SAM/IG/13

INTERNATIONAL CIVIL AVIATION ORGANIZATION
South American Office

Regional Project RLA/06/901

THIRTEENTH WORKSHOP/MEETING OF THE SAM IMPLEMENTATION GROUP

(SAM/IG/13)

FINAL REPORT

Lima, Peru, 21 to 25 April 2014

INDEX

HISTORY OF THE MEETING

ii-1 PLACE AND DURATION OF THE MEETING

The Thirteenth Workshop/Meeting of the SAM Implementation Group (SAM/IG/13) was held at the premises of the ICAO South American Regional Office in Lima, Peru, from 21 to 25 April 2014, under the auspices of Regional Project RLA/06/901.

ii-2 OPENING CEREMONY AND OTHER MATTERS

Mr. Franklin Hoyer, Regional Director of the ICAO South American Office, greeted the participants for the continuous support provided to activities developed at regional scale by the South American Office, as well as the civil aviation authorities and national and private organizations of the ICAO South American Region for the continuous support to the activities of the SAM Implementation Group.

ii-3 SCHEDULE, ORGANIZATION, WORKING METHODS, OFFICERS AND SECRETARIAT

The Meeting agreed to hold its sessions from 09:00 to 15:30 hours, with appropriate breaks. The work was done with the Meeting as a Single Committee, Working Groups and Ad-hoc Groups.

Mr. Luiz Ricardo de Souza Nascimento, delegate from Brazil, was unanimously elected as Chairman of the Meeting. Also, Mr. Paulo Vila Millones, delegate from Peru, was elected as Vice-Chairman.

Mr. Onofrio Smarrelli, RO/CNS SAM Office, Lima, acted as Secretary assisted by Messrs. Julio Pereira, RO/ATM/SAR, Roberto Arca, RO/ATM/SAR/AIM, Marcelo Ureña, RO/FLS and Lia Ricalde, RO/AGA.

In addition, the Secretariat counted with the support of Messrs. Mauricio Corredor, Rapporteur of the ATFM Group; Omar Gouarnalusse, Rapporteur of the CNS Group; and Murilo Albuquerque Loureiro and Alessander de Andrade Santoro, Rapporteurs of the Automation Group.

ii-4 WORKING LANGUAGES

The working language of the Meeting was Spanish with simultaneous interpretation in English, and its relevant documentation was presented in Spanish and English.

ii-5 AGENDA

The following agenda was adopted:

Agenda Item 1: Follow up to conclusions and decisions adopted by SAM/IG meetings, results of the thirty-eighth session of the ICAO Assembly (A38) and thirteenth meeting of Civil Aviation Authorities of the SAM Region (RAAC/13) and progress made in the development of the new electronic Air Navigation Plan (e-ANP)

Agenda Item 2: Implementation of the Air Traffic Flow Management (ATFM) and Collaborative Decision-Making (CDM)

Agenda Item 3: Criteria and procedures for the approval of performance-based navigation operations

Agenda Item 4: Assessment of operational requirements in order to determine the implementation of communications, navigation, and surveillance (CNS) capabilities improvement for en-route and terminal area operations

Agenda Item 5: Operational implementation of new ATM automated systems and integration of the existing systems

Agenda Item 6: Transition from AIS to AIM

Agenda Item 7: Other business

ii-6 **ATTENDANCE**

The Meeting was attended by 81 participants from 12 States of the SAM Region (Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, French Guiana (France), Panamá, Paraguay, Peru and Uruguay), 1 CAR State (United States), 1 International Organization (IATA) and 6 observers (AIRBUS, ARINC, ATECH, BOEING, LH SYSTEMS and NAVCANADA). The list of participants is shown in page iii-1.

ii.7 **LIST OF CONCLUSIONS**

No.	Title	Page
SAM/IG/13-1	Alignment of the national air navigation plans with the ICAO Global Air Navigation Plan (GANP) and SAM Performance-Based Air Navigation Implementation Plan (PBIP)	1-2
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SAM/IG/13-4	Action to support flow management during the FIFA 2014 World Cup in Brazil	2-8
SAM/IG/13-5	Draft proposal on Second Part of ICAO Doc 9971	2-10
SAM/IG/13-6	Review of the advanced RNP (A-RNP) and RNP 0.3 advisory circulars	3-1
SAM/IG/13-7	Implementation of the RAIM availability prediction service in the SAM Region	4-5
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Agenda Item 1: Follow up to conclusions and decisions adopted by SAM/IG meetings, results of the thirty-eighth session of the ICAO Assembly (A38) and thirteenth meeting of Civil Aviation Authorities of the SAM Region (RAAC/13) and progress made in the development of the new electronic Air Navigation Plan (e-ANP)

1.1 Under this Agenda Item, the Meeting reviewed WP/02 - *Review of the status of compliance of Conclusions formulated by SAM/IG meetings and pending activities* (Secretariat), WP/03 - *Results of the 38th Session of the ICAO Assembly (A38)* (Secretariat), WP/04 – *Results of the Thirteenth Meeting of Civil Aviation Authorities of the South American Region (RAAC/13)* (Secretariat) and WP/05 - *Progress made in the development of the new electronic Air Navigation Plan (eANP)* (Secretariat).

Follow up to conclusions and decisions adopted by SAM/IG meetings

1.2 The Meeting examined the valid conclusions and pending activities of the SAM Implementation Group (SAM/IG) workshops/meetings, shown in **Appendix A** to this Agenda Item. The list of conclusions and activities include:

a) tasks to develop and/or the corresponding conclusion in the areas under analysis;
b) specific tasks which will lead to compliance of the main task;
c) expected results in each task;
d) finalization dates;
e) responsible persons for its execution;
f) supporting members for each task; and
g) status of implementation of the same, and when necessary, for a better understanding, an explanatory comment on the status of implementation is included.

1.3 In addition, the Meeting completed the table in **Appendix B** to this Agenda Item showing the tasks in charge of the States, in order to make a follow-up of same.

Results of the thirty-eighth session of the ICAO Assembly (A38)

1.4 Note was taken of the following resolutions adopted at the thirty-eighth session of the ICAO Assembly (A38) in the air navigation field, deemed relevant for air navigation planning and implementation in the SAM Region:

a) A38-2 – ICAO global planning for safety and air navigation;
b) A38-6 – Support of the ICAO policy on radio frequency spectrum matters;
c) A38-8 – Proficiency in the English language used for radiotelephony communications;
d) A38-11 – Formulation and implementation of standards and recommended practices (SARPs) and procedures for air navigation services (PANS) and notification of differences; and
e) A38-12 – Consolidated statement of continuing ICAO policies and associated practices related specifically to air navigation.

A38-2 – ICAO global planning for safety and air navigation

1.5 The Meeting was informed that through Resolution A38-2, the Assembly endorsed the first edition of the Global Aviation Safety Plan (GASP) and the fourth edition of the Global Air Navigation Plan (GANP) to be used as global strategic direction for safety and air navigation, respectively, and resolved that the aforementioned GASP and GANP would provide the framework for the development and implementation of regional, sub-regional and national implementation plans, thus ensuring harmonisation and coordination of efforts aimed at improving civil aviation safety, capacity and efficiency.

1.6 In this regard, the Meeting noted that the *SAM Performance-Based Air Navigation Implementation Plan* (PBIP) (Version 1.4) had been presented and approved at the thirteenth meeting of Civil Aviation Authorities of the SAM Region (RAAC/13), through Conclusion RAAC/13-5. The plan was amended taking into account the ICAO Global Air Navigation Plan (GANP) (Doc. 9750) (fourth edition) and in alignment with the Aviation System Block Upgrades (ASBU) methodology, with a view to achieving a more efficient and interoperable airspace that will meet future capacity demand without compromising safety.

1.7 Finally, the Meeting deemed convenient that the States of the Region should amend their national air navigation plan based on the new GANP and the PBIP. The GANP and the PBIP may be downloaded from: http://www.icao.int/SAM/Pages/eDocumentsDisplay.aspx?area=GEN. In this respect, the following conclusion was formulated:

Conclusion SAM/IG/13-1 Alignment of the national air navigation plans with the ICAO Global Air Navigation Plan (GANP) and SAM Performance-Based Air Navigation Implementation Plan (PBIP)

That SAM States amend their national air navigation plans, with the aim of aligning them with the new ICAO Global Air Navigation Plan (GANP, 4th Edition) and SAM Performance-Based Air Navigation Implementation Plan (PBIP) approved at the thirteenth meeting of Civil Aviation Authorities of the SAM Region (RAAC/13), and present any progress made in October 2014, at SAM/IG/14 meeting.

A38-6 – Support of the ICAO policy on radio frequency spectrum matters

1.8 The Meeting noted that Resolution A38-6 seeks to meet current and future radio frequency spectrum allocation requirements to ensure the operation of communications, navigation, and surveillance systems in support of air navigation. In this regard, the Meeting urged the States, international organisations and other civil aviation stakeholders to support firmly the ICAO frequency spectrum strategy and the ICAO position at the International Telecommunication Union (ITU) World Radiocommunication Conference (WRC) and in other regional and international activities conducted in preparation for the WRC.

1.9 In addition, the Meeting deemed convenient that States work together to deliver efficient aeronautical frequency management and “best practices” to demonstrate the effectiveness and relevance of the aviation industry in spectrum management.

1.10 In this sense, the Meeting took under consideration the importance that States actively participate in the activities required to support the ICAO position at the forthcoming ITU WRC-15, circulated by ICAO through State letter E 3/5.15-13/57 dated 3 July 2013, and copy of which is contained in **Appendix C** to this Agenda Item.

1.11 In this respect and in order to coordinate national activities in support of the ICAO position at ITU WRC-15, the Meeting deemed convenient that States designate their national focal points and notify the Regional Office by the end of May 2014. The ICAO South American Regional Office would submit a letter to all SAM States, requesting the information by the indicated date, and the Meeting formulated the following Conclusion:

Conclusion SAM/IG/13-2 Designation of national focal points to coordinate activities in support of the ICAO position at the ITU WRC-15

That SAM States, if they have not done so yet, designate a national focal point to coordinate, as necessary, between ICAO and the national bodies responsible for managing the radio frequency spectrum, with a view to supporting the ICAO position at the ITU WRC-15 shown in Appendix C to this part of the Report, notifying the Regional Office no later than **31 May 2014**.

A38-8 – Proficiency in the English language used for radiotelephony communications

1.12 The Meeting took note that member States are to use ICAO standardised phraseology in all situations for which it has been specified and the ICAO Aviation English Language Test Service (AELTS) to verify language testing instruments, make use of the ICAO Language Proficiency Requirements – Rated Speech Samples training aid; and to assist each other in their implementation of the language proficiency requirements.

A38-11 – Formulation and implementation of standards and recommended practices (SARPs) and procedures for air navigation services (PANS) and notification of differences

1.13 With regard to this Resolution, the Meeting reminded member States of the requirement under ICAO Annex 15 to publish any significant differences in their aeronautical information publication (AIP) and to use the Electronic Filing of Differences (EFOD) system when notifying their differences to ICAO.

A38-12 – Consolidated statement of continuing ICAO policies and associated practices related specifically to air navigation

1.14 In respect of this Resolution, the Meeting deemed convenient that States take note of the continuing policies of the aforementioned statement and take them into account in the planning, establishment, and provision of air navigation services. Special attention should be paid to policies and practices concerning qualified and competent civil aviation personnel and human performance.

Results of the thirteenth meeting of Civil Aviation Authorities of the SAM Region (RAAC/13)

1.15 The Meeting noted that RAAC/13 meeting was attended by 11 SAM States and 2 NAM/CAR States, as well as by 8 international organisations, totalling 70 participants, and that the main topics addressed by the RAAC/13 meeting were: air navigation and safety implementation priorities for the 2014-2016 period, the SAM performance-based air navigation implementation plan (PBIP) as aligned with the ASBU, the ICAO regional technical cooperation tools for the implementation of air navigation and safety improvements, the regional performance scoreboard, and the Declaration of Bogota.

1.16 The Meeting was informed that RAAC/13 meeting endorsed the priorities, goals, and associated metrics for improving navigation and safety efficiency and capacity, formulating conclusion RAAC/13-8 – *Implementation of air navigation and safety oversight priorities,* urging SAM States to implement air navigation and safety priorities pursuant to the regional goals agreed in the Declaration of Bogota for the 2014-2016 period, and international organisations to support the priorities of the States. **Appendices D and E** to this Agenda Item contain the air navigation priorities and goals and Declaration of Bogota, respectively.

Progress made in the development of the new electronic Air Navigation Plan (e-ANP)

1.17 The Meeting noted that the structure, format and contents of the e-ANP would be composed of three volumes:

a) Volume I should contain stable plan elements whose amendment necessitated approval by the Council and these elements be related to:

- assignment of responsibilities;
- mandatory requirements subject to regional agreement; and/or
- additional requirements specific to the region which are not covered in SARPs.

Note. The following is a non-exhaustive list of such elements:

- Flight Information Regions (FIR) boundaries (table and charts);
- Search and Rescue Regions (SRR) boundaries (table and charts);
- Volcanic Ash Advisory Centres (VAAC);
- Tropical Cyclone Advisory Centres (TCAC);
- Volcano Observatories (VO).

b) Volume II should contain dynamic plan elements whose amendment did not necessitate approval by the Council and these elements be related to:

- assignment of responsibilities;
- mandatory requirements subject to regional agreement; and/or
- additional requirements specific to the region which are not covered in SARPs.

Note.- The following is a non-exhaustive list of such elements:

- Major traffic flows;
- ATS route network;
- Meteorological Watch Offices (MWO);
- Secondary Surveillance Radar (SSR) codes;
- Five-letter name-codes;
- VOLMET broadcasts.

c) Volume III should contain dynamic/flexible plan elements whose amendment would not be subject to a formal application of the procedure for amendment of the ANP. These elements are related to the implementation of certain air navigation systems, based mainly on the ASBU modules endorsed at regional or sub-regional level.

1.18 The Meeting took note of the development of the eANP on a web based platform. The public would be given read-only access to the e-ANPs of all Regions and focal points designated by States and International Organizations would be given access to develop and submit proposals for amendments to the relevant e-ANP of the Regions concerned.

1.19 The Meeting deemed convenient that States designate a focal point to coordinate with the ICAO SAM Regional Office the provision of the data required for the drafting of the new e-ANP. In this respect, the Regional Office will send a State letter requesting the nomination of a focal point, and the submission of the corresponding information for the end of June 2014, at the latest. In this regard, the following conclusion was formulated:

Conclusion SAM/IG/13-3 Designation of a national focal point for the drafting of the new regional e-ANP

That, with the aim that SAM States can coordinate with the ICAO SAM Regional Office the provision of the data necessary for the drafting of the new regional electronic air navigation plan (e-ANP):

a) The ICAO SAM Regional Office will send a State letter in early June 2014, requesting the nomination of a national focal point; and

b) SAM States will officially inform by 1 August 2014 the name of the designated focal point, and provide a brief resumé, telephone number and electronic mail of the incumbent.

APPENDIX A

STATUS OF APPLICATION OF CONCLUSIONS AND/OR TASKS ORIGINATED IN SAM/IG MEETINGS

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
1. ATS Routes Implementation							
2. Optimisation of ATS routes in the SAM Region							
2-4	Handling of air transport environmental problems	Obtaining of objective data over benefits that will be reached in terms of reduction of harmful gas emissions into the atmosphere.	• Known data. • Availability of information required for monitoring of environmental protection.	Permanent	States	N/A	**VALID** Check fuel savings estimate chart. Permanent task.
2-5	Prepare a measurable plan of performance, including gas emissions safety, efficiency, etc.	• Check available tools to carry out this task. • Prepare a measurable plan.	A measurable plan will be available which will permit a clear vision of the current and future status of performance regarding gas emissions, safety and efficiency.	SAM/IG/9	RLA/06/901	RO/ATM	**VALID** This task was included in the review of the action plan for the optimization of the SAM airspace, developed at SAM/IG/11 meeting.

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
2-19	**Conclusion SAM/IG/7-1 - ATS routes network optimisation programme of the South American Region, Phase 3, Version 02** That ICAO SAM States take pertinent actions to follow the guidelines and comply with established deadlines to continue with Phase 3, Version 02 of the ATS routes network optimisation programme of the South American Region, shown in Appendix A to this part of the report.	See ATS routes network optimisation programme, Version 02 (SAM/IG/7) action plan.	Version 02 ATS routes network optimisation.	As per action plan	States RLA/06/901 IATA Regional Office	RO/ATM RO/AIM	**VALID** The task regarding the review of the action plan for the optimization of the SAM Airspace, developed at SAM/IG/11 meeting, has been included. Phase 3, Version 02 has been divided into stages. Implementation date for first stage is 12 December 2013. Second stage is foreseen for November 2014.
2-20	**Conclusion SAM/IG/10-1 - Safety Plan for the implementation of routes Phase 3, Version 02** That SAM Region States determine the viability of the SAM ATS Route Network optimization (ATSRO) Programme, Phase 3, Version 02, based on a risk assessment, in order to ensure safety within their FIRs.	Determine viability of ATSRO Programme.	Result of risk assessment within considered FIR	ATSRO/5	SAM States		**VALID** States approved implementation by stages in ATSRO/5 Meeting.

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
2-22	**Conclusion SAM/IG/11-2 - Implementation of the concept on the flexible use of the airspace in the ICAO SAM Region** That States of the SAM Region use the Guidance Manual for the implementation of the concept on the flexible use of the airspace in the SAM Region for the design and management of the Flight Information Regions airspaces under their jurisdiction, appearing under SAM/IG/10 report, Agenda Item 2, Appendix E	Operational improvements related with airspace optimization	National plan for the optimization of the airspace with the use of FUA	SAM/IG/14	SAM States		**VALID** The task of developing all the required guide material, as well as the Action Plan Model and other documentation, has been fulfilled in the Region. This task was included in the Action Plan for the Optimization of airspace in the SAM Region. As no PBN issues will be discussed during SAM/IG/13 meeting, this task passes to SAM/IG/14 meeting.
3. Implementation of Performance Based Navigation (PBN) in the SAM Region							
3-17	**Conclusion SAM/IG/5-4 Implementation of Continuous Descent Operations** That, recognizing the efficiency and environmental benefits of Continuous Descent operations, and the need to harmonize these operations in the interest of safety, States are encouraged to include the implementation of Continuous Descent operations (CDO) as part of their PBN implementation plans and to implement CDO in accordance with the ICAO CDO Manual.	States should include in their PBN programmes the CDO concept.	CDO implemented as per national requirements.	SAM/IG/14	States	RO/ATM	**VALID** Some States introduced CDO in their national plans, but these not appear as such in the publications. After the Second Workshop on PBN use in the design of airspaces in terminal areas, States may present their preliminary works indicating the entry and exit points of the designed TMAs.

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
3-18	**Conclusion SAM/IG/11-1 – Support to the SAM States in the redesign of their TMAs** That, Project RLA/06/901 consider the viability of: Replicate the Course/ Workshop on Airspace Design at the Lima Regional Office for one week, with an intensive schedule, with experts of the Region, Project and IATA instructors, that have already offered their support to this initiative; and Create a support team to assist a group of States that are aligned in their traffic flows, in the development of a basic design aimed at main international airports.	Conduct courses on PBN design in terminal areas for the SAM Region, in the Lima Regional Office.	Base design of selected terminal areas, in order to allow States to deepen and implement new TMAs based on PBN design.	December 2014	RLA/06/901 Project	ATM/ROs and Miami Course instructors	**VALID** The First Workshop on design of airspace using PBN will be conducted in Bogota, Colombia from 12 to 23 May 2014 and the Second Workshop for the presentation of State's preliminary designs will be held in Lima, Peru, from 8 to 12 September 2014.

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
3-19	**Conclusion SAM/IG/11-2 – Implementation of the concept of the Flexible Use of the Airspace in the SAM Region** That, the States of the SAM Region use the Guidance for the implementation of the Concept of the Flexible Use of the Airspace in the SAM Region, shown in Appendix E to the item 2 of the SAM/IG/10 Meeting, for the design and management of the airspace of the Flight Information Regions under its jurisdiction.	Implement Coordination and Civil-Military Cooperation Committees. Coordinate flexible use of prohibited, restricted and dangerous areas affecting the airspace optimization.	Optimized prohibited, restricted and dangerous areas.	2014	States	RO/ATM	**VALID**
3-23	**Conclusion SAM/IG/6-3 – Forms CMA F5 and CMA F6** That SAM States take pertinent action in order to apply forms CMA F5 and CMA F6, attached as Appendices A and B to this part of the report, and send them to CARSAMMA as soon as the PBN approval of aircraft and operators is established.	• Use Forms CMA F5 and CMA F6. • Taking into consideration that some listings contain all data foreseen in such form, and in such cases, the meeting concluded that the submission of the corresponding F5 forms is not necessary. In cases in which the lists do not contain information foreseen in Form F5, States should send them to CARSAMMA.	Safe RNAV5 implementation.	First Phase October 2011 SAM/IG/14	States	RO/ATM	**VALID** States should implement procedures to keep data base updated. Present information sent to CARSAMMA at SAM/IG/14 meeting.

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
3-25	**Conclusion SAM/IG/6-5 - Lateral navigation deviation reporting form** That SAM States take the corresponding action in order to use the monitoring programme and particularly lateral navigation deviation reporting form attached as Appendix F to this part of the report, and send it to CARSAMMA on the tenth day of each month.	Collect information of lateral deviations and send it to CARSAMMA	Safe RNAV5 implementation.	SAM/IG/14	States	RO/ATM	**VALID** The Secretariat will coordinate on the validity of this Conclusion with CARSAMMA.

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
3-26	**Conclusion SAM/IG/12-2 – PBN approach instrument procedures** That SAM States: a) publish the navigation specification corresponding to such SIDs and STARs RNAV not having such indication at present;				States	RO/ATM	**VALID**
	b) complete the implementation of APV procedures for all instrument flight runway ends, whether as primary approach or as support to precision approach, with a view to completing 70% of PBN approaches by 2014 and 100% by 2016; and	Implement APV procedures for all instrument flight runway ends.	70% of APV approaches 100% of APV approaches	2014 2016			
	c) advise the Regional office of any changes in the status of implementation of instrument approach procedures, whether conventional or PBN, in each SAM/IG meeting, in order to update regional efficiency indicators.		Information papers in SAM/IG meetings	2016			

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
4. Standards and procedures for performance based navigation operations approval							
4-11	**Para 4.9 SAM/IG/6 report-** Establish standard criteria for the Regional System on ground and flight Validation of flight procedures through satellite-based PBN instruments.	Prepare standardised criteria.	Uniform application of Validation criteria on ground and flight procedures through satellite-based PBN instruments.	SAM/IG/9	RLA/99/901	RO/FLS	**VALID** The draft CA 91-012 – Flight validation (FV) of satellite-supported instrument flight procedures (IFP) of performance based navigation (PBN) was presented during the SAM/IG/6. To this respect, the Meeting requested the Secretariat to send a survey of flight inspection experts for comments and further approval. The Secretariat will consult with SAM RO/FLS on the status of this Conclusion.

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
5- ATFM implementation							
5-11	**Conclusion SAMIG/5-7 ATFM Teleconferences in the SAM Region** That SAM States continue to hold weekly ATFM teleconferences between flow management units or flow management positions (FMU / FMP) to improve the exchange of information among participating States.	Implement ATFM teleconferences	Coordination between FMU/FMP carried out.	Permanent	States	RO/ATM	**VALID** States maintain web conferences due to communication problems in TELCONs held. The use of SKYPE and go-to-meeting is planned. REDDIG II includes a speech communications sub-network to support this application. Weekly teleconferences are not being held, but various States transmit the teleconference format by e-mail.
5-16	**Conclusion SAM/IG/6-8 ATFM AIP SUPP/AIC Model** That the States of the ICAO South American Region, when preparing their national AIC, use as a reference the ATFM AIP SUPP/AIC model shown in Appendix E to this part of the report.	Prepare AIC	Harmonised publications in the SAM Region	October 2016	States	RO/ATM	**VALID**

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
5-18	Message exchange in the ATFM manual be prepared as a MOU among States to be included in the ATFM Manual.	Preparation of MOU for ATFM messages exchange among States.	MOU prepared and approved.	SAM/IG/14	States Regional Project RLA/06/901	RO/ATM RO/CNS	**COMPLETED** A model of ATFM Letter of Operational Agreement was prepared for the coordination and exchange of ATFM information, included in Appendix D to the Report on Agenda Item 4 of the SAM/IG/12 meeting.
5-19	Preliminary exercise on runway capacity and ATC sectors. The remaining States are encouraged to present their studies for SAM/IG/8.	Carry out a preliminary study on runway capacity and ATC sectors.	Present studies on exercises carried out	SAM/IG/12	States	RO/ATM	**VALID** 71% of SAM Region States have performed runway capacity calculations in their main airports. Guyana, Panama, Suriname and Uruguay have not presented the runway capacity calculations.

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
6. Assessment of operational requirements in order to determine the implementation of communications and surveillance (CNS) capabilities improvement for en-route and terminal area operations							
6-7	**Conclusion SAM/IG/6-9 - Actions required for AMHS interconnection** That SAM States, in view of the delays in the interconnection of the AMHS, proceed with the following actions: a) Require from their AMHS providers the necessary support to successfully end the necessary interconnections; b) Make necessary arrangements to train personnel in the interconnection tasks, with the aim of minimizing the dependency with their providers; c) Maximize pertinent coordination; and d) States that have not yet done so, complete the drafting and signature of the MoU.	Interconnection of CNS systems	Interconnection of AMHS	End of 2013	SAM States	SAM States AMHS providers RO/CNS	**COMPLETED** a) Completed. Coordination has been carried out with providers to complete the interconnection. b) Completed. In July 2012 an AMHS course was carried out by EUROCONTROL's INSTILUX center; from 24 to 28 July 2013 a second course was carried out by the same Institute. c) Completed. Coordination has been increased. d) Even though AMHS interconnection MoUs are pending, States involved have approved goals to complete AMHS interconnection, indicated inSAM/IG/13, Agenda Item 4, Appendix C.

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
6-12	SAM/IG/10 Report paragraph 5.1, to complete safety guidelines for the implementation of IP networks and IP router policy.	Complete safety guidelines for the implementation of IP networks and IP router policy.	Safety guidelines of IP networks document. IP router policy document.	SAM/IG/11	Project D1	RO/CNS	**COMPLETED** SAM/IG/11 meeting examined same, and were later submitted to States for their review. Comments were only received from Bolivia, which were incorporated into the guides. Therefore, same have been approved.
6-13	**Conclusion SAM/IG/11-4 - International AMHS interconnection** That, with regard to international operational AMHS interconnections, if bilateral arrangements conducted by States do not permit another solution, same should make adjustments in their systems in order that they are compatible with mode TP0 as a whole and in accordance with Regulation RFC 1006.	Compatibility with mode TP0 at AMHS installed	AMHS compatible with mode TP0	2016	States	RO/CNS	**SUPERSEDED** By Conclusion SAM/IG/12-4

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
6-14	**Conclusion SAM/IG/11-5 - Use of the radio frequency spectrum** That, the States of the SAM Region: a) Ensure the VSAT networks operating in the band between 3.4 to 4.2 Ghz with regard to the IMT services, informing of any interference to both the pertinent national entity and the ICAO SAM Regional Office; b) Examine lists COM 1 to 3 and confirm the use of the frequencies assigned, notifying of any changes therein; and c) Count with a mechanism agreed upon with the national authority enabling detection and solving the use of unauthorized transmissions causing inconveniences to the aeronautical services.	a) Inform on the interference in 3.4 to 4.2 Ghz band b) Examine lists COM 1, 2 and 3 c) Mechanism to enable detection and solution to interferences presented	a) 3.4 to 4.2 Ghz band interference free b) Lists COM 1, 2 and 3 updated c) Establishment of mechanisms to detect and solve interference problems	Continuous activity	States	RO/CNS	**COMPLETED** As it is a continuous activity, the Secretariat will make follow-up, inviting States to keep the ICAO SAM RO informed on the topics taken under consideration in parts a) b) and c) of this Conclusion

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
6-15	**Conclusion SAM/IG/12-3 – International AMHS interconnection** That, with regard to international operational AMHS interconnections and with the aim of solving apparent incompatibility problems between the systems installed in Argentina, Brazil and Venezuela with the AMHS in Peru, these States carry out corresponding efforts so: a) their providers determine and inform the precise causes preventing the interconnections, and appropriately indicate the procedures to solve them; and b) they inform the results of the evaluation at SAM/IG/13 meeting.	a) Determine the precise causes preventing the AMHS interconnection between Argentina, Brazil and Venezuela with Peru. b) Present the results to SAM/IG/13.	Procedures to complete the AMHS interconnection between Argentina, Brazil and Venezuela with Peru.	April 2014	Argentina, Brazil, Peru and Venezuela	RO/CNS	**VALID** April 2014 Trials have been made between Brazil and Peru. More information is presented . Under SAM/IG/13, Agenda Item 4. The successful implementation of this trial will enable successfully completing AMHS interconnection between Argentina-Peru and Venezuela-Peru.

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
6-16	**Conclusion SAM/IG/12-4 – Approval of Web RAIM availability prediction service bidding process** That, the Meeting, as result of the technical and commercial evaluations made to the proposals presented at the RAIM availability prediction service bidding process, proceeded to analyse same and endorse the results obtained.	Approval of the results of the evaluation to the proposals presented at the Web RAIM availability prediction service bidding process.	Web RAIM availability prediction service approved.	October 2013	Project RLA/06/901 member States	RO/CNS RO/ATM	**COMPLETED** SAM/IG/12 Meeting analyzed and approved the evaluation to the proposals presented at the Web RAIM availability prediction service bidding process. ICAO has assigned a contract number for the implementation of this service (22501411). To date, contract between ICAO and the winning company has not yet been signed. It is expected that the contract is signed by the end of May 2014.
7. Operational implementation of new ATM automated systems and integration of the existing systems							
7-1	**SAM/IG/3-8 - Preparation of specific implementation plans for the interconnection of automated systems** That States of the SAM Region start the development of specific plans for the implementation of automated systems interconnection, considering the implementation dates indicated in Regional Interconnection Plan for Automated Systems in adjacent ACCs, specified in Appendix B of this part of the Report, and information	Operational implementation of ATM automated systems and interconnection of automated systems installed between adjacent ACCs.	Memorandum of Understanding (MoU) between SAM pairs of States for the interconnection of automated systems.	2012	SAM States	RO/CNS RLA/06/901 Project automation experts	**COMPLETED** Most States of the Region with automated systems installed at their ACCs have issued plans taking into account the guide material prepared by SAM/IG with the support of RLA/06/901 Project. States pending implementation of their plans, have taken note of the guideline material drafted by SAM/IG.

No.	Task to be developed	Specific tasks	Deliverables	Finalization date	Responsible	Supporting members to the task	Status of implementation
	contained in the following documentation: a) Memorandum of Understanding for the implementation of automated systems interconnection between two States having adjacent ACCs, Interface Control Document (ICD) for data communication between ATS dependencies in Caribbean and South American Regions (CAR/SAM ICD); b) Interface control document (ICD) for data communications between ATS units in the Caribbean and South American Regions (CAR/SAM ICD); c) System Interface Control Document (SICD); and d) Regional interconnection initial plan for ACC automated systems. e) Preliminary reference system/ subsystem specification for the air traffic control automation system (SSS).						

APPENDIX B

FOLLOW-UP OF CONCLUSIONS AND PENDING TASKS OF THE SAM/IG MEETING

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
1-1 **SAM/IG/1-1** **CAR/SAM PBN Roadmap** That ICAO SAM States, in implementing RNAV/RNP, take the pertinent actions to follow guidelines contained in the CAR/SAM PBN Roadmap as shown in Appendix C to this part of the report.	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**--**	**YES**	**O/G**	**YES**	**YES**	**YES**	**YES**	**YES**	**PER:** Dec 2009
1-1 That States examine: a) Impact of RNAV routes implementation in the airspace Aircraft fleet, Air traffic services, and b) Establish pertinent coordination so as to enable integrated, harmonious and timely implementation of more direct RNAV routes.	**O/G**	**O/G**	**YES**	**YES**	**YES**	**O/G**	**--**	**O/G**	**O/G**	**O/G**	**YES**	**O/G**	**YES**	**YES**	**COL:** June **ECU**: Local coordination with corresponding area. **PAR:** SAM/IG/ 5 **PER**: SAM/IG/5 **VEN:** Mar 2010
2-1 Implementation of RNAV routes	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**--**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	
2-3 **Conclusion** **SAM/IG/2-1** **PBN implementation Programme for en-route operations** That the ICAO SAM States take appropriate actions to follow the guidelines and comply with the targets established in the PBN implementation for en-route operations, which is shown in Appendix B to this part of the Report.	**YES**	**YES**	**YES**	**YES**	**YES**	**--**	**--**	**YES**	**YES**	**YES**	**OG**	**YES**	**YES**	**YES**	**PER**: Nov 2010

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
2-10 **Conclusion SAM/IG/2-2** **Initial AIC** That States of ICAO SAM Region using as model the AIC presented in Appendix C to this part of the Report: a) publish in the AIRAC date of 9 April 2009 an Aeronautical Information Circular (AIC) informing the aeronautical community on their intention to implement RNAV 5 on 18 November 2010; b) reflect in this AIC the specific YEStuations within the airspace under their jurisdiction.	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**--**	**YES**	**YES**	**YES**	**YES**	**O/G**	**YES**	**YES**	**GUY:** Nov. 2009 **SUR:** Will inform 15 Nov. 2009
2-12 **Conclusion SAM/IG/2-3** **Survey on the Fleet Navigation Capacity** That States conduct a survey on the fleet navigation capacity, using, to that end, the form contained in Appendix D to this part of the Report, and send the information collected to the ICAO South American Regional Office, on the following dates: a) Aircraft operating commercial flights, which have more than 5 700 kg. of MTOW – 15 February 2009; b) Aircraft operating commercial flights, which have less than 5 700 kg. of MTOW – 15 May 2009; c) Other aircraft registered in the Region–15 Aug 2009.	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**--**	**YES**	**O/G**	**YES**	**YES**	**O/G**	**YES**	**YES**	**COL:** Initially had same problem as Venezuela but after holding PBN seminars we have started the approval process. **PAR**: completed a) pending b) and c). **VEN**: fruitless surveys have been carried out in view of the little knowledge that operators and aircraft owners have on PBN concept. A dissemination campaign is being carried to, to enable the improvement of data provided by the same.
2-13 **1.2** 1.2 Collect air traffic data to understand air traffic flows in a specific airspace.	**YES**	**NO**	**YES**	**YES**	**YES**	**YES**	**--**	**YES**	**O/G**	**YES**	**YES**	**YES**	**YES**	**YES**	**PER**: carried out Jul 2009. Delivered to SAM Office. Only ARG, BOL, CHI, COL, PAR and URU have submitted corresponding data collection as of Dec 2013.

Conclusión/Tarea **Conclusion/Task**	**ARG**	**BOL**	**BRA**	**CHI**	**COL**	**ECU**	**FGY**	**GUY**	**PAN**	**PAR**	**PER**	**SUR**	**URU**	**VEN**	**OBSERVACIONES** **REMARKS**
2-14 **Conclusion SAM/IG/2-4** **PBN Implementation Model for TMA and Approach** That States/Territories and International Organizations use the PBN Implementation Model for TMA and Approach in the preparation of their PBN implementation programmes for TMA and Approach, shown in Appendix E, item 2 SAM/IG/2 Report.	**YES**	**O/G**	**YES**	**YES**	**YES**	**O/G**	**--**	**YES**	**O/G**	**YES**	**YES**	**O/G**	**YES**	**YES**	**ECU**: Submitted**.** **PER:** Dec 2009, this model is being used. **SUR**: 15 Nov 2009. **VEN**: 18 Nov 2010.
3-1 **Conclusion SAM/IG/2-5** **Advisory Circular CA 91-002 and Job Aid for Aircraft and operators RNAV 5 operational approval** That States of ICAO South American Region: a) Use as an acceptable compliance source in aircraft and operators RNAV 5 operational approval Advisory Circular CA 91-002 and Job Aid for Aircraft and operators RNAV 5 operational approval, presented in Appendices A and B, respectively, to this part of the Report. b) Publish respective national regulations up to April 2009.	**YES**	**YES**	**YES**	**YES**	**YES**	**O/G**	**--**	**O/G**	**O/G**	**YES**	**YES**	**--**	**YES**	**YES**	COL: Information circular was published and may be seen at the hyperlink:CI 5102-082-002 **ECU**: Coord. with OPS **PER**: Dec 2009 **BRA** and **PAN:** publication is being harmonized with CA LAR. **PAR:** signature pending Oct. 2010.
3.5 **Conclusion SAM/IG/3-3** **PBN Implementation National Plans** That States of ICAO South American Region, present their PBN Implementation National Plans to SAM/IG/4 Meeting, using PBN Implementation Plan Model, shown in Appendix B of this part of the Report, as well as using the action plan models and information contained PBN Implementation Project TMA Operations and Short Term Approximations of SAM Region, approved by SAM/IG/2 Meeting.	**YES**	**YES**	**YES**	**YES**	**YES**					**YES**	**YES**		**YES**	**YES**	**BOL:** delivered Dec. 2009. **ECU**: Submitted (electronic version pending). **VEN:** finalised and delivered.

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
4-5 **Initial ATFM AIC Model**	**YES**	**YES**	**N/A**	**NO**	**YES**	**YES**	**--**	**YES**	**O/G**	**YES**	**YES**	**O/G**	**YES**	**YES**	**BRA:** information published in the AIP. **GUY**: 22 Oct 2009.
Conclusion SAM/IG/3-1 **ATS Route Network Optimising in the South American Region** That the ICAO SAM States take relevant action to follow the guidelines and meet the target dates established in the ATS Route Network Optimising Programme in the South American Region that appears in Appendix B to this part of the report.	**YES**	**YES**	**YES**	**YES**	**O/G**	**--**	**--**	**--**	**--**	**YES**	**YES**	**--**	**YES**	**YES**	**VEN:** pertinent actions taken.
Conclusion SAM/IG/3-4 **Advisory Circulars CA 91-008, CA 91-009 and CA 91-010** That States of the SAM Region: a) use as acceptable means of compliance in aircraft approval and exploiters for RNP APCH, RNP AR APCH and APV/Baro-VNAV operations, Advisory Circulars CA 91-008, CA 91-009 and CA 91-010, shown in Appendices B, C and D, respectively to this part of the report; and b) publish the corresponding national regulations until 5 October 2009.	**O/G**	**YES**	**SI**	**YES**	**YES**	**O/G**	**O/G**	**O/G**	**O/G**	**YES**	**YES**	**O/G**	**YES**	**YES**	**BOL**: published in RAB91 **COL:** published the following information circular: CI-5102-082-008 CI-5102-082-009 CI-5102-082-010 **PAR:** in final process of publication. **VEN:** published in September 2010 CA RNAV5, RNP-1, RNP AR APCH and APV-BARO/VNAV.

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
3-5 **Conclusion SAM/IG/3-5** **Runway capacity of an international airport and ATC associated sector** SAM States are encouraged to carry out at least an exercise to determine the runway capacity of an international airport and ATC sector, associated or another one selected for each State, to present the results to the SAM/IG/4 Meeting, providing the following information: a) Amount of personnel trained for the exercise b) Methodology applied c) Result of the exercise, providing the declared capacity for each runway and ATC selected sector. d) Identification of problems found in the methodology applied.	**O/G**	**YES**	**YES**	**YES**	**YES**	**YES**	**--**	**--**	**--**	**YES**	**YES**	**--**	**NO**	**YES**	**ECU:** has trained personnel and calculation Quito and Guayaquil airports **PAR**: has trained personnel and Airport calculation in Asunción airport. **VEN:** exercise requested was made, personnel from Venezuela has participated in ATFM training workshops**.** **BOL:** training was provided to personnel in Viru Viru. **URU**: Continues with personnel problems. Support will be requested to the Regional Office to carry out activities.
Conclusion SAM/IG/4-1 **SAM routes network point of contact** That SAM States designate a point of contact to support the development of task 2.2.5 of the Action Plan for optimisation of the SAM Routes Network, and send the corresponding data (email and telephone) until 31 January 2010.	**YES**	**YES**	**YES**	**YES**	**YES**	**--**	**--**	**--**	**--**	**YES**	**YES**	**--**	**YES**	**YES**	**BOL:** César Varela **URU:** Gustavo Turcatti Tel.5982 604 0408 Int 5111 blantur@gmail.com **VEN:** Carlos Gonzalez and Pablo Rattia

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
Conclusion SAM/IG/4-2 **Advisory Circulars for Aircraft approval and operators for RNP 10 operations, RNAV 5, RNAV 1 and 2, Basic RNP 1, RNP APCH, RNP AR APCH and APV/baro-VNAV** That States of ICAO South American Region, according to the PBN implementation plans: a) use the Advisory Circulars (AC), in developing their acceptable means of compliance of approval of aircraft and operators for RNP 10 operations, RNAV 5, RNAV 1 and 2, Basic RNP 1, RNP APCH, RNP AR APCH and APV/baro-VNAV, that are shown in Appendices A1, A2, B1, B2, C1, C2, D1, D2, E1, E2, F1, F2, G1 and G2 of this part of the report; and	**O/G**	**YES**	**O/G**	**YES**	**YES**	**O/G**	**O/G**	**O/G**	**O/G**	**YES**	**YES**	**O/G**	**YES**	**YES**	**BOL**: published in RAB 91. **COL**: Following information circulars: CI-5102-082-001 CI-5102-082-002 CI-5102-082-003 CI-5102-082-008 CI-5102-082-009 CI-5102-082-010 **PAR**: in final process of publication. **VEN**: RNP10, RNAV2, RNP APP AR pending.
b) that job aids of aforesaid circulars be incorporated into Inspector's manuals of Operations and airworthiness.	--	--	--	**YES**	**YES**	--	--	--	--	--	--	--	--	--	**COL**: Airworthiness inspector guide can be consulted at hyperlink: Guía inspector Aeronavegabilidad
Conclusion SAM/IG/4-3 **Continued data collection about PBN Fleet Capacity in the South American Region** The Meeting considered that: a) efforts should be continued in order that each State, through its PBN Focal Points, conduct such actions to send, as soon as possible, information, about its PBN fleet capacity to ICAO Regional Office. The information collected by States should, as far as possible, be sent to the Regional Office in a file with Excel format. b) each State is responsible for providing data and, as time passes, updates or further details on the submitted data should be made;	**O/G**	**O/G**	**O/G**	**YES**	**YES**	**O/G**	**O/G**	**O/G**	**O/G**	**O/G**	**NO**	**O/G**	**YES**	**YES**	**COL:** Had the same difficulties as Venezuela, and finally the information was collected. However, we believe this item should be considered as completed since it was pre-assessment and we are now in the implementation process. **VEN:** fruitless surveys have been carried out in view of the poor knowledge that operators and aircraft owners have. A dissemination campaign is being carried out to enable improvement of data provided by the same.
c) to facilitate the updating of data, the file of the survey of each state be posted on the website of the															

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
SAM Office, in order that each State, through a code, can have access to information on its fleet , and thus can perform the update of the data entered , and send it, via e-mail, to the Regional Office.															
Conclusion SAM/IG/5-1 **Training programme and documentation for air traffic controllers and AIS operators** That SAM States use the material shown in Appendix A to this part of the report as guidance material for air traffic controllers and AIS operators.	**O/G**	**YES**	**YES**	**YES**	**YES**	**--**	**--**	**O/G**	**--**	**YES**	**NO**	**--**	**YES**	**YES**	**BOL:** PBN and ATC recurrent seminars were held. **COL**: Training for controllers and flight plan personnel has already started. There will be a transition period, since this amendment is effective as of April 2012. **URU**: PBN training was initiated. **VEN:** final training phase at the IUAC.
Conclusion SAMIG/5-2 **PBN/RNAV5 seminars for operators** That SAM States, in view of the few operators that have requested the approval, and the need to encourage them to start this process, conduct PBN seminars in which operators are informed about the corresponding approval procedures.	**OG**	**YES**	**YES**	**YES**	**YES**	**OG**	**OG**	**OG**	**OG**	**YES**	**YES**	**OG**	**YES**	**YES**	**BOL**: PBN seminars were carried out at all levels. **COL**: Several seminars were conducted for operators and several commercial operators have already started the process. It is suggested that the restrictions to be applied to uncertified operators as of 22 Sep 2011, be published. **VEN**: continuously.

Conclusión/Tarea **Conclusion/Task**	**ARG**	**BOL**	**BRA**	**CHI**	**COL**	**ECU**	**FGY**	**GUY**	**PAN**	**PAR**	**PER**	**SUR**	**URU**	**VEN**	**OBSERVACIONES** **REMARKS**
Conclusion SAMIG/5-3 **Data Collection** That: a) SAM States collect data on flights conducted on domestic and international routes in the upper airspace (FL 245 or above) of the SAM Region during the period 1 to 15 July 2010, and send them to the SAM Regional Office before 13 August 2010; and b) That the sample be consistent with the form and the guidelines for completing the form described in Appendix B to this part of the Report, using the Excel format.	**YES**	**YES**	**YES**	**YES**	**NO**	**--**	**--**	**O/G**	**--**	**YES**	**YES**	**--**	**YES**	**YES**	**VEN**: sent to the regional office and delivered during SAM/IG/6 Meeting.
Conclusion SAM/IG/5-4 **Implementation of Continuous Descent Operations** That, recognizing the efficiency and environmental benefits of Continuous Descent operations, and the need to harmonize these operations in the interest of safety, States are encouraged to include the implementation of Continuous Descent operations (CDO) as part of their PBN implementation plans and to implement CDO in accordance with the ICAO CDO Manual.	**O/G**	**O/G**	**O/G**	**YES**	**O/G**	**--**	**--**	**O/G**	**--**	**YES**	**NO**	**--**	**NO**	**NO**	**URU:** will request support of Regional Office to restructure airspace and procedures construction.
Conclusion SAMIG/5-7 **ATFM Teleconferences in the SAM Region** That SAM States continue to hold weekly ATFM teleconferences between flow management units or flow management positions (FMU / FMP) to improve the exchange of information among participating States.	**YES**	**YES**	**YES**	**YES**	**YES**	**NO**	**NO**	**NO**	**YES**	**YES**	**YES**	**NO**	**NO**	**YES**	Web REDDIG II includes a speech communications sub-network to meet initial ATFM requirements.

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
Conclusion SAM/IG/6-1 **Application of further actions to reduce the risk and risk rate resulting from the SAM ATS routes network optimisation safety plan** That States, ATS providers and aircraft **operators**, take the necessary measures to apply recommendations and further actions in order to reduce the risk and resulting risk rate as shown in Appendix 1 to Chapter 4 of the Safety Plan for the SAM Region ATS routes network, as shown in Appendix A to this part of the report.	**NO**	**O/G**	**YES**	**O/G**	**O/G**	**--**	**--**	**--**	**--**	**O/G**	**NO**	**--**	**YES**	**YES**	
Conclusion SAM/IG/6-2 **Application of subsequent actions to reduce the RNAV5 safety plan risk and the resulting risk rate** That States, ATS providers and aircraft users take the necessary measures to apply further action to reduce the RNAV5 safety plan risk and the resulting risk rate, as shown in Appendix 1 to Chapter 4 of the safety plan for RNAV5 implementation in the SAM Region, shown in Appendix I to this part of the report.	**NO**	**O/G**	**YES**	**O/G**	**O/G**	**--**	**--**	**--**	**--**	**O/G**	**NO**	**--**	**YES**	**YES**	
Conclusion SAM/IG/6-3 **Forms CMA F5 and CMS F6** That SAM States take pertinent action in order to apply forms CMA F5 and CMA F6, attached as Appendices A and B to this part of the report, and send them to CARSAMMA as soon as the PBN approval of aircraft and operators is established.	**YES**	**O/G**	**YES**	**YES**	**YES**	**--**	**--**	**--**	**--**	**O/G**	**NO**	**--**	**YES**	**YES**	**BOL:** Approvals completed
Conclusion SAM/IG/6-4 **ENR 3.3 – Table model of the AIPs** That SAM States, in publishing in their AIPs RNAV routes, use the ENR table model shown in Appendix D to this part of the report.	**YES**	**YES**	**YES**	**YES**	**YES**	**--**	**--**	**--**	**--**	**YES**	**YES**	**--**	**YES**	**YES**	**CHI:** As defined in SAM/IG/7

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
Conclusion SAM/IG/6-5 **Lateral navigation deviation reporting form** That SAM States take the corresponding action in order to use the monitoring programme and particularly lateral navigation deviation reporting form attached as Appendix F to this part of the report, and send it to CARSAMMA on the tenth day of each month.	**NO**	**--**	**YES**	**YES**	**YES**	**--**	**--**	**--**	**--**	**YES**	**YES**	**--**	**YES**	**YES**	
Conclusion SAM/IG/6-9- **Actions required for AMHS interconnection** That SAM States, in view of the delays in the interconnection of the AMHS, proceed with the following actions:	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	Actions corresponding to parts a), b) and c) of this Conclusion have been completed, pending only part d). French Guiana (France) has no AMHS. Uruguay installed its AMHS in March 2014.
a) Require from their AMHS providers the necessary support to successfully end the necessary interconnections;	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**N/A**	**YES**	**NO**	**YES**	**YES**	**YES**	**O/G**	**YES**	
b) Make necessary arrangements to train personnel in the interconnection tasks, with the aim of minimizing the dependency with their providers;	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**N/A**	**YES**	**NO**	**YES**	**YES**	**YES**	**O/G**	**YES**	
c) Maximize pertinent coordination; and	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**N/A**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	
d) States that have not yet done so, complete the drafting and signature of the MoU.	**O/G**	**N/A**	**O/G**	**O/G**	**O/G**	**O/G**	**N/A**	**O/G**	**O/G**	**YES**	**O/G**	**O/G**	**O/G**	**O/G**	

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
Conclusion SAM/IG/7-1 **ATS routes network optimisation programme of the South American Region, Phase 3, Version 02** That ICAO SAM States take pertinent actions to follow the guidelines and comply with established deadlines to continue with Phase 3, Version 02 of the ATS routes network optimisation programme of the South American Region, shown in Appendix A to this part of the report.	--	YES	--	YES	O/G	--	--	--	--	O/G	--	--	NO	--	
Conclusion SAM/IG/7-2 **Implementation of RNAV-5** That SAM States implement RNAV-5 in continental airspace routes, on 20 October 2011, at 09:01 UTC.	YES	YES	--	YES	YES	--	--	--	--	YES	--	--	YES	YES	
Conclusion SAM/IG/7-3 **Documentation to be published for the implementation of RNAV-5** That SAM States publish the following documentation no later than 22 September 2011, effective on 20 October 2011: a) Amendment to the AIP or AIP Supplement containing the applicable standards and procedures, including the corresponding in-flight contingencies, the model of which appears in Appendix C to this part of the report; and b) The ENR 3.3 Tables that correspond to RNAV routes, using the model shown in Appendix D to this part of the report. Note: Appendix E contains 4 examples that may be used as a reference by the States.	YES	YES	--	YES	YES	--	--	--	--	YES	--	--	YES	--	
Conclusion SAM/IG/7-4 **Publication of the trigger NOTAM** That SAM States publish the trigger NOTAM no later than 13 October 2011, using the following model: In keeping with AIC xx and AIP Supplement xx, RNAV-5 will start to be applied on RNAV routes of the continental airspace in the xx FIR at 09:01 UTC of 20 October 2011.	YES	YES	YES	YES	YES	--	--	--	--	YES	YES	NOV 2012	YES	YES	

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
Conclusion SAM/IG/8-3 - Implementation of a RAIM/FDE prediction system in the SAM Region That, in order for the FDE SAM Region to have a common service for predicting RAIM and FDE availability to support PBN operation for en-route, non-precision approach, vertical guide approach (APV) and terminal area: a) the Fifth Meeting of the Coordination Committee of Regional Project RLA/06/901 consider the purchase of the RAIM prediction service selected between the proposals presented by DWI and Colombia; and b) ICAO analyse the most convenient way for States that are not members of Regional Project RLA/06/901 to pay the corresponding fee for the RAIM prediction service.	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**O/G**		**YES**	**YES**	**YES**	**O/G**	**YES**	**YES**	COMPLETED ICAO HQ TCB Section drafted Contract 22501411 between ICAO, on behalf of RLA/06/901 member States, and DWI for the provision of the web RAIM availability prediction service. It is expected that the Contract is signed by mid-May 2014.
Conclusion SAM/IG/10-1 **Safety Plan for the implementation of routes Phase 3, Version 02** That SAM Region States determine the viability of the SAM ATS Route Network Optimization (ATSRO) Programme based on a risk assessment, in order to ensure safety within their FIRs.															
Conclusion SAM/IG/10-2 **Implementation of the new concept of flexible use of the airspace in the ICAO South American Region** That States in the SAM Region, if deemed appropriate, recommend the definitive approval of the Guidelines for the Implementation of the Flexible Use of Airspace Concept in the ICAO South American Region for the design and airspace management of the flight information region under their jurisdiction.															

Conclusión/Tarea Conclusion/Task	ARG	BOL	BRA	CHI	COL	ECU	FGY	GUY	PAN	PAR	PER	SUR	URU	VEN	OBSERVACIONES REMARKS
Conclusion SAM/IG/11-4 - International AMHS interconnection That, with regard to international operational AMHS interconnections, if bilateral arrangements conducted by States do not permit another solution, same should make adjustments in their systems in order that they are compatible with mode TP0 as a whole and in accordance with Regulation RFC 1006.	NO	YES	NO	YES	YES	YES	N/A	YES	YES	NO	YES	YES	N/A	NO	**SUPERSEDED** By Conclusion SAM/IG/12-3
Conclusion SAM/IG/11-5 - Use of the radio frequency spectrum **That, the States of the SAM Region:**															
a) Ensure the VSAT networks operating in the band between 3.4 to 4.2 Ghz with regard to the IMT services, informing of any interference to both the pertinent national entity and the ICAO SAM Regional Office;	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	
b) Examine lists COM 1 to 3 and confirm the use of the frequencies assigned, notifying of any changes therein; and	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	
c) Count with a mechanism agreed upon with the national authority enabling detection and solving the use of unauthorized transmissions causing inconveniences to the aeronautical services.	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	
Conclusion SAM/IG/12-2 - PBN instrument approach procedures That SAM States: a) publish the navigation specification corresponding to such SIDs and STARs RNAV not having such indication at present; b) complete the implementation of APV procedures for all instrument flight runway ends, whether as primary approach or as support to precision approach, with a view to completing 70% of PBN approaches by 2014 and 100% by 2016; and															

Conclusión/Tarea Conclusion/Task	**ARG**	**BOL**	**BRA**	**CHI**	**COL**	**ECU**	**FGY**	**GUY**	**PAN**	**PAR**	**PER**	**SUR**	**URU**	**VEN**	**OBSERVACIONES REMARKS**
c) advise the Regional Office of any changes in the status of implementation of instrument approach procedures, whether conventional or PBN, annually, in order to update regional efficiency indicators.															
Conclusion SAM/IG/12-3 - International AMHS interconnection That, with regard to international operational AMHS interconnections and with the aim of solving apparent incompatibility problems between the systems installed in Argentina, Brazil and Venezuela with the AMHS in Peru, these States carry out corresponding efforts so: a) Their providers determine and inform the precise causes preventing the interconnections, and appropriately indicate the procedures to solve them; and b) They inform the results of the evaluation at SAM/IG/13 meeting.	O/G		O/G								O/G			O/G	
Conclusion SAM/IG/12-4 - Approval of Web RAIM availability prediction service bidding process That, the Meeting, as result of the technical and commercial evaluations made to the proposals presented at the RAIM availability prediction service bidding process, proceeded to analyse same and endorse the results obtained.	YES	YES	YES	YES	YES	YES			YES	YES	YES		YES	YES	The web RAIM availability prediction service was approved.

International
Civil Aviation
Organization

Organisation
de l'aviation civile
internationale

Organización
de Aviación Civil
Internacional

Международная
организация
гражданской
авиации

منظمة الطيران
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航空组织

Tel.: +1 514-954-8219 ext. 6712

Ref.: E 3/5.15-13/57 2 July 2013

Subject: ICAO Position for the ITU WRC-15

Action required: To consider the ICAO Position when developing your State's position for WRC-15 and to support the ICAO Position during WRC-15

Sir/Madam,

1. I have the honour to inform you that the Council, at the fourth meeting of its 199th Session, held on 27 May 2013, approved the ICAO Position on issues of critical concern to aviation which are on the agenda of the International Telecommunication Union (ITU) World Radiocommunication Conference (2015) (WRC-15) as contained in Attachment B to this letter.

2. The ICAO Position will be submitted to the ITU WRC-15. In addition, ICAO will undertake, within the budget limits of the Organization, to present the ICAO Position at the WRC-15 preparatory activities within ITU and Regional Telecommunications Organizations. However, I wish to emphasize that active support from States is **the only way** to ensure that the results of WRC-15 reflect civil aviation's continued need for spectrum. In this regard, I invite your attention to Assembly Resolution A36-25 (*Support of the ICAO Policy on radio frequency spectrum matters*) and Recommendation 1/12 (*Development of the aeronautical frequency spectrum resource*) of the Twelfth Air Navigation Conference. Kindly ensure that your administration is involved, to the fullest extent possible, in your national preparations and regional negotiations for WRC-15, and that representatives from your civil aviation administration are included in your delegation to the conference.

3. May I request that the enclosed information (Attachment B) be considered for incorporation into your State's position for WRC-15 and that your delegation to the conference be prepared to support the ICAO Position on issues of concern to international civil aviation.

Accept, Sir/Madam, the assurances of my highest consideration.

for

Raymond Benjamin
Secretary General

Enclosures:
A — Summary of the main points addressed by the ICAO Position for ITU WRC-15
B — ICAO Position for the ITU WRC-15

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Summary of the main points addressed by the ICAO Position for the International Telecommunication Union (ITU) World Radiocommunication Conference 2015 (WRC-15)

Radio frequency spectrum is a scarce natural resource with finite capacity for which demand is constantly increasing. The requirements of civil aviation as well as other spectrum users continue to grow at a fast pace, thus creating an ever-increasing pressure to an already stretched resource. International competition between radio services obliges all spectrum users, aeronautical and non-aeronautical alike, to continually defend and justify retention of existing or addition of new frequency bands. The ICAO Position aims at protecting aeronautical frequency spectrum for all radiocommunication and radionavigation systems used for ground facilities and on board aircraft.

The ICAO Position addresses all radioregulatory aspects on aeronautical matters on the agenda for the WRC-15. The items of main concern to aviation include the following:

- identification of additional frequency bands for the International Mobile Telecommunications (IMT). Under this agenda item, the telecommunications industry is seeking up to 1200 MHz of additional spectrum in the 300 MHz to 6 GHz range for mobile and broadband applications. It is expected that a number of aeronautical frequency bands will come under pressure for potential repurposing, especially some of the Primary Surveillance Radar (PSR) bands. Existing frequency allocations which are vital for the operation of aeronautical very small aperture terminal (VSAT) ground-ground communication networks, especially in tropical regions, are also expected to come under pressure. Due to decisions made by a previous WRC, this has already become a problematic issue in Africa. WRC-15 agenda items 1.1 and 9.1.5 refer.

- potential radioregulatory means to facilitate the use of non-safety satellite service frequency bands for a very safety-critical application, the command and control link for remotely piloted aircraft systems (RPAS) in non-segregated airspace. The fixed satellite service bands in question are being used today to support RPAS in segregated airspace, however these frequency bands do not enjoy the freedom of interference typical of aeronautical safety allocations and there are no special measures in the Radio Regulations applicable to the protection of these frequency bands. WRC-15 agenda item 1.5 refers.

- review the continued use of the band 5 091 – 5 150 MHz by the fixed satellite service. A potential solution to this item may improve spectrum access for safety-critical aeronautical radionavigation and radiocommunication systems in this frequency band. WRC-15 agenda item 1.7 refers.

- possible aeronautical allocations to support wireless avionics intra-communications (WAIC). WAIC systems have been identified by the aerospace industry as a means to increase cost-efficiency and environmental friendliness, while maintaining required levels of safety, through the use of wireless technology, potentially making more efficient airframe designs possible. WRC-15 agenda item 1.17 refers.

In addition to WRC-15 agenda item 1.1, potential solutions to a number of other agenda items to be addressed during WRC-15 may negatively impact aeronautical spectrum. These include new allocations to the fixed and mobile satellite services (items 1.6 and 1.10), extended allocation to the earth exploration satellite service (items 1.11 and 1.12), a potential new allocation to the amateur service in the 5 MHz band (item 1.4), regulatory provisions and spectrum allocations to enable possible new maritime Automatic Identification System (AIS) technology applications (item 1.16).

Major threats to aviation include the possibility of harmful interference to essential aeronautical radionavigation and radiocommunication systems. This could have a direct and severe impact on the safety as well as the efficiency of flight operations.

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ICAO POSITION FOR THE INTERNATIONAL TELECOMMUNICATION UNION (ITU) WORLD RADIOCOMMUNICATION CONFERENCE 2015 (WRC-15)

SUMMARY

This paper reviews the agenda for the ITU WRC-15, discusses points of aeronautical interest and provides the ICAO Position for these agenda items.

The ICAO Position aims at protecting aeronautical spectrum for radiocommunication and radionavigation systems required for current and future safety-of-flight applications. In particular, it stresses that safety considerations dictate that exclusive frequency bands must be allocated to safety critical aeronautical systems and that adequate protection against harmful interference must be ensured. It also includes proposals for new aeronautical allocations to support new aeronautical applications.

Support of the ICAO Position by Contracting States is required to ensure that the position is supported at the WRC-15 and that aviation requirements are met.

CONTENTS

Attachment

Agenda for ITU WRC-15

1. INTRODUCTION

1.1 The ICAO Position on issues of interest to international civil aviation to be decided at the 2015 ITU World Radiocommunication Conference (WRC-15) is presented below. The agenda of this Conference is contained in the attachment. The ICAO Position is to be considered in conjunction with sections 7-II and 8 of the *Handbook on Radio Frequency Spectrum Requirements for Civil Aviation, Volume I* (Doc 9718, Vol.1, 6th Edition - 2013) which incorporates the ICAO Spectrum Strategy and Policies and related information. Doc 9718 is available on http://legacy.icao.int/anb/panels/acp (see webpage: Repository). Also available at the above-mentioned website are the WRC-15 relevant ITU Resolutions referenced in the ICAO Position.

1.2 ICAO supports the working principle which was utilized in studies for WRC-07 and WRC-12. This working principle recognizes that the compatibility of ICAO standard systems with existing or planned aeronautical systems operating in accordance with international aeronautical standards will be ensured by ICAO. Compatibility of ICAO standard systems with non-ICAO standard aeronautical systems (or non-aeronautical systems) will be addressed in ITU.

2. ICAO AND THE INTERNATIONAL REGULATORY FRAMEWORK

2.1 ICAO is the specialized agency of the United Nations providing for the International regulatory framework for Civil Aviation. The Convention on International Civil Aviation is an international treaty providing required provisions for the safety of flights over the territories of the 191 ICAO Member States and over the high seas. It includes measures to facilitate air navigation, including international Standards and Recommended Practices, commonly referred to as SARPs.

2.2 The ICAO standards constitute rule of law through the ICAO Convention and form a regulatory framework for aviation, covering personnel licensing, technical requirements for aircraft operations, airworthiness requirements, aerodromes and systems used for the provision of communications, navigation and surveillance, as well as other technical and operational requirements.

3. SPECTRUM REQUIREMENTS FOR INTERNATIONAL CIVIL AVIATION

3.1 Air transport plays a major role in driving sustainable economic and social development in hundreds of nations. Since the mid-1970s, air traffic growth has consistently defied economic recessionary cycles, expanding two-fold once every 15 years. In 2012, air transport directly and indirectly supported the employment of 56.6 million people, contributing over $2 trillion to global Gross Domestic Product (GDP), and carried over 2.5 billion passengers and $5.3 trillion worth of cargo.

3.2 The safety of air operation is dependent on the availability of reliable communication and navigation services. Current and future communication, navigation and surveillance/air traffic management (CNS/ATM) provisions are highly dependent upon sufficient availability of radio frequency spectrum that can support the high integrity and availability requirements associated with aeronautical safety systems, and demand special conditions to avoid harmful interference to these systems. Spectrum requirements for current and future aeronautical CNS systems are specified in the ICAO Spectrum Strategy[1], as addressed by the Twelfth Air Navigation Conference, and as approved by the ICAO Council.

3.3 In support to the safety aspects related to the use of radio frequency spectrum by aviation, **Article 4.10** of the Radio Regulations states that "*ITU Member States recognize that the*

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[1] The ICAO spectrum strategy is incorporated in the ICAO *Handbook on Radio Frequency Spectrum Requirements for Civil Aviation*, Volume 1 (Doc. 9718 – 6th Edition, to be published in 2013).

safety aspects of radionavigation and other safety services require special measures to ensure their freedom from harmful interference; it is necessary therefore to take this factor into account in the assignment and use of frequencies". In particular, compatibility of aeronautical safety services with co-band or adjacent band aeronautical non-safety services or non-aeronautical services must be considered with extreme care in order to preserve the integrity of the aeronautical safety services.

3.4 The continuous increase in air traffic movements as well as the additional requirement for accommodating new and emerging applications such as Unmanned Aircraft Systems (UAS[2]) is placing increased demand on both the aviation regulatory and air traffic management mechanisms. As a result the airspace is becoming more complex and the demand for frequency assignments (and consequential spectrum allocations) is increasing. While some of this demand can be met through improved spectral efficiency of existing radio systems in frequency bands currently allocated to aeronautical services, it is inevitable that these frequency bands may need to be increased or additional aviation spectrum allocations may need to be agreed to meet this demand.

3.5 The ICAO Position for the ITU WRC-15 was developed in 2012 and 2013 with the assistance of the Aeronautical Communications Panel (ACP) Working Group F (frequency) and was reviewed by the Air Navigation Commission (ANC) at the seventh meeting of its 191st session on 30 October 2012. Following the review by the ANC, it was submitted to ICAO Contracting States and relevant international organizations for comment. After final review of the ICAO Position and the comments by the ANC on 30 April 2013, the ICAO position was reviewed and approved by the ICAO Council on 27 May 2013. When the ICAO Position was established, studies on a number of agenda items for WRC-15 were still on-going in the ICAO Navigation Systems Panel (NSP), the ICAO Aeronautical Communications Panel (ACP), in the ITU and in regional telecommunication organizations. These studies are to be completed prior to the WRC-15 and, if/as necessary, the ICAO position will be refined or updated taking into account the results of this on-going work.

3.6 States and international organizations are requested to make use of the ICAO Position, to the maximum extent possible, in their preparatory activities for the WRC-15 at national level, in the activities of the regional telecommunication organizations[3] and in the relevant meetings of the ITU.

4. AERONAUTICAL ASPECTS ON THE AGENDA FOR WRC-15

Note 1.— The statement of the ICAO Position on an agenda item is given in a text box at the end of the section addressing the agenda item, after the introductory background material.

*Note 2.— No impact on aeronautical services has been identified from WRC-15 Agenda Items **1.2**, **1.3**, **1.8**, **1.9**, **1.13**, **1.14**, **1.15**, **1.18**, **3**, **5**, **6**, **7**, **9.2**, **9.3** and **10** which are therefore not addressed in this position.*

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[2] UAS is referred to in ICAO as Remotely Piloted Aircraft Systems (RPAS)

[3] African Telecommunication Union (ATU), Asia-Pacific Telecommunity (APT), European Conference of Postal and Telecommunications Administrations (CEPT), Inter-American Telecommunication Commission (CITEL), Arab Spectrum Management Group (ASMG) and the Regional Commonwealth in the Field of Communications (RCC).

WRC-15 Agenda Item 1.1

Agenda Item Title:
To consider additional spectrum allocations to the mobile service on a primary basis and identification of additional frequency bands for International Mobile Telecommunications (IMT) and related regulatory provisions, to facilitate the development of terrestrial mobile broadband applications, in accordance with Resolution 233 (WRC-12);

Discussion:

This agenda item seeks to identify additional spectrum for use by terrestrial mobile communication systems to facilitate the development of terrestrial broadband applications. While the agenda item is not specific about the required RF spectrum bandwidth or the frequency bands targeted, the United States and Europe have both declared that they are intending to make at least 500 MHz of additional spectrum available for international mobile telecommunications (IMT), ideally below 6 GHz. Resolution **233** (WRC-12) identifies, in the *considering*, a number of frequency bands below 6 GHz where studies have previously been undertaken in ITU-R. Two of these frequency bands (2 700 – 2 900 MHz and 3 400 – 3 700 MHz) are of concern to aviation. It has been assumed that frequency bands below 100 MHz (and probably below 400 MHz) will not be of interest due to the cost of implementation, variability in propagation and throughput capacity.

A number of aviation systems used for the assurance of safety of flight are operating below 6 000 MHz and it is therefore essential to ensure that any new allocation to the mobile service does not adversely impact the operation of these systems. Based on recent experience with the introduction of mobile systems in the frequency band below 2 690 MHz and the remediation that was required to avoid interference to primary surveillance radar systems in the adjacent frequency band (2 700 – 2 900 MHz), care needs to be taken not only with any proposal for co-frequency band sharing of aeronautical services with non-aeronautical services but also with proposals for the introduction of new allocations in adjacent frequency bands.

The following aeronautical systems operate in the frequency range 400 – 6 000 MHz:

406 – 406.1 MHz

Emergency Locator Transmitter: Emergency locator transmitters, referred to as emergency position-indicating radio beacons (EPIRB) in the ITU, when activated transmit a distress signal which can be received by the COSPAS/SARSAT satellites and suitably equipped aircraft and vessels to facilitate search and rescue operations. Whilst there have been no recent compatibility studies, Resolution **205** was updated at WRC-12 to call for regulatory, technical and operational studies with a view to identify any required regulatory action that can be identified in the Director's report to WRC-15.

960 – 1 215 MHz

Distance measuring equipment (DME): DME is the ICAO standard system for the determination of the position of an aircraft based on the distance between that aircraft and ~~a~~ ground-based DME beacons within radio line of sight. Studies in Europe with respect compatibility with adjacent frequency band (below 960 MHz) IMT systems, and within ICAO with regard to co-frequency band sharing of the aeronautical mobile (R) service (AM(R)S) within the frequency band 960 – 1 164 MHz, show that any co-frequency band sharing with IMT systems would be difficult.

1 030 & 1 090 MHz

Secondary surveillance radar (SSR): SSR is the ICAO standard system that operates on two frequencies (1 030 and 1 090 MHz), used to identify the position of an aircraft based on an aircrafts' response to an interrogation by the ground based element of the SSR system.

1 090 Extended Squitter (1 090ES): 1090 ES is an ICAO standard system to support automatic dependent surveillance-broadcast (ADS-B); automatically broadcasting the position and other parameters of the aircraft in order to allow other aircraft and ground facilities to track that aircraft.

Multilateration (MLAT): MLAT is the ICAO standard system used to identify the position of an aircraft based on an aircraft's transmission of a squitter or as response to an interrogation by a ground based SSR or by active MLAT.

Airborne collision avoidance system (ACAS): ACAS is the ICAO standard system operating on the same frequencies as SSR, used for the detection and avoidance of airborne conflict situations.

These systems provide for essential surveillance functions on a global basis. Although detailed studies would be required to fully assess any sharing proposals, the fact that two frequencies are used to support all of these safety-of-life systems would indicate that any sharing is unlikely to be acceptable to ICAO on safety grounds.

Universal access transceiver (UAT): UAT is an ICAO standardized system operating on 978 MHz intended to support automatic dependant surveillance-broadcast as well as ground uplink services to aircraft such as situational awareness and flight information services.

Global navigation satellite systems: The global allocation to the radionavigation satellite service in the frequency band~~s~~ 1 164 – 1 215 MHz is intended to provide civil precision navigational services for various users, including aviation. Compatibility of the radionavigation satellite service and the aeronautical radionavigation service in the frequency range 960 – 1 215 MHz has been established through footnote **5.328A** and Resolutions **609** and **610**.

Aeronautical Communications Future Communication System: The frequency band 960 – 1 164 MHz was allocated to the AM(R)S for the development by ICAO of a significant component of the aeronautical future communication system. Report ITU-R **M.2235** presents compatibility studies of AM(R)S systems operating in the band 960 – 1 164 MHz with systems operating in the same frequency band, and in the adjacent frequency bands, both on-board the aircraft and on the ground.

1 215 – 1 350 MHz

Primary radar: This band, especially frequencies above 1 260 MHz, is extensively used for long-range primary surveillance radar to support air traffic control in the en-route and terminal environments. No recent studies have been undertaken with respect to compatibility with terrestrial mobile systems. Given the similarity between these radars and those operating in the frequency band 2 700 – 2 900 MHz, the results of studies in that frequency band should be applicable.

1 559 – 1 610 MHz

Global navigation satellite systems: These systems are used by the ICAO standardised satellite navigation systems for navigation in the en-route, terminal and airport environments. A number of recent studies have been undertaken within United States with respect to the compatibility between terrestrial mobile systems operating in an adjacent frequency band and satellite navigation systems. Those studies indicated that sharing was not possible.

1.5 / 1.6 GHz

Aeronautical mobile satellite communication systems: The frequency bands 1 545 – 1 555 and 1 646.5 – 1 656.5 MHz as well as the frequency band 1 610 – 1 626.5 MHz are used for the provision of ICAO standardised satellite communication services. A number of recent studies have been undertaken within Europe and United States with respect to the compatibility between terrestrial mobile systems and satellite systems in a frequency range that covers these assignments. Those studies indicated that sharing was not possible.

2 700 – 3 100 MHz

Approach primary radar: This band is extensively used to support air traffic control services at airports especially approach services. There have been a number of studies undertaken within the ITU, Europe and the United States on sharing with respect to compatibility with terrestrial mobile systems. The more recent studies are related to the introduction of mobile systems below 2 690 MHz and compatibility with radars operating above 2 700 MHz. These studies have shown significant compatibility issues which would suggest that co-frequency band sharing would be impractical. Additionally, previous technical studies in the ITU, in particular on co-channel compatibility between primary radars operating in the frequency range 2 700 – 3 100 MHz and mobile service showed that co-frequency compatibility between the terrestrial mobile service and radar systems was not feasible.

3 400 – 4 200 MHz and 4 500 – 4 800 MHz

Fixed Satellite Service (FSS) systems used for aeronautical purposes: FSS systems are used in the frequency range 3 400 – 4 200 MHz and the frequency band 4 500 – 4 800 MHz as part of the ground infrastructure for transmission of critical aeronautical and meteorological information (see Resolution **154** (WRC-12) and agenda item 9.1.5). FSS systems in the 3.4 – 4.2 GHz frequency range are also used for feeder links to support AMS(R)S systems. ITU-R Report **M.2109** contains sharing studies between IMT and FSS in the frequency range 3 400 – 4 200 MHz and frequency band 4 500 – 4 800 MHz and ITU-R Report **S.2199** contains studies on compatibility of broadband wireless access systems and FSS networks in the frequency range 3 400 – 4 200 MHz. Both studies show a potential for interference from IMT and broadband wireless access stations into FSS Earth stations at distances of up to several hundred km. Such large separation distances would impose substantial constraints on both mobile and satellite deployments. The studies also show that interference can occur when IMT systems are operated in the adjacent frequency band.

4 200 – 4 400 MHz

Radio altimeters: This frequency band is used by radio altimeters. Radio altimeters provide an essential safety-of-life function during all phases of flight, including the final stages of landing where the aircraft has to be maneuvered into the final landing position or attitude.

5 000 – 5 250 MHz

Microwave Landing System (MLS): The frequency band 5 030 – 5 091 MHz is to be used for the Microwave Landing System. MLS provides for precision approach and landing of aircraft. Future implementation of MLS is expected to be limited, mainly due to the prospect of GNSS (GBAS) offering equivalent capabilities, but where deployed, the MLS needs to be protected from harmful interference.

UAS Terrestrial and UAS Satellite communications: At WRC-12, an allocation~~s~~ to the AM(R)S was introduced and a footnoted aeronautical mobile satellite (R) service allocation was brought into the table of allocations in the frequency range 5 000-5 150 MHz with the view to provide spectrum for command and non-payload communications with unmanned aircraft systems. The development and implementation of these systems, taking into account the need to protect other uses in the frequency range 5 000 – 5 150 MHz is currently being considered in ICAO.

AeroMACS: Provisions for introducing systems for communications with aircraft on the surface of an airport (AeroMACS) were introduced in the Radio Regulations in 2007 in the frequency band 5 091 – 5 150 MHz. Currently ICAO is developing SARPs for implementing AeroMACS.

Aeronautical Telemetry: Provisions for introducing systems for Aeronautical telemetry were introduced in the Radio Regulations in 2007 in the frequency range 5 091 – 5 250 MHz. Aeronautical telemetry systems are currently being implemented.

5 350 – 5 470 MHz

Airborne Weather Radar: The frequency range 5 350 – 5 470 MHz is globally used for airborne weather radar. The airborne weather radar is a safety critical instrument assisting pilots in deviating from potential hazardous weather conditions and detecting wind shear and microbursts. This use is expected to continue for the long term.

5 850 – 6 425 MHz

Fixed Satellite Service (FSS) systems used for aeronautical purposes: The frequency range 5 850 – 6 425 MHz is used by aeronautical VSAT networks for transmission (E-s) of critical aeronautical and meteorological information.

As this agenda item could impact a variety of frequency bands used by aeronautical safety services below 6 GHz it will be important to ensure that agreed studies validate compatibility prior to considering additional allocations.

ICAO Position:

To oppose any new allocation to the mobile service in or adjacent to:

- frequency bands allocated to aeronautical safety services (ARNS, AM(R)S, AMS(R)S); or

- frequency bands used by fixed satellite service (FSS) systems for aeronautical purposes as part of the ground infrastructure for transmission of aeronautical and meteorological information or for AMS(R)S feeder links,

unless it has been demonstrated through agreed studies that there will be no impact on aeronautical services.

WRC-15 Agenda Item 1.4

Agenda Item Title:
To consider possible new allocation to the amateur service on a secondary basis within the band 5 250-5 450 kHz in accordance with Resolution 649 (WRC-12);

Discussion:

The frequency band 5 450 – 5 480 kHz is allocated on a primary basis to the aeronautical mobile (R) service (AM(R)S) in Region 2. The use of this band for long distance communications (HF) by aviation is subject to the provisions of Appendix **27**. Any allocation made to the amateur service in the frequency band 5 250 – 5 450 kHz under this agenda item must ensure the protection of aeronautical systems operating in the adjacent frequency band 5 450 – 5 480 kHz from harmful interference.

ICAO Position:

To ensure that any allocation made to the amateur service shall not cause harmful interference to aeronautical systems operating under the allocation to the aeronautical mobile (R) service in the adjacent frequency band 5 450 – 5 480 kHz in Region 2.

WRC-15 Agenda Item 1.5

Agenda Item Title:
To consider the use of frequency bands allocated to the fixed-satellite service not subject to Appendices 30, 30A and 30B for the control and non-payload communications of unmanned aircraft systems (UAS) in non-segregated airspaces, in accordance with Resolution 153 (WRC-12);

Discussion:

ICAO Standard systems to support safe and efficient aircraft operations on a global basis are developed in accordance with the provisions of the ITU Radio Regulations. Of significant importance to aviation is that the frequency bands that support radio communication and navigation for aircraft are allocated to recognized safety services (such as the AM(R)S, the AMS(R)S or the ARNS).

This agenda item calls for studies to determine whether a system operating under an allocation to the Fixed Satellite Service (FSS), which is regarded as a non-safety service, can be used to support unmanned aircraft system (UAS[4]) control and non-payload communications (CNPC[5]) which has been determined to be a safety application. If such use is found feasible, then any resultant technical and regulatory actions should be limited to the case of UAS using satellites, as studied, and not set a precedent that puts other aeronautical safety services at risk.

The Twelfth Air Navigation Conference (AN-Conf/12) was held in November 2012, and the main theme was to redraft the global Air Navigation Plan based on the concept of Aviation System Block Upgrades (ASBU). Worldwide ICAO Air Navigation Conferences are held approximately every 10 years, and their primary goal is to establish and promote a common vision or path to ensure a safe, coherent and harmonized modernization of the Air Transport System. There was substantive discussion on spectrum, resulting in two AN-Conf/12 Recommendations (1/12 and 1/13) relevant to this WRC-15 agenda item.

At WRC-12 no new satellite allocations were made to support beyond-line-of-sight (BLOS) UAS CNPC. However the aeronautical mobile satellite (R) service (AMS(R)S) in the frequency range 5 000 – 5 150 MHz, previously allocated through footnote **5.367**, is now a table allocation and the co-ordination requirements in the frequency band 5 030 – 5 091 MHz were changed from **9.21** to **9.11A**.

The requirement for BLOS (satellite) communications (54 MHz) cannot be fulfilled in the limited spectrum available in the frequency bands 1.5/1.6 GHz, and no AMS(R)S satellite system currently operates in the frequency range 5 000 – 5 150 MHz to support current/near-term UAS CNPC.

Existing systems operating in the FSS in the unplanned frequency bands 4/6 GHz, 12/14 GHz and 20/30 GHz have spectrum capacity available that can meet the requirements for BLOS communications and could be used for UAS CNPC provided that the principles detailed below are fulfilled. However the FSS is not recognised in the ITU as a safety service. Some of these systems have been notified for registration under article **11.41**.

Standards and Recommended Practices (SARPs) for CNPC are developed in ICAO. CNPC links must meet specific Required Communications Performance (RCP) to satisfy the aviation safety requirements as identified during this development. UAS CNPC links operated on frequencies in FSS allocations would have to be validated to meet those SARPs. Command and Control communication (C2) requirements should be differentiated from ATC communications requirements since technical

[4] UAS is referred to in ICAO as Remotely Piloted Aircraft Systems (RPAS)

[5] CNPC is referred to in ICAO as Command and Control (C2) or Command, Control and ATC Communications (C3).

and operational constraints, as well as technological solutions, may differ. Actual UAS operations with satellite-based CNPC systems using FSS allocations are performed to date in segregated airspace. This gives some indication that FSS satellite systems operating in the frequency bands 4/6 GHz, 12/14 GHz and 20/30 GHz may have the capability of supporting UAS CNPC in non-segregated airspace as well. However regulatory measures will be required to address the conditions for UA CNPC links. In addition regulatory measures will be required to address some of the safety related conditions as detailed below.

AMS(R)S is the appropriate type of service allocation to support the satellite component for UAS command and control and ATC relay in non-segregated airspace. However, WRC-15 AI 1.5 asks for studies for the use of FSS allocations for UAS applications.

Article 15 of the Radio Regulations states that special consideration shall be given to avoiding interference on distress and safety frequencies.

In order to satisfy the requirements for BLOS communications for UAS, the use of satellite CNPC links will have to comply with the following conditions:

1. That the technical and regulatory actions should be limited to the case of UAS using satellites, as studied, and not set a precedent that puts other aeronautical safety services at risk.

2. That all frequency bands which carry aeronautical safety communications need to be clearly identified in the Radio Regulations.

3. That the assignments and use of the relevant frequency bands have to be consistent with article **4.10** of the Radio Regulations which recognizes that safety services require special measures to ensure their freedom from harmful interference.

4. Knowledge that any assignment operating in those frequency bands:

   - is in conformity with technical criteria of the Radio Regulations,
   - has been successfully co-ordinated, including cases where co-ordination was not completed but the ITU examination of probability of harmful interference resulted in favourable finding, or any caveats placed on that assignment have been addressed and resolved such that the assignment is able to satisfy the requirements to provide BLOS communications for UAS; and
   - has been recorded in the International Master Frequency Register.

5. That interference to systems is reported in a transparent manner and addressed in the appropriate timescale.

6. That realistic worst case conditions, including an appropriate safety margin, can be applied during compatibility studies.

7. That any operational considerations for UAS will be handled in ICAO and not in the ITU.

ICAO Position:

Unmanned aircraft systems (UAS) have great potential for innovative civil applications, provided that their operation does not introduce risks to the safety of life.

Taking into account Recommendations 1/12 and 1/13 of the Twelfth Air Navigation Conference (November 2012) "*That ICAO … develop and implement a comprehensive aviation frequency spectrum strategy … which includes the following objectives: … clearly state in the strategy the need for aeronautical systems to operate in spectrum allocated to an appropriate aeronautical safety service*"; and "*That ICAO support studies in the International Telecommunication Union Radio Communication Sector (ITU-R) to determine what ITU regulatory actions are required to enable use of frequency bands allocated to the fixed satellite service for remotely piloted aircraft system command and control (C2) links to ensure consistency with ICAO technical and regulatory requirements for a safety service.*", in order to support the use of FSS systems for UAS CNPC links in non-segregated airspace, the technical and regulatory actions identified by studies under **Resolution 153** (WRC-12) must be consistent with the above Recommendations, and satisfy the following conditions:

1. That the technical and regulatory actions should be limited to the case of UAS using satellites, as studied, and not set a precedent that puts other aeronautical safety services at risk.

2. That all frequency bands which carry aeronautical safety communications need to be clearly identified in the Radio Regulations.

3. That the assignments and use of the relevant frequency bands have to be consistent with article **4.10** of the Radio Regulations which recognizes that safety services require special measures to ensure their freedom from harmful interference.

4. Knowledge that any assignment operating in those frequency bands:

- is in conformity with technical criteria of the Radio Regulations,
- has been successfully co-ordinated, including cases where co-ordination was not completed but the ITU examination of probability of harmful interference resulted in a favourable finding, or any caveats placed on that assignment have been addressed and resolved such that the assignment is able to satisfy the requirements to provide BLOS communications for UAS; and
- has been recorded in the International Master Frequency Register.

5. That interference to systems is reported in a transparent manner and addressed in the appropriate timescale.

6. That realistic worst case conditions, including an appropriate safety margin, can be applied during compatibility studies.

7. That any operational considerations for UAS will be handled in ICAO and not in the ITU.

WRC-15 Agenda Item 1.6

Agenda Item Title:
To consider possible additional primary allocations:

- **to the fixed-satellite service (Earth-to-space and space-to-Earth) of 250 MHz in the range between 10 GHz and 17 GHz in Region 1;**
- **to the fixed-satellite service (Earth-to-space) of 250 MHz in Region 2 and 300 MHz in Region 3 within the range 13 – 17 GHz;**

and review the regulatory provisions on the current allocations to the fixed-satellite service within each range, taking into account the results of ITU-R studies, in accordance with Resolutions 151 (WRC-12) and 152 (WRC-12), respectively;

Discussion:

This agenda item seeks to address the spectrum needs of the fixed satellite service to support projected future needs. Whilst the scope of this agenda item is limited in terms of frequency bands within which studies can take place there are a number of aeronautical systems such as Doppler navigation aids (13.25 – 13.4 GHz) and airport surface detection equipment/airborne weather radar (15.4 – 15.7 GHz) which need to be appropriately protected. Any allocation to the fixed satellite service should not adversely impact on the operation of aeronautical services in this frequency range.

ICAO Position:

To oppose any new fixed satellite service allocation unless it has been demonstrated through agreed studies that there will be no impact on aviation use of the relevant frequency band.

WRC-15 Agenda Item 1.7

Agenda Item Title:

To review the use of the band 5 091 – 5 150 MHz by the fixed-satellite service (Earth-to-space) (limited to feeder links of the non-geostationary mobile-satellite systems in the mobile-satellite service) in accordance with Resolution 114 (Rev.WRC-12);

Discussion:

In 1995 the allocation in the frequency band 5 091 – 5 150 MHz to the fixed satellite service (FSS) (Earth-to-space), limited to feeder links of the non-geostationary mobile satellite systems in the mobile satellite service, was added in order to address what at the time was perceived to be a temporary shortage of spectrum for such feeder links. To recognize the temporary nature of the allocation two clauses were added to the allocation at that time limiting the introduction of new assignments to the period up to 1 January 2008 and making the FSS secondary after the 1 January 2010. Subsequent conferences have modified these dates with the current dates being 1 January 2016 (no new frequency assignments) and 1 January 2018 (revert FSS to a secondary status) respectively.

Resolution **114** (WRC-12) calls for a review of allocations to both the aeronautical radionavigation service (ARNS) and the FSS in this band. ICAO is specifically invited to further review the detailed spectrum requirements and planning for international standard aeronautical radionavigation systems in the band. Initially this band was reserved to meet requirements for microwave landing system (MLS) assignments which could not be satisfied in the frequency band 5 030 – 5 091 MHz.

Aviation is implementing a new airport communication system under the recently allocated aeronautical mobile (R) service (AM(R)S) in the frequency band 5 091 – 5 150 MHz. Deployment and the capacity of this airport communication system is limited by the restrictions on the aggregate signal level permissible under the co-ordination arrangements established as part of agreeing to the AM(R)S allocation. Those arrangements allowed an increase in FSS satellite noise temperature (ΔTs $/Ts$) for the AM(R)S of 2% under the assumption that ARNS and aeronautical telemetry in the band would be contributing an additional 3% and 1% respectively. While the ARNS allocation should be maintained for the future, ARNS systems are not expected to operate in that band in the near-term, so as part of the review of the FSS allocation ICAO would wish to see a more flexible allocation of the ΔTs $/Ts$ between the various aeronautical services. Instead of limiting AM(R)S to 2% and ARNS to 3%, the regulations should be revised to restrict the combination of AM(R)S plus ARNS to a total of 5% ΔTs $/Ts$. This would allow increased flexibility for the AM(R)S while retaining the overall noise temperature increase caused by aeronautical systems operating in the band to 6%. Hence, the removal of the date limitation of the FSS can be supported, provided that stable sharing conditions with the ARNS and AM(R)S in the band are maintained and flexibility is improved in regards to ΔTs $/Ts$.

ICAO Position:

Support the removal of date limitations on the fixed satellite service (FSS) allocation in the frequency band 5091 – 5150 MHz subject to:

- the retention of the aeronautical protections contained in Resolution **114** (WRC-12).
- improving the flexibility for managing the allowed FSS satellite noise temperature increase by the aeronautical mobile (R) and aeronautical radionavigation services operating in the band 5 091-5 150 MHz.

WRC-15 Agenda Item 1.10

Agenda Item Title:
To consider spectrum requirements and possible additional spectrum allocations for the mobile-satellite service in the Earth-to-space and space-to-Earth directions, including the satellite component for broadband applications, including International Mobile Telecommunications (IMT), within the frequency range from 22 GHz to 26 GHz, in accordance with Resolution 234 (WRC-12);

Discussion:

A shortfall is predicted in the amount of mobile satellite spectrum available to support the satellite component of IMT, partly due to the failure to identify any spectrum that could be allocated to the mobile satellite service (MSS) below 16 GHz at WRC-12. This agenda item seeks to address these spectrum needs by identifying suitable spectrum for assignment to the MSS in the frequency range 22 – 26 GHz. Whilst the scope of this agenda item is limited in terms of frequency bands within which studies can take place, aviation does operate a number of airport surface detection systems in the frequency range 24.25 – 24.65 GHz in Regions 2 and 3 that need to be appropriately protected. Any allocation to the MSS should not adversely impact on the operation of aeronautical services in this frequency range.

ICAO Position:

To oppose any new mobile satellite service allocation unless it has been demonstrated through agreed studies that there will be no impact on aviation use in the 24.25 – 24.65 GHz frequency band in Regions 2 and 3.

WRC-15 Agenda Item 1.11

Agenda Item Title:
To consider a primary allocation for the Earth exploration-satellite service (Earth-to-space) in the 7-8 GHz range, in accordance with Resolution 650 (WRC-12);

Discussion:

Limited spectrum is available for tracking, telemetry and control systems operating in the Earth exploration-satellite service (EESS) and the available spectrum is currently in use by hundreds of satellites. This agenda item seeks to identify suitable additional spectrum for allocation to the Earth exploration-satellite service in the frequency range 7 – 8 GHz to complement the existing allocation at 8 025 – 8 400 MHz. Whilst the scope of this agenda item is limited in terms of frequency bands within which studies can take place, aviation does operate a number of airborne Doppler navigation systems in the frequency band 8 750 – 8 850 MHz that need to be appropriately protected. Any allocation to the EESS should not adversely impact on the operation of aeronautical services in the frequency band 8750 – 8850 MHz.

ICAO Position:

To oppose any new allocation to the Earth exploration-satellite service, unless it has been demonstrated through agreed studies that there will be no impact on aviation use in the frequency band 8 750 – 8 850 MHz.

WRC-15 Agenda Item 1.12

Agenda Item Title:
To consider an extension of the current worldwide allocation to the Earth exploration-satellite (active) service in the frequency band 9 300 – 9 900 MHz by up to 600 MHz within the frequency bands 8 700 – 9 300 MHz and/or 9 900 – 10 500 MHz, in accordance with Resolution 651 (WRC-12);

Discussion:
The frequency band 9 000 – 9 200 MHz is used by aeronautical radar systems (ground and airborne), including Airport Surface Detection Equipment (ASDE), Airport Surface Movement Radar (ASMR) and Precision Approach Radar (PAR) sometimes combined with Airport Surface Radar (ASR). They cater for short-range surveillance and precision functions up to a 50 km (approx. 25 NM) range. In aviation, these systems are used for precision monitoring, approach and surface detection functions and in airborne weather radar systems where their shorter wavelength is suitable for the detection of storm clouds. These radars are due to remain in service for the foreseeable future. The ongoing protection of the aeronautical uses of this frequency band needs to be assured.

Within ITU-R it has been argued that the impact on the aeronautical services has already been proven since the technical data is mainly identical to the outcome of studies performed prior to the allocation for the Earth exploration-satellite service (EESS) above 9 300 MHz by WRC-07. However the equipment types considered in the past were only un-modulated pulse Radars, rather than newer solid-state-based Radars that utilize pulse-compression modulation. The compatibility of these new Radar technologies with the EESS has not yet been analysed, however, they are being addressed in current ITU studies.

Whilst understanding that an increase in EESS synthetic aperture radar transmission bandwidth will increase the resolution with which objects can be measured, aviation would wish to understand the tangible benefits brought by such an increase in resolution before considering any allocation to the EESS. Additionally any proposals for the sharing of the aeronautical radionavigation frequency band 9 000 – 9 200 MHz by the EESS can only be considered on the basis of agreed studies, which take into account the present and expected future use of the band by aviation, and the constraints applied to this use. Such an allocation to EESS shall be subject to the provision that no harmful interference is caused to, nor protection is claimed from, or otherwise constraints are imposed on the operation and future development of aeronautical systems operating in the aeronautical radionavigation service in the frequency band 9 000 - 9 200 MHz. This provision protects the aeronautical utilization against harmful interference that may be caused when assignments are made with system characteristics different from those assumed in the compatibility analysis and interference mechanisms which were not foreseen in the compatibility analysis (for example the studies done for the 9 300 – 9 500 MHz allocation did not consider the radar systems with pulse compression).

ICAO Position:

Oppose any allocation to the Earth exploration-satellite service in the frequency band 9 000 – 9 200 MHz unless:-

- it has been demonstrated through agreed studies that there will be no impact on aviation use.
- no additional constraints are placed on the use of the frequency band by aeronautical systems

No change to Nos. **5.337**, **5.427**, **5.474** and **5.475**.

WRC-15 Agenda Item 1.16

Agenda Item Title:
To consider regulatory provisions and spectrum allocations to enable possible new Automatic Identification System (AIS) technology applications and possible new applications to improve maritime radiocommunication in accordance with Resolution 360 (WRC-12);

Discussion:

The maritime automatic identification system is fitted in search and rescue aircraft to allow co-ordination of search and rescue activities in which both vessels and aircraft are involved. It is essential to ensure that any change to the regulatory provisions and spectrum allocations resulting from this agenda item do not adversely impact on the capability of search and rescue aircraft to effectively communicate with vessels during disaster relief operations.

ICAO Position:

To ensure that any change to the regulatory provisions and spectrum allocations resulting from this agenda item do not adversely impact on the capability of search and rescue aircraft to effectively communicate with vessels during disaster relief operations.

WRC-15 Agenda Item 1.17

Agenda Item Title:
To consider possible spectrum requirements and regulatory actions, including appropriate aeronautical allocations, to support wireless avionics intra-communications (WAIC), in accordance with Resolution 423 (WRC-12);

Discussion:

The civil aviation industry is developing the future generation of aircraft. This future generation is being designed to enhance efficiency and reliability while maintaining, current required levels of safety as a minimum. The use of wireless technologies in the aircraft may reduce the overall weight of systems, reducing the amount of fuel required to fly and thus benefiting the environment.

Wireless Avionics Intra-Communications (WAIC) systems provide one way to derive these benefits. WAIC systems provide for radiocommunication between two or more points on a single aircraft and constitute exclusive closed on board networks required for the operation of an aircraft. WAIC systems do not provide air-to-ground, air-to-satellite or air-to-air communications. WAIC systems will only be used for safety-related aircraft applications.

Resolution **423** calls for consideration to be initially given to frequency bands currently allocated to aeronautical services (AMS, AM(R)S and ARNS) on a worldwide basis. If existing aeronautical bands cannot support the WAIC spectrum requirements, then new aeronautical allocations should be considered.

WAIC is a communication system which carries aeronautical safety related content and should therefore be seen as an application of the aeronautical mobile (route) service (AM(R)S). Initially the spectrum requirements for WAIC need to be identified to evaluate the possible use of existing AM(R)S allocations, and as such, if the spectrum requirements cannot be met then additional AM(R)S allocations are required.

Provided that technical studies show that WAIC systems will not cause harmful interference to existing or planned aeronautical systems in the aeronautical bands, ICAO supports any necessary additional AM(R)S allocations required to support the implementation of WAIC.

ICAO Position:

Support any necessary additional global aeronautical mobile (route) service allocation required to facilitate the implementation of WAIC, provided technical studies show that WAIC systems will not cause harmful interference to existing or planned aeronautical systems operating in frequency bands allocated to aeronautical safety services.

WRC-15 Agenda Item 4

Agenda Item Title:
In accordance with Resolution 95 (Rev.WRC-07), to review the resolutions and recommendations of previous conferences with a view to their possible revision, replacement or abrogation;

ICAO Position:

Resolutions:

Resolution No.	***Title***	***Action recommended***
18 *(Rev WRC-12)*	Relating to the procedure for identifying and announcing the position of ships and aircraft of States not parties to an armed conflict	No change
20 *(Rev. WRC-03)*	Technical cooperation with developing countries in the field of aeronautical telecommunications	No change
26 *(Rev. WRC-07)*	Footnotes to the Table of Frequency Allocations in Article 5 of the Radio Regulations	No change
27 *(Rev. WRC-12)*	Use of incorporation by reference in the Radio Regulations	No change
28 *(Rev. WRC-03)*	Revision of references to the text of ITU-R recommendations incorporated by reference in the Radio Regulations	No change
63 *(Rev. WRC-12)*	Protection of radiocommunication services against interference caused by radiation from industrial, scientific and medical (ISM) equipment	No change
67	Updating and rearrangement of the Radio Regulations	Modify as necessary based on the results of studies carried out under WRC-15. Agenda Item 9.1
95 *(Rev. WRC-07)*	General review of the resolutions and recommendations of world administrative radio conferences and world radiocommunication conferences	No change
114 *(Rev. WRC-12)*	Studies on compatibility between new systems of the aeronautical radionavigation service and the fixed-satellite service (Earth-to-space) (limited to feeder links of the non-geostationary mobile-satellite systems in the mobile-satellite service) in the frequency band 5 091 – 5 150 MHz	Modify as necessary based on the results of studies carried out under WRC-15. Agenda Item 1.7
151	Additional primary allocations to the fixed-satellite service in frequency bands between 10 and 17 GHz in Region 1	Delete after WRC-15
152	Additional primary allocations to the fixed-satellite service in the Earth-to-space direction in	Delete after WRC-15

Resolution No.	*Title*	*Action recommended*
	frequency bands between 13 – 17 GHz in Region 2 and Region 3	
153	To consider the use of frequency bands allocated to the fixed-satellite service not subject to Appendices 30, 30A and 30B for the control and non-payload communications of unmanned aircraft systems in non-segregated airspaces	Modify as necessary based on the results of studies carried out under WRC-15. Agenda Item 1.5
154	Consideration of technical and regulatory actions in order to support existing and future operation of fixed-satellite service earth stations within the band 3 400 – 4 200 MHz, as an aid to the safe operation of aircraft and reliable distribution of meteorological information in some countries in Region 1	Modify as necessary based on the results of studies carried out under WRC-15 Agenda Item 9.1.5. Based on the outcome of the Agenda Item, potentially extend the scope to other concerned regions (Caribbean, South America, Asia Pacific)
205 *(Rev. WRC-12)*	Protection of the systems operating in the mobile satellite service in the band 406 – 406.1 MHz	Modify as necessary based on the result of studies carried out under WRC-15. Agenda Item 9.1.1
207 *(Rev. WRC-03)*	Measures to address unauthorized use of and interference to frequencies in the bands allocated to the maritime mobile service and to the aeronautical mobile (R) service	No change
217 *(WRC-97)*	Implementation of wind profiler radars	No change
222 *(Rev. WRC-12)*	Use of the frequency bands 1 525 – 1 559 MHz and 1 626.5 – 1 660.5 MHz by the mobile-satellite service, and procedures to ensure long-term spectrum access for the aeronautical mobile-satellite (R) service	No change
225 *(Rev .WRC-12)*	Use of additional frequency bands for the satellite component of IMT	No change
233	Studies on frequency-related matters on International Mobile Telecommunications and other terrestrial mobile broadband applications	Delete after WRC-15
339 *(Rev. WRC-07)*	Coordination of NAVTEX services	No change
354 (WRC-07)	Distress and safety radiotelephony procedures for 2 182 kHz	No change
356 (WRC-07)	ITU maritime service information registration	No change
360	Consideration of regulatory provisions and spectrum allocations for enhanced Automatic Identification System technology applications	Modify as necessary based on the results of studies carried out

Resolution No.	***Title***	***Action recommended***
	and for enhanced maritime radiocommunication	under WRC-15. Agenda Item 1.16
405	Relating to the use of frequencies of the aeronautical mobile (R) service	No change
413 *(WRC-12)*	Use of the band 108 – 117.975 MHz by aeronautical service	No change
417 (WRC-12)	Use of the frequency band 960 – 1 164 MHz by the aeronautical mobile (R) service	No change
418 (*Rev. WRC-12*)	Use of the band 5 091 – 5 250 MHz by the aeronautical mobile service for telemetry applications	Modify as necessary based on the results of studies carried out under WRC-15. Agenda Item 1.7
422	Development of methodology to calculate aeronautical mobile-satellite (R) service spectrum requirements within the frequency bands 1 545 – 1 555 MHz (space-to-Earth) and 1 646.5 – 1 656.5 MHz (Earth-to-space)	Modify or suppress as necessary, subject to the completion of the work.
423	Consideration of regulatory actions, including allocations, to support Wireless Avionics Intra-Communications	Modify as necessary based on the results of studies carried out under WRC-15. Agenda Item 1.17
608 *(WRC-03)*	Use of the frequency band 1 215 – 1 300 MHz by systems of the radionavigation satellite service	Delete after studies completed
609 *(WRC-07)*	Protection of aeronautical radionavigation systems from the equivalent power flux-density produced by radionavigation satellite service networks and systems in the 1 164 – 1 215 MHz band	No change
610 *(WRC-03)*	Coordination and bilateral resolution of technical compatibility issues for radionavigation satellite networks and systems in the band 1 164 – 1 300 MHz, 1 559 – 1 610 MHz and 5 010 – 5 030 MHz	No change
612 (*Rev. WRC-12*)	Use of the radiolocation service between 3 and 50 MHz to support oceanographic radar operations	No change
644 *(Rev. WRC-12)*	Radiocommunication resources for early warning, disaster mitigation and relief operations	No change
705 *(MOB-87)*	Mutual protection of radio services operating in the band 70 – 130 kHz	No change
729 *(WRC-07)*	Use of frequency adaptive systems in the MF and HF bands	Delete after WRC-15
748 (*Rev. WRC-12*)	Compatibility between the aeronautical mobile (R) service and the fixed satellite service (Earth-to-space) in the band 5 091 – 5 150 MHz	Modify as necessary based on the results of studies carried out

Resolution No.	*Title*	*Action recommended*
		under WRC-15 Agenda Item 1.7
957	Studies towards review of the definitions of *fixed service*, *fixed station* and *mobile station*	Delete after WRC-15

Recommendations:

Recommendation No.		*Action recommended*
7 *(Rev. WRC-97)*	Adoption of standard forms for ship station and ship earth station licences and aircraft station and aircraft earth station licences	No change
9	Relating to the measures to be taken to prevent the operation of broadcasting stations on board ships or aircraft outside national territories	No change
71	Relating to the standardization of the technical and operational characteristics of radio equipment	No change
75 *(WRC-03)*	Study on the boundary between the out-of-band and spurious domains of primary radars using magnetrons	No change
401	Relating to the efficient use of aeronautical mobile (R) worldwide frequencies	No change
608 *(Rev. WRC-07)*	Guidelines for consultation meetings established in Resolution **609 (WRC-03)**	No change

WRC-15 Agenda Item 8

Agenda Item Title:
To consider and take appropriate action on requests from administrations to delete their country footnotes or to have their country name deleted from footnotes, if no longer required, taking into account Resolution 26 (Rev. WRC-07).

Discussion:

Allocations to the aeronautical services are generally made for all ITU Regions and normally on an exclusive basis. These principles reflect the global process of standardization within ICAO for the promotion of safety and to support the global interoperability of radiocommunication and radionavigation equipment used in civil aircraft. In some instances, however, footnotes to the ITU Table of Frequency Allocations allocate spectrum in one or more countries to other radio services in addition or alternatively to the aeronautical service to which the same spectrum is allocated in the body of the table.

The use of country footnote allocations to non-aeronautical services in aeronautical bands is generally not recommended by ICAO, on safety grounds, as such use may result in harmful interference to safety services. Furthermore, this practice generally leads to an inefficient use of available spectrum to aeronautical services, particularly when the radio systems sharing the band have differing technical characteristics. It also may result in undesirable (sub-) regional variations with respect to the technical conditions under which the aeronautical allocations can be used. This can have a serious impact on the safety of aviation.

The following footnotes in aeronautical bands should be deleted for safety and efficiency reasons as discussed below:

a) In the frequency bands used for the ICAO instrument landing system (ILS), (marker beacons 74.8 – 75.2 MHz; localizer 108 – 112 MHz and glide path 328.6 – 335.4 MHz) and the VHF omni-directional radio range system (VOR); 108 – 117.975 MHz, Nos. **5.181**, **5.197** and **5.259** allow for the introduction of the mobile service on a secondary basis and subject to agreement obtained under No. **9.21** of the Radio Regulations when these bands are no longer required for the aeronautical radionavigation service. The use of both ILS and VOR is expected to continue. In addition, WRC-03, as amended by WRC-07, has introduced No. **5.197A** stipulating that the band 108 – 117.975 MHz is also allocated on a primary basis to the aeronautical mobile (R) service (AM(R)S), limited to systems operating in accordance with recognized international aeronautical standards. Such use shall be in accordance with Resolution **413 (Rev. WRC-12)**. The use of the band 108 – 112 MHz by the AM(R)S shall be limited to systems composed of ground-based transmitters and associated receivers that provide navigational information in support of air navigation functions in accordance with recognized international aeronautical standards. As a result, access to these bands by the mobile service is not feasible, in particular since no acceptable sharing criteria that secure the protection of aeronautical systems have been established to date. Nos. **5.181**, **5.197** and **5.259** should now be deleted since they do not represent a realistic expectation for an introduction of the mobile service in these bands.

b) In the frequency band 1 215 – 1 300 MHz, which is used by civil aviation for the provision of radionavigation services through No. **5.331.** Footnote No. **5.330** allocates the band in a number of countries to the fixed and mobile service. Given the receiver sensitivity of aeronautical uses of the frequency band, ICAO does not support the continued inclusion of an additional service through country footnotes. ICAO would therefore urge administrations to remove their name from the No. **5.330**.

c) In the frequency bands 1 610.6 – 1 613.8 MHz and 1 613.8 – 1 626.5 MHz, which is assigned to the aeronautical radionavigation service, No. **5.355** allocates the band on a secondary basis to the fixed service in a number of countries. Given that this band is allocated to a safety of life service, ICAO does not support the continued inclusion of an additional service through country footnotes. ICAO would therefore urge administrations to remove their name from the No. **5.355.**

d) In the frequency band 1 559 – 1 610 MHz, which is used for elements of the ICAO global navigation satellite system (GNSS), Nos. **5.362B** and **5.362C** allow the operation of the fixed service in some countries on a primary basis until 1 January 2010 and on a secondary basis until 1 January 2015. This band is allocated, on a worldwide, primary basis, to the aeronautical radionavigation service (ARNS) and to the radionavigation-satellite service (RNSS). The band already supports operation of two prime elements of the global navigation satellite system (GNSS), i.e. global navigation satellite system (GLONASS) and global positioning system (GPS), the standards for which have been adopted into ICAO SARPs. SARPs for other RNSS systems, such as the European Galileo system, are under development. Studies undertaken in preparation for WRC-2000 indicate that a geographical separation distance exceeding line-of-sight (in the order of 400 km) between aircraft using GNSS and stations of the fixed service is required to ensure safe operation of GNSS. This is a very severe restriction, which can prohibit the safe use of GNSS over wide areas around any fixed service installation. Were a fixed service to be introduced into this band then harmful interference situations could arise leading to disruption to GNSS, affecting the safety of aircraft in flight. Thus, the WRC-2000 agreement to terminate all use by the fixed service in this band in 2015 still constitutes a severe and unacceptable constraint on the safe and effective use of GNSS in some areas of the world. It is, therefore, recommended that deletion of these allocations be effective from 2015.

e) In the frequency band 3 400 – 4 200 MHz, the existing allocation to the fixed satellite service (FSS) (space-Earth) is used to provide aeronautical VSAT service, see discussion under agenda items 1.1 and 9.1.5. No. **5.430A** allocates this band also to the mobile service in a number of States in Region 1, including States in Africa. African States are recommended to withdraw their names from this footnote.

f) In the frequency band 4 200 – 4 400 MHz, which is reserved for use by airborne radio altimeters, No. **5.439** allows the operation of the fixed service on a secondary basis in some countries. Radio altimeters are a critical element in aircraft automatic landing systems and serve as a sensor in ground proximity warning systems. Interference from the fixed service has the potential to affect the safety of all-weather operations. Deletion of this footnote is recommended.

ICAO Position:

To support deletion of Nos. **5.181, 5.197** and **5.259**, as access to the frequency bands 74.8 – 75.2, 108 – 112 and 328.6 –335.4 MHz by the mobile service is not feasible and could create the potential for harmful interference to important radionavigation systems used by aircraft at final approach and landing as well as systems operating in the aeronautical mobile service operating in the frequency band 108 – 112 MHz.

To support deletion of No. **5.330** as access to the frequency band 1 215 – 1 300 MHz by the fixed and mobile services could potentially cause harmful interference to services used to support aircraft operations.

To support deletion of No. **5.355** as access to the frequency bands 1 610.6 – 1 613.8 and 1 613.8 – 1 626.5 MHz by the fixed services could potentially jeopardize aeronautical use of these frequency bands.

To support the deletion of Nos. **5.362B** and **5.362C** as of 2015 in order to eliminate harmful interference that has been caused by the fixed service to essential aeronautical radionavigation satellite functions in the frequency band 1 559 –1 610 MHz and to permit the full utilization of GNSS services to aircraft on a global basis.

To support the removal of States in the African region from No. **5.430A** to ensure the protection of the safety operation of the aeronautical VSAT in the frequency band 3 400 – 4 200 MHz, where it is allocated on primary basis to the mobile service.

To support the deletion of No. **5.439** to ensure the protection of the safety critical operation of radio altimeters in the frequency band 4 200 – 4 400 MHz.

Note 1.— Administrations indicated in the footnotes mentioned in the ICAO Position above which are urged to remove their country names from these footnotes are as follows:

No. ***5.181***	*Egypt, Israel and Syrian Arab Republic*
No. ***5.197***	*Syrian Arab Republic*
No. ***5.259***	*Egypt and Syrian Arab Republic*
No. ***5.330***	*Angola, Bahrain, Bangladesh, Cameroon, Chad, China, Djibouti, Egypt, Eritrea, Ethiopia, Guyana, India, Indonesia, Iran (Islamic Republic of), Iraq, Israel, Japan, Jordan, Kuwait, Nepal, Oman, Pakistan, the Philippines, Qatar, Saudi Arabia, Somalia, Sudan, South Sudan, the Syrian Arab Republic, Togo, the United Arab Emirates, and Yemen*
No. ***5.355***	*Bahrain, Bangladesh, Congo (Rep of the), Djibouti, Egypt, Eritrea, Iraq, Israel, Kuwait, Qatar, Syrian Arab Republic, Somalia, Sudan, South Sudan, Chad, Togo and Yemen*
No. ***5.362B***	*Algeria, Armenia, Azerbaijan, Belarus, Benin, Cameroon, Democratic People's Republic of Korea, Gabon, Georgia, Guinea, Guinea-Bissau, Jordan, Kazakhstan, Kyrgyzstan, Libya, Lithuania, Mali, Mauritania, Nigeria, Pakistan, Poland, Romania, Russian Federation, Saudi Arabia, Senegal, the Syrian Arab Republic, Tajikistan, Tanzania, Turkmenistan, Tunisia, Ukraine, and Uzbekistan*
No. ***5.362C***	*Chad, Congo (Rep of the), Eritrea, Iraq, Israel, Jordan, Qatar, Somalia, Sudan, South Sudan, the Syrian Arab Republic, Togo, and Yemen*
No. ***5.430A***	*Algeria, Saudi Arabia, Bahrain, Benin, Botswana, Burkina Faso, Cameroon, Congo (Rep. of the), Côte d'Ivoire, Egypt, French overseas departments and communities in Region 1, Gabon, Guinea, Israel, Jordan, Kuwait, Lesotho, Malawi, Mali, Morocco, Mauritania, Mozambique, Namibia, Niger, Oman, Qatar, the Syrian Arab Republic, the Dem. Rep. of the Congo, Senegal, Sierra Leone, South Africa, Swaziland, Chad, Togo, Tunisia, Zambia and Zimbabwe*
No. ***5.439***	*Iran (Islamic Republic of)*

WRC-15 Agenda Item 9.1

Agenda Item Title:
To consider and approve the Report of the Director of the Radiocommunication Bureau, in accordance with Article 7 of the Convention:
On the activities of the Radiocommunication Sector since WRC-12.

Note: The subdivision of Agenda item 9.1 into sub-items, such as 9.1.1, 9.1.2, etc. was made at the first session of the Conference Preparatory Meeting for WRC-15 (CPM15-1) and is summarized in the BR Administrative Circular CA/201 of 19 March 2012.

Sub-item 1 (9.1.1);
Resolution 205 – Protection of the systems operating in the mobile-satellite service in the band 406 –406.1 MHz

Discussion:

This resolution calls for studies into the protection requirements of the distress and safety system operating at 406 MHz from interference and that the Director of the Radiocommunication Bureau to report any regulatory action required to WRC-15.

Emergency Locating Transmitters (ELT's) are an element of the COSPAS-SARSAT system. Mandatory carriage of ELT's for aircraft is specified in Annex 6 to the ICAO Convention. SARPs for ELTs are contained in Annex 10 to the Chicago Convention. The use of ELTs offers the possibility of dramatically shortening the time required to alert rescue forces to the distress and to assist in final "homing" by the rescue team. In the ITU, such beacons are named emergency position-indicating radio beacons (EPIRBs). ICAO supports the continued protection of this system through appropriate provisions in the Radio Regulations.

ICAO Position:

Support increased protection of COSPAS-SARSAT system in the frequency band 406 – 406.1 MHz.

Sub-item 5 (9.1.5);
Consideration of technical and regulatory actions in order to support existing and future operation of fixed-satellite service earth stations within the band 3 400 – 4 200 MHz, as an aid to the safe operation of aircraft and reliable distribution of meteorological information in some countries in Region 1 (Resolution 154 (WRC-12))

Discussion:

The efficient provision of air navigation services requires the implementation and operation of ground communications infrastructure with high availability, reliability and integrity in order to fulfil aviation performance requirements.
In the Africa and Indian Ocean region, the difficulty of fulfilling these requirements, given the extent of the airspace and weakness in terrestrial communication infrastructure, led, in 1997, the ICAO AFI Planning and Implementation Regional Group to approve the use of fixed satellite technology (VSAT) to support terrestrial aeronautical communications services in the frequency band 3.4 – 4.2 GHz. In

tropical regions, due to more pronounced rain attenuation at higher frequency bands, this frequency band remains the only viable option for satellite links with high availability.

Since the 90s, States and / or organizations in the AFI Region have developed and implemented networks of satellite-based VSAT systems in this fixed satellite service (FSS) band. These VSAT networks support all aeronautical communications services including the extension of VHF aeronautical mobile, navigation and surveillance systems.

Today, these VSAT systems constitute a real infrastructure spanning the entire African continent and beyond and the availability of the entire 3.4 – 4.2 GHz FSS frequency band is crucial for the AFI Region to ensure the continued growth of traffic while maintaining the required level of safety in this region.

Recommendation **724**, adopted by the WRC-07, indicates that satellite communication systems operating in the fixed satellite service may be the only medium to support the requirements of the ICAO communication, navigation, surveillance and air traffic management systems, where an adequate terrestrial communication infrastructure is not available.

WRC-07 allocated the frequency band 3.4 – 3.6 GHz to the mobile, except aeronautical mobile, service on a primary basis in some countries, including Region 1, subject to regulatory and technical restrictions (No. **5.430A**). The deployment of (non-aeronautical terrestrial) mobile service systems in vicinity of airports has led to an increased number of cases of interference into the FSS (VSAT) receivers. Consequently, some additional measures need to be adopted to improve the protection of the FSS links supporting aeronautical communications.

ICAO supports ITU-R studies on the appropriate regulatory and/or technical measures that Administrations in the AFI region should apply to facilitate protection of VSATs used for the transmission of aeronautical and meteorological information in the 3.4 – 4.2 GHz frequency band from other services operating in the band. This will ensure the continued growth of traffic while maintaining the required level of safety in this region.

Note: The problem can also occur in other regions. The 3.4 – 4.2 GHz frequency range is used by VSAT networks for aeronautical communications in tropical regions of Central/South America and the Asia Pacific as well as Africa. Hence there is a potential link to WRC-15 AI 1.1.

ICAO Position:

To support possible technical and regulatory measures to ensure protection of VSATs used for the transmission of aeronautical and meteorological information in the frequency range 3.4 – 4.2 GHz from other services operating in the same or adjacent frequency range.

Sub-item 6 (9.1.6);
Resolution 957 – Studies towards review of the definitions of *fixed service, fixed station* and *mobile station*

Discussion:

These three definitions are indirectly related to aeronautical services and hence any change in the definitions could have an impact on the interpretation of the definition of aeronautical mobile services. This Resolution calls for studies into whether a change in the definition of these terms is required and for the Director of the Radiocommunication Bureau to report to WRC-15.

ICAO Position:

Ensure that any change to the definitions as a result of a review of the studies referenced in Resolution **957,** do not adversely impact aviation.

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ATTACHMENT TO THE APPENDIX

RESOLUTION 807 (WRC-12)

Agenda for the 2015 World Radiocommunication Conference

The World Radiocommunication Conference (Geneva, 2012),

considering

a) that, in accordance with No. 118 of the ITU Convention, the general scope of the agenda for a world radiocommunication conference should be established four to six years in advance and that a final agenda shall be established by the Council two years before the conference;

b) Article 13 of the ITU Constitution relating to the competence and scheduling of world radiocommunication conferences and Article 7 of the Convention relating to their agendas;

c) the relevant resolutions and recommendations of previous world administrative radio conferences (WARCs) and world radiocommunication conferences (WRCs),

recognizing

a) that WRC-12 has identified a number of urgent issues requiring further examination by WRC-15;

b) that, in preparing this agenda, some items proposed by administrations could not be included and have had to be deferred to future conference agendas,

resolves

to recommend to the Council that a world radiocommunication conference be held in 2015 for a maximum period of four weeks, with the following agenda:

1 on the basis of proposals from administrations, taking account of the results of WRC-12 and the Report of the Conference Preparatory Meeting, and with due regard to the requirements of existing and future services in the bands under consideration, to consider and take appropriate action in respect of the following items:

1.1 to consider additional spectrum allocations to the mobile service on a primary basis and identification of additional frequency bands for International Mobile Telecommunications (IMT) and related regulatory provisions, to facilitate the development of terrestrial mobile broadband applications, in accordance with Resolution **233 (WRC-12)**;

1.2 to examine the results of ITU-R studies, in accordance with Resolution **232 (WRC-12)**, on the use of the frequency band 694-790 MHz by the mobile, except aeronautical mobile, service in Region 1 and take the appropriate measures;

1.3 to review and revise Resolution **646 (Rev.WRC-12)** for broadband public protection and disaster relief (PPDR), in accordance with Resolution **648 (WRC-12)**;

1.4 to consider possible new allocation to the amateur service on a secondary basis within the band 5 250-5 450 kHz in accordance with Resolution **649 (WRC-12)**;

1.5 to consider the use of frequency bands allocated to the fixed-satellite service not subject to Appendices **30**, **30A** and **30B** for the control and non-payload communications of unmanned aircraft systems (UAS) in non-segregated airspaces, in accordance with Resolution **153 (WRC-12)**;

1.6 to consider possible additional primary allocations:

1.6.1 to the fixed-satellite service (Earth-to-space and space-to-Earth) of 250 MHz in the range between 10 GHz and 17 GHz in Region 1;

1.6.2 to the fixed-satellite service (Earth-to-space) of 250 MHz in Region 2 and 300 MHz in Region 3 within the range 13-17 GHz;

and review the regulatory provisions on the current allocations to the fixed-satellite service within each range, taking into account the results of ITU-R studies, in accordance with Resolutions **151 (WRC-12)** and **152 (WRC-12)**, respectively;

1.7 to review the use of the band 5 091-5 150 MHz by the fixed-satellite service (Earth-to-space) (limited to feeder links of the non-geostationary mobile-satellite systems in the mobile-satellite service) in accordance with Resolution **114 (Rev.WRC-12)**;

1.8 to review the provisions relating to earth stations located on board vessels (ESVs), based on studies conducted in accordance with Resolution **909 (WRC-12)**;

1.9 to consider, in accordance with Resolution **758 (WRC-12)**:

1.9.1 possible new allocations to the fixed-satellite service in the frequency bands 7 150-7 250 MHz (space-to-Earth) and 8 400-8 500 MHz (Earth-to-space), subject to appropriate sharing conditions;

1.9.2 the possibility of allocating the bands 7 375-7 750 MHz and 8 025-8 400 MHz to the maritime-mobile satellite service and additional regulatory measures, depending on the results of appropriate studies;

1.10 to consider spectrum requirements and possible additional spectrum allocations for the mobile-satellite service in the Earth-to-space and space-to-Earth directions, including the satellite component for broadband applications, including International Mobile Telecommunications (IMT), within the frequency range from 22 GHz to 26 GHz, in accordance with Resolution **234 (WRC-12)**;

1.11 to consider a primary allocation for the Earth exploration-satellite service (Earth-to-space) in the 7-8 GHz range, in accordance with Resolution **650 (WRC-12)**;

1.12 to consider an extension of the current worldwide allocation to the Earth exploration-satellite (active) service in the frequency band 9 300-9 900 MHz by up to 600 MHz within the frequency bands 8 700-9 300 MHz and/or 9 900-10 500 MHz, in accordance with Resolution **651 (WRC-12)**;

1.13 to review No. **5.268** with a view to examining the possibility for increasing the 5 km distance limitation and allowing space research service (space-to-space) use for proximity operations by space vehicles communicating with an orbiting manned space vehicle, in accordance with Resolution **652 (WRC-12)**;

1.14 to consider the feasibility of achieving a continuous reference time-scale, whether by the modification of coordinated universal time (UTC) or some other method, and take appropriate action, in accordance with Resolution **653 (WRC-12)**;

1.15 to consider spectrum demands for on-board communication stations in the maritime mobile service in accordance with Resolution **358 (WRC-12)**;

1.16 to consider regulatory provisions and spectrum allocations to enable possible new Automatic Identification System (AIS) technology applications and possible new applications to improve maritime radiocommunication in accordance with Resolution **360 (WRC-12)**;

1.17 to consider possible spectrum requirements and regulatory actions, including appropriate aeronautical allocations, to support wireless avionics intra-communications (WAIC), in accordance with Resolution **423 (WRC-12)**;

1.18 to consider a primary allocation to the radiolocation service for automotive applications in the 77.5-78.0 GHz frequency band in accordance with Resolution **654 (WRC-12)**;

2 to examine the revised ITU-R Recommendations incorporated by reference in the Radio Regulations communicated by the Radiocommunication Assembly, in accordance with Resolution **28 (Rev.WRC-03)**, and to decide whether or not to update the corresponding references in the Radio Regulations, in accordance with the principles contained in Annex 1 to Resolution **27 (Rev.WRC-12)**;

3 to consider such consequential changes and amendments to the Radio Regulations as may be necessitated by the decisions of the Conference;

4 in accordance with Resolution **95 (Rev.WRC-07)**, to review the resolutions and recommendations of previous conferences with a view to their possible revision, replacement or abrogation;

5 to review, and take appropriate action on, the Report from the Radiocommunication Assembly submitted in accordance with Nos. 135 and 136 of the Convention;

6 to identify those items requiring urgent action by the Radiocommunication Study Groups in preparation for the next world radiocommunication conference;

7 to consider possible changes, and other options, in response to Resolution 86 (Rev. Marrakesh, 2002) of the Plenipotentiary Conference, an advance publication, coordination, notification and recording procedures for frequency assignments pertaining to satellite networks, in accordance with Resolution **86 (Rev.WRC-07)** to facilitate rational, efficient, and economical use of radio frequencies and any associated orbits, including the geostationary-satellite orbit;

8 to consider and take appropriate action on requests from administrations to delete their country footnotes or to have their country name deleted from footnotes, if no longer required, taking into account Resolution **26 (Rev.WRC-07)**;

9 to consider and approve the Report of the Director of the Radiocommunication Bureau, in accordance with Article 7 of the Convention:

9.1 on the activities of the Radiocommunication Sector since WRC-12;

9.2 on any difficulties or inconsistencies encountered in the application of the Radio Regulations; and

9.3 on action in response to Resolution **80 (Rev.WRC-07)**;

10 to recommend to the Council items for inclusion in the agenda for the next WRC, and to give its views on the preliminary agenda for the subsequent conference and on possible agenda items for future conferences, in accordance with Article 7 of the Convention,

resolves further

to activate the Conference Preparatory Meeting,

invites the Council

to finalize the agenda and arrange for the convening of WRC-15, and to initiate as soon as possible the necessary consultations with Member States,

instructs the Director of the Radiocommunication Bureau

to make the necessary arrangements to convene meetings of the Conference Preparatory Meeting and to prepare a report to WRC-15,

instructs the Secretary-General

to communicate this Resolution to international and regional organizations concerned.

— END —

APPENDIX D

PRIORITIES FOR THE IMPLEMENTATION OF AIR NAVIGATION IMPROVEMENTS

PBN implementation

1.1 Upon analysing the status of implementation of performance-based navigation (PBN) in the South American Region, note was taken of the status of PBN implementation in the optimisation of routes, terminal areas (TMAs), and instrument approach procedures (IAPs). The meeting also reviewed the goals to be achieved by SAM States during the period 2014-2016.

Optimisation of the regional ATS route network (ATSRO)

1.2 Regarding route optimisation at regional level, it was noted that out of a total of 254 routes that make up the regional ATS route network, 159 (62%) correspond to conventional routes and 95 (38%) to PBN routes.

PBN redesign of terminal areas

1.3 Regarding standard arrivals and departures (STARs and SIDs), the meeting analysed the results of the survey conducted by the Regional Office as well as the information of the State AIPs.

1.4 In this regard, it was noted that, of the 99 international airports of the SAM Region listed in the CAR/SAM Air Navigation Plan (ANP), 1,680 STAR and SID procedures have been designed and published in the SAM Region, of which 878 (52%) are conventional, and 802 (48%) are PBN.

1.5 Likewise, it was noted that regarding continuous descent operations (CDO) and continuous climb operations (CCO) in the PBN STARs and SIDs of the region, no CDOs or CCOs have been published in the respective AIPs, but there are 56 PBN STARs in SBBS (Brasilia) and the 24 PBN STARs in SBRF (Recife) that have been developed using CDO techniques, although they are not indicated as such in the chart.

1.6 The indication of CCOs or CDOs in the SID or STAR chart, due to its importance, is under study by the planning and implementation groups to ensure an improved situational awareness by air traffic controllers and pilots.

PBN instrument approach procedures

1.7 Regarding PBN instrument procedures, the Air Navigation Directors took note of ICAO Assembly Resolution A37-11 on global performance-based navigation goals.

1.8 According to Resolution A37-11, the SAM Region has 114 runways for which instrument procedures have been developed to 175 of the existing 228 thresholds. For these 175 thresholds, 107 APV procedures have been implemented, accounting for 61% of IFR runways.

1.9 It was noted that, of all the procedures existing in the Region for international airports listed in the ANP, there were 783 approach procedures for the 99 airports; 178 were PBN approach procedures (including the GNSS IAPs), out of which 107 were RNP APCH, accounting for 14%, distributed as follows: 83 APV Baro-VNAV (APV) procedures - 11%, and 24 RNP procedures with authorisation required (RNP AR), accounting for 3%.

PBN goals for the period 2014-2016 in the SAM Region

1.10 Regarding standard departures and arrivals (SIDs and STARs) designed in accordance with the PBN concept, CDO and CCO operations, and the objectives of Resolution A37-11 concerning instrument procedures with vertical guidance, the following regional goal was agreed upon for the triennium 2014-2016:

Proposed percentages	**60% 2016**	**60% 2016**	**40% 2016**	**40% 2016**	**60% 2016**	**According to Resolution A-37/11 70% 2014 100% 2016**		
CAR/SAM ANP international airports	PBN SID	PBN STAR	CCOs CDOs in SIDs and STARS	PBN routes Lower airspace	PBN routes Upper airspace	IAP APV/L NAV	IAP RNP-AR	IAP LNAV Only

1.11 Additionally, based on the airspace optimisation programme being implemented in the SAM Region, a **<u>reduction of 40.000 tonnes of CO_2 emissions per year</u>** was considered as <u>regional goal</u>, mainly related to route optimisation and TMAs using CCO and CDO techniques derived from fuel savings by the users.

ATFM implementation

1.12 Upon analysing the status of implementation of air traffic flow management (ATFM) in the South American Region, and in view of the global events to be held in 2014 and 2016, the meeting identified the need to have at least one ATFM position at the area control centres.

1.13 To date, 2 centralised flow management units and 3 flow management units or positions (FMU/FMP) have been implemented in the SAM Region, while one State is in the process of implementation and 8 States are carrying out activities or have not yet taken action for ATFM implementation. Based on the analysis made, it was noted that 36% of SAM States had implemented FMUs or FMPs.

1.14 Out of the 99 international airports in the SAM Region listed in the ANP, ATFM services are provided to 45 airports (27 in Brazil, 8 in Colombia, 1 in Chile, 2 in Paraguay, and 7 in Venezuela), accounting for 45% of all the airports in the Region. This percentage does not include airports in States that are in the process of implementation.

1.15 Under the auspices of project RLA/06/901, several training courses have been conducted and even a guide has been developed for calculating runway and ATC sector capacity to assist States with the runway and ATC sector calculation methodology. Likewise, courses have been carried out at the centralised ATFM unit in Brazil, and the ATFM and the associated CDM manuals were developed for use in the SAM Region.

ATFM goals for the period 2014-2016 for the SAM Region

1.16 In view of the above, and given the importance of ATFM for capacity/demand balancing, the following ATFM goals were agreed for the period 2014-2016:

a) 2014-2016: at least one flow management unit (FMU) or flow management position (FMP) in the ACC of each FIR.

b) 2016: one centralised ATFM unit (ATFMC) in those States that have more than one FIR.

AIM implementation

1.17 Regarding AIM implementation in the SAM Region, 14 States of the Region have completed Phase 1 of the roadmap for the transition from AIS to AIM, with respect to the following elements:

a) P-03 — AIRAC adherence monitoring;
b) P-04 — Monitoring of States' differences to Annexes 4 and 15; and
c) P-05 —WGS implementation.

1.18 Regarding element P-17, which corresponds to quality management (QMS) implementation, it was noted that in the SAM Region, there were 5 QMS-certified States: Brazil, Chile, Ecuador, French Guiana (France), and Paraguay.

1.19 An important landmark in the road to the new systems is the completion by administrations of Phase 1 of the AIS-to-AIM transition process, since the phased and interdependent transition requires that one phase be completed before moving on to the next transition phase.

1.20 A delay in the implementation of Phase 1 will have a significant impact on several areas that depend on the quality of aeronautical information. One of the most affected areas is ATM.

AIM goal for SAM States that need to complete PHASE 1 of the AIS-to-AIM transition roadmap during the period 2014-2016

1.21 According to the information provided by the AIM experts of the States, the following goals were proposed for the period 2014-2016 for those States that had not yet obtained AIM QMS certification:

State	% of implementation January 2012	% of implementation May 2013	Certification
Argentina	30 %	30%	**2015**
Bolivia	30%	30%	**2015**
Colombia	70%	90%	**2014**
Guyana	0%	25%	**2016**
Panama	70%	70%	**2015**
Peru	40%	50%	**2015**
Suriname	30%	35%	**2016**
Uruguay	90%	95%	**2014**
Venezuela	50%	50%	**2015**

Interconnection of AMHS systems

1.22 The interconnection of aeronautical message handling systems (AMHS) started in 2010, at a time when many SAM States had already implemented AMHS systems. To date, four AMHS interconnections have been completed. The connections were implemented on the regional communications network, REDDIG, using the IP communications protocol (Internet protocol).

1.23 In order to establish technical, operational, and administrative agreements when interconnecting automated systems, a model Memorandum of Understanding ((MoU) has been developed for use in the SAM Region. Accordingly, the States planning to start the interconnection will describe in the MoU the activities required for the interconnection, with the respective dates, as well as the parties technically and operationally responsible for coordinating activities.

1.24 A total of 26 AMHS interconnections are required. **The goal is to have 100% of AMHS interconnections completed by the end of 2016**; four have already been completed and the remainder will be implemented as follows: one in 2013, 11 in 2014, 5 in 2015, and 5 in 2016.

Interconnection of automated systems

1.25 The interconnection of automated systems between adjacent ACCs is aimed at reducing the risk of aeronautical incidents resulting from coordination activities, while improving planning phases for an efficient control of flights to/from the corresponding flight information regions (FIR).

1.26 Follow-up to the interconnection of automated systems in the Region is done through the SAM implementation (SAM/IG) meetings, with the support of project RLA/06/901, through which guides have been drafted to support implementation, and through missions to the States, as shown in the website of the ICAO South American Regional Office in the section on electronic documents.

1.27 The interconnection of automated systems consists of the exchange or radar data using the ASTERIX (*All Purpose Structured Eurocontrol Surveillance Information Exchange*) format and IP communication protocols (Internet Protocol), and the implementation of automated transfer of flight plans between automated centres through AIDC (ATS interfacility data communication). The means of communication will be the REDDIG regional network.

1.28 The goal for the interconnection of automated systems is 15 interconnections **implemented by the end of 2015**. The schedule of implementation from 2013 to 2015 is as follows: **1 in 2013, 8 in 2014, and 6 in 2015.**

Implementation of domestic IPS (Internet protocol suites) communication networks

1.29 With the implementation of AMHS, many SAM States have improved their domestic communication networks by implementing domestic IPS networks, but very few States have planned the implementation of AIS and/or MET services, operational voice services (direct or switched ATS communications) and radar surveillance services over the same domestic IP network.

1.30 The implementation of domestic IPS networks will facilitate the implementation of new services to support aeronautical services, thus increasing their availability.

1.31 In this sense, **it is foreseen that, by the end of the period 2014-2016, 80% of the States of the Region** will have implemented domestic IPS networks with the aforementioned characteristics. Implementation during the period 2014-2016 would be distributed as follows: 2 in 2014, 3 in 2015, and 5 in 2016. It is expected that full implementation will be achieved by 2018.

APPENDIX E

INTERNATIONAL CIVIL AVIATION ORGANIZATION
South American Regional Office

BOGOTA DECLARATION

The thirteenth meeting of Civil Aviation Authorities of the SAM Region held in Bogota, Colombia, from 4 to 6 December 2013, convened by the ICAO South American Regional Office, and counting with the participation of high level officials representing 13 States and 8 international organizations and industry:

Considering that, in accordance with Article 37 of the International Civil Aviation Convention, each contracting State undertakes to collaborate in securing the highest practicable degree of uniformity in regulations, standards, procedures and organization in relation to aircraft, personnel, airways and auxiliary services in all matters in which such uniformity will facilitate and improve air navigation;

*Notin*g the objectives to be achieved through the Global Air Navigation and Safety Plans, recently approved by the Thirty-eighth Session of the ICAO Assembly;

Taking into account the paramount role civil aviation performs in the socio-economical, exchange and commerce development for regional integration;

Aware that the constant air transport growth in the region and the great worldwide events to be developed in the next years require additional efforts to improve even more the aviation safety, efficiency and security indicators;

Aware that the air transport growth poses additional challenges for the infrastructure of both airports and air navigation;

Aware that the management of regional processes towards the implementation of air navigation, safety and security operational improvements require the establishment of clear indicators and goals;

Recognizing that the South American Region has successfully implemented regional technical cooperation mechanisms adopting a joint approach in the solution of problems of common interest;

Aware that the harmonization of regional standards and procedures will facilitate a collaborative environment among States, guaranteeing an increase in the levels of air operations safety in the region and the achievement of joint goals;

Aware that regional air navigation operational improvements are more productive, and that delays from one State can negatively affect the remainder States;

Recognizing that legislation on the protection of sources of information is necessary for a better regional State Safety Programme (SSP) and Safety Management Implementation (SMS) implementation;

Aware that the safety objectives achieved to date require specific actions for their sustainment;

Recognizing the importance of developing air safety intelligence using reactive, proactive and predictive information to accompany the taking of decisions, mitigation of safety risks and continuous improvement;

Recognizing the collaborative working potential of the runway safety teams (RST) as a risk management tool; and

Considering the action plan agreed upon during the Meeting of Air Navigation and Flight Safety Directors of the South American (SAM) Region.

The thirteenth meeting of Civil Aviation Authorities of the SAM Region (RAAC/13):

DECLARES its commitment in achieving the following goals by 2016:

1. **Safety oversight**
Have 80% of effective implementation (EI) in the SAM Region.

2. **Accidents**
Reduce the SAM regional accident rate gap in 50% with regard to the global accident rate.

3. **Runway excursions**
Reduce runway excursions in 20% with regard to the average rate of the Region (2007 – 2012).

4. **Aerodrome certification**
Have 20% of the international aerodromes certified.

5. **State Safety Programmes (SSP) and Safety Management System (SMS) Implementation**
- *Reach 67% of SSP implementation.*
- *Reach 100% of the service providers SMS oversight capacity*.

6. **PBN terminal**
Full compliance with goals established in ICAO Assembly Resolution A37-11 regarding approach procedure with vertical guidance (APV).

7. **PBN enroute**
- *60% of the international aerodromes with standard instrument departure (SID) / standard instrument arrival (STAR) PBN.*
- *60% of the routes/airspaces with performance based navigation (PBN).*

8. **CDO**
40% of the international aerodromes / terminal control areas (TMA) with continuous descent operation (CDO).

9. **CCO**
40% of the international aerodromes / TMAs with continuous climb operations (CCO).

10. **Estimated fuel savings/ C02 emissions reduction based on the ICAO fuel savings estimation tool (IFSET)**
Reach 40,000 tons of regional CO2 emissions reduction per year in en-route PBN implementation.

11. **ATFM**
100% of the area control centre (ACCs) providing air traffic flow management (ATFM).

12. **AIM**
100% of the required elements in PHASE I (aeronautical information services (AIS) to aeronautical information management (AIM) Roadmap).

13. **AMHS interconnection**
100% of the Air Traffic Services Message Handling Services (AMHS) regionally interconnected.

14. **Interconnection of automated systems (ATS interfacility data communications (AIDC) exchange)**
100% of the automated systems interconnected.

15. **Implementation of national Internet protocol (IP) networks**
80% of the States with national IP communications networks implemented.

Issued in Bogota, Colombia, 6 December 2013

Agenda Item 2: Implementation of the Air Traffic Flow Management (ATFM) and Collaborative Decision-Making (CDM)

Follow-up on progress in the implementation of ATFM

2.1 The meeting noted that in the SAM Region, in 2013, 57% of States have made the corresponding runway capacity calculations. In 2014, Ecuador performed runway capacity calculations corresponding to Quito and Guayaquil and French Guiana presented information regarding runway capacity calculations in Cayenne, remaining Guyana, Panama, Suriname and Uruguay pending to complete these calculations. The progress registered to date is of 14% compared to 2013.

Percentage of States that have done runway and ATC sector capacity calculations

2013 57%	**ARG**	**BOL**	**BRA**	**CHI**	**COL**	**ECU**	**FGI**	**GUY**	**PAN**	**PAR**	**PER**	**SUR**	**URU**	**VEN**
	YES	YES	YES	YES	YES	NO	N/D	NO	NO	YES	YES	NO	NO	YES
2014 71%	**ARG**	**BOL**	**BRA**	**CHI**	**COL**	**ECU**	**FGY**	**GUY**	**PAN**	**PAR**	**PER**	**SUR**	**URU**	**VEN**
	YES	YES	YES	YES	YES	YES	YES	NO	NO	YES	YES	NO	NO	YES

2.2 Regarding the implementation of flow management units or positions, in 2013 35% of States comply with this goal. No progress has been registered in the implementation of flow management units during 2014.

2.3 States having answered the ATFM survey as part of the ATFM Implementation Plan designed during the SAM/IG/11 Meeting are: Argentina, Brazil, Chile, Colombia, Ecuador, Paraguay, Peru, Uruguay and Venezuela.

2.4 The Meeting noted that during RAAC/13 Meeting (Colombia, December 2013), Civil Aviation Authorities of the Region committed, by the Bogota Declaration, to achieve the goal of having at least one FMU or FMP implemented at ACC by maximum 2016. In such sense, best efforts should be made to fulfill the implementation, in order to be on time to achieve the goal.

2.5 The lack of implementation of flow management units in some ACCs of the Region, will severely impact the capacity and management of air traffic, taking into account the increase in demand expected due to the Soccer World Cup by mid-2014, and the Olympic Games in 2016, to be held in Brazil.

2.6 The increase in demand has a ripple effect that will affect many States, causing delays and consequent losses in users, along with a heavy workload in ATC units in the absence of sufficient management units for due balance between capacity and demand.

2.7 **Appendix A** to this part of the report shows a list of focal points for ATFM issues updated with the data available to the end of this meeting. It is required that these focal points are included in the daily information messages sent, in order to enable the availability of reliable and authorized information of the situation in each State.

2.8 Within the updating procedures usually used in SAM/IG/ meetings, the current ATFM Action Plan should be reviewed and completed with the information of progress made by States towards the development of tasks as well as with the responsible party in charge of its fulfillment. Said plan is contained in **Appendix B** to this part of the report.

Implementation of airport collaborative decision-making (A-CDM)

2.9 The Meeting was informed that the A-CDM concept is a work philosophy for airports, based on joint decision-making through sharing of information amongst the various parties involved in air operations. Aircraft operators, air navigation and ground handling service providers, and airport operators share (updated and precise) information that was not being shared before, with the resulting impact on air operations and benefitting both the stakeholders as well as passengers and the environment.

2.10 A-CDM is a CDM application for a specific environment (airports). CDM can be applied to different processes/procedures/services, since it is only a tool/process for attaining a given objective.

2.11 At present, A-CDM has been fully implemented in Europe at five international airports: Munich, Paris-Charles de Gaulle, Brussels, Frankfurt, and Rome-Fiumicino, and is in the process of implementation at 30 other airports, including Madrid-Barajas (being tested), Barcelona-El Prat, and Palma de Mallorca in Spain.

2.12 Main benefits of A-CDM are:

a) <u>Airport operators</u> - A-CDM may improve the efficient use of stands/gates and increase airport capacity;

b) <u>Aircraft operators</u> - A-CDM will help them reduce surface movement costs due to lower fuel consumption as a result of reduced taxiing and runway end holding times, also reducing environmental impact;

c) <u>Ground handling service providers</u> - A-CDM will make data available more in advance, permit better planning of tasks, and improve, *inter alia*, awareness of aircraft status on the ground, thus reducing delays;

d) <u>Air traffic service providers</u> - A-CDM can improve flow control and increase airspace capacity;

e) <u>Air traffic controllers</u> - A-CDM can assist in the development of runway improvements and capacity planning;

f) <u>Passengers</u> - Passengers will also obtain significant benefits since it will improve punctuality, increase customer satisfaction, reduce lost connections, and they will have better information and service when incidents occur.

2.13 The Meeting observed that although ICAO expects to have the associated SARPs ready only in 2016, Aviation System Block Upgrades (ASBU) have been already approved at the AN-Conf/12, and the 38th Assembly was presented with WP/39 and WP/336 on the importance of implementing A-CDM.

2.14 The Meeting noted that RAAC/13 meeting reviewed the SAM PBIP (Version 1.4) as aligned with the ASBU, and went on to approve and adopt it at regional level, formulating Conclusion RAAC/13-5 – *SAM Performance-Based Air Navigation Implementation Plan (SAM PBIP) as aligned with the ASBU.*

2.15 The PBIP includes ASBU Module N° B0-80: Improved airport operations through airport collaborative decision-making (A-CDM), designed to “Implement collaborative applications that will allow the sharing of surface operations data among the different stakeholders at the airport. This will improve surface traffic management, reducing delays on movement and manoeuvring areas and enhance safety, efficiency, and situational awareness.”

2.16 The SAM initiative would consist in working in the Region on the basis of the experience gained at airports throughout the world that have successfully implemented A-CDM and available documentation. The Meeting agreed that the first step would be to know the current situation of the Region. To this end, following States have completed an A-CDM survey, which is included as **Appendix C** to this part of the report: Brazil, Chile, Colombia, Ecuador, Panama, Paraguay, Peru, Suriname, Uruguay and Venezuela.

Interrelation between ATFM and PBN

2.17 The Meeting noted that the SAM PBN Implementation Group (SAM/PBN/IG) was created by SAM/IG/1 (Lima, Peru, 21 to 25 April 2008), in order to develop guidelines for RNAV and RNP implementation processes in en-route, terminal area and approach phases, considering the performance based navigation (PBN) concept.

2.18 Likewise, the SAM ATFM Implementation Group (SAM/ATFM/IG), was created by SAM/IG/1 in order to develop specific studies and guidelines for the implementation of a SAM system of Air Traffic Flow Management, according with ICAO strategic objectives.

2.19 After almost 6 years since the First SAM/IG Meeting, both groups have already made progress in their work programme, supporting the implementation of PBN and ATFM in the SAM Region. The current status of these groups indicates that the conditions are already given to provide States guidelines to favor the capacity, efficiency and safety of air navigation by the adequate interrelation between the PBN and ATFM concepts.

2.20 The Meeting observed that the Airspace Concept provides an operational scheme in an airspace developed to satisfy explicit strategic objectives such as the improvement of safety, the increase of air traffic and the environment impact mitigation capacity, etc. The airspace concept should include details of airspace practical organization, based on user characteristics as well as on CNS/ATM infrastructure available or to be implemented.

2.21 For TMA operations, the airspace concept involves implementation of SID and STAR, trying to avoid conflicts between arrivals and departures, favoring aircraft flying at optimum profiles with the application of Continuous Descent Operations (CDO) and Continuous Climb Operations (CCO). Moreover, STARs should be connected to APV procedures as far as possible.

2.22 The PBN application for the development of airspace concepts will provide the necessary tools for the reduction of flown distances, for the implementation of CDO and CCO concepts, as well as for the link between STAR RNAV/RNP and APV procedures.

2.23 The PBN trajectory predictability permits the use of more departure and arrival points in a TMA, reducing the flown distance and consequently, lowering the fuel consumption and gas emissions damaging the environment. Nevertheless, the increase of trajectories demands the use of "altitude windows for crossings", establishing adequate specific altitudes for aircraft arriving and departing from TMA.

2.24 Nevertheless, the PBN based airspace concepts as mentioned before, depend mostly on an adequate air traffic flow management, with the corresponding strategic, pre-tactic and tactic ATFM measures. The interaction between RNAV/RNP arrivals and departures, with CDO/CCO and an adequate link between STAR and approach, depends on a sequence of optimized departures and arrivals for which the air traffic controller should use radar vectors only on punctual situations.

2.25 Besides not permitting flights on their optimum profiles, another damaging consequence of using radar vectors in a "PBN environment" with a major number of trajectories is the work overload faced by air traffic controller to guarantee the separation between aircraft, taking into consideration that the new trajectories used with radar vectors are not "guaranteed" by the "altitude windows for crossings".

2.26 The strategic ATFM measures should provide an optimum air traffic flow, avoiding TMA overload, as well as enabling the application of pre-tactic and mainly tactic ATFM measures that guarantee an optimum sequence of arrivals and departures. Thus avoiding the application of radar vectors and holdings, among other measures, leading aircraft not to comply with their optimum flight profiles.

2.27 A simple example (only for illustration, without precise calculation) would be the case of a TMA covering only one airport, with only one runway. Supposing that the separation between successive approaches is 5 NM and that there are 4 entry points in a TMA with constant flow, the FMP/FMU should coordinate with the ATC dependencies in order to apply further measures to permit an adequate air traffic sequence, thus allowing that the air traffic concept operates adequately:

- "Miles-in-trail (MIT) not less than 20 NM in each entry point; or
- "Minutes-in-trail (MINIT)" not less than 2.5 minutes in each entry point. The application of MINIT should consider the use of "Required Time of Arrival" of FMS in aircrafts, aiming to an adequate sequence of air traffic for TMA.

2.28 Based on the discussions on the relationship between PBN and AFTM, the Meeting deemed it convenient that ATFM Action Plan should be updated so as to include activities to facilitate the integration between PBN and ATFM, containing as well ATFM strategic pre-tactic and tactic practical measures to facilitate the application of PBN airspace concepts.

DECEA actions towards the Soccer World Cup FIFA 2014

2.29 The Meeting was informed that the expected increase of the air traffic movement during the Soccer World Cup FIFA 2014 indicates the need to develop measures to maintain a fast and efficient Air Traffic Service (ATS) and Air Traffic Flow Management (ATFM).

2.30 DECEA has developed an Action Plan aiming at the maintenance of SISCEAB efficiency, taking into account the growth of air traffic demand and restrictions imposed to some parts of the Brazilian airspace throughout these major events.

2.31 Considering such a need, DECEA has developed actions within this Plan directly involving the national ATFM, such as airports coordination, restricted airspace implementation, ATCO training, Brazilian aerial mesh adjustments and airspace design amendments.

2.32 The actions planned and implemented by DECEA for the 2014 World Cup were defined in an Action Plan, published as an Ordinance, in order to adapt and optimize the aeronautical and airports infrastructure aiming to meet air traffic demand during these events.

2.33 In order to guarantee the effectiveness of the Action Plan in this complex scenario, two working groups were created to support DECEA: The *Committee for Major Events Coordination*, created to plan and manage the process of the Action Plan and the *SISCEAB preparation Committee*, to perform the actions set in the Action Plan.

2.34 It is important to highlight that the actions developed by DECEA on the World Cup are part of a major plan which guides SISCEAB bodies and the other stakeholders on the Collaborative Decision Making system (CDM).

2.35 In spite of being two months until World Cup, DECEA commitment with this event can be measured by observing the Action Plan activities which were already performed, such as: airspace design alterations in order to improve ATFM, ATCO training, AIC elaboration, disclosure of practical guide for stakeholders, en-route-CDM implementation, contingency plan update, etc.

2.36 In order to present a general view of the Action Plan, the most important issues of the plan are included as **Appendix D** to this part of the report, containing: perception of the plan, plan composition, as well as examples of two actions directly related to the ATFM, which were of fundamental importance for the implementation of the Plan goals. More information can be obtained by consulting DECEA Ordinance N°115-T/VICEA of 6 July 2011 and other amendments.

Use of SLOT for air taxi and general aviation aircraft at coordinated aerodromes during the FIFA 2014 World Cup in Brazil

2.37 The Meeting was informed that, in order to address increased demand and maintain a safe, orderly and efficient air traffic flow, the *Centro de Gerenciamento da Navegação Aérea* (CGNA) would coordinate 23 (twenty-three) aerodromes that are directly involved with the participants of the event, and would monitor an additional 50 (fifty) that, based on demand, could also be declared as coordinated aerodromes.

2.38 The Brazilian administration noted that airport infrastructure would be used at its maximum capacity through an efficient decision-making and data management system involving air navigation service providers (ANSPs), the civil aviation authority, airports, and airlines.

2.39 In order to meet increased demand foreseen for the 2014 World Cup in an efficient manner, DECEA had established in AIC A08/14 the rules applicable to the airports involved.

2.40 Furthermore, the Meeting noted that, through the implementation of these rules, DECEA sought to balance ATC and airport capacity. Coordinated and monitored aerodromes have been defined to serve scheduled, air taxi and general aviation operations.

2.41 Rules for SLOT, general aviation aircraft flow and coordinated aerodromes have been defined through CDM amongst ATFM representatives and airport authorities.

2.42 SLOT rules and a list of monitored and coordinated airports for the 2014 World Cup have been published in AIC A05/14 (**Appendix E** to this part of the report).

Temporary disruptions in Brazilian airspace during the FIFA 2014 World Cup

2.43 The Meeting was informed that DECEA, as the entity responsible for Brazilian airspace, had developed an air traffic flow management plan for big events, such as the United Nations Conference on Sustainable Development (Rio +20) (2012), the Football Confederations Cup (Brazil, 2013), and the World Catholic Youth Day (Rio, 2013).

2.44 The Meeting took note that events of high international visibility require perfect coordination amongst ATS, air defence, and public security. This integration enables maximum performance in ATS, ATFM, security, and airspace management, reducing the impact of increased demand during the event.

2.45 Following the security criteria applied in worldwide events like the FIFA World Cup, and seeking to maintain service levels, the Meeting was informed that the Brazilian Air Force command had defined specific (RESERVED, RESTRICTED or PROHIBITED) airspace areas with different vertical and horizontal boundaries.

2.46 Changes in Brazilian airspace during the FIFA 2014 World Cup are shown in the ***Guía Prático da Copa 2014*** on the CGNA website (www.cgna.gov.br), and in AIC A08/14 (**Appendix F** to this part of the report), covering the following topics:

a) *Master command and control room;*
b) *Air traffic control;*
c) *Aeronautical information circular;*
d) *Airports and their locations;*
e) *Coordinated airports*
f) *Airspace defence;*
g) *Airspace constraints;*
h) *Restrictions;*
i) *Definition of exclusion areas;*
j) *Operational constraints of exclusion areas;*
k) *Description of exclusion areas; and*
l) *Flight safety measures.*

2.47 Following a detailed analysis of the information provided by the Brazilian delegation, the Meeting concluded that several actions were needed to allow SAM States and ICAO to contribute to an adequate air traffic flow management during the FIFA 2014 World Cup in Brazil.

2.48 In order to provide States with a forecast of air traffic demand, the Meeting requested the Brazilian delegation to send information on the flights to be conducted during the World Cup. DECEA/CGNA agreed to present the Secretariat with information on commercial flights to be conducted during the event, by 7 May 2014, and information on non-commercial flights (general aviation, VIP, etc.), by 28 May 2014.

2.49 Likewise, in order to allow SAM States to prepare for air traffic demand, DECEA/CGNA will provide information concerning the dates considered to be critical for the World Cup.

2.50 The Meeting considered that SAM States should establish a Basic Action Plan containing the necessary measures for proper flow management, including *inter alia*: preventive and corrective maintenance of navigation and communication equipment, strengthening of operational and maintenance staff, establishment of daily operational briefings for air traffic controllers, etc. Such plan should be developed based on air traffic demand and taking into account the critical dates to be defined by DECEA/CGNA.

2.51 Based on the aforementioned air traffic demand and flow management measures already scheduled, the ICAO SAM Regional Office shall coordinate 3 teleconferences on 9 May, 30 May, and 5 June 2014, so that DECEA/CGNA may clarify any doubts that SAM States could have regarding the air traffic flow management strategy developed by Brazil.

2.52 The Meeting agreed on the need for SAM States to disseminate AIC A05/14 and AIC A08/14 and other relevant information within their States in order to inform users on the rules applicable to the entry and operation of aircraft in Brazilian airspace. Special attention must be given to the fact that ATC units in Brazil will not accept into their airspace aircraft flying to the 23 coordinated airports if they lack a SLOT assigned and inserted in the flight plan, as specified in AIC A05/14.

2.53 The Meeting pointed to the need for SAM States to update their ATFM points of contact who, in addition to participating in the teleconferences during the World Cup, would be involved in the ATFM activities organised by the Office. Furthermore, SAM States must also designate a point of contact or ATC/ATFM unit to be responsible for defining and conducting the activities established in collaboration with the Air Navigation Management Centre (CGNA), in case tactical ATFM measures need to be adopted and mainly in case of contingencies resulting from unforeseen situations. These operational points of contact are included in **Appendix G** to this part of the Report.

2.54 The Meeting took note that SAM States could visit the CGNA website (www.cgna.gov.br) to obtain information on restrictions imposed on airports and ATC sectors, the *Guía Prático da Copa 2014*, and the process for obtaining a slot for operating at coordinated airports.

2.55 The Meeting assigned the highest priority to the adoption of measures to avoid unilateral flow-restricting measures by States, especially those based on time and which did not take into account the possibility of vertical separation, such as accepting the transfer of only one aircraft every 10 minutes, regardless of flight level. Such measures could severely affect air traffic flow, especially during events of high air traffic demand, like the World Cup. Furthermore, the Meeting agreed that, in case flow-restricting measures were required, distance-based separations should be used, taking advantage of existing ATS surveillance tools. The adoption of such measures must be based on sound ATC sector capacity studies and should be coordinated in advance with ATC units responsible for the provision of ATC in adjacent FIRs and, during the World Cup, with CGNA.

2.56 In order to provide close coordination amongst South American ATC units, the Meeting agreed that SAM States should participate in the daily teleconferences that CGNA will conduct to coordinate operational actions and any ATFM measures needed during the day. Instructions for participating in such daily teleconferences are contained in **Appendix H** to this part of the report.

2.57 Based on the above, the Meeting formulated the following conclusion to enable SAM States and the ICAO SAM Regional Office to effectively contribute to an adequate flow management during the FIFA 2014 World Cup in Brazil:

Conclusion SAM/IG/13-4 Action to support flow management during the FIFA 2014 World Cup in Brazil

That the following action be taken to support flow management during the FIFA 2014 World Cup:

a) DECEA/CGNA send to the Secretariat air traffic demand forecasts for commercial flights by 7 May 2014, and for non-commercial flights (general aviation, VIP, etc.) by 28 May 2014;
b) DECEA/CGNA send information about critical dates of the event by 7 May 2014;
c) based on air traffic demand and taking into account critical dates, SAM States establish a Basic Action Plan containing the measures needed for adequate flow management, and defining, amongst other relevant aspects, the preventive and corrective maintenance strategy for navigation and communication equipment, the strengthening of operational and maintenance personnel, the establishment of daily operational briefings for air traffic controllers, etc.;
d) the ICAO SAM Regional Office coordinate 3 teleconferences, on 9 May, 30 May, and 5 June 2014, so that DECEA/CGNA may clarify any doubts SAM States may have regarding the air traffic flow management strategy developed by Brazil;
e) SAM States disseminate AIC A05/14 and AIC08/14, contained in Appendices F and G to this part of the report, and other relevant information within their States, in order to inform users about the rules applicable for the entry into, and use of, Brazilian airspace. Special attention must be given to the fact that ATC units of Brazil will not accept into their airspace aircraft flying to the 23 coordinated airports if they lack a SLOT assigned and inserted in the flight plan, as specified in AIC A05/14;
f) SAM States keep their ATFM points of contact up-to-date and available to allow for effective coordination of action required for the event;
g) SAM States designate a point of contact or ATC/ATFM unit to be responsible for defining and conducting the activities established in collaboration with CGNA, in case ATFM measures need to be adopted, and mainly in case of contingencies resulting from unforeseen situations;
h) SAM States assign the highest priority to the adoption of urgent measures to avoid unilateral flow-restricting measures that might severely affect air traffic flow, especially during events of great air traffic demand, such as the World Cup. Such measures, if needed, must be based on sound ATC sector capacity studies and coordinated in advance with ATC units responsible for ATC in adjacent FIRs and, during the World Cup, with CGNA; and
i) SAM States participate in the daily teleconferences that CGNA will conduct to coordinate operational activities and any ATFM measures that may need to be taken during the day. Instructions for participating in such daily teleconferences, starting 10 June to 14 July 2014, are contained in Appendix H to this part of the report.

Draft proposal on Second Part of ICAO Doc. 9971

2.58 The Meeting noted the draft that should become a complementary part, as Part II of ICAO Doc 9971, referring to Air Traffic Flow Management in a collaborative form. The Manual contains information on how ATFM should be implemented and applied by using collaborative decision-making processes, in order to balance capacity and demand within different volumes of airspace and airport environments.

2.59 This manual, which is included as **Appendix I** to this part of the report, highlights the need of close cooperation among different stakeholders by providing flexibility in the use of the airspace and airport resources.

2.60 This guidance material addresses issues related to air navigation service providers, airspace users, airline operation centers, airport operators, airport ground handlers, airport slot coordinators, regulators, military and security authorities, as well as meteorological agencies and industries related to aviation.

2.61 Based on the aforesaid, the Meeting adopted following conclusion:

Conclusion SAM/IG/13-5 Draft proposal on Second Part of ICAO Doc 9971

> That SAM States send by 30 September 2014, comments on draft proposal on Second Part of ICAO Doc 9971 aiming to provide required information for the optimization of the Manual, as deemed appropriate.

RLA/06/901 Project ATFM Work Plan for 2014

2.62 The Meeting observed that SAM/IG/12 noted the request for support from Project RLA/06/901 to conduct a theoretical/practical course on ATFM procedures to be performed by qualified personnel of States, with duration of 10 days at CGNA Brazil, if possible, during the second half of 2014.

2.63 This course contemplated to develop the following:

a) Airspace monitoring process;
b) Analysis process of air traffic demand;
c) Standards and procedures for the ATFM of a FMU/FMP dependence;
d) Implementation of ATFM preliminary measures;
e) TMI implementation;
f) ATFM messaging;
g) Development of international teleconferences;
h) Coordination of special events;
i) Civil/military coordination processes; and
j) ATFM exemption procedures.

2.64 The Meeting noted that the Coordinating Committee of Project RLA/06/901 approved within Output 3.1, which corresponds to the "*Operational implementation of new ATM automated systems and integration of existing*", to carry out the CGNA ATFM Operational Course, which is related to the ASBU B0-NOPS Module.

2.65 For the purpose of programming the course, the Meeting was of the opinion that it would be necessary to provide the information requested in the form attached as **Appendix J** to this part of the Report, detailing the product to be achieved and its relation to the ATFM implementation goals with which the States have committed in the Declaration of Bogota.

2.66 In this sense, the Meeting assigned to the Secretariat the task of coordinating the completion of course programming with the States and CGNA, to meet the expectations of the participants and adjusting them to CGNA possibilities.

Activities carried out by Paraguay regarding the implementation of ATFM harmonised with the Projects assigned to the SAM Region

2.67 The Meeting took note of the information provided by the delegation of Uruguay, which in 2009 had started along the path towards the implementation of the ATFM system. Through participation in courses on Airport Capacity and ATS Sector Calculation, ATFM, and the use of the CDM concept, the road was paved for gradual implementation.

2.68 In 2010, the new Manual of Functions of the *Dirección Nacional de Aeronáutica* (DINAC) was approved in 2010, and the future air traffic flow management units were envisaged in Paraguay. The air traffic flow central unit (mainly responsible for the regulatory area) and two FMUs at the international airports of Asunción and Guaraní of Ciudad del Este (operational areas) were approved.

2.69 The Meeting took note of the following achievements of the Administration of Paraguay:

- ATFM manual (updated and harmonised - January 2014).
- CDM manual (updated and harmonised - January 2014).
- ATFM roadmap (updated and harmonised - January 2014).
- AIC Supplements on ATFM implementation in Paraguay (permanent).
- ATFM training (SGES, November 2013).
- Second training on the collection of data required for runway and ATC sector calculation (delivered in December 2013, provided by trained officials of the FMU/SGES and FMU/SGAS).
- Runway capacity calculation at the Silvio Pettirossi (SGAS) and Guaraní (SGES) airports, completed and delivered in January 2014, based on data collected in 2013.
- Updating of the National Air Navigation Plan of Paraguay aligned with the SAM performance-based air navigation implementation plan, Chapter 4, and its respective B0 80-PIA 1 and B0 35-PIA 3.

2.70 The delegation of Paraguay stated that all the aforementioned documents had been harmonised in accordance with the guidance and recommendations emanating from the final report of the SAM/IG/12 meeting (based on the Regional Roadmap) and as envisaged in the ATFM Roadmap of Paraguay with a view to standardising criteria.

2.71 The progress made in the implementation of the Projects are directly related to the action plans of regional implementation groups, which are approved and implemented by the States, and are shown in **Appendix K** to this part of the report.

Calculation of the Capacity of “Silvio Pettirossi” and “Guaraní” International Airports by Paraguay

2.72 The Meeting noted that, in the final report of the SAM/IG/11 meeting held in May 2013, under Agenda Item 4: Implementation of air traffic management (ATFM) in the SAM Region, Item 4.4, it was noted that the States that had not done so yet should conduct runway and ATC sector capacity calculations at their main airports, giving priority to those with significant traffic.

2.73 In order to fulfil this task, the State of Paraguay submitted the results of the capacity calculation at the “Silvio Pettirossi” and “Guaraní” international airports, as shown in **Appendix L** to this part of the report.

APPENDIX A / APÉNDICE A

LIST OF CONTACTS FOR ATFM FOCAL POINTS AND ESTABLISHED ATFM UNITS /

LISTA DE CONTACTOS PARA PUNTOS FOCALES ATFM Y DE LAS UNIDADES ATFM ESTABLECIDAS

State / Estado	ATFM responsible-Name, MU/ACC, e-mail, telephone / Responsable ATFM-Nombre, FMU/ACC, correo electrónico, teléfono
ARGENTINA*	Víctor Marcelo de Virgilio Jefe del Departamento Gestión del Espacio Aéreo Tel.: +5411 4317-6000, Ext 15130/14105 Cel: E-mail: dsna@faa.mil.ar Carlos Omar Torres Administración Nacional de Aeronáutica Civil (ANAC) Jefe Departamento Programación Técnica Tel: +54 11 5941-3000, Ext. 69193 E-mail: ctorres@anac.gov.ar
BOLIVIA (PLURINATIONAL STATE OF) / BOLIVIA (ESTADO PLURINACIONAL DE)*	ATCO Miguel Castillo Ochoa Dirección General de Aeronáutica Civil (DGAC) Jefe de la Unidad ATM/SAR Tel.: +591 2211-4465 Cel.: +591 7204-6745 E-mail: mcastillo@dgac.gob.bo ATCO Daniel Bustamante Leyton Dirección General de Aeronáutica Civil (DGAC) Inspector ATM/SAR Tel.: Cel.: +591 7220-1865 E-mail: dbustamante@dgac.gob.bo
BRAZIL / BRASIL*	TCel Luiz Roberto Barbosa Medeiros Centro de Gerenciamento e Navegação Aérea – CGNA Chefe da Divisão de Operações Tel.: +55 21 2101-6531 Cel.: +55 21 99499-1658 E-mail: medeiros@cgna.gov.br Cap José Airton Patricio Centro de Gerenciamento e Navegação Aérea – CGNA Oficial ATM Tel.: +55 21 2101-6448 Cel.: +55 21 98554-4425 E-mail: patriciojap@cgna.gov.br

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* Actualizados en la SAM/IG/13

APPENDIX B

ACTION PLAN FOR THE IMPLEMENTATION OF ATFM AT SAM AIRPORTS

A: AIRPORT				
Task description	**Start**	**End**	**Responsible party (designate individual or organisation in charge)**	**Remarks**
1. Airport demand/capacity (runway capacity) analysis				
1.1 Carry out Calculation of Airport and Airspace Capacity of main airports by States. 1. Identify personnel available in each State to carry out calculation of runway capacity. 2. Identify which airports already have calculation of runway capacity. 3. Identify, prioritize and report what airports require calculation of runway capacity. 4. Carry out calculation of runway capacity. 5. Identify airports exceeding runway capacity.	Sep 2009	SAM/IG/14	States	**Valid** States that have not yet done so are encouraged to submit the required information. Item 4 has to be presented to SAM/IG/14.
1.2 Notify the airports where periods exist where the demand is greater than existing capacity including simulations, if necessary, by States.	Sep/Oct 2009	Permanent	States	**Permanent** Brazil, Paraguay and Peru presented the data. Assure States that the aim of these tasks is to share information.
1.3 Determine operational factors affecting airport demand and capacity to optimise utilisation of existing capacity, including simulations, is necessary.	Sep/Oct 2009	Permanent	States	**Valid** Brazil, Paraguay and Peru presented the data.
1.4 Notify airport capacity in terms of aircraft operation in main airports.	SAM/IG/12		States	**Permanent** Updated in each SAM/IG.

A: AIRPORT				
Task description	**Start**	**End**	**Responsible party (designate individual or organisation in charge)**	**Remarks**
2. Coordination with the ATM community				
2.1 Promote seminars to the ATFM community considering the CDM concept for the implementation of ATFM and initiate corresponding coordination. 1. Consider the implementation of a CDM process in main airports. 2. States will notify airports with this process.	SAM/IG/11	Permanent	States	**Valid** ATFM operational concept, ATFM manual and ATFM roadmap will be taken into account.
3. Infrastructure and database				
3.2 Establish a data base format to be used for automation.	SAM/IG/11		States	**Valid**
4. Policy, standards, and procedures				
4.7 Provide AIP/AIC published information on ATFM.	SAM/IG/11		States	**Permanent** Information will be presented in each SAM/IG The format of the publication is in doc 8196
5. Training				
5.1 Establish courses on: a) FMP/FMU training b) Airport CMD training	SAM/IG/13	SAM/IG/14	Project RLA/06/901	The participation of an AGA and an ATFM expert is expected for the A-CMD course
5.2 Draft ATFM training plans and submit them.	SAM/IG/11		States	
5. 3 Establish courses on: a) Training in FMP/FMU b) Training in airport CMD	SAM/IG/14		Project RLA/06/901	

A: AIRPORT				
Task description	**Start**	**End**	**Responsible party (designate individual or organisation in charge)**	**Remarks**
5.7 Monitor the training of the ATM community.	SAM/IG/11		States	**Permanent**
6. Final implementation decision				
6.1 Review factors that may affect the implementation decision.			States	**Valid**
6.2 Declare the pre-operational implementation in the defined area.			States	**Valid**
6.3 Declare the final operational implementation in the defined area.			States	**Valid**
7. Monitor system performance				
7.1 Develop performance indicators according to CDM manual.	SAM/IG/11	SAM/IG/14	States	**Valid** States will present an information paper concerning the performance indicators.
7.2 Develop a performance indicators follow-up programme	SAM/IG/11	SAM/IG/15	States	**Valid**
7.3 Develop and implement an ATFM post-implementation follow-up programme at airports.	SAM/IG/13	SAM/IG/15	States	**Valid**

ACTION PLAN FOR ATFM IMPLEMENTATION IN THE SAM REGION				
B- AIRSPACE (ATC Sector)				
Task description	**Start**	**End**	**Responsible party (designate individual or office in charge)**	**Remarks**
1. Airspace demand and capacity analysis				
1.2 Carry out ATC sectors calculation. 1. Identify personnel available in each State to carry out calculation of air space capacity. 2. Identify which sectors already count with calculation of capacity. 3. Identify, prioritize and report what sectors require calculation of capacity. 4. Identify sectors exceeding capacity.	SAM/IG/11	SAM/IG/13	States	**Permanent** States that have not yet done so are encouraged to submit the required information.
1.4 Carry out the States estimate airspace ATC sector capacity calculation and their terminal areas at the major airports.	Sep 2009	SAM/IG/13	States	**Valid**
1.5. Identify airspace sectors where demand sometimes exceeds capacity, including simulations by the States, if necessary.	TBD		States	**Permanent** Brazil has presented their studies.
1.6 Identify factors affecting airspace demand and capacity in order to optimise the use of existing capacity, including simulations if necessary.	TBD		States	**Permanent** Brazil has presented their studies.
1.7 Present conclusions on the existing airspace capacity.	TBD		States	**Permanente** Brazil has presented their studies.
2. Coordination with the ATM community				
2.2 Promote seminars to the ATFM community considering the airspace capacity concept for the implementation of ATFM and initiate corresponding coordination.	SAM/IG/11		States	**Valid**

ACTION PLAN FOR ATFM IMPLEMENTATION IN THE SAM REGION				
B- AIRSPACE (ATC Sector)				
Task description	**Start**	**End**	**Responsible party (designate individual or office in charge)**	**Remarks**
3. Infrastructure and database				
3.1 The ATFM/IG Group will present the basic requirements for a regional automated system.	SAM/IG/12	SAM/IG/13	ATFM/IG	**Valid** Brazil has already implemented. Colombia presented their preliminary requirements.
3.2 Coordinate implementation activities with the Automation Group.	SAM/IG/13		ATFM/IG	**Valid** Depends on information of 3.1.
4. Policy, standards, and procedures	TBD	Jun 2013	States	
4.2 Develop a regional strategy and framework for the implementation of Centralized ATFM units.	2008	206	Project RLA/06/901	**Valid**
4.3 Develop template/contents for operational agreements between Centralized ATFM units for interregional demand/capacity balancing.	2008	2016	Project RLA/06/901	**Valid**
4.4 Define common elements of situational awareness between FMUs; • common traffic displays; • common weather displays (Internet); • communications (teleconferences, web):	2008		States	**Permanent**
4.5 Review the regional ATFM implementation roadmap to be used by States as FMU/FMP implementation guide.	SAM/IG/11	Permanent	States	**Valid**

ACTION PLAN FOR ATFM IMPLEMENTATION IN THE SAM REGION				
B- AIRSPACE (ATC Sector)				
Task description	**Start**	**End**	**Responsible party (designate individual or office in charge)**	**Remarks**
4.6 Apply a national strategy to implement the use of a flexible upper airspace (FUA), on the basis or the Guideline for the Implementation of the Flexible Use of Airspace (FUA) Concept in the South American Region: • evaluate the management processes in the use of the airspace; • improve the current domestic airspace management to adjust dynamic changes to the traffic flows in tactical stages; • introduce improvements to the ground ATS systems and associated procedures for the extension of the FUA with dynamic management processes in the use of the airspace; • dynamically implement ATC sectorization with the aim of providing a better balance between demand and capacity that responds in real time to changing situations in the traffic flows and to accommodate in the short-term the users preferred trajectories.	2008	2015	States	**Valid**
5. Training	**TBD**	**TBD**		
5.1 Train personnel in the sector capacity calculation and subjects related to ATFM for the airspace.	TBD	TBD	States	**Permanent**
5.2 Prepare plans and ATFM training material	TBD	TBD	States	**Valid**
5.3 Conduct training of personnel involved.	TBD	TBD	States	**Valid**
6. Final implementation decision				
6.1 Analyse factors affecting the implementation decision.	N/A		States	**Valid**
6.2 Declare pre-operational implementation in the area defined.	N/A		States	**Valid**

ACTION PLAN FOR ATFM IMPLEMENTATION IN THE SAM REGION				
B- AIRSPACE (ATC Sector)				
Task description	**Start**	**End**	**Responsible party (designate individual or office in charge)**	**Remarks**
6.3 Declare definitive operational implementation in the area defined.	N/A		States	**Valid**
7. Monitor system performance				
7.1 Draft performance indicators	2010		Project RLA/06/901	**Valid**
7.2 Develop an indicators follow-up programme.	TBD		States	**Valid**

A-CDM Survey

	Questions	ARG	BOL	BRA	CHI	COL	ECU	GUY	PAN	PAR	PER	SUR	URU	VEN	TOTAL	
															YES	**NO**
1	**How many international airports have implemented the Airport-Collaborative Decision Making (A-CDM) in the State?**			NO	YES	NO	NO		NO	NO	NO	NO	NO	NO	**1**	**9**
2	**Is the A-CDM planned to be implemented at a short and medium term in the main international airpots of your State?** If the answer is affirmative, specify the airport(s) and the expected date of the implementation			YES	YES	YES	NO		YES	YES	NO	NO	NO	NO	**5**	**5**
3	**¿Has the State's service provider implemented the ATFM?**				YES	YES	NO		NO	YES	NO	NO	NO		**2**	**5**
	a) Area Control Centre in the form of Flow Management Post (FMP)?				YES	NO	NO				NO	NO	NO		**1**	**5**
	b) Area Control Centre in the form of Flow Management Unit (FMU)?				NO	NO	NO			YES	NO	NO	NO		**1**	**6**
	c) Centralized ATFM?			YES	NO	YES	NO			YES	NO	NO	NO	YES	**4**	**5**
4	**Has the Collaborative Decision Making (CDM) been implemented in an ATFM environment?**			YES	YES	YES	NO		NO	YES	NO	NO	NO	NO	**4**	**6**
5	**Users have shared information with the remaining interested parts of the A-CDM about:**															
	a) Flight plans and flight itineraries?			NO	YES	NO	NO		YES	YES	YES	NO	NO	NO	**4**	**6**
	b) Forecasts.			NO	YES	NO	NO		YES	NO	NO	NO	NO	NO	**2**	**8**
	c) Messages status.			NO	NO	NO	NO		YES	YES	NO	NO	NO	NO	**2**	**8**
	d) Information on operational planning (stand, gate, landing time, in-block time, turn-round time).			NO	NO	NO	NO		NO	YES	NO	NO	NO	NO	**1**	**9**
	e) Warnings and alerts (i.e. insufficient time to complete a turn-round time).			NO	NO	NO	NO		NO	YES	SI	NO	NO	NO	**2**	**8**
	f) Status of aeronautical/systems aids and meteorological conditions.			NO	YES	NO	NO		YES	YES	NO	NO	NO	NO	**3**	**7**

Questions		States													
		ARG	BOL	BRA	CHI	COL	ECU	GUY	PAN	PAR	PER	SUR	URU	VEN	TOTAL
6	**What is the average time that arriving aircraft have to wait in the taxiways or in the aprons because the gate assigned is still busy?**			5 to 15 m in airports with high traffic	6 min	30 to 45 min	6 min		N/A	10 min	30 min	minor	N/A	5 min	
7	**What is the average time that aircraft have to wait in the designated stand the arrival of the ground handling?**			5 to 15 m in airports with high traffic	N/A	No data	3 min		N/A	5 min	N/A	None	N/A	Nil	
8	**What is the average time of delay of departure aircraft in respect to the scheduled off-block time?**			Depends on distance/ time, procedures	6 min	15 to 30 min	15 min		N/A	FPL comp ly	15 min	10 min or less	N/A	45 min	
9	**What is the average time in which airlines should inform that the aircraft is not ready to initiate taxiing at the scheduled time?**				N/A	N/A	At ATC req.		N/A	N/A	N/A	30 min after dep. time	N/A	30 min	

APPENDIX D / APÉNDICE D

ACTION PLAN

FIFA SOCCER WORLD CUP BRAZIL 2014

PLAN DE ACCION

COPA MUNDIAL DE FUTBOL FIFA BRASIL 2014

MINISTRY OF DEFENSE

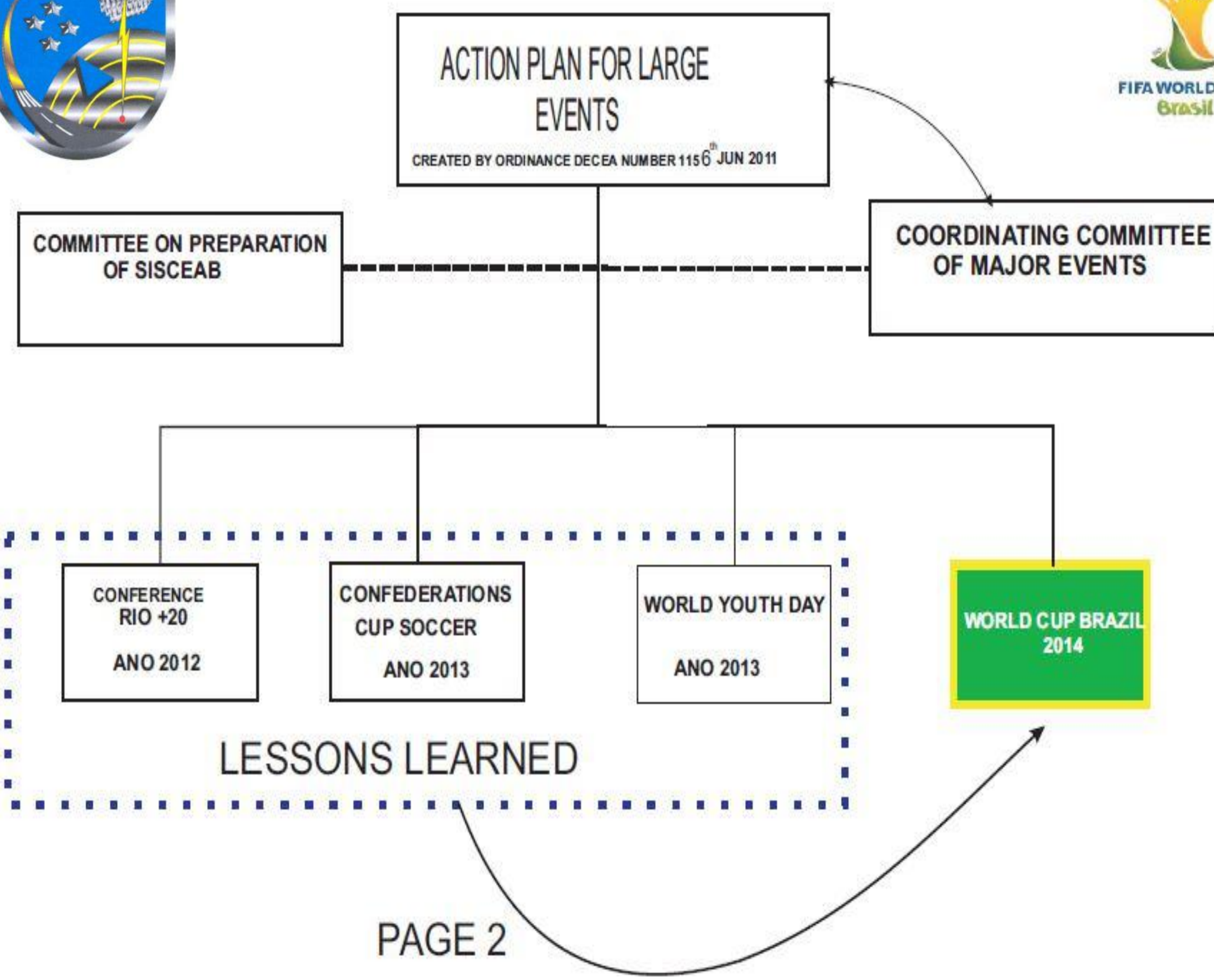
AIR FORCE COMMAND

DEPARTMENT OF AIRSPACE CONTROL

ACTION PLAN
WORLD CUP SOCCER 2014

ACTION PLAN FOR THE FIFA BRAZIL SOCCER WORLD CUP 2014

CONCEPTION



ACTION PLAN FOR THE FIFA BRAZIL SOCCER WORLD CUP 2014

DECEA

FIFA WORLD CUP Brasil

ACTION PLAN FOR THE WORLD CUP

MODULES

- CAPACITY
- PROJECTION OF DEMAND
- MONITORING EQUIPMENTS AND AIDS
- LEGISLATION
- AIR TRAFFIC FLOW MANAGEMENT
- MANAGEMENT OF OPERATIONAL SAFETY
- SECURITY AND DEFENSE
- CAPACITATIONS OF HUMAN RESOURCES
- AIRSPACE DESIGN
- PROPAGANDA

ACTION PLAN FOR THE FIFA BRAZIL SOCCER WORLD CUP 2014

MODULE 1: CAPACIDADE				
ACTIONS				STATUS
1.1 To define the segments of aviation of the airports in issue.	1.2 measure and declare the runway capacities of the main airport.	1.4 Measure and declare the sector capacities of the of the FIR and TMA of the airspaces.	***Correction action proposed by the committee***	Accomplished
MODULE 2: PROJECTED DEMAND				
ACTIONS				
2.1 Project the aircraft demand for the impacted airports.	2.2 project the aircraft demand for the controlled sectors of the Brazilian air space.		***Correction action proposed by the committee***	Accomplished
MODULE 3: MONITORING EQUIPMENTS AND AIDS				
ACTIONS				
3.1 To perform preventive and corrective maintenance on the installed infrastructure.	3.2 To perform the inspections in flight of the installed infrastructure.		3.3 to make available the INTERNET and INTRAER in every ATS facilities involved with the events.	Accomplished
3.4 To map the aeronautical and airport existing infrastructure.	3.5 To modernize the operational room of the Air Navigation Management Center.		***Correction action proposed by the committee***	Accomplished
MODULE 4: LEGISLATION				
ACTIONS				
4.1 Issue a brochure with all the alterations during the event and make it known by the public.	4.2 Issue the AIC of the coordinated aerodromes.		4.3 To prepare the Air space coordination plan (PCEA).	Accomplished

MODULE 5: AIR TRAFFIC FLOW MANAGEMENT				
ACTIONS				STATUS
5.1 Propose operational agreements with the ATFM centers around the world.	5.2 Simulate in advance the scenarios (aerodromes and air spaces) through a real time simulation (STR) and in accelerated time (STA).	5.3 To analyse the air traffic flow directions in the controlled sectors of the air space.	5.4 To set up the Performance Based Navigation in the Terminals of Recife, Brasilia, Rio de Janeiro and Sao Paulo.	
5.5 Adapt and apply the military methodology (Command and control) in a civilian event, the implementation of the Master Room of Control and Command and the work methodology used in this room.	5.6 To turn operational the INTEGRATED SYSTEM OF MANAGEMENT AND AIR TRAFFIC MOVIMENT (SIGMA)	5.7 Along with INFRAERO and Airport stake holders to define the numbers of vacancies in the aprons of the general aviation.	5.8 To gather together with the DTCEA´s involved in these events to discuss about operational subjects.	Accomplished
5.9 To revise the AIC with the air space alterations during the event.	5.10 To perform the operational planning of the numbers of consoles in the operational facilities involved with the events.	5.11 to promote the en route Route CDM with the ATC facilities and airline companies, regional and international ones.	*Correction action proposed by the committee*	
MODULE 6 : MANAGEMENT OF OPERATIONAL SAFETY				
ACTIONS				STATUS
6.1 Study and analysis of risk management.	6.2 Update and publication of contingency plans		*Correction action proposed by the committee*	Accomplished

MODULE 7 : SECURITY AND DEFENSE			
ACTIONS			STATUS
7.1 Implementation of the national plan of defence in events of such proportions.	7.2 The creation of exclusion areas, visual corridors and patrol areas for exclusive use of the security and defence aircraft.	***Correction action proposed by the committee***	Accomplished
MODULE 8: CAPACITATIONS OF THE HUMAN RESOURCES			
ACTIONS			**STATUS**
8.1 To prepare and train the technicians in order to guarantee the appropriate number of personnel according to the traffic demand.	8.2 Trainning of the Chiefs, Directors and Commanders.	***Correction action proposed by the committee***	Accomplished
MODULE 9: AIRSPACE DESIGNE			
ACTIONS			
9.1 Redesign the Brazilian air space to attend the demand increase.	9.2 New sectorization of the busy sectors in order to attend the projected demand increase.	***Correction action proposed by the committee***	Accomplished
MODULE 10: PROPAGANDA			
ACTIONS			
10.1 Definition of the target public for preparing the propaganda.	10.2 Selection of the appropriate media for the propaganda with the suitable target public.	***Correction action proposed by the committee***	Accomplished

MODULE

FLOW MANAGEMENT

↓

ACTION 5.4
PERFORMANCE BASED NAVIGATION
PBN

AT 12th december 2013, was implemented PBN in Rio and São Paulo terminals areas in order to increase ATC capacity.

ACTION PLAN FOR THE FIFA BRAZIL SOCCER WORLD CUP 2014

MODULE

FLOW MANAGEMENT

ACTION 5.11
COLABORATIVE DECISION MAKING
CDM

WERE CHANGED FLOWS FOR EUROPE AND AMERICA IN
1st CDM-ROUTES

"1st CDM- Routes Workshop" conducted by the Brazilian ANSP (DECEA) on a Joint venture with IATA and the Brazilian Airlines Association (ABEAR), in the period of 26th and 27th March 2014."

APPENDIX E / APÉNDICE E

AIC A05/14

SLOT ALLOCATION REGULATION FOR AIR TAXI AND GENERAL AVIATION AIRCRAFT AT COORDINATED AERODROME THROUGHOUT FIFA BRAZIL SOCCER WORLD CUP 2014

AIC A05/14

REGLAS PARA EMPLEO DE SLOT PARA AERONAVES DE TAXI AÉREO Y AVIACIÓN GENERAL EN AERÓDROMOS COORDINADOS DURANTE LA COPA DEL MUNDO DE FÚTBOL FIFA BRASIL 2014

BRASIL

DEPARTAMENTO DE CONTROLE DO ESPAÇO AÉREO
SUBDEPARTAMENTO DE OPERAÇÕES
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AIC
A
05/14

01 MAY 2014

SLOT ALLOCATION REGULATION FOR AIR TAXI AND GENERAL AVIATION AIRCRAFT AT COORDENATED AERODROME THOUGHOUT FIFA BRASIL SOCCER WORLD CUP 2014

1 PRELIMINARY CONSIDERATIONS

1.1 PURPOSE

This aeronautical information circular (AIC) purpose is detailing the procedures for the landings and departures of air taxi and general aviation aircraft at coordinated aerodromes, throughout FIFA Brazil 2014 Soccer World Cup, modifying the rules in AIP Brazil Part ENR 1.9 and ICA 100-11 (Flight Plan) items 3.2.1, 3.3.1, 5.3.1 and 5.4.1.

1.2 SCOPE

The provisions within this AIC apply, when suitable, to the facilities, and sectors of the Air Space Control System (SISCEAB) concerned with the air navigation management, and also the air space users under Brazilian jurisdiction.

2 INTRODUCTION

On October 30th 2007, the Fédération Internationale de Football Association (FIFA) officialized the occurrence of the Soccer World Cup 2014 in Brazil, having, however, the matches of the 32 delegations that will participate in the championship, distributed to 12 cities.

The experience acquired throughout the United Nations Conference about sustainable development (Rio+20), FIFA Soccer Confederations Cup Brazil 2013 and Catholic World Youth Day Rio 2013 raises the confidence that the current airport infrastructure at the main aerodromes in the cities where the soccer matches are going to take place will not suffice to accommodate the expected air traffic demand.

In order to manage the increase of the air traffic and maintain a safe, orderly and efficient air traffic flow, the Air Navigation Management Center (CGNA) is going to coordinate 23 (twenty-three) aerodromes directly related to the reception of people and event participants, and monitor other 50 (fifty), that might, depending on the air traffic demand, be announced coordinated.

Therewith, the airport infrastructure will be used at its maximum capacity, with an efficient decisive system supported by the exchange and spread of management information among air navigation service providers (ANSP), Civil Aviation Authority, Airport Administrations, Aircraft Operators and holders.

BRASIL **AIC**
DEPARTAMENTO DE CONTROLE DO ESPAÇO AÉREO **A**
SUBDEPARTAMENTO DE OPERAÇÕES **05/14**
DIVISÃO DE COORDENAÇÃO E CONTROLE
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REGRAS DE ALOCAÇÃO DE SLOT PELA AS AERONAVES QUE EFETUAM SERVIÇOS DE TAXI AÉREO E AS DE AVIAÇÃO GERAL EM AERÓDROMOS COORDENADOS DURANTE A COPA DO MUNDO DE FUTEBOL FIFA BRASIL 2014

1 DISPOSIÇÕES PRELIMINARES

1.1 FINALIDADE

Esta circular de informações aeronáuticas (AIC) tem por finalidade detalhar os procedimentos para as operações de pouso e decolagem de aeronaves que efetuam serviços de taxi aéreo e as de aviação geral em aeródromos coordenados, durante a Copa do Mundo de Futebol FIFA Brasil 2014, alterando as regras contidas na Parte ENR 1.9 da AIP Brasil e dos itens 3.2.1, 3.3.1, 5.3.1 e 5.4.1 da ICA 100-11 (Plano de Voo).

1.2 ÂMBITO

As disposições constantes nesta AIC aplicam-se, naquilo que lhes couber, aos órgãos, e setores do Sistema de Controle do Espaço Aéreo Brasileiro (SISCEAB) envolvidos com o gerenciamento da navegação aérea, bem como aos usuários do espaço aéreo sob jurisdição do Brasil.

2 INTRODUÇÃO

No dia 30 de outubro de 2007, a Fédération Internationale de Football Association (FIFA) oficializou a realização da Copa do Mundo de Futebol de 2014 no Brasil, tendo, portanto, os jogos das 32 delegações que disputarão o campeonato, distribuídos em 12 cidades-sedes.

A experiência adquirida durante a Conferência das Nações Unidas sobre Desenvolvimento Sustentável (Rio+20), Copa das Confederações de Futebol FIFA Brasil 2013 e Jornada Mundial da Juventude Católica Rio 2013 traz a convicção de que a atual infraestrutura aeroportuária nos principais aeródromos localizados nas cidades-sedes dos jogos será insuficiente para receber o volume de movimentos aéreos esperado.

Para gerenciar o crescimento dos movimentos aéreos e manter um fluxo de tráfego aéreo seguro, ordenado e eficiente, o Centro de Gerenciamento da Navegação Aérea (CGNA) irá coordenar 23 (vinte e três) aeródromos diretamente relacionados à recepção direta de público e participantes do evento, e monitorar outros 50 (cinquenta), que poderão, dependendo da demanda de movimentos, serem declarados coordenados.

Com isso, a infraestrutura aeroportuária será utilizada na sua máxima extensão possível, com um eficiente sistema decisório apoiado pela troca e difusão de informações gerenciais entre provedores de serviço de navegação aérea (PSNA), Autoridade de Aviação Civil, Administrações Aeroportuárias, Operadores e Exploradores de aeronaves.

3 DEFINITIONS

3.1 ALTERNATE AERODROME

Herein this AIC, alternate aerodrome, is that one indirectly related to the reception of people and event participants, being an option under bad weather circumstances, saturation, airport infrastructure interdiction or impracticability of the destination aerodrome.

3.2 COORDINATED AERODROME

Aerodrome where the air traffic demand expectation tends to exceed the capacity of the airport infrastructure, having, however, all its landing and departure operations conditioned to the acquisition of ATC SLOT.

3.3 COORDINATED AERODROME LEVEL A

Coordinated aerodrome level A is the one where the air traffic demand expectation tends to exceed the runway capacity, being, however, necessary ATC SLOT to perform either landing or departure operations.

3.4 COORDINATED AERODROME LEVEL B

Coordinated aerodrome level B is the one where the air traffic demand expectation tends to exceed either the capacity of aircraft apron or the passenger's and/or cargo terminal.

3.5 DESTINATION AERODROME

Herein this AIC, destination aerodrome is the one directly related to people and event participants reception.

3.6 MONITORED AERODROME

Aerodrome where the demand expectation tends to exceed 80% of the announced capacity. Depending on the demand, the monitored aerodrome might be announced coordinated.

3.7 AIR TRAFFIC DEMAND

It's the number of aircraft that requires the ATM System services in a given period of time.

3.8 AIR TRAFFIC DEMAND EXPECTATION

Total number of intended operations at an aerodrome or control sector, in a specified period of time.

3.9 FLIGHT INTENT

It's the total amount of information related to a scheduled flight, whether or not communicated to an ATS facility.

3 DEFINIÇÕES

3.1 AERÓDROMO ALTERNATIVO

Para efeito desta Circular, aeródromo alternativo é aquele indiretamente relacionado à recepção de público e participantes do evento, servindo como opção em situações climáticas, saturação, interdição ou impraticabilidade da infraestrutura aeroportuária do aeródromo de destino.

3.2 AERÓDROMO COORDENADO

Aeródromo cuja expectativa de demanda de tráfego aéreo tende a ultrapassar a capacidade aeroportuária, tendo, portanto, todas as suas operações de pouso e decolagem condicionadas à obtenção de SLOT ATC.

3.3 AERÓDROMO COORDENADO NÍVEL A

Aeródromo coordenado nível A é aquele cuja expectativa de demanda tende a ultrapassar a capacidade de pista, sendo, portanto, necessário SLOT ATC para realizar operações tanto de pouso como de decolagem.

3.4 AERÓDROMO COORDENADO NÍVEL B

Aeródromo coordenado nível B é aquele cuja expectativa de demanda tende a ultrapassar a capacidade do pátio de estacionamento de aeronaves ou do terminal de passageiros e/ou carga, sendo, portanto, necessário SLOT ATC para realizar operações de pouso.

3.5 AERÓDROMO DE DESTINO

Para efeito desta Circular, aeródromo de destino é aquele diretamente relacionado à recepção direta de público e participantes do evento;

3.6 AERÓDROMO MONITORADO

Aeródromo cuja expectativa de demanda tende a ultrapassar 80% da capacidade declarada. Dependendo da demanda, o aeródromo monitorado poderá ser declarado como coordenado.

3.7 DEMANDA DE TRÁFEGO AÉREO

É o número de aeronaves que requisitam os serviços do Sistema ATM em um dado período de tempo.

3.8 EXPECTATIVA DE DEMANDA DE TRAFEGO AÉREO

Número total de operações pretendidas em um aeródromo ou setor de controle, por um período de tempo especificado.

3.9 INTENÇÃO DE VOO

É o conjunto de informações relativas a um voo programado, transmitido ou não a um órgão ATS.

3.10 ATM SYSTEM

It's a system that provides air traffic management through collaborative integration of people, information, technologies, resources and services; with the support of communication, navigation and surveillance either on the ground or in space.

3.11 ATC SLOT

Allotted time for either an aircraft to pass over a position report fix or a landing or departure operation.

3.12 OPPORTUNITY SLOT

Timetable directed to either the departure or landing operation of an aircraft taking advantage of the utilization of an ATC SLOT not put to practical use by another aircraft.

4 GENERAL RULES

4.1 The validity period of an ATC SLOT is from 5 minutes before until 15 minutes after the time allotted on the CGNA Integrated SLOT Central (CIS) worksheet, except when the landing and departure operations are delayed by the following reasons: adverse meteorological conditions; stoppage in the provision o ATS services; interdiction or impracticability of the airport infrastructure; and implementation of air traffic flow management (ATFM) measures.

REMARK: The aircraft that performs landing or departure operations outside the above mentioned period is going to have its registration referred to the Civil Aviation Authority (ANAC) for the expected sanctions.

4.2 During the period an aerodrome is declared coordinated, the regular, extra, charter and cargo flights belonging to the air transportation companies are going to be included in the Integrated SLOT Central worksheet by the Civil Aviation Authority (ANAC), according to the partition of the infrastructure capacity dedicated for this segment of aviation. The changes, delays and cancellations will be coordinated by CGNA.

REMARK: The landing and departure operations time changes of regular, extra, charter and cargo flights belonging to the air transportation companies are going to be subject to the ATC SLOT availability.

4.3 The ATC SLOT allocation for the aircraft performing specialized air taxi service and the general aviation ones must be performed at the CIS timetable worksheet of the Allocation SLOT System, in the timetable dedicated for the operation of these aviation segments, being the service acknowledged by the delivery of an alphanumeric code, that will have to be included in the FPL item 18 (eighteen), complete or simplified. In order to do that, users must register in the System and send CIS the airworthiness certificate (CA) of national registration aircraft and ANAC flight authorization (AVANAC) of foreign registration aircraft, which are going to be registered in each user's LOGIN.

REMARK 1: The CIS SLOT allocation System is going to be available to the users from May 14th, 2014 at 00:00h, for allocations at the aerodromes which are going to be declared coordinated throughout FIFA Soccer World Cup Brazil 2014.

3.10 SISTEMA ATM

É um sistema que provê gerenciamento de tráfego aéreo por meio da integração colaborativa de pessoas, informações, tecnologias, recursos e serviços, com suporte de comunicação, navegação e vigilância baseadas no solo ou no espaço.

3.11 SLOT ATC

Horário definido para que uma aeronave efetue a passagem sobre um fixo de posição ou uma operação de pouso ou decolagem.

3.12 SLOT DE OPORTUNIDADE

Horário destinado à operação de decolagem ou pouso de uma aeronave em razão do aproveitamento de um SLOT ATC não utilizado.

4 REGRAS GERAIS

4.1 O período de validade de um SLOT ATC está compreendido entre 5 minutos antes até 15 minutos após o horário alocado na planilha da Central Integrada de SLOT (CIS) do CGNA, exceto nos casos em que as operações de pouso ou decolagem sejam atrasadas pelos seguintes motivos: condições meteorológicas adversas; interrupção na prestação dos serviços ATS; Interdição ou impraticabilidade da infraestrutura aeroportuária; e aplicação de medidas de gerenciamento de fluxo de tráfego aéreo (ATFM).

NOTA: A aeronave que realizar operações de pouso ou decolagem fora do período acima especificado terá a sua matrícula encaminha à ANAC para as sanções previstas.

4.2 No período em que um aeródromo for declarado coordenado, os voos regulares, extras, charters e fretamentos das empresas de transporte aéreo serão incluídos na planilha da Central Integrada de SLOT (CIS) pela Agência Nacional de Aviação Civil (ANAC), de acordo com a partição da capacidade da infraestrutura destinada a esse segmento da aviação. As alterações, atrasos e cancelamentos serão coordenados pelo CGNA.

NOTA: As alterações de horários das operações de pouso e decolagem dos voos regulares, extras, charters e cargueiros das empresas de transporte aéreo estarão sujeitas à disponibilidade de SLOT ATC.

4.3 A alocação do SLOT ATC para as aeronaves que efetuam serviços especializados de táxi aéreo e as da aviação geral deverá ser realizada na régua do Sistema de alocação de SLOT da CIS, nos horários destinados à operação desse segmento da aviação, sendo o atendimento confirmado pelo recebimento de um código alfanumérico, que deverá ser incluído no campo 18 (dezoito) do FPL, completo ou simplificado. Para tanto, os usuários deverão se cadastrar no Sistema e encaminhar à CIS o Certificado de Aeronavegabilidade (CA) das aeronaves de matrícula nacional e a autorização de voo da ANAC (AVANAC) das aeronaves de matrícula estrangeiras, os quais ficarão registrados no LOGIN de cada usuário.

NOTA 1: O sistema de alocação de SLOT da CIS ficará disponível ao usuário a partir da zero hora do dia 14 de maio de 2014, para as alocações nos aeródromos que serão declarados coordenados no período da Copa do Mundo de Futebol FIFA Brasil 2014.

REMARK 2: The CIS SLOT system is going to be blocked for SLOT allocation at the coordinated aerodromes located, or nearby, the air defense yellow areas and also the red ones 15 minutes prior and throughout its activation (for more detailed information about the time of activations of these areas, the user must refer to the subject specific AIC.

REMARK 3: The aircraft that achieve landing ATC SLOT allocation prior to the above mentioned period must departure prior to the areas activation, in order not to exceed the maximum time limit on the ground. Otherwise, are going to be penalized by ANAC sanctions.

4.4 ATC SLOT time change is not going to be allowed in the system. The user intending to change the landing or departure operation time must cancel the allocation and allocate another SLOT to the new intended timetable.

4.5 The departure and destination aerodromes are going to be allowed to be changed in the system itself. However, for a departure SLOT only the destination aerodrome will be allowed to be changed and for a landing SLOT only the departure aerodrome is going to be allowed to be changed.

4.6 The aircraft registration can be changed in the System itself. However, the replaced aircraft is going to be blocked by the system for SLOT allocation on the day the change occurred.

REMARK: In order to avoid the CIS system misuse and put into practice the equality principle, CGNA is going to limit the number of changes (aircraft registration and departure and destination airports), informing this limit on CIS WEBSITE (http://www.cgna.gov.br/full_web_slot).

4.7 The ATS messages for the changes are going to be filed only at the coordination rooms (AIS) after the changes in the items 4.5 and 4.6.

4.8 Specially at the departure coordinated aerodromes, the specialized air taxi flights and the general aviation flights must file at the coordination room (AIS) the FPL, complete or simplified, with at least 01h30min (one hour and thirty minutes) prior to the departure ATC SLOT defined timetable.

4.9 The specialized air taxi flights and the general aviation flights, of which the destination aerodrome is coordinated, must file at the coordination room (AIS) the FPL, complete or simplified, with at least 01h30min (one hour and thirty minutes) prior to the expected timetable in the item 13 of the Flight Plan.

REMARK: The aircraft that intend to departure from aerodromes without ATS facility must file the FPL at the coordination room (AIS) of the coordinated aerodrome, via telephone or telex, with at least 01h30min (one hour and thirty minutes) prior to the expected departure time.

4.10 The flights that don't comply with the terms in the items 4.8 e 4.9 are going to have the allocation canceled, being the ATC SLOT reutilized as opportunity SLOT.

REMARK: The opportunity SLOTs mentioned in the item above are going to be suspended for the coordinated aerodrome located inside or nearby the air defense yellow areas and also the red ones, throughout their activation period.

NOTA 2: O sistema de SLOT da CIS ficará bloqueado para alocação de SLOT nos aeródromos coordenados localizados, ou próximos, às áreas amarelas e vermelhas de defesa aérea 15 minutos antes e durante as suas ativações (para maiores detalhes sobre o tempo de ativação dessas áreas, o usuário deverá consultar a AIC específica sobre o assunto).

NOTA 3: As aeronaves que conseguirem alocar SLOT ATC de pouso antes do período acima deverá realizar a operação de decolagem antes da ativação das áreas, a fim de não ultrapassar o tempo máximo de permanência no solo. Caso contrário sofrerão sanções previstas pela ANAC.

4.4 Não será permitida a alteração do horário do SLOT ATC no sistema. O usuário que pretende alterar o horário da operação de pouso ou decolagem deverá cancelar a alocação e conseguir outro SLOT para o novo horário pretendido.

4.5 Os aeródromos de partida e destino poderão ser alterados no próprio Sistema. No entanto, para um SLOT de decolagem só poderá ser alterado o aeródromo de destino e para um SLOT de pouso só poderá ser alterado o aeródromo de partida.

4.6 A matrícula da aeronave poderá ser alterada no próprio Sistema. No entanto, a aeronave substituída ficará bloqueada pelo sistema para alocação de SLOT no dia em que foi realizada a alteração.

NOTA: visando evitar o mau uso do Sistema da CIS e praticar o princípio da equidade, o CGNA limitará o número de alterações (matrícula de aeronave e aeródromos de partida e destino), informando esse limite no WEBSITE da CIS http://www.cgna.gov.br/full_web_slot.

4.7 As mensagens ATS de modificações só poderão ser apresentadas nas salas de informações aeronáuticas (AIS) após as alterações contidas nos itens 4.5 e 4.6.

4.8 Especificamente nos aeródromos coordenados de partida, os voos especializados de táxi aéreo e os voos da aviação geral deverão apresentar na Sala AIS os FPL, completo ou simplificado, com antecedência mínima de 01h30min (uma hora e trinta minutos) do horário definido como SLOT ATC de decolagem.

4.9 Os voos especializados de táxi aéreo e os voos da aviação geral, cujo aeródromo de destino é coordenado, deverão apresentar na Sala AIS os FPL, completo ou simplificado, com antecedência mínima de 01h30min (uma hora e trinta minutos) do horário previsto no campo 13 do Plano de Voo.

NOTA: As aeronaves que pretendam decolar de aeródromos desprovidos de órgãos ATS deverão apresentar os FPL na Sala AIS do aeródromo coordenado, via telefone, ou telex, com antecedência mínima de 01h30min (uma hora e trinta minutos). Os planos AFIL não serão permitidos enquanto o aeródromo de destino for considerado coordenado.

4.10 Os voos que não cumprirem os prazos contidos em 4.8 e 4.9 perderão a alocação, sendo os SLOT ATC reaproveitados como SLOT de oportunidade.

NOTA: os SLOT de oportunidade que trata o item acima serão suspensos para os aeródromos coordenados localizados ou próximos às áreas amarelas e vermelhas de defesa aérea no período das suas respectivas ativações.

4.11 The specialized air taxi flights and the general aviation flights with an ATC SLOT, that already presented their respective flight intentions (complete or simplified FPL) and know they are not going to use it; must cancel it on the CIS System, sparing no effort for the cancellation to be done at least 01h30min (one hour and thirty minutes) from the allocated timetable.

REMARK 1: The canceled ATC SLOTs will be made available for CIS, being reutilized by other users.

REMARK 2: The cancellation of the ATC SLOT does not release the user from filing the cancellation ATS message (CNL) at the coordination room (AIS).

REMARK 3: The aircraft that does not utilize the allocated ATC SLOT is going to have its registration referred to ANAC for the expected sanctions.

5 MOVIMENT BETWEEN COORDINATED AERODROMES

5.1 Herein this AIC, the coordinated airports are going to be classified by levels, in accordance with the availability of the airport infrastructure elements: level A – The demand tends to overcome the runway capacity; and level B - The demand tends to overcome the aircraft parking apron capacity, or the passengers and/or cargo terminal.

5.2 The aircraft that perform specialized air taxi service and the general aviation ones that intend to operate at a level A coordinated aerodrome must allocate ATC SLOT for a landing and also a departure operation.

5.3 The aircraft that perform specialized air taxi services and the general aviation ones that intend to operate at a level B coordinated aerodrome must allocate the ATC SLOT only for the landing operations.

Example 1: movement between coordinated level A aerodromes:

For a movement departing from a level A aerodrome, with destination to another level A coordinated aerodrome, the user must fill in the item 18 of the FPL, complete or simplified, the departure SLOT code of the departure aerodrome and the landing SLOT code of the destination aerodrome.

Example 2: Movement departing from a level A coordinated aerodrome to a level B coordinated aerodrome:

The users intending to perform a movement, departing from a coordinated aerodrome level A to a coordinated aerodrome level B must fill in the item 18 of the FPL, complete or simplified, the departure SLOT code of the departure aerodrome and the landing SLOT code of the destination aerodrome.

Example 3: Movement departing from a Level B coordinated aerodrome to a level A coordinated aerodrome:

For a movement, departing from a level B coordinated aerodrome to a level A coordinated aerodrome, the user must fill in the item 18 of the FPL, complete or simplified, only the landing SLOT code of the destination aerodrome.

4.11 Os voos especializados de táxi aéreo e os voos da aviação geral de posse de um SLOT ATC, que já apresentaram as respectivas intenções de voo (FPL, completo ou simplificado) e tenham conhecimento da sua não utilização deverão cancelá-los no Sistema da CIS, envidando esforços de forma que o cancelamento seja realizado com antecedência mínima de 01h30min (uma hora e trinta minutos) do horário alocado.

NOTA 1: Os SLOT ATC cancelados serão disponibilizados para CIS, sendo reaproveitados para outros usuários.

NOTA 2: O cancelamento do SLOT ATC não desobriga da apresentação da mensagem ATS de cancelamento do plano (CNL) na Sala AIS.

NOTA 3: A aeronave que não utilizar o SLOT ATC alocado terá a sua matrícula encaminha à ANAC para as sanções previstas.

5 DESLOCAMENTO ENTRE AERÓDROMOS COORDENADOS

5.1 Para efeito desta Circular, os aeroportos coordenados serão classificados por níveis, de acordo com a disponibilidade dos elementos da infraestrutura aeroportuária: nível A – a demanda tende a ultrapassar a capacidade de pista; e nível B – a demanda tende a ultrapassar a capacidade do pátio de estacionamento de aeronaves, ou do terminal de passageiros e/ou carga.

5.2 As aeronaves que efetuam serviços especializados de táxi aéreo e as da aviação geral que pretendam operar em um aeródromo coordenado de nível A deverão alocar SLOT ATC tanto para realizar uma operação de decolagem, como uma de pouso.

5.3 As aeronaves que efetuam serviços especializados de táxi aéreo e as da aviação geral que pretendam operar em um aeródromo coordenado de nível B deverão alocar SLOT ATC para realizar apenas operações de pouso.

Exemplo 1: deslocamento entre aeródromos coordenados de nível A:

Para um deslocamento decolando de um aeródromo de nível A, com destino a outro aeródromo coordenado de nível A, o usuário deverá incluir no campo 18 do FPL, completo ou simplificado, o código SLOT de decolagem do aeródromo de partida e o código SLOT de pouso do aeródromo de destino.

Exemplo 2: deslocamento decolando de um aeródromo coordenado de nível A para um aeródromo coordenado de nível B:

Os usuários que pretendam realizar um deslocamento, decolando de um aeródromo coordenado de nível A para um aeródromo coordenado de nível B deverão incluir no campo 18 do FPL, completo ou simplificado, o código SLOT de decolagem do aeródromo de origem e o código SLOT de pouso do aeródromo de destino.

Exemplo 3: deslocamento decolando de um aeródromo coordenado de nível B para um aeródromo coordenado de nível A:

Para um deslocamento, decolando de aeródromo coordenado de nível B para um aeródromo coordenado de nível A, o usuário deverá incluir no campo 18 do FPL, completo ou simplificado, somente o código SLOT de pouso do aeródromo de destino.

Example 4: movement between level B coordinated aerodromes:

For a movement, departing from a level B coordinated aerodrome to another level B coordinated aerodrome, the user must fill in the item 18 of the FPL, complete or simplified, only the landing SLOT code of the destination aerodrome.

Example 5: movement from a level A coordinated aerodrome to a non-coordinated aerodrome:

For a movement from a level A coordinated aerodrome to a non-coordinated one, the user must fill in the item 18 of the FPL, complete or simplified, only the departure SLOT code of the departure aerodrome.

Example 6: movement from a non-coordinated aerodrome to level A coordinated aerodromes:

For a movement, departing from a non-coordinated aerodrome to a level A coordinated aerodrome, the user must fill in the item 18 of the FPL, complete or simplified, only the landing SLOT code of the destination aerodrome.

Example 7: Movement between level B coordinated aerodromes to non-coordinated aerodromes:

For a movement, departing from a level B coordinated aerodrome to a non-coordinated aerodrome, the user will need neither the departure SLOT from the departure aerodrome nor the landing SLOT to the destination aerodrome.

Example 8: Movement from non-coordinated aerodrome to level B coordinated aerodromes:

For a movement, from a non-coordinate aerodrome to a level B coordinated aerodrome, the user must fill in the item 18 of the FPL, complete or simplified, only the landing SLOT code of the destination aerodrome.

6 ASSIGNMENTS

6.1 CGNA ASSIGNMENTS:

a) Keep the CIS System on CGNA webpage operational;

b) Register the air taxi aircraft and the general aviation ones in their respective LOGIN, according to the receiving of the Airworthiness Certificates (A) and ANAC flight authorization (AVANAC);

c) Keep a file with all CA and AVANAC and exclude from the register the aircraft with respective overdue CA and AVANAC;

d) Issue PRENOTAM coordinating an aerodrome, informing the coordination level and the relevant period;

e) Include in the CIS allocation system all the regular, extra, charter and cargo flights of the air transportation companies referred by ANAC;

f) Monitor the SLOT system and list the discrepancies found;

Exemplo 4: deslocamento entre aeródromos coordenados de nível B:

Para um deslocamento, decolando de um aeródromo coordenado de nível B com destino a outro aeródromo coordenado de nível B, o usuário deverá incluir no campo 18 FPL, completo ou simplificado, somente o código SLOT de pouso do aeródromo de destino.

Exemplo 5: deslocamento de aeródromos coordenados de nível A para aeródromos não coordenados:

Para um deslocamento, decolando de um aeródromo coordenado de nível A com destino a um aeródromo não coordenado, o usuário deverá incluir no campo 18 do FPL, completo ou simplificado, somente o código SLOT de decolagem do aeródromo de partida.

Exemplo 6: deslocamento de aeródromos não coordenados para aeródromos coordenados de nível A:

Para um deslocamento, decolando de um aeródromo não coordenado com destino a um aeródromo coordenado de nível A, o usuário deverá incluir no campo 18 do FPL, completo ou simplificado, somente o código SLOT de pouso do aeródromo de destino.

Exemplo 7: deslocamento entre aeródromos coordenados de nível B para aeródromos não coordenados:

Para um deslocamento, decolando de um aeródromo coordenado de nível B com destino a um aeródromo não coordenado, o usuário não precisará de SLOT para decolar do aeródromo de partida, nem SLOT para pousar no aeródromo de destino.

Exemplo 8: deslocamento de aeródromos não coordenados para aeródromos coordenados de nível B:

Para um deslocamento, decolando de um aeródromo não coordenado com destino a um aeródromo coordenado de nível B, o usuário deverá incluir no campo 18 FPL, completo ou simplificado, somente o código SLOT de pouso do aeródromo de destino.

6 ATRIBUIÇÕES

6.1 ATRIBUIÇÕES DO CGNA:

a) Manter o Sistema da CIS na página WEB do CGNA operacional;

b) Cadastrar as aeronaves das empresas de taxi aéreo e da aviação geral nos respectivos LOGIN, conforme os recebimentos dos Certificados de Aeronavegabilidade (CA) e autorização de voo da ANAC (AVANAC);

c) Manter um arquivo com todos CA e AVANAC e excluir do cadastro as aeronaves com seus respectivos CA e AVANAC vencidos;

d) Emitir PRENOTAM declarando um aeródromo coordenado, informando o nível de coordenação e o período de vigência;

e) Incluir no sistema de alocação da CIS todos os voos regulares, extras e charters das empresas de transporte aéreo encaminhados pela ANAC;

f) Monitorar o Sistema de SLOT e registrar as discrepâncias encontradas;

g) Generate a report for the SLOT allocation, flight data changes and ATC SLOT cancellation according to the LOGIN, company and aircraft; and

h) refer to ANAC for analysis and expected sanctions the registration of the aircraft that do not follow the rules in this AIC.

6.2 COORDINATION ROOMS (AIS) ASSIGNMENTS AT COORDINATED AERODROMES:

a) Cancel, in the SLOT System, interface of the coordinated aerodrome coordination room (AIS), all the departure ATC SLOT of the flights that, until 01h30min (one hour and thirty minutes) from the allocated timetable, did not file the complete or simplified FPL;

b) Cancel, in the SLOT System, interface of the coordinated aerodrome coordination room (AIS), all the landing ATC SLOT, of which FPL was not processed until 01h30min (one hour and thirty minutes) before the expected departure time at the departure aerodrome;

c) Refer constantly to the SLOT System and verify the opportunity landing ATC SLOT availability (time interval of less than 45 minutes from the expected timetable) and inform the Control Tower (TWR) of the coordinated aerodrome;

d) Allocate in the SLOT System, interface of the coordinated aerodrome coordination room (AIS), the opportunity ATC SLOT, listing the LOGIN and the respective flight data from those users who intend to operate the canceled SLOT timetable;

e) Inform CGNA immediately any discrepancy in the SLOT System, or the verification of its misuse by users;

f) Do not accept FPL, complete or simplified, when either the departure or destination aerodromes is considered coordinated and the ATC SLOT alphanumeric code is not specified in the item 18;

g) Verify in the SLOT System, interface of the coordinated aerodrome coordination room (AIS), whether or not the SLOT code presented in the flight plan is part of the SLOT System schedule and in accordance with the aircraft registration or flight number;

h) Register, in the SLOT System, interface of the coordinated aerodrome coordination room (AIS), presentation item, the ATC SLOT, of which Flight Plan and/or flight notification has been presented and approved.

6.3 NON-COORDINATED AERODROME COORDINATION ROOM (AIS) ASSIGNMENTS:

a) Do not accept the FPL, complete or simplified, when the departure or destination aerodrome is coordinated and the ATC SLOT alphanumeric code is not specified in the item 18;

b) Verify in the SLOT System, interface of the aerodrome coordination room (AIS), whether or not the SLOT code presented in the Flight Plan is part of the SLOT System schedule and in accordance with the aircraft registration and flight number; and

g) Gerar os relatórios de alocação de SLOT, alterações de dados do voo e cancelamentos de SLOT ATC por LOGIN, empresa e aeronave; e

h) Encaminhar à ANAC para análise e aplicação de sanções previstas as matrículas das aeronaves que descumprirem as regras previstas nesta AIC.

6.2 ATRIBUIÇÕES DAS SALAS AIS EM AERÓDROMO COORDENADO:

a) Cancelar, no Sistema de SLOT, interface Sala AIS Aeródromo Coordenado, todos os SLOT ATC de decolagem dos voos que, até 01h30min (uma hora e trinta minutos) do horário alocado, não apresentaram o FPL completo ou simplificado;

b) Cancelar, no Sistema de SLOT, interface Sala AIS Aeródromo Coordenado, todos os SLOT ATC de pouso, cujo FPL não foi processado até 01h30min (uma hora e trinta minutos) antes do horário previsto de decolagem no aeródromo de partida;

c) Consultar constantemente o Sistema de SLOT e verificar a disponibilidade de SLOT ATC de oportunidade para pouso (intervalo de tempo menor que 45 minutos do horário previsto) e informar à Torre de Controle (TWR) do Aeródromo coordenado;

d) Alocar no Sistema de SLOT, interface Sala AIS Aeródromo Coordenado, o SLOT ATC de oportunidade, registrando o LOGIN e os respectivos dados do voo daqueles usuários que desejarem operar nos horários dos SLOT cancelados pela Sala AIS, conforme 4.8 e 4.9;

e) Informar imediatamente ao CGNA qualquer discrepância no Sistema de SLOT, ou a constatação de mau uso do mesmo por parte dos usuários;

f) Não aceitar o FPL, completo ou simplificado, quando o aeródromo de partida ou de destino for considerado coordenado e não esteja especificado no item 18 o código alfanumérico do SLOT ATC;

g) Checar no Sistema de SLOT, interface Sala AIS Aeródromo Coordenado, se o código SLOT apresentado no Plano de Voo está contido na régua do Sistema de SLOT e consciente com a matrícula da aeronave ou número do voo; e

h) Registrar, na régua do Sistema de SLOT, interface Sala AIS Aeródromo Coordenado, campo apresentação, o SLOT ATC, cujo Plano de Voo e/ou Notificação de Voo tenha sido apresentado e aprovado.

6.3 ATRIBUIÇÃO DAS SALAS AIS AERÓDROMO NÃO COORDENADO:

a) Não aceitar o FPL, completo ou simplificado, quando o aeródromo de partida ou de destino for considerado coordenado e não esteja especificado no item 18 o código alfanumérico do SLOT ATC;

b) checar no sistema de slot, interface sala ais, se o código slot apresentado no plano de voo está contido na régua do sistema de slot e consciente com a matrícula da aeronave ou número do voo; e

c) Register, in the SLOT System schedule, interface of the coordination room (AIS), presentation item, the ATC SLOT of which Flight Plan and/or flight notification has been presented and approved.

6.4 APP ASSIGNMENTS:

a) Coordinate with the TWR of the coordinated aerodrome the availability of opportunity ATC SLOT, every time an aircraft demonstrates its landing intents at that location.

6.5 COORDINATED AERODROME TWR ASSIGNMENTS:

a) Verify with the coordination room (AIS) the availability of opportunity landing ATC SLOT; and

b) Verify in the SLOT System, interface of the coordination room (AIS), whether or not the flight and/or the aircraft calling for clearance (regular flight, unscheduled, air taxi and general aviation) is in the System schedule, in accordance with the item 4.2 of this AIC.

6.6 AIR TAXI USERS AND GENERAL AVIATION ASSIGNMENTS:

a) Arrange for the register in the SLOT System, in accordance with instructions in the CIS WEBSITE (http://www.cgna.gov.br/full_web_slot);

b) Forward, via e-mail to CIS: centralslotsuporte@cgna.gov.br, the respective CA and/or AVANAC of the aircraft that will be registered under the LOGIN;

c) Operate the CIS SLOT System;

d) Include in the FPL, complete or simplified, the ATC SLOT code provided by the CIS SLOT System;

e) File a Flight Plan to an aerodrome nearby the coordinated airport and, in the item 18 of t he FPL and/or Flight Notification, add the following remark: RMK/OPT, in case the aircraft wants to use a landing opportunity SLOT, example: RMK/OPT SBSP; and

f) Contact the APP, of which jurisdiction is the coordinated aerodrome, and reinforce his flight intents, in case the aircraft wants to use an opportunity

7 SLOT CONCERNED AERODROMES

7.1 Herein this AIC, the following aerodromes are going to be announced coordinated throughout the Soccer World Cup FIFA Brazil 2014: SBGL; SBRJ; SBJR; SBGR; SBSP; SBKP; SBSJ; SBCF; SBBH; SBBR; SBGO; SBCY; SBCG; SBCT; SBBI; SBFL; SBMT; SBJD; SBPA; SBSV; SBRF; SBNT; SBFZ; SBSG; e SBEG.

7.2 The following aerodromes are being monitored throughout the Soccer World Cup FIFA Brazil 2014 and, depending on the demand, might be announced coordinated: SBRP; SBVT; SBCB; SBME; SBCP; SBJF; SBPR; SBMK; SBIP; SBUL; SBUR; SBCN; SBTE; SBJP; SBMS; SBPB; SBMO; SBKG; SBUF; SBPL; SBJU; SBAR; SBIL; SBQV; SBPS; SWRD; SBBW; SBVH; SBPJ; SBNF;SBLO; SBMG; SBCH; SBBV; SBPV; SBBE; SBSN; SBMQ; SBIC; SBTF; SBFI; SBCX; SBPK; SBCM; SBPF; SBAQ; SBBU; e SBSR.

c) Registrar, na régua do Sistema de SLOT, interface Sala AIS, campo apresentação, o SLOT ATC, cujo Plano de Voo e/ou Notificação de Voo tenha sido apresentado e aprovado.

6.4 ATRIBUIÇÕES DO APP:

a) Coordenar com a TWR do aeródromo coordenado quanto à disponibilidade de SLOT ATC de oportunidade, sempre que uma aeronave manifestar sua intenção de pouso naquela localidade.

6.5 ATRIBUIÇÕES DA TWR DO AERÓDROMO COORDENADO:

a) Verificar com a Sala AIS a disponibilidade de SLOT ATC de oportunidade para pouso; e

b) Checar no Sistema de SLOT, interface Sala AIS, se o voo e/ou a aeronave chamando para autorização (voo regular, não regular, taxi aéreo e aviação geral) está na régua do Sistema, de acordo com o contido no item 4.2 desta AIC.

6.6 ATRIBUIÇÕES USUÁRIOS TAXI AÉREO E AVIAÇÃO GERAL:

a) Providenciar o cadastro no Sistema de SLOT, conforme instruções contidas no WEBSITE da CIS: http://www.cgna.gov.br/full_web_slot;

b) Encaminhar, via email para CIS: centralslotsuporte@cgna.gov.br, os respectivos CA e/ou AVANAC das aeronaves que ficarão registradas no LOGIN;

c) Operar o Sistema de SLOT da CIS;

d) Incluir no FPL, completo ou simplificado, o código do SLOT ATC fornecido pelo Sistema de SLOT da CIS;

e) Apresentar um Plano de Voo para um aeródromo nas proximidades do aeroporto coordenado e, no Item 18 do FPL e/ou Notificação de Voo, acrescentar a seguinte observação: RMK/OPT, no caso de a aeronave querer usar um SLOT de oportunidade para pouso, exemplo: RMK/OPT SBSP; e

f) Estabelecer contato com o APP, cuja jurisdição esteja o aeródromo coordenado, e reiterar a sua intenção de pouso, no caso da aeronave querer usar um SLOT de oportunidade.

7 AERÓDROMOS ENVOLVIDOS

7.1 Para efeito desta AIC, os seguintes aeródromos serão declarados coordenados durante a Copa do Mundo de Futebol FIFA Brasil 2014: SBGL; SBRJ; SBJR; SBGR; SBSP; SBKP; SBSJ; SBCF; SBBH; SBBR; SBGO; SBCY; SBCG; SBCT; SBBI; SBFL; SBMT; SBJD; SBPA; SBSV; SBRF; SBNT; SBFZ; SBSG; e SBEG.

7.2 Os seguintes aeródromos estarão sendo monitorados durante a Copa do Mundo de Futebol FIFA Brasil 2014 e, dependendo da demanda, poderão ser declarados coordenados: SBRP; SBVT; SBCB; SBME; SBCP; SBJF; SBPR; SBMK; SBIP; SBUL; SBUR; SBCN; SBTE; SBJP; SBMS; SBPB; SBMO; SBKG; SBUF; SBPL; SBJU; SBAR; SBIL; SBQV; SBPS; SWRD; SBBW; SBVH; SBPJ; SBNF;SBLO; SBMG; SBCH; SBBV; SBPV; SBBE; SBSN; SBMQ; SBIC; SBTF; SBFI; SBCX; SBPK; SBCM; SBPF; SBAQ; SBBU; e SBSR.

7.3 The period and the coordination level, as well as the maximum time limit in each coordinated aerodrome parking apron are going to be informed via NOTAM in timely fashion.

8 FINAL CONSIDERATIONS

8.1 The Flow Management Cells (FMC) of the ATC facilities involved with coordinated aerodromes must, systematically, verify the compliance with the procedures detailed herein this AIC.

8.2 The approval of this AIC was published in DECEA Internal Bulletin, nº 47, of march of 12, 2014.

8.3 The cases not foreseen in this AIC are going to be decided by Your Excellency the Chief of the Sub-department of Operations of the Air Space Control Department (DECEA).

7.3 O período e o nível de coordenação, bem como o tempo máximo de permanência no pátio de estacionamento de cada aeródromo coordenado serão informados via NOTAM oportunamente.

8 DISPOSIÇÕES FINAIS

8.1 As Células de Gerenciamento de Fluxo (FMC) dos órgãos de controle envolvidos com aeródromos coordenados deverão, sistematicamente, verificar o cumprimento dos procedimentos detalhados nesta AIC.

8.2 A aprovação desta AIC foi publicada no Boletim Interno do DECEA nº 47, de 12 de março de 2014.

8.3 Os casos não previstos nesta AIC serão resolvidos pelo Exmo Sr. Chefe do Subdepartamento de Operações do Departamento de Controle do Espaço Aéreo (DECEA).

APPENDIX F / APÉNDICE F

PRACTICAL REFERENCE GUIDE ON THE AIRSPACE CHANGES FOR THE FIFA SOCCER WORLD CUP BRAZIL 2014

AIC A08/14

GUIA PRACTICA DE CONSULTA SOBRE LAS ALTERACIONES DEL ESPACIO AÉREO PARA LA COPA DEL MUNDO DE FÚTBOL FIFA BRASIL 2014

AIC A08/14

FIFA WORLD CUP
Brasil

Guia Prático de Consulta sobre as alterações do Espaço Aéreo para a Copa do Mundo de Futebol FIFA Brasil 2014

DECEA

Departamento
de Controle do Espaço Aéreo

Este guia tem apenas a função de ilustrar e apresentar, resumidamente, as implicações e restrições operacionais decorrentes da realização da Copa do Mundo de Futebol - FIFA Brasil 2014, não se constituindo em instrumento oficial de consulta.
Para o planejamento e desenvolvimento de qualquer tipo de atividade aérea, consultar as informações aeronáuticas pertinentes.

Maiores informações nos sites:
www.decea.gov.br
www.cgna.gov.br
www.anac.gov.br

EDIÇÃO
Centro de Navegação Aérea (CGNA/DECEA)

DIAGRAMAÇÃO
Assessoria de Comunicação Social (ASCOM/DECEA)
Projeto Gráfico: Aline Prete
Fotografias: Agência Força Aérea - Ten Enilton
Mapas: Google Earth®

Editado em 18/03/2014

Introdução

O crescimento dos movimentos aéreos, esperado durante a realização da Copa do Mundo de Futebol de Futebol FIFA Brasil 2014, sinaliza a necessidade de pronto atendimento e eficiência na prestação dos serviços de tráfego aéreo (ATS) e gerenciamento do fluxo de tráfego aéreo (ATFM). Um grande evento traz novas demandas e com elas maior necessidade de planejamento, tornando-se imperativo manter a segurança, fluidez e eficiência, aspectos já presentes no atendimento prestado ao tráfego aéreo.

O trabalho para alcançar a excelência desejada inicia-se com a execução criteriosa de um planejamento amplo, claro, objetivo e exequível. Com isso, assegura-se o máximo desempenho dos serviços ATS, do ATFM, da segurança das operações aéreas e do gerenciamento do espaço aéreo brasileiro, minimizando, assim, as possibilidades de impactos decorrentes do previsível aumento do tráfego aéreo no período do evento.

Há décadas, o Brasil vem consolidando posição de vanguarda no gerenciamento de tráfego aéreo (ATM), não se limitando a investimentos em equipamentos e novas instalações, mas indo muito além, desenvolvendo processos próprios, enfatizando o treinamento especializado e incorporando com eficiência, rapidez e flexibilidade conceitos modernos.

O País tem a responsabilidade de administrar o espaço aéreo territorial (8.511.965 km^2) e o espaço aéreo sobrejacente à área oceânica, que se estende até o meridiano 10º W, perfazendo um total de 22 milhões de km^2. Nesse espaço, existem diversos eventos acontecendo ao mesmo tempo, tais como: voos da aviação comercial internacional e doméstica, voos da aviação geral, treinamento da aviação civil, exercícios, manobras e operações militares, aeronaves remotamente pilotadas, ensaio de voo e diversas atividades aeroesportivas, e tudo deve funcionar sempre em perfeita harmonia. A qualidade e eficácia no uso do espaço aéreo se manterão também durante a Copa do Mundo de Futebol FIFA Brasil 2014, graças ao trabalho de diversos setores, entre eles o Comando da Aeronáutica (COMAER).

O COMAER, por meio do Departamento de Controle do Espaço Aéreo (DECEA), efetuou um planejamento para a Copa do Mundo de Futebol FIFA Brasil 2014 que teve como foco a segurança e a manutenção de um fluxo de tráfego aéreo rápido, seguro e ordenado e, por meio do Comando de Defesa Aeroespacial Brasileiro (COMDABRA), um planejamento minucioso das ações necessárias para a defesa do espaço aéreo.

Para a execução desses planejamentos, O COMAER, por meio do Centro de Gerenciamento da Navegação Aérea (CGNA), unidade subordinada ao DECEA, elaborou um plano de ação considerando o incremento da demanda e as restrições impostas em algumas porções do espaço aéreo.

Todos os módulos previstos neste plano de ação, tais como: estrutura e capacidade do espaço aéreo; projeção da demanda; infraestrutura técnica; adequação da legislação, normas e procedimentos; segurança e defesa; capacitação técnica; entre outros, foram rigorosamente cumpridos.

Esta não é a primeira vez que o COMAER traça um planejamento para gerenciar o fluxo do tráfego aéreo em um grande evento. Durante a Conferência das Nações Unidas sobre Desenvolvimento Sustentável (Rio +20), em junho de 2012, a Copa das Confederações de Futebol FIFA Brasil 2013, em junho de 2013, e a Jornada Mundial da Juventude Católica Rio 2013, em agosto de 2013, o Comando da Aeronáutica teve uma experiência bem-sucedida e elogiada, utilizando um conceito e uma estrutura militar num evento civil.

Este conceito é colocado em prática na sala master de comando e controle, localizada no CGNA, e será repetido na Copa do Mundo de Futebol FIFA Brasil 2014 e nos Jogos Olímpicos e Paraolímpicos em 2016.

Para a Copa do Mundo de Futebol FIFA Brasil 2014, a segurança e a eficiência, binômio que caracteriza nosso espaço aéreo, deixarão marcas indeléveis que servirão como legado para o Brasil.

Sala Master de comando e controle

A sala master de comando e controle contará com a participação de diversos órgãos governamentais para coordenar as ações durante a Copa do Mundo de Futebol FIFA Brasil 2014.

Dentre essas ações estão o monitoramento do fluxo de tráfego aéreo, segurança e defesa do espaço aéreo, infraestrutura aeronáutica e aeroportuária, vigilância sanitária, vigilância agropecuária, receita federal, polícia federal e inspeção da aviação civil.

A sala master permitirá consolidar um conceito que unificará e padronizará processos dos diversos elos envolvidos, direta ou indiretamente, nas questões do espaço aéreo e aeroportos, visando garantir a segurança dos usuários por meio do gerenciamento de informações e do processo de tomada de decisão em colaboração.

Durante as atividades da sala master, todas as informações serão compartilhadas sobre a chegada, os deslocamentos e a partida de autoridades e delegações.

Cercada por "*videowalls*", a sala master permitirá a visualização da situação das aeronaves evoluindo nos aeroportos (sistema de pistas, pátio e terminais), bem como no espaço aéreo, com o posicionamento das aeronaves e as respectivas informações de voo, disponibilizando aos profissionais uma demanda constante de informações, o que permitirá melhores decisões e coordenações inerentes ao gênero.

Controle de Tráfego Aéreo

Para garantir um fluxo de tráfego aéreo rápido, seguro e ordenado, bem como a defesa do espaço aéreo brasileiro em toda sua extensão, nossos controladores de tráfego aéreo ficarão de prontidão, preparados a prestar um serviço de excelência, atestado pela Organização da Aviação Civil Internacional (OACI) nas suas auditorias.

Contaremos com 2600 controladores treinados no Instituto de Controle do Espaço Aéreo (ICEA) para lidar com demandas cotidianas e extremas do setor aéreo durante o evento, como ações terroristas, sequestros de aeronaves e identificação de aviões que, por ventura, se aproximarem dos estádios dos jogos sem autorização.

O treinamento, intitulado PROSIMA – Programa de Simulação de Movimentos Aéreos –, envolveu a simulação de tráfegos da circulação aérea nacional, composta pela aviação civil e militar, em áreas demarcadas para rotas aéreas, aproximações, tráfego de aeródromo e manobras. Esse treinamento irá garantir a segurança do tráfego aéreo durante os jogos.

Desde novembro de 2012, os profissionais que estarão de prontidão nos órgãos de controle de tráfego aéreo (ATC) das 12 cidades-sede, participam desse complexo programa de capacitação voltado especialmente às particularidades da demanda estimada para o evento.

Circular de Informações Aeronáuticas

O DECEA publicará uma circular de informações aeronáuticas (AIC) específica, detalhando todas as alterações e/ou suspensões temporárias de legislações, normas e procedimentos no espaço aéreo brasileiro durante a Copa do Mundo de Futebol FIFA Brasil 2014, tais como: aeroportos e suas vocações; aeroportos coordenados e monitorados; apresentação e aprovação do plano de voo; medidas de segurança de voo; e restrições do espaço aéreo.

Aeroportos e suas Vocações

Com as dimensões continentais do Brasil, diversas cidades gostariam e teriam condições de receber em seus aeroportos as operações aéreas envolvidas na Copa do Mundo de Futebol FIFA Brasil 2014.

A seleção dos aeroportos foi realizada com base em critérios técnicos, não necessariamente os aeroportos escolhidos satisfazem a todos os critérios, mas, com certeza, possuem um conjunto maior de capacidades para atender às demandas do evento.

Interesse e disponibilidade do administrador aeroportuário, distância da cidade-sede, infraestrutura nos arredores do aeroporto (vias de acesso, escoamento do trânsito, acesso rápido a rodovias estaduais e federais), capacidade aeroportuária (número de vagas para aviação regular doméstica e internacional, aviação geral, aviação militar envolvida no evento), complexo de pistas (comprimento de pista de pouso e decolagem, pista de táxi, resistência do piso das pistas e pátios de estacionamento) e serviços de tráfego aéreo (auxílios à navegação, controle de tráfego aéreo, meteorologia, comunicações, informações aeronáuticas, procedimentos de subida e descida) são essenciais para a prestação de um serviço de qualidade aos nossos visitantes durante os dias em que acontecerem os jogos oficiais da Copa do Mundo de Futebol FIFA Brasil 2014.

A seguir são apresentados os aeródromos de destino e de alternativa com as suas respectivas vocações (seguimentos da aviação) em cada cidade-sede:

BELO HORIZONTE						
Copa do Mundo de Futebol FIFA Brasil 2014		**Indicativo**	**VIP**	**Internacional**	**Doméstico**	**Geral**
Aeródromos de destino	Confins	SBCF				
	Pampulha	SBBH				
	Parque de Lagoa Santa	PAMA-LS				
Aeródromos de alternativa	Galeão	SBGL				
	Guarulhos	SBGR				
	Campinas	SBKP				
	Brasília	SBBR				
	Santos Dumont	SBRJ				
	Montes Claros	SBMK				
	Ribeirão Preto	SBRP				
	Uberaba	SBUR				
	Uberlândia	SBUL				
	Carlos Prates	SBPR				
	Ipatinga	SBIP				
	Juiz de Fora	SBJF				

BRASÍLIA						
Copa do Mundo de Futebol FIFA Brasil 2014		**Indicativo**	**VIP**	**Internacional**	**Doméstico**	**Geral**
Aeródromos de destino	Brasília	SBBR				
	Base Aérea de Brasília	BABR				
	Goiânia	SBGO				
Aeródromos de alternativa	Base Aérea de Anápolis	BAAN				
	Confins	SBCF				
	Campinas	SBKP				
	Guarulhos	SBGR				
	Galeão	SBGL				
	Uberaba	SBUR				
	Uberlândia	SBUL				
	Montes Claros	SBMK				
	Ribeirão Preto	SBRP				
	Caldas Novas	SBCN				

CUIABÁ						
Copa do Mundo de Futebol FIFA Brasil 2014		**Indicativo**	**VIP**	**Internacional**	**Doméstico**	**Geral**
Aeródromos de destino	Cuiabá	SBCY				
Aeródromos de alternativa	Campo Grande	SBCG				
	Brasília	SBBR				
	Goiânia	SBGO				
	Palmas	SBPJ				
	Barra do Garças	SBBW				
	Vilhena	SBVH				

CURITIBA						
Copa do Mundo de Futebol FIFA Brasil 2014		**Indicativo**	**VIP**	**Internacional**	**Doméstico**	**Geral**
Aeródromos de destino	Afonso Pena	SBCT				
	Bacacheri	SBBI				
	CINDACTA II	CINDACTA II				
Aeródromos de alternativa	Guarulhos	SBGR				
	Porto Alegre	SBPA				
	Florianópolis	SBFL				
	Foz do Iguaçú	SBFI				
	Campinas	SBKP				
	Galeão	SBGL				
	Navegantes	SBNF				
	Londrina	SBLO				
	Maringá	SBMG				
	Chapecó	SBCH				
	Joinvile	SBJV				

FORTALEZA							
Copa do Mundo de Futebol FIFA Brasil 2014		**Indicativo**	**VIP**	**Internacional**	**Doméstico**	**Geral**
Aeródromos de destino	Fortaleza	SBFZ				
	Base Aérea de Fortaleza	BAFZ				
Aeródromos de alternativa	Natal	SBNT				
	Recife	SBRF				
	Salvador	SBSV				
	Teresina	SBTE				
	João Pessoa	SBJP				
	Mossoró	SBMS				
	Parnaíba	SBPB				
	Juazeiro do Norte	SBJU				

MANAUS						
Copa do Mundo de Futebol FIFA Brasil 2014		**Indicativo**	**VIP**	**Internacional**	**Doméstico**	**Geral**
Aeródromos de destino	Manaus	SBEG				
	Base Aérea de Manaus	BAMN				
Aeródromos de alternativa	Boa Vista	SBBV				
	Porto Velho	SBPV				
	Belém	SBBE				
	Santarém	SBSN				
	Macapá	SBMQ				
	Itacoatiara	SBIC				
	Tefé	SBTF				

NATAL						
Copa do Mundo de Futebol FIFA Brasil 2014		**Indicativo**	**VIP**	**Internacional**	**Doméstico**	**Geral**
Aeródromos de destino	São Gonçalo do Amarante	SBSG				
	Natal	SBNT				
	Base Aérea de Natal	BANT				
Aeródromos de alternativa	Fortaleza	SBFZ				
	Recife	SBRF				
	Salvador	SBSV				
	João Pessoa	SBJP				
	Campina Grande	SBKG				
	Juazeiro do Norte	SBJU				
	Paulo Afonso	SBUF				

PORTO ALEGRE						
Copa do Mundo de Futebol FIFA Brasil 2014		**Indicativo**	**VIP**	**Internacional**	**Doméstico**	**Geral**
Aeródromos de destino	Porto Alegre	SBPA				
	Base Aérea de Canoas	BACO				
Aeródromos de alternativa	Florianópolis	SBFL				
	Afonso Pena	SBCT				
	Foz do Iguaçu	SBFI				
	Campinas	SBKP				
	Guarulhos	SBGR				
	Galeão	SBGL				
	Chapecó	SBCH				
	Navegantes	SBNF				
	Caxias do Sul	SBCX				
	Joinvile	SBJV				
	Pelotas	SBPK				
	Criciúma	SBCM				
	Passo Fundo	SBPF				

RECIFE						
Copa do Mundo de Futebol FIFA Brasil 2014		**Indicativo**	**VIP**	**Internacional**	**Doméstico**	**Geral**
Aeródromos de destino	Recife	SBRF				
	Base Aérea de Recife	BARF				
Aeródromos de alternativa	Salvador	SBSV				
	Natal	SBNT				
	Fortaleza	SBFZ				
	João Pessoa	SBJP				
	Campina Grande	SBKG				
	Maceió	SBMO				
	Paulo Afonso	SBUF				
	Juazeiro do Norte	SBJU				
	Petrolina	SBPL				

RIO DE JANEIRO						
FIFA Soccer World Cup Brazil 2014		**Designator**	**VIP**	**International**	**Domestic**	**General**
Destination aerodromes	Galeão	SBGL				
	Santos Dumont	SBRJ				
	Jacarepaguá	SBJR				
	Base Aérea do Galeão	BAGL				
	Base Aérea de Santa Cruz	BASC				
Alternate aerodromes	Guarulhos	SBGR				
	Confins	SBCF				
	Campinas	SBKP				
	Brasília	SBBR				
	São José dos Campos	SBSJ				
	Ribeirão Preto	SBRP				
	Vitória	SBVT				
	Juiz de Fora	SBJF				
	Cabo Frio	SBCB				
	Macaé	SBME				
	Campos	SBCP				

SALVADOR						
FIFA Soccer World Cup Brazil 2014		**Designator**	**VIP**	**International**	**Domestic**	**General**
Destination aerodromes	Salvador	SBSV				
Alternate aerodromes	Recife	SBRF				
	Natal	SBNT				
	Fortaleza	SBFZ				
	Galeão	SBGL				
	Aracaju	SBAR				
	Maceió	SBMO				
	Ilhéus	SBIL				
	Vitória da Conquista	SBQV				
	Porto Seguro	SBPS				

SÃO PAULO						
Copa do Mundo de Futebol FIFA Brasil 2014		**Indicativo**	**VIP**	**Internacional**	**Doméstico**	**Geral**
Aeródromos de destino	Guarulhos	SBGR				
	Campinas	SBKP				
	Congonhas	SBSP				
	Campo de Marte	SBMT				
	Jundiaí	SBJD				
	Base Aérea de São Paulo	BASP				
Aeródromos de alternativa	Galeão	SBGL				
	Curitiba	SBCT				
	Confins	SBCF				
	Brasília	SBBR				
	São José dos Campos	SBSJ				
	Santos Dumont	SBRJ				
	Ribeirão Preto	SBRP				
	Araraquara	SBAQ				
	Bauru	SBBU				
	São José do Rio Preto	SBSR				
	Arealva	SBAE				

Aeroportos Coordenados

A fim de gerenciar o crescimento dos movimentos aéreos durante a Copa do Mundo de Futebol FIFA Brasil 2014, o CGNA coordenará os aeroportos escolhidos pela Casa Civil e Secretaria de Aviação Civil da Presidência da República (SAC), em articulação com a Agência Nacional de Aviação Civil (ANAC), conforme o tipo de operação e de infraestrutura aeroportuária envolvida.

A coordenação de um aeroporto é uma metodologia que consiste em estabelecer intervalos de tempo predeterminados, denominado de SLOT ATC, para as operações de pouso e decolagem de todas as aeronaves que operam no aeroporto, com o objetivo de regrar a utilização para que a sua capacidade de operação não seja ultrapassada, mantendo a eficiência na prestação dos serviços das infraestruturas aeroportuária e aeronáutica, segundo os condicionantes de pista, pátio e terminal (embarque e desembarque, doméstico e internacional).

Quando se declara que um aeroporto está coordenado, significa dizer que todas as intenções de voo estarão condicionadas à obtenção de SLOT ATC para pouso ou decolagem.

O período da coordenação dos aeroportos será do dia 10 de junho de 2014 ao dia 15 de julho de 2014, podendo variar de aeroporto para aeroporto, a depender do número de jogos.

A ANAC alocará SLOT ATC para voos comerciais regulares (domésticos e internacionais), voos comerciais não regulares (domésticos e internacionais) e voos de delegações. A SAC, por sua vez, ficará responsável pela alocação dos SLOT ATC para os Chefes de Estado e VIP e o CGNA para aviação geral.

Para efetuar o cadastramento e conhecer os procedimentos para a obtenção do SLOT ATC, o usuário de aviação geral deverá consultar a AIC específica ou, então, visitar a página do CGNA na INTERNET no endereço *www.cgna.gov.br* e clicar no *link* SLOT.

Os seguintes aeródromos serão declarados coordenados durante a Copa do Mundo de Futebol FIFA Brasil 2014: SBMT; SBJD; SBGL; SBRJ; SBJR; SBGR; SBSP; SBKP; SBSJ; SBCF; SBBH; SBBR; SBGO; SBCY; SBCG; SBCT; SBBI; SBFL; SBPA; SBSV; SBRF; SBNT; SBFZ; SBSG; e SBEG.

Os seguintes aeródromos estarão sendo monitorados durante a Copa do Mundo de Futebol FIFA Brasil 2014 e, dependendo da demanda, poderão ser declarados coordenados: SBRP; SBVT; SBCB; SBME; SBCP; SBJF; SBPR; SBMK; SBIP; SBUL; SBUR; SBCN; SBTE; SBJP; SBMS; SBPB; SBMO; SBKG; SBUF; SBPL; SBJU; SBAR; SBIL; SBQV; SBPS; SBBW; SBVH; SBPJ; SBNF; SBLO; SBMG; SBJV; SBCH; SBBV; SBPV; SBBE; SBSN; SBMQ; SBIC; SBTF; SBFI; SBCX; SBPK; SBCM; SBPF; SBAQ; SBBU; e SBSR.

Defesa do espaço Aéreo

O COMDABRA é o responsável pela defesa do espaço aéreo brasileiro. Com aeronaves modernas, profissionais capacitados e uma doutrina de emprego da Força bem consolidada, defende a nação, garantindo a soberania do espaço aéreo, de forma ininterrupta, e cumprindo a missão do COMAER.

Com alocação planejada dos meios, materiais e efetivo, garantiu durante a Conferência das Nações Unidas sobre Desenvolvimento Sustentável (Rio +20), em junho de 2012, a Copa das Confederações de Futebol FIFA Brasil 2013, em junho de 2013, e a Jornada Mundial da Juventude Católica Rio 2013, em agosto de 2013, a defesa e a segurança das instalações e dos participantes dos eventos.

Não será diferente durante a Copa do Mundo de Futebol FIFA Brasil 2014, pois o COMDABRA estará presente, junto com o DECEA e os demais elos do COMAER, defendendo o espaço aéreo das 12 cidades-sede.

Restrições do Espaço Aéreo

Durante o evento, seremos visitados por turistas do mundo inteiro, empresários, Chefes de Estado e de Governo, autoridades esportivas, personalidades de diversas áreas, imprensa internacional, enfim, o Brasil será o centro das atenções do mundo durante 30 dias.

Seguindo os critérios de segurança adotados mundialmente em eventos da importância e do vulto da Copa do Mundo de Futebol FIFA Brasil 2014 e a manutenção dos níveis dos serviços de tráfego aéreo prestados, o COMAER criou áreas de exclusão (RESERVADA, RESTRITA ou PROIBIDA) em determinadas porções do espaço aéreo brasileiro com tamanhos e níveis de acessos diferentes.

A segurança e o impacto operacional, entre outros, foram os critérios adotados para criação das áreas de exclusão. A segurança do público, de atletas, autoridades, aeronaves e instalações e a preocupação constante em reduzir os impactos operacionais para os usuários do espaço aéreo nortearam a localização, o tamanho e os níveis de acesso das referidas áreas.

As autorizações para o ingresso nos espaços aéreos segregados dependem da natureza e das intenções do voo, como, por exemplo, aeronaves transportando autoridades, delegações das seleções de futebol, aeronaves comerciais de operação regular doméstica e/ou internacional, aviação geral, emprego militar, defesa aérea, transporte de pessoal e/ou material (civil ou militar), aeronaves ligadas à segurança pública, aeronaves de busca e salvamento (SAR) e aeronaves ambulância.

As áreas de exclusão estão localizadas no espaço aéreo inferior das FIR e dentro das TMA das localidades onde ocorrerão as partidas oficiais da Copa do Mundo de Futebol FIFA Brasil 2014, ou seja, BELO HORIZONTE, BRASÍLIA, CUIABÁ, CURITIBA, FORTALEZA, MANAUS, NATAL, PORTO ALEGRE, RECIFE, RIO DE JANEIRO, SALVADOR E SÃO PAULO.

Os períodos de vigência dessas restrições serão compreendidos entre 3 (três) horas antes e 4 (quatro) horas após o início das partidas durante a abertura e encerramento da Copa do Mundo de Futebol FIFA Brasil 2014; entre 1 (uma) hora antes e 3 (três) horas após o início das partidas durante fase de grupos; e entre 1 (uma) horas antes e 4 (quatro) horas após o início das partidas durante as demais fases, assim como todas as outras ações e restrições previstas. Vale ressaltar que o período de vigência das restrições varia de acordo com o jogo. Isso significa que uma mesma cidade-sede poderá ter horários diferentes conforme os jogos que receberá.

Fora desses períodos, o uso do espaço aéreo volta a sua normalidade. Além deste encarte explicativo, todos os períodos estarão previstos e ativados por uma AIC específica.

Definição das Áreas de Exclusão

ÁREA RESERVADA

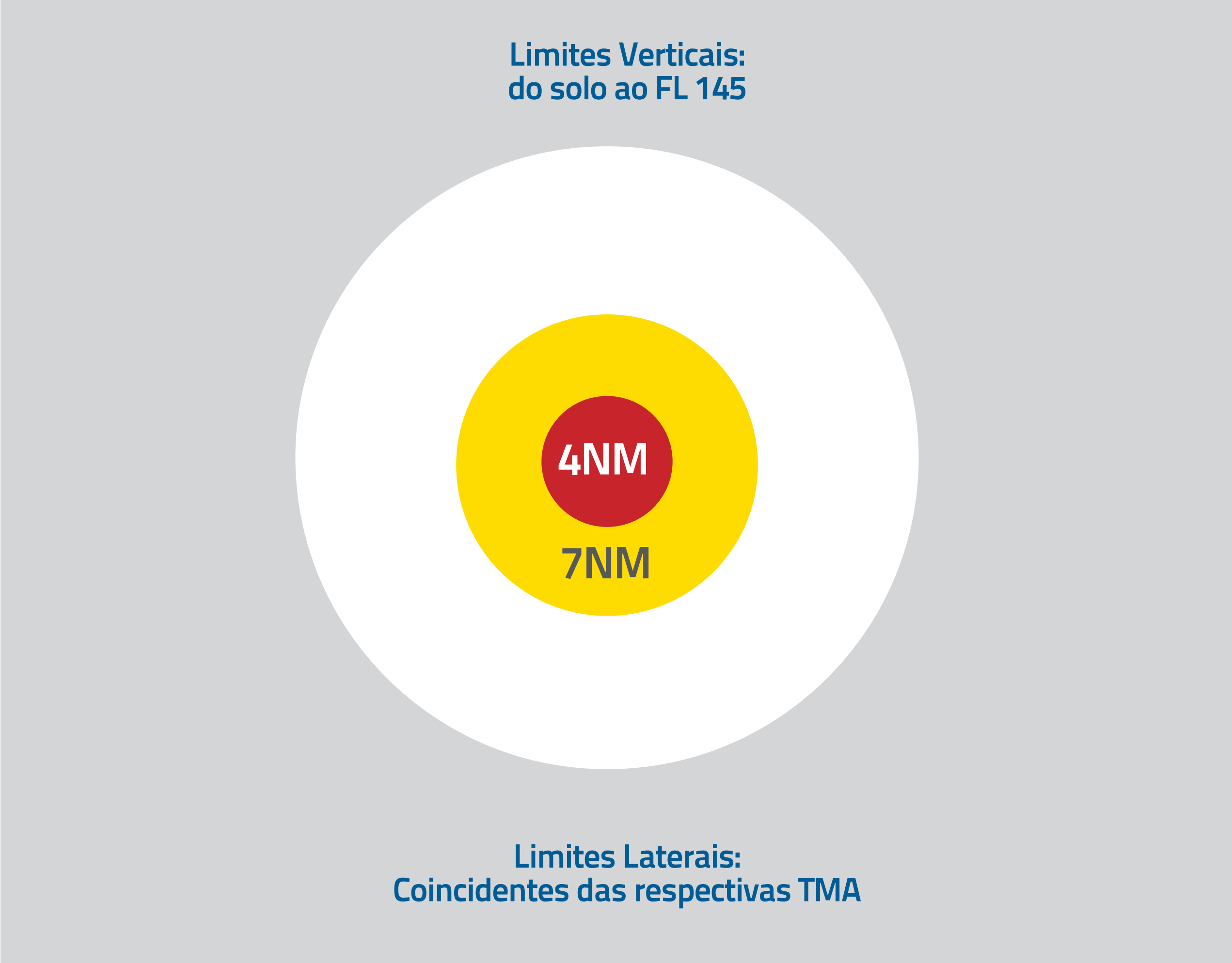
Área com dimensões definidas que correspondem às projeções laterais das TMA das localidades envolvidas e limites verticais da superfície ao nível de voo (FL) 145.

ÁREA RESTRITA

Área com dimensões definidas com seu limite lateral de 7 NM de raio com centro no estádio de futebol e limites verticais da superfície ao nível de voo (FL) 145.

ÁREA PROIBIDA

Área com dimensões definidas com seu limite lateral de 4 NM de raio com centro no estádio de futebol e limites verticais da superfície ao nível de voo (FL) 145



Restrições Operacionais das Áreas de Exclusão

ÁREA RESERVADA

Na ÁREA RESERVADA, denominada BRANCA, comum a todas as cidades-sede, todos os tráfegos deverão ser conhecidos e cumprir as regras determinadas em legislação e as orientações dos órgãos ATC.

Seguem abaixo as restrições operacionais que deverão ser observadas na área BRANCA:

- Não serão permitidos, inclusive dentro dos Espaços Aéreos Condicionados (EAC), treinamentos de voo IFR e VFR, treinamentos de aproximações por instrumentos, treinamento no circuito de tráfego e de toque e arremetida, voos de instrução, manutenção, cheques ANAC, acrobáticos, turísticos, planadores, operações de paraquedas, parapentes, balões, dirigíveis, ultraleves, aeronaves experimentais, asas-deltas, pulverização agrícola, reboque de faixas, aeromodelos, foguetes e aeronaves remotamente pilotados (RPA);
- Todos os movimentos aéreos deverão estar devidamente identificados e sob coordenação dos órgãos ATC, antes de adentrarem nessa área;
- Operações de ambulância aérea evoluindo dentro da área serão autorizadas após coordenação prévia com o controle de aproximação (APP);
- Aeronaves evoluindo na TMA, mesmo identificadas e sob controle dos órgãos ATC, no <u>caso de modificarem suas rotas sem autorização e rumarem para áreas não autorizadas</u>, assim como as aeronaves não identificadas, poderão ser classificadas como hostis e sofrerão às Medidas de Policiamento do Espaço Aéreo (MPEA);
- Operações de aeronaves de asa fixa ficarão limitadas às aeronaves que se destinem ou tenham como origem os aeródromos da TMA, não sendo permitido o cruzamento da área BRANCA. As aeronaves com origens ou destinos dentro da área BRANCA cumprirão perfil determinado pelo APP;
- Aeronaves cruzando em aerovia abaixo do FL 145, cujo destino não esteja dentro da mesma, serão direcionadas para os fixos laterais da TMA. As aeronaves cruzando acima do FL 145 não sofrerão desvios;
- Movimentos aéreos que se realizem nesta área deverão possuir FPL apresentado e aprovado pelos órgãos ATC e coordenado pelo APP da TMA, sendo obrigatória a comunicação bilateral com aqueles órgãos, bem como o funcionamento do equipamento transponder. Todos os movimentos aéreos que descumprirem essas regras serão considerados suspeitos e estarão sujeitos às MPEA; e
- Operações de helicópteros estarão autorizadas para desembarque e partida dos aeródromos locais ou helipontos, bem como para operação *offshore* e trânsito no espaço aéreo, atentando para as restrições previstas nas áreas RESTRITAS e PROIBIDAS. Quando aplicável, deverão

utilizar estritamente as rotas especiais de helicóptero (REH) estabelecidas, sendo que algumas poderão ser suspensas temporariamente, o que será informado em AIC específica. As aeronaves deverão apresentar FPL completo, intenções de decolagem de local desprovido de órgãos ATS deverão ser previamente coordenadas com o APP da TMA, sendo necessário alocar código transponder A/C atribuído pelo órgão ATC desde antes da decolagem até o pouso e informar imediatamente ao órgão ATC a falha do transponder.

ÁREA RESTRITA

Na ÁREA RESTRITA, denominada AMARELA, comum a todas as cidades-sede, serão permitidas somente aeronaves devidamente autorizadas, dentre elas: aeronaves envolvidas nos eventos; aeronaves transportando Chefe de Estado e de Governo; delegações das seleções de futebol; *very important person* (VIP); aeronaves comerciais de operação regular existente, regular novo e não regular de parecer favorável da ANAC; além das aeronaves autorizadas pela autoridade competente.

As aeronaves comerciais de operação regular existente, regular novo e não regular de parecer favorável da ANAC que estejam em procedimentos de chegada ou partida dos aeródromos da TMA serão autorizadas desde que atendam aos requisitos de segurança da ANAC, ou seja, os tripulantes e os passageiros sejam submetidos ao processo de inspeção de aviação civil, de acordo com o PSA estabelecido para os aeródromos de origem.

Todos os movimentos aéreos que descumprirem essas regras serão considerados hostis e estarão sujeitos às MPEA.

ÁREA PROIBIDA

Na ÁREA PROIBIDA, denominada VERMELHA, comum a todas as cidades-sede, serão permitidas somente aeronaves envolvidas nos eventos, desde que previamente autorizadas pelo Comandante do COMDABRA.

Obs.: Todas as operações de aeronaves serão proibidas, exceto as aeronaves de segurança pública, aeronaves militares, aeronaves SAR, aeronaves ambulância e as demais aeronaves envolvidas nas atividades operacionais, previamente autorizadas pelo Comandante do COMDABRA.

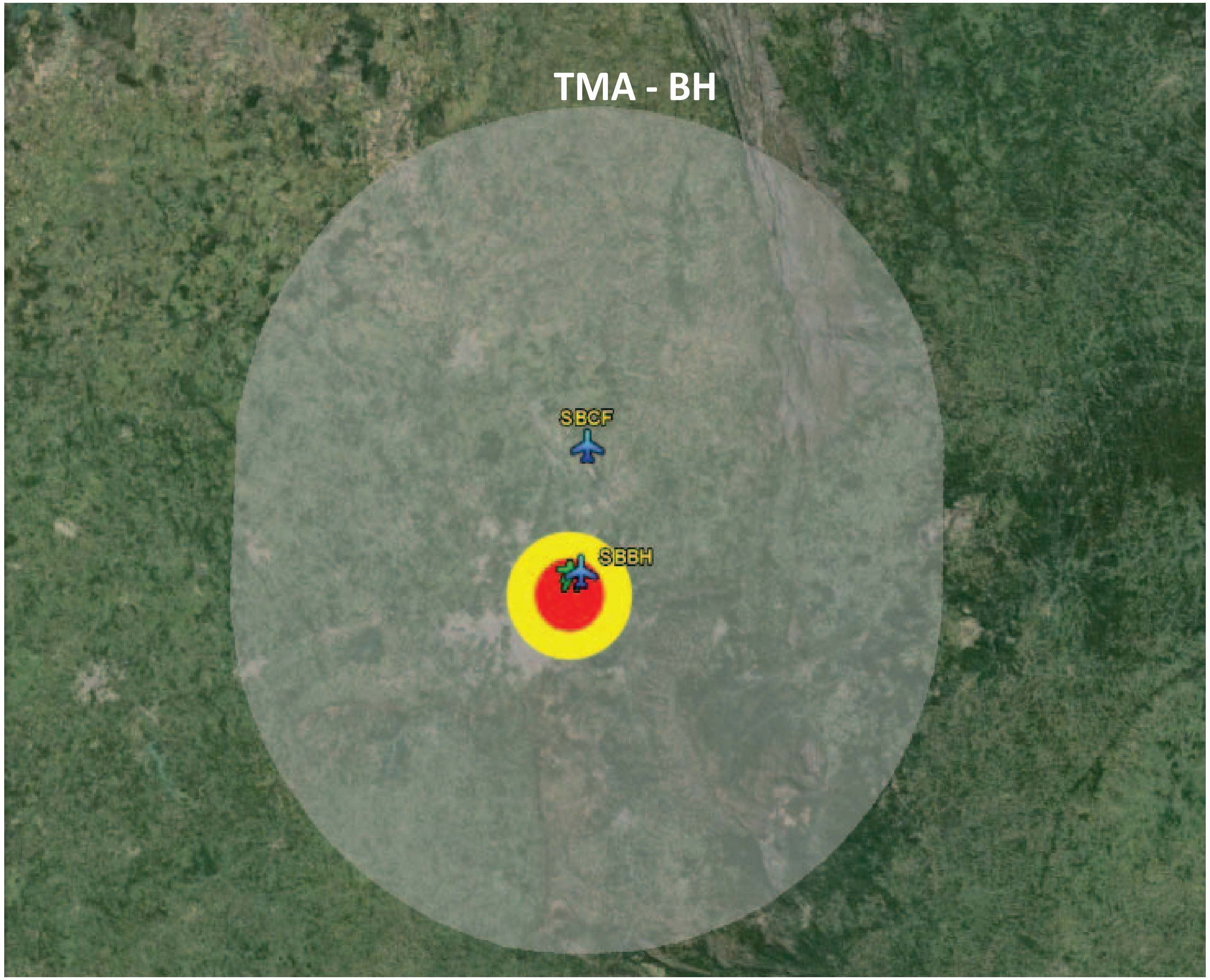
Todos os movimentos aéreos que descumprirem essas regras serão considerados hostis e estarão sujeitos às MPEA.

Descrição das Áreas de exclusão

DESCRIÇÃO DAS ÁREAS DE EXCLUSÃO
Belo Horizonte (MG)

Dias e horários de ativação das áreas

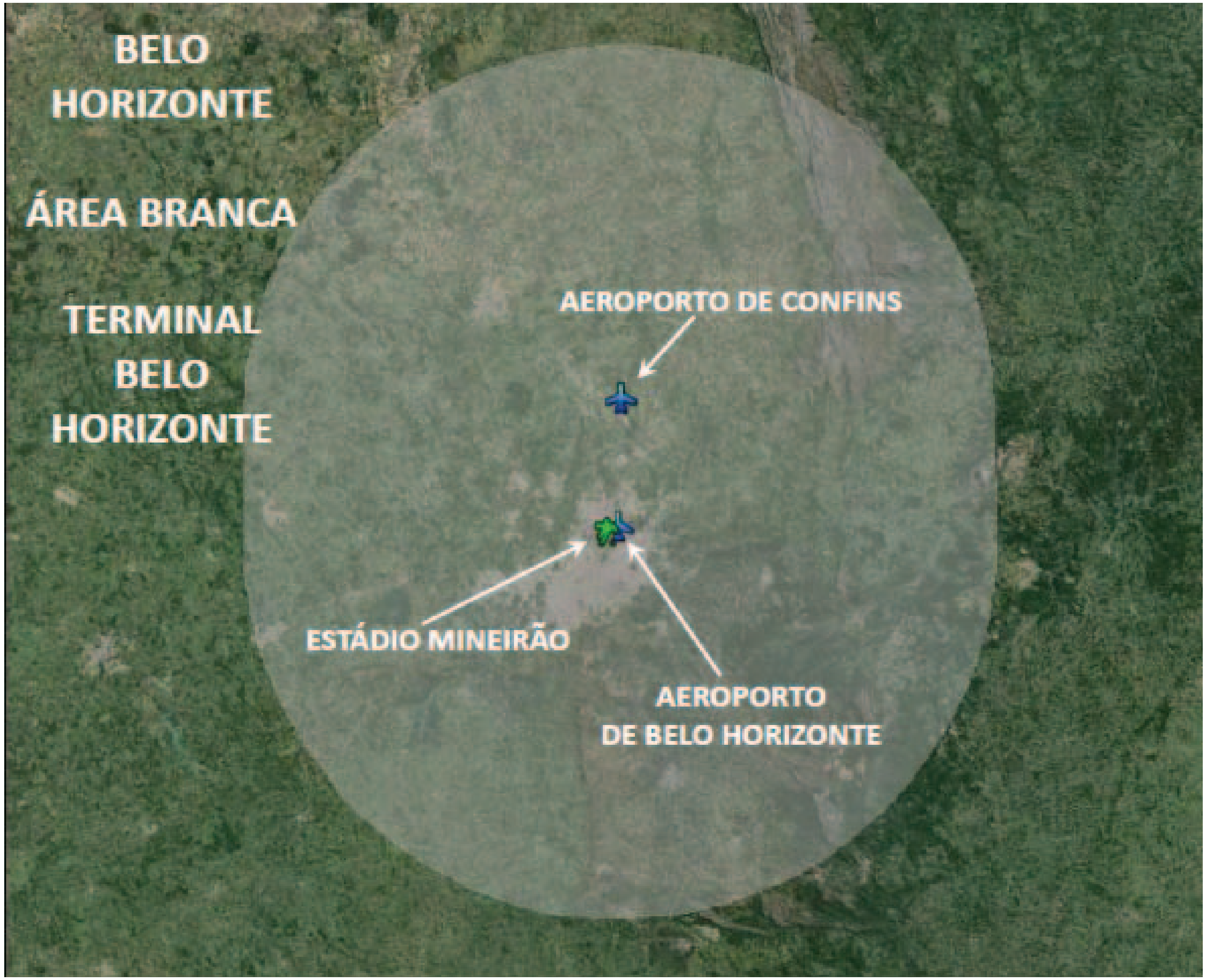
- dia 14/06/2014 (13h local) – início às 12h local e término às 16h local;
- dia 17/06/2014 (13h local) – início às 12h local e término às 16h local;
- dia 21/06/2014 (13h local) – início às 12h local e término às 16h local;
- dia 24/06/2014 (13h local) – início às 12h local e término às 16h local;
- dia 28/06/2014 (13h local) – início às 12h local e término às 17h local; e
- dia 08/07/2014 (17h local) – início às 16h local e término às 21h local.



DESCRIÇÃO DAS ÁREAS DE EXCLUSÃO
Belo Horizonte (MG)

ÁREA RESERVADA

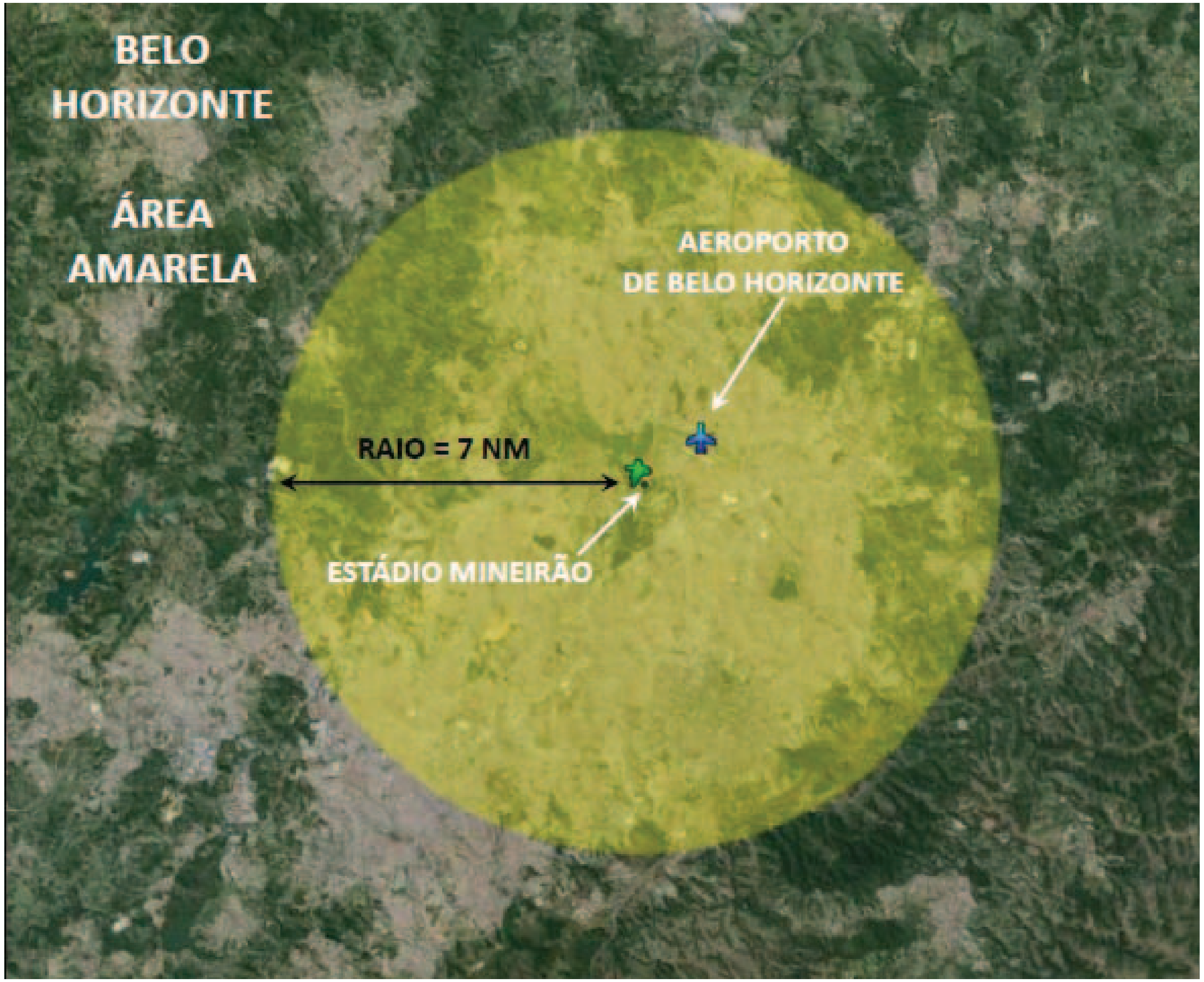
Área denominada BRANCA, definida pelas projeções laterais da TMA Belo Horizonte e limites verticais da superfície ao FL 145.



DESCRIÇÃO DAS ÁREAS DE EXCLUSÃO
Belo Horizonte (MG)

ÁREA RESTRITA

Área denominada AMARELA, dentro da área BRANCA, definida como um círculo com centro nas coordenadas 19°51′57″S 043°58′15″W, com 7 NM de raio e com volume de responsabilidade sobreposto da superfície até o FL 145.

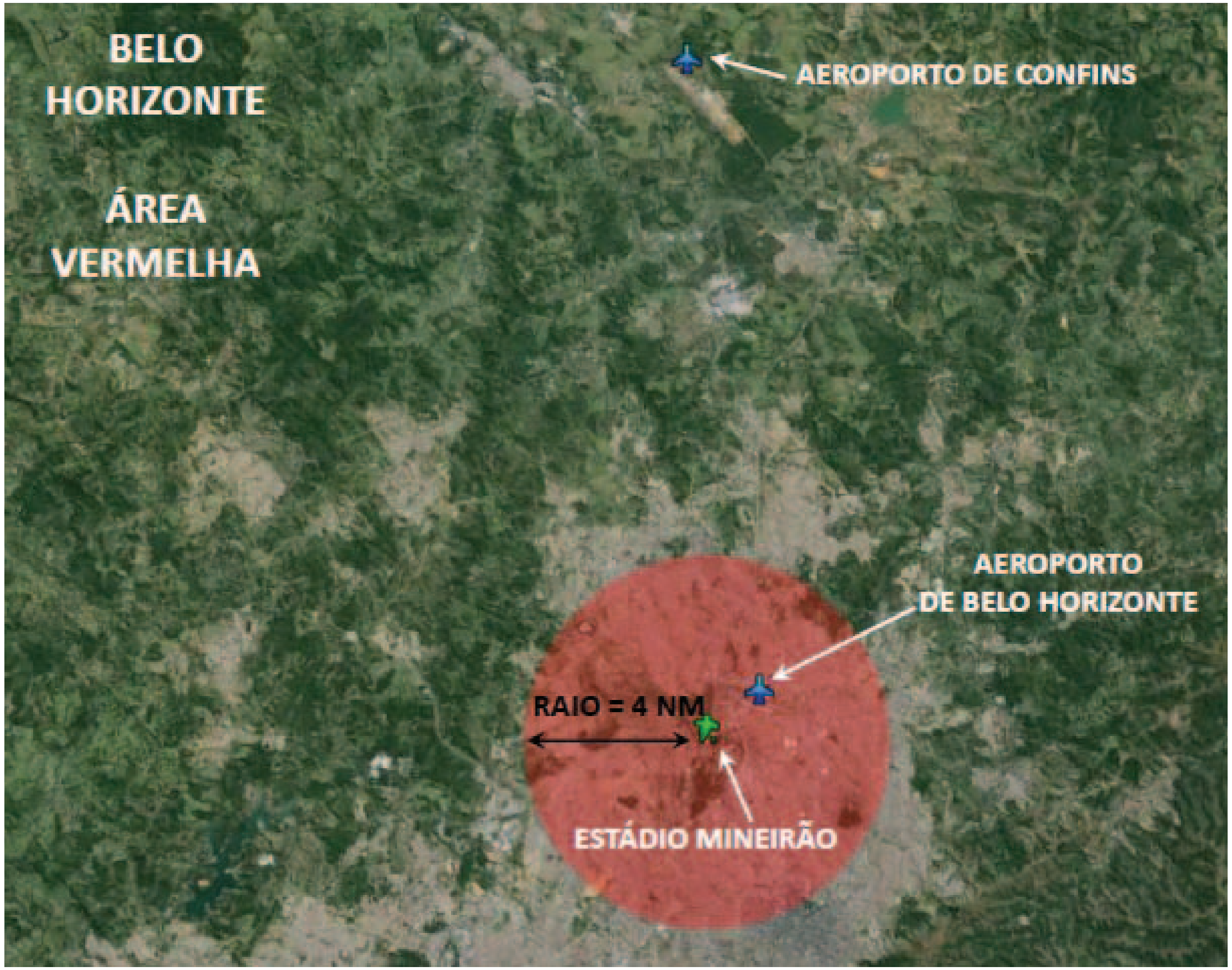


DESCRIÇÃO DAS ÁREAS DE EXCLUSÃO

Belo Horizonte (MG)

ÁREA PROIBIDA

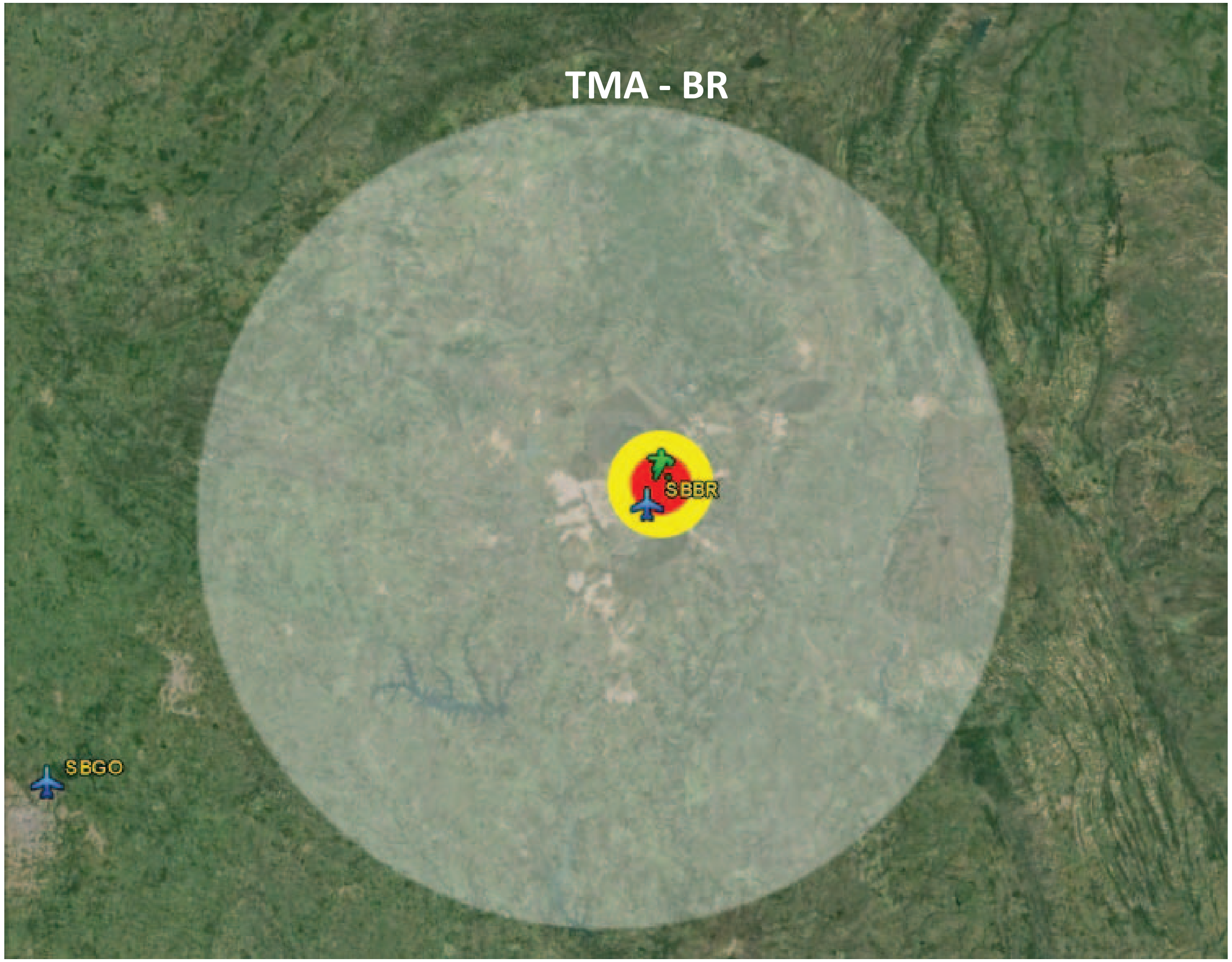
Área denominada VERMELHA, dentro da ÁREA AMARELA, definida como um círculo com centro nas coordenadas 19°51'57"S 043°58'15"W, com 4 NM de raio e com volume de responsabilidade sobreposto da superfície até o FL 145.



DESCRIÇÃO DAS ÁREAS DE EXCLUSÃO
Brasília (DF)

Dias e horários de ativação das áreas

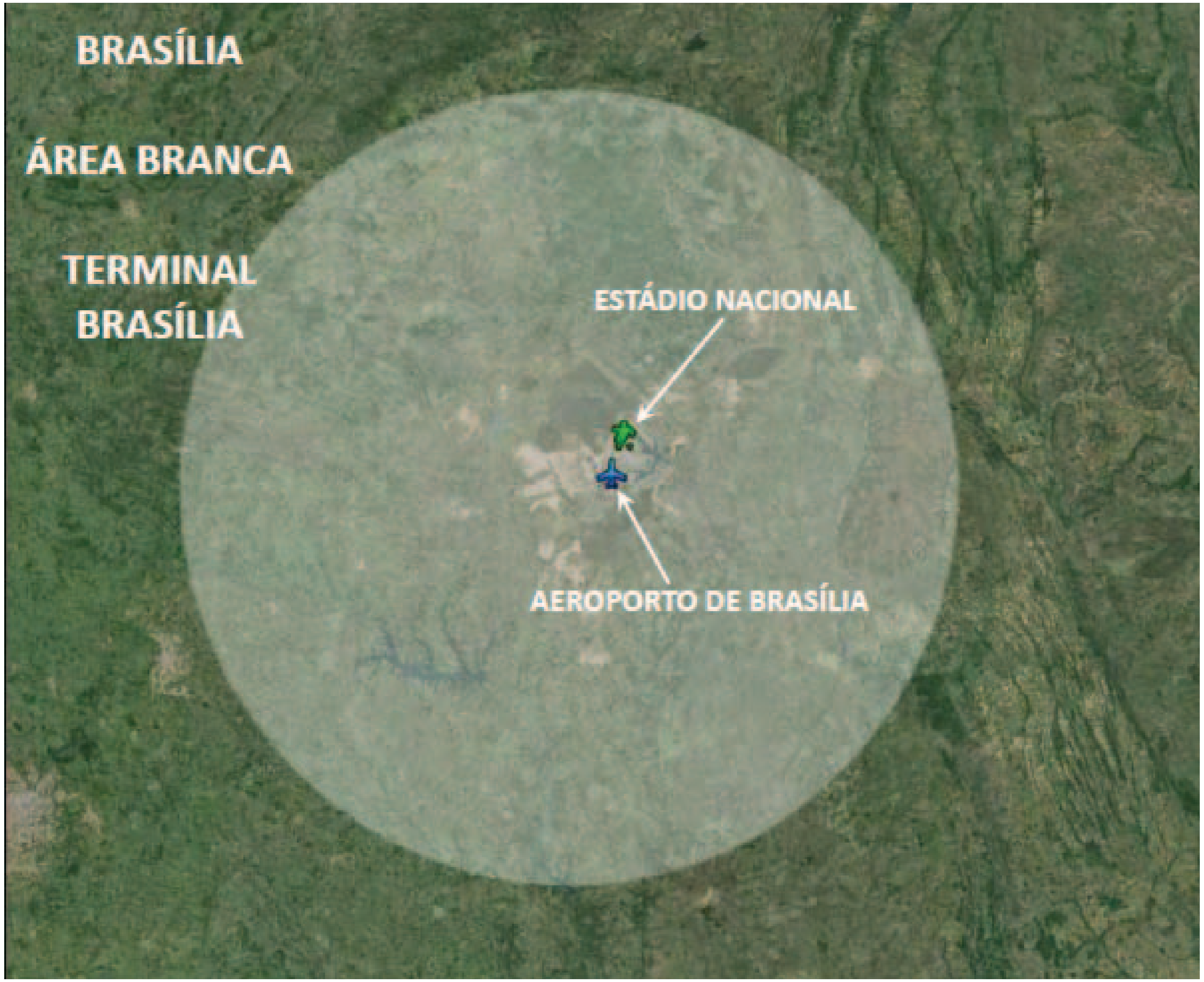
- dia 15/06/2014 (13h local) – início às 12h local e término às 16h local;
- dia 19/06/2014 (13h local) – início às 12h local e término às 16h local;
- dia 23/06/2014 (17h local) – início às 16h local e término às 20h local;
- dia 26/06/2014 (13h local) – início às 12h local e término às 16h local;
- dia 30/06/2014 (13h local) – início às 12h local e término às 17h local;
- dia 05/07/2014 (13h local) – início às 12h local e término às 17h local; e
- dia 12/07/2014 (17h local) – início às 16h local e término às 21h local.



DESCRIÇÃO DAS ÁREAS DE EXCLUSÃO
Brasília (DF)

ÁREA RESERVADA

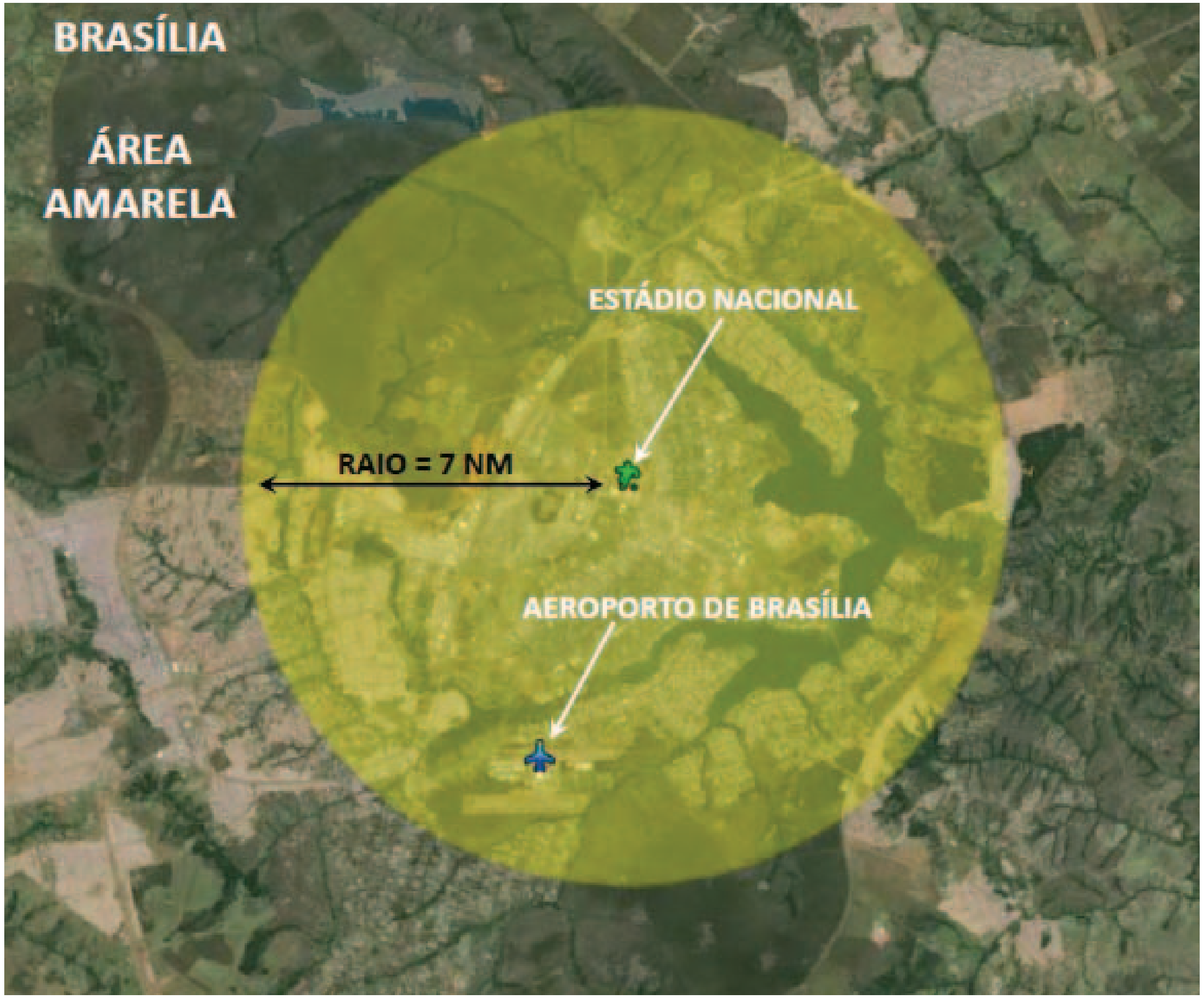
Área denominada BRANCA, definida pelas projeções laterais da TMA Brasília e limites verticais da superfície ao FL 145.



DESCRIÇÃO DAS ÁREAS DE EXCLUSÃO
Brasília (DF)

ÁREA RESTRITA

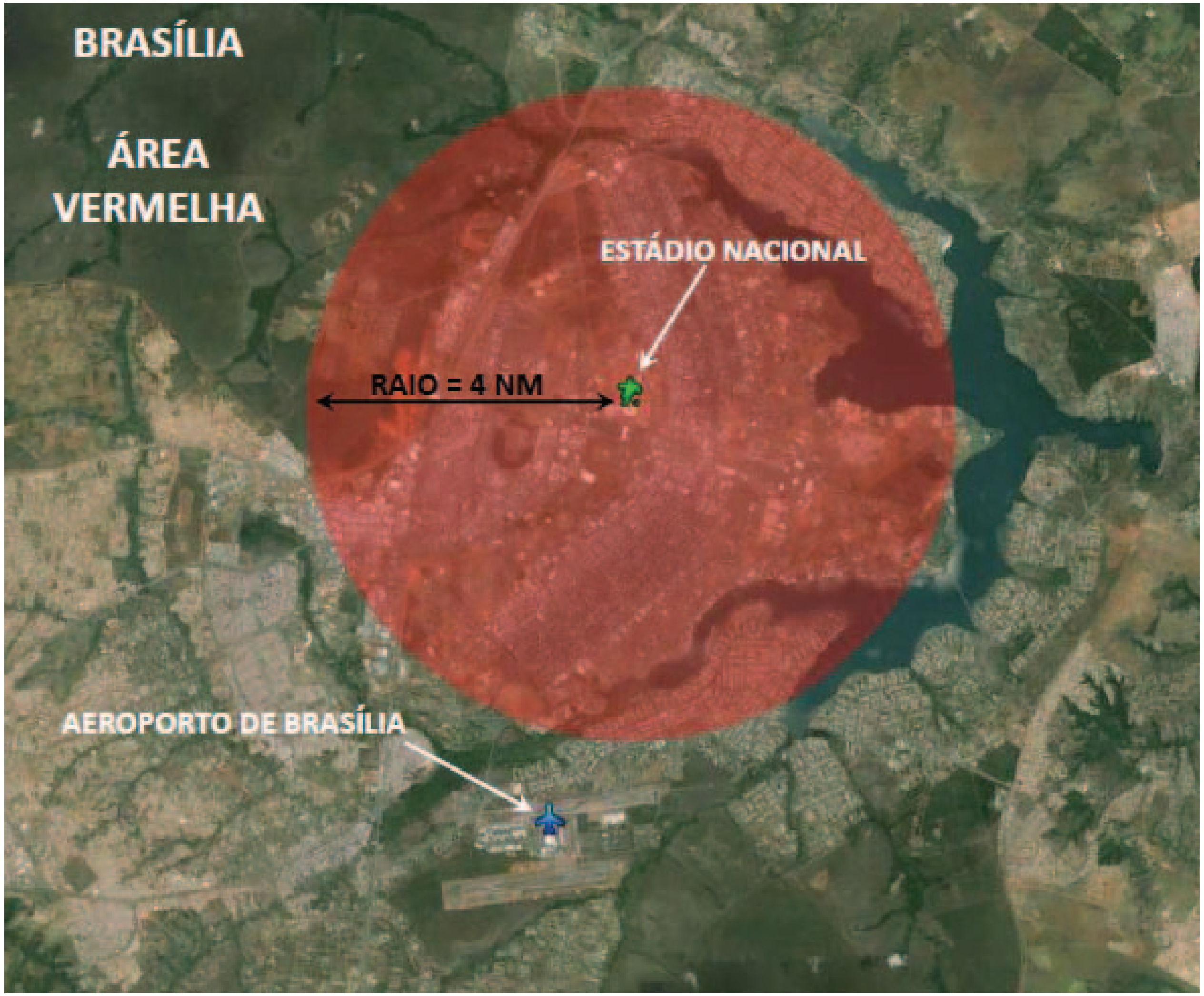
Área denominada AMARELA, dentro da área BRANCA, definida como um círculo com centro nas coordenadas 15°47'01"S 047°53'57"W, com 7 NM de raio e com volume de responsabilidade sobreposto da superfície até o FL 145.



DESCRIÇÃO DAS ÁREAS DE EXCLUSÃO
Brasília (DF)

ÁREA PROIBIDA

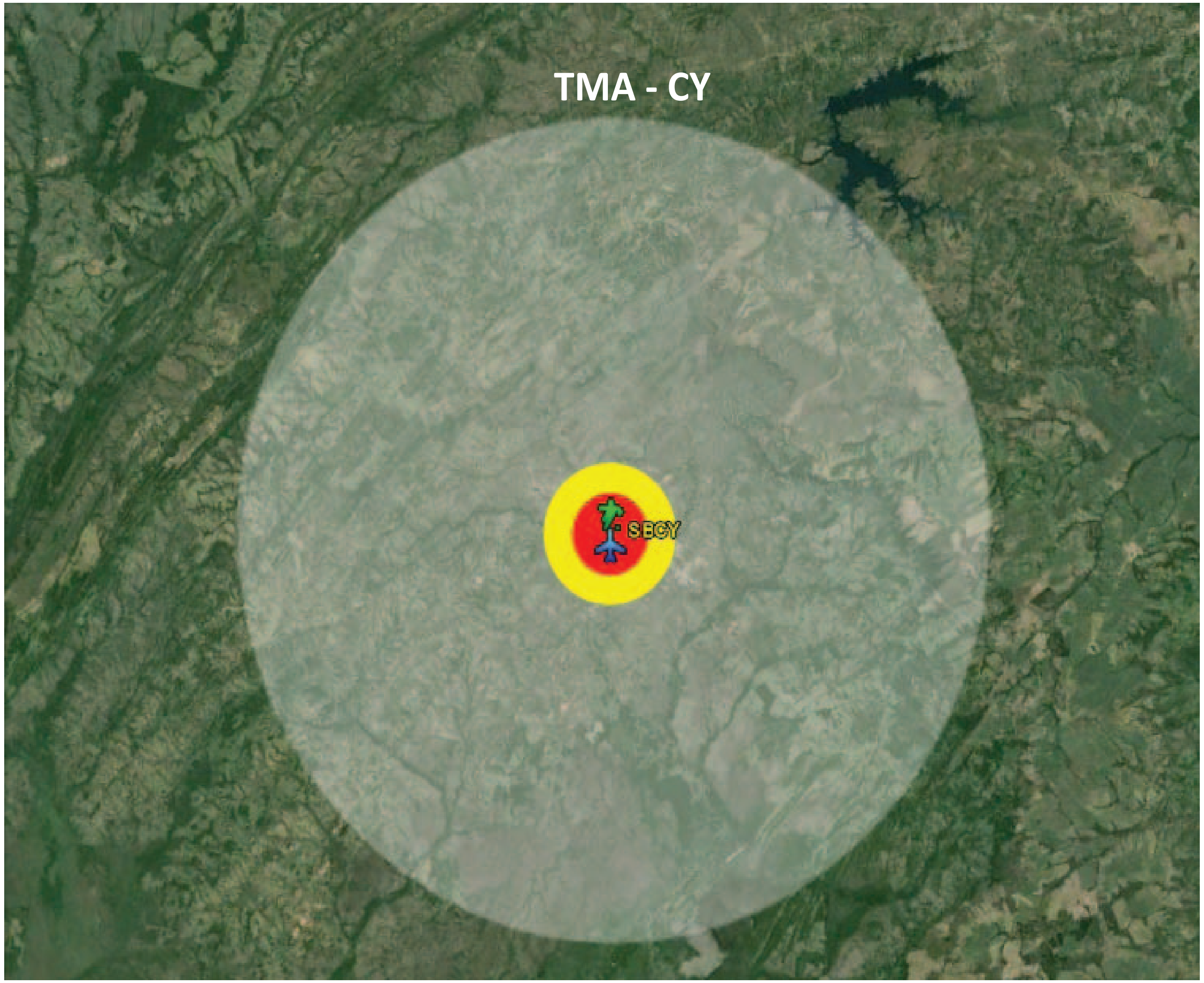
Área denominada VERMELHA, dentro da ÁREA AMARELA, definida como um círculo com centro nas coordenadas 15°47'01"S 047°53'57"W, com 4 NM de raio e com volume de responsabilidade sobreposto da superfície até o FL 145.



DESCRIÇÃO DAS ÁREAS DE EXCLUSÃO
Cuiabá (MT)

Dias e horários de ativação das áreas

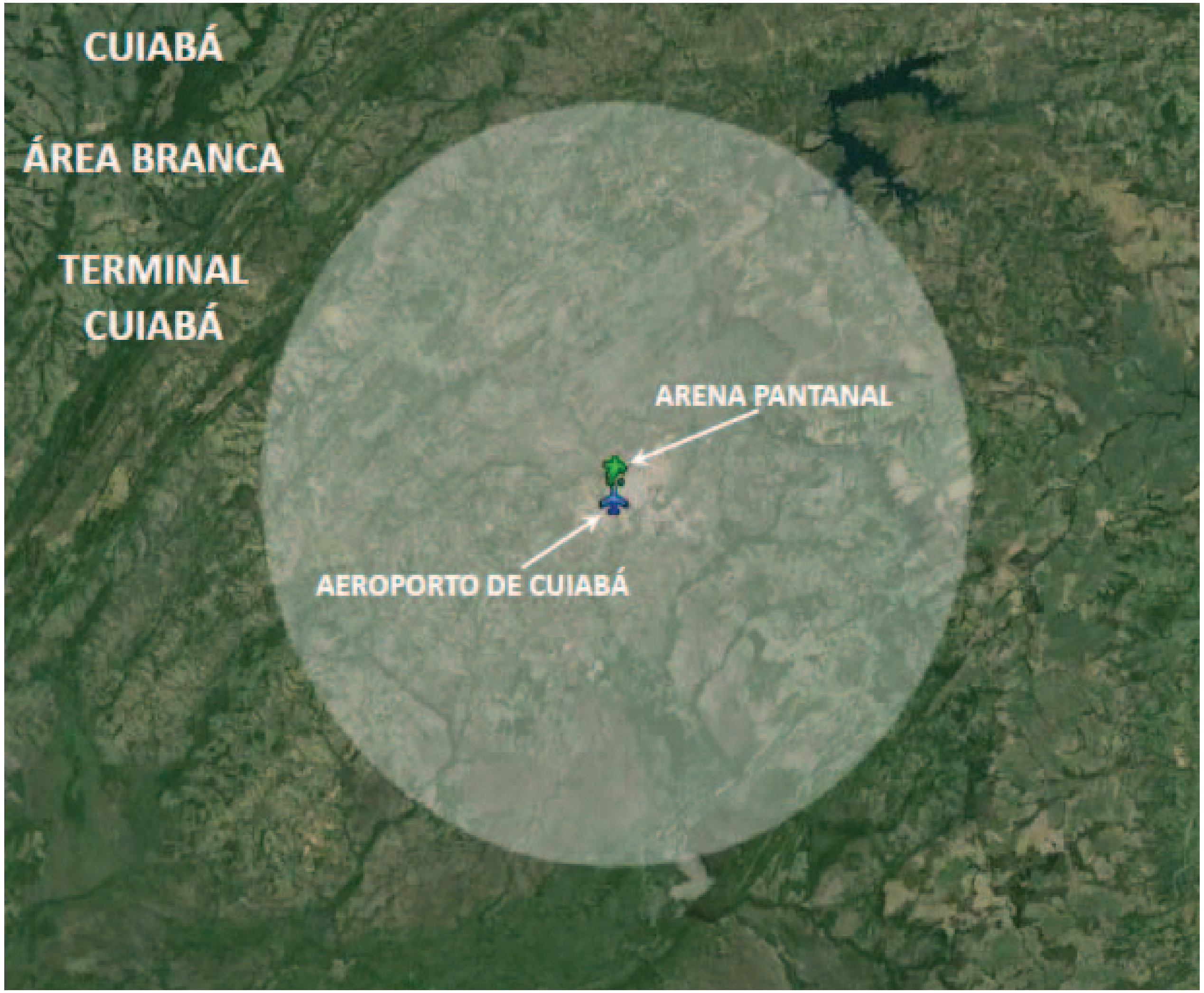
- dia 13/06/2014 (18h local) – início às 17h local e término às 21h local;
- dia 17/06/2014 (18h local) – início às 17h local e término às 21h local;
- dia 21/06/2014 (18h local) – início às 17h local e término às 21h local; e
- dia 24/06/2014 (16h local) – início às 15h local e término às 19h local.



DESCRIÇÃO DAS ÁREAS DE EXCLUSÃO
Cuiabá (MT)

ÁREA RESERVADA

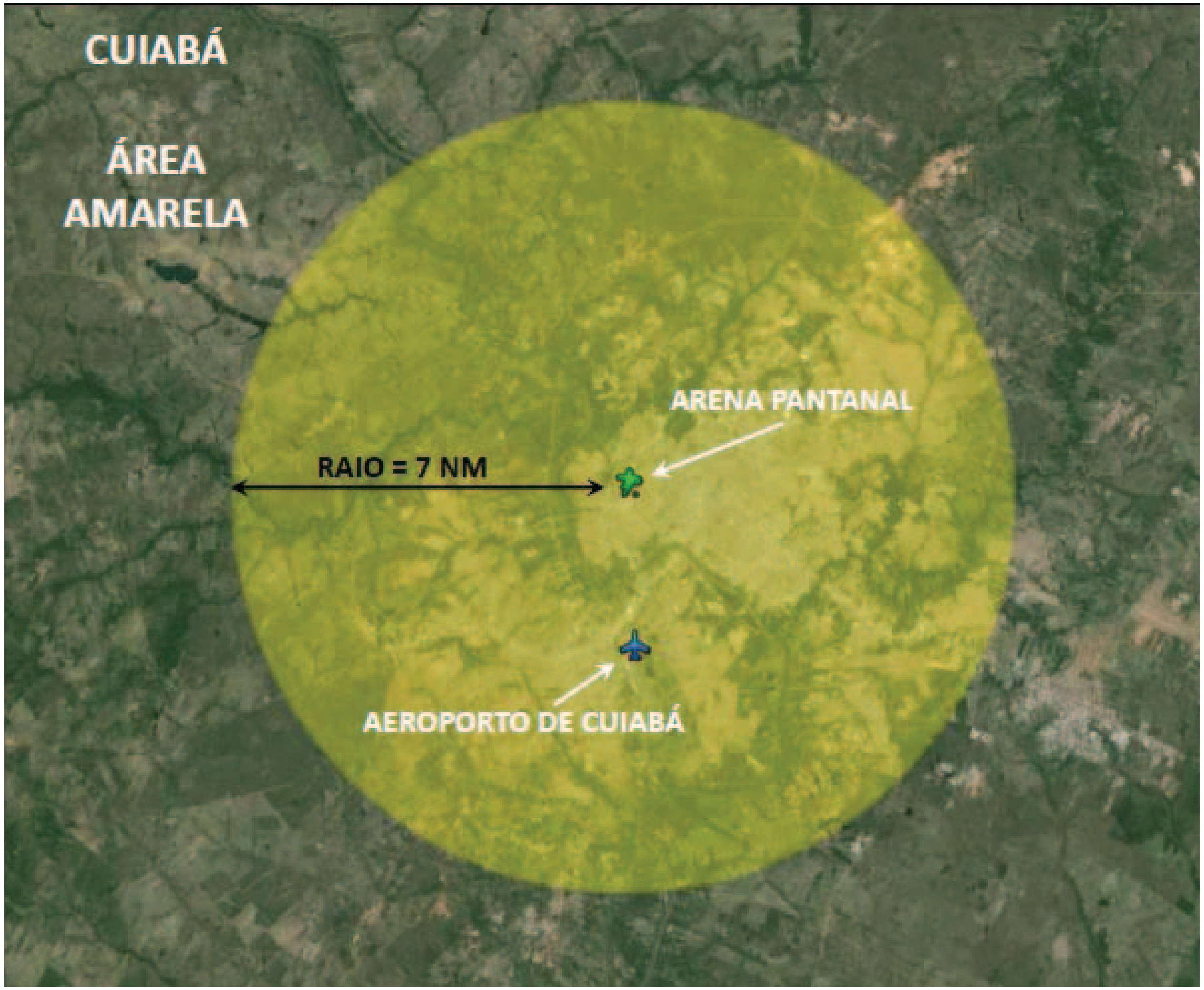
Área denominada BRANCA, definida pelas projeções laterais da TMA Cuiabá e limites verticais da superfície ao FL 145.



DESCRIÇÃO DAS ÁREAS DE EXCLUSÃO
Cuiabá (MT)

ÁREA RESTRITA

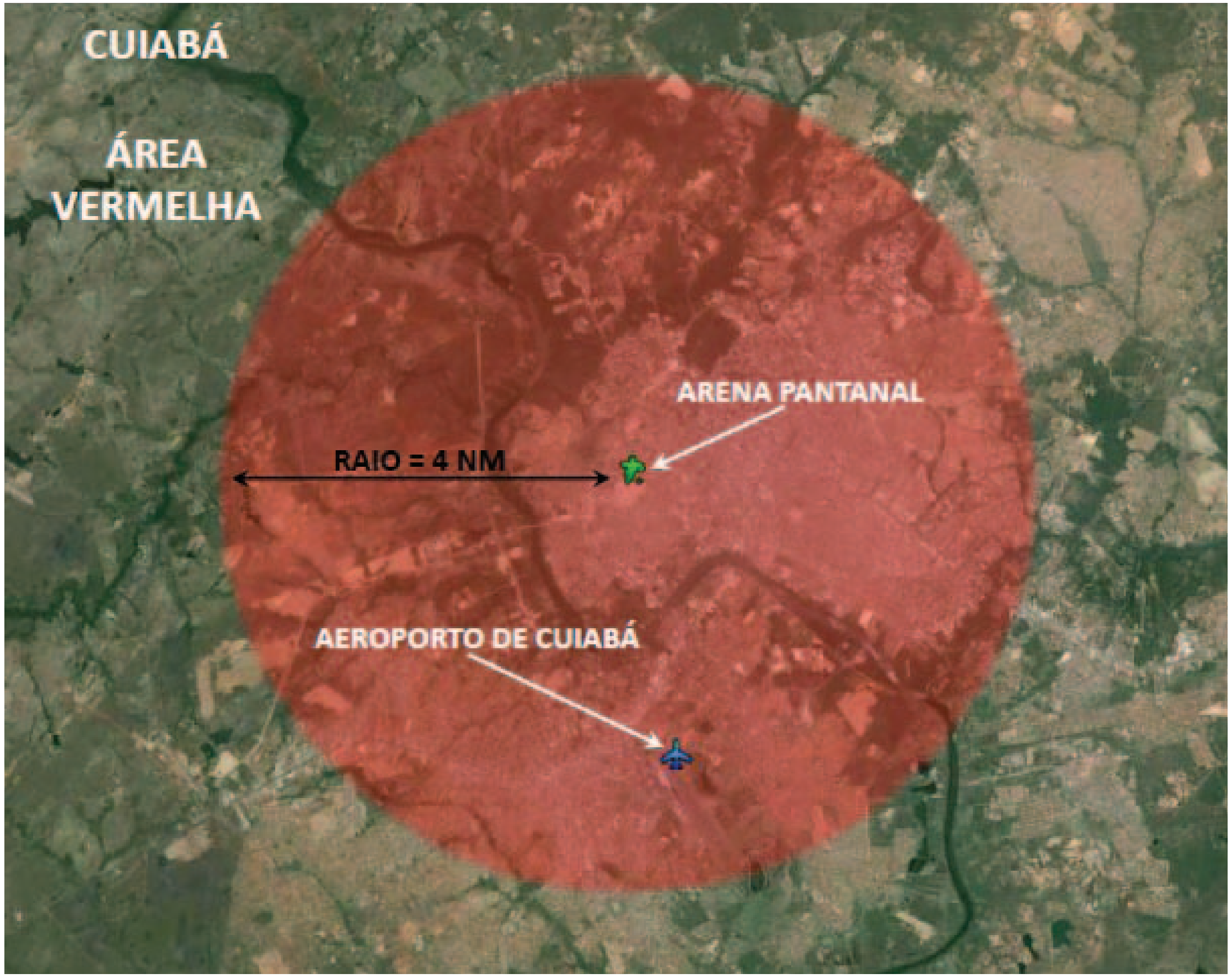
Área denominada AMARELA, dentro da área BRANCA, definida como um círculo com centro nas coordenadas 15°36’11”S 056°07’14”W, com 7 NM de raio e com volume de responsabilidade sobreposto da superfície até o FL 145.



DESCRIÇÃO DAS ÁREAS DE EXCLUSÃO
Cuiabá (MT)

ÁREA PROIBIDA

Área denominada VERMELHA, dentro da ÁREA AMARELA, definida como um círculo com centro nas coordenadas 15°36’11”S 056°07’14”W, com 4 NM de raio e com volume de responsabilidade sobreposto da superfície até o FL 145.



DESCRIÇÃO DAS ÁREAS DE EXCLUSÃO
Curitiba (PR)

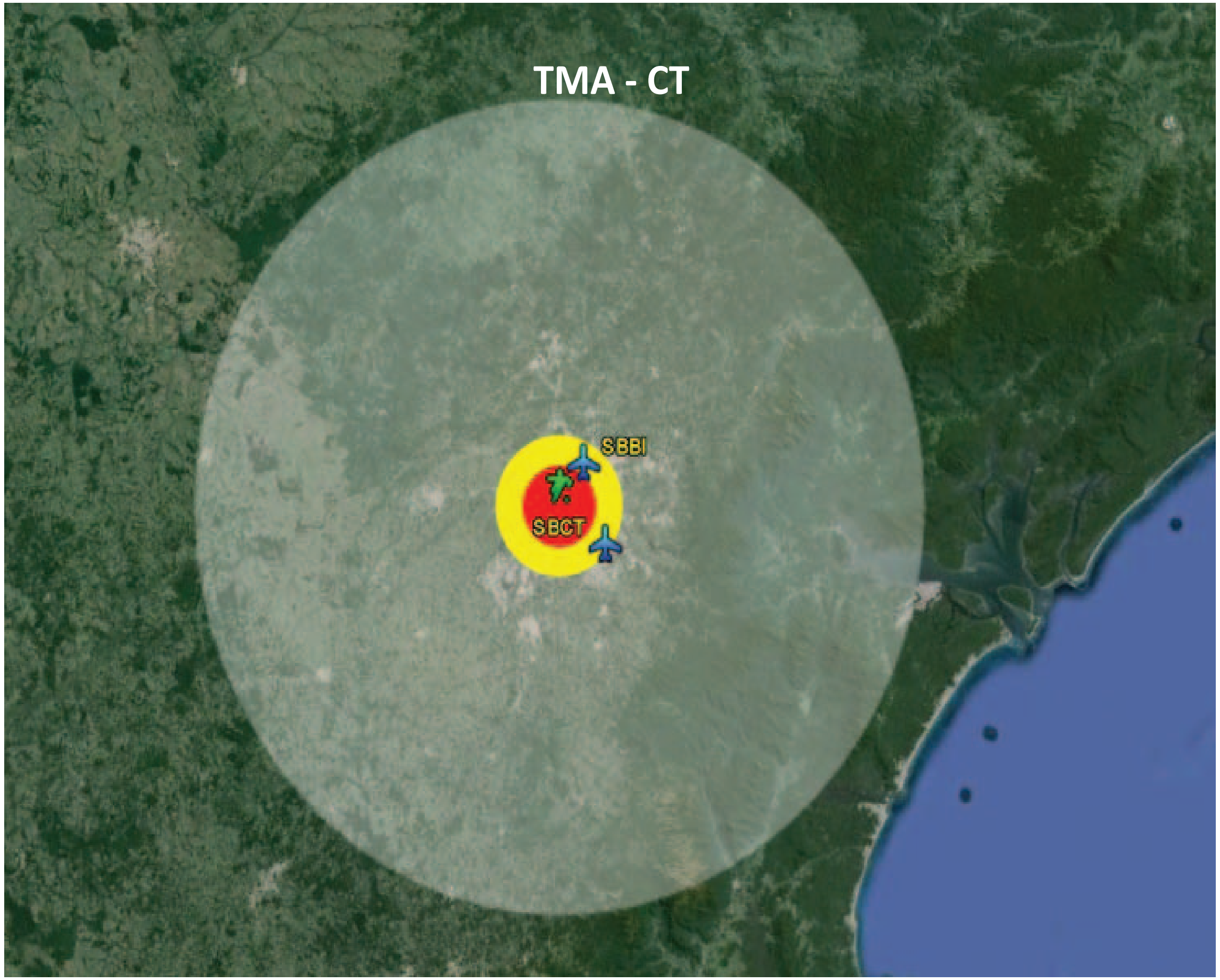
Dias e horários de ativação das áreas

- dia 16/06/2014 (16h local) – início às 15h local e término às 19h local;

- dia 20/06/2014 (19h local) – início às 18h local e término às 22h local;

- dia 23/06/2014 (13h local) – início às 12h local e término às 16h local; e

- dia 26/06/2014 (17h local) – início às 16h local e término às 20h local.



DESCRIÇÃO DAS ÁREAS DE EXCLUSÃO
Curitiba (PR)

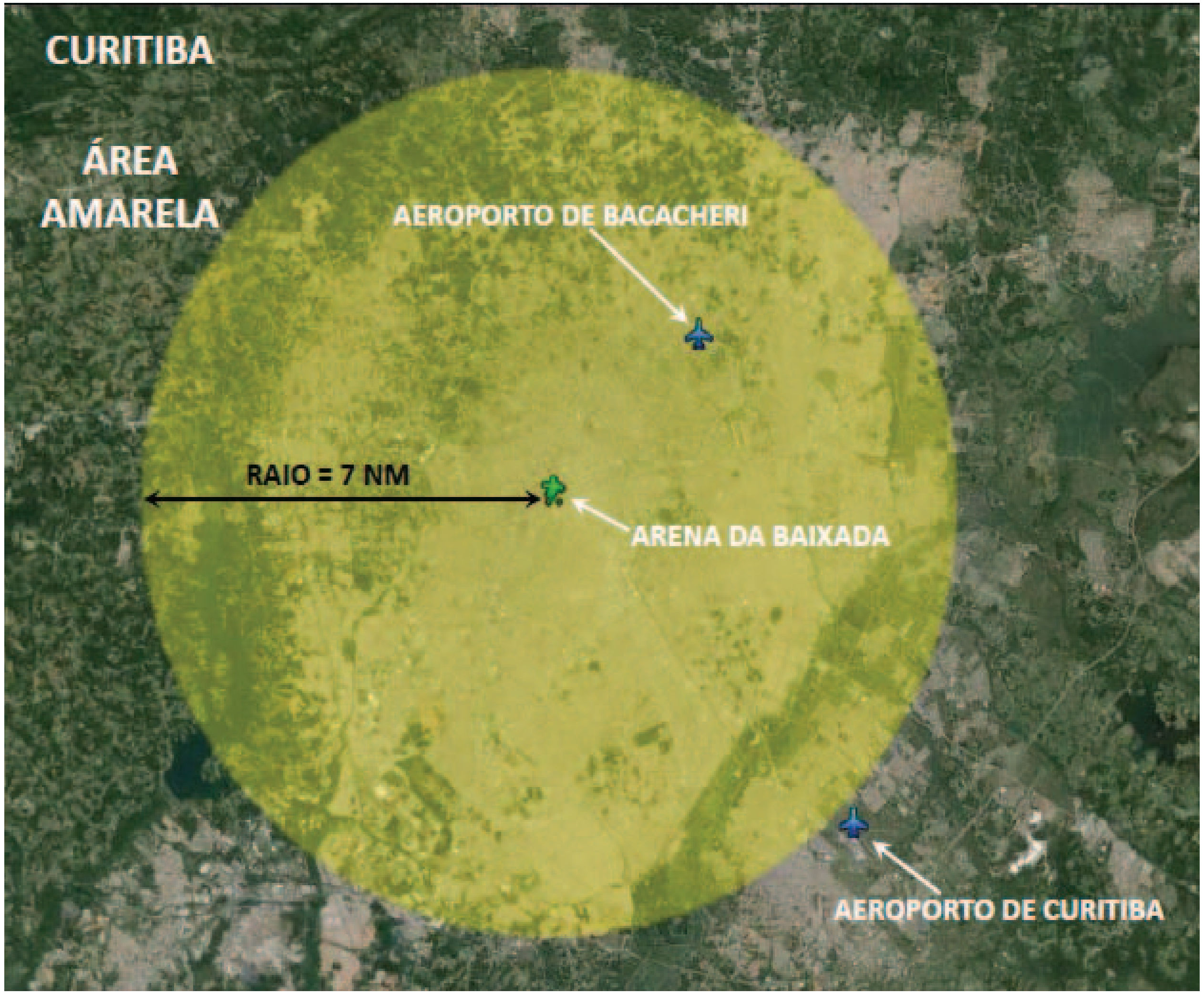
ÁREA RESERVADA

Área denominada BRANCA, definida pelas projeções laterais da TMA Curitiba e limites verticais da superfície ao FL 145.

DESCRIÇÃO DAS ÁREAS DE EXCLUSÃO
Curitiba (PR)

ÁREA RESTRITA

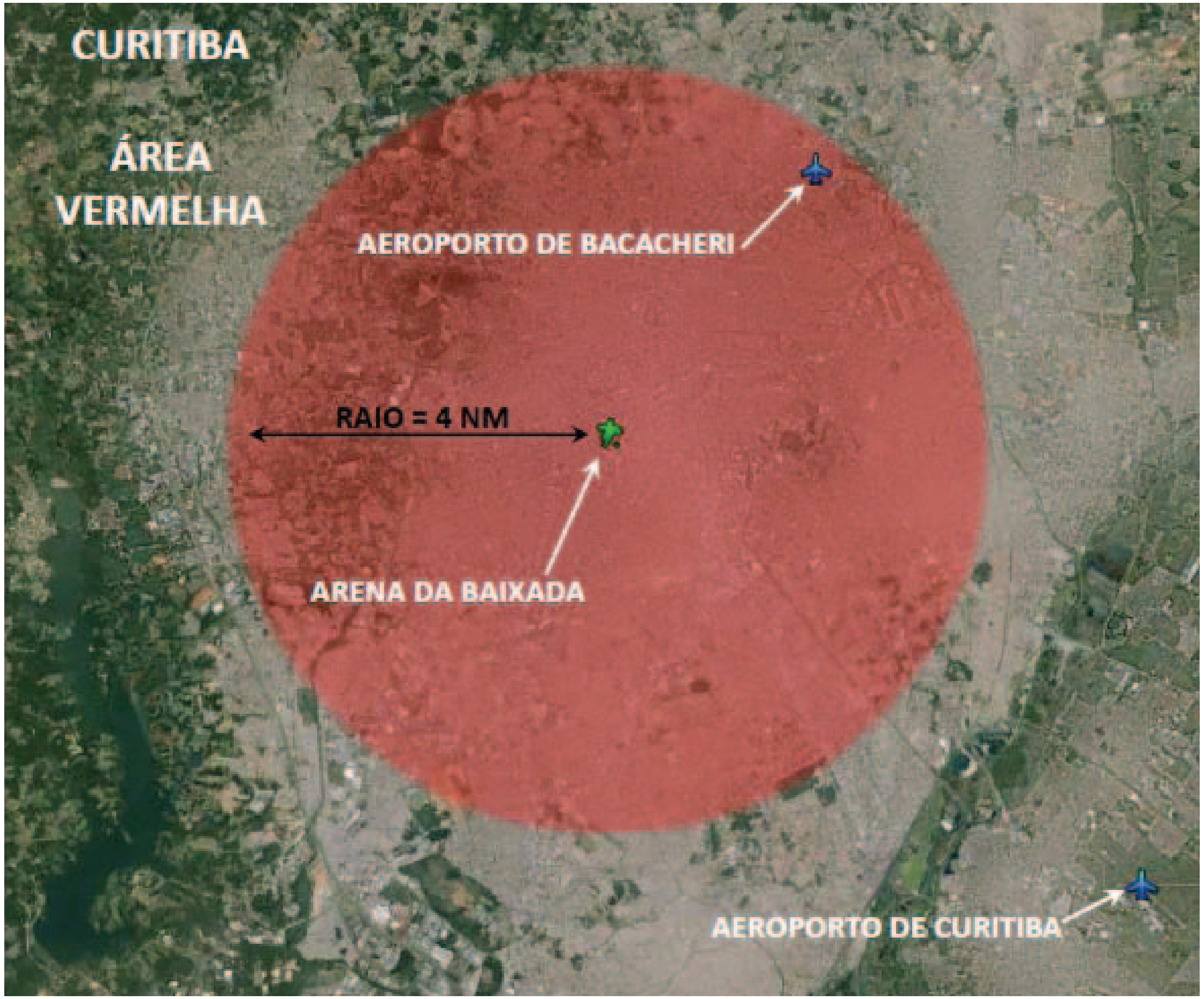
Área denominada AMARELA, dentro da área BRANCA, definida como um círculo com centro nas coordenadas 25°26'54"S 049°16'37"W, com 7 NM de raio e com volume de responsabilidade sobreposto da superfície até o FL 145.



DESCRIÇÃO DAS ÁREAS DE EXCLUSÃO
Curitiba (PR)

ÁREA PROIBIDA

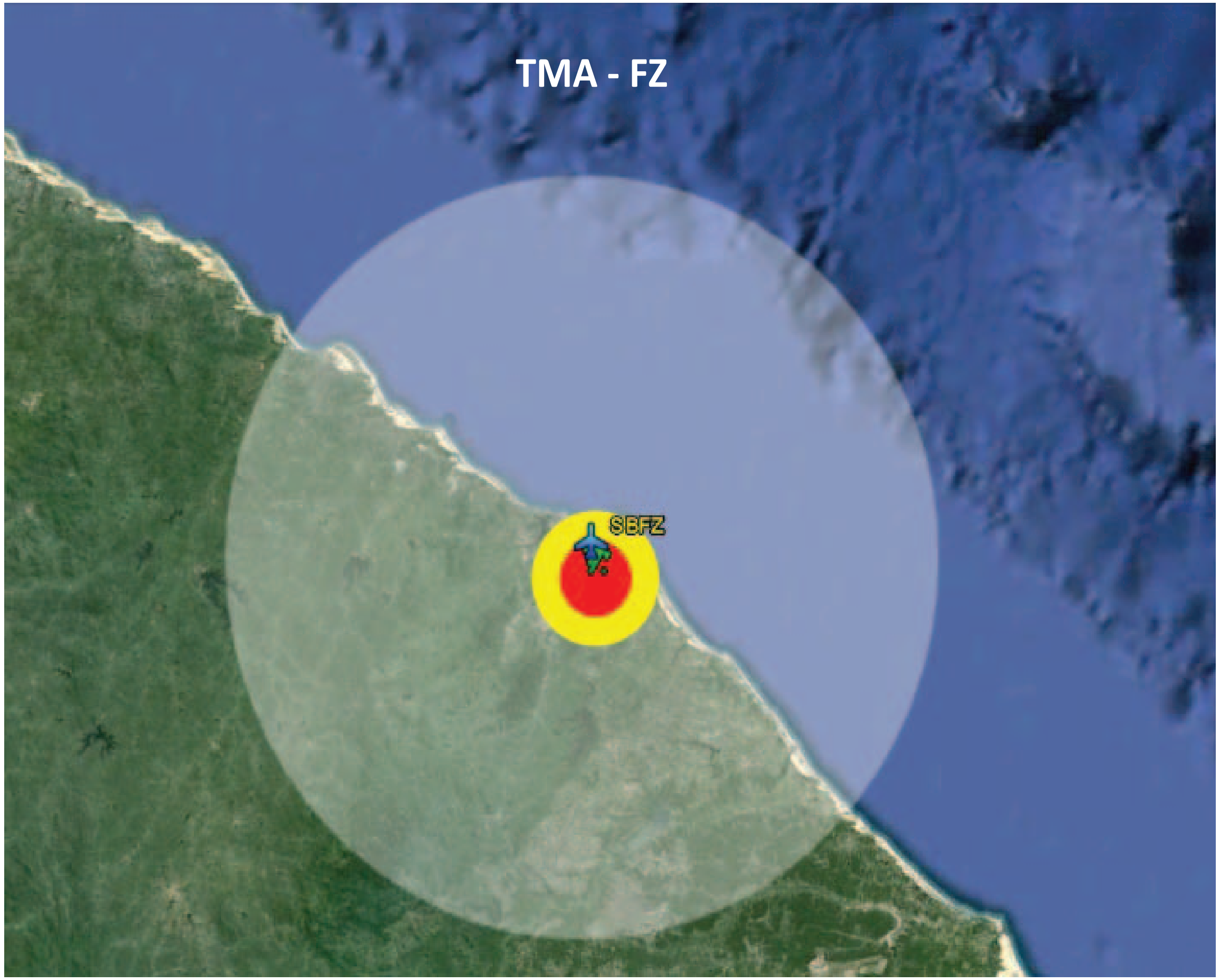
Área denominada VERMELHA, dentro da ÁREA AMARELA, definida como um círculo com centro nas coordenadas 25°26′54″S 049°16′37″W, com 4 NM de raio e com volume de responsabilidade sobreposto da superfície até o FL 145.



DESCRIÇÃO DAS ÁREAS DE EXCLUSÃO
Fortaleza (CE)

Dias e horários de ativação das áreas

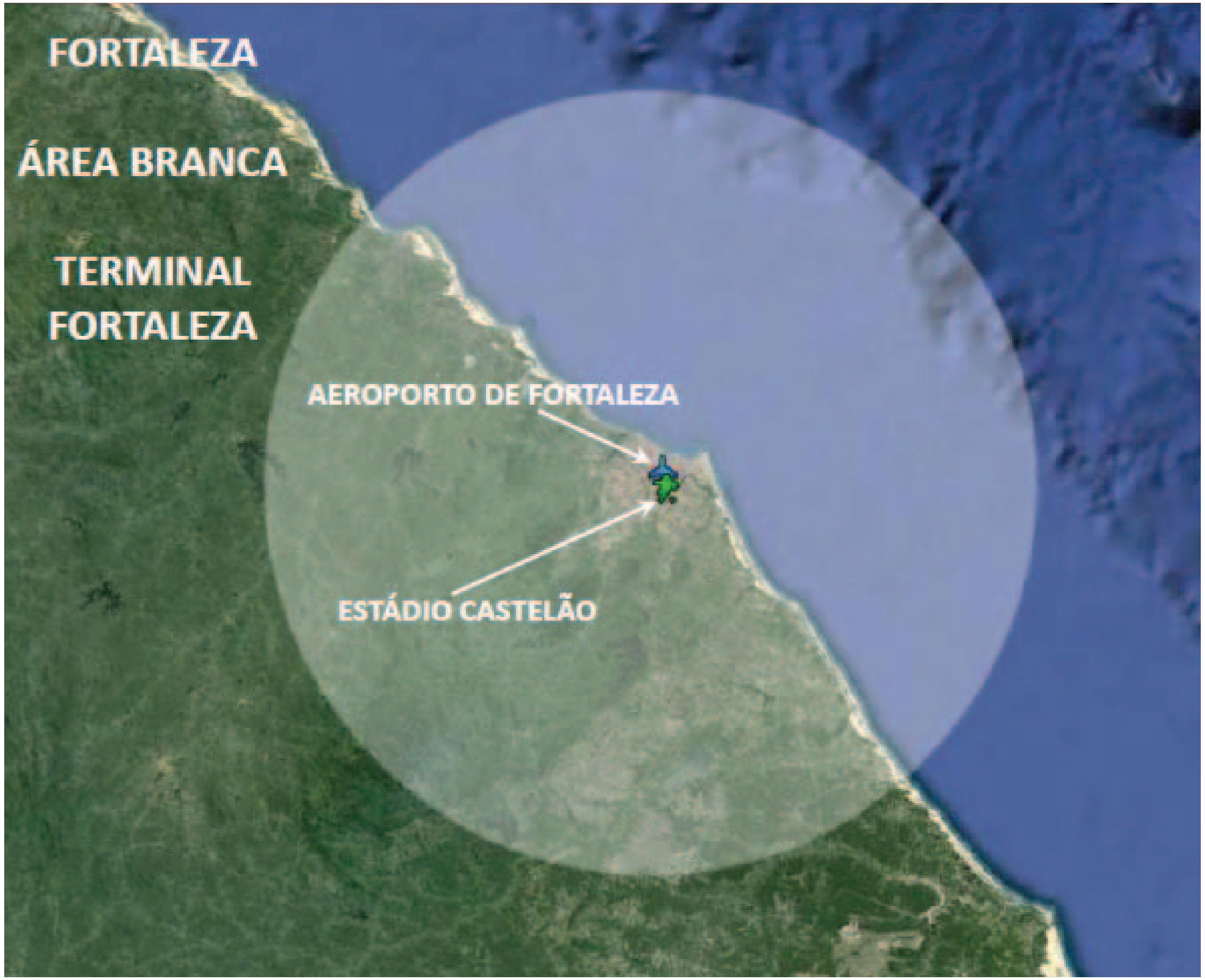
- dia 14/06/2014 (16h local) – início às 15h local e término às 19h local;
- dia 17/06/2014 (16h local) – início às 15h local e término às 19h local;
- dia 21/06/2014 (16h local) – início às 15h local e término às 19h local;
- dia 24/06/2014 (17h local) – início às 16h local e término às 20h local;
- dia 29/06/2014 (13h local) – início às 12h local e término às 17h local; e
- dia 04/07/2014 (17h local) – início às 16h local e término às 21h local.



DESCRIÇÃO DAS ÁREAS DE EXCLUSÃO
Fortaleza (CE)

ÁREA RESERVADA

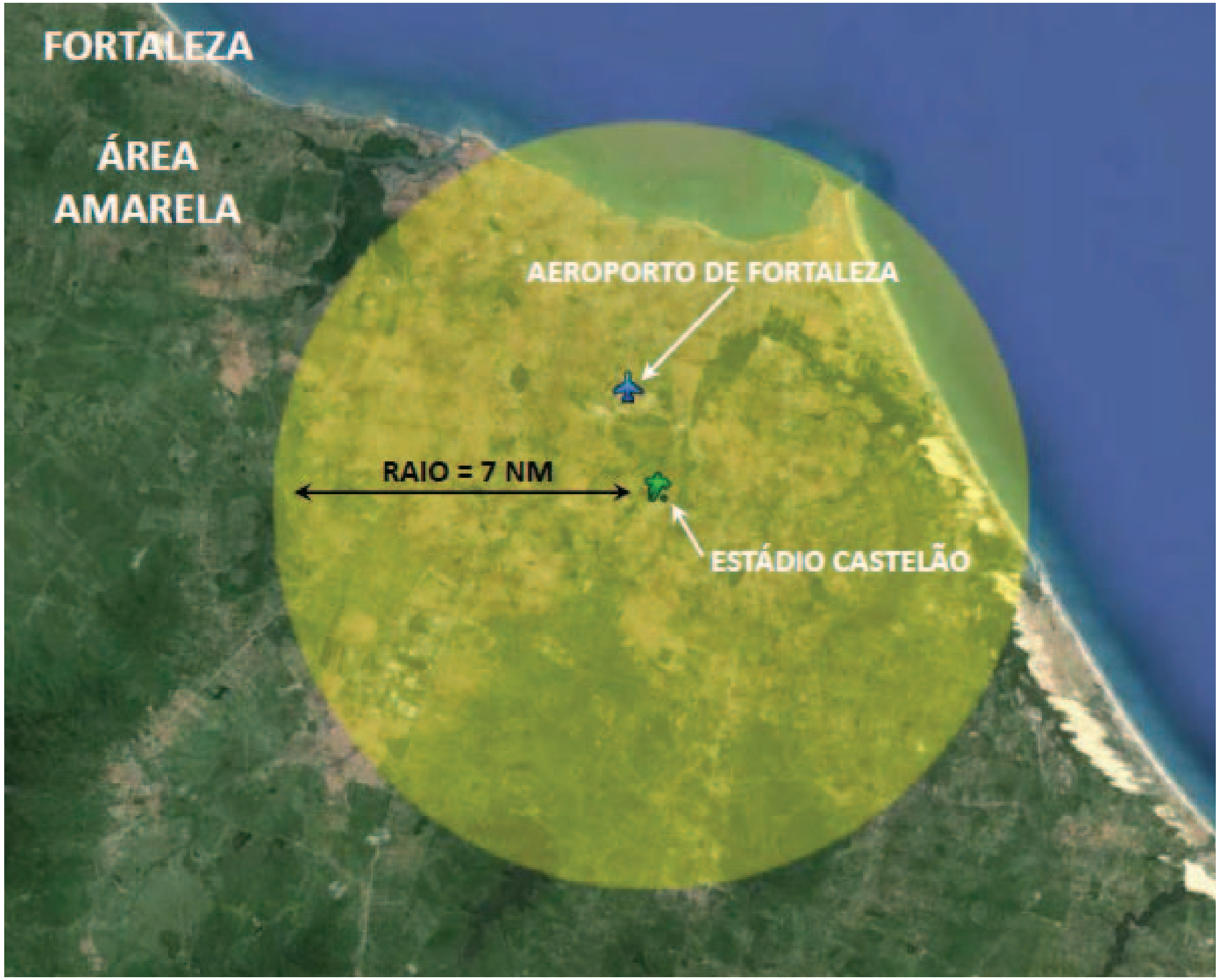
Área denominada BRANCA, definida pelas projeções laterais da TMA Fortaleza e limites verticais da superfície ao FL 145.



DESCRIÇÃO DAS ÁREAS DE EXCLUSÃO
Fortaleza (CE)

ÁREA RESTRITA

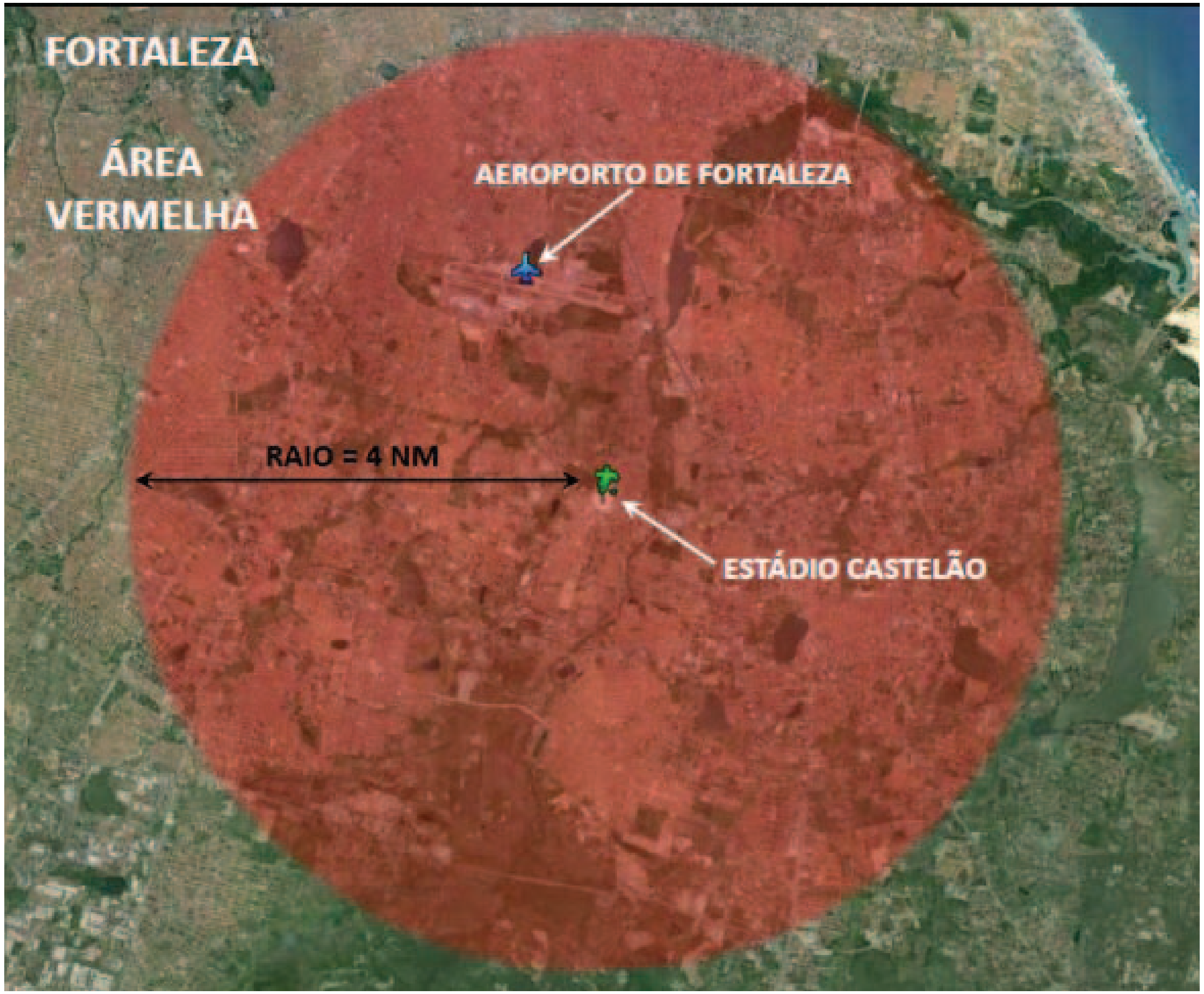
Área denominada AMARELA, dentro da área BRANCA, definida como um círculo com centro nas coordenadas 03°48’25”S 038°31’19”W, com 7 NM de raio e com volume de responsabilidade sobreposto da superfície até o FL 145.



DESCRIÇÃO DAS ÁREAS DE EXCLUSÃO
Fortaleza (CE)

ÁREA PROIBIDA

Área denominada VERMELHA, dentro da ÁREA AMARELA, definida como um círculo com centro nas coordenadas 03°48′25″S 038°31′19″W, com 4 NM de raio e com volume de responsabilidade sobreposto da superfície até o FL 145.



DESCRIÇÃO DAS ÁREAS DE EXCLUSÃO
Manaus (AM)

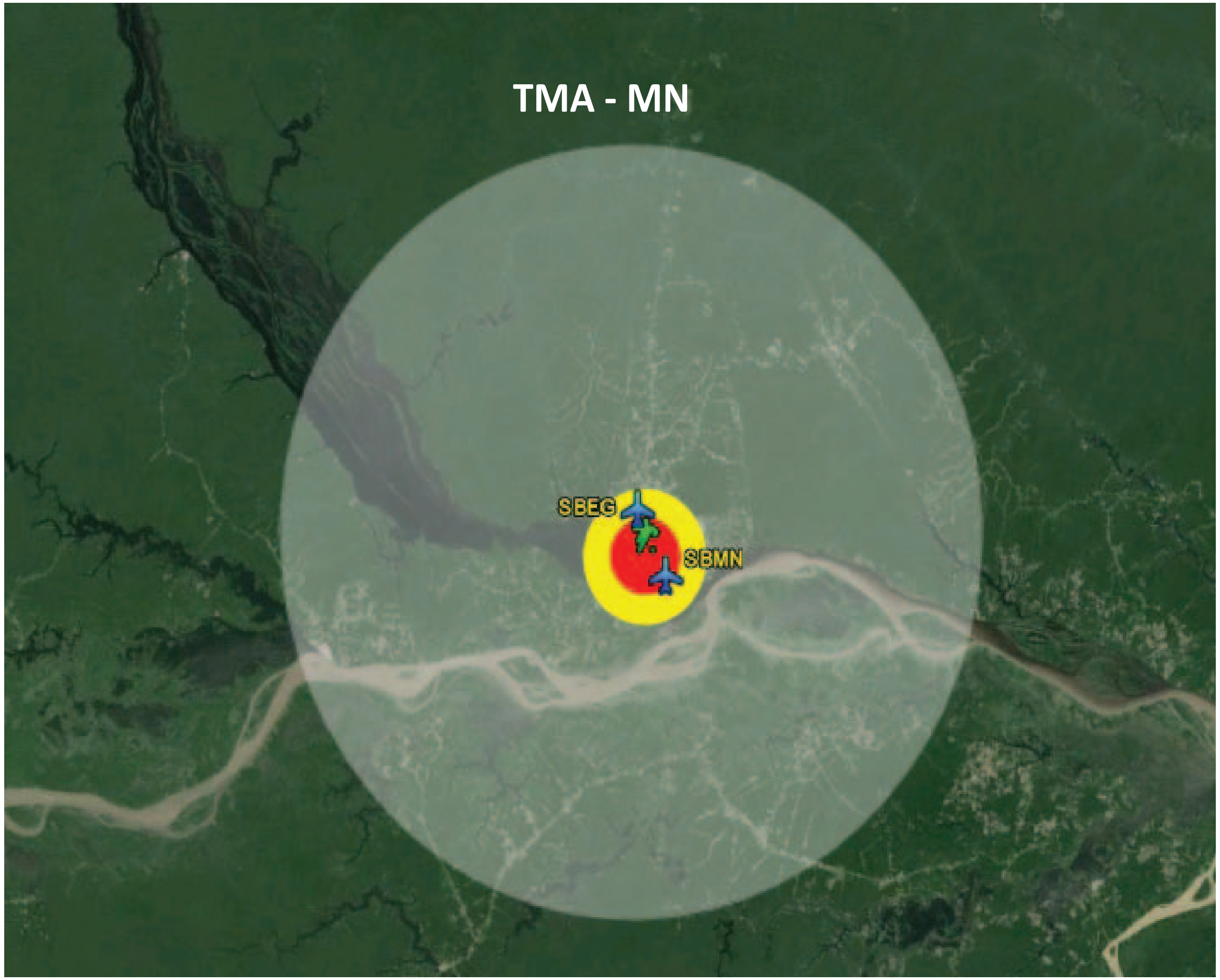
Dias e horários de ativação das áreas

- dia 14/06/2014 (18h local) – início às 17h local e término às 21h local;

- dia 18/06/2014 (18h local) – início às 17h local e término às 21h local;

- dia 22/06/2014 (18h local) – início às 17h local e término às 21h local; e

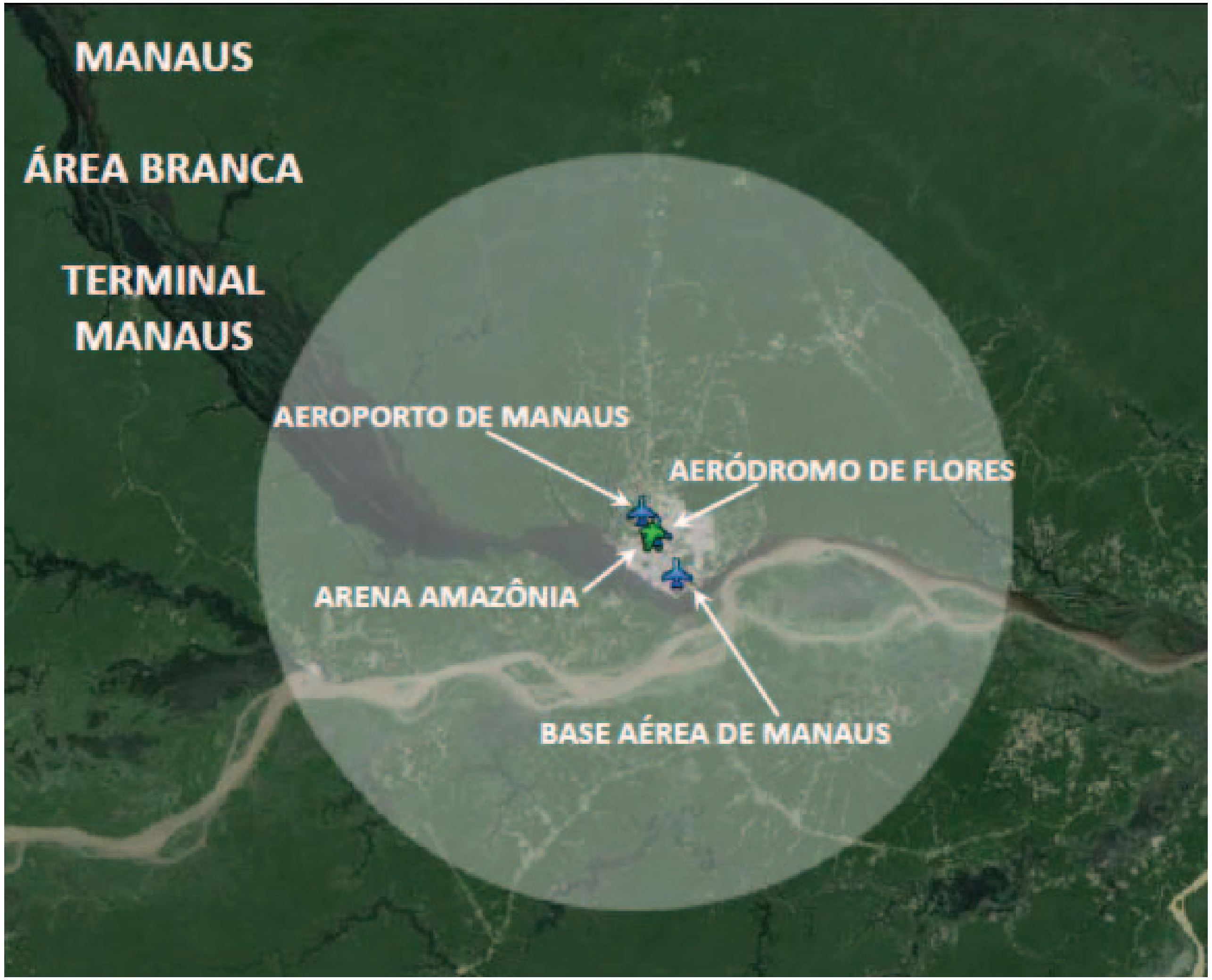
- dia 25/06/2014 (16h local) – início às 15h local e término às 19h local.



DESCRIÇÃO DAS ÁREAS DE EXCLUSÃO
Manaus (AM)

ÁREA RESERVADA

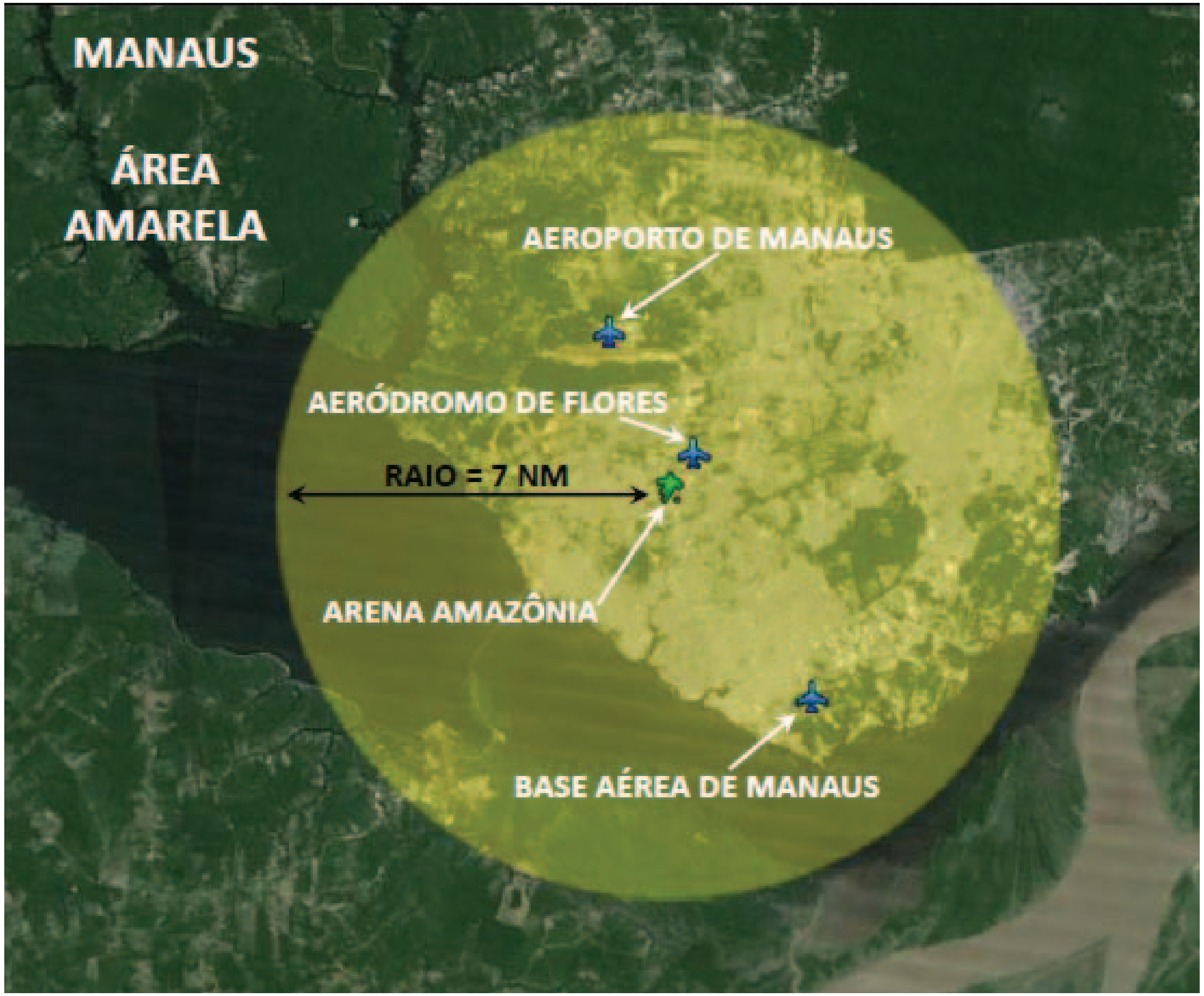
Área denominada BRANCA, definida pelas projeções laterais da TMA Manaus e limites verticais da superfície ao FL 145.



DESCRIÇÃO DAS ÁREAS DE EXCLUSÃO
Manaus (AM)

ÁREA RESTRITA

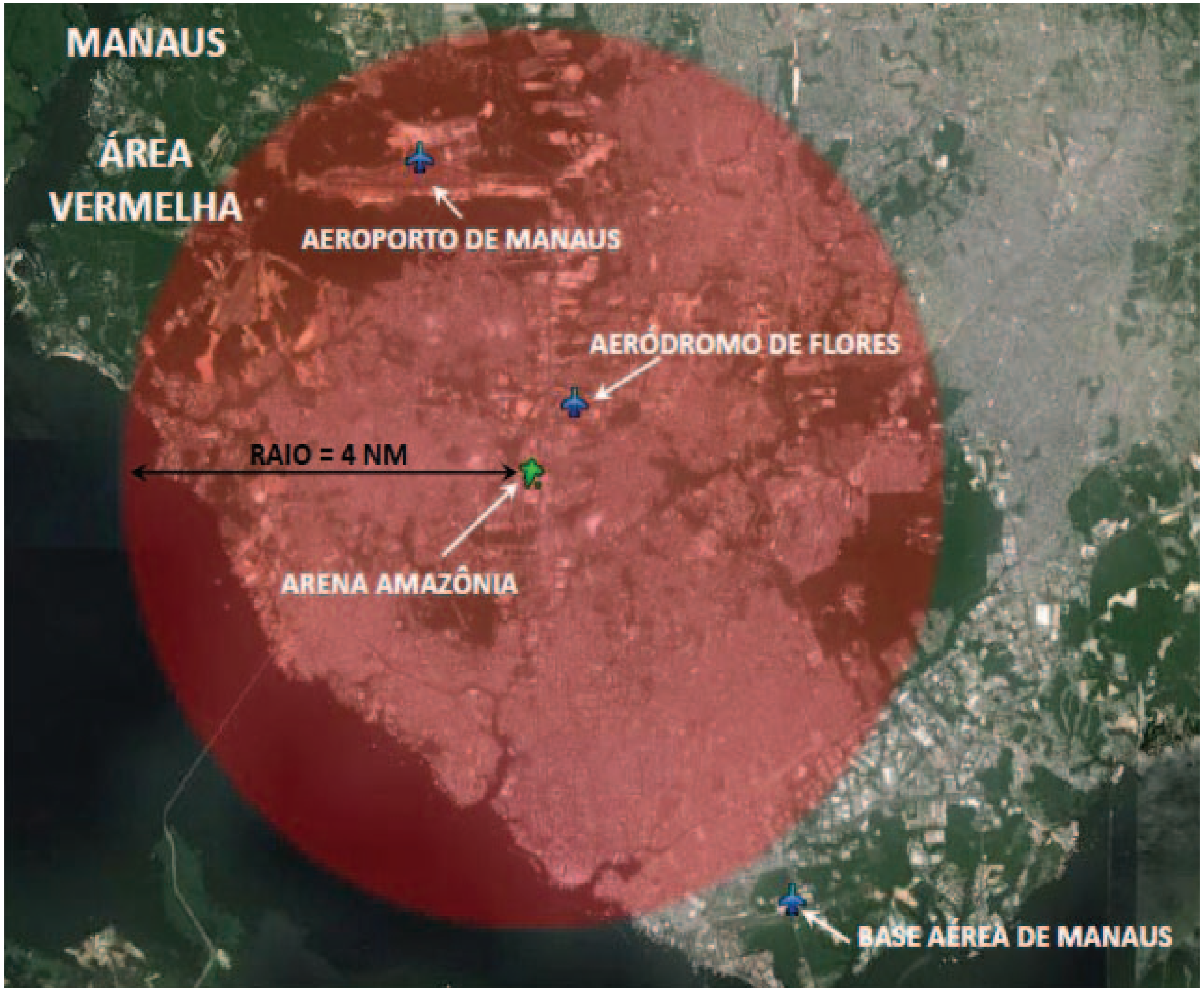
Área denominada AMARELA, dentro da área BRANCA, definida como um círculo com centro nas coordenadas 03°04'58.02"S 060°01'39.76"W, com 7 NM de raio e com volume de responsabilidade sobreposto da superfície até o FL 145.



DESCRIÇÃO DAS ÁREAS DE EXCLUSÃO
Manaus (AM)

ÁREA PROIBIDA

Área denominada VERMELHA, dentro da ÁREA AMARELA, definida como um círculo com centro nas coordenadas 03°04’58.02”S 060°01’39.76”W, com 4 NM de raio e com volume de responsabilidade sobreposto da superfície até o FL 145.



DESCRIÇÃO DAS ÁREAS DE EXCLUSÃO
Natal (RN)

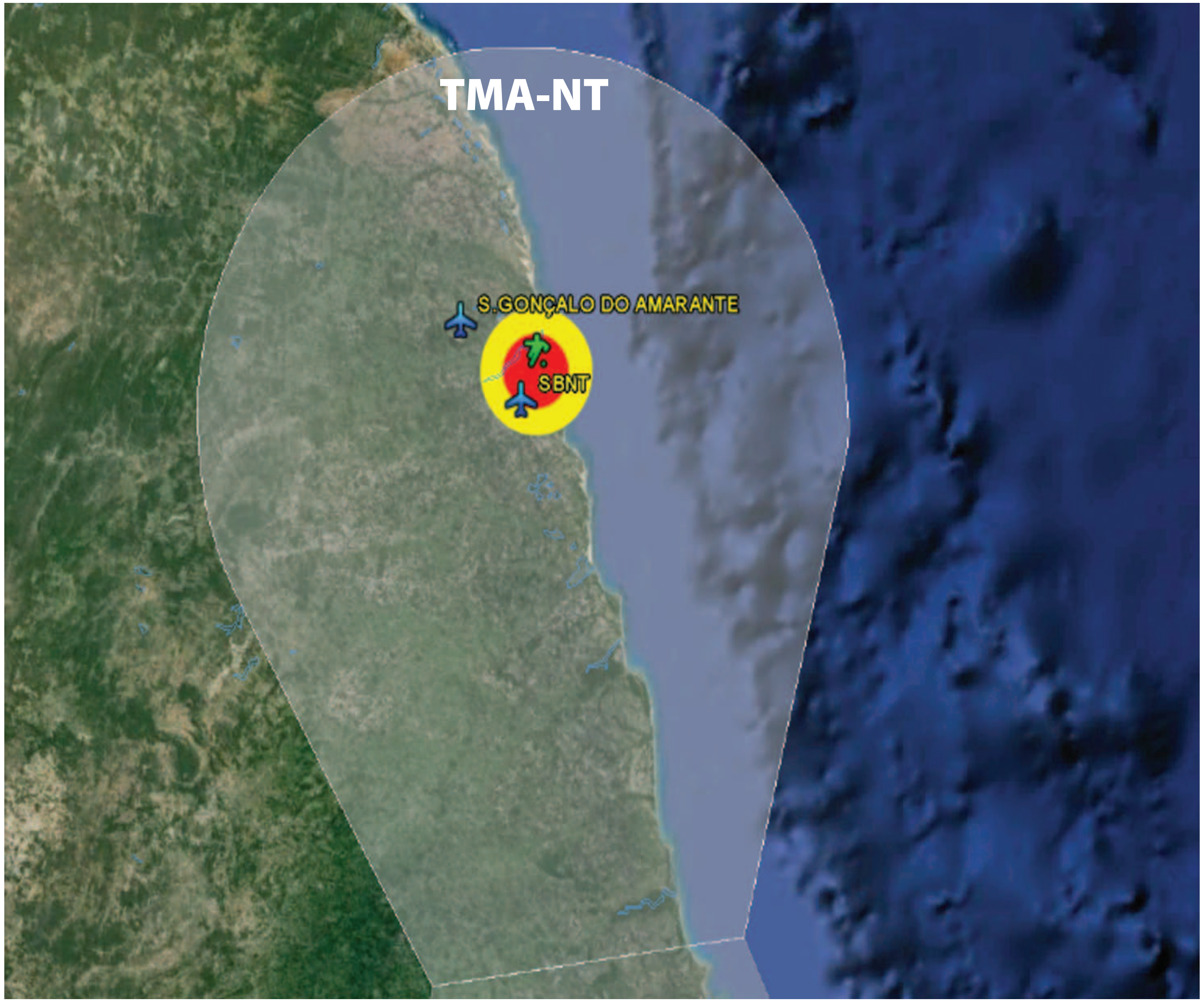
Dias e horários de ativação das áreas

- dia 13/06/2014 (13h local) – início às 12h local e término às 16h local;

- dia 16/06/2014 (19h local) – início às 18h local e término às 22h local;

- dia 19/06/2014 (19h local) – início às 18h local e término às 22h local; e

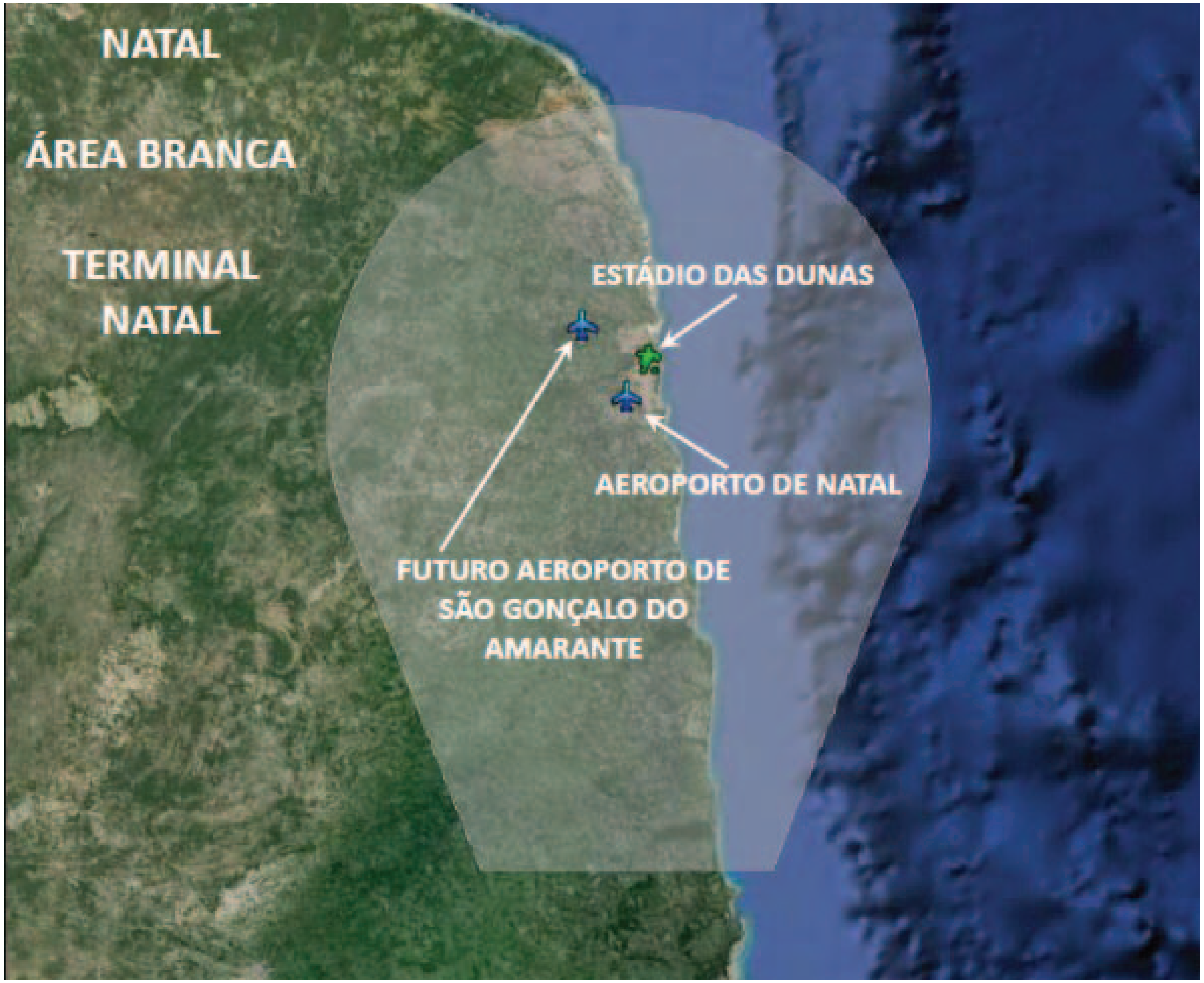
- dia 24/06/2014 (13h local) – início às 12h local e término às 16h local.



DESCRIÇÃO DAS ÁREAS DE EXCLUSÃO
Natal (RN)

ÁREA RESERVADA

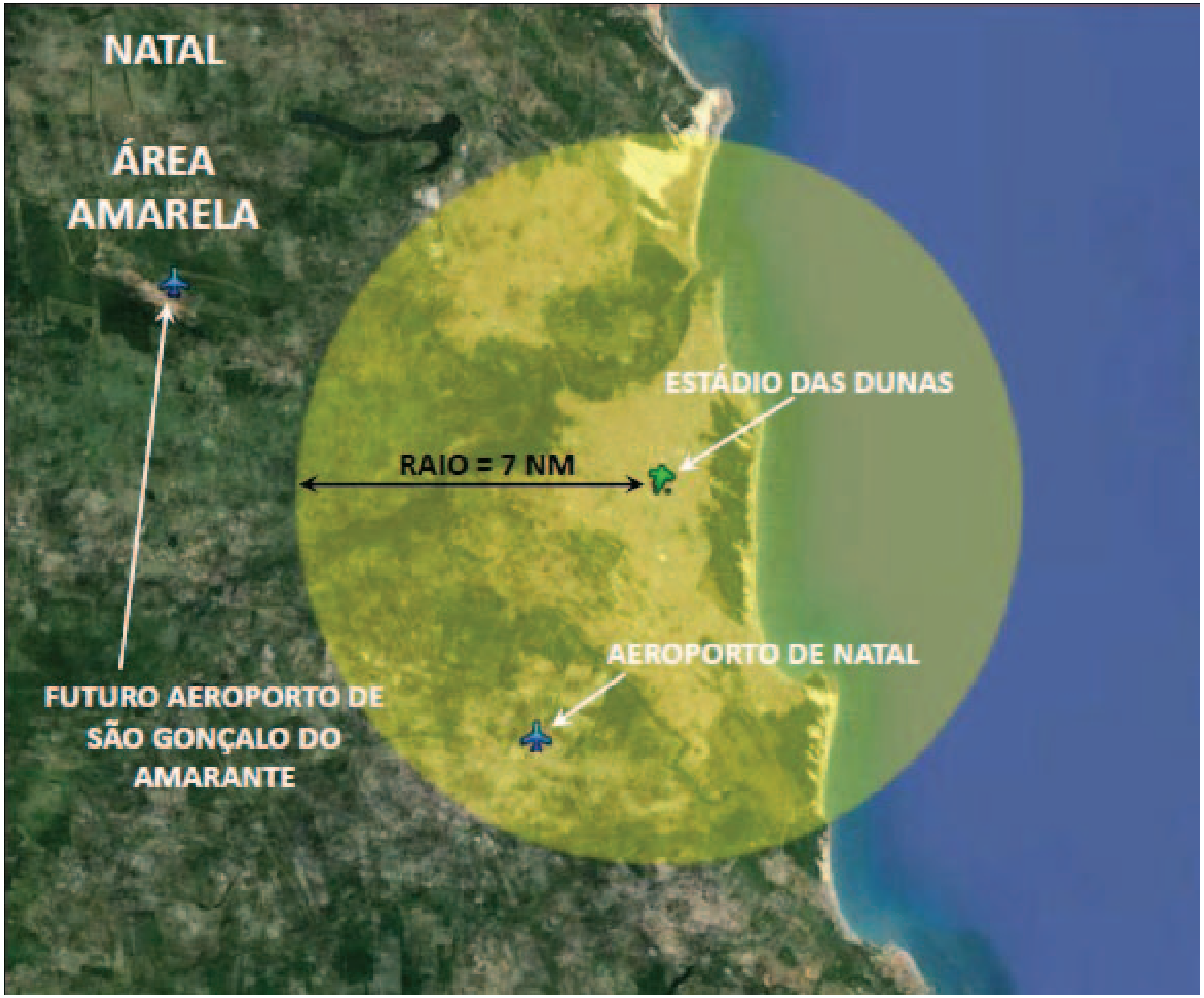
Área denominada BRANCA, definida pelas projeções laterais da TMA Natal e limites verticais da superfície ao FL 145.



DESCRIÇÃO DAS ÁREAS DE EXCLUSÃO
Natal (RN)

ÁREA RESTRITA

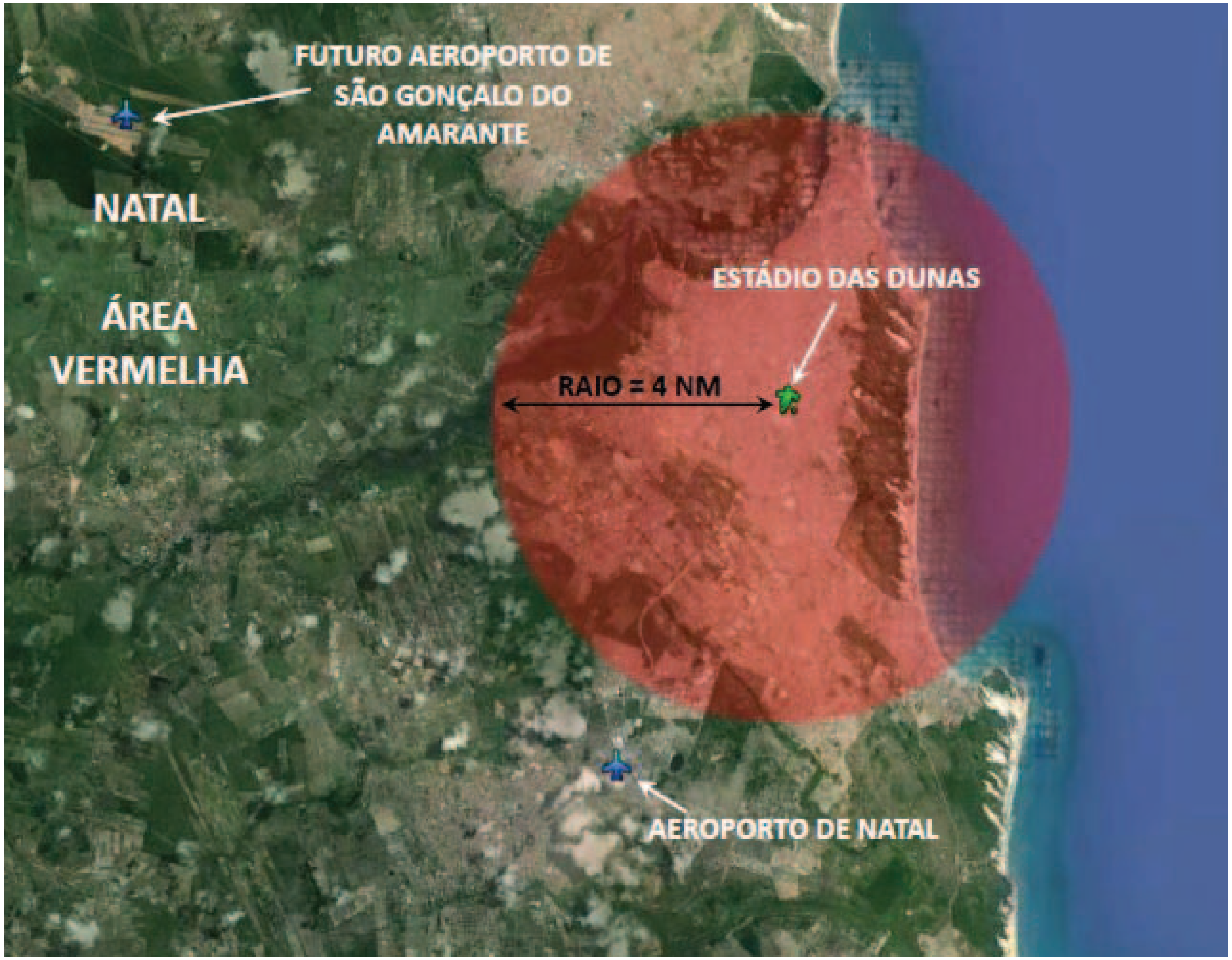
Área denominada AMARELA, dentro da área BRANCA, definida como um círculo com centro nas coordenadas 05°49'33.34"S 035°12'45.78"W, com 7 NM de raio e com volume de responsabilidade sobreposto da superfície até o FL 145.



DESCRIÇÃO DAS ÁREAS DE EXCLUSÃO
Natal (RN)

ÁREA PROIBIDA

Área denominada VERMELHA, dentro da ÁREA AMARELA, definida como um círculo com centro nas coordenadas 05°49'33.34"S 035°12'45.78"W, com 4 NM de raio e com volume de responsabilidade sobreposto da superfície até o FL 145.



DESCRIÇÃO DAS ÁREAS DE EXCLUSÃO
Porto Alegre (RS)

Dias e horários de ativação das áreas

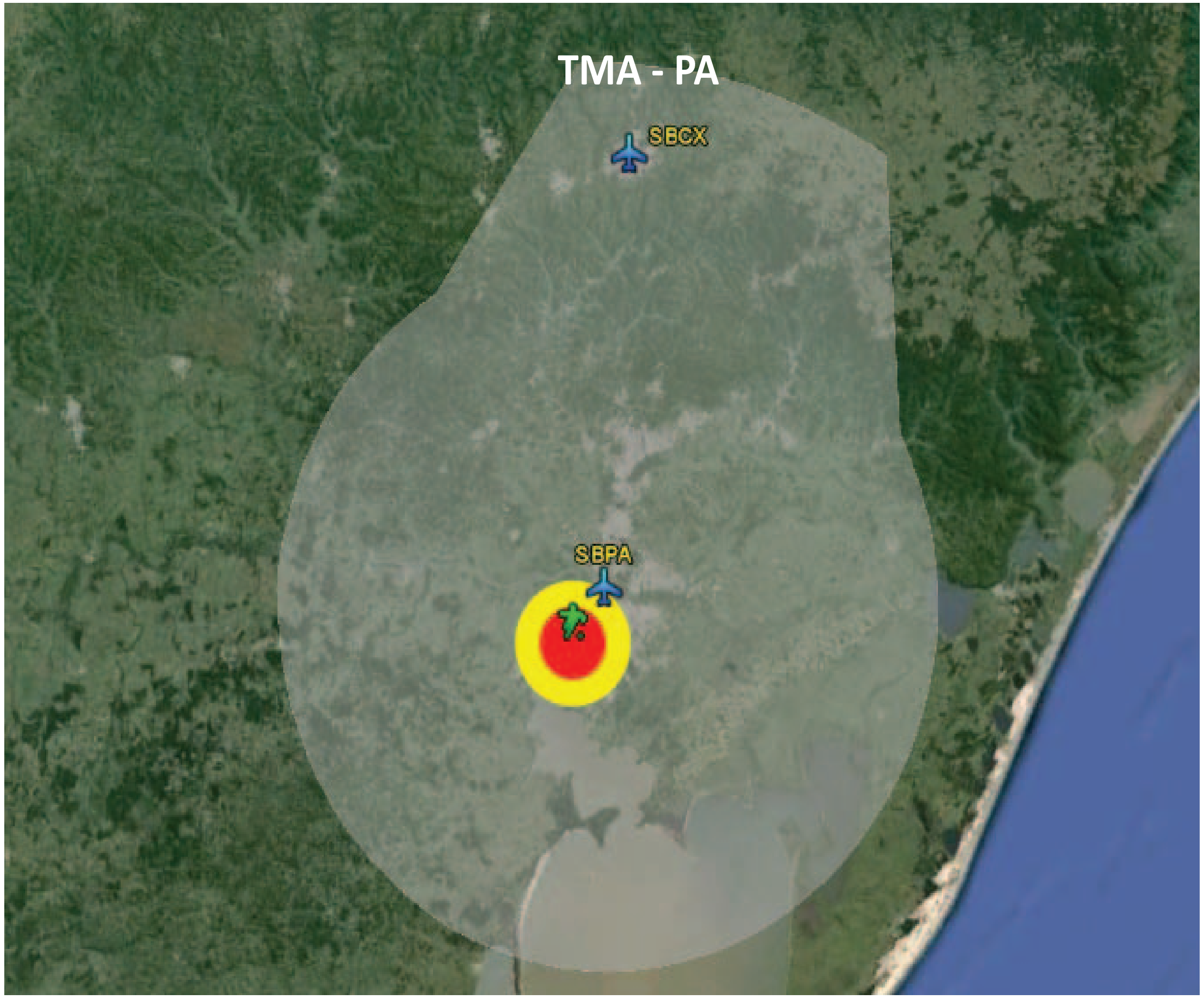
- dia 15/06/2014 (16h local) – início às 15h local e término às 19h local;

- dia 18/06/2014 (13h local) – início às 12h local e término às 16h local;

- dia 22/06/2014 (16h local) – início às 15h local e término às 19h local;

- dia 25/06/2014 (13h local) – início às 12h local e término às 16h local; e

- dia 30/06/2014 (17h local) – início às 16h local e término às 21h local.



DESCRIÇÃO DAS ÁREAS DE EXCLUSÃO
Porto Alegre (RS)

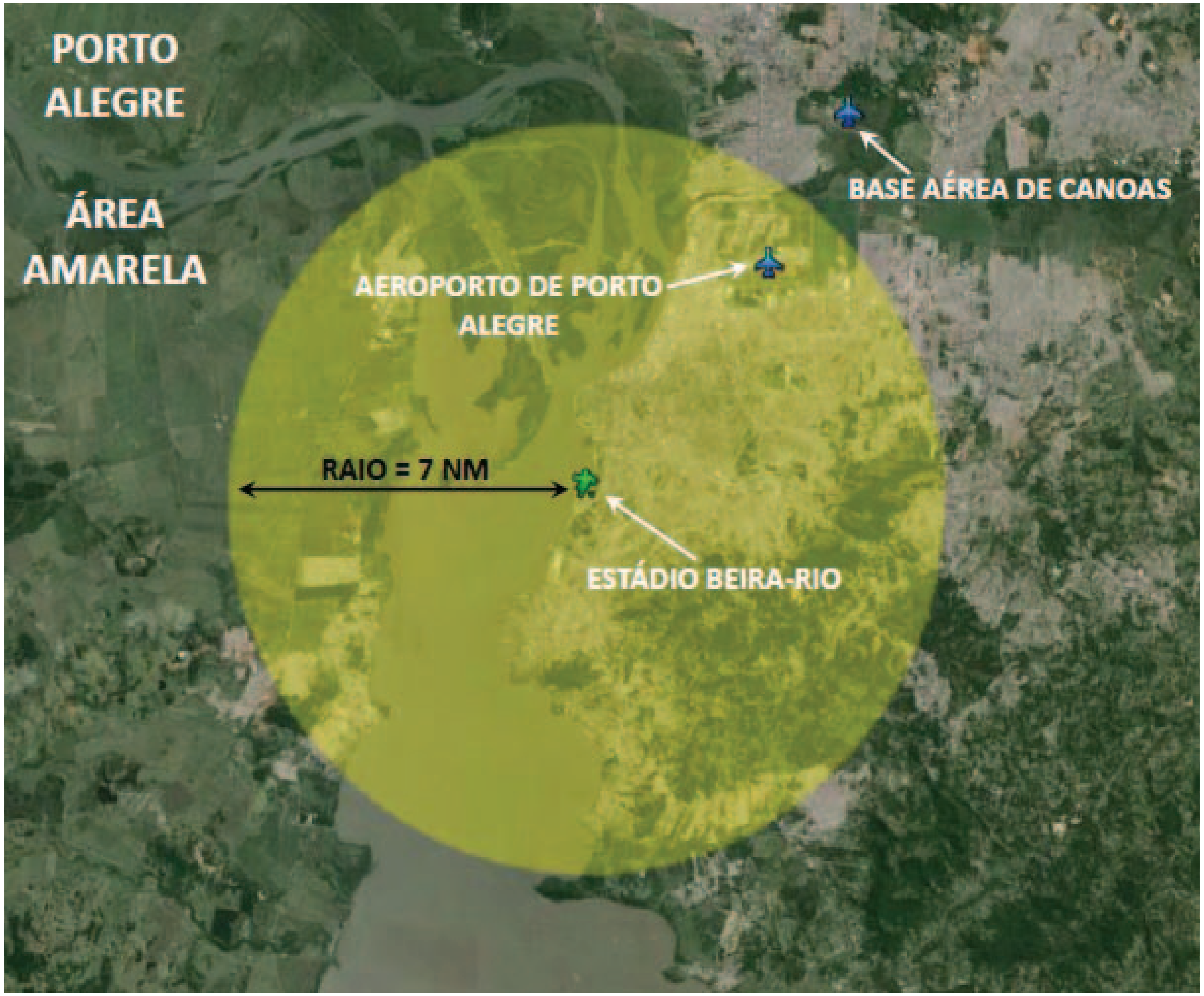
ÁREA RESERVADA

Área denominada BRANCA, definida pelas projeções laterais da TMA Porto Alegre e limites verticais da superfície ao FL 145.

DESCRIÇÃO DAS ÁREAS DE EXCLUSÃO
Porto Alegre (RS)

ÁREA RESTRITA

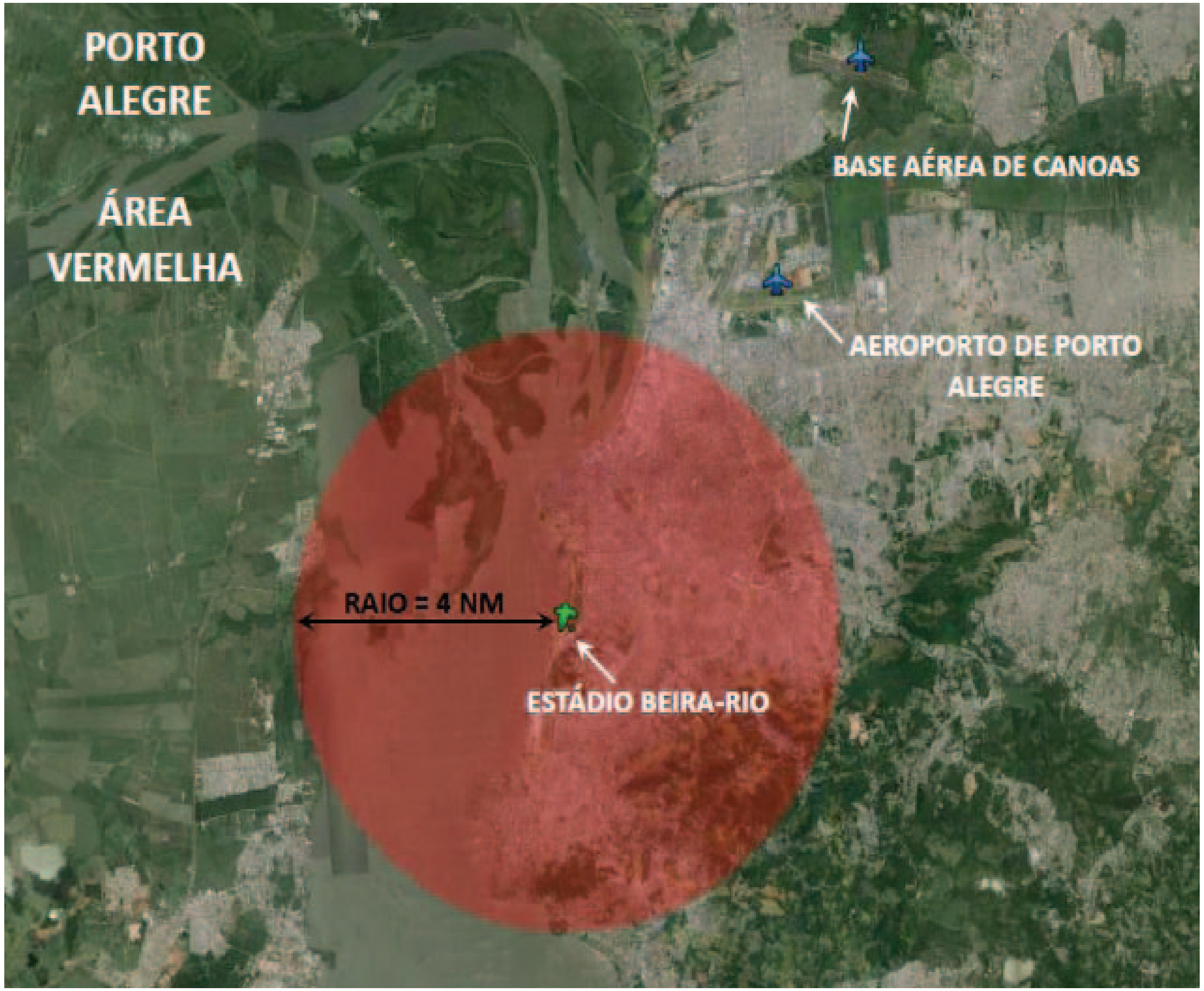
Área denominada AMARELA, dentro da área BRANCA, definida como um círculo com centro nas coordenadas 30°03’53.40”S 051°14’09.47”W, com 7 NM de raio e com volume de responsabilidade sobreposto da superfície até o FL 145.



DESCRIÇÃO DAS ÁREAS DE EXCLUSÃO
Porto Alegre (RS)

ÁREA PROIBIDA

Área denominada VERMELHA, dentro da ÁREA AMARELA, definida como um círculo com centro nas coordenadas 30°03’53.40”S 051°14’09.47”W, com 4 NM de raio e com volume de responsabilidade sobreposto da superfície até o FL 145.



DESCRIÇÃO DAS ÁREAS DE EXCLUSÃO
Recife (PE)

Dias e horários de ativação das áreas

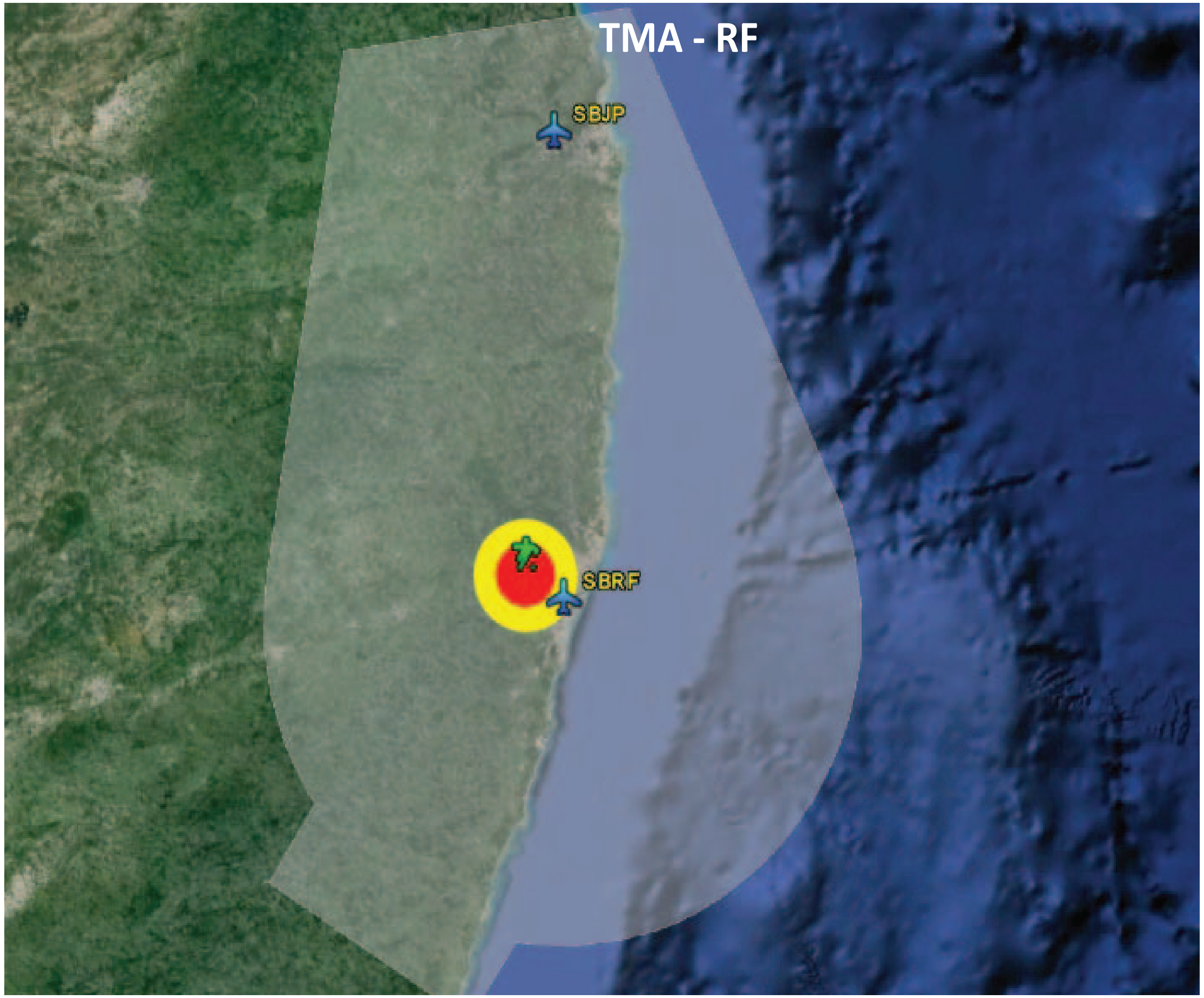
- dia 14/06/2014 (22h local) – início às 21h local e término às 01h local;

- dia 20/06/2014 (13h local) – início às 12h local e término às 16h local;

- dia 23/06/2014 (17h local) – início às 16h local e término às 20h local;

- dia 26/06/2014 (13h local) – início às 12h local e término às 16h local; e

- dia 29/06/2014 (17h local) – início às 16h local e término às 21h local.



DESCRIÇÃO DAS ÁREAS DE EXCLUSÃO
Recife (PE)

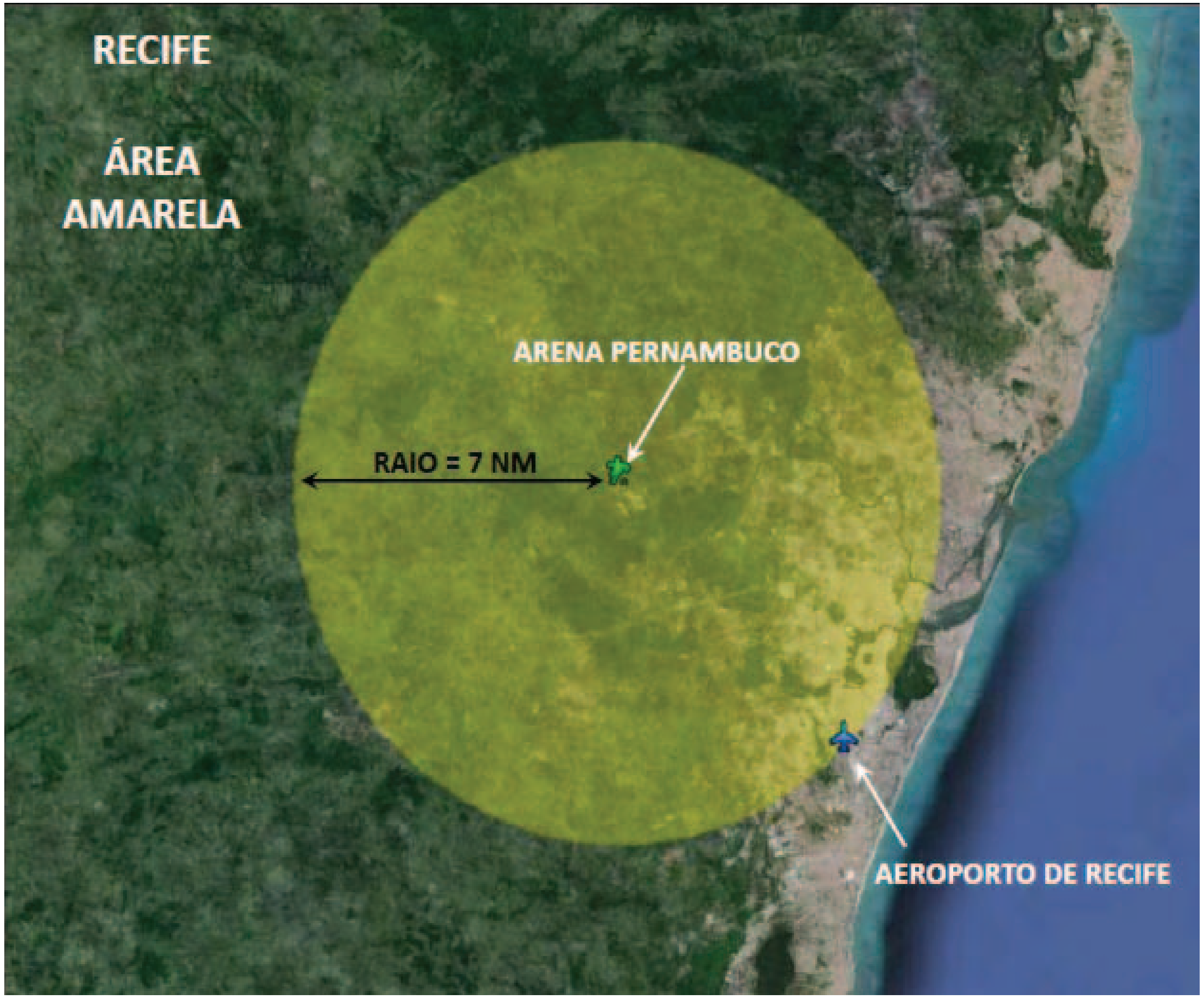
ÁREA RESERVADA

Área denominada BRANCA, definida pelas projeções laterais da TMA Recife e limites verticais da superfície ao FL 145.

DESCRIÇÃO DAS ÁREAS DE EXCLUSÃO
Recife (PE)

ÁREA RESTRITA

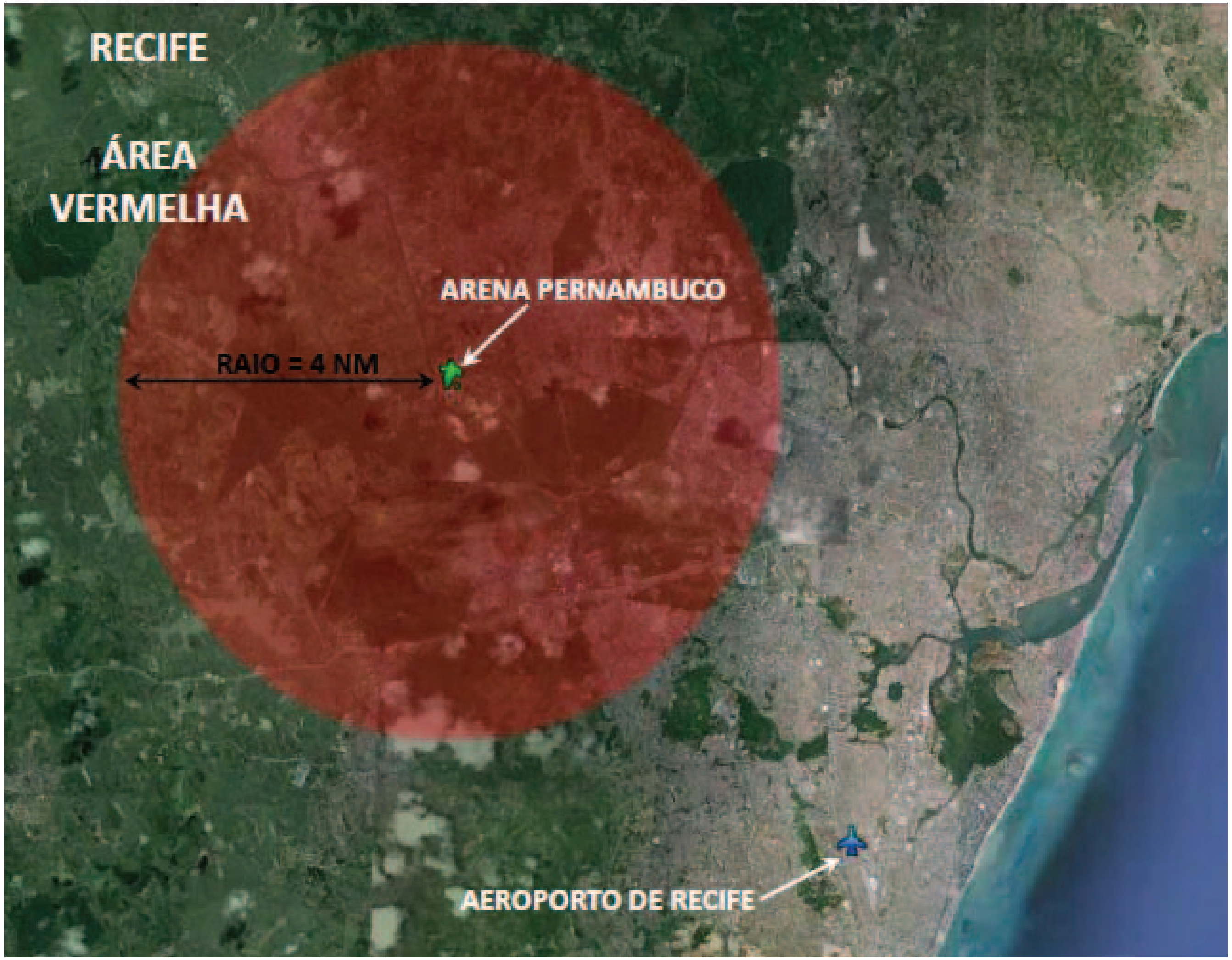
Área denominada AMARELA, dentro da área BRANCA, definida como um círculo com centro nas coordenadas 08°02'24"S 035°00'29"W, com 7 NM de raio e com volume de responsabilidade sobreposto da superfície até o FL 145.



DESCRIÇÃO DAS ÁREAS DE EXCLUSÃO
Recife (PE)

ÁREA PROIBIDA

Área denominada VERMELHA, dentro da ÁREA AMARELA, definida como um círculo com centro nas coordenadas 08°02'24"S 035°00'29"W, com 4 NM de raio e com volume de responsabilidade sobreposto da superfície até o FL 145.



DESCRIÇÃO DAS ÁREAS DE EXCLUSÃO
Rio de Janeiro (RJ)

Dias e horários de ativação das áreas

- dia 15/06/2014 (19h local) – início às 18h local e término às 22h local;

- dia 18/06/2014 (16h local) – início às 15h local e término às 19h local;

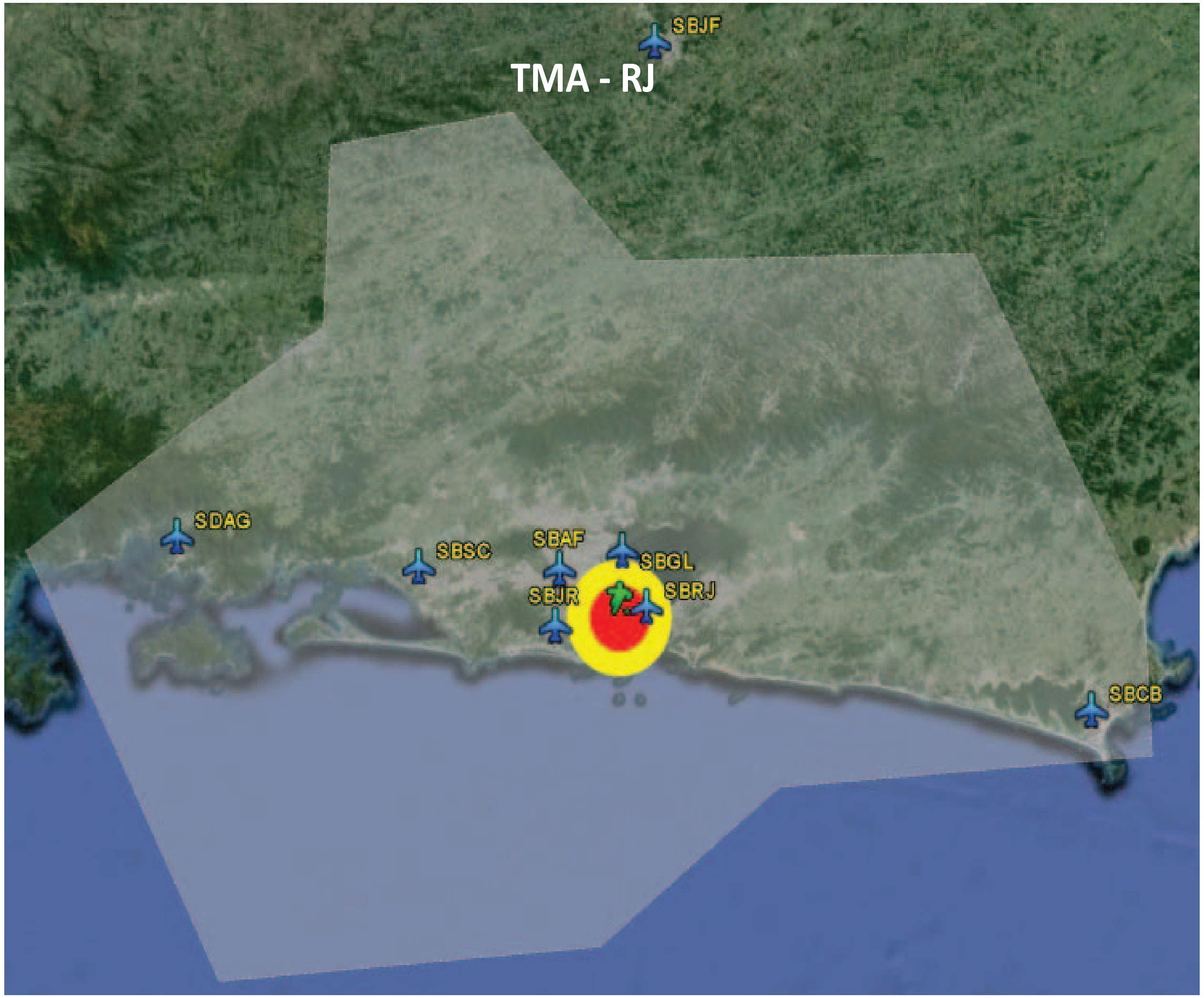
- dia 22/06/2014 (13h local) – início às 12h local e término às 16h local;

- dia 25/06/2014 (17h local) – início às 16h local e término às 20h local;

- dia 28/06/2014 (17h local) – início às 16h local e término às 21h local;

- dia 04/07/2014 (13h local) – início às 12h local e término às 17h local; e

- dia 13/07/2014 (16h local) – início às 13h local e término às 20h local.



DESCRIÇÃO DAS ÁREAS DE EXCLUSÃO
Rio de Janeiro (RJ)

ÁREA RESERVADA

Área denominada BRANCA, definida pelas projeções laterais da TMA Rio de Janeiro e limites verticais da superfície ao FL 145.

DESCRIÇÃO DAS ÁREAS DE EXCLUSÃO
Rio de Janeiro (RJ)

ÁREA RESTRITA

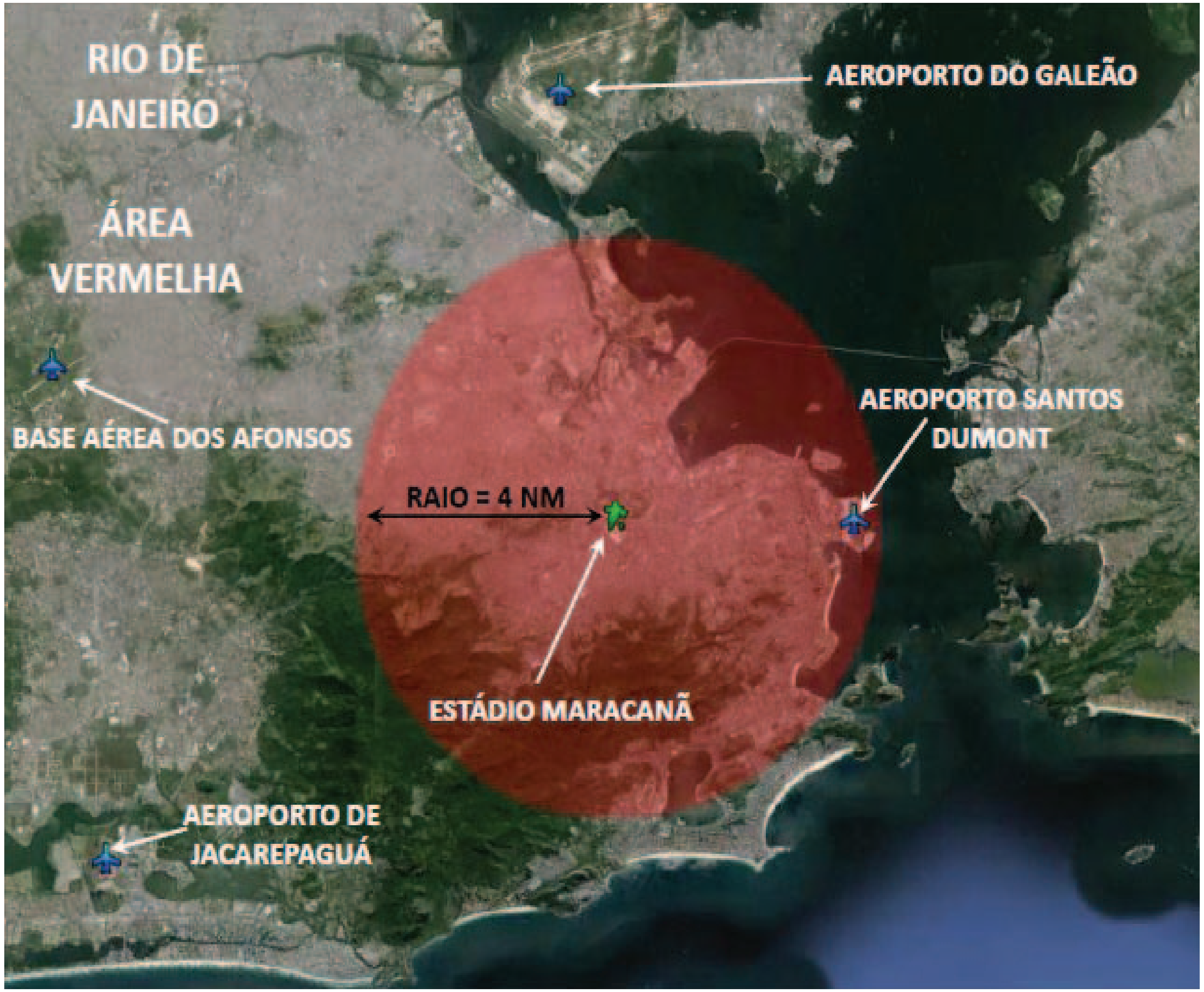
Área denominada AMARELA, dentro da área BRANCA, definida como um círculo com centro nas coordenadas 22°54’42”S 043°13’49”W, com 7 NM de raio e com volume de responsabilidade sobreposto da superfície até o FL 145.

DESCRIÇÃO DAS ÁREAS DE EXCLUSÃO

Rio de Janeiro (RJ)

ÁREA PROIBIDA

Área denominada VERMELHA, dentro da ÁREA AMARELA, definida como um círculo com centro nas coordenadas 22°54’42”S 043°13’49”W, com 4 NM de raio e com volume de responsabilidade sobreposto da superfície até o FL 145.



DESCRIÇÃO DAS ÁREAS DE EXCLUSÃO
Salvador (BA)

Dias e horários de ativação das áreas

- dia 13/06/2014 (16h local) – início às 15h local e término às 19h local;

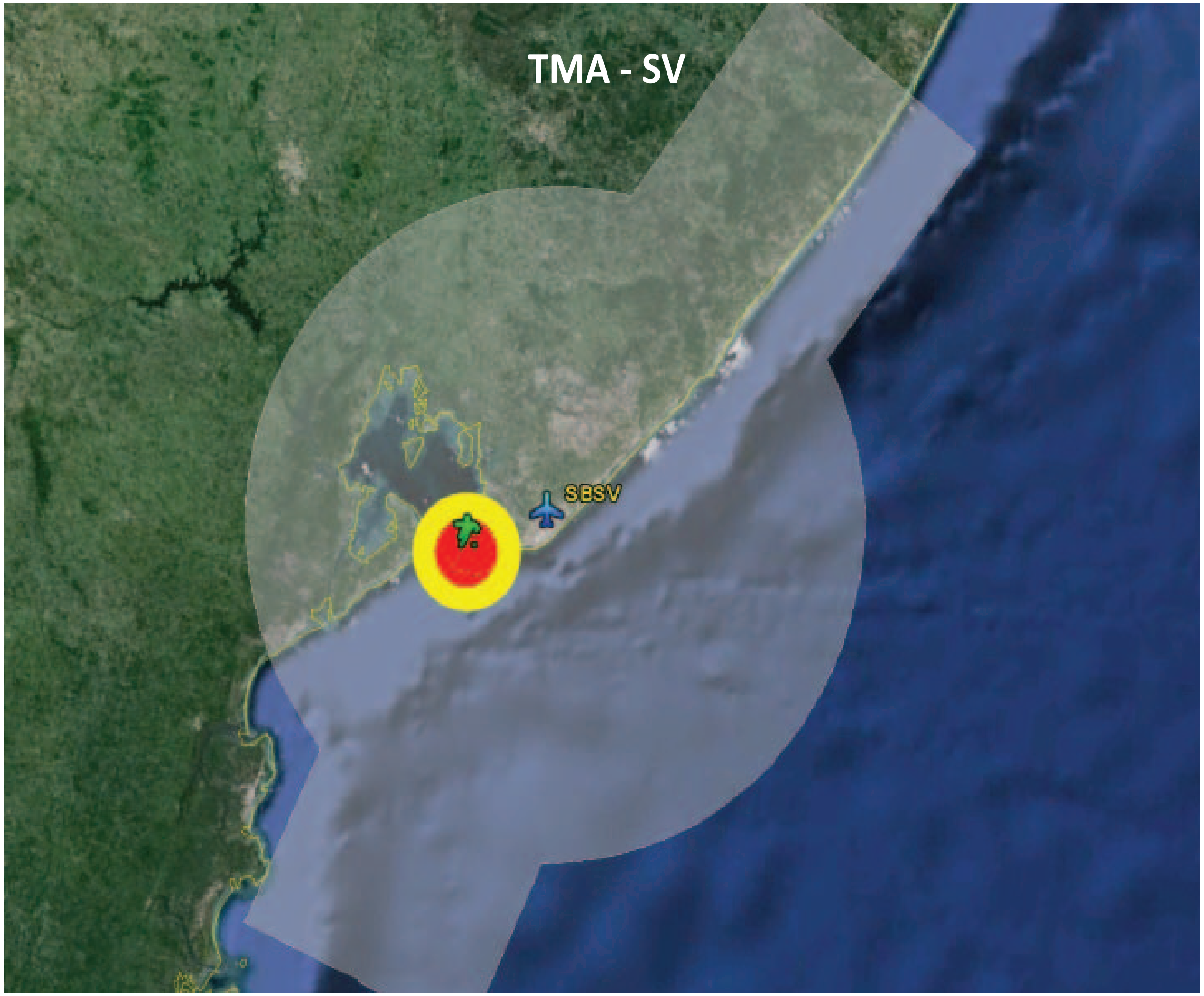
- dia 16/06/2014 (13h local) – início às 12h local e término às 16h local;

- dia 20/06/2014 (16h local) – início às 15h local e término às 19h local;

- dia 25/06/2014 (13h local) – início às 12h local e término às 16h local;

- dia 01/07/2014 (17h local) – início às 16h local e término às 21h local; e

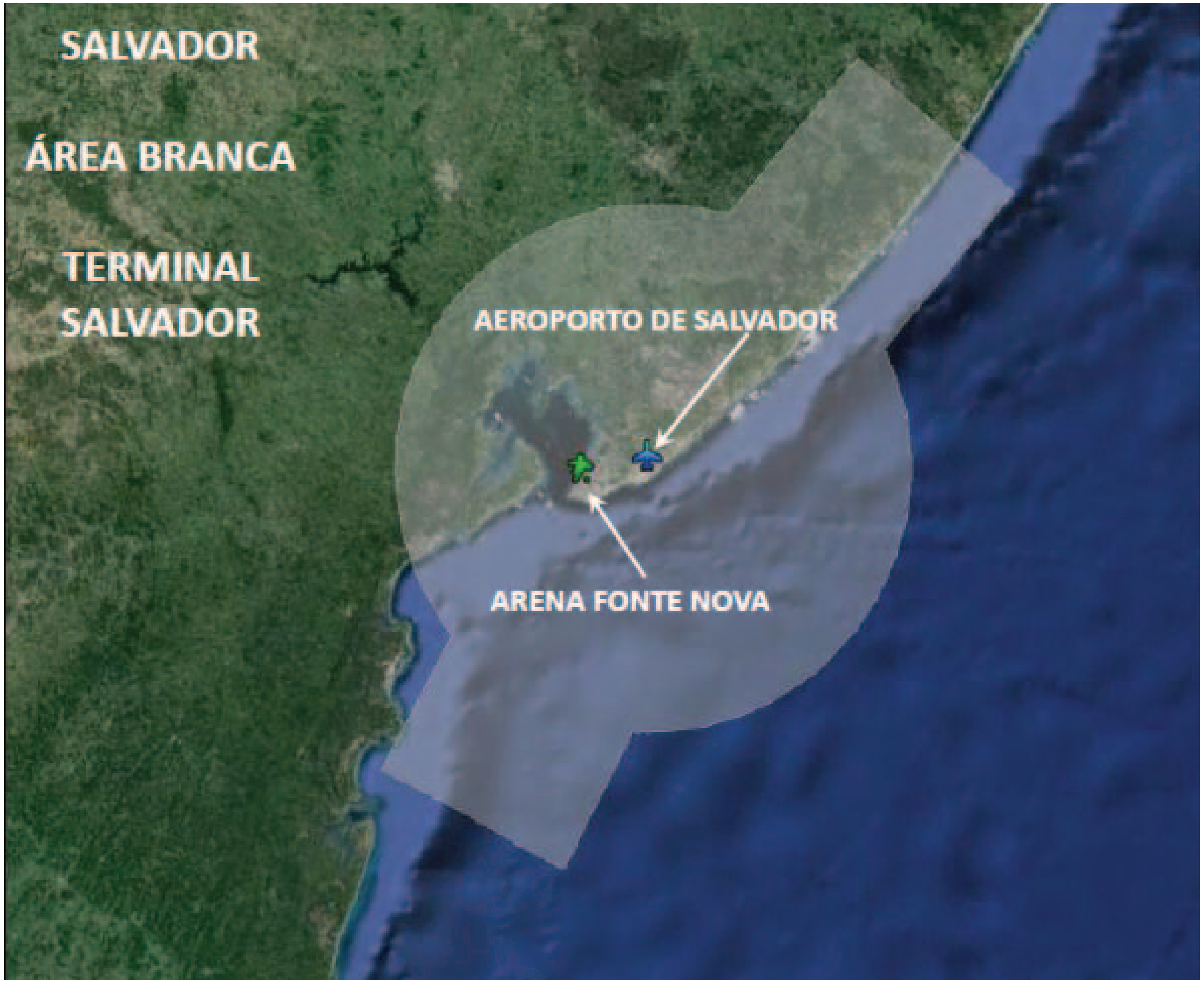
- dia 05/07/2014 (17h local) – início às 16h local e término às 21h local.



DESCRIÇÃO DAS ÁREAS DE EXCLUSÃO
Salvador (BA)

ÁREA RESERVADA

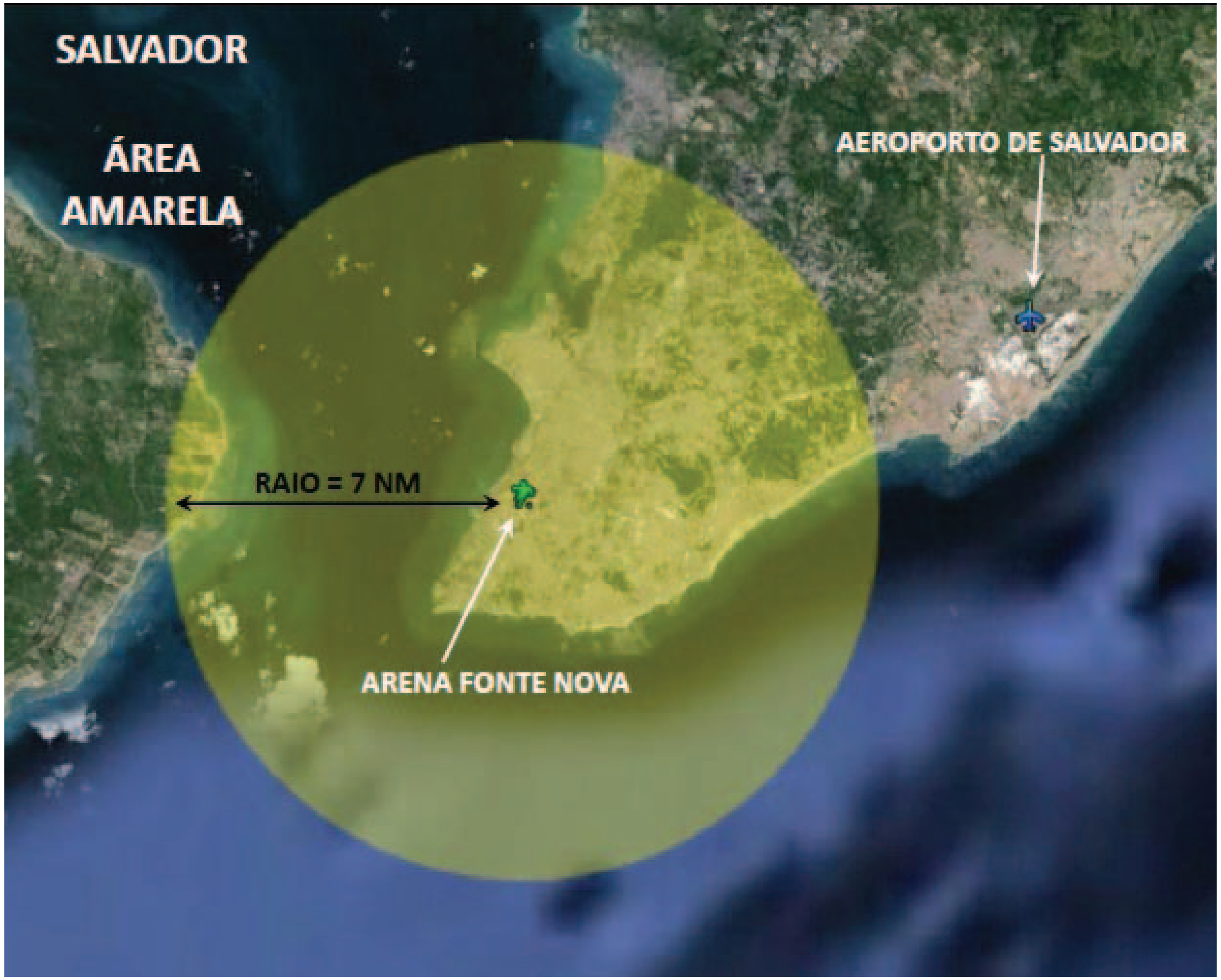
Área denominada BRANCA, definida pelas projeções laterais da TMA Salvador e limites verticais da superfície ao FL 145.



DESCRIÇÃO DAS ÁREAS DE EXCLUSÃO
Salvador (BA)

ÁREA RESTRITA

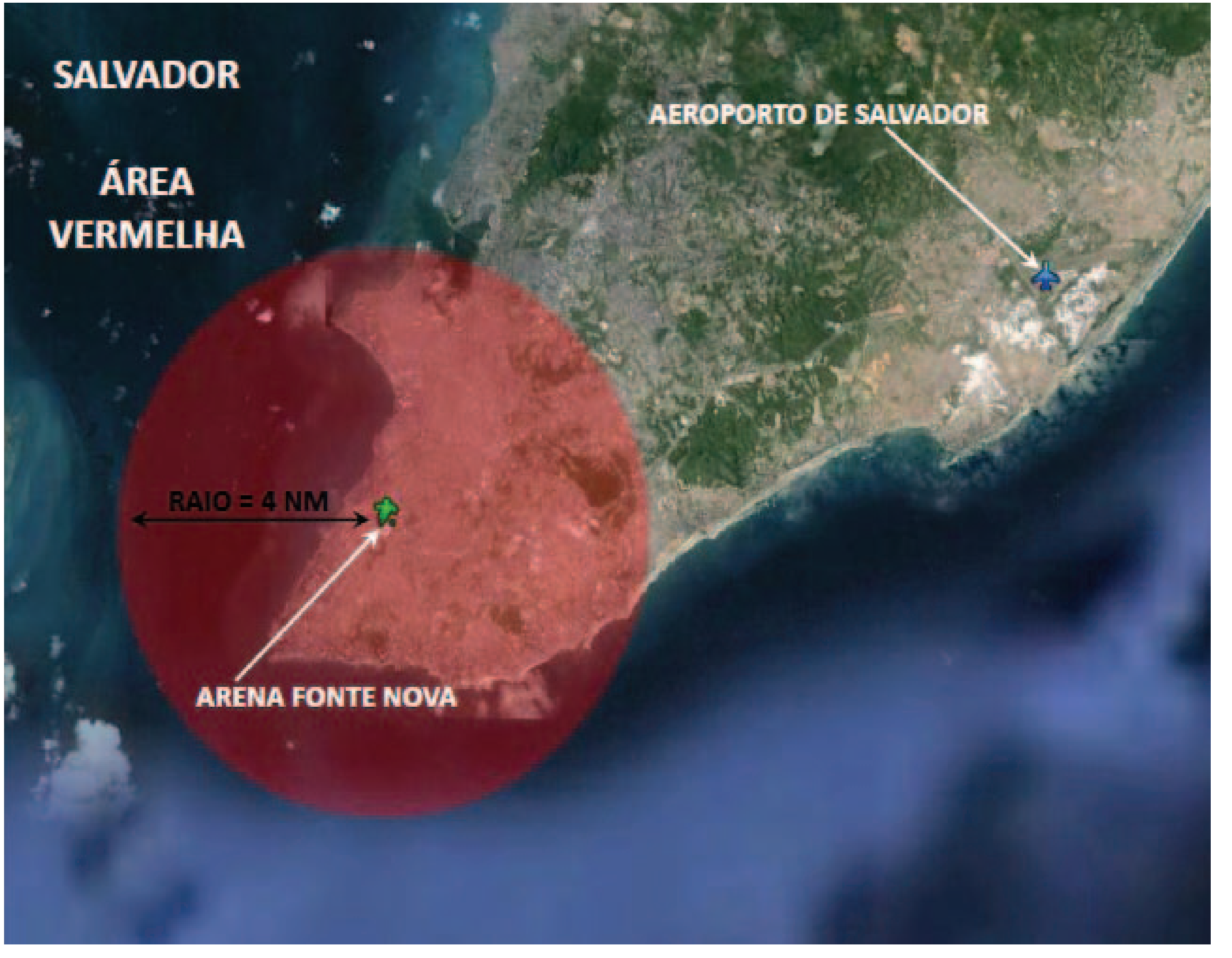
Área denominada AMARELA, dentro da área BRANCA, definida como um círculo com centro nas coordenadas 12°58'43"S 038°30'15"W, com 7 NM de raio e com volume de responsabilidade sobreposto da superfície até o FL 145.



DESCRIÇÃO DAS ÁREAS DE EXCLUSÃO
Salvador (BA)

ÁREA PROIBIDA

Área denominada VERMELHA, dentro da ÁREA AMARELA, definida como um círculo com centro nas coordenadas 12°58'43"S 038°30'15"W, com 4 NM de raio e com volume de responsabilidade sobreposto da superfície até o FL 145.



DESCRIÇÃO DAS ÁREAS DE EXCLUSÃO
São Paulo (SP)

Dias e horários de ativação das áreas

- dia 12/06/2014 (17h local) – início às 14h local e término às 21h local;

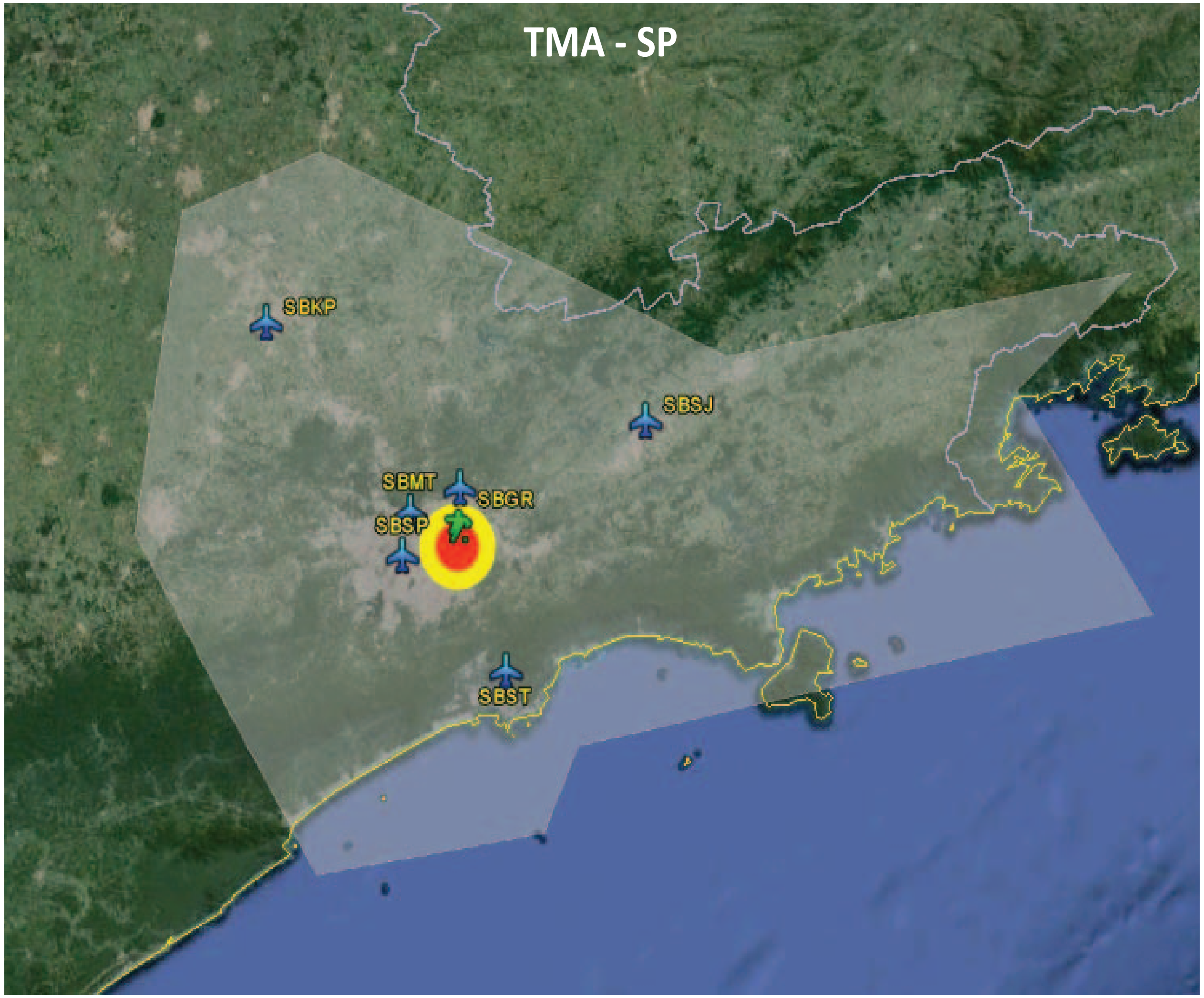
- dia 19/06/2014 (16h local) – início às 15h local e término às 19h local;

- dia 23/06/2014 (13h local) – início às 12h local e término às 16h local;

- dia 26/06/2014 (17h local) – início às 16h local e término às 20h local;

- dia 01/07/2014 (13h local) – início às 12h local e término às 17h local; e

- dia 09/07/2014 (17h local) – início às 16h local e término às 21h local.



DESCRIÇÃO DAS ÁREAS DE EXCLUSÃO
São Paulo (SP)

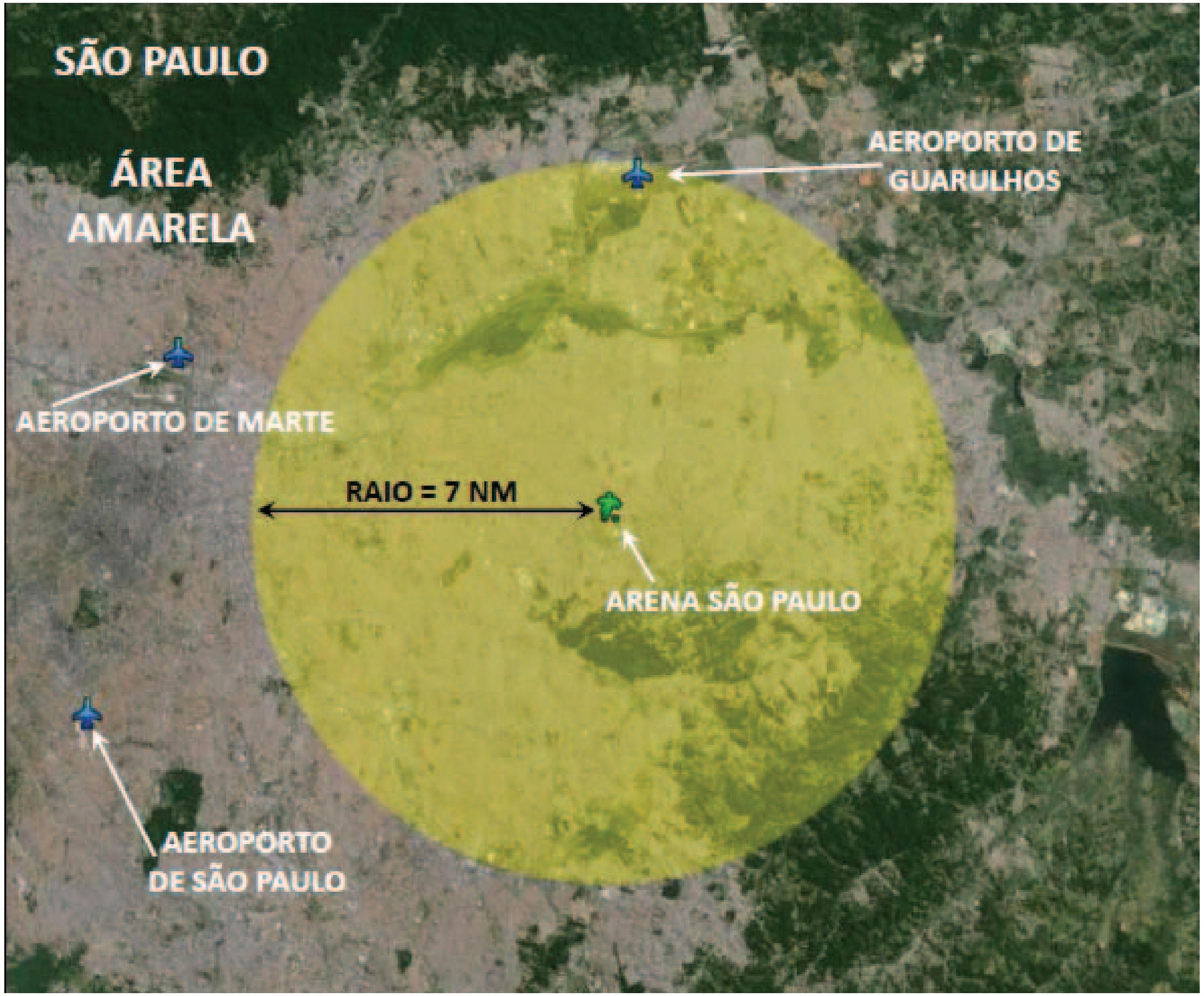
ÁREA RESERVADA

Área denominada BRANCA, definida pelas projeções laterais da TMA São Paulo e limites verticais da superfície ao FL 145.

DESCRIÇÃO DAS ÁREAS DE EXCLUSÃO
São Paulo (SP)

ÁREA RESTRITA

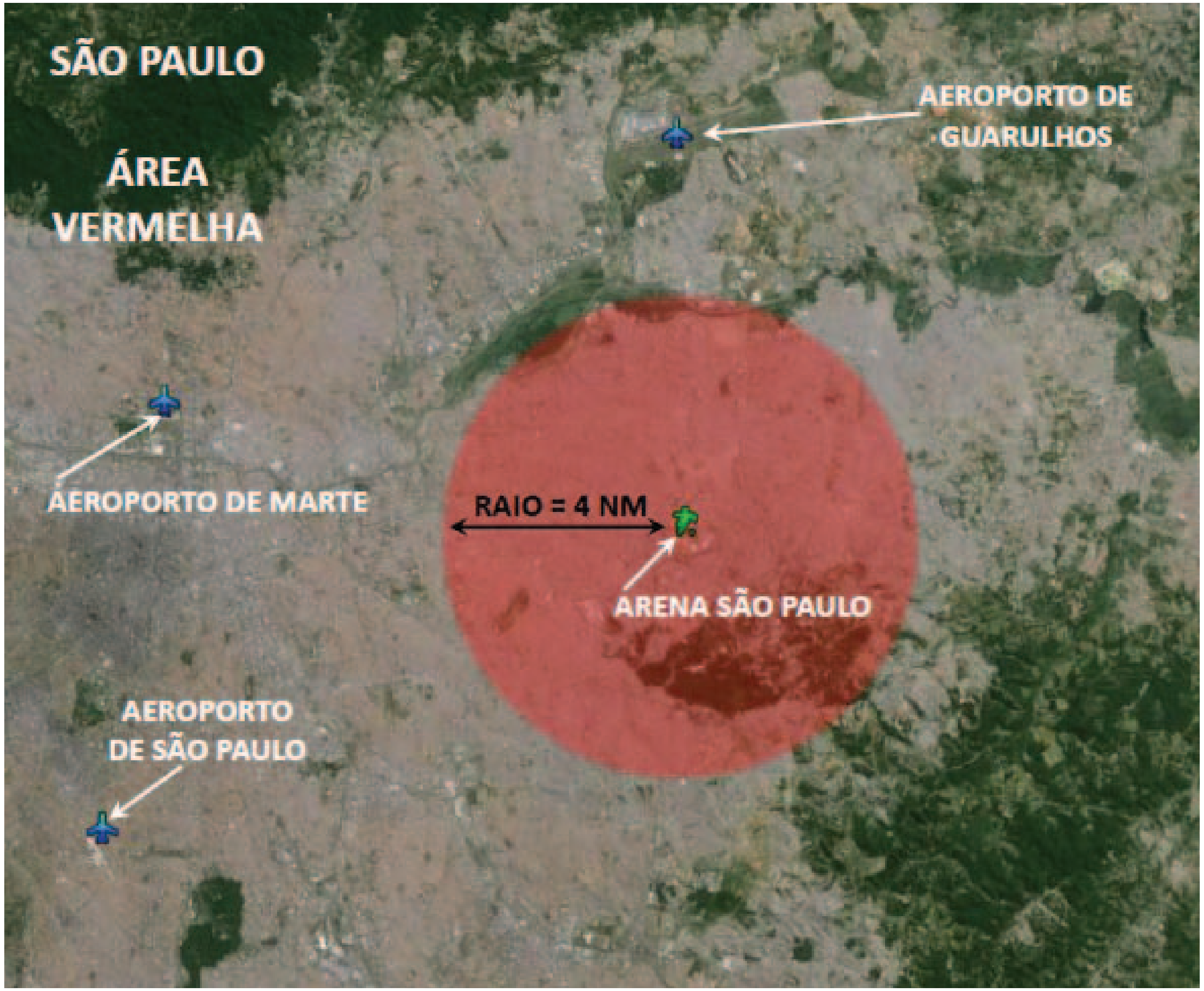
Área denominada AMARELA, dentro da área BRANCA, definida como um círculo com centro nas coordenadas 23°32′43.14″S 046°28′23.30″W, com 7 NM de raio e com volume de responsabilidade sobreposto da superfície até o FL 145.



DESCRIÇÃO DAS ÁREAS DE EXCLUSÃO
São Paulo (SP)

ÁREA PROIBIDA

Área denominada VERMELHA, dentro da ÁREA AMARELA, definida como um círculo com centro nas coordenadas 23°32'43.14"S 046°28'23.30"W, com 4 NM de raio e com volume de responsabilidade sobreposto da superfície até o FL 145.



Restrições do Espaço Aéreo

RESTRIÇÕES DO ESPAÇO AÉREO

Medidas de segurança de voo

Além de observar as normas e procedimentos previstos em legislação e as orientações contidas na AIC específica, todas as aeronaves deverão cumprir as regras de voo previstas nos FPL autorizados. Caso haja necessidade de modificar as regras de voo, as solicitações deverão ser coordenadas com os órgãos ATC.

Aeronaves que descumprirem o perfil ou regra de voo prevista, sem a autorização dos órgãos ATC e/ou entrarem em qualquer uma das aéreas de exclusão sem permissão, sofrerão as MPEA e serão compelidas a abandonar o espaço aéreo restrito e/ou efetuar pousos em aeródromos com Medidas de Controle no Solo (MCS).

Havendo autorização para utilizar as áreas de exclusão, caso haja qualquer necessidade de desviar da rota aprovada, é obrigatório que o piloto notifique imediatamente o órgão ATC.

O piloto que julgar que infringirá qualquer das regras estabelecidas para os espaços aéreos RESERVADOS, RESTRITOS e/ou PROIBIDOS, sem a devida autorização do órgão ATC, deverá de imediato, afastar-se das mesmas, entrar em contato com o órgão ATC e informar a situação, mantendo o código transponder que recebeu originalmente. Porém, se não obtiver contato, o piloto deverá efetuar chamada na frequência 121.5 MHz e acionar o código 7600. Os órgãos ATC prestarão sempre todo apoio aos pilotos.

E não esqueça: NUNCA ENTRE NA ÁREA ***VERMELHA*** SEM ESTAR AUTORIZADO PELO ÓRGÃO ATC.

Seguem abaixo os procedimentos a serem adotados, pelas aeronaves em falha de comunicações, durante o período de ativação das áreas de exclusão:

Antes de entrar na Área Branca

Não ENTRE. Prossiga para um aeródromo alternativo fora desta área, acione o código transponder 7600 e execute os procedimentos para falha de comunicações rádio previstos em legislação.

Em voo dentro da Área Branca

Se o seu destino estiver dentro da área AMARELA, não ENTRE. Prossiga para uma alternativa fora dessa área, acione o código transponder 7600 e execute os procedimentos para falha de comunicações rádio previstos em legislação.

NUNCA entre na Área *Vermelha*

Aeronaves não identificadas sofrerão as MPEA e, caso necessário, poderão sofrer medidas severas, estando sujeitas às MEDIDAS DE INTERVENÇÃO, MEDIDAS DE PERSUASÃO e MEDIDAS DE DETENÇÃO.

Uma aeronave que estiver sendo interceptada deverá imediatamente seguir as instruções dadas pela aeronave interceptadora em 121,5 MHz e/ou interpretar e responder aos sinais visuais; se equipada com equipamento transponder, selecionar o código 7700, no modo 3/A, salvo instruções em contrário do órgão ATC apropriado.

O COMAER reserva-se o direito de interceptar qualquer aeronave, a critério dos órgãos de defesa aérea ou das autoridades responsáveis pela execução das missões de defesa aeroespacial.

Departamento
de Controle do Espaço Aéreo

Av. General Justo, 160 • Centro
Rio de Janeiro/RJ • 20021-130
www.decea.gov.br

BRASIL — AIC

DEPARTAMENTO DE CONTROLE DO ESPAÇO AÉREO — **A**
SUBDEPARTAMENTO DE OPERAÇÕES — **08/14**
DIVISÃO DE COORDENAÇÃO E CONTROLE
AV. GENERAL JUSTO, 160- 2 ANDAR
20021-130 RIO DE JANEIRO-RJ — **01 MAY 2014**

Email: dnor1@decea.gov.br AFS: SBRJYGYO TEL.: (21) 2101-6761 ASSINATURA.: (21) 2117-7294

TEMPORARY AIR SPACE CHANGES IN THE BRASILIAN AIRSPACE FOR THE FIFA SOCCER WORLD CUP BRASIL 2014

1 PRELIMINARY CONSIDERATIONS

1.1 PURPOSE

This aeronautical information circular (AIC) purpose is publishing the temporary changes in the Brasilian airspace throughout the FIFA Soccer World Cup Brasil 2014, as well as the general and specific procedures to be followed by the pilots in command and by the air traffic control facilities (ATC) belonging to the Brasilian Air Space Control System (SISCEAB) in the course of the event.

1.2 SCOPE

This aeronautical information circular (AIC) applies to all those who, in the course of the performance of their duties, will use the Brasilian airspace throughout the FIFA Soccer World Cup Brasil 2014.

2 INTRODUCTION

The growth of air traffic movement, expected during the event of FIFA Soccer World Cup Brasil 2014, signalizes the need for immediate attention and efficiency in the provision of air traffic services (ATS) and air traffic flow management (ATFM). A big event brings new demands and along with them better need for planning, becoming imperative the maintenance of safety, fluidity and efficiency, aspects already present in the service provided for the air traffic.

The labor to achieve the desired excellence starts with the selective accomplishment of an ample, clear, objective and feasible planning. This way, guaranteeing the maximum performance of the ATS services, ATFM, the safety of air operations and of the Brasilian air space management, minimizing, therefore, the impact possibilities resulting from the predictable increase of air traffic throughout the event.

For decades, Brasil has consolidated vanguard position in the air traffic management (ATM), not only limiting its investments in equipment and new facilities, but also beyond expectation, developing its own methods, emphasizing specialized training and incorporating modern concepts with efficiency, quickness and flexibility.

The country has the responsibility of administering the territorial airspace (8.511.965 km²) and the oceanic airspace, that extends up to 10º W, adding up to 22 million km². In this airspace, there are several events taking place at the same time, such as: international and domestic airliners, general aviation flights, civil aviation training, exercises, military maneuvers and operations, remotely piloted aircraft (RPA), test flights and a diversity of aero-sport activities, and all those must work in perfect harmony. The quality and effectiveness in the use of airspace will be also kept throughout the FIFA Soccer World Cup Brasil 2014, due to the work of a diversity of departments, among them the Aeronautics Command (COMAER).

BRASIL AIC

DEPARTAMENTO DE CONTROLE DO ESPAÇO AÉREO **A**
SUBDEPARTAMENTO DE OPERAÇÕES **08/14**
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ALTERAÇÕES TEMPORÁRIAS NO ESPAÇO AÉREO BRASILEIRO DURANTE A REALIZAÇÃO DA COPA DO MUNDO DE FUTEBOL FIFA BRASIL 2014

1 DISPOSIÇÕES PRELIMINARES

1.1 FINALIDADE

Esta Circular de Informação Aeronáutica (AIC) tem por finalidade divulgar as alterações temporárias no espaço aéreo brasileiro durante a Copa do Mundo de Futebol FIFA Brasil 2014, bem como os procedimentos gerais e específicos a serem seguidos pelos pilotos em comando e pelos órgãos de controle de tráfego aéreo (ATC) do Sistema de Controle do Espaço Aéreo Brasileiro (SISCEAB) durante o evento.

1.2 ÂMBITO

Esta Circular de Informação Aeronáutica (AIC) aplica-se a todos aqueles que, no desempenho de suas funções, venham a utilizar o espaço aéreo brasileiro durante a Copa do Mundo de Futebol FIFA Brasil 2014.

2 INTRODUÇÃO

O crescimento dos movimentos aéreos, esperado durante a realização da Copa do Mundo de Futebol de Futebol FIFA Brasil 2014, sinaliza a necessidade de pronto atendimento e eficiência na prestação dos serviços de tráfego aéreo (ATS) e gerenciamento do fluxo de tráfego aéreo (ATFM). Um grande evento traz novas demandas e com elas maior necessidade de planejamento, tornando-se imperativo manter a segurança, fluidez e eficiência, aspectos já presentes no atendimento prestado ao tráfego aéreo.

O trabalho para alcançar a excelência desejada inicia-se com a execução criteriosa de um planejamento amplo, claro, objetivo e exequível. Com isso, assegura-se o máximo desempenho dos serviços ATS, do ATFM, da segurança das operações aéreas e do gerenciamento do espaço aéreo brasileiro, minimizando, assim, as possibilidades de impactos decorrentes do previsível aumento do tráfego aéreo no período do evento.

Há décadas, o Brasil vem consolidando posição de vanguarda no gerenciamento de tráfego aéreo (ATM), não se limitando a investimentos em equipamentos e novas instalações, mas indo muito além, desenvolvendo processos próprios, enfatizando o treinamento especializado e incorporando com eficiência, rapidez e flexibilidade conceitos modernos.

O País tem a responsabilidade de administrar o espaço aéreo territorial (8.511.965 km²) e o espaço aéreo sobrejacente à área oceânica, que se estende até o meridiano 10º W, perfazendo um total de 22 milhões de km². Nesse espaço, existem diversos eventos acontecendo ao mesmo tempo, tais como: voos da aviação comercial internacional e doméstica, voos da aviação geral, treinamento da aviação civil, exercícios, manobras e operações militares, aeronaves remotamente pilotadas (RPA), ensaio de voo e diversas atividades aeroesportivas, e tudo deve funcionar sempre em perfeita harmonia. A qualidade e eficácia no uso do espaço aéreo se manterão também durante a Copa do Mundo de Futebol FIFA Brasil 2014, graças ao trabalho de diversos setores, entre eles o Comando da Aeronáutica (COMAER).

The COMAER, through the Air Space Control Department (DECEA), performed a planning for the FIFA Soccer World Cup Brasil 2014 that focused on security and the maintenance of a fast, safe and orderly air traffic flow and, through the Brasilian Aero-spatial Defense Command (COMDABRA), a detailed planning of the necessary actions for the airspace defense.

For the accomplishment of this planning, the COMAER, through the Air Navigation Management Center (CGNA), a DECEA subordinate Unit, performed an action plan considering the demand increment and the imposed restrictions in some airspace portions.

All of the modules expected in this action plan, such as: structure and airspace capacity; demand projection; technical infrastructure; legislation accommodation; standards and procedures; security and defense; technical qualification; among other things, were strictly achieved.

This is not the first time that COMAER delineates a planning to manage the air traffic flow on a big event. Throughout the United Nations Conference on Sustainable Development (Rio+20), in June 2012, the FIFA confederations Cup Brasil 2013, Catholic World Youth day Rio 2013, the Aeronautics Command had a successful and praised experience, using military concept and structure in a civilian event.

This concept is put into practice in the command and control master room, located at CGNA, and will be repeated in FIFA Soccer World Cup Brasil 2014 and the Olympic Games and Paralympics 2016.

For FIFA Soccer World Cup Brasil 2014, the safety and efficiency, binomial that characterizes our airspace, are going to leave indelible marks that will serve as a legacy for Brasil.

3 ABBREVIATIONS

ACAV	In-flight Alarm Control Area
AIC	Aeronautical Information Circular
AIS	Aeronautical Information Service
ANAC	National Civil Aviation Agency
APP	Approach Control
AREVO	Refueling In-flight Area
ATC	Air Traffic Control
ATIS	Automatic Terminal Information Service
ATM	Air Traffic Management
ATS	Air Traffic Service
CGNA	Air Navigation Management Center
CIS	Integrated SLOT Central
COL	Local Organizing Committee

O COMAER, por meio do Departamento de Controle do Espaço Aéreo (DECEA), efetuou um planejamento para a Copa do Mundo de Futebol FIFA Brasil 2014 que teve como foco a segurança e a manutenção de um fluxo de tráfego aéreo rápido, seguro e ordenado e, por meio do Comando de Defesa Aeroespacial Brasileiro (COMDABRA), um planejamento minucioso das ações necessárias para a defesa do espaço aéreo.

Para a execução desses planejamentos, O COMAER, por meio do Centro de Gerenciamento da Navegação Aérea (CGNA), Unidade subordinada ao DECEA, elaborou um plano de ação considerando o incremento da demanda e as restrições impostas em algumas porções do espaço aéreo.

Todos os módulos previstos neste plano de ação, tais como: estrutura e capacidade do espaço aéreo; projeção da demanda; infraestrutura técnica; adequação da legislação, normas e procedimentos; segurança e defesa; capacitação técnica; entre outros, foram rigorosamente cumpridos.

Esta não é a primeira vez que o COMAER traça um planejamento para gerenciar o fluxo do tráfego aéreo em um grande evento. Durante a Conferência das Nações Unidas sobre Desenvolvimento Sustentável (Rio +20), em junho de 2012, a Copa das Confederações de Futebol FIFA Brasil 2013, em junho de 2013, e a Jornada Mundial da Juventude Católica Rio 2013, em agosto de 2013, o Comando da Aeronáutica teve uma experiência bem-sucedida e elogiada, utilizando um conceito e uma estrutura militar num evento civil.

Este conceito é colocado em prática na sala master de comando e controle, localizada no CGNA, e será repetido na Copa do Mundo de Futebol FIFA Brasil 2014 e nos Jogos Olímpicos e Paraolímpicos em 2016.

Para a Copa do Mundo de Futebol FIFA Brasil 2014, a segurança e a eficiência, binômio que caracteriza nosso espaço aéreo, deixarão marcas indeléveis que servirão como legado para o Brasil.

3 ABREVIATURAS

ACAV	Área de Controle Alarme em Voo
AIC	Circular de Informações Aeronáuticas
AIS	Sala de Informações Aeronáuticas
ANAC	Agência Nacional de Aviação Civil
APP	Controle de Aproximação
AREVO	Área de Reabastecimento em Voo
RPA	Aeronave Remotamente Pilotada
ATC	Controle de Tráfego Aéreo
ATIS	Serviço Automático de Informação Terminal
ATM	Gerenciamento de Tráfego Aéreo
ATS	Serviço de Tráfego Aéreo
CGNA	Centro de Gerenciamento da Navegação Aérea
CIS	Central Integrada de SLOT
COL	Comitê Organizador Local

COMDABRA	Brasilian Aero-spatial Defense Command
DECEA	Air Space Control Department
FIFA	Fédération Internationale de Football Association
FIR	Flight Information Region
FL	Flight Level
FPL	Flight Plan
ICAO	International Civil Aviation Organization
ICEA	Airspace Control Institute
IFR	Instrument Flight Rules
MCS	Ground Control Measures
MPEA	Airspace Policing Measures
NM	Nautical Miles
NOTAM	Notice to Airmen
OPO	Operational Permanent Officer
PSA	Airport Security program
RCC	Rescue Coordination Center
REAST	Special Route for Non-transponder Aircraft
REH	Helicopter Special Routes
RPA	Remotely Piloted Aircraft
RPL	Repetitive Flight Plan
SAC	Civil Aviation Secretariat
SAR	Search and Rescue
SISCEAB	Brasilian Airspace Control System
SUA	Special Use Airspace
TMA	Terminal Control Area
TWR	Aerodrome Control Tower
UTI	Intensive Care Unit
VFR	Visual Flight Rules
VIP	Very Important Person

4 AIRSPACE RESTRICTIONS

Following the safety criteria adopted all over the world in such important and voluminous events such as FIFA Soccer World Cup Brasil 2014 and the maintenance of the provided air traffic service level, the COMAER created segregated areas (RESERVED, RESTRICTED or PROHIBITED) in certain Brasilian airspace portions with different access levels and sizes.

The safety and operational impact, among other things, were the criteria adopted for the segregated area. The Safety of people, athletes, Authorities, aircraft and facilities and the constant concern in reducing the operational impacts so that the airspace users get acquainted with the location, size and the access levels of the aforesaid areas.

COMDABRA	Comando de Defesa Aeroespacial Brasileiro
DECEA	Departamento de Controle do Espaço Aéreo
EAC	Espaço Aéreo Condicionado
FIFA	Fédération Internationale de Football Association
FIR	Região de Informação de Voo
FL	Nível de Voo
FPL	Plano de Voo
ICEA	Instituto de Controle do Espaço Aéreo
IFR	Regras de Voo por Instrumentos
MPEA	Medidas de Policiamento do Espaço Aéreo
NM	Milhas Náuticas
NOTAM	Aviso aos Aeronavegantes
OACI	Organização da Aviação Civil Internacional
OPO	Oficial de Permanência Operacional
PSA	Programa de Segurança Aeroportuária
RCC	Centro de Coordenação de Salvamento
REAST	Rotas Especiais de Aeronaves sem Transponder
REH	Rotas Especiais de Helicóptero
RPL	Plano de Voo Repetitivo
SAC	Secretaria de Aviação Civil
SAR	Busca e Salvamento
SISCEAB	Sistema de Controle do Espaço Aéreo Brasileiro
TMA	Área de Controle Terminal
TWR	Torre de Controle de Aeródromo
UTI	Unidade de Tratamento Intensivo
VFR	Regras de Voo Visual
VIP	Very Important Person

4 RESTRIÇÕES DO ESPAÇO AÉREO

Seguindo os critérios de segurança adotados mundialmente em eventos da importância e do vulto da Copa do Mundo de Futebol FIFA Brasil 2014 e a manutenção dos níveis dos serviços de tráfego aéreo prestados, o COMAER criou áreas de exclusão (RESERVADA, RESTRITA ou PROIBIDA) em determinadas porções do espaço aéreo brasileiro com tamanhos e níveis de acessos diferentes.

A segurança e o impacto operacional, entre outros, foram os critérios adotados para criação das áreas de exclusão. A segurança do público, de atletas, autoridades, aeronaves e instalações e a preocupação constante em reduzir os impactos operacionais para os usuários do espaço aéreo nortearam a localização, o tamanho e os níveis de acesso das referidas áreas.

The clearances to enter the segregated airspaces depend on the nature and the flight intentions, like, for example, aircraft carrying authorities, national soccer team delegations, regular domestic and/or international operation commercial aircraft, general aviation, military use, air defense, passenger and/or material (civilian or military) transportation, public security aircraft, search and rescue aircraft (SAR) and ambulance aircraft.

The segregated areas are located in the low FIR airspace and inside the TMAs of the locations where the official FIFA Soccer World Cup Brasil 2014 soccer matches will take place, that is, BELO HORIZONTE, BRASÍLIA, CUIABÁ, CURITIBA, FORTALEZA, MANAUS, NATAL, PORTO ALEGRE, RECIFE, RIO DE JANEIRO, SALVADOR E SÃO PAULO.

These restrictions period of validity will be between 3 (three) hours before and 4 (four) hours after the start of the matches by the opening and completion of the FIFA Soccer World Cup Brasil 2014; between 1 (one) hour before and 3 (three) hours after the start of the matches during the group phases; and 1 (one) hour before and 4 (four) hours after the start of the matches during the next phases, as well as all of the other expected actions and restrictions. It is worth pointing out that the restrictions period of validity varies according to the game. This means that a same host city might have different timetables according to the matches it will host. Outside of these periods, the airspace use is back to normality.

5 SEGREGATED AREAS DEFINITION

5.1 RESERVED AREA

Area named WHITE, defined by the lateral projections of TMAs in the involved locations and vertical limits from the surface to FL 145.

5.2 RESTRICTED AREA

Area named YELLOW, inside the WHITE area, defined with a 7-mile radius lateral limit with its center located at the soccer stadium and vertical limits from the surface to flight level FL 145, of which description is going to be through the geographic coordinates, according to the attachments.

5.3 PROHIBITED AREA

There are three PROHIBITED areas, as described below:

a) Area named RED, inside the YELLOW AREA, defined with its 4-mile radius lateral limit with its center located at the soccer stadium and vertical limits from the surface to flight level FL 145. of which description is going to be through the geographic coordinates, according to the attachments, and published in AIC;

b) Area named in-flight control and alarm (ACAV), with specific dimensions, located in the low Flight Information Region (FIR) airspace, between FLs 210 and 240, of which lateral limits are going to be described through the geographic coordinates, according to the attachments, and published in AIC; and

c) Area named in-flight refueling (AREVO), with specific dimensions, located in the low FIRs airspace, between FLs 150 e 200, of which lateral limits are going to be described through the geographic coordinates, according to the attachments, and published in AIC.

As autorizações para o ingresso nos espaços aéreos segregados dependem da natureza e das intenções do voo, como, por exemplo, aeronaves transportando autoridades, delegações das seleções de futebol, aeronaves comerciais de operação regular doméstica e/ou internacional, aviação geral, emprego militar, defesa aérea, transporte de pessoal e/ou material (civil ou militar), aeronaves ligadas à segurança pública, aeronaves de busca e salvamento (SAR) e aeronaves ambulância.

As áreas de exclusão estão localizadas no espaço aéreo inferior das FIR e dentro das TMA das localidades onde ocorrerão as partidas oficiais da Copa do Mundo de Futebol FIFA Brasil 2014, ou seja, BELO HORIZONTE, BRASÍLIA, CUIABÁ, CURITIBA, FORTALEZA, MANAUS, NATAL, PORTO ALEGRE, RECIFE, RIO DE JANEIRO, SALVADOR E SÃO PAULO.

Os períodos de vigência dessas restrições serão compreendidos entre 3 (três) horas antes e 4 (quatro) horas após o início das partidas durante a abertura e encerramento da Copa do Mundo de Futebol FIFA Brasil 2014; entre 1 (uma) hora antes e 3 (três) horas após o início das partidas durante fase de grupos; e entre 1 (uma) horas antes e 4 (quatro) horas após o início das partidas durante as demais fases, assim como todas as outras ações e restrições previstas. Vale ressaltar que o período de vigência das restrições varia de acordo com o jogo. Isso significa que uma mesma cidade-sede poderá ter horários diferentes conforme os jogos que receberá. Fora desses períodos, o uso do espaço aéreo volta a sua normalidade.

5 DEFINIÇÃO DAS ÁREAS DE EXCLUSÃO

5.1 ÁREA RESERVADA

Área denominada BRANCA, definida pelas projeções laterais das TMA das localidades envolvidas e limites verticais da superfície ao FL 145.

5.2 ÁREA RESTRITA

Área denominada AMARELA, dentro da área BRANCA, definida com seu limite lateral de 7 NM de raio com centro no estádio de futebol e limites verticais da superfície ao FL 145, cuja descrição será por meio de coordenadas geográficas, conforme os anexos.

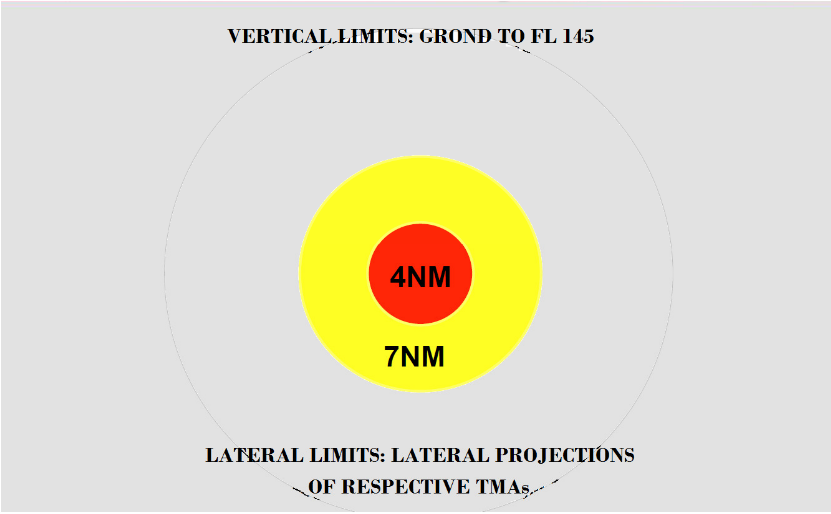
5.3 ÁREA PROIBIDA

Existem três áreas PROIBIDAS, conforme descrição abaixo:

a) Área denominada VERMELHA, dentro da área AMARELA, definida com seu limite lateral de 4 NM de raio com centro no estádio de futebol e limites verticais da superfície ao FL 145, cuja descrição será por meio de coordenadas geográficas, conforme os anexos, e divulgados em AIC;

b) Área denominada controle e alarme em voo (ACAV), com dimensões definidas, localizada no espaço aéreo inferior das regiões de informação de voo (FIR), entre os FL 210 e 240, cujos limites laterais serão descritos por meio de coordenadas geográficas, conforme os anexos, e divulgados em AIC; e

c) Área denominada reabastecimento em voo (AREVO), com dimensões definidas, localizada no espaço aéreo inferior das FIR, entre os FL 150 e 200, cujos limites laterais serão descritos por meio de coordenadas geográficas, conforme os anexos, e divulgados em AIC.



6 SEGREGATED AREAS OPERATIONAL RESTRICTIONS

6.1 RESERVED AREA

In the RESERVED AREA, named WHITE, common to all host cities, all traffic must be known, follow the legislation rules and also the orientation of the ATC facilities.

Below are the operational restrictions that must be observed in the WHITE area:

a) It will not be authorized, even inside the Special Use Airspace (SUA), IFR and VFR training, instrument approach training, traffic pattern training and touch and go landing, instruction flight, maintenance, ANAC flight check, aerobatic, tour flights, sailplanes, parachuting operations, parasail, balloons, blimps, ultra-lights, experimental aircraft, hang-glider, crop spraying aircraft, banner towing, model aircraft, rocket and remotely piloted aircraft (RPA);

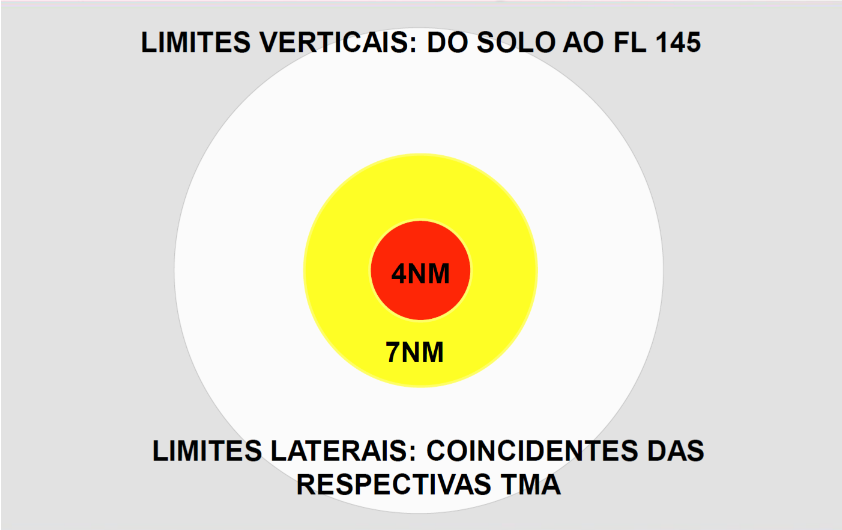
b) All flights must be properly identified and under ATC facilities coordination, prior to entering this area;

c) Ambulance flight operations flying inside the area are going to be authorized after previous coordination with the approach control (APP);

d) Flights inside the TMA, even identified and under ATC facilities control, in case they modify their routes without any clearance and go to non-authorized areas, as well as the non-identified aircraft, might be qualified as hostile and are going to be subject to the Airspace Policing Measures (MPEA);

e) fixed wing aircraft operations are going to be limited to the aircraft destined to or proceeding from the TMA aerodromes, not been authorized the crossing of WHITE areas by aircraft destined to aerodromes outside this area. The aircraft proceeding from or destined to the WHITE area will follow a profile determined by the responsible APP;

f) Aircraft crossing an airway below FL145, which destination is not inside it, are going to be directed to lateral TMA fixes. The aircraft crossing above FL145 are not going to be deviated;



6 RESTRIÇÕES OPERACIONAIS DAS ÁREAS DE EXCLUSÃO

6.1 ÁREA RESERVADA

Na ÁREA RESERVADA, denominada BRANCA, comum a todas as cidades-sede, todos os tráfegos deverão ser conhecidos e cumprir as regras determinadas em legislação e as orientações dos órgãos ATC.

Seguem abaixo as restrições operacionais que deverão ser observadas na área BRANCA:

a) Não serão permitidos, inclusive dentro dos EAC, treinamentos de voo IFR e VFR, treinamentos de aproximações por instrumentos, treinamento no circuito de tráfego e de toque e arremetida, voos de instrução, manutenção, cheques da Agência Nacional da Aviação Civil (ANAC), acrobáticos, turísticos, planadores, operações de paraquedas, parapentes, balões, dirigíveis, ultraleves, aeronaves experimentais, asas-deltas, pulverização agrícola, reboque de faixas, aeromodelos, foguetes e RPA;

b) Todos os movimentos aéreos deverão estar devidamente identificados e sob coordenação dos órgãos ATC, antes de adentrarem nessa área;

c) Operações de ambulância aérea evoluindo dentro da área serão autorizadas após coordenação prévia com o controle de aproximação (APP);

d) Aeronaves evoluindo na TMA, mesmo identificadas e sob controle dos órgãos ATC, no caso de modificarem suas rotas sem autorização e rumarem para áreas não autorizadas, assim como as aeronaves não identificadas, poderão ser classificadas como HOSTIS e sofrerão às Medidas de Policiamento do Espaço Aéreo (MPEA);

e) Operações de aeronaves de asa fixa ficarão limitadas às aeronaves que se destinem ou tenham como origem os aeródromos da TMA, não sendo permitido o cruzamento da área BRANCA por aeronaves destinadas a aeródromos fora da mesma. As aeronaves com origens ou destinos dentro da área BRANCA cumprirão perfil determinado pelo APP responsável pela área na qual se encontra;

f) Aeronaves cuja rota cruzaria a TMA em aerovia abaixo do FL 145, cujo destino não esteja dentro da mesma, serão direcionadas para os fixos laterais da TMA. As aeronaves cruzando acima do FL 145 não sofrerão desvios;

g) Flights in this area must have a filed and approved FPL by ATC facilities and coordinated by the TMA APP, being compulsory the communication with those facilities, as well as the activation of the transponder equipment. All those flights that do not comply with these rules are going to be considered SUSPICIOUS and will be subject to the MPEA; and

h) Helicopter **o**perations are going to be authorized for disembarking and departure from the local aerodromes or heliport, as well as offshore operation and traffic in the airspace, watching for the expected restrictions in the RESTRICTED and PROHIBITED areas. When applicable, they must utilize strictly the helicopter special routes (REH) established, noting that some of them might be suspended temporarily. The aircraft will have to file a complete FPL. The departure intentions from places without ATC facilities will have to be coordinated previously with the APP located in that TMA, being necessary the allocation of a transponder code A/C indicated by the ATC facility since before take-off up to landing and immediately inform the ATC facility the event of a transponder failure.

6.2 RESTRICTED AREA

In the RESTRICTED AREA, named YELLOW, common to all host cities, it will be allowed only aircraft duly authorized, among them: aircraft related to the events; aircraft carrying Head of State or Government; national soccer team delegations, very important person (VIP), commercial aircraft of existing regular operation, new regular and non-regular; and also the aircraft authorized by the COMDABRA Commander.

The commercial aircraft of existing regular operation, new regular and non-regular that are performing arrival and departure procedures at TMA aerodromes are going to be authorized as long as they do not enter the PROHIBITED areas and fulfill the safety ANAC requirements, that is, the crew members and the passengers undergo the civil aviation inspection process, according to the airport security program (PSA) established for the aerodromes of origin.

All those flights that do not comply with these rules are going to be considered hostile and will be subject to the MPEA.

6.3 PROHIBITED AREA

In the PROHIBITED AREA, named RED, common to all host cities, it will be allowed only aircraft involved in the events, as long as they are previously authorized by the COMDABRA Commander.

All those flights that do not comply with these rules are going to be considered hostile and will be subject to the MPEA.

All aircraft operations are going to be prohibited, except as follows:

In the area named RED, it will be authorized the public security aircraft, military aircraft, SAR aircraft, ambulance aircraft and the other aircraft involved in the operational activities, previously authorized by the COMDABRA Commander.

In the area named ACAV, all aircraft are going to be prohibited, except the E-99;

g) Movimentos aéreos que se realizem nesta área deverão possuir FPL apresentado e aprovado pelos órgãos ATC e coordenado pelo APP da TMA, sendo obrigatória a comunicação bilateral com aqueles órgãos, bem como o funcionamento e o uso do equipamento transponder. Todos os movimentos aéreos que descumprirem essas regras serão considerados SUSPEITOS e estarão sujeitos às MPEA; e

h) Operações de helicópteros estarão autorizadas para desembarque e partida dos aeródromos locais ou helipontos, bem como para operação offshore e trânsito no espaço aéreo, atentando para as restrições previstas nas áreas RESTRITAS e PROIBIDAS. Quando aplicável, deverão utilizar estritamente as rotas especiais de helicóptero (REH) estabelecidas, sendo que algumas poderão ser suspensas temporariamente. As aeronaves deverão apresentar FPL completo. As intenções de decolagem de local desprovido de órgãos ATS deverão ser previamente coordenadas com o APP da TMA, sendo necessário alocar código transponder nos modos A/C, atribuído pelo órgão ATC, desde antes da decolagem até o pouso e deverão informar imediatamente ao órgão ATC caso ocorra uma falha do transponder.

6.2 ÁREA RESTRITA

Na ÁREA RESTRITA, denominada AMARELA, comum a todas as cidades-sede, serão permitidas somente aeronaves devidamente autorizadas, dentre elas: aeronaves envolvidas nos eventos; aeronaves transportando Chefes de Estado e de Governo; delegações das seleções de futebol; very important person (VIP); aeronaves comerciais de operação regular existente, regular novo e não regular; além das aeronaves autorizadas pelo Comandante do COMDABRA.

As aeronaves comerciais de operação regular existente, regular novo e não regular que estejam em procedimentos de chegada ou partida dos aeródromos da TMA serão autorizadas desde que não entrem nas áreas PROIBIDAS e atendam aos requisitos de segurança da ANAC, ou seja, os tripulantes e os passageiros sejam submetidos ao processo de inspeção de aviação civil, de acordo com o PSA estabelecido para os aeródromos de origem.

Todos os movimentos aéreos que descumprirem essas regras serão considerados HOSTIS e estarão sujeitos às MPEA.

6.3 ÁREA PROIBIDA

Na ÁREA PROIBIDA, denominada VERMELHA, comum a todas as cidades-sede, serão permitidas somente aeronaves envolvidas nos eventos, desde que previamente autorizadas pelo Comandante do COMDABRA.

Todos os movimentos aéreos que descumprirem essas regras serão considerados HOSTIS e estarão sujeitos às MPEA.

Todas as operações de aeronaves serão proibidas, exceto para os casos descritos a seguir:

Na área denominada VERMELHA, serão autorizadas as aeronaves de segurança pública, aeronaves militares, aeronaves SAR, aeronaves ambulância e as demais aeronaves envolvidas nas atividades operacionais previamente autorizadas pelo Comandante do COMDABRA;

Na área denominada ACAV, todas as aeronaves serão proibidas, exceto o E-99;

In the area named AREVO, all aircraft are going to be prohibited, except the tanker aircraft and the one being refueled; and

The regular and non-scheduled commercial aviation aircraft (charter and freighter, except air taxi) will be authorized to perform landing and take-off operations at airports inside the RED areas, as prescribed in the attachments to this Plan.

7 HOST CITIES SEGREGATED AREAS

The reserved, restricted and prohibited areas of the FIFA Soccer World Cup Brasil 2014 host cities are set out in this Circular attachments, as follows:

Belo Horizonte – According to attachment A in this AIC;

Brasília – According to attachment B in this AIC;

Cuiabá – According to attachment C in this AIC;

Curitiba – According to attachment D in this AIC;

Fortaleza – According to attachment E in this AIC;

Manaus – According to attachment F in this AIC;

Natal – According to attachment G in this AIC;

Porto Alegre – According to attachment H in this AIC;

Recife – According to attachment I in this AIC;

Rio de Janeiro – According to attachment J in this AIC;

Salvador – According to attachment K in this AIC; and

São Paulo – According to attachment L in this AIC.

8 FLIGHT SAFETY MEASURES

Besides observing the standards and procedures expected in the legislation and the guidelines in this AIC, all aircraft will have to follow the flight rules expected in the authorized flight plans. In case there is any need to modify the flight rules, the requests must be coordinated with the ATC facilities.

Aircraft that do not comply with the expected profile or flight rule, without the ATC facilities authorization and/or enter any of the segregated areas without authorization, are going to be subject to the MPEAs and are going to be compelled to abandon the restricted airspace and/or land at aerodromes with Ground Control Measures (MCS).

In case there is any need to enter the segregated areas, in the event that there is any need to deviate from the approved route, the pilot must notify the ATC facilities immediately.

The pilot who supposes he is going to violate any of the established rules for the RESERVED, RESTRICTED and/or PROHIBITED airspaces, without the ATC facility authorization, must immediately, distance from them, contact the ATC facility and inform the situation, keeping the transponder code he originally received. However, In case there is no contact, the pilot must contact on 121.5 MHz and squawk code 7600. The ATC facilities will always support the pilots.

Never forget: NEVER ENTER A RED AREA WITHOUT THE ATC FACILITY AUTHORIZATION.

Na área denominada AREVO, todas as aeronaves serão proibidas, exceto a aeronave reabastecedora e a aeronave que está sendo reabastecida; e

As aeronaves da aviação comercial regular e não regular (charter e fretamento, exceto táxi aéreo), poderão realizar operações de decolagem dos aeródromos que estiverem dentro das áreas VERMELHAS, de acordo com o contido nos anexos a este Plano.

7 ÁREAS DE EXCLUSÃO DAS CIDADES-SEDE

As áreas reservadas, restritas e proibidas das cidades-sede envolvidas na Copa do Mundo de Futebol FIFA Brasil 2014 constam dos anexos desta Circular, conforme a relação abaixo:

Belo Horizonte – Conforme anexo A desta AIC;

Brasília – Conforme anexo B desta AIC;

Cuiabá – Conforme anexo C desta AIC;

Curitiba – Conforme anexo D desta AIC;

Fortaleza – Conforme anexo E desta AIC;

Manaus – Conforme anexo F desta AIC;

Natal – Conforme anexo G desta AIC;

Porto Alegre – Conforme anexo H desta AIC;

Recife – Conforme anexo I desta AIC;

Rio de Janeiro – Conforme anexo J desta AIC;

Salvador – Conforme anexo K desta AIC; e

São Paulo – Conforme anexo L desta AIC.

8 MEDIDAS DE SEGURANÇA DE VOO

Além de observar as normas e procedimentos previstos em legislação e as orientações contidas nesta Circular, todas as aeronaves deverão cumprir as regras de voo previstas nos FPL autorizados. Caso haja necessidade de modificar as regras de voo, as solicitações deverão ser coordenadas com os órgãos ATC.

Aeronaves que descumprirem o perfil ou regra de voo prevista, sem a autorização dos órgãos ATC e/ou entrarem em qualquer uma das aéreas de exclusão sem permissão, sofrerão as MPEA e serão compelidas a abandonar o espaço aéreo restrito e/ou efetuar pousos em aeródromos com Medidas de Controle no Solo (MCS).

Havendo autorização para utilizar as áreas de exclusão, caso haja qualquer necessidade de desviar da rota aprovada, é obrigatório que o piloto notifique imediatamente o órgão ATC.

O piloto que julgar que infringirá qualquer das regras estabelecidas para os espaços aéreos RESERVADOS, RESTRITOS e/ou PROIBIDOS, sem a devida autorização do órgão ATC, deverá de imediato, afastar-se das mesmas, entrar em contato com o órgão ATC e informar a situação, mantendo o código transponder que recebeu originalmente. Porém, se não obtiver contato, o piloto deverá efetuar chamada na frequência 121.5 MHz e acionar o código 7600. Os órgãos ATC prestarão sempre todo apoio aos pilotos.

E não esqueça: NUNCA ENTRE NA ÁREA VERMELHA SEM ESTAR AUTORIZADO PELO ÓRGÃO ATC.

You can find below the procedures to be adopted, by the aircraft in communication failure, during the segregated areas activation period:

8.1 PRIOR TO ENTER THE WHITE AREA

Do not enter. Proceed to an alternate aerodrome outside this area, squawk transponder code 7600 and execute the radio communication failure procedures expected in the legislation.

8.2 FLYING INSIDE THE WHITE AREA

In case your destination is inside the YELLOW area, DO NOT ENTER. Proceed to an alternate aerodrome outside this area, squawk transponder code 7600 and execute the radio communication failure procedures expected in the legislation.

8.3 NEVER ENTER THE RED AREA

Non-identified aircraft are going to suffer the consequences of MPEA and, if necessary, might suffer severe measures, being subject to the INTERVENTION MEASURES, PERSUASIVE MEASURES AND DETENTION MEASURES.

An aircraft being intercepted must immediately follow the instructions issued by the interceptor on 121.5 MHz and/or interpret and respond to the visual signs; if transponder operated, allocate code 7700, in mode 3/A, unless expressed differently by the appropriate ATC facility.

THE COMAER RETAINS THE RIGHT TO INTERCEPT ANY AIRCRAFT, AT THE AIR DEFENSE FACILITIES DISCRETION OR THE AUTHORITIES RESPONSIBLE FOR THE AERO-SPATIAL DEFENSE MISSIONS.

9 PRESENTATION AND APPROVAL OF THE FLIGHT PLAN

In order to perform a flight in the RESERVED, RESTRICTED, or PROHIBITED areas (departures according to attachments), in the period they are activated, the aircraft must be in the updated repetitive flight plan schedule (RPL) or file a flight plan in the aeronautical information service (AIS) room, at least, 01h30min (one hour an thirty minutes) prior to the activation of the segregated areas.

The command and control master room, located at CGNA, is responsible for the flight approvals and coordination with COMDABRA, the main military operation facilities, the local operation cells and with the ATC facilities.

The CGNA retains the right to deny the flight intentions that do not comply with the event operational requirements and those that can cause control sectors imbalance of any Terminal Control Area (TMA) or Flight Information Region (FIR) or yet those exceeding the declared capacities of the concerned airports.

The aircraft that do not file the ATC SLOT code, in case they intend to take off or land at coordinated airports and do not comply with the maximum expected limits to perform their flights or do not arrange for the ATS messages expected in the current legislation, are going to have their flight plans canceled, being necessary the filing of a new flight plan.

Flights in the PROHIBITED areas are not going to be authorized, under no circumstances, during the activation periods, except those aircraft authorized by the COMDABRA Commander. The aircraft that do not comply with such determination are going to be subject to the Airspace Policing Measures (MPEA).

Seguem abaixo os procedimentos a serem adotados, pelas aeronaves em falha de comunicações, durante o período de ativação das áreas de exclusão:

8.1 ANTES DE ENTRAR NA ÁREA BRANCA

Não ENTRE. Prossiga para um aeródromo alternativo fora desta área, acione o código transponder 7600 e execute os procedimentos para falha de comunicações rádio previstos em legislação.

8.2 EM VOO DENTRO DA ÁREA BRANCA

Se o seu destino estiver dentro da área AMARELA, não ENTRE. Prossiga para uma alternativa fora dessa área, acione o código transponder 7600 e execute os procedimentos para falha de comunicações rádio previstos em legislação.

8.3 NUNCA ENTRE NA ÁREA VERMELHA

Aeronaves não identificadas sofrerão as MPEA e, caso necessário, poderão sofrer medidas severas, estando sujeitas às MEDIDAS DE INTERVENÇÃO, MEDIDAS DE PERSUASÃO e MEDIDAS DE DETENÇÃO.

Uma aeronave que estiver sendo interceptada deverá imediatamente seguir as instruções dadas pela aeronave interceptadora em 121,5 MHz e/ou interpretar e responder aos sinais visuais; se equipada com equipamento transponder, selecionar o código 7700, no modo 3/A, salvo instruções em contrário do órgão ATC apropriado.

O COMAER RESERVA-SE O DIREITO DE INTERCEPTAR QUALQUER AERONAVE, A CRITÉRIO DOS ÓRGÃOS DE DEFESA AÉREA OU DAS AUTORIDADES RESPONSÁVEIS PELA EXECUÇÃO DAS MISSÕES DE DEFESA AEROESPACIAL.

9 APRESENTAÇÃO E APROVAÇÃO DO PLANO DE VOO

Para realizar voo nas áreas RESERVADA, RESTRITA, ou PROIBIDA (decolagens, conforme anexos) durante o período em que estiverem ativadas, as aeronaves deverão constar da listagem de plano de voo repetitivo (RPL) atualizada ou apresentar plano de voo (FPL) às salas AIS com, no mínimo, 01h30min (uma hora e trinta minutos) de antecedência do início da ativação das áreas de exclusão

A sala master de comando e controle, localizada no CGNA, é a responsável pela aprovação dos voos e coordenação com o COMDABRA, com os órgãos de controle de operações militares principais, com as células de operação local e com os órgãos ATS.

O CGNA reserva-se o direito de rejeitar as intenções de voo que não atendam aos requisitos operacionais do evento e aquelas que possam provocar desbalanceamento nos setores de controle de qualquer Área de Controle Terminal (TMA) ou Região de Informação de Voo (FIR) e ainda as que ultrapassarem as capacidades declaradas dos aeroportos envolvidos.

As aeronaves que não apresentarem o código de SLOT ATC, caso pretendam decolar ou pousar em aeródromos coordenados, e não cumprirem os limites máximos previstos para a realização de seus voos ou não providenciarem as mensagens ATS previstas na legislação em vigor, terão seus FPL cancelados, sendo necessária a apresentação de um novo plano.

Não serão autorizados, em hipótese nenhuma, voos nas áreas PROIBIDAS durante os períodos de sua ativação, exceto as aeronaves autorizadas pelo Comandante do COMDABRA. As aeronaves que descumprirem essa determinação estarão sujeitas às Medidas de Policiamento do Espaço Aéreo (MPEA).

9.1 TRANSPONDER USE

The transponder is the primary means of identification for traffic, flying in the airspace, throughout the air operations. Thus, only the flights with the functional equipment on board are going to be authorized. Aircraft without the transponder equipment are not going to be authorized inside the segregated areas. Throughout the segregated areas activation, all of the special routes for aircraft without transponder (REAST) are going to be suspended.

9.2 INSTRUMENT DEPARTURE AND ARRIVAL PROCEDURES

The segregated areas activation are going to cause restrictions in the landing and departure operations at some host cities airports, according to the attachments. Only the aircraft authorized by the COMDABRA Commander are going to operate at the aerodromes, during the period mentioned.

The instrument departure and arrival procedures are not going to be suspended and/or canceled, despite the restrictions imposed by the activation of these areas, however the ATC facilities are going to select and use only the procedures that are not going to intervene with the areas.

The airspace users in Brasil are not going to be penalized, since all aerodromes are going to have instrument departure and arrival procedures throughout the segregated areas activation period.

9.3 AIRPORTS AND THEIR VOCATIONS

Taking into consideration the continental dimensions of Brasil, several cities would like and would be able to have at their airports the flight operations involved in FIFA Soccer World Cup Brasil 2014.

The selection of the airports was achieved on a technical basis, not necessarily the selected airports fulfill all of the criteria, but, for sure, possess a larger set of capabilities to cater to the event demands.

Interest and availability of the airport administrator, distance from the host city, infrastructure in the vicinity of the airports (access roads, traffic outflow, fast access to federal and state roads), airport capability (number of parking places for regular domestic and international aviation, general aviation and military aviation involved in the event), runway complex (landing and departure runway length, taxiway, runway and aprons pavement classification number) and air traffic services (navigational aids, air traffic control, meteorology, communications, aeronautical information, departure and arrival procedures) are essential for providing quality service to our visitors along the days of the official FIFA Soccer World Cup Brasil 2014 matches.

Following are introduced the destination and alternate aerodromes along with their respective vocations (aviation segments) in each host city:

9.1 USO DO TRANSPONDER

O transponder é o meio primário de identificação para tráfegos, evoluindo no espaço aéreo, durante as operações aéreas. Desta forma, somente serão autorizados os voos de aeronaves que possuam o equipamento a bordo e em funcionamento. Não serão permitidos voos de aeronaves sem transponder nas áreas de exclusão. Durante os horários de ativação das áreas de exclusão, todas as rotas especiais de aeronaves sem transponder (REAST) serão suspensas.

9.2 PROCEDIMENTOS DE SAÍDA E DESCIDA POR INSTRUMENTOS

A ativação das áreas de exclusão provocarão restrições nas operações de pouso e decolagem em alguns aeródromos das cidades-sede, conforme os anexos. Somente poderão operar nos aeródromos, durante o referido período, as aeronaves autorizadas pelo Comandante do COMDABRA.

Os procedimentos de saída e descida por instrumentos não serão suspensos e/ou cancelados, apesar das restrições impostas pela criação destas áreas, porém os órgãos ATC selecionarão e utilizarão somente os procedimentos que não intervirão com as áreas.

Os usuários do espaço aéreo brasileiro não serão prejudicados, pois todos os aeródromos terão procedimentos de saída e chegada descida por instrumentos durante o período de ativação das áreas de exclusão.

9.3 AEROPORTOS E SUAS VOCAÇÕES

Com as dimensões continentais do Brasil, diversas cidades gostariam e teriam condições de receber em seus aeroportos as operações aéreas envolvidas na Copa do Mundo de Futebol FIFA Brasil 2014.

A seleção dos aeroportos foi realizada com base em critérios técnicos, não necessariamente os aeroportos escolhidos satisfazem a todos os critérios, mas, com certeza, possuem um conjunto maior de capacidades para atender às demandas do evento.

Interesse e disponibilidade do administrador aeroportuário, distância da cidade-sede, infraestrutura nos arredores do aeroporto (vias de acesso, escoamento do trânsito, acesso rápido a rodovias estaduais e federais), capacidade aeroportuária (número de vagas para aviação regular doméstica e internacional, aviação geral, aviação militar envolvida no evento), complexo de pistas (comprimento de pista de pouso e decolagem, pista de táxi, resistência do piso das pistas e pátios de estacionamento) e serviços de tráfego aéreo (auxílios à navegação, controle de tráfego aéreo, meteorologia, comunicações, informações aeronáuticas, procedimentos de subida e descida) são essenciais para a prestação de um serviço de qualidade aos nossos visitantes durante os dias em que acontecerem os jogos oficiais da Copa do Mundo de Futebol FIFA Brasil 2014.

A seguir são apresentados os aeródromos de destino e de alternativa com as suas respectivas vocações (segmentos da aviação) em cada cidade-sede:

BELO HORIZONTE						
FIFA Soccer World Cup Brasil 2014		**Designator**	**VIP**	**International**	**domestic**	**General**
Destination aerodromes	Confins	SBCF				
	Pampulha	SBBH				
	Parque de Lagoa Santa	PAMA-LS				
Alternate aerodromes	Galeão	SBGL				
	Guarulhos	SBGR				
	Campinas	SBKP				
	Brasília	SBBR				
	Santos Dumont	SBRJ				
	Montes Claros	SBMK				
	Ribeirão Preto	SBRP				
	Uberaba	SBUR				
	Uberlândia	SBUL				
	Carlos Prates	SBPR				
	Ipatinga	SBIP				
	Juiz de Fora	SBJF				

BRASÍLIA						
FIFA Soccer World Cup Brasil 2014		**Designator**	**VIP**	**International**	**domestic**	**General**
Destination aerodromes	Brasília	SBBR				
	Base Aérea de Brasília	BABR				
	Goiânia	SBGO				
Alternate aerodromes	Base Aérea de Anápolis	BAAN				
	Confins	SBCF				
	Campinas	SBKP				
	Guarulhos	SBGR				
	Galeão	SBGL				
	Uberaba	SBUR				
	Uberlândia	SBUL				
	Montes Claros	SBMK				
	Ribeirão Preto	SBRP				
	Caldas Novas	SBCN				

BELO HORIZONTE						
Copa do Mundo FIFA Brasil 2014		Indicativo	VIP	Internacional	Doméstico	Geral
Aeródromos de destino	Confins	SBCF				
	Pampulha	SBBH				
	Parque de Lagoa Santa	PAMA-LS				
Aeródromos de alternativa	Galeão	SBGL				
	Guarulhos	SBGR				
	Campinas	SBKP				
	Brasília	SBBR				
	Santos Dumont	SBRJ				
	Montes Claros	SBMK				
	Ribeirão Preto	SBRP				
	Uberaba	SBUR				
	Uberlândia	SBUL				
	Carlos Prates	SBPR				
	Ipatinga	SBIP				
	Juiz de Fora	SBJF				

BRASÍLIA						
Copa do Mundo FIFA Brasil 2014		Indicativo	VIP	Internacional	Doméstico	Geral
Aeródromos de destino	Brasília	SBBR				
	Base Aérea de Brasília	BABR				
	Goiânia	SBGO				
Aeródromos de alternativa	Base Aérea de Anápolis	BAAN				
	Confins	SBCF				
	Campinas	SBKP				
	Guarulhos	SBGR				
	Galeão	SBGL				
	Uberaba	SBUR				
	Uberlândia	SBUL				
	Montes Claros	SBMK				
	Ribeirão Preto	SBRP				
	Caldas Novas	SBCN				

CUIABÁ						
FIFA Soccer World Cup Brasil 2014		**Designator**	**VIP**	**International**	**domestic**	**General**
Destination aerodromes	Cuiabá	SBCY				
Alternate aerodromes	Campo Grande	SBCG				
	Brasília	SBBR				
	Goiânia	SBGO				
	Palmas	SBPJ				
	Barra do Garças	SBBW				
	Vilhena	SBVH				

CURITIBA						
FIFA Soccer World Cup Brasil 2014		**Designator**	**VIP**	**International**	**domestic**	**General**
Destination aerodromes	Afonso Pena	SBCT				
	Bacacheri	SBBI				
	CINDACTA II	CINDACTA II				
Alternate aerodromes	Guarulhos	SBGR				
	Porto Alegre	SBPA				
	Florianópolis	SBFL				
	Foz do Iguaçú	SBFI				
	Campinas	SBKP				
	Galeão	SBGL				
	Navegantes	SBNF				
	Londrina	SBLO				
	Maringá	SBMG				
	Chapecó	SBCH				
	Joinvile	SBJV				

CUIABÁ						
Copa do Mundo FIFA Brasil 2014		Indicativo	VIP	Internacional	Doméstico	Geral
Aeródromos de destino	Cuiabá	SBCY				
Aeródromos de alternativa	Campo Grande	SBCG				
	Brasília	SBBR				
	Goiânia	SBGO				
	Palmas	SBPJ				
	Barra do Garças	SBBW				
	Vilhena	SBVH				

CURITIBA						
Copa do Mundo FIFA Brasil 2014		Indicativo	VIP	Internacional	Doméstico	Geral
Aeródromos de destino	Afonso Pena	SBCT				
	Bacacheri	SBBI				
	CINDACTA II	CINDACTA II				
Aeródromos de alternativa	Guarulhos	SBGR				
	Porto Alegre	SBPA				
	Florianópolis	SBFL				
	Foz do Iguaçú	SBFI				
	Campinas	SBKP				
	Galeão	SBGL				
	Navegantes	SBNF				
	Londrina	SBLO				
	Maringá	SBMG				
	Chapecó	SBCH				
	Joinvile	SBJV				

FORTALEZA							
FIFA Soccer World Cup Brasil 2014		**Designator**	**VIP**	**International**	**domestic**	**General**
Destination aerodromes	Fortaleza	SBFZ				
	Base Aérea de Fortaleza	BAFZ				
Alternate aerodromes	Natal	SBNT				
	Recife	SBRF				
	Salvador	SBSV				
	Teresina	SBTE				
	João Pessoa	SBJP				
	Mossoró	SBMS				
	Parnaíba	SBPB				
	Juazeiro do Norte	SBJU				

MANAUS						
FIFA Soccer World Cup Brasil 2014		**Designator**	**VIP**	**International**	**domestic**	**General**
Destination aerodromes	Manaus	SBEG				
	Base Aérea de Manaus	BAMN				
Alternate aerodromes	Boa Vista	SBBV				
	Porto Velho	SBPV				
	Belém	SBBE				
	Santarém	SBSN				
	Macapá	SBMQ				
	Itacoatiara	SBIC				
	Tefé	SBTF				

FORTALEZA						
Copa do Mundo FIFA Brasil 2014		Indicativo	VIP	Internacional	Doméstico	Geral
Aeródromos de destino	Fortaleza	SBFZ				
	Base Aérea de Fortaleza	BAFZ				
Aeródromos de alternativa	Natal	SBNT				
	Recife	SBRF				
	Salvador	SBSV				
	Teresina	SBTE				
	João Pessoa	SBJP				
	Mossoró	SBMS				
	Parnaíba	SBPB				
	Juazeiro do Norte	SBJU				

MANAUS						
Copa do Mundo FIFA Brasil 2014		Indicativo	VIP	Internacional	Doméstico	Geral
Aeródromos de destino	Manaus	SBEG				
	Base Aérea de Manaus	BAMN				
Aeródromos de alternativa	Boa Vista	SBBV				
	Porto Velho	SBPV				
	Belém	SBBE				
	Santarém	SBSN				
	Macapá	SBMQ				
	Itacoatiara	SBIC				
	Tefé	SBTF				

NATAL						
FIFA Soccer World Cup Brasil 2014		**Designator**	**VIP**	**International**	**domestic**	**General**
Destination aerodromes	São Gonçalo do Amarante	SBSG				
	Natal	SBNT				
	Base Aérea de Natal	BANT				
Alternate aerodromes	Fortaleza	SBFZ				
	Recife	SBRF				
	Salvador	SBSV				
	João Pessoa	SBJP				
	Campina Grande	SBKG				
	Juazeiro do Norte	SBJU				
	Paulo Afonso	SBUF				

PORTO ALEGRE						
FIFA Soccer World Cup Brasil 2014		**Designator**	**VIP**	**International**	**domestic**	**General**
Destination aerodromes	Porto Alegre	SBPA				
	Base Aérea de Canoas	BACO				
Alternate aerodromes	Florianópolis	SBFL				
	Afonso Pena	SBCT				
	Foz do Iguaçu	SBFI				
	Campinas	SBKP				
	Guarulhos	SBGR				
	Galeão	SBGL				
	Chapecó	SBCH				
	Navegantes	SBNF				
	Caxias do Sul	SBCX				
	Joinvile	SBJV				
	Pelotas	SBPK				
	Criciúma	SBCM				
	Passo Fundo	SBPF				

NATAL						
Copa do Mundo FIFA Brasil 2014		Indicativo	VIP	Internacional	Doméstico	Geral
Aeródromos de destino	São Gonçalo do Amarante	SBSG				
	Natal	SBNT				
	Base Aérea de Natal	BANT				
Aeródromos de alternativa	Fortaleza	SBFZ				
	Recife	SBRF				
	Salvador	SBSV				
	João Pessoa	SBJP				
	Campina Grande	SBKG				
	Juazeiro do Norte	SBJU				
	Paulo Afonso	SBUF				

PORTO ALEGRE						
Copa do Mundo FIFA Brasil 2014		Indicativo	VIP	Internacional	Doméstico	Geral
Aeródromos de destino	Porto Alegre	SBPA				
	Base Aérea de Canoas	BACO				
Aeródromos de alternativa	Florianópolis	SBFL				
	Afonso Pena	SBCT				
	Foz do Iguaçu	SBFI				
	Campinas	SBKP				
	Guarulhos	SBGR				
	Galeão	SBGL				
	Chapecó	SBCH				
	Navegantes	SBNF				
	Caxias do Sul	SBCX				
	Joinvile	SBJV				
	Pelotas	SBPK				
	Criciúma	SBCM				
	Passo Fundo	SBPF				

RECIFE							
FIFA Soccer World Cup Brasil 2014		**Designator**	**VIP**	**International**	**domestic**	**General**
Destination aerodromes	Recife	SBRF				
	Base Aérea de Recife	BARF				
Alternate aerodromes	Salvador	SBSV				
	Natal	SBNT				
	Fortaleza	SBFZ				
	João Pessoa	SBJP				
	Campina Grande	SBKG				
	Maceió	SBMO				
	Paulo Afonso	SBUF				
	Juazeiro do Norte	SBJU				
	Petrolina	SBPL				

RIO DE JANEIRO						
FIFA Soccer World Cup Brasil 2014		**Designator**	**VIP**	**International**	**domestic**	**General**
Alternate aerodromes	Galeão	SBGL				
	Santos Dumont	SBRJ				
	Jacarepaguá	SBJR				
	Base Aérea do Galeão	BAGL				
	Base Aérea de Santa Cruz	BASC				
Destination aerodromes	Guarulhos	SBGR				
	Confins	SBCF				
	Campinas	SBKP				
	Brasília	SBBR				
	São José dos Campos	SBSJ				
	Ribeirão Preto	SBRP				
	Vitória	SBVT				
	Juiz de Fora	SBJF				
	Cabo Frio	SBCB				
	Macaé	SBME				
	Campos	SBCP				

RECIFE						
Copa do Mundo FIFA Brasil 2014		Indicativo	VIP	Internacional	Doméstico	Geral
Aeródromos de destino	Recife	SBRF				
	Base Aérea de Recife	BARF				
Aeródromos de alternativa	Salvador	SBSV				
	Natal	SBNT				
	Fortaleza	SBFZ				
	João Pessoa	SBJP				
	Campina Grande	SBKG				
	Maceió	SBMO				
	Paulo Afonso	SBUF				
	Juazeiro do Norte	SBJU				
	Petrolina	SBPL				

RIO DE JANEIRO						
Copa do Mundo FIFA Brasil 2014		Indicativo	VIP	Internacional	Doméstico	Geral
Aeródromos de destino	Galeão	SBGL				
	Santos Dumont	SBRJ				
	Jacarepaguá	SBJR				
	Base Aérea do Galeão	BAGL				
	Base Aérea de Santa Cruz	BASC				
Aeródromos de alternativa	Guarulhos	SBGR				
	Confins	SBCF				
	Campinas	SBKP				
	Brasília	SBBR				
	São José dos Campos	SBSJ				
	Ribeirão Preto	SBRP				
	Vitória	SBVT				
	Juiz de Fora	SBJF				
	Cabo Frio	SBCB				
	Macaé	SBME				
	Campos	SBCP				

SALVADOR						
FIFA Soccer World Cup Brasil 2014		**Designator**	**VIP**	**International**	**domestic**	**General**
Alternate aerodromes	Salvador	SBSV				
Destination aerodromes	Recife	SBRF				
	Natal	SBNT				
	Fortaleza	SBFZ				
	Galeão	SBGL				
	Aracaju	SBAR				
	Maceió	SBMO				
	Ilhéus	SBIL				
	Vitória da Conquista	SBQV				
	Porto Seguro	SBPS				

SÃO PAULO						
FIFA Soccer World Cup Brasil 2014		**Designator**	**VIP**	**International**	**domestic**	**General**
Destination aerodromes	Guarulhos	SBGR				
	Campinas	SBKP				
	Congonhas	SBSP				
	Campo de Marte	SBMT				
	Jundiaí	SBJD				
	Base Aérea de São Paulo	BASP				
Alternate aerodromes	Galeão	SBGL				
	Curitiba	SBCT				
	Confins	SBCF				
	Brasília	SBBR				
	São José dos Campos	SBSJ				
	Santos Dumont	SBRJ				
	Ribeirão Preto	SBRP				
	Araraquara	SBAQ				
	Bauru	SBBU				
	São José do Rio Preto	SBSR				
	Arealva	SBAE				

SALVADOR						
Copa do Mundo FIFA Brasil 2014		Indicativo	VIP	Internacional	Doméstico	Geral
Aeródromos de destino	Salvador	SBSV				
Aeródromos de alternativa	Recife	SBRF				
	Natal	SBNT				
	Fortaleza	SBFZ				
	Galeão	SBGL				
	Aracaju	SBAR				
	Maceió	SBMO				
	Ilhéus	SBIL				
	Vitória da Conquista	SBQV				
	Porto Seguro	SBPS				

SÃO PAULO						
Copa do Mundo FIFA Brasil 2014		Indicativo	VIP	Internacional	Doméstico	Geral
Aeródromos de destino	Guarulhos	SBGR				
	Campinas	SBKP				
	Congonhas	SBSP				
	Campo de Marte	SBMT				
	Jundiaí	SBJD				
	Base Aérea de São Paulo	BASP				
Aeródromos de alternativa	Galeão	SBGL				
	Curitiba	SBCT				
	Confins	SBCF				
	Brasília	SBBR				
	São José dos Campos	SBSJ				
	Santos Dumont	SBRJ				
	Ribeirão Preto	SBRP				
	Araraquara	SBAQ				
	Bauru	SBBU				
	São José do Rio Preto	SBSR				
	Arealva	SBAE				

10 COORDINATED AIRPORTS

In order to manage the increase of the air traffic movement throughout the FIFA Soccer World Cup Brasil 2014, CGNA is going to coordinate the airports chosen by the Civil Office of the Presidency of the Republic, through the SAC, in articulation with the Civil Aviation Authority (ANAC), according to the type of operation and the airport infrastructure involved.

The coordination of an airport is a methodology that consists in establishing predetermined time intervals, named ATC SLOT, for the landing and departure operations of all aircraft operating at the airport, with the purpose of regulating the use so that the operational capacity is not exceeded, maintaining the efficiency in the provision of the airport infrastructure and aeronautics services, according to the runway, apron and terminal (boarding and disembark, domestic and international) conditioning.

When an airport is announced coordinated, it is meant that all flight intentions will be conditioned to the acquisition of a landing or departure ATC SLOT.

The airports coordination period will be from June 10th, 2014 to July 15th 2014, it might vary from airport to airport, depending on the number of matches.

ANAC will allocate ATC SLOT for commercial regular flights (domestic and international), commercial non-scheduled flights (domestic and international), including public charter and excluding air taxi and delegation flights. The SAC, in its turn, will be responsible for the ATC SLOT allocation of Heads of State and VIP and CGNA for general aviation.

In order to perform the registration and get to know the standards and procedures for the acquisition of ATC SLOT, the general aviation user will have to refer to the AIC SLOTALLOCATION REGULATION FOR AIR TAXI AND GENERAL AVIATION AIRCRAFT AT COORDENATED AERODROME THOUGHOUT FIFA SOCCER WORLD CUP BRASIL 2014 or, then, visit CGNA WEBPAGE at www.cgna.gov.br and click on the SLOT link.

The following aerodromes will be announced coordinated throughout FIFA Soccer World Cup Brasil 2014: SBGL; SBRJ; SBJR; SBGR; SBSP; SBKP; SBSJ; SBCF; SBBH; SBBR; SBGO; SBCY; SBCG; SBCT; SBBI; SBFL; SBPA; SBSV; SBRF; SBNT; SBFZ; SBSG; SBEG; SBMT; and SBJD.

The following aerodromes will be monitored throughout FIFA Soccer World Cup Brasil 2014 and, depending on the demand, might be announced coordinated: SBRP; SBVT; SBCB; SBME; SBCP; SBJF; SBPR; SBMK; SBIP; SBUL; SBUR; SBCN; SBTE; SBJP; SBMS; SBPB; SBMO; SBKG; SBUF; SBPL; SBJU; SBAR; SBIL; SBQV; SBPS; SBBW; SBVH; SBPJ; SBNF; SBLO; SBMG; SBJV; SBCH; SBBV; SBPV; SBBE; SBSN; SBMQ; SBIC; SBTF; SBFI; SBCX; SBPK; SBCM; SBPF; SBAQ; SBAE; SBBU; e SBSR.

10.1 GROUND TURNAROUND TIME

The SAC, through ANAC, in articulation with the Airport Administrations will establish the maximum turnaround time on the ground, in the airports involved in the event, in order to improve the air operations flow in the installed infrastructure.

The Aircraft Operators and/or holders who possibly do not comply with the time established are going to be subject to the expected regulation sanctions. Among the expected legislation penalties, are the ones in ANAC decision Nº 13 that deals with aircraft removal.

10 AEROPORTOS COORDENADOS

A fim de gerenciar o crescimento dos movimentos aéreos durante a Copa do Mundo de Futebol FIFA Brasil 2014, o CGNA coordenará os aeroportos escolhidos pela Casa Civil da Presidência de Republica, por meio da SAC, em articulação com a Agência Nacional de Aviação Civil (ANAC), conforme o tipo de operação e de infraestrutura aeroportuária envolvida.

A coordenação de um aeroporto é uma metodologia que consiste em estabelecer intervalos de tempo predeterminados, denominado de SLOT ATC, para as operações de pouso e decolagem de todas as aeronaves que operam no aeroporto, com o objetivo de regrar a utilização para que a sua capacidade de operação não seja ultrapassada, mantendo a eficiência na prestação dos serviços das infraestruturas aeroportuária e aeronáutica, segundo os condicionantes de pista, pátio e terminal (embarque e desembarque, doméstico e internacional).

Quando se declara que um aeroporto está coordenado, significa dizer que todas as intenções de voo estarão condicionadas à obtenção de SLOT ATC para pouso ou decolagem.

O período da coordenação dos aeroportos será do dia 10 de junho de 2014 ao dia 15 de julho de 2014, podendo variar de aeroporto para aeroporto, a depender do número de jogos.

A ANAC alocará SLOT ATC para voos comerciais regulares (domésticos e internacionais), voos comerciais não regulares (domésticos e internacionais), incluindo charter público e excluindo taxi aéreo e voos de delegações. A SAC, por sua vez, ficará responsável pela alocação dos SLOT ATC para os Chefes de Estado e VIP e o CGNA para aviação geral.

Para efetuar o cadastramento e conhecer os procedimentos e regras para a obtenção do SLOT ATC, o usuário de aviação geral deverá consultar a AIC REGRAS DE ALOCAÇÃO DE SLOT PELA AS AERONAVES QUE EFETUAM SERVIÇOS DE TAXI AÉREO E AS DE AVIAÇÃO GERAL EM AERÓDROMOS COORDENADOS DURANTE A COPA DO MUNDO DE FUTEBOL FIFA BRASIL 2014 ou, então, visitar a página do CGNA na INTERNET no endereço www.cgna.gov.br e clicar no link SLOT.

Os seguintes aeródromos serão declarados coordenados durante a Copa do Mundo de Futebol FIFA Brasil 2014: SBGL; SBRJ; SBJR; SBGR; SBSP; SBKP; SBSJ; SBCF; SBBH; SBBR; SBGO; SBCY; SBCG; SBCT; SBBI; SBFL; SBPA; SBSV; SBRF; SBNT; SBFZ; SBSG; SBEG; SBMT; e SBJD.

Os seguintes aeródromos estarão sendo monitorados durante a Copa do Mundo de Futebol FIFA Brasil 2014 e, dependendo da demanda, poderão ser declarados coordenados: SBRP; SBVT; SBCB; SBME; SBCP; SBJF; SBPR; SBMK; SBIP; SBUL; SBUR; SBCN; SBTE; SBJP; SBMS; SBPB; SBMO; SBKG; SBUF; SBPL; SBJU; SBAR; SBIL; SBQV; SBPS; SBBW; SBVH; SBPJ; SBNF; SBLO; SBMG; SBJV; SBCH; SBBV; SBPV; SBBE; SBSN; SBMQ; SBIC; SBTF; SBFI; SBCX; SBPK; SBCM; SBPF;SBAQ; SBAE; SBBU; e SBSR.

10.1 TEMPO DE PERMANÊNCIA DE SOLO

A SAC, por meio da ANAC, em articulação com os Administradores Aeroportuários, estabelecerá os tempos máximos de permanência de solo, nos aeródromos envolvidos no evento, visando aprimorar o fluxo das operações aéreas nas infraestruturas instaladas.

Os operadores e/ou exploradores de aeronaves que porventura descumprirem os tempos estabelecidos estarão sujeitos as sanções previstas em lei. Dentre as punições previstas em legislação, estão as contidas na decisão Nº 13 da ANAC que trata da remoção de aeronaves.

The airport administrations might proceed the immediate removal of the aircraft that violate the usage rules established for the event involved aerodromes under the following conditions: exceed the airport operator authorized turnaround time for a given air operation; park at a position different from the one established by the operator; and any other condition that impedes, without valid reason, the air operation flow.

The turnaround time, as well as all pieces of information related to the coordination of the involved airports, as for example, coordination period, time period, ATS clearances, possible alternate aerodromes, among others, will be published by means of Notice to Airmen (NOTAM) specific to each involved aerodrome.

11 FINAL CONSIDERATIONS

11.1 The approval of this AIC was published in DECEA Internal Bulletin, nº 58 of march 27, 2014.

11.2 The cases not foreseen in this AIC are going to be decided by Your Excellency the Chief of the Sub-department of Operations of the Air Space Control Department (DECEA).

As Administrações Aeroportuárias poderão proceder à imediata remoção da aeronave que violar as regras de utilização estabelecidas para os aeródromos envolvidos no evento nas seguintes hipóteses: ultrapassar o tempo de permanência autorizado pelo operador de aeródromo para determinada operação aérea; estacionar em posição diferente da determinada pelo operador; e qualquer outra hipótese que impeça, sem justa causa, o fluxo de operações aéreas.

Os tempos de permanência de solo, bem como todas as informações relativas à coordenação dos aeródromos envolvidos, como por exemplo, período de coordenação, faixa horária, autorizações ATS, aeródromos que poderão ser utilizados como alternativa, dentre outras, estarão publicadas por meio de Aviso aos Aeronavegantes (NOTAM) específicos para cada aeródromo envolvido.

11 DISPOSIÇÕES FINAIS

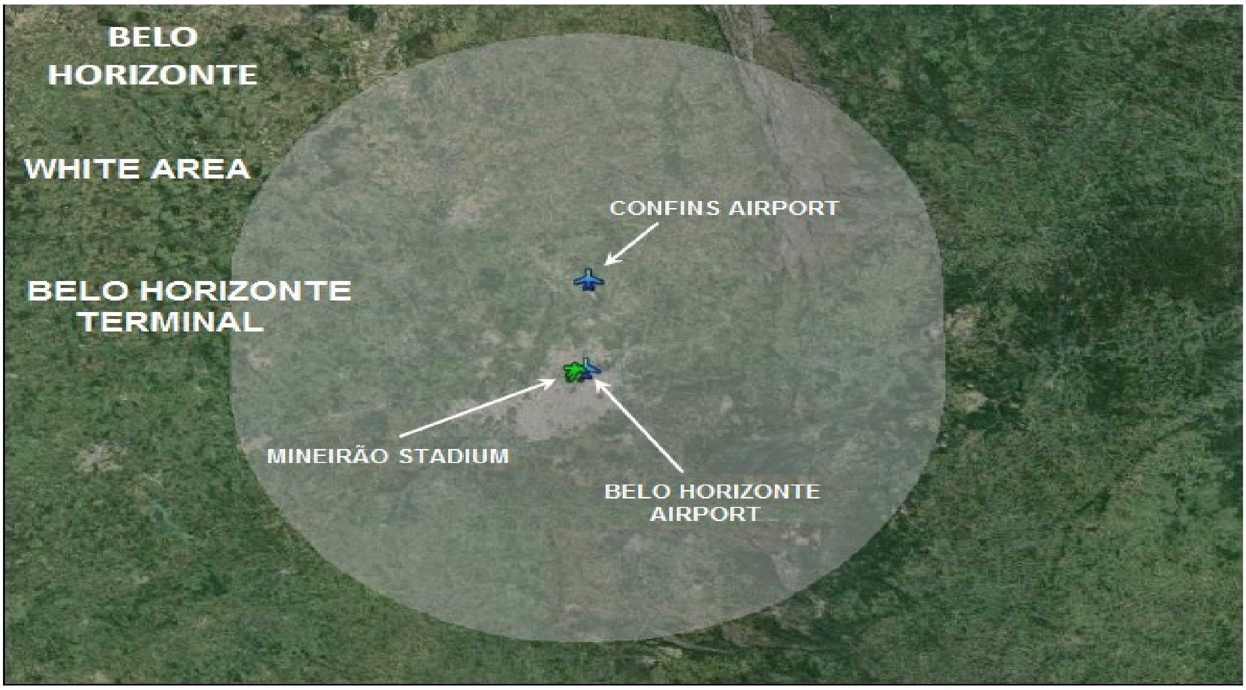
11.1 Esta AIC foi aprovada e publicada no Boletim Interno do DECEA nº 58, de 27 de março de 2014.

11.2 Os casos não previstos nesta AIC serão resolvidos pelo Exmo Sr. Chefe do Subdepartamento de Operações do Departamento de Controle do Espaço Aéreo (DECEA).

ATTACHMENT A - BELO HORIZONTE

RESERVED AREA

Area named WHITE, defined by the lateral projections of Belo Horizonte TMA and vertical limits from the surface to FL 145.



RESTRICTED AREA

Area named YELLOW, inside the WHITE area, defined as a circle centered on the coordinates 19°51'57"S 043°58'15"W, with 7-NM radius and with responsibility volume superposed from the surface up to FL 145.

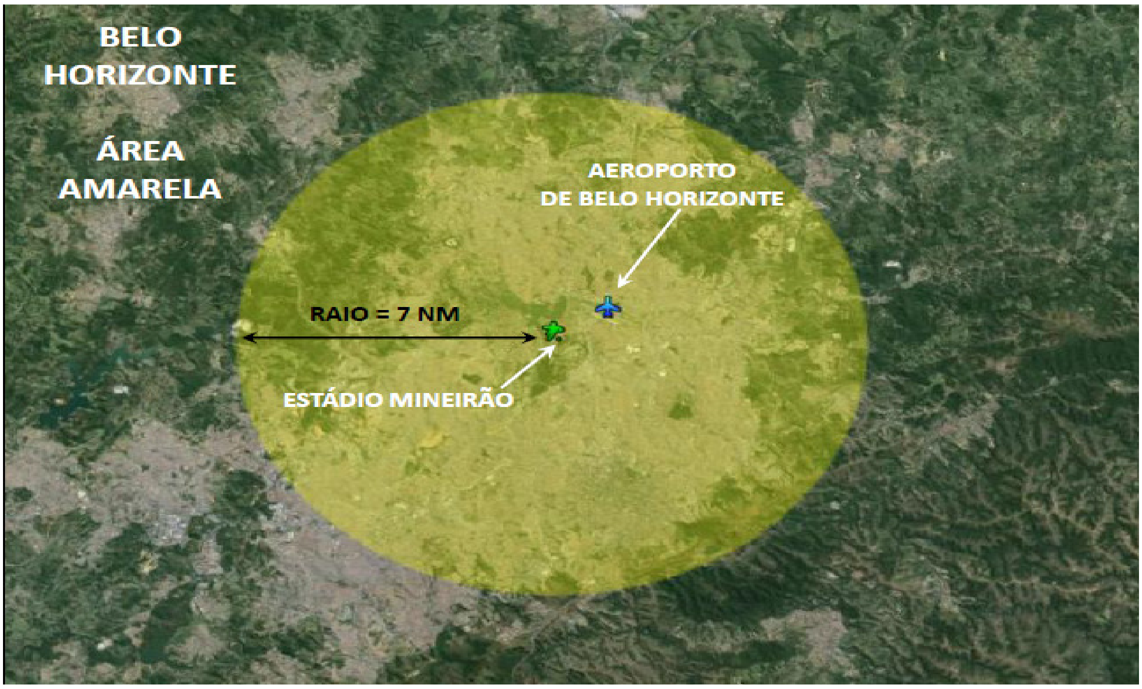
ANEXO A – BELO HORIZONTE

ÁREA RESERVADA

Área denominada BRANCA, definida pelas projeções laterais da TMA Belo Horizonte e limites verticais da superfície ao FL 145.

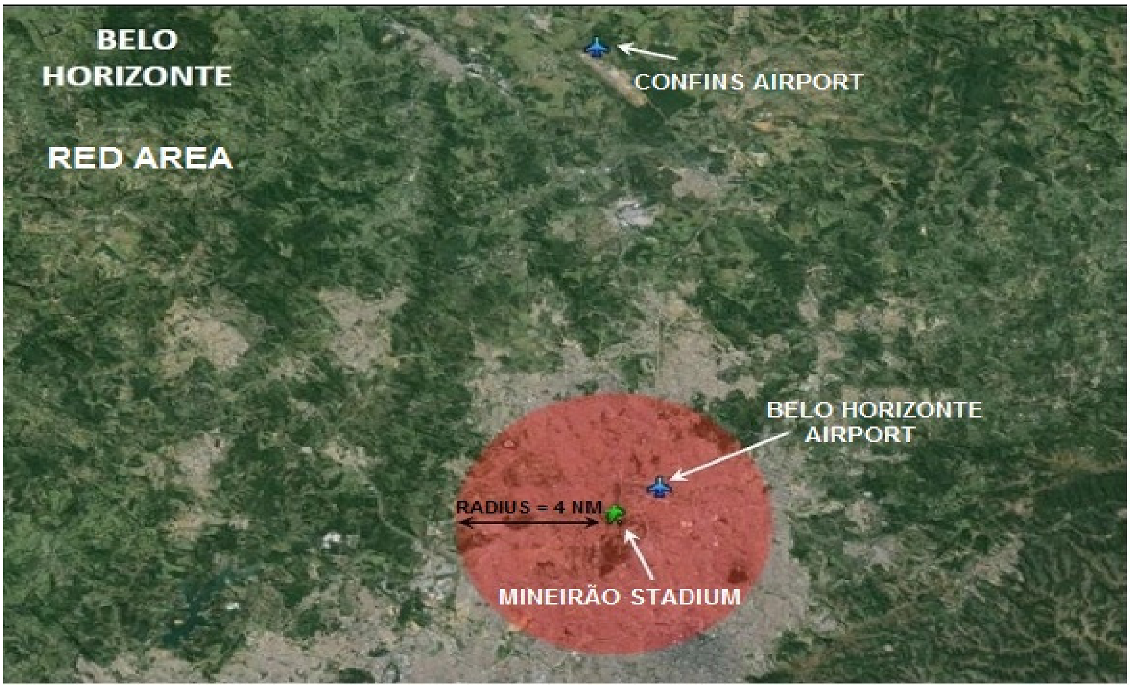
ÁREA RESTRITA

Área denominada AMARELA, dentro da área BRANCA, definida como um círculo com centro nas coordenadas 19°51'57"S 043°58'15"W, com 7 NM de raio e com volume de responsabilidade sobreposto da superfície até o FL 145.



PROHIBITED AREA

Area named RED, inside the YELLOW area, defined as a circle centered on the coordinates 19°51'57"S 043°58'15"W, with 4-NM radius and with responsibility volume superposed from the surface up to FL 145.



ACAV AREA

Defined area from FL 210 to FL 240, formed by a polygon with the following geographic coordinates:

20° 33’ 24” S 043° 30’ 20” W;

20° 08’ 00” S 042° 57’ 42” W;

20° 19’ 30” S 042° 01’ 47” W; and

21º 08’ 38” S 043º 13’ 14” W.

AREVO AREA

Defined area from FL 150 to FL 200, formed by a polygon with the following geographic coordinates:

20° 33’ 24” S 043° 30’ 20” W;

20° 08’ 00” S 042° 57’ 42” W;

20° 19’ 30” S 042° 01’ 47” W; and

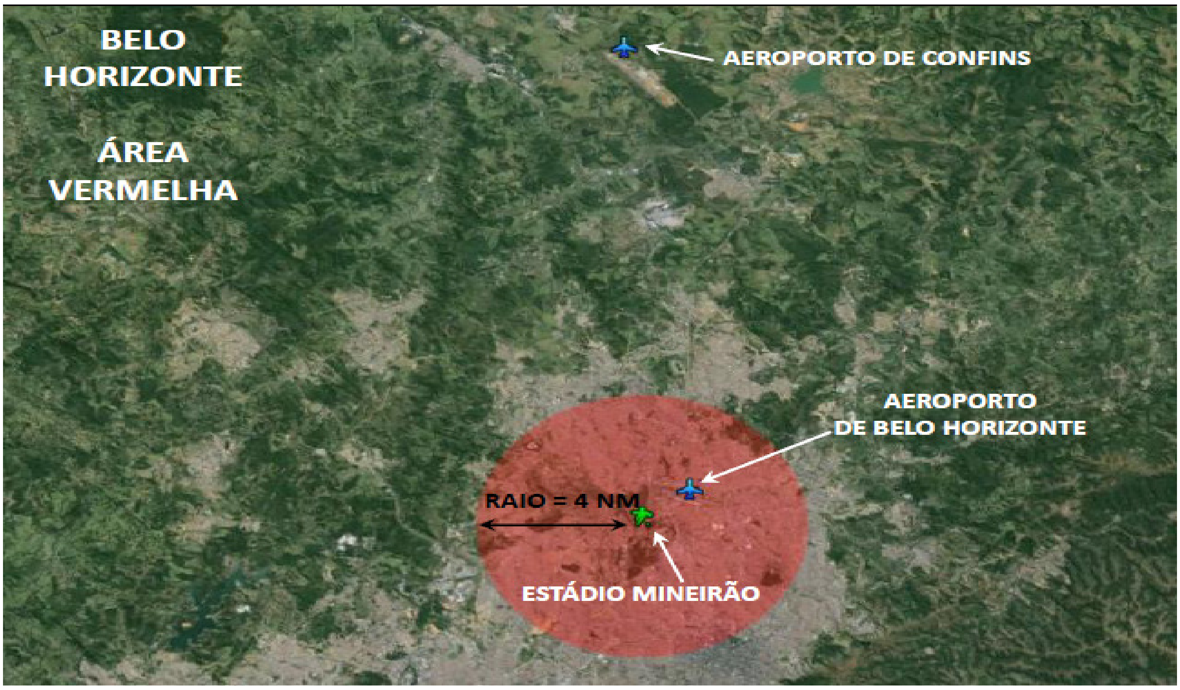
21° 08’ 38” S 043° 13’ 14” W.

DAYS AND TIMETABLES

14/Jun/2014 (1 p.m. local time) – from 12 noon local time until 4 p.m. local time;
17/Jun/2014 (1 p.m. local time) – from 12 noon local time until 4 p.m. local time;
21/Jun/2014 (1 p.m. local time) – from 12 noon local time until 4 p.m. local time;
24/Jun/2014 (1 p.m. local time) – from 12 noon local time until 5 p.m. local time;
28/ Jun/2014 (1 p.m. local time) – from 12 noon local time until 4 p.m. local time, and
08/Jul/2014 (5 p.m. local time) – from 4 p.m. local time until 9 p.m. local time.

ÁREA PROIBIDA

Área denominada VERMELHA, dentro da ÁREA AMARELA, definida como um círculo com centro nas coordenadas 19°51'57"S 043°58'15"W, com 4 NM de raio e com volume de responsabilidade sobreposto da superfície até o FL 145.



ÁREA ACAV

Área definida do FL 210 até o FL 240, formada por um polígono com as seguintes coordenadas geográficas:

20° 33’ 24” S 043° 30’ 20” W;

20° 08’ 00” S 042° 57’ 42” W;

20° 19’ 30” S 042° 01’ 47” W; e

21º 08’ 38” S 043º 13’ 14” W.

ÁREA AREVO

Área definida do FL 150 até o FL 200, formada por um polígono com as seguintes coordenadas geográficas:

20° 33’ 24” S 043° 30’ 20” W;

20° 08’ 00” S 042° 57’ 42” W;

20° 19’ 30” S 042° 01’ 47” W; e

21° 08’ 38” S 043° 13’ 14” W.

DIAS E HORÁRIOS

Dia 14/06/2014 (13h local) – início às 12h local e término às 16h local;
Dia 17/06/2014 (13h local) – início às 12h local e término às 16h local;
Dia 21/06/2014 (13h local) – início às 12h local e término às 16h local;
Dia 24/06/2014 (13h local) – início às 12h local e término às 16h local;
Dia 28/06/2014 (13h local) – início às 12h local e término às 17h local; e.
Dia 08/07/2014 (17h local) – início às 16h local e término às 21h local.

LANDING AND TAKEOFF OPERATIONS

The landing and takeoff operations at the aerodromes of the host cities may be under operational restriction during the days and period of restricted areas activation. The aerodrome traffic is back to regular operation just after the end of areas activation.

Below are the operational constraints on landing and takeoff operations:

a) Prohibited landing on any runways of Pampulha Airport, and

b) Authorized takeoff operations from runway 13 of Pampulha Airport, with no turn towards the Stadium side, until leaving the YELLOW area.

AIRCRAFT SPECIAL ROUTES.

a) Temporary suspension of REA K, from gate FLORES until JUATUBA position;

b) Temporary suspension of REA H, from gate NOVA LIMA until ITABIRITO position; and

c) Temporary suspension of REA SARZEDO.

OPERAÇÕES DE POUSOS E DECOLAGENS

Nos dias e períodos de ativação das áreas restritas, as operações de pouso e decolagem nos aeródromos das cidades-sede poderão sofrer restrições operacionais. Após o termino da ativação das áreas, o uso do aeródromo volta a sua normalidade.

Seguem abaixo as restrições operacionais nas operações de pouso e decolagem:

a) Proibido as operações de pouso em todas as pistas do Aeroporto de Pampulha; e

b) Autorizado as operações de decolagem na pista 13 Aeroporto de Pampulha, sem efetuar curva para o lado do estádio, até sair da área AMARELA.

ROTA ESPECIAL DE AERONAVES

a) Suspensão temporária da REA K, do portão FLORES até a posição JUATUBA;

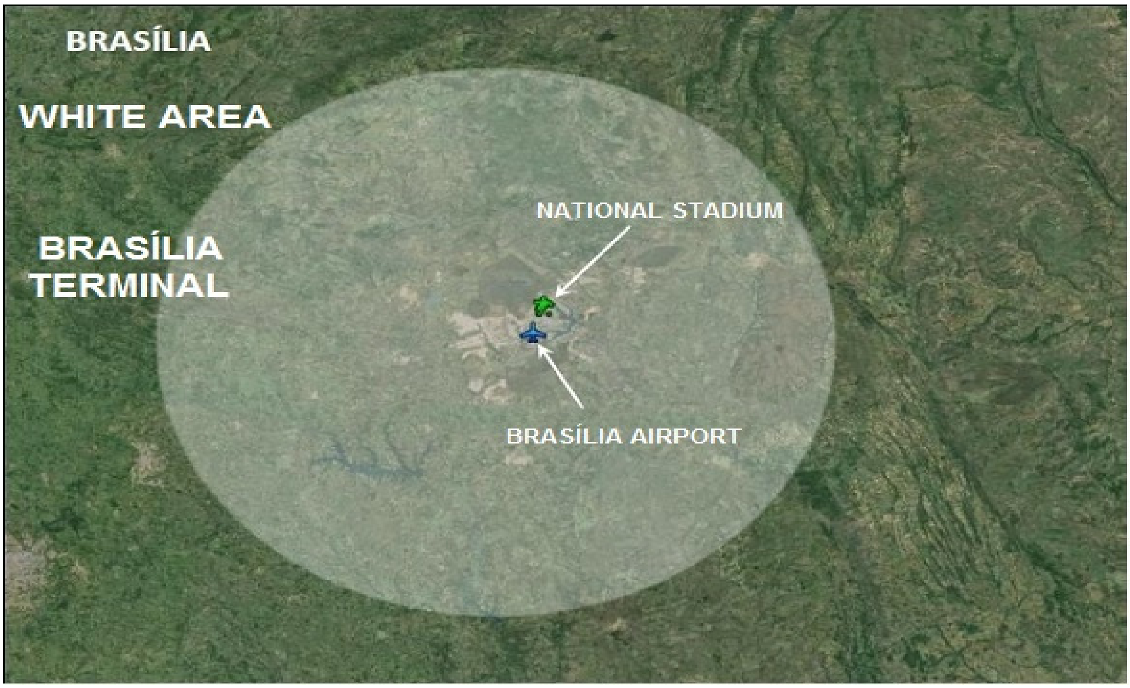
b) Suspensão temporária da REA H, do portão NOVA LIMA até a posição ITABIRITO; e

c) Suspensão temporária da REA SARZEDO.

ATTACHMENT B - BRASÍLIA

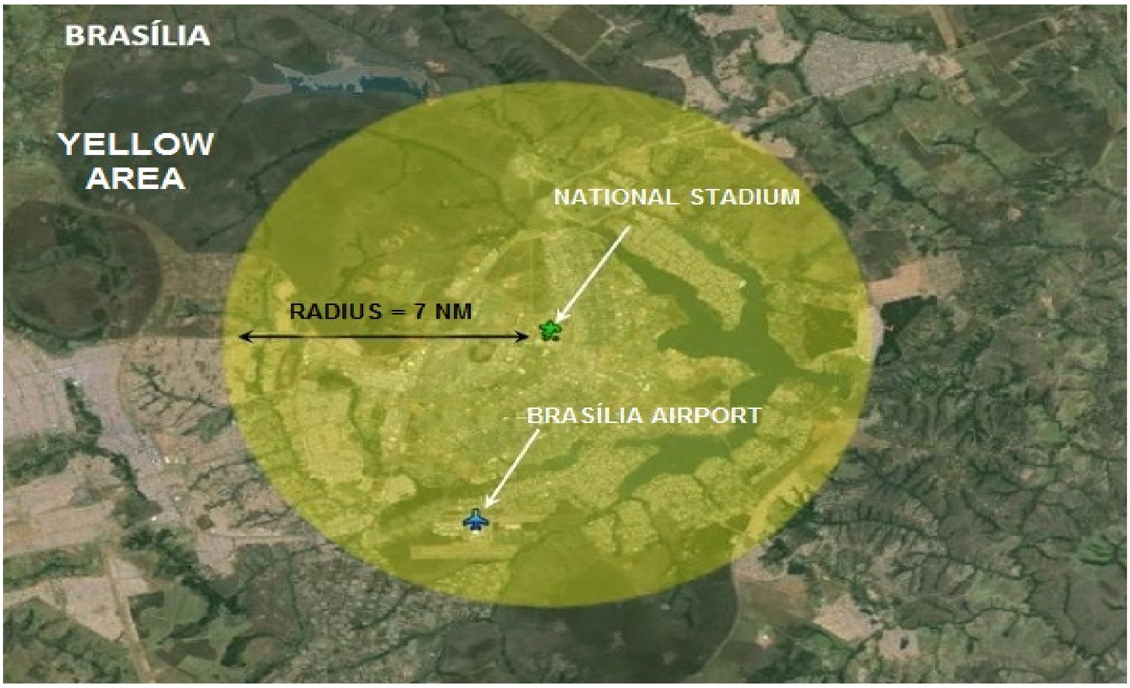
RESERVED AREA

Area named WHITE, defined by the lateral projections of Brasília TMA and vertical limits from the surface to FL 145.



RESTRICTED AREA

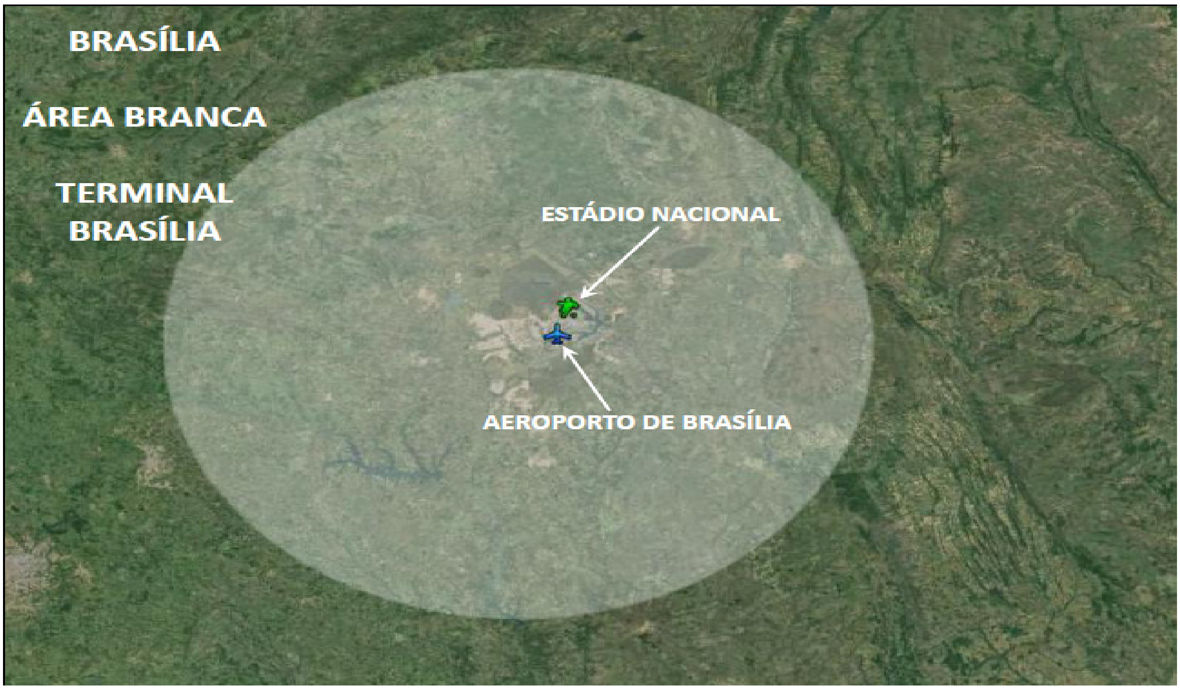
Area named YELLOW, inside the WHITE area, defined as a circle centered on the coordinates 15°47'01"S 047°53'57"W, with 7-NM radius and with responsibility volume superposed from the surface up to FL 145.



ANEXO B – BRASÍLIA

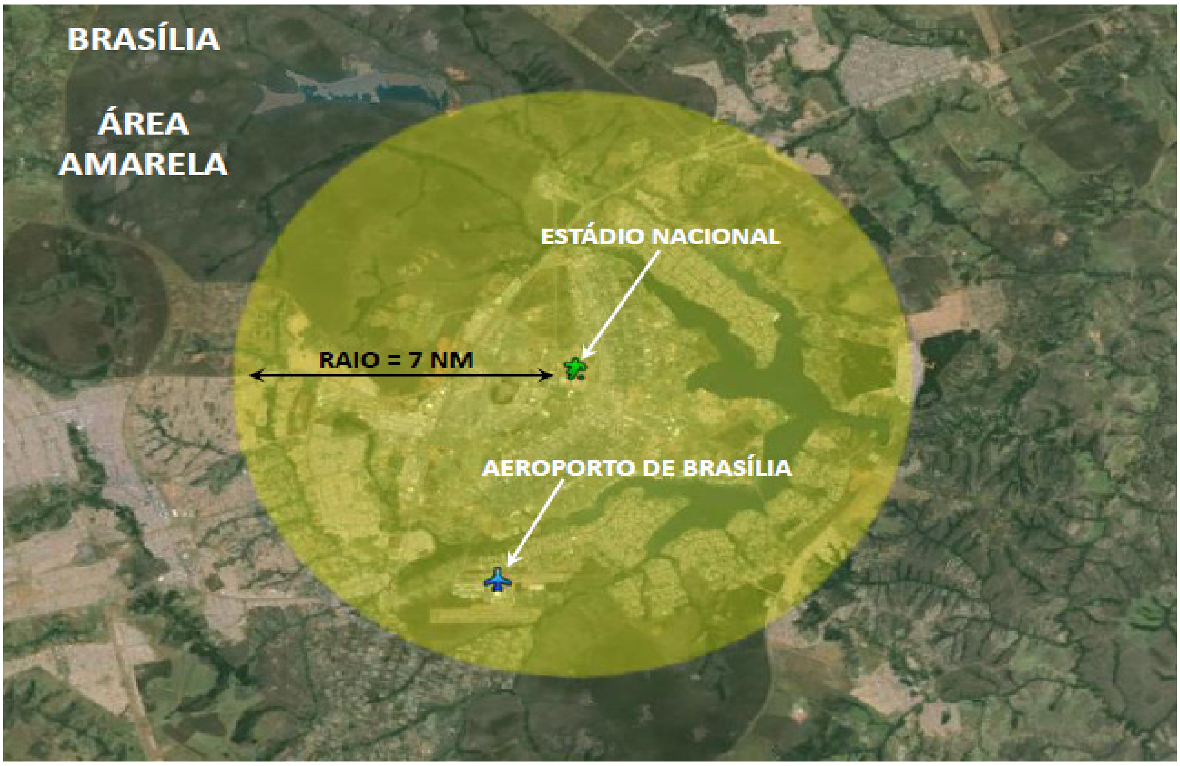
ÁREA RESERVADA

Área denominada BRANCA, definida pelas projeções laterais da TMA Brasília e limites verticais da superfície ao FL 145.



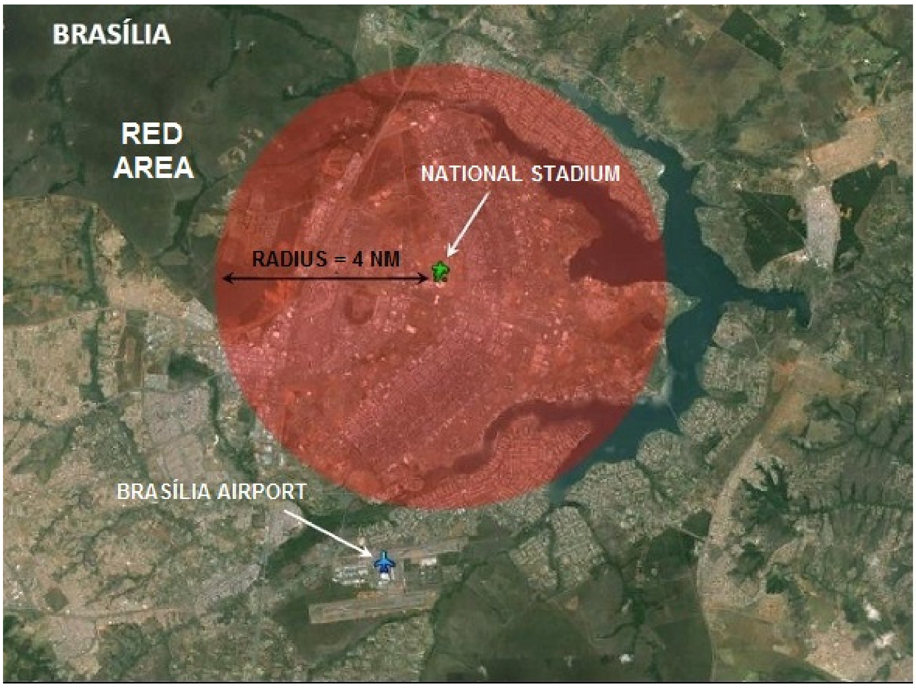
ÁREA RESTRITA

Área denominada AMARELA, dentro da área BRANCA, definida como um círculo com centro nas coordenadas 15°47'01"S 047°53'57"W, com 7 NM de raio e com volume de responsabilidade sobreposto da superfície até o FL 145.



PROHIBITED AREA

Area named RED, inside the YELLOW AREA, defined as a circle centered on the coordinates 15°47'01"S 047°53'57"W, with 4-NM radius and with responsibility volume superposed from the surface up to FL 145.



ACAV AREA

Defined area from FL 210 until FL 240, formed by a polygon with the following geographic coordinates:

15° 06’ 00” S 049° 17’ 00” W;

15° 25’ 00” S 048° 44’ 00” W;

16° 30’ 00” S 049° 18’ 00” W; and

16° 12’ 00” S 049° 57’ 00” W.

AREVO AREA

Defined area from FL 150 until FL 200, formed by a polygon with the following geographic coordinates:

15º 06’ 00” S 049º 17’ 00” W;

15º 25’ 00” S 048º 44’ 00” W;

16º 30’ 00” S 049º 18’ 00” W; and

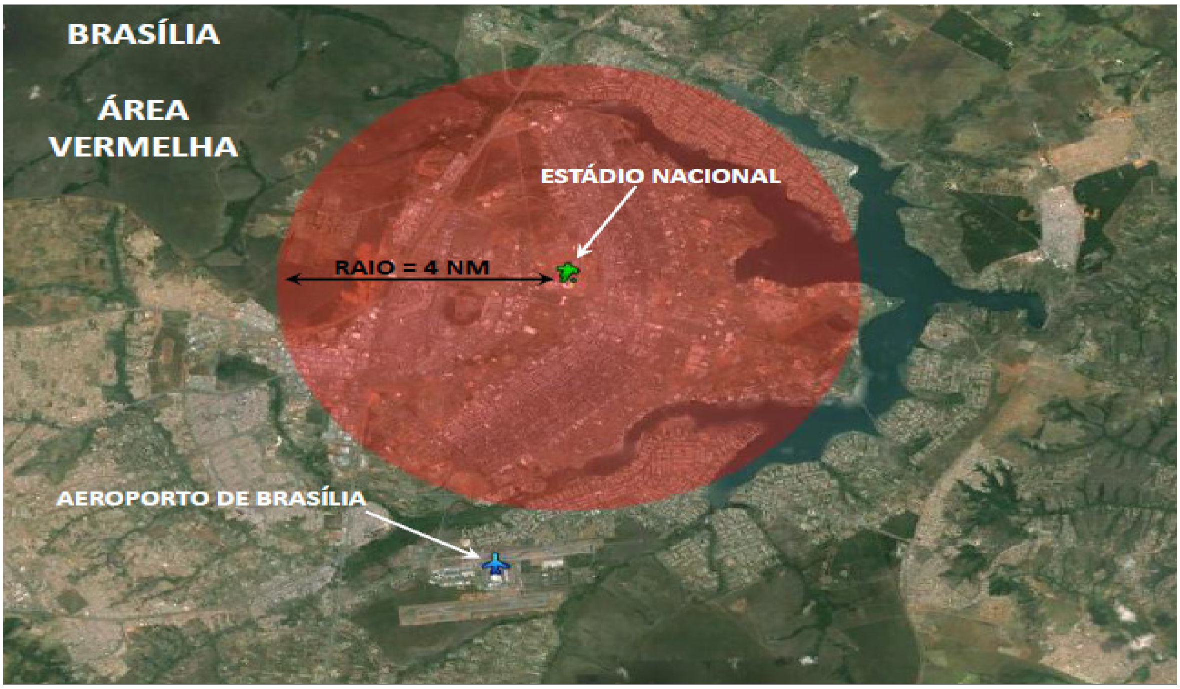
16º 12’ 00” S 049º 57’ 00” W.

DAYS AND TIMETABLE

15/ Jun/2014 (1 p.m. local time) - from 12 noon local time until 4 p.m. local time;
19/Jun/2014 (1 p.m. local time) - from 12 noon local time until 4 p.m. local time;
23/Jun/2014 (5 p.m. local time) - from 4 p.m. local time until 8 p.m. local time;
26/Jun/2014 (1 p.m. local time) - from 12 noon local time until 4 p.m. local time;
30/Jun/2014 (1 p.m. local time) - from 12 noon local time until 5 p.m. local time;
05/Jul/2014 (1 p.m. local time) - from 12 noon local time until 5 p.m. local time;
12/Jul/2014 (5 p.m. local time) - from 4 p.m. local time until 9 p.m. local time.

ÁREA PROIBIDA

Área denominada VERMELHA, dentro da ÁREA AMARELA, definida como um círculo com centro nas coordenadas 15°47'01"S 047°53'57"W, com 4 NM de raio e com volume de responsabilidade sobreposto da superfície até o FL 145.



ÁREA ACAV

Área definida do FL 210 até o FL 240, formada por um polígono com as seguintes coordenadas geográficas:

15° 06’ 00” S 049° 17’ 00” W;

15° 25’ 00” S 048° 44’ 00” W;

16° 30’ 00” S 049° 18’ 00” W; e

16° 12’ 00” S 049° 57’ 00” W.

ÁREA AREVO

Área definida do FL 150 até o FL 200, formada por um polígono com as seguintes coordenadas geográficas:

15º 06’ 00” S 049º 17’ 00” W;

15º 25’ 00” S 048º 44’ 00” W;

16º 30’ 00” S 049º 18’ 00” W; e

16º 12’ 00” S 049º 57’ 00” W.

DIAS E HORÁRIOS

Dia 15/06/2014 (13h local) – início às 12h local e término às 16h local;
Dia 19/06/2014 (13h local) – início às 12h local e término às 16h local;
Dia 23/06/2014 (17h local) – início às 16h local e término às 20h local;
Dia 26/06/2014 (13h local) – início às 12h local e término às 16h local;
Dia 30/06/2014 (13h local) – início às 12h local e término às 17h local;
Dia 05/07/2014 (13h local) – início às 12h local e término às 17h local; e
Dia 12/07/2014 (17h local) – início às 16h local e término às 21h local.

LANDING AND TAKEOFF OPERATIONS

The landing and takeoff operations at the aerodromes of the host cities may be under operational restriction during the days and period of restrict areas activation. The aerodrome traffic is back to regular operation just after the end of areas activation.

Below are the operational constraints on landing and takeoff operations:

a) No restraints for landing and takeoff operations on any runways of Brasilia International Airport.

OPERAÇÕES DE POUSOS E DECOLAGENS

Nos dias e períodos de ativação das áreas restritas, as operações de pouso e decolagem nos aeródromos das cidades-sede poderão sofrer restrições operacionais. Após o termino da ativação das áreas, o uso do aeródromo volta a sua normalidade.

Seguem abaixo as restrições operacionais nas operações de pouso e decolagem:

a) Sem restrições para as operações de pouso e decolagem em todas as pistas Aeroporto Internacional de Brasília.

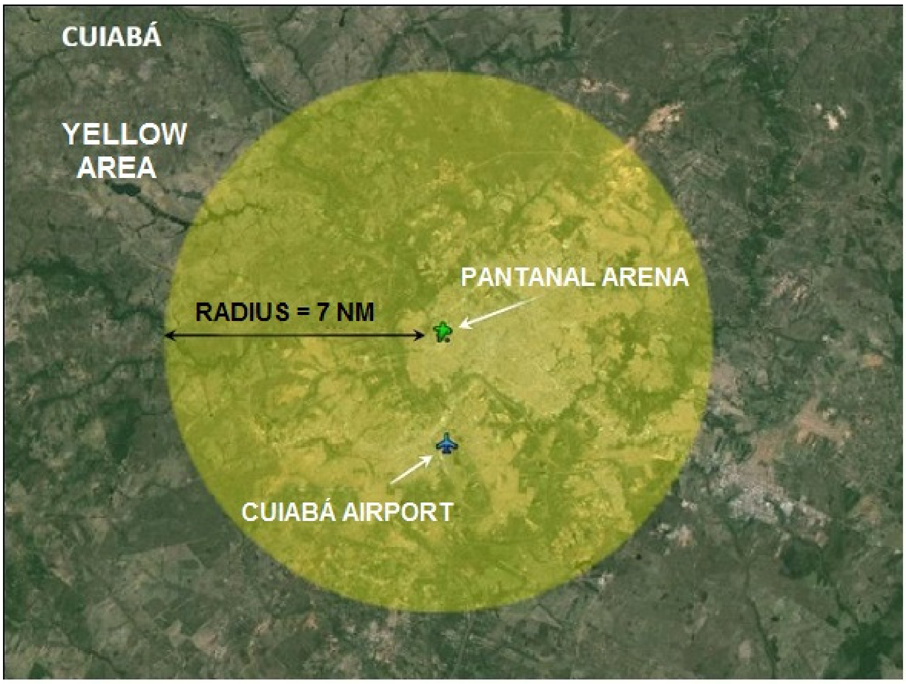
ATTACHMENT C - CUIABÁ

RESERVED AREA

Area named WHITE, defined by the lateral projections of Cuiabá TMA and vertical limits from the surface to FL 145.

RESTRICTED AREA

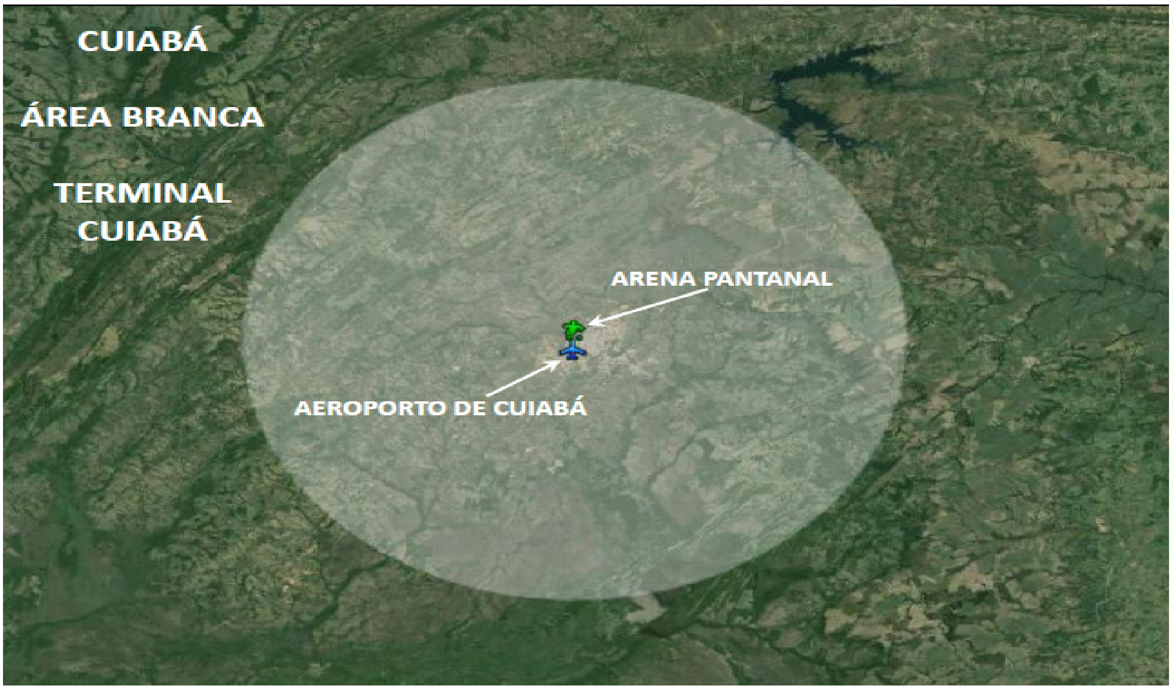
Area named YELLOW, inside the WHITE area, defined as a circle centered on the coordinates 15°36'11"S 056°07'14"W, with 7-NM radius and with responsibility volume superposed from the surface up to FL 145.



ANEXO C – CUIABÁ

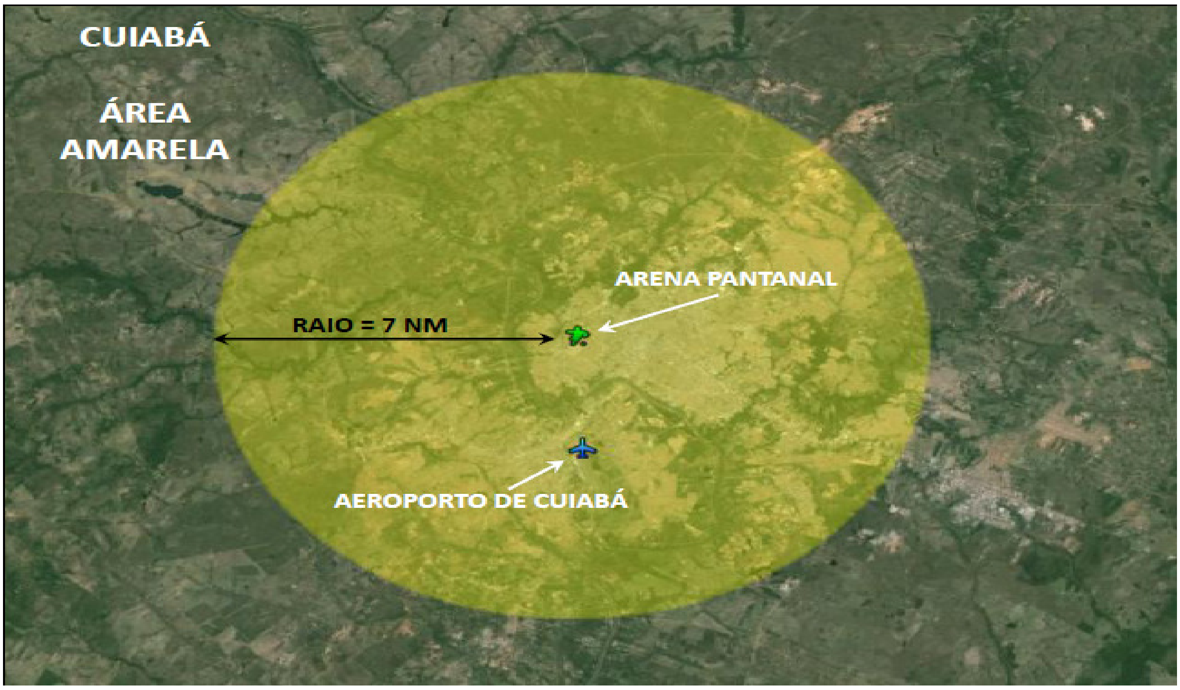
ÁREA RESERVADA

Área denominada BRANCA, definida pelas projeções laterais da TMA Cuiabá e limites verticais da superfície ao FL 145.



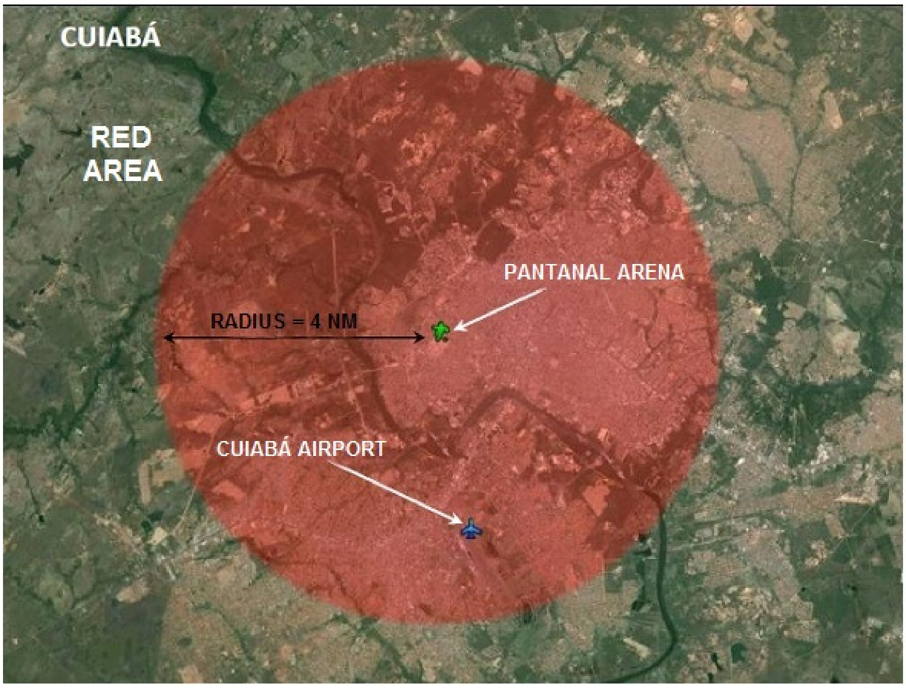
ÁREA RESTRITA

Área denominada AMARELA, dentro da área BRANCA, definida como um círculo com centro nas coordenadas 15°36'11"S 056°07'14"W, com 7 NM de raio e com volume de responsabilidade sobreposto da superfície até o FL 145.



PROHIBITED AREA

Area named RED, inside the YELLOW AREA, defined as a circle centered on the coordinates 15°36'11"S 056°07'14"W, with 4-NM radius and with responsibility volume superposed from the surface up to FL 145.



ACAV AREA

Defined area from FL 210 until FL 240, formed by a polygon with the following geographic coordinates:

14º 19’ 00” S 055º 39’ 00” W;

15º 17’ 00” S 054º 40’ 00” W;

15º 42’ 00” S 055º 03’ 00” W; and

14º 45’ 00” S 056º 02’ 00” W.

AREVO AREA

Defined area from FL 150 until FL 200, formed by a polygon with the following geographic coordinates:

14º 19’ 00” S 055º 39’ 00” W;

15º 17’ 00” S 054º 40’ 00” W;

15º 42’ 00” S 055º 03’ 00” W; and

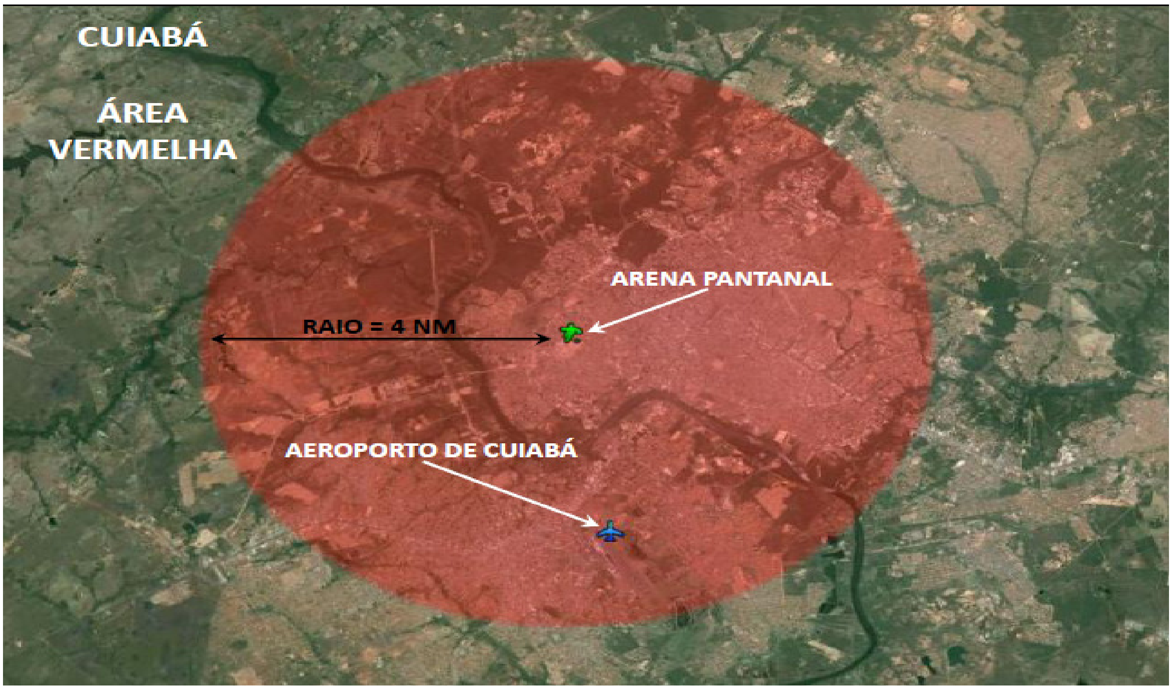
14º 45’ 00” S 056º 02’ 00” W.

DAYS AND TIMETABLE

13/Jun/2014 (6 p.m. local time) - from 5 p.m. local time until 9 p.m. local time;
17/Jun/2014 (6 p.m. local time) - from 5 p.m. local time until 9 p.m. local time;
21/Jun/2014 (6 p.m. local time) - from 5 p.m. local time until 9 p.m. local time;
24/Jun/2014 (4 p.m. local time) - from 3 p.m. local time until 7 p.m. local time.

ÁREA PROIBIDA

Área denominada VERMELHA, dentro da ÁREA AMARELA, definida como um círculo com centro nas coordenadas 15°36'11"S 056°07'14"W, com 4 NM de raio e com volume de responsabilidade sobreposto da superfície até o FL 145.



ÁREA ACAV

Área definida do FL 210 até o FL 240, formada por um polígono com as seguintes coordenadas geográficas:

14º 19’ 00” S 055º 39’ 00” W;

15º 17’ 00” S 054º 40’ 00” W;

15º 42’ 00” S 055º 03’ 00” W; e

14º 45’ 00” S 056º 02’ 00” W.

ÁREA AREVO

Área definida do FL 150 até o FL 200, formada por um polígono com as seguintes coordenadas geográficas:

14º 19’ 00” S 055º 39’ 00” W;

15º 17’ 00” S 054º 40’ 00” W;

15º 42’ 00” S 055º 03’ 00” W; e

14º 45’ 00” S 056º 02’ 00” W.

DIAS E HORÁRIOS

Dia 13/06/2014 (18h local) – início às 17h local e término às 21h local;
Dia 17/06/2014 (18h local) – início às 17h local e término às 21h local;
Dia 21/06/2014 (18h local) – início às 17h local e término às 21h local; e
Dia 24/06/2014 (16h local) – início às 15h local e término às 19h local.

LANDING AND TAKEOFF OPERATIONS

The landing and takeoff operations at the aerodromes of the host cities may be under operational restriction during the days and period of restrict areas activation. The aerodrome traffic is back to regular operation just after the end of areas activation.

Below are the operational constraints on landing and takeoff operations:

a) Prohibited landing on all runways of Cuiabá International Airport; and

b) Authorized takeoff operations from runway 17 of Cuiabá International Airport.

OPERAÇÕES DE POUSOS E DECOLAGENS

Nos dias e períodos de ativação das áreas restritas, as operações de pouso e decolagem nos aeródromos das cidades-sede poderão sofrer restrições operacionais. Após o termino da ativação das áreas, o uso do aeródromo volta a sua normalidade.

Seguem abaixo as restrições operacionais nas operações de pouso e decolagem:

a) Proibido as operações de pouso em todas as pistas do Aeroporto Internacional de Cuiabá; e
b) Autorizado as operações de decolagem na pista 17 do Aeroporto Internacional de Cuiabá.

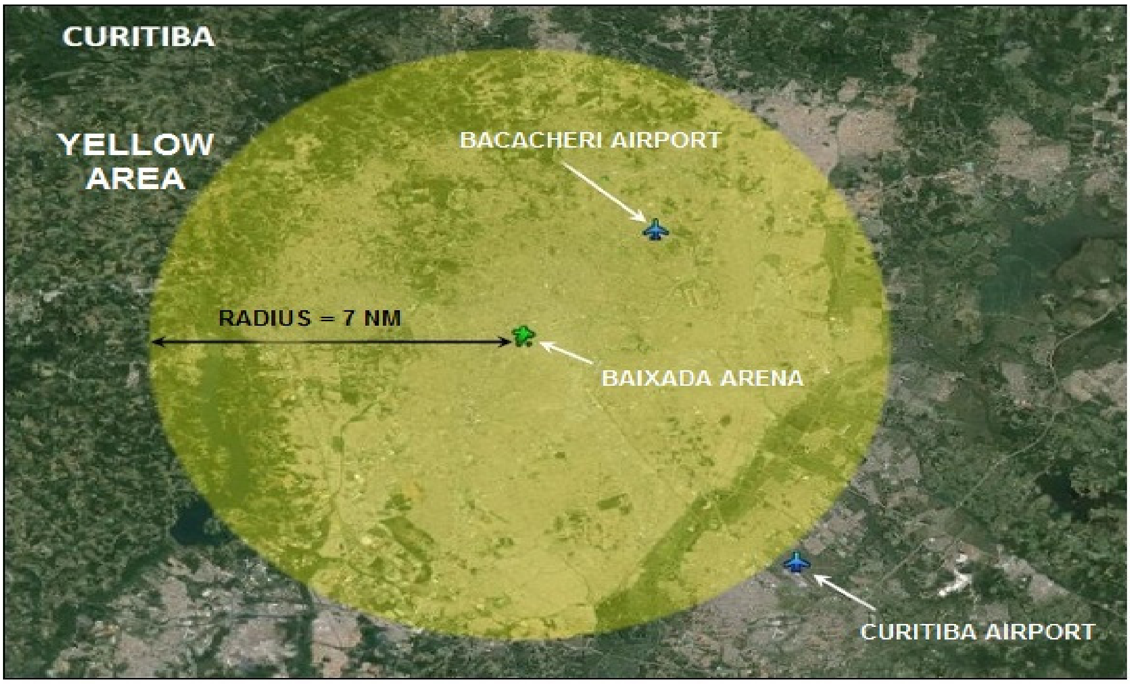
ATTACHMENT D - CURITIBA

RESERVED AREA

Area named WHITE, defined by the lateral projections of Curitiba TMA and vertical limits from the surface to FL 145.

RESTRICTED AREA

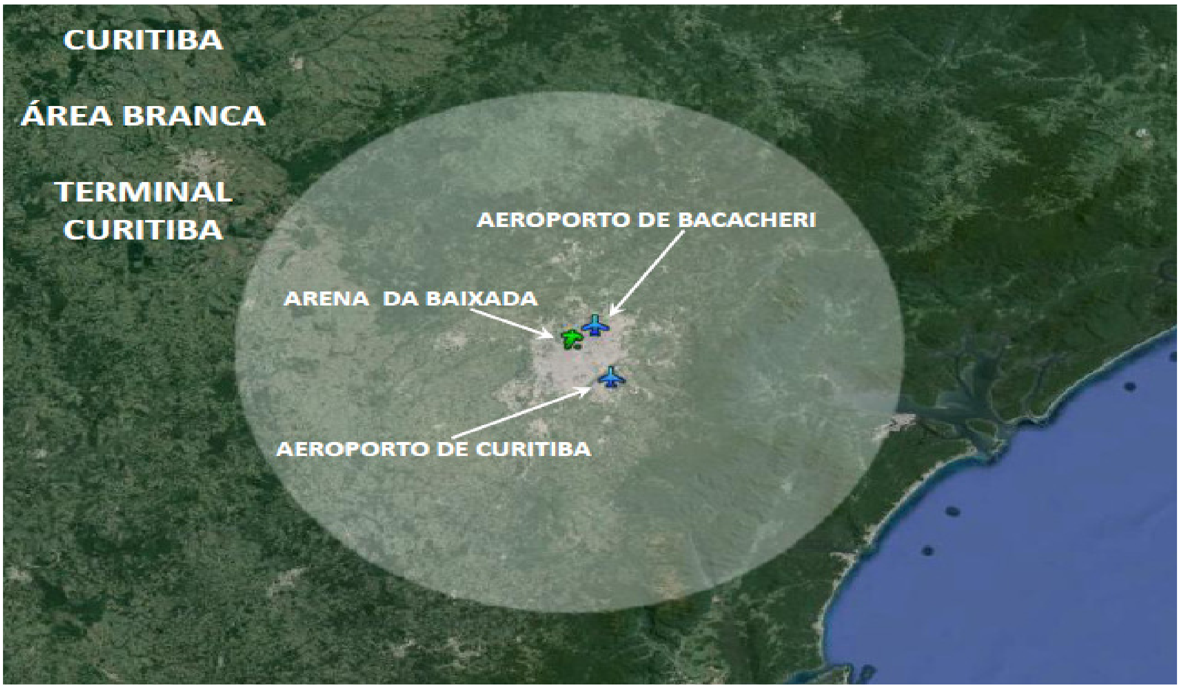
Area named YELLOW, inside the WHITE area, defined as a circle centered on the coordinates 25°26'54"S 049°16'37"W, with 7-NM radius and with responsibility volume superposed from the surface up to FL 145.



ANEXO D – CURITIBA

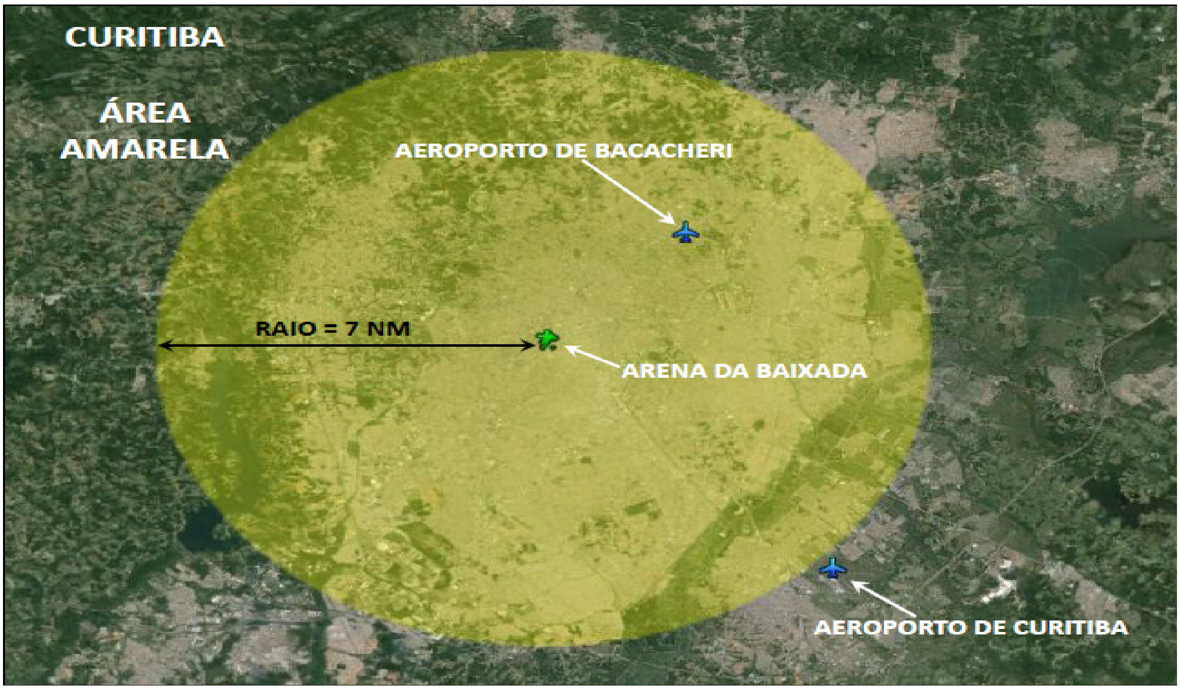
ÁREA RESERVADA

Área denominada BRANCA, definida pelas projeções laterais da TMA Curitiba e limites verticais da superfície ao FL 145.



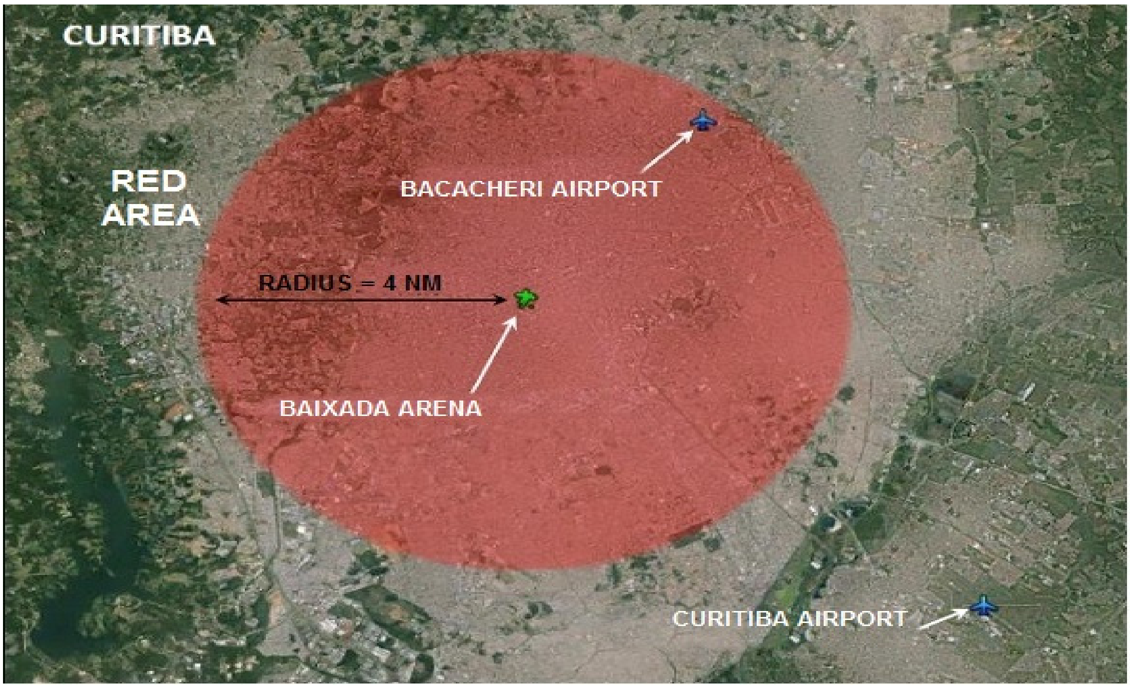
ÁREA RESTRITA

Área denominada AMARELA, dentro da área BRANCA, definida como um círculo com centro nas coordenadas 25°26'54"S 049°16'37"W, com 7 NM de raio e com volume de responsabilidade sobreposto da superfície até o FL 145.



PROHIBITED AREA

Area named RED, inside the YELLOW AREA, defined as a circle centered on the coordinates 25°26'54"S 049°16'37"W, with 4-NM radius and with responsibility volume superposed from the surface up to FL 145.



ACAV AREA

Defined area from FL 180 until FL 220, formed by a polygon with the following geographic coordinates:

26° 19' 33" S 049° 27' 49" W;

26° 01' 07" S 048° 24' 47" W;

26° 29' 38" S 048° 14' 15" W; and

26° 47' 39" S 049° 18' 23" W.

AREVO AREA

Defined area from FL 150 until FL 170, formed by a polygon with the following geographic coordinates:

26° 19' 33" S 049° 27' 49" W;

26° 01' 07" S 048° 24' 47" W;

26° 29' 38" S 048° 14' 15" W; and

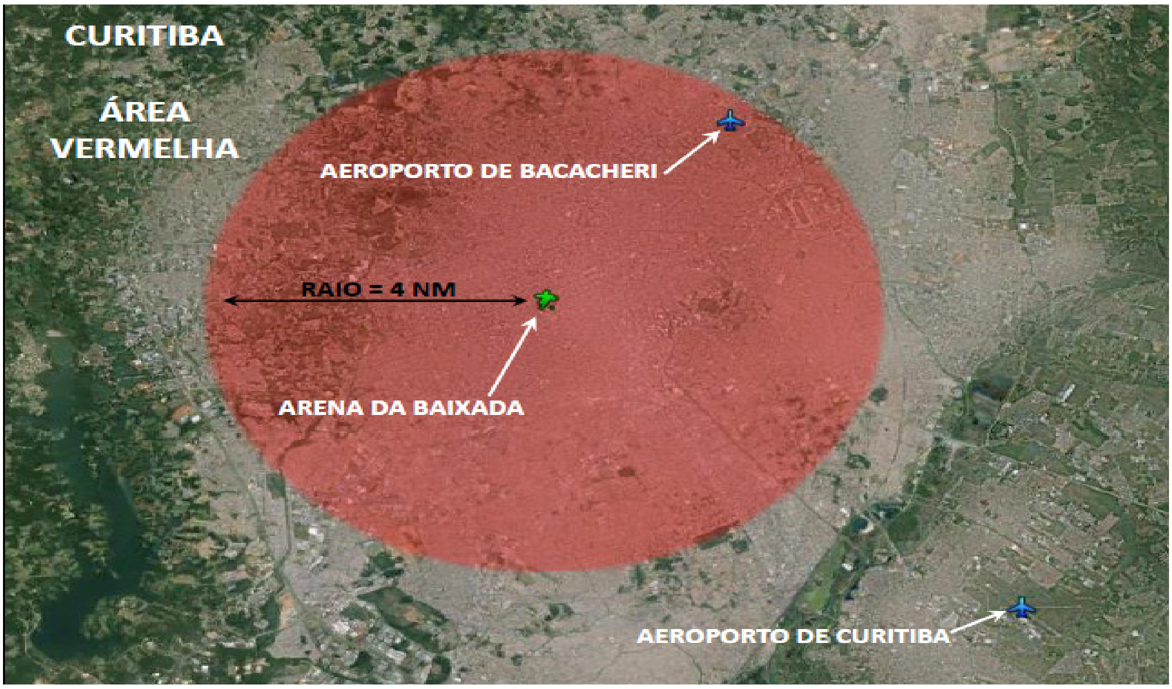
26° 47' 39" S 049° 18' 23" W.

DAYS AND TIMETABLE

16/Jun/2014 (4 p.m. local time) - from 3 p.m. local time until 7 p.m. local time;
20/Jun/2014 (7 p.m. local time) - from 6 p.m. local time until 10 p.m. local time;
23/Jun/2014 (1 p.m. local time) - from 12 noon local time until 4 p.m. local time;
26/Jun/2014 (5 p.m. local time) - from 4 p.m. local time until 8 p.m. local time.

ÁREA PROIBIDA

Área denominada VERMELHA, dentro da ÁREA AMARELA, definida como um círculo com centro nas coordenadas 25°26'54"S 049°16'37"W, com 4 NM de raio e com volume de responsabilidade sobreposto da superfície até o FL 145.



ÁREA ACAV

Área definida do FL 180 até o FL 220, formada por um polígono com as seguintes coordenadas geográficas:

26° 19' 33" S 049° 27' 49" W;

26° 01' 07" S 048° 24' 47" W;

26° 29' 38" S 048° 14' 15" W; e

26° 47' 39" S 049° 18' 23" W.

ÁREA AREVO

Área definida do FL 150 até o FL 170, formada por um polígono com as seguintes coordenadas geográficas:

26° 19' 33" S 049° 27' 49" W;

26° 01' 07" S 048° 24' 47" W;

26° 29' 38" S 048° 14' 15" W; e

26° 47' 39" S 049° 18' 23" W.

DIAS E HORÁRIOS

Dia 16/06/2014 (16h local) – início às 15h local e término às 19h local;
Dia 20/06/2014 (19h local) – início às 18h local e término às 22h local;
Dia 23/06/2014 (13h local) – início às 12h local e término às 16h local; e
Dia 26/06/2014 (17h local) – início às 16h local e término às 20h local.

LANDING AND TAKEOFF OPERATIONS

The landing and takeoff operations at the aerodromes of the host cities may be under operational restriction during the days and period of restrict areas activation. The aerodrome traffic is back to regular operation just after the end of areas activation.

Below are the operational constraints on landing and takeoff operations:

a) Prohibited landing operation on runways 15 and 33 of Curitiba International Airport;

b) Prohibited takeoff operations from runway 33 of Curitiba International Airport;

c) Authorized takeoff operations from runways 11, 15 and 29 of Curitiba International Airport; and

d) Authorized takeoff operations from runway 36 of Bacacheri Airport.

AIRCRAFT SPECIAL ROUTES

Temporary suspension of REA LITORAL;

Temporary suspension of REA VOÇOROCA;

Temporary suspension of REA CONTENDA

Temporary suspension of REA RIO VERDE;

Temporary suspension of REA CAMPO MAGRO;

Temporary suspension of REA RIO BRANCO;

Temporary suspension of REA ITARETAMA;

Temporary suspension of REA TUNAS;

Temporary suspension of REA COLOMBO;

Temporary suspension of REA MARUMBI;

Temporary suspension of REA REPRESA;

Temporary suspension of REA SERRA DO MAR;

Temporary suspension of REA PEDÁGIO;

Temporary suspension of REA PIRAQUARA; e

Temporary suspension of REA TAMANDARÉ.

SPECIAL ROUTE FOR AIRCRAFT WITHOUT TRANSPONDER

Temporary suspension of all special routes for aircraft without transponder.

OPERAÇÕES DE POUSOS E DECOLAGENS

Nos dias e períodos de ativação das áreas restritas, as operações de pouso e decolagem nos aeródromos das cidades-sede poderão sofrer restrições operacionais. Após o termino da ativação das áreas, o uso do aeródromo volta a sua normalidade.

Seguem abaixo as restrições operacionais nas operações de pouso e decolagem:

a) Proibido as operações de pouso nas pistas 15 e 33 do Aeroporto Internacional de Curitiba;
b) Proibido as operações de decolagem na pista 33 do Aeroporto Internacional de Curitiba;
c) Autorizado as operações de decolagem nas pistas 11, 15 e 29 do Aeroporto Internacional de Curitiba; e
d) Autorizado as operações de decolagem na pista 36 do Aeroporto de Bacacheri.

ROTA ESPECIAL DE AERONAVES

Suspensão Temporária da REA LITORAL;

Suspensão Temporária da REA VOÇOROCA;

Suspensão Temporária da REA CONTENDA;

Suspensão Temporária da REA RIO VERDE;

Suspensão Temporária da REA CAMPO MAGRO;

Suspensão Temporária da REA RIO BRANCO;

Suspensão Temporária da REA ITARETAMA;

Suspensão Temporária da REA TUNAS;

Suspensão Temporária da REA COLOMBO;

Suspensão Temporária da REA MARUMBI;

Suspensão Temporária da REA REPRESA;

Suspensão Temporária da REA SERRA DO MAR;

Suspensão Temporária da REA PEDÁGIO;

Suspensão Temporária da REA PIRAQUARA; e

Suspensão Temporária da REA TAMANDARÉ.

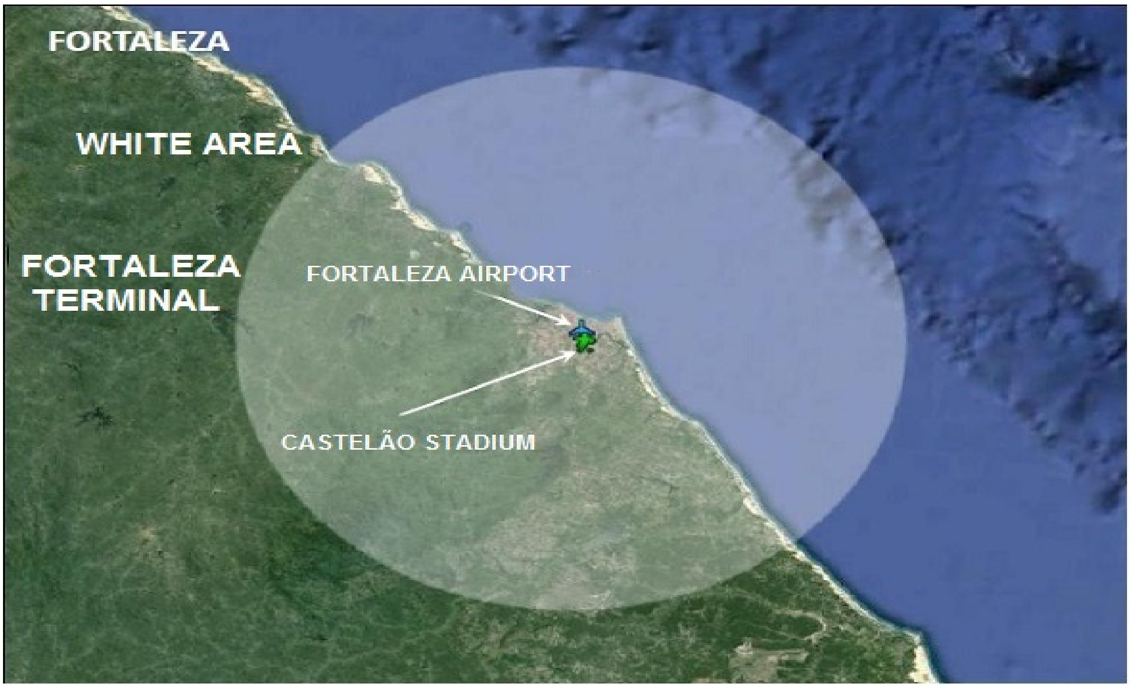
ROTA ESPECIAL PARA AERONAVES SEM TRANSPONDER

Suspensão temporária de todas as rotas especiais para aeronaves sem transponder.

ATTACHMENT E - FORTALEZA

RESERVED AREA

Area named WHITE, defined by the lateral projections of Fortaleza TMA and vertical limits from the surface to FL 145.



RESTRICTED AREA

Area named YELLOW, inside the WHITE area, defined as a circle centered on the coordinates 03°48'25"S 038°31'19"W, with 7-NM radius and with responsibility volume superposed from the surface up to FL 145.

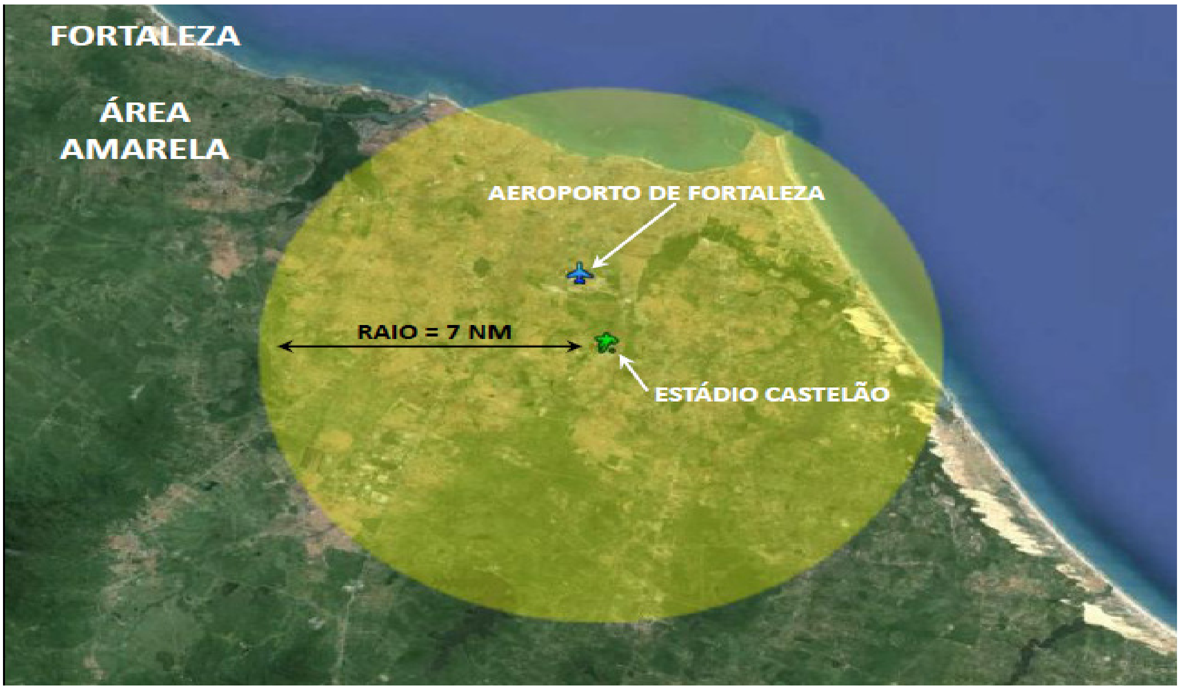
ANEXO E – FORTALEZA

ÁREA RESERVADA

Área denominada BRANCA, definida pelas projeções laterais da TMA Fortaleza e limites verticais da superfície ao FL 145.

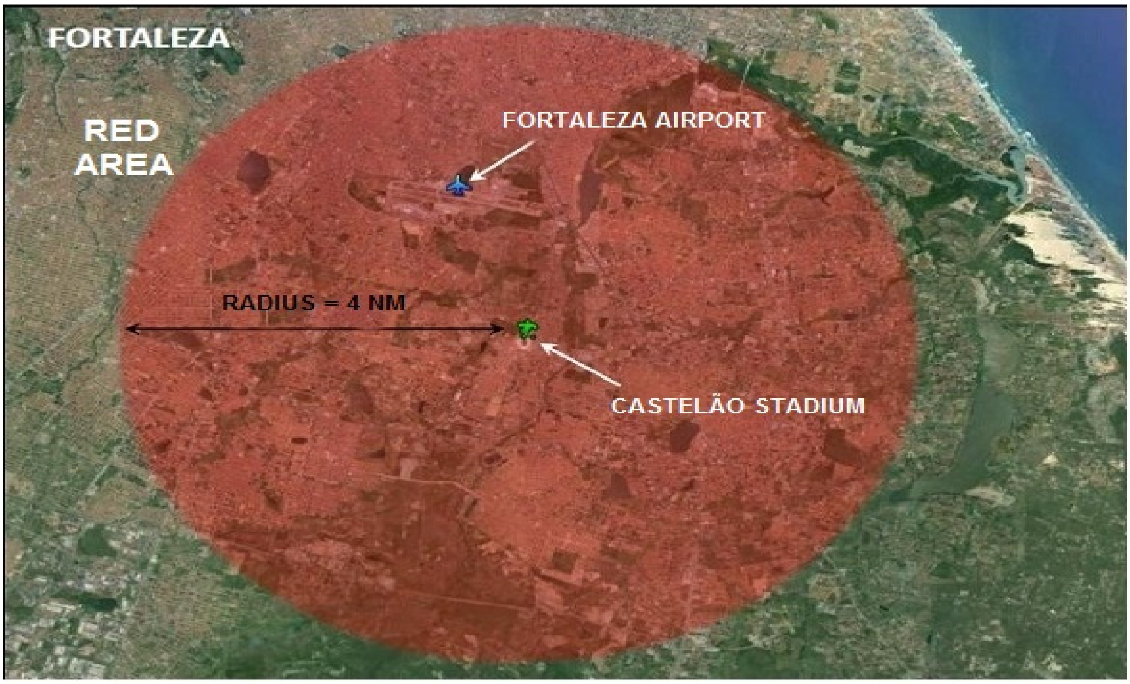
ÁREA RESTRITA

Área denominada AMARELA, dentro da área BRANCA, definida como um círculo com centro nas coordenadas 03°48'25"S 038°31'19"W, com 7 NM de raio e com volume de responsabilidade sobreposto da superfície até o FL 145.



PROHIBITED AREA

Area named RED, inside the YELLOW AREA, defined as a circle centered on the coordinates 03°48'25"S 038°31'19"W, with 4-NM radius and with responsibility volume superposed from the surface up to FL 145.



ACAV AREA

Defined area from FL 180 until FL 220, formed by a polygon with the following geographic coordinates:

03° 00’ 35” S 039° 34’ 10” W;

03° 25’ 01” S 039° 21’ 14” W;

02° 50’ 22” S 038° 13’ 22” W; and

02° 26’ 24” S 038° 22’ 58” W.

AREVO AREA

Defined area from FL 150 until FL 170, formed by a polygon with the following geographic coordinates:

03° 00’ 35” S / 039° 34’ 10” W;

03° 25’ 01” S / 039° 21’ 14” W;

02° 50’ 22” S / 038° 13’ 22” W; e

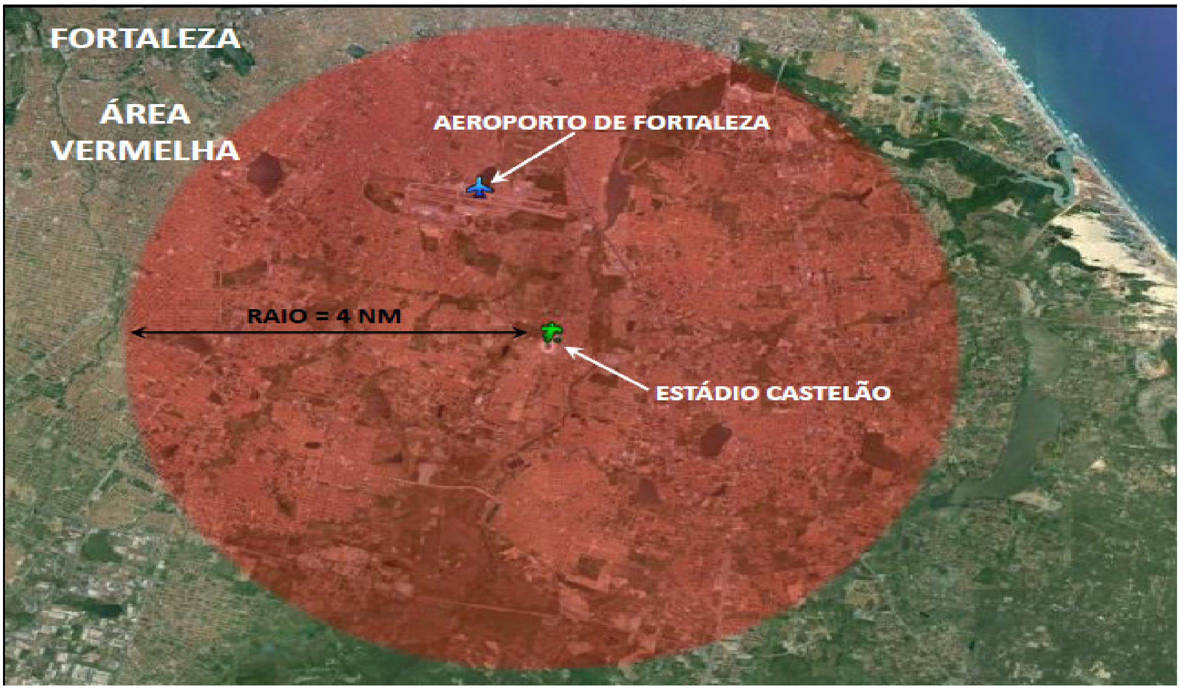
02° 26’ 24” S / 038° 22’ 58” W.

DAYS AND TIMETABLE

14/Jun2/014 (4 p.m. local time) - from 3 p.m. local time until 7 p.m. local time;
17/Jun/2014 (4 p.m. local time) - from 3 p.m. local time until 7 p.m. local time;
21/Jun/2014 (4 p.m. local time) - from 3 p.m. local time until 7 p.m. local time;
24/Jun/2014 (5 p.m. local time) - from 4 p.m. local time until 8 p.m. local time;
29/Jun/2014 (1 p.m. local time) - from 12 noon local time until 5 p.m. local time;
04/Jul/2014 (5 p.m. local time) - from 4 p.m. local time until 9 p.m. local time.

ÁREA PROIBIDA

Área denominada VERMELHA, dentro da ÁREA AMARELA, definida como um círculo com centro nas coordenadas 03°48'25"S 038°31'19"W, com 4 NM de raio e com volume de responsabilidade sobreposto da superfície até o FL 145.



ÁREA ACAV

Área definida do FL 180 até o FL 220, formada por um polígono com as seguintes coordenadas geográficas:

03° 00’ 35” S 039° 34’ 10” W;

03° 25’ 01” S 039° 21’ 14” W;

02° 50’ 22” S 038° 13’ 22” W; e

02° 26’ 24” S 038° 22’ 58” W.

ÁREA AREVO

Área definida do FL 150 até o FL 170, formada por um polígono com as seguintes coordenadas geográficas:

03° 00’ 35” S / 039° 34’ 10” W;

03° 25’ 01” S / 039° 21’ 14” W;

02° 50’ 22” S / 038° 13’ 22” W; e

02° 26’ 24” S / 038° 22’ 58” W.

DIAS E HORÁRIOS

Dia 14/06/2014 (16h local) – início às 15h local e término às 19h local;
Dia 17/06/2014 (16h local) – início às 15h local e término às 19h local;
Dia 21/06/2014 (16h local) – início às 15h local e término às 19h local;
Dia 24/06/2014 (17h local) – início às 16h local e término às 20h local;
Dia 29/06/2014 (13h local) – início às 12h local e término às 17h local; e
Dia 04/07/2014 (17h local) – início às 16h local e término às 21h local.

LANDING AND TAKEOFF OPERATIONS

The landing and takeoff operations at the aerodromes of the host cities may be under operational restriction during the days and period of restrict areas activation. The aerodrome traffic is back to regular operation just after the end of areas activation.

Below are the operational constraints on landing and takeoff operations:

a) Prohibited landing operation on any runways of Fortaleza International Airport; and

b) Authorized takeoff operations from all runways of Fortaleza International Airport, though it is not authorized to make a turn towards the Stadium side, until leaving the YELLOW area.

SPECIAL ROUTE FOR AIRCRAFT WITHOUT TRANSPONDER

Temporary suspension of all special routes for aircraft without transponder.

OPERAÇÕES DE POUSOS E DECOLAGENS

Nos dias e períodos de ativação das áreas restritas, as operações de pouso e decolagem nos aeródromos das cidades-sede poderão sofrer restrições operacionais. Após o termino da ativação das áreas, o uso do aeródromo volta a sua normalidade.

Seguem abaixo as restrições operacionais nas operações de pouso e decolagem:

a) Proibido as operações de pouso em todas as pistas do Aeroporto Internacional de Fortaleza; e
b) Autorizado as operações de decolagem de todas as pistas do Aeroporto Internacional de Fortaleza, sem efetuar curva para o lado do estádio, até sair da área AMARELA.

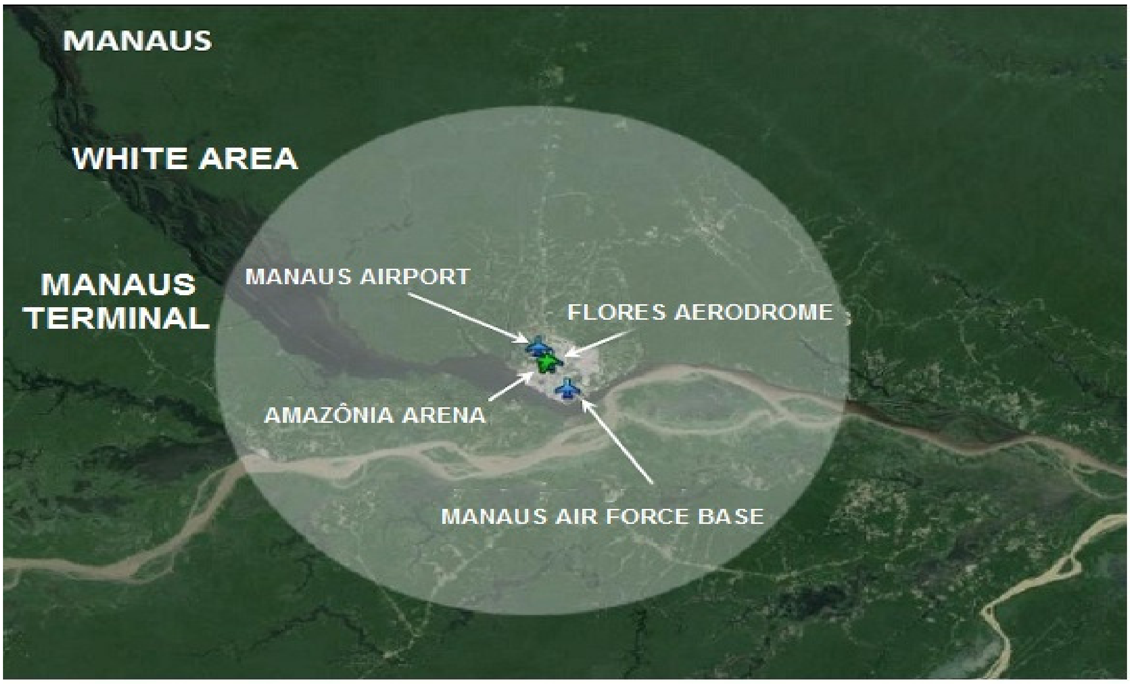
ROTA ESPECIAL PARA AERONAVES SEM TRANSPONDER

Suspensão temporária de todas as rotas especiais para aeronaves sem transponder.

ATTACHMENT F - MANAUS

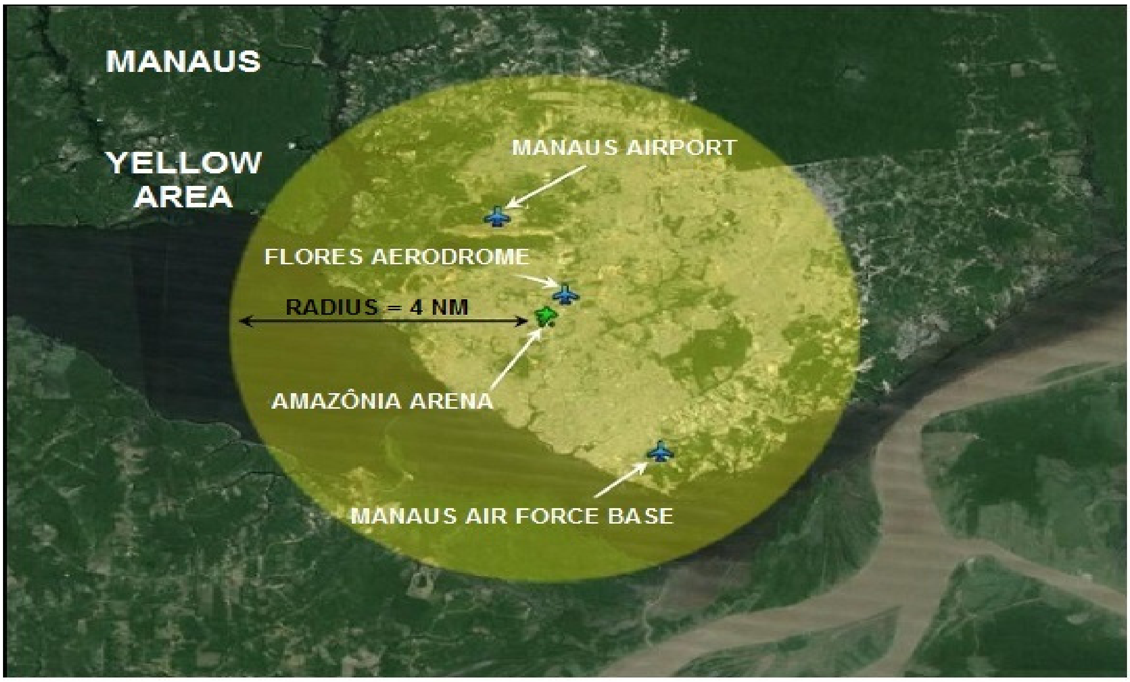
RESERVED AREA

Area named WHITE, defined by the lateral projections of Manaus TMA and vertical limits from the surface to FL 145.



RESTRICTED AREA

Area named YELLOW, inside the WHITE area, defined as a circle centered on the coordinates 03°04'58.02"S 060°01'39.76"W, with 7-NM radius and with responsibility volume superposed from the surface up to FL 145.



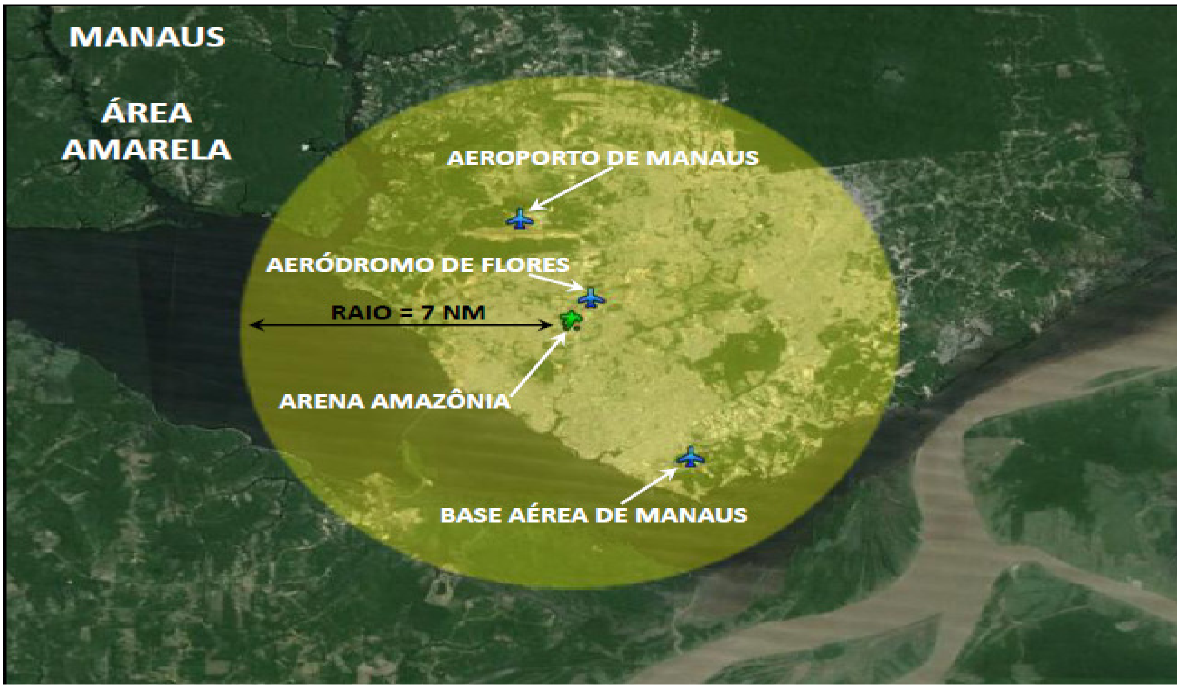
ANEXO F – MANAUS

ÁREA RESERVADA

Área denominada BRANCA, definida pelas projeções laterais da TMA Manaus e limites verticais da superfície ao FL 145.

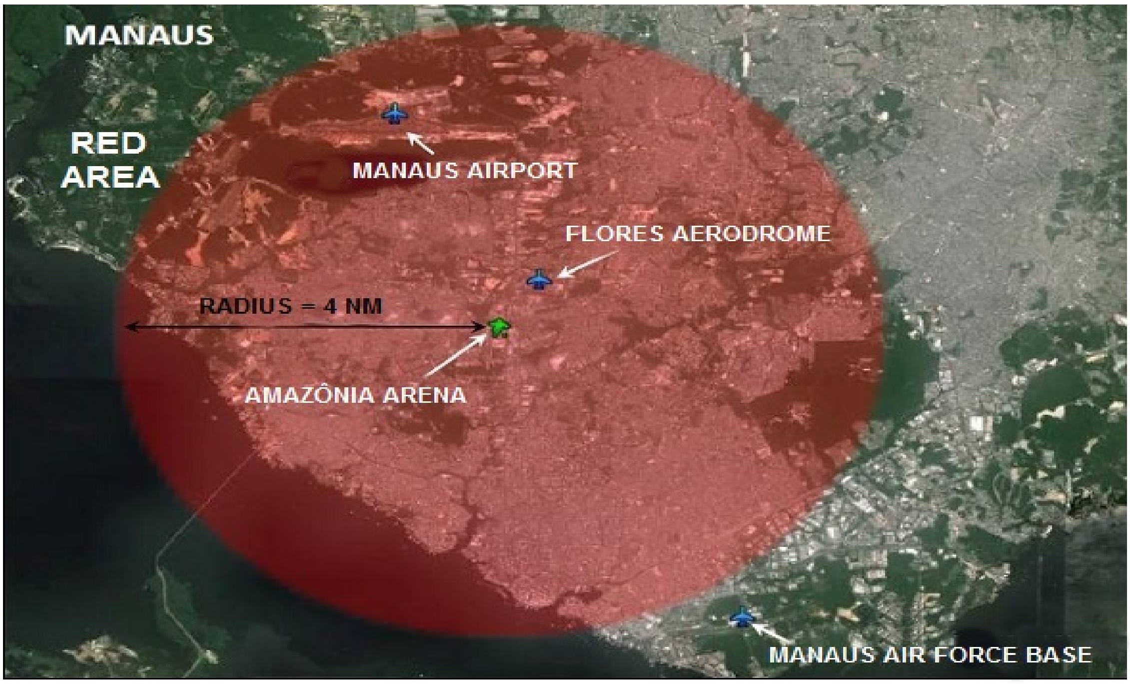
ÁREA RESTRITA

Área denominada AMARELA, dentro da área BRANCA, definida como um círculo com centro nas coordenadas 03°04'58.02"S 060°01'39.76"W, com 7 NM de raio e com volume de responsabilidade sobreposto da superfície até o FL 145.



PROHIBITED AREA

Area named RED, inside the YELLOW AREA, defined as a circle centered on the coordinates 03°04'58.02"S 060°01'39.76"W, with 4-NM radius and with responsibility volume superposed from the surface up to FL 145.



ACAV AREA

Defined area from FL 200 until FL 240, formed by a polygon with the following geographic coordinates:

01° 33’ 21” S 059° 41’ 10” W;

02° 00’ 15” S 060° 11’ 17” W;

02° 55’ 15” S 059° 11’ 54” W; and

02° 29’ 49” S 058° 48’ 42” W.

AREVO AREA

Defined are from FL 150 until FL 190, formed by a polygon with the following geographic coordinates:

01° 33’ 21” S 059° 41’ 10” W;

02° 00’ 15” S 060° 11’ 17” W;

02° 55’ 15” S 059° 11’ 54” W; and

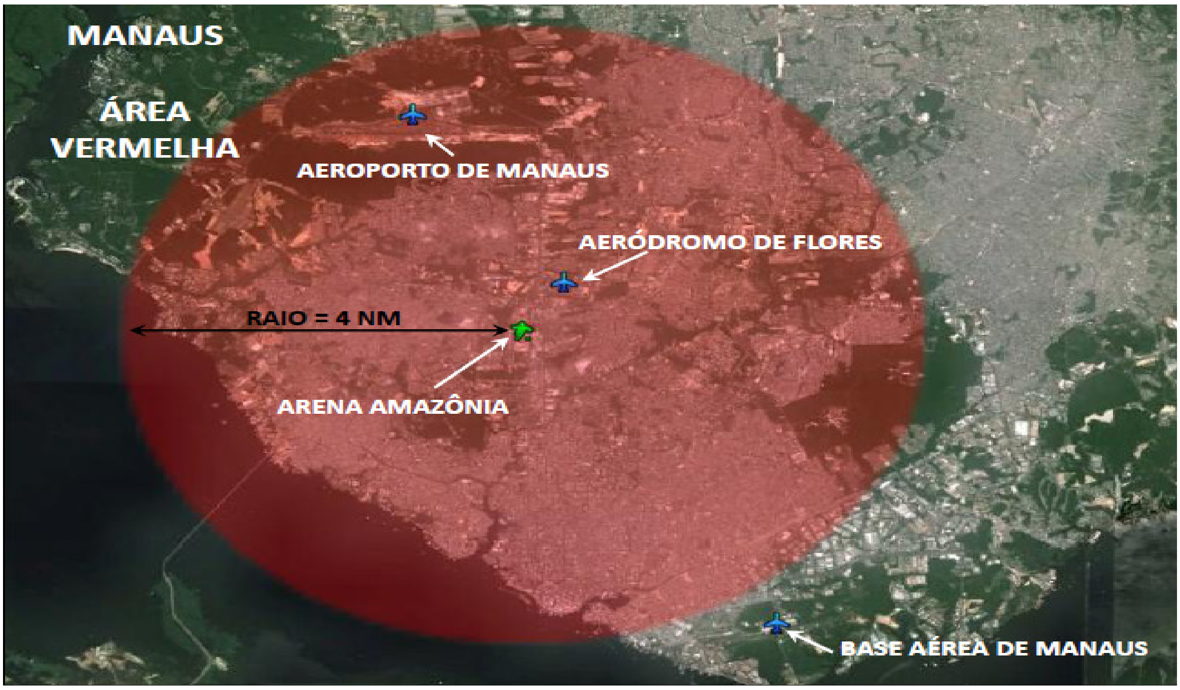
02° 29’ 49” S 058° 48’ 42” W.

DAYS AND TIMETABLE

14/Jun/2014 (6 p.m. local time) - from 5 p.m. local time until 9 p.m. local time;
18/Jun/2014 (6 p.m. local time) - from 5 p.m. local time until 9 p.m. local time;
22/Jun/2014 (6 p.m. local time) - from 5 p.m. local time until 9 p.m. local time;
25/Jun/2014 (4 p.m. local time) - from 3 p.m. local time until 7 p.m. local time.

ÁREA PROIBIDA

Área denominada VERMELHA, dentro da ÁREA AMARELA, definida como um círculo com centro nas coordenadas 03°04'58.02"S 060°01'39.76"W, com 4 NM de raio e com volume de responsabilidade sobreposto da superfície até o FL 145.



ÁREA ACAV

Área definida do FL 200 até o FL 240, formada por um polígono com as seguintes coordenadas geográficas:

01° 33’ 21” S 059° 41’ 10” W;

02° 00’ 15” S 060° 11’ 17” W;

02° 55’ 15” S 059° 11’ 54” W; e

02° 29’ 49” S 058° 48’ 42” W.

ÁREA AREVO

Área definida do FL 150 até o FL 190, formada por um polígono com as seguintes coordenadas geográficas:

01° 33’ 21” S 059° 41’ 10” W;

02° 00’ 15” S 060° 11’ 17” W;

02° 55’ 15” S 059° 11’ 54” W; e

02° 29’ 49” S 058° 48’ 42” W.

DIAS E HORÁRIOS

Dia 14/06/2014 (18h local) – início às 17h local e término às 21h local;
Dia 18/06/2014 (18h local) – início às 17h local e término às 21h local;
Dia 22/06/2014 (18h local) – início às 17h local e término às 21h local; e
Dia 25/06/2014 (16h local) – início às 15h local e término às 19h local.

LANDING AND TAKEOFF OPERATIONS

The landing and takeoff operations at the aerodromes of the host cities may be under operational restriction during the days and period of restrict areas activation. The aerodrome traffic is back to regular operation just after the end of areas activation.

Below are the operational constraints on landing and takeoff operations:

a) Prohibited landing operation on any runways of Manaus International Airport; and

b) Authorized takeoff operations from all runways of Manaus International Airport, though it is not authorized to make a turn towards the Stadium side, until leaving the YELLOW area.

AIRCRAFT SPECIAL ROUTES

a) Temporary suspension of REA ALFA;

b) Temporary suspension of REA BRAVO;

c) Temporary suspension of REA CHARLIE;

d) Temporary suspension of REA DELTA; and

e) Temporary suspension of REA ECHO.

OPERAÇÕES DE POUSOS E DECOLAGENS

Nos dias e períodos de ativação das áreas restritas, as operações de pouso e decolagem nos aeródromos das cidades-sede poderão sofrer restrições operacionais. Após o termino da ativação das áreas, o uso do aeródromo volta a sua normalidade.

Seguem abaixo as restrições operacionais nas operações de pouso e decolagem:

a) Proibido as operações de pouso em todas as pistas do Aeroporto Internacional de Manaus; e
b) Autorizado as operações de decolagem de todas as pistas do Aeroporto Internacional de Manaus, sem efetuar curva para o lado do estádio, até sair da área AMARELA.

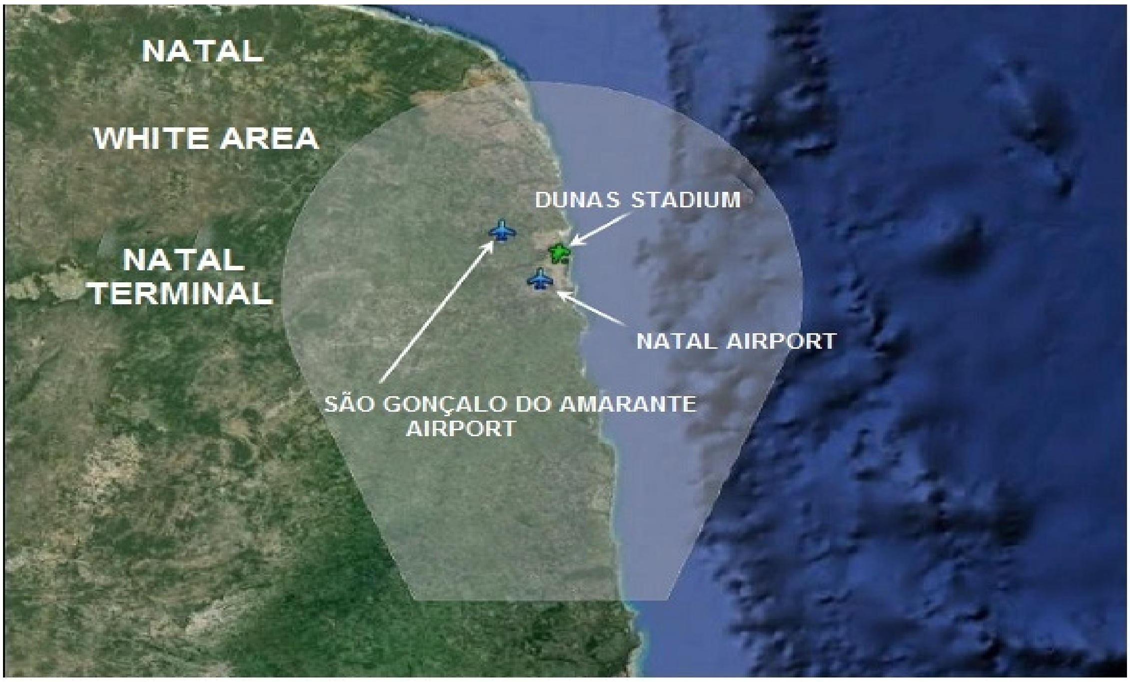
ROTAS ESPECIAIS DE AERONAVES

a) Suspensão temporária da REA ALFA;
b) Suspensão temporária da REA BRAVO;
c) Suspensão temporária da REA CHARLIE;
d) Suspensão temporária da REA DELTA; e
e) Suspensão temporária da REA ECHO.

ATTACHMENT G - NATAL

RESERVED AREA

Area named WHITE, defined by the lateral projections of Natal TMA and vertical limits from the surface to FL 145.



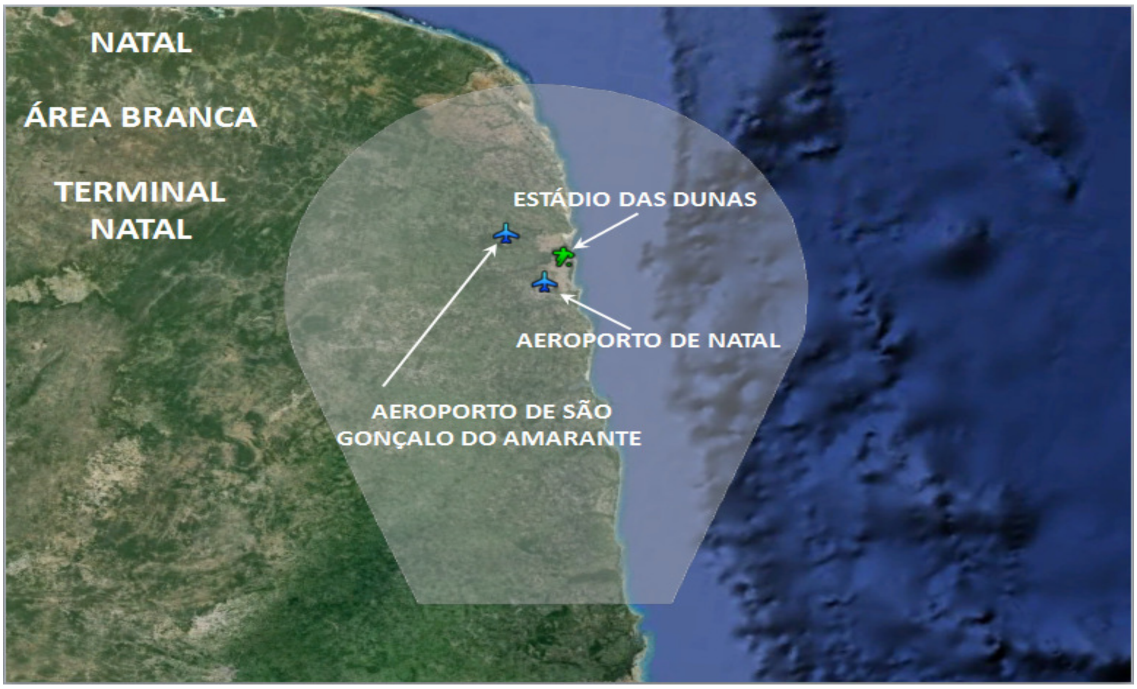
RESTRICTED AREA

Area named YELLOW, inside the WHITE area, defined as a circle centered on the coordinates 05°49'33.34"S 035°12'45.78"W, with 7-NM radius and with responsibility volume superposed from the surface up to FL 145.

ANEXO G – NATAL

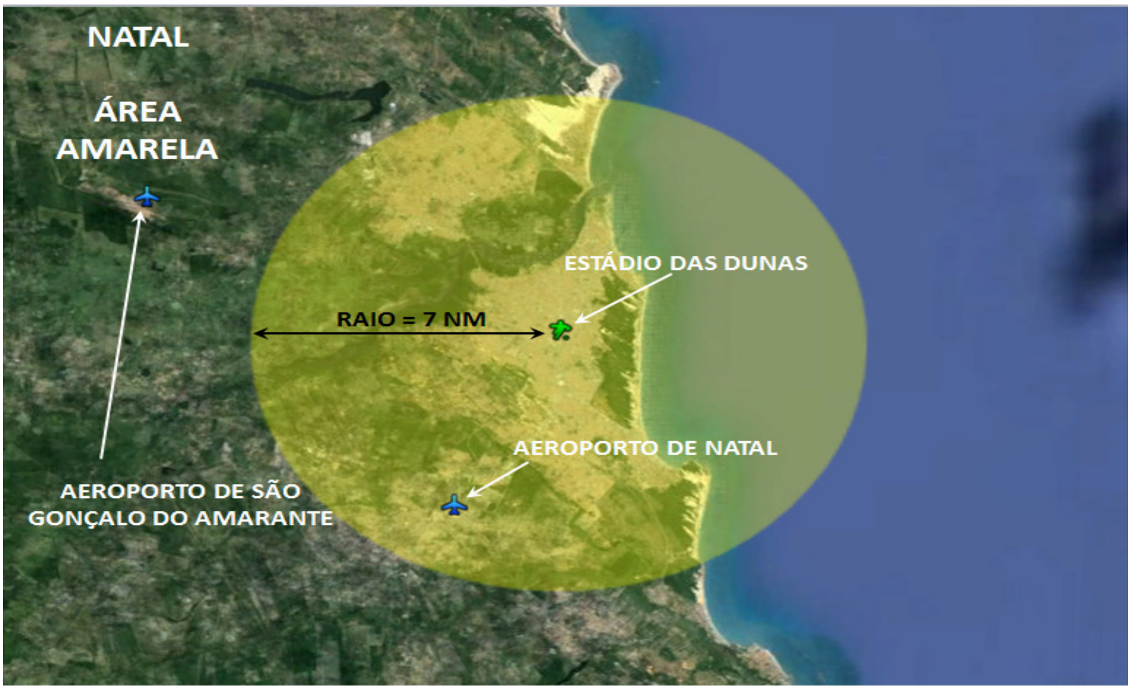
ÁREA RESERVADA

Área denominada BRANCA, definida pelas projeções laterais da TMA Natal e limites verticais da superfície ao FL 145.



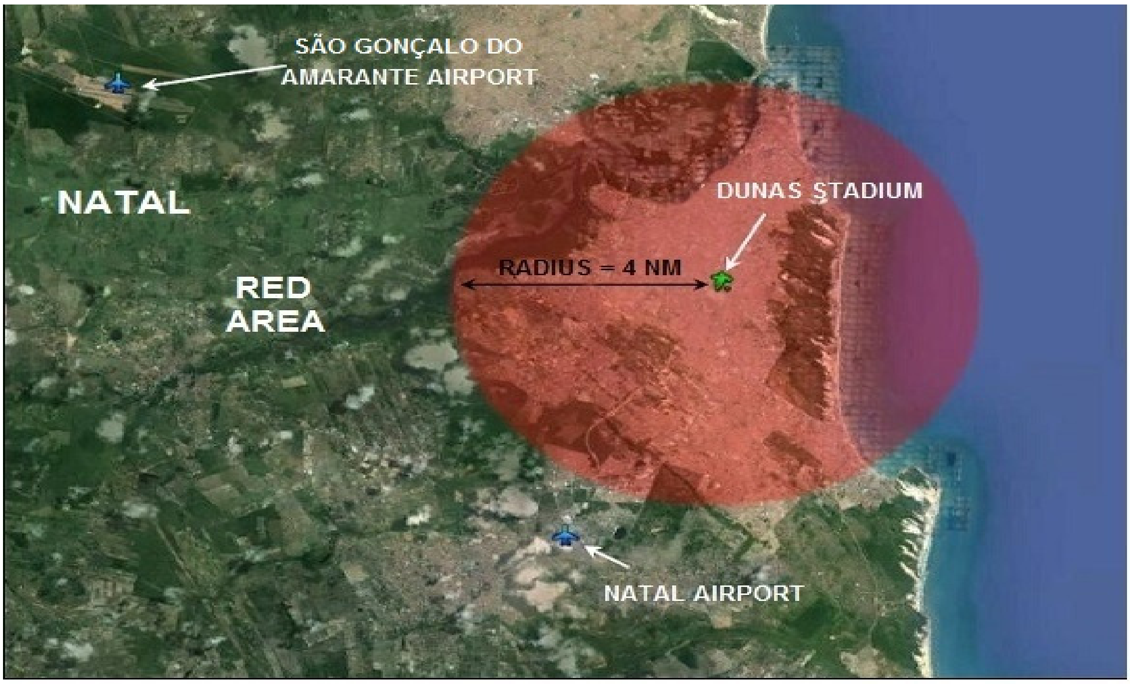
ÁREA RESTRITA

Área denominada AMARELA, dentro da área BRANCA, definida como um círculo com centro nas coordenadas 05°49'33.34"S 035°12'45.78"W, com 7 NM de raio e com volume de responsabilidade sobreposto da superfície até o FL 145.



PROHIBITED AREA

Area named RED, inside the YELLOW AREA, defined as a circle centered on the coordinates 05°49'33.34"S 035°12'45.78"W, with 4-NM radius and with responsibility volume superposed from the surface up to FL 145.



ACAV AREA

Defined area from FL 180 until FL 220, formed by a polygon with the following geographic coordinates:

05° 40’ 36” S 034° 21’ 21” W;

06° 02’ 02” S 033° 45’ 45” W;

07° 10’ 03” S 034° 27’ 00” W; and

06° 48’ 56” S 035° 01’ 18” W.

AREVO AREA

Defined area from FL 150 until FL 170, formed by a polygon with the following geographic coordinates:

05° 40’ 36” S 034° 21’ 21” W;

06° 02’ 02” S 033° 45’ 45” W;

07° 10’ 03” S 034° 27’ 00” W; and

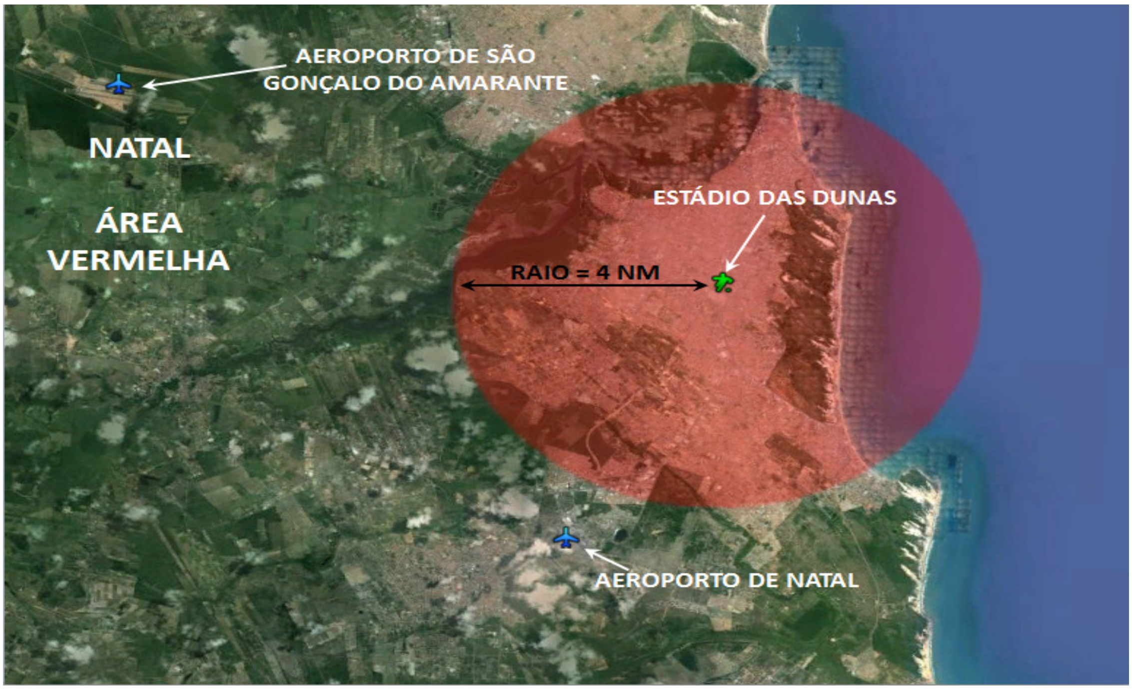
06° 48’ 56” S 035° 01’ 18” W.

DAYS AND TIMETABLE

13/Jun/2014 (1 p.m. local time) - from 12 noon local time until 4 p.m. local time;
16/Jun/2014 (7 p.m. local time) - from 6 p.m. local time until 10 p.m. local time;
19/Jun/2014 (7 p.m. local time) - from 6 p.m. local time until 10 p.m. local time;
24/Jun/2014 (1 p.m. local time) - from 12 noon local time until 4 p.m. local time.

ÁREA PROIBIDA

Área denominada VERMELHA, dentro da ÁREA AMARELA, definida como um círculo com centro nas coordenadas 05°49'33.34"S 035°12'45.78"W, com 4 NM de raio e com volume de responsabilidade sobreposto da superfície até o FL 145.



ÁREA ACAV

Área definida do FL 180 até o FL 220, formada por um polígono com as seguintes coordenadas geográficas:

05° 40’ 36” S 034° 21’ 21” W;

06° 02’ 02” S 033° 45’ 45” W;

07° 10’ 03” S 034° 27’ 00” W; e

06° 48’ 56” S 035° 01’ 18” W.

ÁREA AREVO

Área definida do FL 150 até o FL 170, formada por um polígono com as seguintes coordenadas geográficas:

05° 40’ 36” S 034° 21’ 21” W;

06° 02’ 02” S 033° 45’ 45” W;

07° 10’ 03” S 034° 27’ 00” W; e

06° 48’ 56” S 035° 01’ 18” W.

DIAS E HORÁRIOS

Dia 13/06/2014 (13h local) – início às 12h local e término às 16h local;
Dia 16/06/2014 (19h local) – início às 18h local e término às 22h local;
Dia 19/06/2014 (19h local) – início às 18h local e término às 22h local; e
Dia 24/06/2014 (13h local) – início às 12h local e término às 16h local.

LANDING AND TAKEOFF OPERATIONS

The landing and takeoff operations at the aerodromes of the host cities may be under operational restriction during the days and period of restrict areas activation. The aerodrome traffic is back to regular operation just after the end of areas activation.

Below are the operational constraints on landing and takeoff operations:

a) Prohibited landing operation on runway 30 of São Gonçalo do Amarante International Airport;

b) Authorized takeoff operations from runway 30 of São Gonçalo do Amarante International Airport;

c) Authorized landing operations on all runways of Natal International Airport; and

d) Authorized takeoff operations from all runways of Natal International Airport, though it is not authorized to make a turn towards the Stadium side, until leaving the YELLOW area.

SPECIAL ROUTE FOR AIRCRAFT WITHOUT TRANSPONDER

Temporary suspension of all special routes for aircraft without transponder.

OPERAÇÕES DE POUSOS E DECOLAGENS

Nos dias e períodos de ativação das áreas restritas, as operações de pouso e decolagem nos aeródromos das cidades-sede poderão sofrer restrições operacionais. Após o termino da ativação das áreas, o uso do aeródromo volta a sua normalidade.

Seguem abaixo as restrições operacionais nas operações de pouso e decolagem:

a) Proibido as operações de pouso na pista 30 do Aeroporto Internacional de São Gonçalo do Amarante;
b) Autorizado as operações de decolagem na pista 30 do Aeroporto Internacional de São Gonçalo do Amarante;
c) Autorizado as operações de pouso em todas as pistas do Aeroporto Internacional de Natal; e
d) Autorizado as operações de decolagem de todas as pistas do Aeroporto Internacional de Natal, sem efetuar curva para o lado do estádio, até sair da área AMARELA.

ROTA ESPECIAL PARA AERONAVES SEM TRANSPONDER

Suspensão temporária de todas as rotas especiais para aeronaves sem transponder.

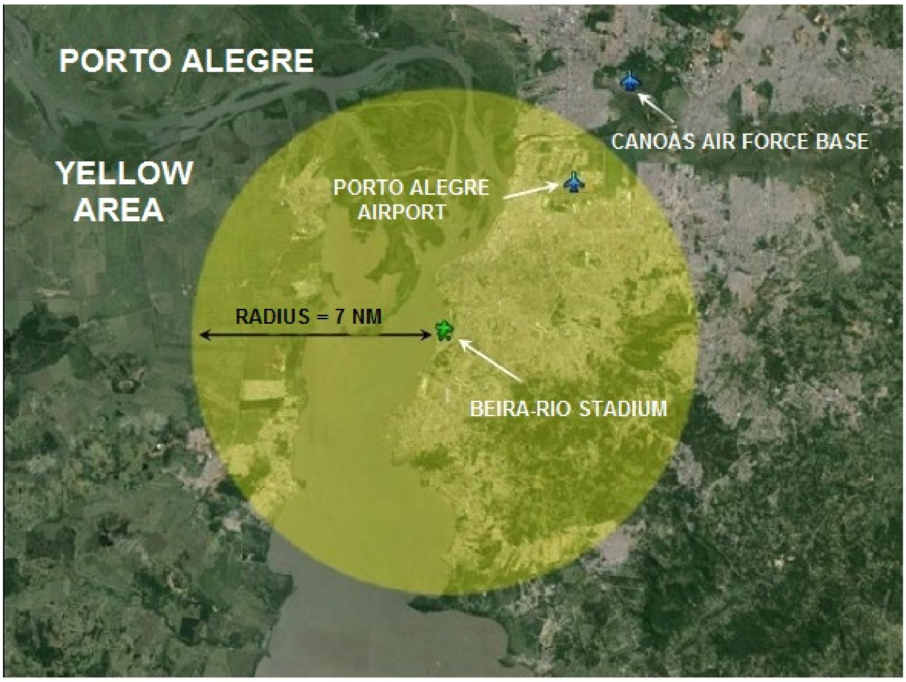
ATTACHMENT H - PORTO ALEGRE

RESERVED AREA

Area named WHITE, defined by the lateral projections of Porto Alegre TMA and vertical limits from the surface to FL 145.

RESTRICTED AREA

Area named YELLOW, inside the WHITE area, defined as a circle centered on the coordinates 30°03'53.40"S 051°14'09.47"W, with 7-NM radius and with responsibility volume superposed from the surface up to FL 145.



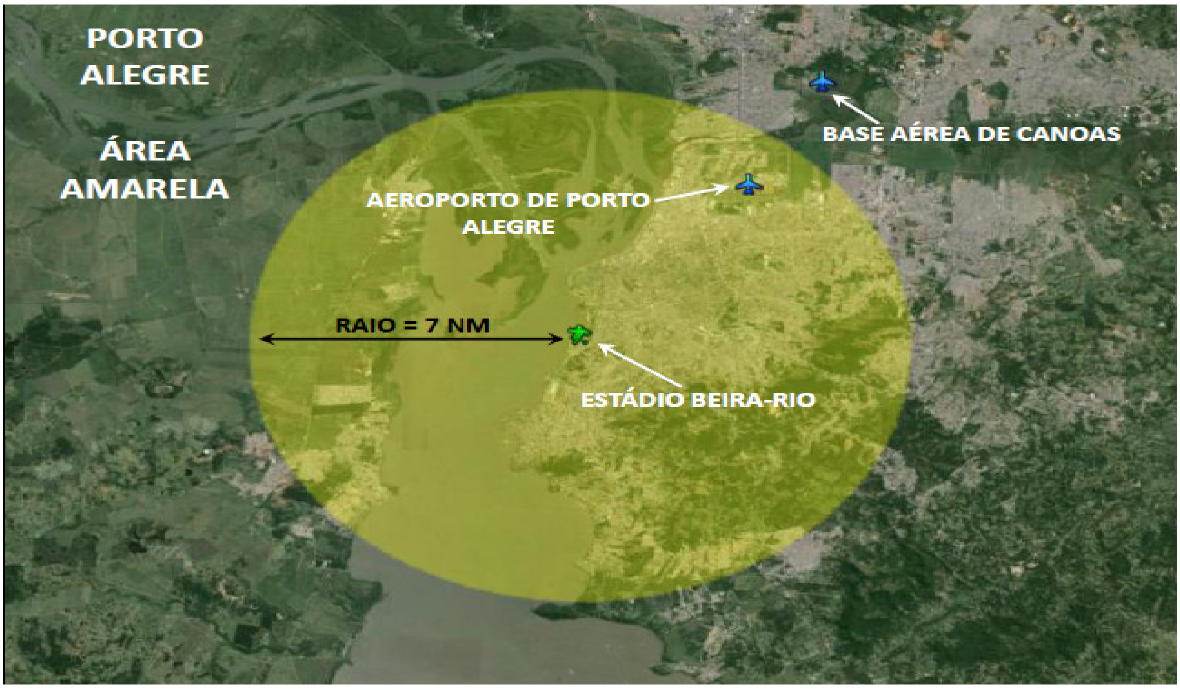
ANEXO H – PORTO ALEGRE

ÁREA RESERVADA

Área denominada BRANCA, definida pelas projeções laterais da TMA Porto Alegre e limites verticais da superfície ao FL 145.

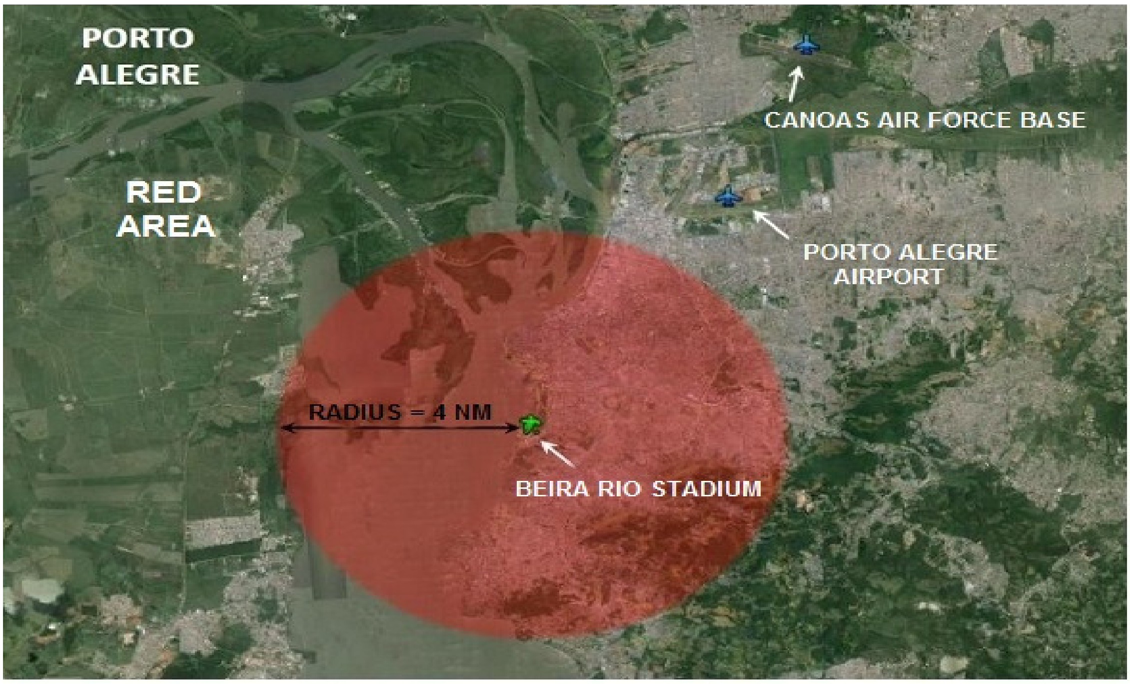
ÁREA RESTRITA

Área denominada AMARELA, dentro da área BRANCA, definida como um círculo com centro nas coordenadas 30°03'53.40"S 051°14'09.47"W, com 7 NM de raio e com volume de responsabilidade sobreposto da superfície até o FL 145.



PROHIBITED AREA

Area named RED, inside the YELLOW AREA, defined as a circle centered on the coordinates 30°03'53.40"S 051°14'09.47"W, with 4-NM radius and with responsibility volume superposed from the surface up to FL 145.



ACAV AREA

Defined area from FL 180 until FL 220, formed by a polygon with the following geographic coordinates:

30° 00' 29" S 050° 12' 10" W;

30° 17' 50" S 049° 45' 12" W;

31° 04' 20" S 050° 26' 30" W; and

30° 46' 49" S 050° 53' 29" W.

AREVO AREA

Defined area from FL 150 until FL 170, formed by a polygon with the following geographic coordinates:

30° 00' 29" S 050° 12' 10" W;

30° 17' 50" S 049° 45' 12" W;

31° 04' 20" S 050° 26' 30" W; and

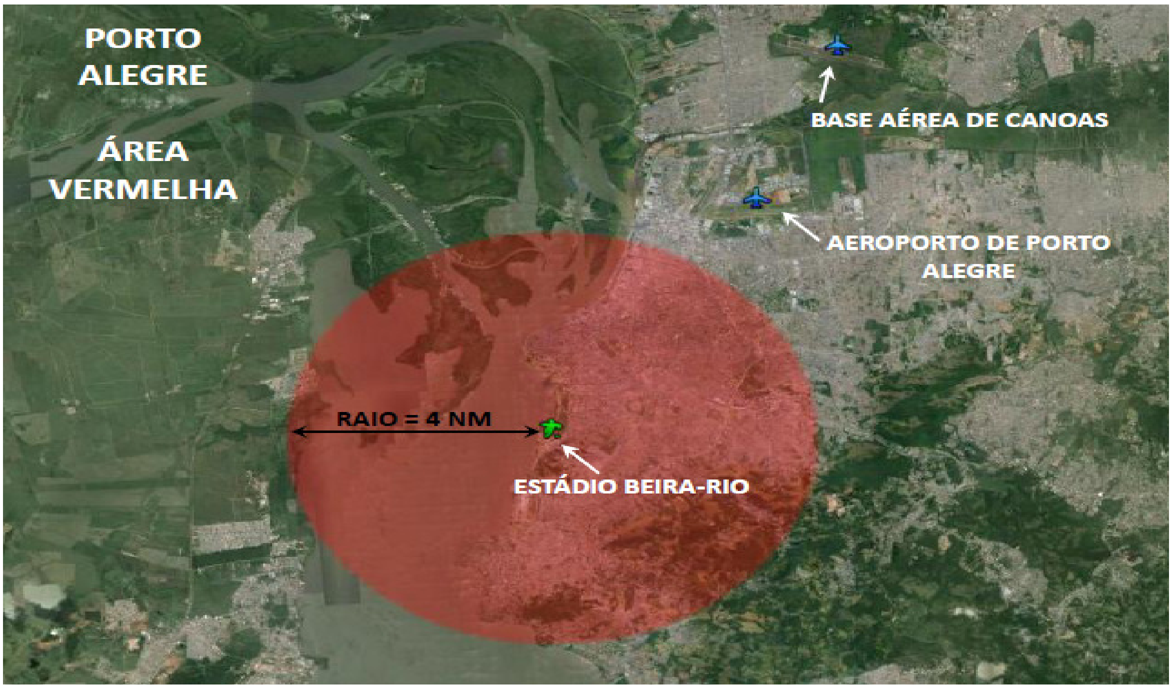
30° 46' 49" S 050° 53' 29" W.

DAYS AND TIMETABLE

15/Jun/2014 (4 p.m. local time) - from 3 p.m. local time until 7 p.m. local time;
18/Jun/2014 (1 p.m. local time) - from 12 noon local time until 4 p.m. local time;
22/Jun/2014 (4 p.m. local time) - from 3 p.m. local time until 7 p.m. local time;
25/Jun/2014 (1 p.m. local time) - from 12 noon local time until 4 p.m. local time;
30/Jun/2014 (5 p.m. local time) - from 4 p.m. local time until 9 p.m. local time.

ÁREA PROIBIDA

Área denominada VERMELHA, dentro da ÁREA AMARELA, definida como um círculo com centro nas coordenadas 30°03'53.40"S 051°14'09.47"W, com 4 NM de raio e com volume de responsabilidade sobreposto da superfície até o FL 145.



ÁREA ACAV

Área definida do FL 180 até o FL 220, formada por um polígono com as seguintes coordenadas geográficas:

30° 00' 29" S 050° 12' 10" W;

30° 17' 50" S 049° 45' 12" W;

31° 04' 20" S 050° 26' 30" W; e

30° 46' 49" S 050° 53' 29" W.

ÁREA AREVO

Área definida do FL 150 até o FL 170, formada por um polígono com as seguintes coordenadas geográficas:

30° 00' 29" S 050° 12' 10" W;

30° 17' 50" S 049° 45' 12" W;

31° 04' 20" S 050° 26' 30" W; e

30° 46' 49" S 050° 53' 29" W.

DIAS E HORÁRIOS

Dia 15/06/2014 (16h local) – início às 15h local e término às 19h local;
Dia 18/06/2014 (13h local) – início às 12h local e término às 16h local;
Dia 22/06/2014 (16h local) – início às 15h local e término às 19h local;
Dia 25/06/2014 (13h local) – início às 12h local e término às 16h local; e
Dia 30/06/2014 (17h local) – início às 16h local e término às 21h local.

LANDING AND TAKEOFF OPERATIONS

The landing and takeoff operations at the aerodromes of the host cities may be under operational restriction during the days and period of restrict areas activation. The aerodrome traffic is back to regular operation just after the end of areas activation.

Below are the operational constraints on landing and takeoff operations:

a) No restraints for landing and takeoff operations on any runways of Porto Alegre International Airport.

SPECIAL ROUTE FOR AIRCRAFT WITHOUT TRANSPONDER

Temporary suspension of all special routes for aircraft without transponder.

OPERAÇÕES DE POUSOS E DECOLAGENS

Nos dias e períodos de ativação das áreas restritas, as operações de pouso e decolagem nos aeródromos das cidades-sede poderão sofrer restrições operacionais. Após o termino da ativação das áreas, o uso do aeródromo volta a sua normalidade.

Seguem abaixo as restrições operacionais nas operações de pouso e decolagem:

a) Sem restrições para as operações de pouso e decolagem em todas as pistas do Aeroporto Internacional de Porto Alegre.

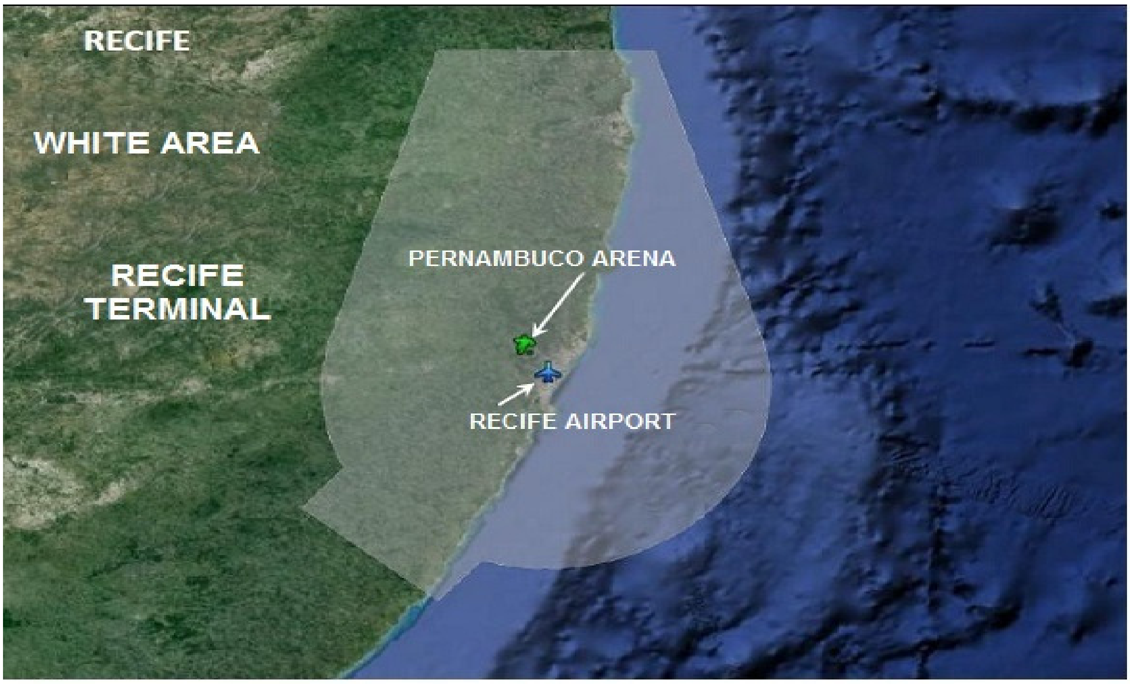
ROTA ESPECIAL PARA AERONAVES SEM TRANSPONDER

Suspensão temporária de todas as rotas especiais para aeronaves sem transponder.

ATTACHMENT I - RECIFE

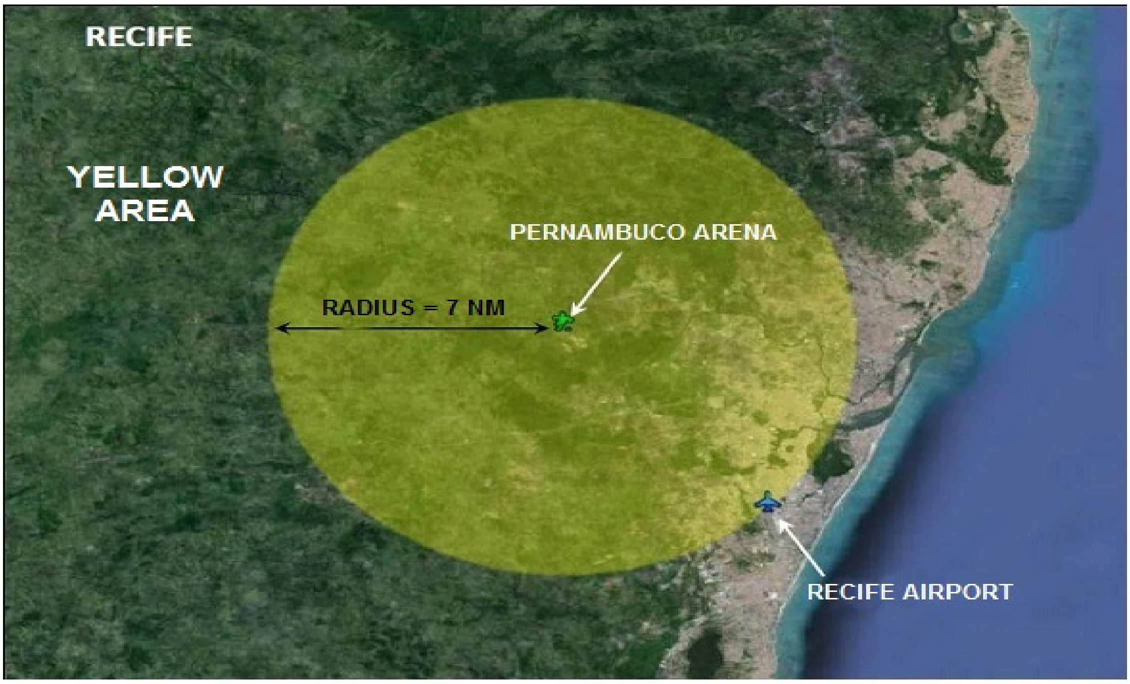
RESERVED AREA

Area named WHITE, defined by the lateral projections of Recife TMA and vertical limits from the surface to FL 145.



RESTRICTED AREA

Area named YELLOW, inside the WHITE area, defined as a circle centered on the coordinates 08°02'24"S 035°00'29"W, with 7-NM radius and with responsibility volume superposed from the surface up to FL 145.



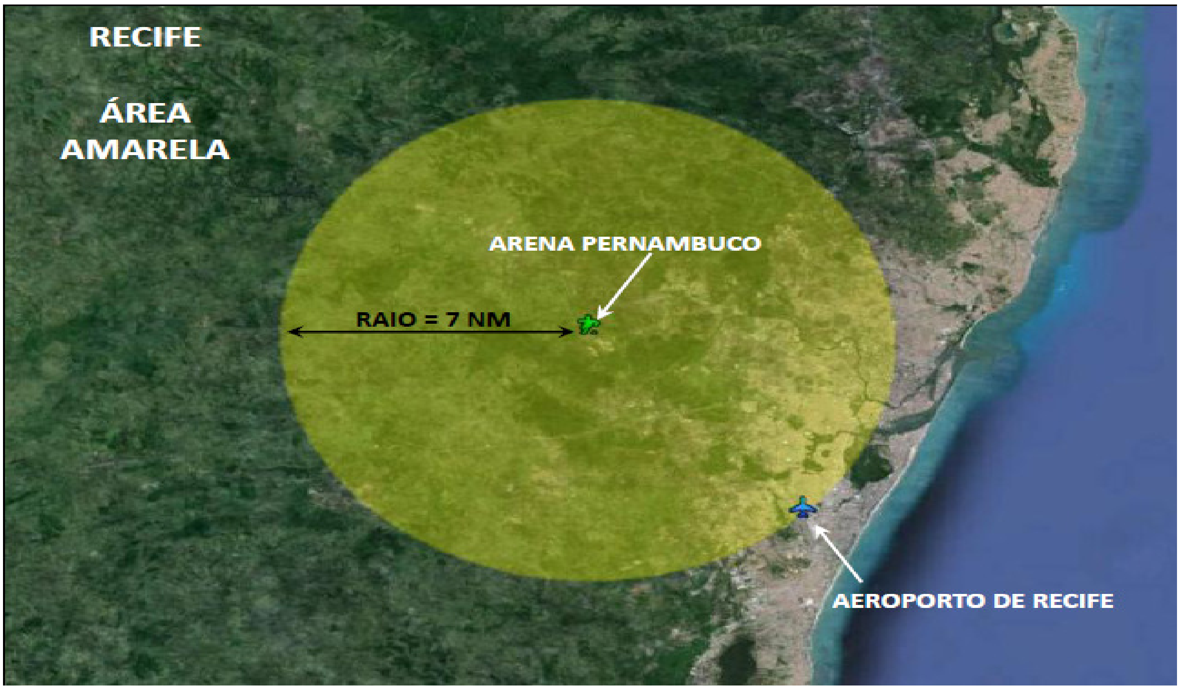
ANEXO I – RECIFE

ÁREA RESERVADA

Área denominada BRANCA, definida pelas projeções laterais da TMA Recife e limites verticais da superfície ao FL 145.

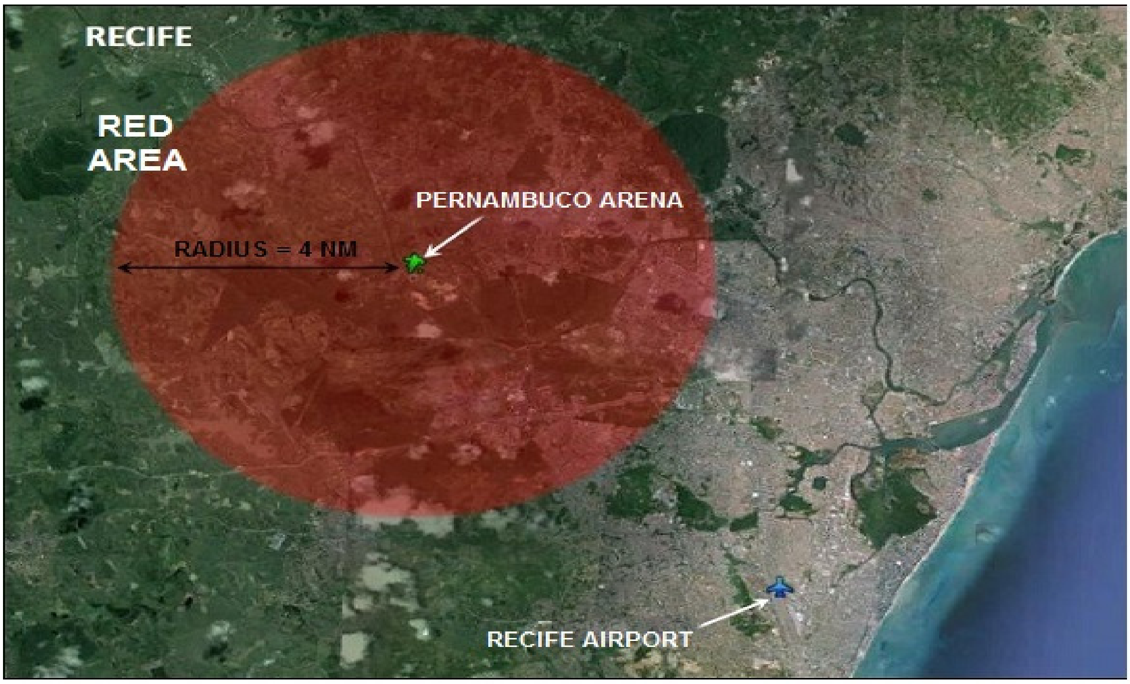
ÁREA RESTRITA

Área denominada AMARELA, dentro da área BRANCA, definida como um círculo com centro nas coordenadas 08°02'24"S 035°00'29"W, com 7 NM de raio e com volume de responsabilidade sobreposto da superfície até o FL 145.



PROHIBITED AREA

Area named RED, inside the YELLOW AREA, defined as a circle centered on the coordinates 08°02'24"S 035°00'29"W, with 4-NM radius and with responsibility volume superposed from the surface up to FL 145.



ACAV AREA

Defined area from FL 180 until FL 220, formed by a polygon with the following geographic coordinates:

08º 47’ 00” S 034º 28’ 00” W;

07º 36’ 00” S 033º 51’ 00” W;

07º 55’ 00” S 033º 15’ 00” W; and

09º 06’ 00” S 033º 52’ 00” W.

AREVO AREA

Defined area from FL until FL 170, formed by a polygon with the following geographic coordinates:

08º 47’ 00” S 034º 28’ 00” W;

07º 36’ 00” S 033º 51’ 00” W;

07º 55’ 00” S 033º 15’ 00” W; and

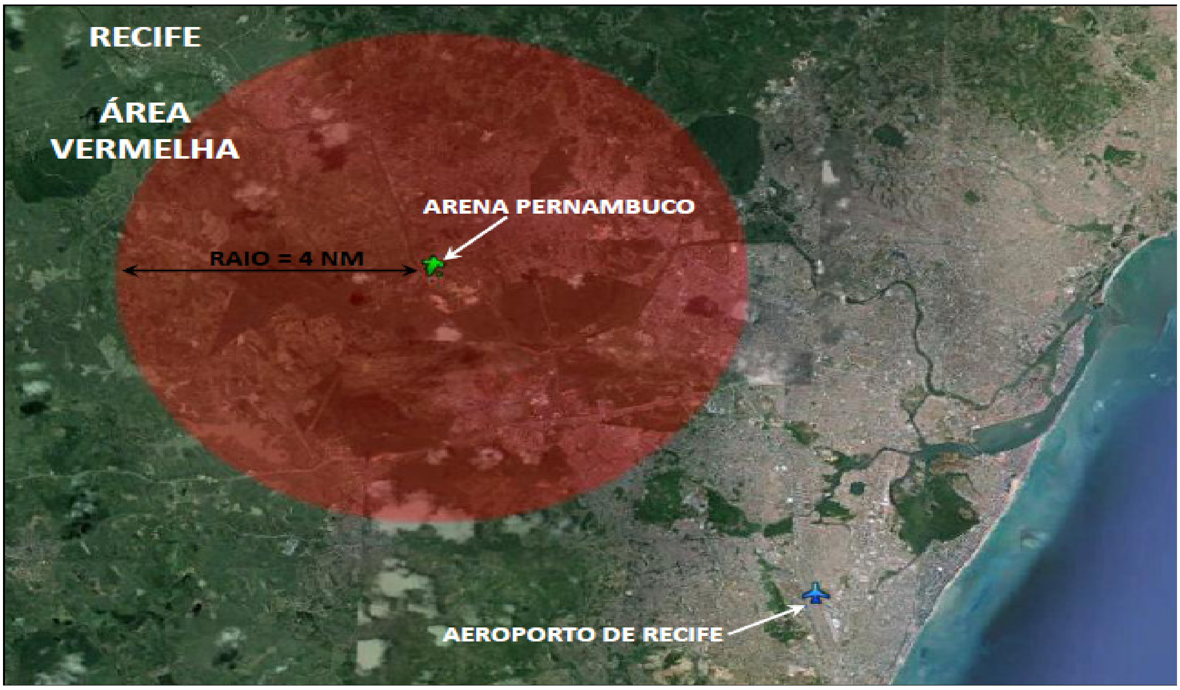
09º 06’ 00” S 033º 52’ 00” W.

DAYS AND TIMETABLE

14/Jun/2014 (10 p.m. local time) - from 9 p.m. local time until 1 a.m. local time;
20/Jun/2014 (1 p.m. local time) - from 12 noon local time until 4 p.m. local time;
23/Jun/2014 (5 p.m. local time) - from 4 p.m. local time until 8 p.m. local time;
26/Jun/2014 (1 p.m. local time) - from 12 noon local time until 4 p.m. local time;
29/Jun/2014 (5 p.m. local time) - from 4 p.m. local time until 9 p.m. local time.

ÁREA PROIBIDA

Área denominada VERMELHA, dentro da ÁREA AMARELA, definida como um círculo com centro nas coordenadas 08°02'24"S 035°00'29"W, com 4 NM de raio e com volume de responsabilidade sobreposto da superfície até o FL 145.



ÁREA ACAV

Área definida do FL 180 até o FL 220, formada por um polígono com as seguintes coordenadas geográficas:

08º 47' 00" S 034º 28' 00" W;

07º 36' 00" S 033º 51' 00" W;

07º 55' 00" S 033º 15' 00" W; e

09º 06' 00" S 033º 52' 00" W.

ÁREA AREVO

Área definida do FL 150 até o FL 170, formada por um polígono com as seguintes coordenadas geográficas:

08º 47' 00" S 034º 28' 00" W;

07º 36' 00" S 033º 51' 00" W;

07º 55' 00" S 033º 15' 00" W; e

09º 06' 00" S 033º 52' 00" W.

DIAS E HORÁRIOS

Dia 14/06/2014 (22h local) – início às 21h local e término às 01h local;
Dia 20/06/2014 (13h local) – início às 12h local e término às 16h local;
Dia 23/06/2014 (17h local) – início às 16h local e término às 20h local;
Dia 26/06/2014 (13h local) – início às 12h local e término às 16h local; e
Dia 29/06/2014 (17h local) – início às 16h local e término às 21h local.

LANDING AND TAKEOFF OPERATIONS

The landing and takeoff operations at the aerodromes of the host cities may be under operational restriction during the days and period of restrict areas activation. The aerodrome traffic is back to regular operation just after the end of areas activation.

Below are the operational constraints on landing and takeoff operations:

a) Prohibited landing operations on all runways of Recife International Airport; and

b) Authorized takeoff operations from runway 18 of Recife International Airport.

OPERAÇÕES DE POUSOS E DECOLAGENS

Nos dias e períodos de ativação das áreas restritas, as operações de pouso e decolagem nos aeródromos das cidades-sede poderão sofrer restrições operacionais. Após o termino da ativação das áreas, o uso do aeródromo volta a sua normalidade.

Seguem abaixo as restrições operacionais nas operações de pouso e decolagem:

a) Proibido as operações de pouso em todas as pistas do Aeroporto Internacional de Recife; e
b) Autorizado as operações de decolagem na pista 18 do Aeroporto Internacional de Recife.

ATTACHMENT J - RIO DE JANEIRO

RESERVED AREA

Area named WHITE, defined by the lateral projections of Rio de Janeiro TMA and vertical limits from the surface to FL 145.

RESTRICTED AREA

Area named YELLOW, inside the WHITE area, defined as a circle centered on the coordinates 22°54'42"S 043°13'49"W, with 7-NM radius and with responsibility volume superposed from the surface up to FL 145.

ANEXO J – RIO DE JANEIRO

ÁREA RESERVADA

Área denominada BRANCA, definida pelas projeções laterais da TMA Rio de Janeiro e limites verticais da superfície ao FL 145.

ÁREA RESTRITA

Área denominada AMARELA, dentro da área BRANCA, definida como um círculo com centro nas coordenadas 22°54'42"S 043°13'49"W, com 7 NM de raio e com volume de responsabilidade sobreposto da superfície até o FL 145.

PROHIBITED AREA

Area named RED, inside the YELLOW AREA, defined as a circle centered on the coordinates 22°54'42"S 043°13'49"W, with 4-NM radius and with responsibility volume superposed from the surface up to FL 145.

ACAV AREA

Defined area from FL 180 to FL 220, formed by a polygon with the following geographic areas:

23° 36’ 15” S 043° 11’ 13” W;

22° 44’ 48” S 041° 36’ 40” W;

23° 27’ 49” S 041° 06’ 49” W; and

24° 29’ 11” S 043° 69’ 47” W.

AREVO AREA

Defined area from FL 150 until FL 170, formed by a polygon with the following geographic coordinates:

23° 36’ 15” S 043° 11’ 13” W;

22° 44’ 48” S 041° 36’ 40” W;

23° 27’ 49” S 041° 06’ 49” W; and

24° 29’ 11” S 043° 69’ 47” W.

DAYS AND TIMETABLE

15/Jun/2014 (7 p.m. local time) - from 6 p.m. local time until 10 p.m. local time;
18/Jun/2014 (4 p.m. local time) - from 3 p.m. local time until 7 p.m. local time;
22/Jun/2014 (1 p.m. local time) - from 12 noon local time until 4 p.m. local time;
25/Jun/2014 (5 p.m. local time) - from 4 p.m. local time until 8 p.m. local time;
28/Jun/2014 (5 p.m. local time) - from 4 p.m. local time until 9 p.m. local time;
04/Jul/2014 (1 p.m. local time) - from 12 noon local time until 5 p.m. local time;
13/Jul/2014 (4 p.m. local time) - from 1 p.m. local time until 8 p.m. local time.

ÁREA PROIBIDA

Área denominada VERMELHA, dentro da ÁREA AMARELA, definida como um círculo com centro nas coordenadas 22°54'42"S 043°13'49"W, com 4 NM de raio e com volume de responsabilidade sobreposto da superfície até o FL 145.

ÁREA ACAV

Área definida do FL 180 até o FL 220, formada por um polígono com as seguintes coordenadas geográficas:

23° 36’ 15” S 043° 11’ 13” W;

22° 44’ 48” S 041° 36’ 40” W;

23° 27’ 49” S 041° 06’ 49” W; e

24° 29’ 11” S 043° 69’ 47” W.

ÁREA AREVO

Área definida do FL 150 até o FL 170, formada por um polígono com as seguintes coordenadas geográficas:

23° 36’ 15” S 043° 11’ 13” W;

22° 44’ 48” S 041° 36’ 40” W;

23° 27’ 49” S 041° 06’ 49” W; e

24° 29’ 11” S 043° 69’ 47” W.

DIAS E HORÁRIOS

Dia 15/06/2014 (19h local) – início às 18h local e término às 22h local;
Dia 18/06/2014 (16h local) – início às 15h local e término às 19h local;
Dia 22/06/2014 (13h local) – início às 12h local e término às 16h local;
Dia 25/06/2014 (17h local) – início às 16h local e término às 20h local;
Dia 28/06/2014 (17h local) – início às 16h local e término às 21h local;
Dia 04/07/2014 (13h local) – início às 12h local e término às 17h local; e
Dia 13/07/2014 (16h local) – início às 13h local e término às 20h local.

LANDING AND TAKEOFF OPERATIONS

The landing and takeoff operations at the aerodromes of the host cities may be under operational restriction during the days and period of restrict areas activation. The aerodrome traffic is back to regular operation just after the end of areas activation.

Below are the operational constraints on landing and takeoff operations:

a) Authorized landing operations on all runways of Galeão International Airport;

b) Authorized takeoff operations from all runways of Galeão International Airport, though it is prohibited to make a turn toward the Stadium side, until leaving the YELLOW area.

c) Prohibited landing operations on all runways of Santos Dumont Airport; and

d) Authorized takeoff operations from all runways of Santos Dumont Airport, though it is prohibited to make a turn toward the Stadium, until leaving the YELLOW area.

AIRCRAFT SPECIAL ROUTE

Temporary suspension of REA BRAVO, from gate 2 to gate 1.

HELICOPTERS SPECIAL ROUTES

a) Temporary suspension of REH ILHA, from GALEÃO position until CACUIA cemetery;
b) Temporary suspension of REH MAGÉ, from GALEÃO position until REDUC position;
c) Temporary suspension of REH PENHA, from MADU position until GALEÃO position;
d) Temporary suspension of REH FERROVIA;
e) Temporary suspension of REH MARACANÃ;
f) Temporary suspension of REH CENTRO;
g) Temporary suspension of REH LAGOA;
h) Temporary suspension of REH PRAIA, from PONTA DA JOATINGA position until LEME hill and GATE 1;
i) Temporary suspension of REH PAQUETÁ, from DUMONT position until PEDÁGIO;
j) Temporary suspension of REH MANGUINHOS;
k) Temporary suspension of REH MADUREIRA; and
l) Temporary suspension of REH BOA VISTA.

OPERAÇÕES DE POUSOS E DECOLAGENS

Nos dias e períodos de ativação das áreas restritas, as operações de pouso e decolagem nos aeródromos das cidades-sede poderão sofrer restrições operacionais. Após o termino da ativação das áreas, o uso do aeródromo volta a sua normalidade.

Seguem abaixo as restrições operacionais nas operações de pouso e decolagem:

a) Autorizado as operações de pousos em todas as pistas do Aeroporto Internacional do Galeão;
b) Autorizado as operações de decolagem em todas as pistas do Aeroporto Internacional do Galeão, sem efetuar curva para o lado do estádio, até sair da área AMARELA;
c) Proibido as operações de pouso em todas as pistas do Aeroporto Santos Dumont; e
d) Autorizado as operações de decolagem em todas as pistas do Aeroporto Santos Dumont, sem efetuar curva para o lado do estádio, até sair da área AMARELA.

ROTA ESPECIAL DE AERONAVES

Suspensão temporária da REA BRAVO, do portão 2 ao portão 1.

ROTAS ESPECIAIS DE HELICÓPTEROS

a) Suspensão temporária da REH ILHA, da posição GALEÃO até o cemitério DO CACUIA;
b) Suspensão temporária da REH MAGÉ, da posição GALEÃO até a posição REDUC;
c) Suspensão temporária da REH PENHA, da posição MADU até a posição GALEÃO;
d) Suspensão temporária da REH FERROVIA;
e) Suspensão temporária da REH MARACANÃ;
f) Suspensão temporária da REH CENTRO;
g) Suspensão temporária da REH LAGOA;
h) Suspensão temporária da REH PRAIA, da posição PONTA DA JOATINGA até o morro do LEME e PORTÃO 1;
i) Suspensão temporária da REH PAQUETÁ, da posição DUMONT até o PEDÁGIO;
j) Suspensão temporária da REH MANGUINHOS;
k) Suspensão temporária da REH MADUREIRA; e
l) Suspensão temporária da REH BOA VISTA.

ATTACHMENT K - SALVADOR

RESERVED AREA

Area named WHITE, defined by the lateral projections of Salvador TMA and vertical limits from the surface to FL 145.

RESTRICTED AREA

Area named YELLOW, inside the WHITE area, defined as a circle centered on the coordinates 12°58'43"S 038°30'15"W, with 7-NM radius and with responsibility volume superposed from the surface up to FL 145.

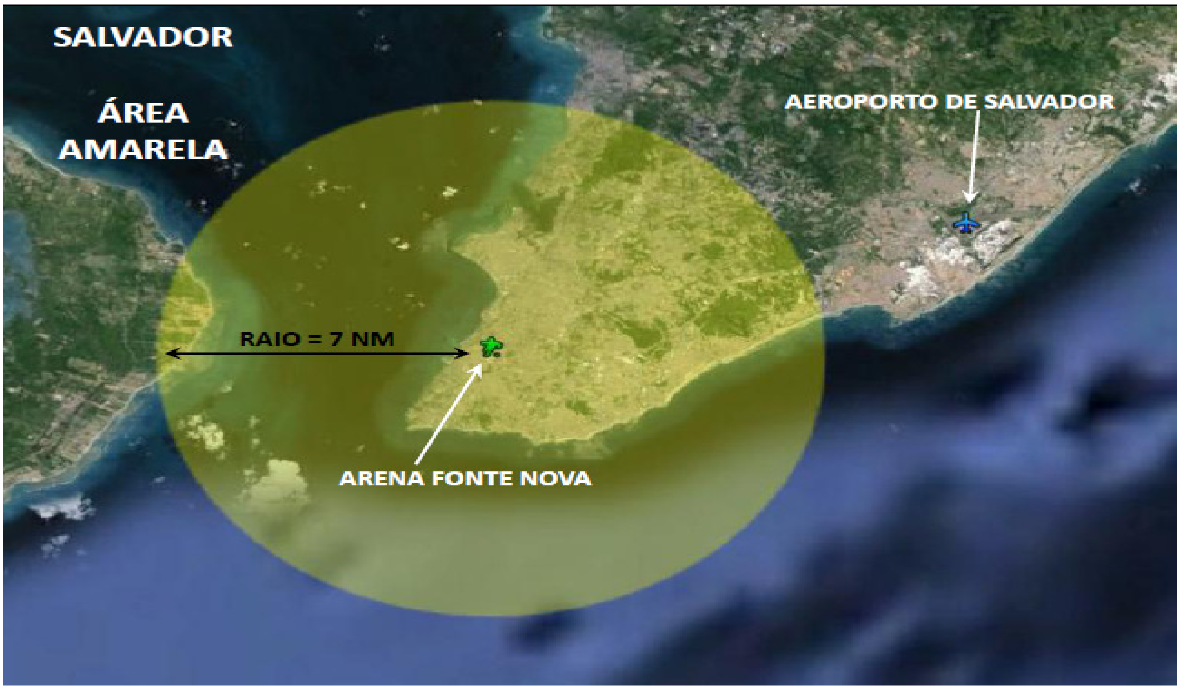
ANEXO K – SALVADOR

ÁREA RESERVADA

Área denominada BRANCA, definida pelas projeções laterais da TMA Salvador e limites verticais da superfície ao FL 145.

ÁREA RESTRITA

Área denominada AMARELA, dentro da área BRANCA, definida como um círculo com centro nas coordenadas 12°58'43"S 038°30'15"W, com 7 NM de raio e com volume de responsabilidade sobreposto da superfície até o FL 145.



PROHIBITED AREA

Area named RED, inside the YELLOW AREA, defined as a circle centered on the coordinates 12°58'43"S 038°30'15"W, with 4-NM radius and with responsibility volume superposed from the surface up to FL 145.

ACAV AREA

Defined area from FL 180 until FL 220, formed by a polygon with the following geographic coordinates:

13º 37’ 00’’ S 037º 52’’ 00’’ W;

12º 26’ 00’’ S 037º 12’ 00’’ W;

12º 46’ 00’’ S 036º 37’ 00’’ W; and

13º 56’ 00’’ S 037º 17’ 00’’ W.

AREVO AREA

Defined area from FL 150 until FL 170, formed by a polygon with the following geographic coordinates:

13º 37’ 00’’ S 037º 52’’ 00’’ W;

12º 26’ 00’’ S 037º 12’ 00’’ W;

12º 46’ 00’’ S 036º 37’ 00’’ W; e

13º 56’ 00’’ S 037º 17’ 00’’ W.

DAYS AND TIMETABLE

13/Jun/2014 (4 p.m. local time) - from 3 p.m. local time until 7 p.m. local time;
16/Jun/2014 (1 p.m. local time) - from 12 noon local time until 4 p.m. local time;
20/Jun/2014 (4 p.m. local time) - from 3 p.m. local time until 7 p.m. local time;
25/Jun/2014 (1 p.m. local time) - from 12 noon local time until 4 p.m. local time;
01/Jul/2014 (5 p.m. local time) - from 4 p.m. local time until 9 p.m. local time;
05/Jul/2014 (5 p.m. local time) - from 4 p.m. local time until 9 p.m. local time.

ÁREA PROIBIDA

Área denominada VERMELHA, dentro da ÁREA AMARELA, definida como um círculo com centro nas coordenadas 12°58'43"S 038°30'15"W, com 4 NM de raio e com volume de responsabilidade sobreposto da superfície até o FL 145.

ÁREA ACAV

Área definida do FL 180 até o FL 220, formada por um polígono com as seguintes coordenadas geográficas:

13º 37’ 00’’ S 037º 52’’ 00’’ W;

12º 26’ 00’’ S 037º 12’ 00’’ W;

12º 46’ 00’’ S 036º 37’ 00’’ W; e

13º 56’ 00’’ S 037º 17’ 00’’ W.

ÁREA AREVO

Área definida do FL 150 até o FL 170, formada por um polígono com as seguintes coordenadas geográficas:

13º 37’ 00’’ S 037º 52’’ 00’’ W;

12º 26’ 00’’ S 037º 12’ 00’’ W;

12º 46’ 00’’ S 036º 37’ 00’’ W; e

13º 56’ 00’’ S 037º 17’ 00’’ W.

DIAS E HORÁRIOS

Dia 13/06/2014 (16h local) – início às 15h local e término às 19h local;
Dia 16/06/2014 (13h local) – início às 12h local e término às 16h local;
Dia 20/06/2014 (16h local) – início às 15h local e término às 19h local;
Dia 25/06/2014 (13h local) – início às 12h local e término às 16h local;
Dia 01/07/2014 (17h local) – início às 16h local e término às 21h local; e
Dia 05/07/2014 (17h local) – início às 16h local e término às 21h local.

LANDING AND TAKEOFF OPERATIONS

The landing and takeoff operations at the aerodromes of the host cities may be under operational restriction during the days and period of restrict areas activation. The aerodrome traffic is back to regular operation just after the end of areas activation.

Below are the operational constraints on landing and takeoff operations:

a) Prohibited landing operations on runway 10 of Salvador International Airport;

b) Authorized takeoff operations from runways 17, 35 and 10 of Salvador International Airport; and

c) Authorized takeoff operations from runway 28 of Salvador International Airport, though it is prohibited to enter the RED area.

AIRCRAFT SPECIAL ROUTE

a) Temporary suspension of REA INTERLAGOS, from PARIPE position until ROTATÓRIA position;

b) Temporary suspension of REA BONFIM;

c) Temporary suspension of REA AXEH; and

d) Temporary suspension of VERA CRUZ.

OPERAÇÕES DE POUSOS E DECOLAGENS

Nos dias e períodos de ativação das áreas restritas, as operações de pouso e decolagem nos aeródromos das cidades-sede poderão sofrer restrições operacionais. Após o termino da ativação das áreas, o uso do aeródromo volta a sua normalidade.

Seguem abaixo as restrições operacionais nas operações de pouso e decolagem:

a) Proibido as operações de pouso na pista 10 do Aeroporto Internacional de Salvador; e
b) Autorizado as operações de decolagem nas pistas 17, 35 e 10 do Aeroporto Internacional de Salvador; e
c) Autorizado as operações de decolagem na pista 28 do Aeroporto Internacional de Salvador, apenas se não entrar na área VERMELHA.

ROTA ESPECIAL DE AERONAVES

a) Suspensão Temporária da REA INTERLAGOS, da posição PARIPE até a posição ROTATÓRIA;
b) Suspensão Temporária da REA BONFIM;
c) Suspensão Temporária da REA AXEH; e
d) Suspensão Temporária da REA VERA CRUZ.

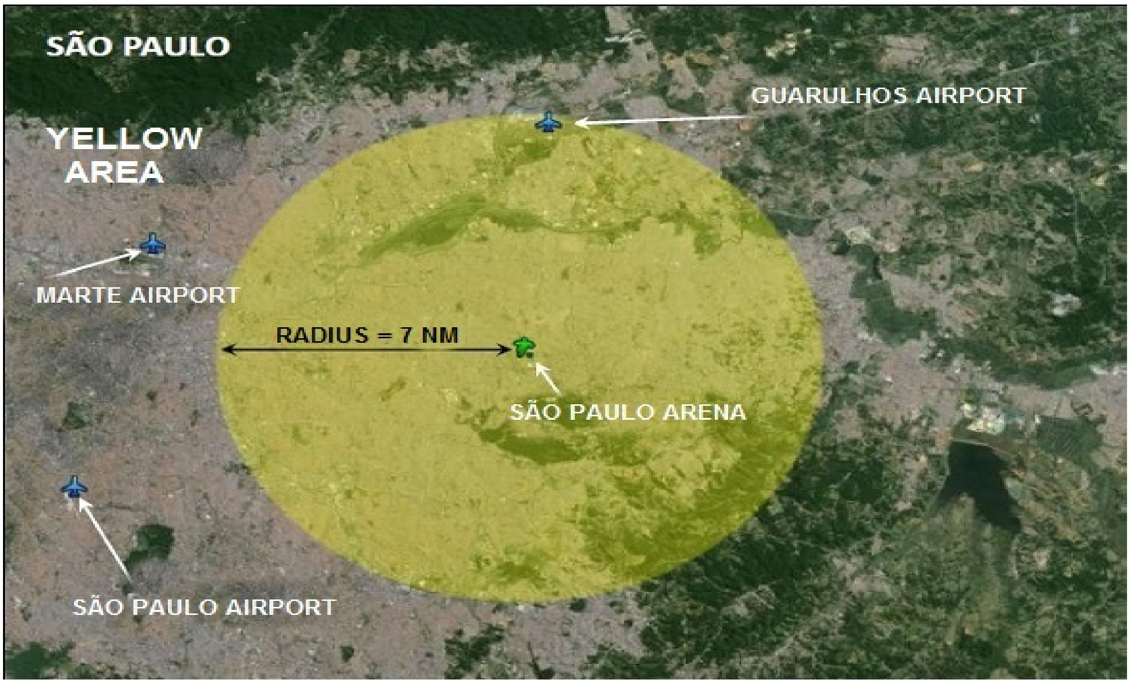
ATTACHMENT L - SÃO PAULO

RESERVED AREA

Area named WHITE, defined by the lateral projections of São Paulo TMA and vertical limits from the surface to FL 145.

RESTRICTED AREA

Area named YELLOW, inside the WHITE area, defined as a circle centered on the coordinates 23°32'43.14"S 046°28'23.30"W, with 7-NM radius and with responsibility volume superposed from the surface up to FL 145.



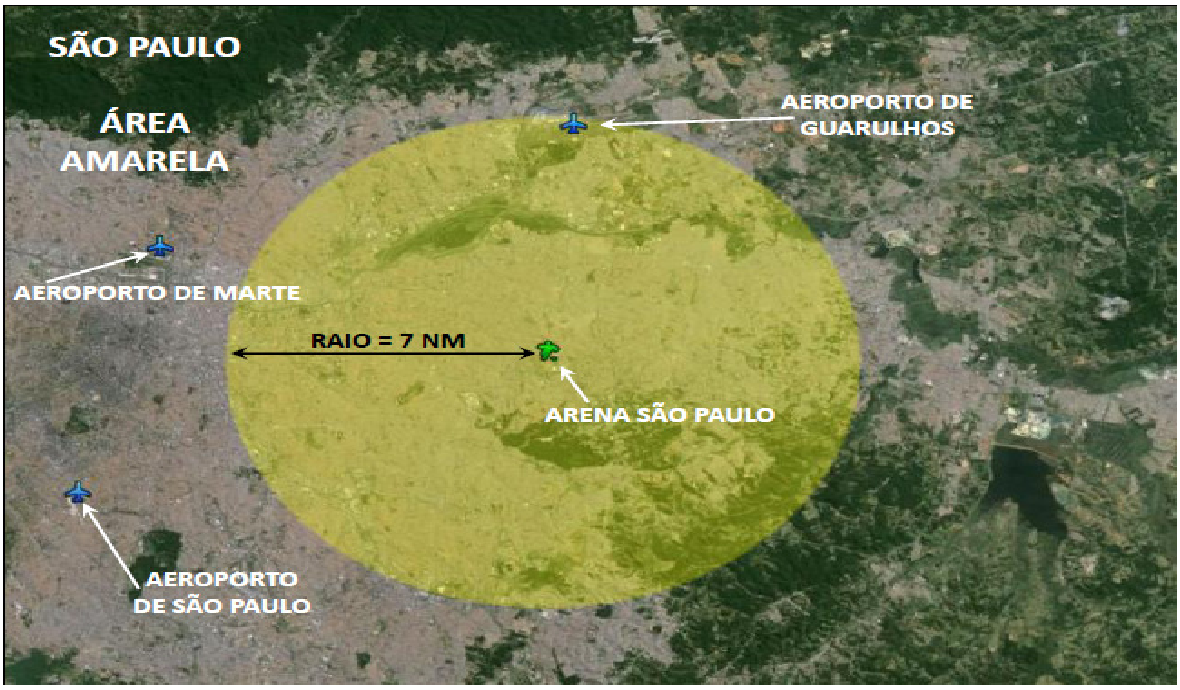
ANEXO L – SÃO PAULO

ÁREA RESERVADA

Área denominada BRANCA, definida pelas projeções laterais da TMA São Paulo e limites verticais da superfície ao FL 145.

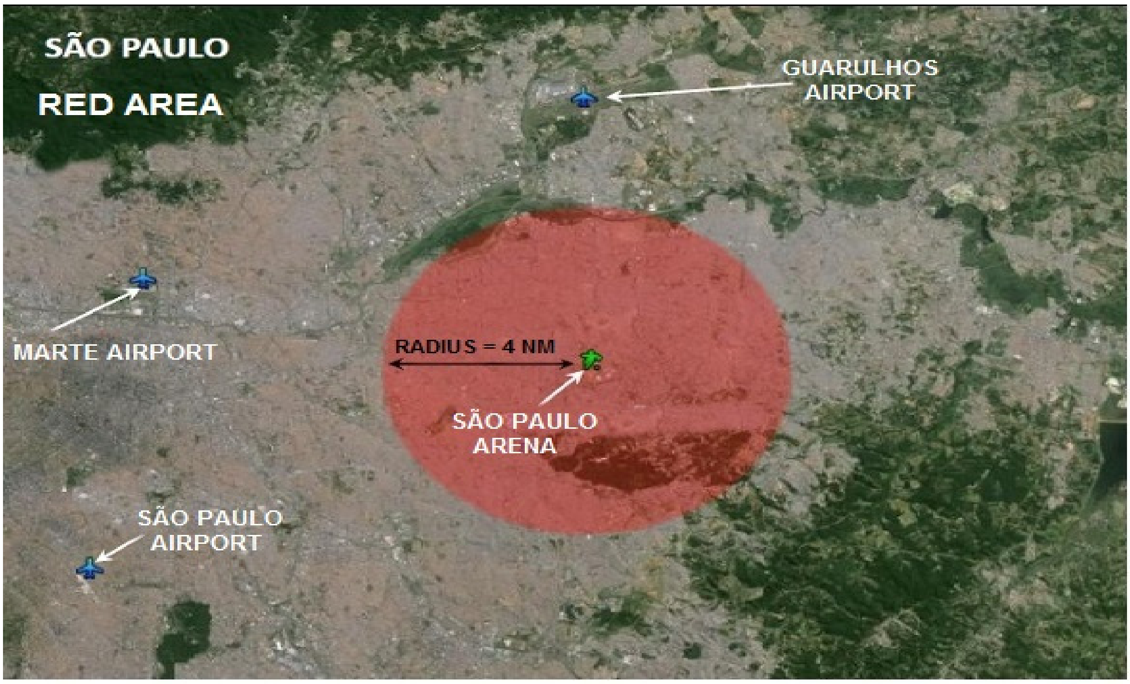
ÁREA RESTRITA

Área denominada AMARELA, dentro da área BRANCA, definida como um círculo com centro nas coordenadas 23°32'43.14"S 046°28'23.30"W, com 7 NM de raio e com volume de responsabilidade sobreposto da superfície até o FL 145.



PROHIBITED AREA

Area named RED, inside the YELLOW AREA, defined as a circle centered on the coordinates 23°32'43.14"S 046°28'23.30"W, with 4-NM radius and with responsibility volume superposed from the surface up to FL 145.



ACAV AREA

Defined area from FL 180 until FL 220, formed by a polygon with the following geographic coordinates:

24º 32' 25"S 046º 16' 42" W;

23º 53' 35"S 045º 09' 43" W;

24º 02' 35"S 044º 23' 13" W; and

25º 17' 16"S 046º 24' 58" W.

AREVO AREA

Defined area from FL 150 until FL 170, formed by a polygon with the following geographic coordinates:

24º 32' 25"S 046º 16' 42" W;

23º 53' 35"S 045º 09' 43" W;

24º 02' 35"S 044º 23' 13" W; and

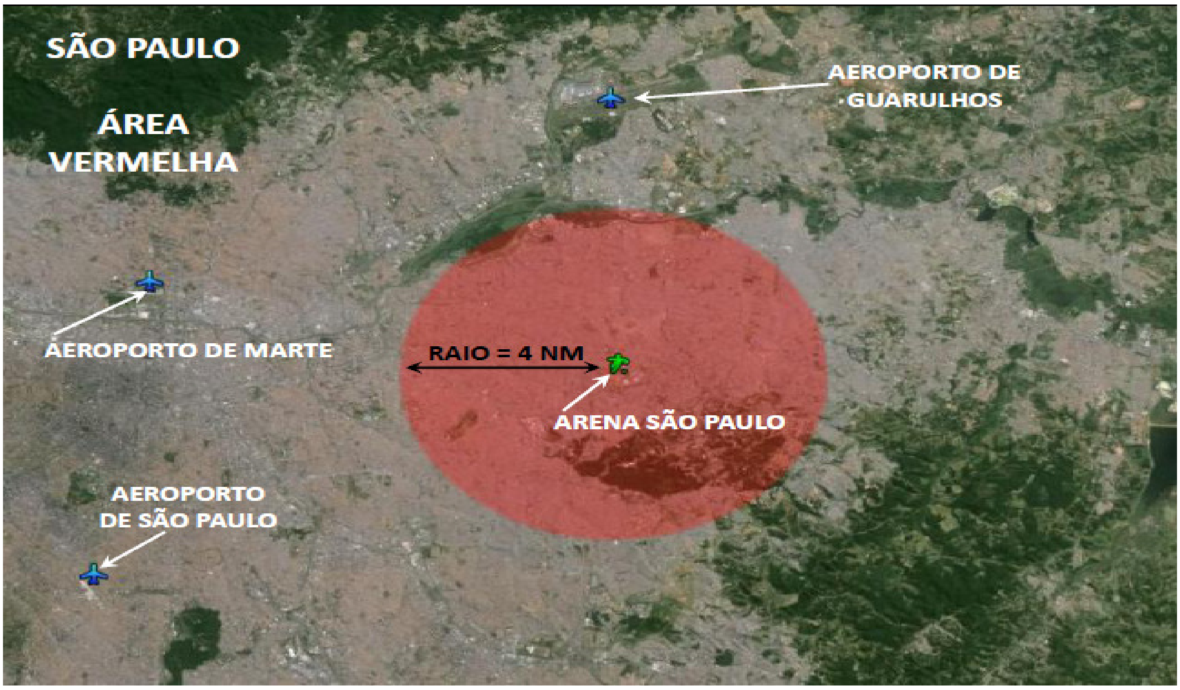
25º 17' 16"S 046º 24' 58" W.

DAYS AND TIMETABLE

12/Jun/2014 (5 p.m. local time) - from 2 p.m. local time until 9 p.m. local time;
19/Jun/2014 (4 p.m. local time) - from 3 p.m. local time until 7 p.m. local time;
23Jjun/2014 (1 p.m. local time) - from 12 noon local time until 4 p.m. local time;
26/Jun/2014 (5 p.m. local time) - from 4 p.m. local time until 8 p.m. local time;
01/Jul/2014 (1 p.m. local time) - from 12 noon local time until 5 p.m. local time;
09/Jul/2014 (5 p.m. local time) - from 4 p.m. local time until 9 p.m. local time.

ÁREA PROIBIDA

Área denominada VERMELHA, dentro da ÁREA AMARELA, definida como um círculo com centro nas coordenadas 23°32'43.14"S 046°28'23.30"W, com 4 NM de raio e com volume de responsabilidade sobreposto da superfície até o FL 145.



ÁREA ACAV

Área definida do FL 180 até o FL 220, formada por um polígono com as seguintes coordenadas geográficas:

24º 32' 25"S 046º 16' 42" W;

23º 53' 35"S 045º 09' 43" W;

24º 02' 35"S 044º 23' 13" W; e

25º 17' 16"S 046º 24' 58" W.

ÁREA AREVO

Área definida do FL 150 até o FL 170, formada por um polígono com as seguintes coordenadas geográficas:

24º 32' 25"S 046º 16' 42" W;

23º 53' 35"S 045º 09' 43" W;

24º 02' 35"S 044º 23' 13" W; e

25º 17' 16"S 046º 24' 58" W.

DIAS E HORÁRIOS

Dia 12/06/2014 (17h local) – início às 14h local e término às 21h local;
Dia 19/06/2014 (16h local) – início às 15h local e término às 19h local;
Dia 23/06/2014 (13h local) – início às 12h local e término às 16h local;
Dia 26/06/2014 (17h local) – início às 16h local e término às 20h local;
Dia 01/07/2014 (13h local) – início às 12h local e término às 17h local; e
Dia 09/07/2014 (17h local) – início às 16h local e término às 21h local.

LANDING AND TAKEOFF OPERATIONS

The landing and takeoff operations at the aerodromes of the host cities may be under operational restriction during the days and period of restrict areas activation. The aerodrome traffic is back to regular operation just after the end of areas activation.

Below are the operational constraints on landing and takeoff operations:

a) No restraints regarding takeoff and landing operations on the runways of Guarulhos International Airport; and
b) No restraints regarding takeoff and landing operations on the runways of Congonhas Airport.

AIRCRAFT SPECIAL ROUTE

a) Temporary suspension of REA INDIA, from CEU FORMOSA to PALMEIRAS; and
b) Temporary suspension of REA ROMEO, from REPRESA to ITAQUERA.

HELICOPTERS SPECIAL ROUTES

a) Temporary suspension of REH ECOLÓGICA, from DUTRA to SMIDT position;
b) Temporary suspension of REH CUMBICA, from SMIDT position until abeam SBGR;
c) Temporary suspension of REH FERROVIA, from ENTROCAMENTO position until CALMOM VIANA position;
d) Temporary suspension of REH SENNA, from SMIDT position until PEDÁGIO ITAQUERA; and
e) Temporary suspension of REH SUZANO.

OPERAÇÕES DE POUSOS E DECOLAGENS

Nos dias e períodos de ativação das áreas restritas, as operações de pouso e decolagem nos aeródromos das cidades-sede poderão sofrer restrições operacionais. Após o termino da ativação das áreas, o uso do aeródromo volta a sua normalidade.

Seguem abaixo as restrições operacionais nas operações de pouso e decolagem:

a) Sem restrições para as operações de pouso e decolagem em todas as pistas do Aeroporto Internacional de Guarulhos; e
b) Sem restrições para as operações de pouso e decolagem em todas as pistas do Aeroporto de Congonhas.

ROTA ESPECIAL DE AERONAVES

a) Suspensão temporária da REA INDIA, entre CEU FORMOSA até PALMEIRAS; e
b) Suspensão temporária da REA ROMEO, entre REPRESA até ITAQUERA.

ROTAS ESPECIAIS DE HELICÓPTEROS

a) Suspensão temporária da REH ECOLÓGICA, entre DUTRA até SMIDT;
b) Suspensão temporária da REH CUMBICA, entre SMIDT até o través de SBGR;
c) Suspensão temporária da REH FERROVIA, entre ENTROCAMENTO até CALMOM VIANA;
d) Suspensão temporária da REH SENNA, entre SMIDT até PEDÁGIO ITAQUERA; e
e) Suspensão temporária da REH SUZANO.

APPENDIX G / APÉNDICE G

LIST OF CONTACTS FOR OPERATIONAL ATFM FOCAL POINTS AND ESTABLISHED ATFM UNITS

LISTA DE CONTACTOS PARA PUNTOS FOCALES ATFM OPERACIONALES Y UNIDADES ATFM ESTABLECIDAS

State/ Estado	ATFM responsible-Name, MU/ACC, e-mail, telephone / Responsable ATFM-Nombre, FMU/ACC, correo electrónico, teléfono
ARGENTINA*	Enrique Muñoz Aeroparque Jorge Newbery Tel.: +5411 6894-0979, E-mail: enriquejmun@hotmail.com
BOLIVIA (Plurinational State of) / **BOLIVIA (Estado Plurinacional de)***	ATCO. Marco Sergio Barrios Barzola Supervisor ACC La Paz Jefe Navegación Aérea Reg. La Paz Tel/Fax: +591 2 281-0203 (ACC/La Paz) Tel/Fax: +591 2 282-1717 (Nav. Aérea) Tel: +591 2 223-8339 (Home/domicilio) Cel.: +591 7 052-3884 E-mail: mbarrios@aasana.bo masebarbar@hotmail.com
BRAZIL / BRASIL*	Gerente Nacional – GNAC Tel.: +55 21 2101-6409 E-mail: gnac@cgna.gov.br Gerente Nacional de Fluxo – GNAF Tel.: +55 21 2101-6546 E-mail: grt@cgna.gov.br Gerencias Regionais – GER Tel.: +55 21 9949-6492 / +55 21 2101 98554 3598 E-mail: gr1@cgna.gov.br / gr2@cgna.gov.br

State/ Estado	ATFM responsible-Name, MU/ACC, e-mail, telephone / Responsable ATFM-Nombre, FMU/ACC, correo electrónico, teléfono
CHILE*	Supervisor ATC de turno ACC Santiago Cel.: +56 9 158-1865
COLOMBIA*	Unidad de Gestión de Afluencia de Tránsito Aéreo y Capacidad – FCMU COL (DE 1100 A 0500 UTC) E-mail: cfmu.dsna@aerocivil.gov.co Please copy to / Favor copiar a: E-mail: cns.fmu@aerocivil.gov.co aga.fmu@aerocivil.gov.co Telefonos: MANAGER: +571 296-2656 CNS: +571 296-2100 AGA: +571 296-2200 DEPARTURE FLOW MANAGEMENT: +571 296-24 06 Celular: MANAGER: +57 317 517-10 46 AGA: +57 317 363- 88 11 CNS: +57 318 330-73 74
ECUADOR*	Operational focal points / Puntos focales operacionales: SUPERVISOR CENTRO DE CONTROL: DDI: +593 4 228-2851 REDDIG: 5060/5051/5052/ 5053
FR.GUIANA / GUYANA FRANCESA	

State/ Estado	ATFM responsible-Name, MU/ACC, e-mail, telephone / Responsable ATFM-Nombre, FMU/ACC, correo electrónico, teléfono
GUYANA	
PANAMÁ*	Focal point in control center / Punto focal en el Centro de Control; Supervisor: +507 315-9880 Emergency focal point /Punto focal de Emergencia: Ricardo Deville Tel.: +507 6238-4009
PARAGUAY*	1-Unidad de Flujo (SGAS) – FMU SGAS (Unidad Operativa). Current responsible / Responsable actual de dicha Unidad: ATCO. Sindulfo Ibarrola Tel./Fax: +595 21 758-5110 Cel.: +595 983 35-0815 E-mail: fmu.asu@gmail.com Mariano Roque Alonso-Paraguay Edificio del Nuevo Centro de Control Unificado. 2-Unidad de Flujo (SGES) – FMU SGES (Unidad Operativa). Current responsable / Responsable actual de dicha Unidad: Lic. ATCO. David Gavilán Tel./Fax: +595 64 420-842 Cel.: +595 983 830-404 E-mai): daga_978@hotmail.com Minga Guazú-Paraguay Aeropuerto Internacional Guaraní.
PERÚ*	José Mondragón Hernández Inspector de Navegación Aérea Dirección General de Aerónautica Civil Tel.: +511 615-7881 Cel.: +51 99044-0563 E-mail: jmondragon@mtc.gob.pe

State/ Estado	ATFM responsible-Name, MU/ACC, e-mail, telephone / Responsable ATFM-Nombre, FMU/ACC, correo electrónico, teléfono
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* Updated SAM/IG/13 / Actualizados en la SAM/IG/13

APPENDIX H / APÉNDICE H

INSTRUCTIONS TO PARTICIPATE IN DAILY CGNA TELECONFERENCES

INSTRUCCIONES PARA PARTICIPAR EN TELECONFERENCIAS DIARIAS CGNA

Centro de Gerenciamento da

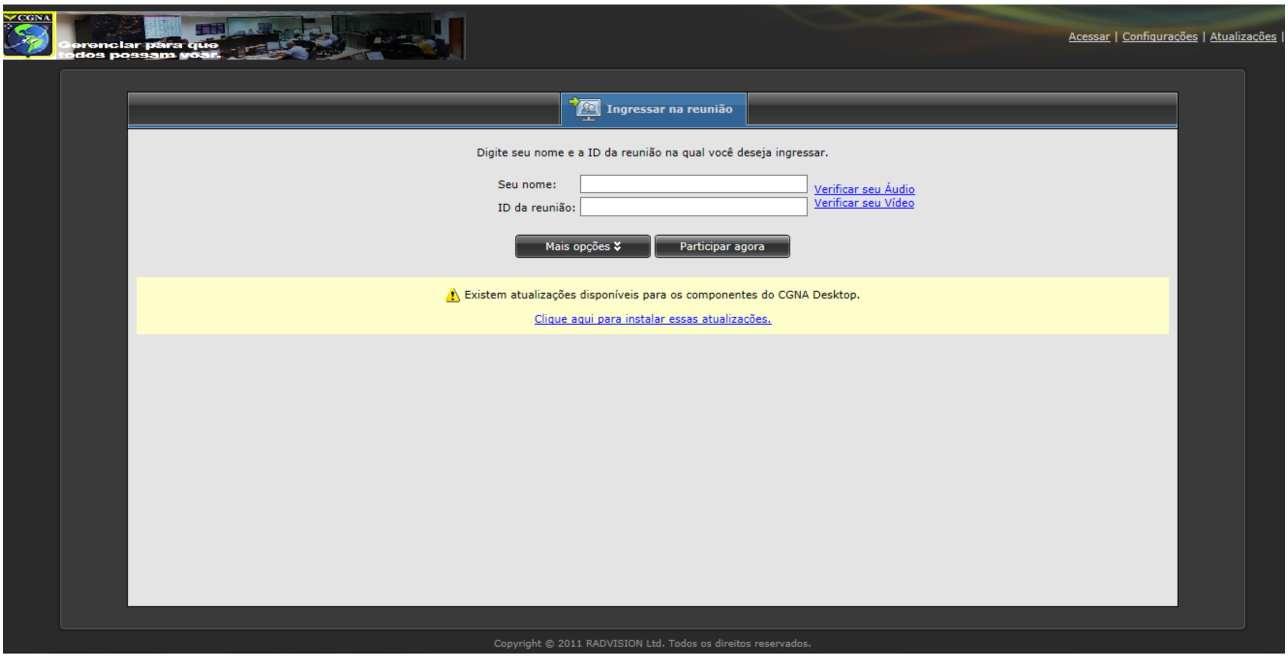
Navegação Aérea

Manual de acesso à Videoconferência do CGNA

Acesso via Internet

Última atualização em 22/04/2014

1- Abra o navegador (Chrome, Firefox, Internet Explorer), e acesse o link: videoconf.cgna.gov.br



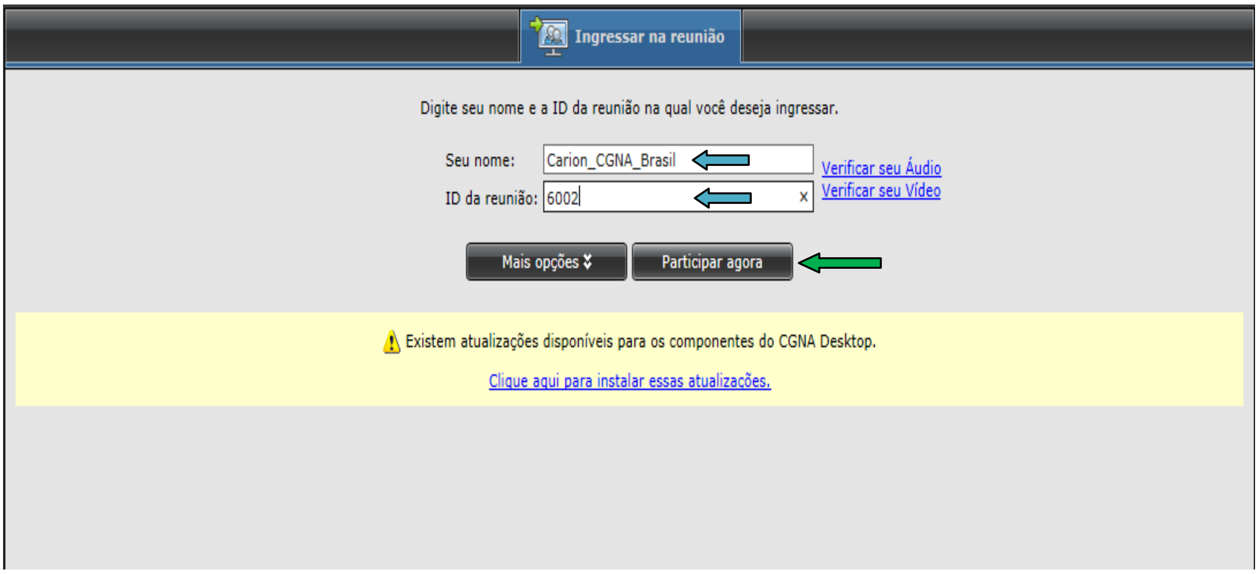
2- Informe seu nome e o ID da reunião.

a. O campo SEU NOME deve seguir o formato: *nome_órgão_País*

(Ex. Carion_CGNA_Brasil)

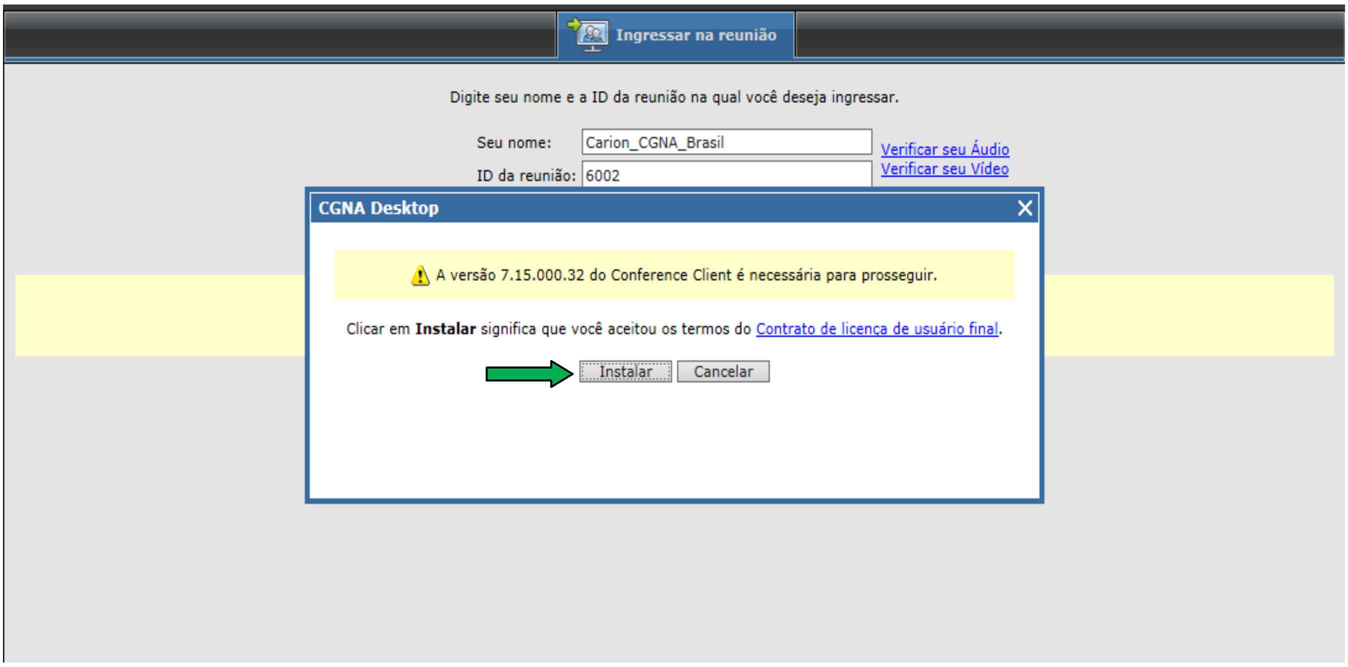
b. O campo ID DA REUNIÃO será informado pelo CGNA, por padrão será *6002*

c. Após informar SEU NOME e ID DA REUNIÃO, clicar em PARTICIPAR AGORA.

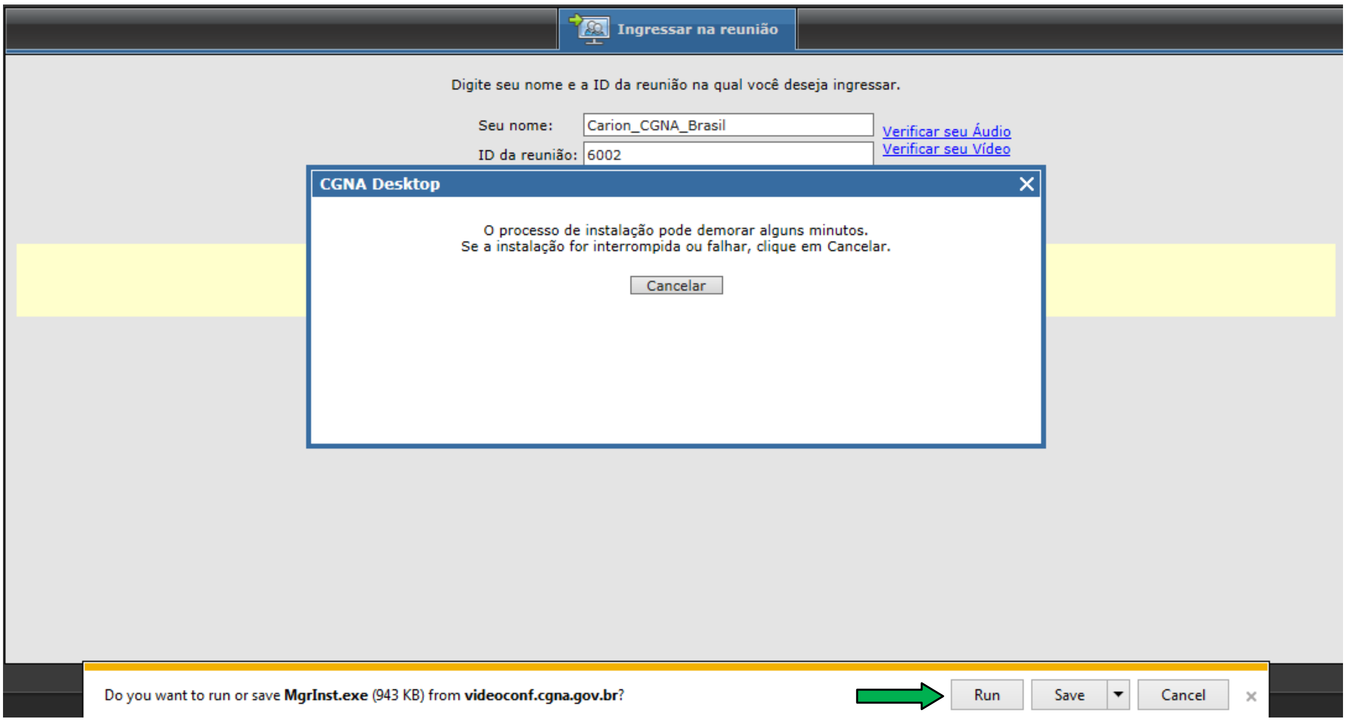


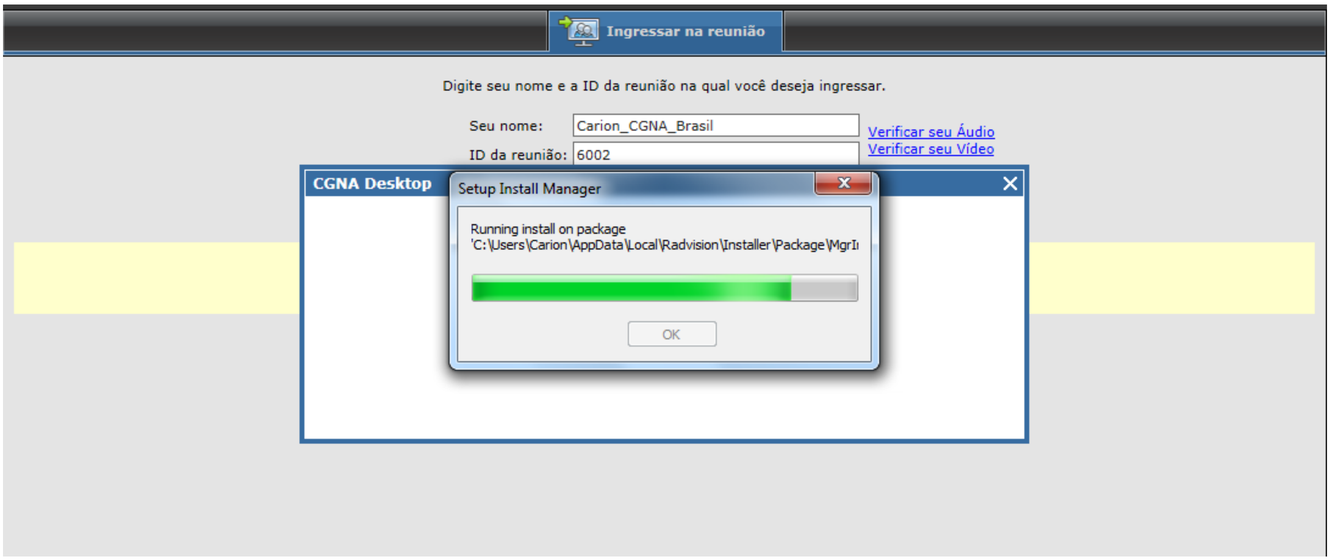
3- No seu primeiro acesso, deverá ser instalado um software para possibilitar o correto funcionamento da videoconferência. A caixa de diálogo para instalação aparecerá automaticamente.

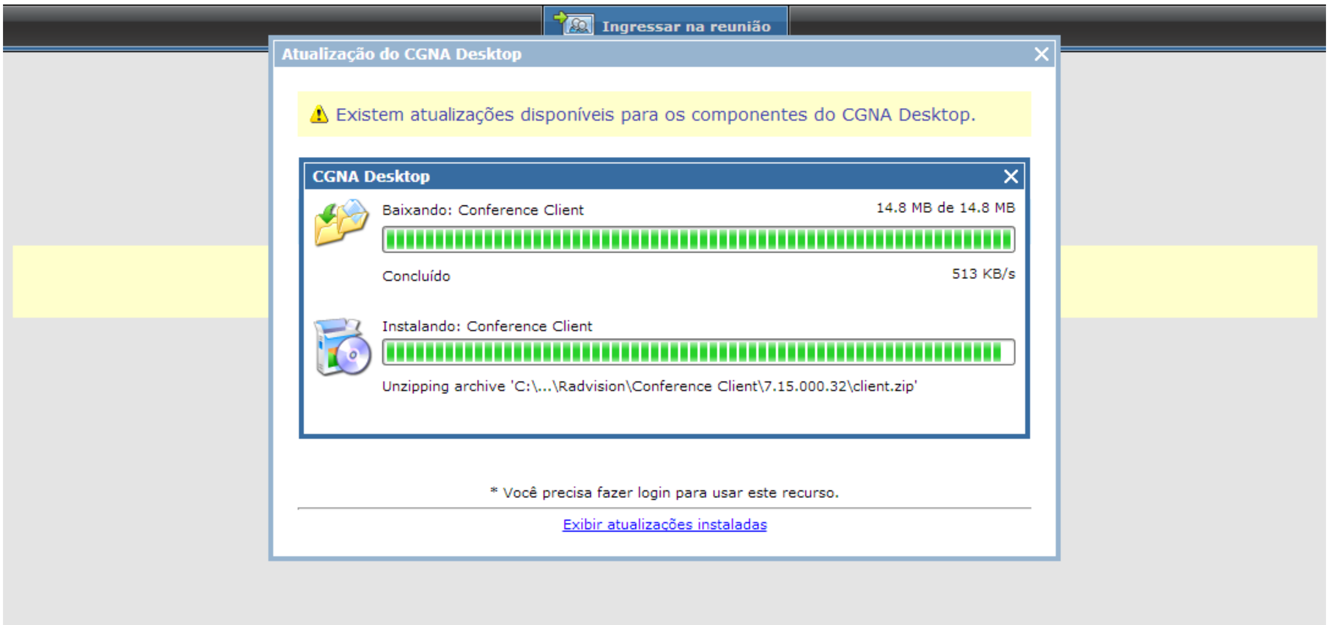
a. Na caixa de diálogo, selecionar: INSTALAR.



b. Em seguida confirmar a instalação do arquivo **MgrInst.exe** e aguardar

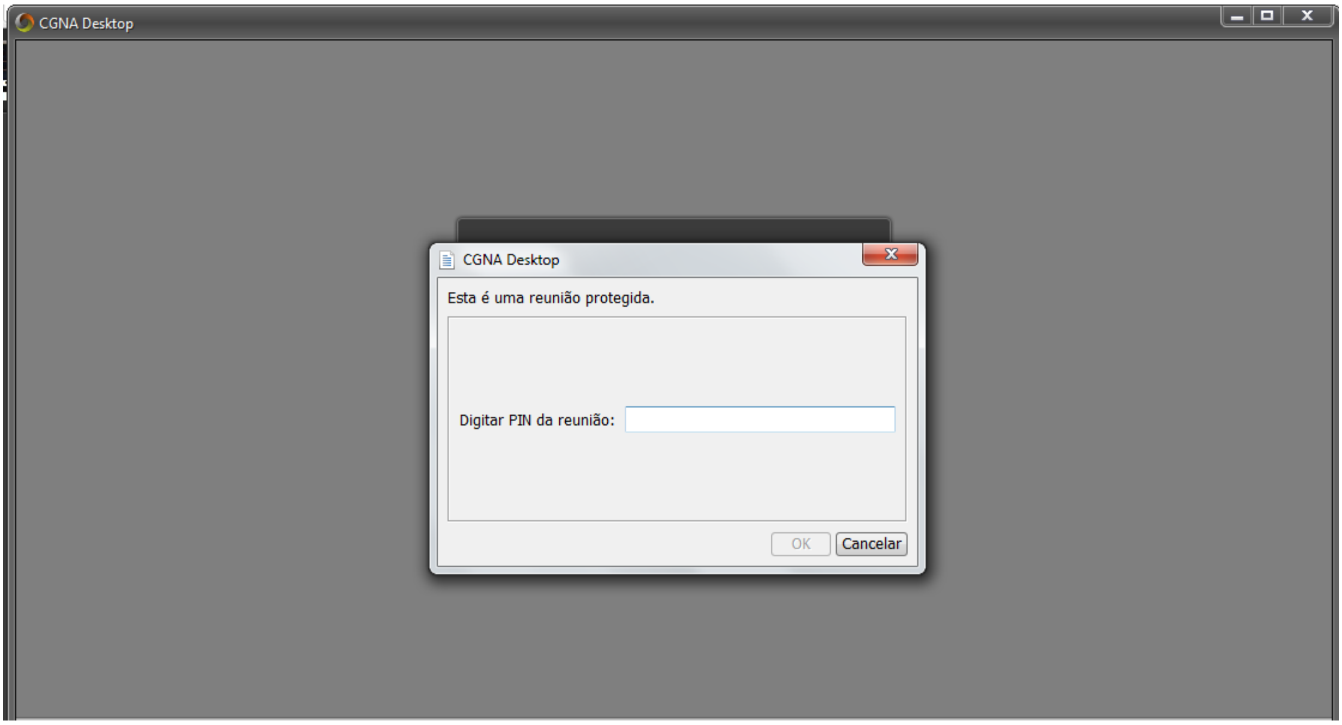




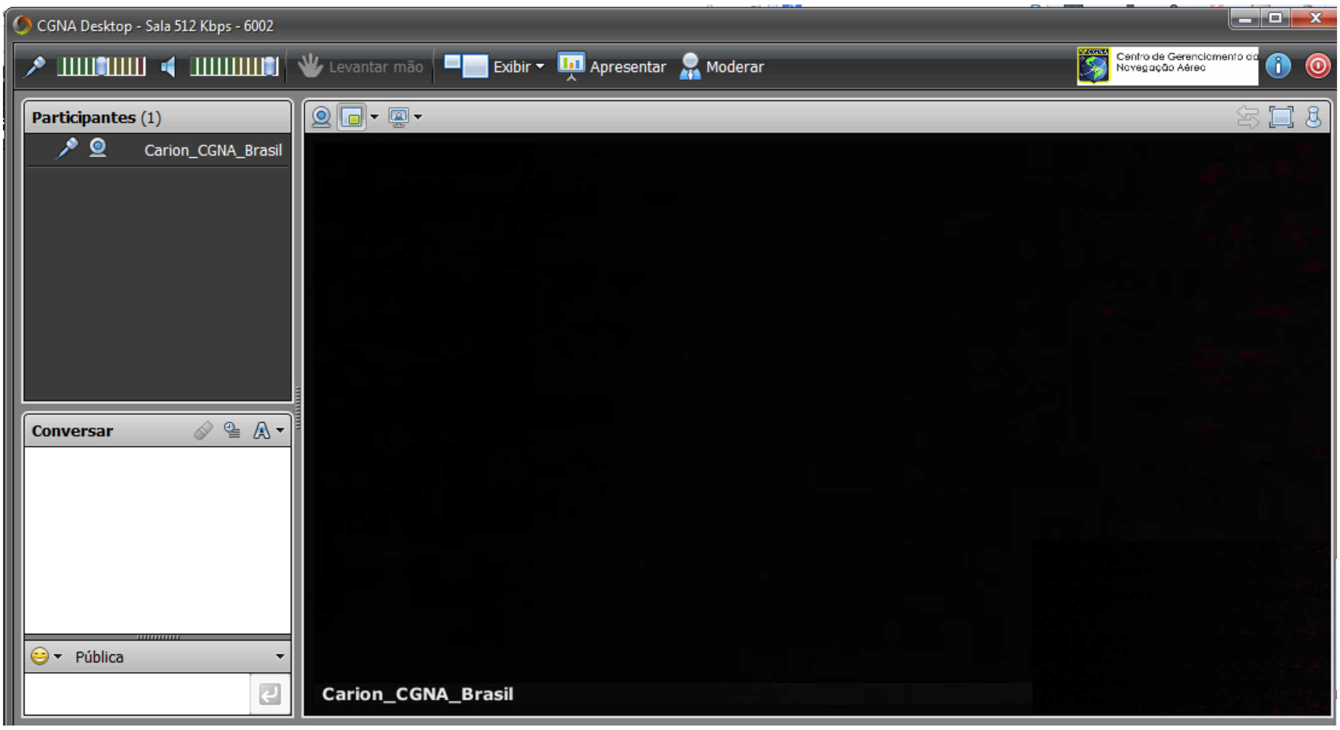


4- Depois do processo de instalação, o sistema solicitará o PIN (senha) e permitirá acesso à conferência.

a. Todos os participantes deverão fazer contato com o CGNA antes do início da Videoconferência para confirmar a participação e receber a senha de acesso.



5- Após confirmação de senha, o convidado poderá participar da Videoconferência.



Dúvidas e/ou sugestões poderão ser encaminhadas à Divisão de Sistemas Operacionais do CGNA através do email: efetivodso@cgna.gov.br

APPENDIX I

Doc 9971

PART II

AIR TRAFFIC FLOW MANAGEMENT (ATFM)

DRAFT

FOREWORD

This guidance material contains information on how air traffic flow management (ATFM) should be implemented and applied by using collaborative decision-making (CDM) processes in order to balance capacity and demand within different volumes of airspace and airport environments. It highlights the need of close cooperation among different stakeholders by providing flexibility in the use of the airspace and airport resources. It provides therefore guidance applicable to:

a) air navigation service providers;
b) airspace users;
c) airline operation centers;
d) airport operators;
e) airport ground handlers;
f) airport slot coordinators;
g) regulators;
h) military authorities;
i) security authorities;
j) meteorological agencies; and
k) industries related to aviation.

Key objectives of this guidance material are to:

a) establish globally consistent ATFM planning and operating practices;
b) encourage a collaborative and harmonized approach to ATFM between States and regions; and
c) encourage a systemic approach to ATFM, including all ATM community members.

This guidance material is designed to provide answers to the following questions:

a) What is the starting point regarding the development of an ATFM service? (Chapter 1);
b) What are the foundational objectives and principles of ATFM? (Chapter 1);
c) What are the benefits of implementing an ATFM service? (Chapter 1);
d) How does an ATFM service operate? (Chapter 2);
e) How is an ATFM service structured and organized? (Chapter 3);
f) What are the roles and responsibilities of the stakeholders in the ATFM service? (Chapter 3);
g) How is the capacity of an airspace sector and airport determined? (Chapter 4);
h) How are ATFM processes applied in order to balance the demand and capacity within its area of responsibility? (Chapter 4);
i) How is an ATFM service implemented? (Chapter 5);
j) What are ATFM Measures and how are they established and applied? (Chapter 6);
k) What data and information are exchanged in an ATFM service? (Chapter 7);
l) What terminology/phraseology is used in ATFM? (Chapter 8); and
m) What resources are available to States regarding the various aspects of ATFM? (Appendices).

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GLOSSARY

ABBREVIATIONS/ACRONYMS

AAR	Airport acceptance rate
ADP	ATFM daily plan
A-CDM	Airport-CDM
AIM	Aeronautical information management
ANM	ATFM notification message
ANSP	Air navigation service provider
AO	Aircraft operator
AOBT	Actual off-block time
ASM	Airspace management
ATFM	Air traffic flow management
ATFMU	Air traffic flow management unit
ATFCM	Air traffic flow and capacity management
ATM	Air traffic management
ATOT	Actual take-off time
ATS	Air traffic services
AU	Airspace user
CDM	Collaborative decision-making
CEF	Capacity enhancement function
CFMU	Central flow management unit
CGNA	Air navigation management centre
CTA	Calculated time of arrival
CTO	Calculated times over
CTOT	Calculated take-off time
EOBT	Estimated off-block time
ETA	Estimated time of arrival
ETD	Estimated time of departure
ETO	Estimated time over a reference point
ETOT	Estimated take-off time
FAP	Future ATM profile
FMP	Flow management position
FMU	Flow management unit
GDP	Ground delay programme
GS	Ground stop
IATA	International Air Transport Association
IFR	Instrument flight rules
MDI	Minimum departure interval
NAVAIDs	Navigation aids
MIT	Miles-in-trail
R&D	Research and development
TMA	Terminal control area
ToD	Top of descent
VFR	Visual flight rules
VMC	Visual meteorological condition

REFERENCES

Global Air Traffic Management Operational Concept (Doc 9854) Manual
on Air Traffic Management System Requirements (Doc 9882) Manual on
Global Performance of the Air Navigation System (Doc 9883)
Manual on Flight and Flow – Information for a Collaborative Environment (Doc 9965)
Civil/Military Cooperation in Air Traffic Management (Cir 330-AN/189)
Procedures for Air Navigation Services — Air Traffic Management (PANS-ATM, Doc 4444)

Chapter 1

INTRODUCTION

1.1 Air traffic flow management philosophy

1.1.1 Air traffic flow management (ATFM) is an enabler of air traffic management (ATM) efficiency and effectiveness. It contributes to the safety, efficiency, cost effectiveness, and environmental sustainability of an ATM system. It is also a major enabler of global interoperability of the air transport industry and it is important to recognize that, over time, two associated concepts will take shape:

a) standardized ATFM processes will be implemented globally; and

b) global ATFM will take shape.

1.1.2 What is the starting point regarding the development of an ATFM service?

1.1.2.1 The level of an ATFM service required in a given setting will depend on a number of factors that will be addressed in this manual It is important to note that an ATFM service may be simple or complex, depending on the environment and its requirements. Even relatively simple ATFM services, when properly designed and implemented, can be as effective as complex services and thus enable Air Navigation Service Providers (ANSPs) to effectively provide the required service.

1.1.2.2 One key to the successful implementation of an effective ATFM service is achieving a robust coordination among aviation stakeholders. It is envisioned that ATFM is performed as a collaborative decision-making process where airports, ANSPs, Airspace Users (AU), military entities, and other stakeholders work together to improve the overall performance of the ATM system. It is likewise envisioned that such coordination will take place within a Flight Information Region (FIR), between FIRs, and ultimately, between regions.

Note – For the purpose of this guidance the term airspace user includes, but is not limited to, airline, air taxi, charter, general aviation, and military operators.

1.1.2 3 ATFM and its applications may not be restricted to one State or FIR because of their far-reaching effects on the flow of traffic elsewhere. The *Procedures for Air Navigation Service – Air Traffic Management* (PANS-ATM, Doc 4444) recognises this important fact, stating that ATFM should be implemented on the basis of a regional air navigation agreement or, when appropriate, as a multilateral agreement.

1.2 Air traffic flow management objectives and principles

1.2.1 What are the foundational objectives and principles of ATFM?

1.2.1.1 The objectives of ATFM are to:

a) enhance the safety of the ATM system by ensuring the delivery of safe traffic densities and minimizing traffic surges;

b) ensure an optimum flow of air traffic throughout all phases of the operation of a flight by balancing demand and capacity;

c) facilitate collaboration among system stakeholders to achieve an efficient flow of air traffic through multiple volumes of airspace in a timely and flexible manner that supports the attainment of the business or mission objectives of Airspace Users (AUs) and provides optimum operational choices;

d) balance the legitimate, but sometimes conflicting, requirements of all AUs, thus promoting equitable treatment;

e) consider ATM system resource constraints and economic and environmental priorities;

f) facilitate, by means of collaboration among all stakeholders, the management of constraints, inefficiencies, and unforeseen events that affect system capacity in order to minimize negative impacts of disruptions and changing conditions; and

g) facilitate the achievement of a seamless and harmonised ATM system while ensuring compatibility with international developments.

1.2.1.2 The principles of ATFM are to:

a) optimize available airport and airspace capacity without compromising safety;

b) maximize operational benefits and global efficiency while maintaining agreed safety levels;

c) promote timely and effective coordination with all affected parties;

d) foster international collaboration leading to an optimal, seamless ATM environment;

e) recognize that airspace is a common resource for all users and ensure equity and transparency, while taking into account security and defence needs;

f) support the introduction of new technologies and procedures that enhance system capacity and efficiency;

g) enhance system predictability and help to maximise aviation economic efficiencies and returns, and support other economic sectors such as business, tourism and cargo; and

h) evolve constantly to support an ever-changing aviation environment.

1.3 Air traffic flow management benefits

1.3.1 What are the benefits of implementing an ATFM service?

1.3.1.1 The benefits of ATFM lie in various domains of the ATM system:

a) operational;

1) enhanced ATM system safety;

2) increased system operational efficiency and predictability through collaborative decision-making processes;

3) effective management of capacity and demand through data analysis and planning;

4) increased situational awareness among stakeholders and a coordinated, collaborative development and execution of operational plans;

5) reduced fuel burn and operating costs; and

6) effective management of irregular operations and effective mitigation of system constraints and consequences of unforeseen events;

b) societal:

1) improved quality of air travel;

2) increased economic development through efficient and cost-effective services to the projected increased levels of air traffic;

3) reduction of aviation-related greenhouse gas emissions; and

4) mitigation of the effects of unforeseen events and situations of reduced capacity and effective, rapid recovery from them.

Chapter 2

THE ATFM SERVICE

2.1 How does an ATFM service operate?

2.1.1 ATFM is relevant to any ATM stakeholder when that stakeholder's effect on aviation is viewed from a systemic perspective.

2.1.2 The guiding principles of "first come, first served" and "equitable access to airspace" have traditionally been very important to the ATM system. The global ATM system is evolving, however, to consider net results in terms of overall system efficiency, the environment, and operating costs. To support this evolution, ATFM service may focus on other priorities such as "most capable aircraft" in order to achieve optimum ATM system performance. Likewise, equitable access to airspace may be viewed on a longer time scale than the short term "first come, first served" model.

2.1.3 ATFM service relies on a number of supporting systems, processes and operational data in order to function effectively. The maturity level of these systems and processes will determine the level of ATFM service that is established. Some elements to be considered are:

a) ATM resources: ATFM recognizes that airspace and aerodromes are common resources shared by all AUs and that equity and transparency must be maintained to the highest standard;

b) traffic demand: A timely, accurate depiction of predicted flight activity for all flights utilizing an ATM resource (e.g., airport, en route sector, etc.). Data should be aggregated from all operational data sources; e.g., airline schedules, flight plan data, airport slot management systems, ATM operational systems, and AU intentions;

c) the tactical, dynamic traffic situation: Accurate data derived from surveillance and flight information, to increase the accuracy of short to medium term prediction;

d) The forecast and dynamic meteorological situation: The integration and display of a variety of meteorological data for ATFM planning and operational execution;

e) the status and availability of airspaces under restrictions or reservations as it affects the flow of air traffic;

f) shared ATFM tools and data interoperability: Tools that enable common situational awareness through the sharing of data and operational information among stakeholders. ATFM tools draw from a variety of databases to accurately display meteorological and air traffic information; and

g) institutional arrangements: Formalized agreements between all ATFM stakeholders in the relevant area and appropriate arrangements with adjacent ATFM units.

2.1.4 Whenever measures to control the flow of air traffic have to be applied in the form of delays, AUs should be notified by ATC while the aircraft are on the ground rather than in flight. A strategy to safely and efficiently balance ground and airborne delays shall be collaboratively agreed upon between the ATFM units, affected ATS facilities and AUs in advance.

2.1.5 AUs should be informed as early as possible regarding the nature and location of ATM constraints so that information can be integrated into the operational plan of the flight.

2.1.6 In addition to airborne holding, the management of airborne delays can be accomplished by slowing aircraft well before top of descent (ToD) and making use of required time of arrival (RTA) aircraft capabilities in order to reduce operating costs, environmental impact, and ATC workload.

2.1.7 When ATFM measures are necessary to manage a constraint, they should be applied in a timely manner and only for the period when expected air traffic demand will exceed the capacity in the constrained area. ATFM measures should be kept to the minimum and, whenever possible, be applied selectively only to that part of the system that is constrained.

2.1.8 Information on anticipated overload situations should be provided to affected AUs as soon as possible.

2.1.9 ATFM measures should be established and coordinated in such a way as to avoid, if at all possible, having cumulative or contradictory effects on the same flights.

2.1.10 Automated tools should be implemented and utilized to allow for effective collaboration and dissemination of ATFM information.

2.1.11 CDM should be utilized to manage flows of traffic through all components of the ATM system. CDM should also occur within and between regions where significant traffic flows exist and interact with each other.

2.1.12 The most efficient utilization of available airspace and airport capacity can be achieved only if all relevant elements of the ATM system have been considered during the planning stage. Moreover, ATFM planning should, whenever required, focus on regional ATFM and be prioritized for appropriate major traffic flows.

2.1.13 ATFM traffic data analysis can yield significant strategic benefits, especially when used in conjunction with airspace and ATS route planning, in terms of future ATM systems and procedure improvements. This is part of a continuous safety and service improvement loop (see Figure 1).

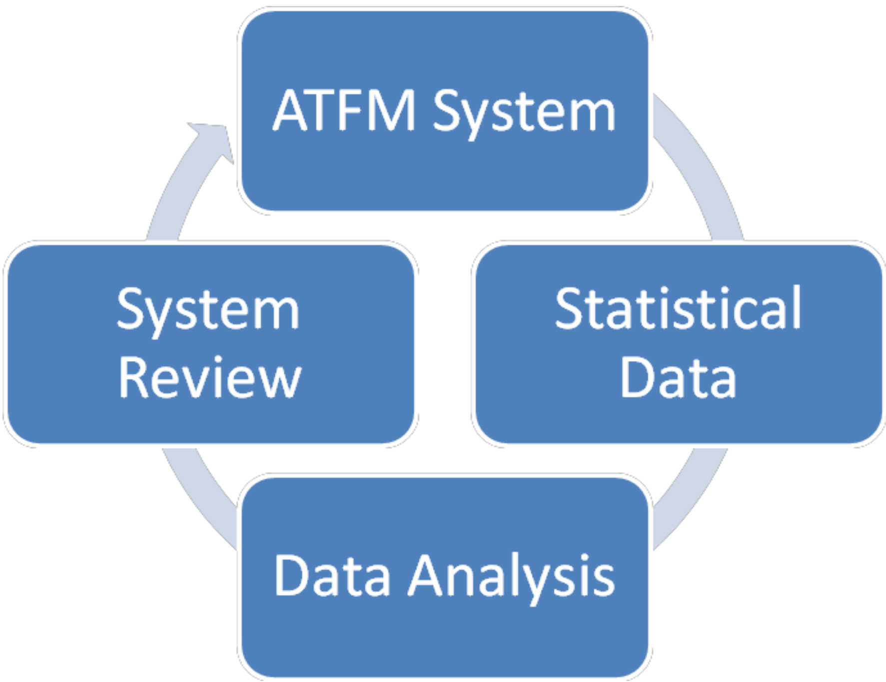


Figure 1. ATFM cycle of review and improvement

2.1.14 States may choose to prioritize or exempt certain classes of flight from ATFM control measures. Examples of such flights include but are not limited to:

a) flights experiencing an emergency, including aircraft subjected to unlawful interference;

b) flights on search and rescue or fire-fighting missions;

c) urgent medical evacuation flights specifically declared by medical authorities;

d) flights with ‘Head of State’ status; and

e) other flights as specifically required by State authorities.

Note – After medical flights have completed their mission they should be subject to ATFM measures. Scheduled passenger transfer flights are, by their nature, non-urgent and should not be given priority under normal operational situation. Notwithstanding any exemption from ATFM measures, exempted aircraft are included in the airport/airspace demand estimation.

2.1.15 Appropriate automated tools could be used to enable and enhance the effective application of ATFM.

2.2 Collaborative decision-making (CDM) in the context of ATFM

2.2.1 CDM is the process which allows decisions to be taken by amalgamating all pertinent and accurate sources of information, ensuring that the data best reflects the situation as known, and ensuring that all concerned stakeholders are given the opportunity to influence the decision. This in turn enables decisions to best meet the operational requirements of all concerned.

2.2.2 The CDM process is a key enabler of an ATFM strategy allowing the sharing of all relevant information between the parties involved in making decisions and supporting an on-going dialogue between the various stakeholders throughout all phases of flight. This enables the various organisations to update each other continuously on events from the strategic level to real-time.

2.2.3 CDM is a supporting process applied to activities such as airspace management and demand/capacity balancing and can be applied across the timeline of activities from strategic planning to tactical operations. CDM is not an objective in itself, but rather a way to reach the performance objectives of the processes it supports. These performance objectives are expected to be agreed upon collaboratively.

2.2.4 Although information sharing is an important enabler for CDM, the sharing of information is not sufficient to realize CDM and the objectives of CDM. Successful CDM also requires agreed upon procedures and rules to ensure that collaborative decisions will be made expeditiously and fairly.

2.2.5 CDM ensures that decisions are taken transparently based on the best information available as provided by the participants in a timely and accurate manner.

2.3 CDM Organization and Structure

2.3.1 The organization and structure of the CDM process depends on the complexity of the ATFM system in place. The structure must be designed to ensure that the affected stakeholders, service providers and airspace users alike, can discuss airspace, capacity and demand issues through regular sessions and formulate plans that consider all pertinent aspects and points of view.

2.3.2 Frequent tactical briefings and conferences can be used to provide an overview of the current ATM situation, discuss any issues and provide an outlook of operations for the coming period. These briefings should be scheduled depending on the traffic patterns and their intensity applicable to the area. They should occur at least daily but may also be scheduled to occur more frequently depending on the traffic and capacity situation (e.g. an evolving meteorological event may require that the briefing frequency be increased). Participants should include involved ATFM and ATS units, chief or senior dispatchers, affected military authorities and airport authorities, as applicable.

2.3.3 The output of these daily conferences should be the publication of an ATFM daily plan (ADP) and subsequent updates. The ADP should be a proposed set of tactical ATFM measures (e.g. activation of routing scenarios, miles-in-trail, etc.) prepared by the ATFM unit and agreed to between all partners concerned during the planning phase. The ADP should evolve through the day and be periodically updated and published.

2.3.4 Feedback and review of the ADP received from ANSPs, AUs, and from the ATFM unit itself represent very important input for further improvement of the Pre-Tactical planning. This feedback helps the ATFM unit identify the reason(s) for ATFM measures and determine corrective actions to avoid reoccurrence. Systematic feed-back from AUs should be gathered via specifically established links.

2.3.5 In addition to the daily conferences, the ATFM unit should consider holding periodic and event specific CDM conferences, with an agenda based on experience. The objective should be to make sure that ATFM measures to be applied are decided through a CDM process and agreed to by all affected stakeholders.

2.4 CDM Requirements and Benefits

2.4.1 Through the application of a transparent CDM process, the involved stakeholders will gain the necessary situational awareness and ensure that the optimum measures are applied in any given situation. CDM will also create an environment where stakeholders better understand the issues of all concerned.

2.4.2 Regular CDM conferences provide stakeholders with the opportunity to propose enhancements that could benefit them, to follow up on any issue, and to monitor the equity of the flow management process.

2.5 ATFM, CDM, and Civil/Military Coordination

2.5.1 ATFM principles are equally applicable to both civil and military flights operated in accordance with civil rules. Civil/military coordination will provide more flexibility to AUs, thanks to the greater availability of both information and airspace. There will continue to be a need to accommodate missions that are incompatible with civil aviation. These missions may be military operations, support of security requirements, live weapons firing, space operations or others. The degree of civil/military coordination in terms of air traffic management within each State continues to be a matter of national policy and, therefore, military participation in a regulated aeronautical information infrastructure will be subject to national considerations.

2.5.2 The processes aiming to a flexible use of airspace involves an optimum sharing of airspace under appropriate civil/military coordination to achieve the proper separation between civil and military flights, thus reducing the need for permanent airspace segregation.

2.5.3 Benefits of civil/military coordination include:

a) operational savings for flights through distance, time and fuel reductions;

b) route network optimization for the provision of ATS and the associated sectoring, providing ATC capacity increases and a reduction of delays of air traffic in general;

c) more efficient air traffic flow separation procedures;

a) reduced ATC workload through a reduction in congestion and choke points;

e) real-time provision of capacity according to the AUs operational requirements; and

f) definition and use of temporary reservation of airspace more in keeping with operational military requirements, in a way that responds optimally to their specific requirements.

2.5.4 It is recommended that States and/or service providers develop and document a collaborative process with users of airspace under restrictions or reservations that enables the use of these airspaces by civilian traffic when not in active use by the primary user in order to increase efficiency.

2.5.5 When applicable, such agreements and procedures should ideally be established on the basis of a regional air navigation agreement. The agreements and procedures aiming to a flexible use of airspace should specify, inter alia:

a) the horizontal and vertical limits of the airspace concerned;

b) the classification of any airspace made available for use by civil air traffic;

c) units or authorities responsible for the airspace;

d) conditions for transfer of the airspace to/from the ATS unit concerned;

e) periods of availability of the airspace;

f) any limitations on the use of the airspace concerned;

g) the means and timing of an airspace activation warning if not permanently active; and

h) any other relevant procedures or information.

Chapter 3

ATFM STRUCTURE AND ORGANIZATION

3.1 How is an ATFM service structured and organized?

3.1.1 It is understood that different levels of ATFM oversight will exist. The main concept, however, is for each State to assign responsibility for the collection, dissemination, monitoring, and surveillance of ATFM activities within its respective FIR(s). This will ensure that all stakeholders have timely and efficient access to applicable ATFM information.

3.1.2 Each State will ensure that an ATFM organizational structure that meets the needs of the aviation community is developed. This structure should address, at a minimum, management and oversight of the following:

a) the air traffic flow management service;

b) coordination/exchange of information, both internally and externally;

c) a line of authority for the implementation of decisions; and

d) compliance with mission requirements.

3.1.3 A line of authority to support the ATFM service is required. This may include the following:

a) manager of the ATFM service;

b) the flow management unit (FMU) that provides ATFM service for a specific set of ATS units; and

c) flow management positions (FMPs) at specific ATS units responsible for the day-to-day ATFM activities.

3.1.4 A prototype ATFM service could be designed as follows:

a) an aerodrome control tower can be served by an FMP. This duty can be assigned to an existing position or it may require a dedicated position. The control tower FMP coordinates with the FMP at the approach control unit;

b) an approach control unit can be served by an FMP. This duty can be assigned to an existing position in the approach control unit or it may require one or more dedicated positions, depending on workload. The approach control unit FMP coordinates with the FMP at an area control centre (ACC);

c) an ACC can be served by a FMU. This ATFM structure in an ACC is more complex and may consist of a number of traffic management coordinator positions to meet the needs of the ACC and its subordinate units. The following functions at an ACC FMU may require dedicated staff, depending on workload:

1) approach control coordination;
2) departure control coordination;
3) en route coordination;
4) meteorological briefing/forecasting coordination;
5) airspace user liaison;
6) military liaison;
7) airport coordination; and
8) additional support functions, such as administrative and information technology coordination may be required. The additional functions of crisis management

coordinator and post-operations analyst may also be required, as applicable.

d) a series of ACCs can be served by a national or sub-regional ATFM centre. This is one of the most complex ATFM structures and includes multiple functions. Each function may require dedicated staff or it may be combined, depending on workload. The functions may include:

1) traffic management coordination;
2) traffic planning;
3) meteorological briefing/forecasting coordination;
4) NOTAM/messaging coordination;
5) flight calibration / flight check coordination;
6) airspace user liaison;
7) military liaison;
8) information technology coordination and operational data management;
9) technical operations coordination (concerning infrastructure and systems such as NAVAIDs, radar, VHF communication sites, etc.);
10) crisis management coordination; and
11) operations analysis.

f) the national or sub-regional ATFM centre is responsible for dissemination and coordination among facilities within its respective area of responsibility and for national, intra-region and inter-regional coordination; and

g) depending on traffic density and size of the ACC units, some of the functions above may be combined.

3.1.5 The purpose of this coordination methodology is to establish a protocol for each level of the organization to be informed of ATFM information in a timely and accurate manner. This is a generic organizational model that can be modified to meet the needs of each specific environment.

3.1.6 It is desirable that letters of agreement (LOA) or other appropriate documentation be developed in order to attain the necessary standardization.

3.2 Roles and responsibilities of the stakeholders in an ATFM service

3.2.1 What are the roles and responsibilities of the stakeholders in an ATFM service?

3.2.1.1 Flow management unit (FMU)/flow management position (FMP)

3.2.1.1.1 FMUs/FMPs monitor and balance traffic flows within their areas of responsibility in accordance with air traffic management directives. FMUs/FMPs direct traffic flows and implement approved traffic management measures in conjunction with, or as directed by, the oversight authority. FMU/FMP duties may include:

a) creating and distributing the ATFM daily plan (ADP) based on prior consultation with the designated facilities and stakeholders;

b) collecting all relevant information, such as meteorological conditions, capacity constraints, infrastructure outages, runway closures, automated system outages, and procedural changes that affect ATS units. This may be accomplished through various means available, such as teleconferences, e-mail, internet, automated data gathering, etc.;

c) analysing and distribute all relevant information;

d) documenting a complete description of all ATFM measures (for example, ground delay programmes, miles-in-trail) in a designated log, which must include, among other data, the times of start and end, the affected stakeholders and flights, and the justification;

e) coordinating procedures with the affected stakeholders;

f) creating a structure for dissemination of information; for example, a website;

g) conducting daily telephone and/or web conferences, as required; and

h) continuously monitoring the ATM system, make service delivery adjustments where necessary, manage ATFM measures and cancel them when no longer required.

3.2.1.2 Airspace users

3.1.2.2.1 The AU participates in the ATFM process by providing and updating flight plan information as well as participating in CDM processes (e.g., discussion of ATFM strategies to improve flight efficiency and participation in user driven prioritisation processes). The participation of AUs in the ATFM process will be supported by CDM telephone conferences and/or web-based interfaces.

3.3 Training requirements for the stakeholders in an ATFM service

3.3.1 FMU/FMP personnel

3.3.1.1 Personnel performing ATFM functions will require standardized and recurrent training in order to maintain currency in a constantly changing environment. A detailed ATFM training plan will ensure that personnel attain an optimized operational efficiency in their respective FMU/FMP. This will allow them to successfully face the important changes in their operational environments and provide the highest possible level of service.

3.3.2 Other ATFM stakeholders

3.3.2.1 All stakeholders involved in the ATFM system must be given the training required to allow for an efficient ATFM service. ATS personnel, as well as AUs, must have the knowledge required to carry out their respective responsibilities.

Chapter 4

CAPACITY, DEMAND AND ATFM PHASES

4.1 How is the capacity of an airspace sector and airport determined?

4.1.1 The capacity of an ATM system depends on many factors, including traffic density and complexity, the ATS route structure, the capabilities of the aircraft using the airspace, weather-related factors, and controller equipment and workload. Every effort should be made to provide sufficient capacity to cater for both normal and peak traffic levels; however, in taking any actions to increase capacity, the responsible ATS authority shall ensure that safety levels are not jeopardized.

4.1.2 The number of aircraft provided with an air traffic service shall not exceed that which can be safely handled by the ATS unit concerned under the prevailing circumstances. In order to define the maximum number of flights which can be safely managed, the appropriate ATS authority should assess and declare the ATC capacity for control sectors (en route and terminal control area) and for airports.

4.1.3 ATC capacity should be expressed as the maximum number of aircraft that can be accepted over a given period of time at an ATM resource (airspace sector, waypoint, airport, etc.). Examples include the sustainable hourly traffic flow or the flow by 15-minute increments.

4.1.4 ATC capacities are not static values. They vary with traffic complexity and other factors. Consideration should be given to tolerance thresholds around standard capacity values that may vary in either direction.

4.1.5 Capacity measurement and calculation methodologies should be developed according to the requirements and conditions of their operational environment. Calculation methodologies have already been established by States in various ICAO regions and they have different levels of complexity. Examples are provided in Appendices C, D and E.

4.2 Balancing demand and capacity

4.2.1 How are ATFM processes applied in order to balance the demand and capacity within its area of responsibility?

4.2.1.1 In order to minimise the effects of ATM system constraints, a methodology to balance demand and capacity should be developed. This can be accomplished through the application of an “ATFM Planning and Management” process. This is a collaborative, interactive capacity and airspace planning process, where airport operators, ANSPs, AUs, military authorities, and other stakeholders work together to improve the performance of the ATM system (see Figure 2).

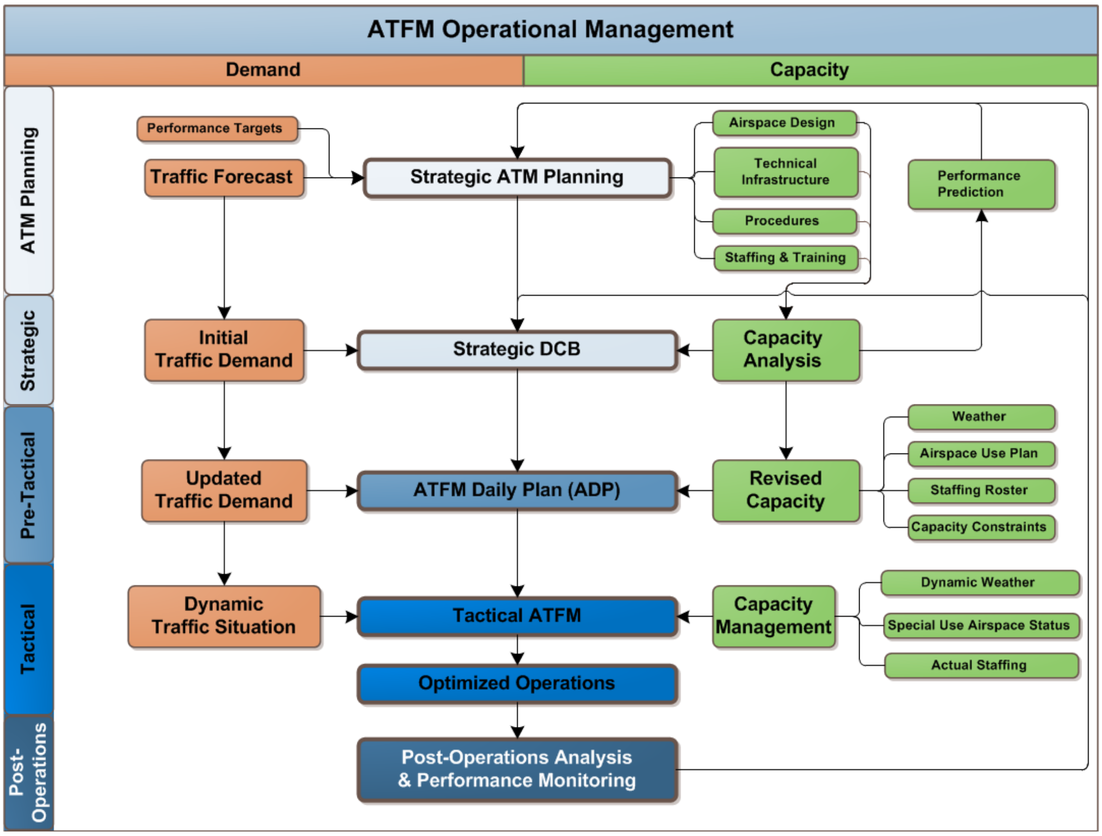


Figure 2. ATFM Operational Management

4.2.1.2 This CDM process allows AUs to optimize their participation in the ATM system while mitigating the impact of constraints on airspace and airport capacity. This also allows for the full realisation of the benefits of improved integration of airspace design, airspace management (ASM), and ATFM. The process contains three equally important phases: ATM Planning, ATFM Execution, and Post-Operations Analysis.

ATM Planning

4.2.1.3 In order to optimise ATM system performance in the ATM Planning phase, available capacity is established and then compared to the forecasted demand and to the established performance targets. Measures taken in this step include:

a) reviewing airspace design (route structure and ATS sectors) and airspace utilisation policies to look for improvements;

b) reviewing the technical infrastructure to assess the possibility of improving capacity through upgrading various ATM support tools;

c) reviewing and updating ATM procedures as required by changes to airspace design and technical infrastructure;

d) reviewing staffing practices to evaluate potential for matching staffing resources with workload and the eventual need for an increase in staffing levels; and

e) reviewing the training that has been developed and delivered to ATFM stakeholders.

4.2.1.4 Such analysis will provide an idea of the magnitude of a possible imbalance between demand and capacity and based on the imbalance, mitigating measures may need to be developed. However, before this is done, it is very important to:

a) establish an accurate picture of the expected traffic demand through the collection, collation, and analysis of air traffic data.

- In order to identify a demand excess, airports and airspaces should be monitored in order to identify significant changes in:

  - forecast demand;
  - ATM system performance targets;

- Demand data can be obtained from different sources, such as:

  - Comparison of recent traffic history (e.g., comparing the same day of the previous week or comparing seasonal high-demand periods);
  - Traffic trends provided by national authorities, user organizations (e.g., IATA), etc.; and
  - Other related information (e.g., air shows, major sports events, large scale military manoeuvres).

b) take into account the complexity and cost of these measures in order to ensure optimum performance, not only from a capacity point of view but also from an economic perspective.

4.2.1.5 The analysis made and the measures taken will result in a declared ATC capacity, and only in those cases where demand exceeds the declared capacity should there be a requirement to consider the utilisation of ATFM measures in the next phase, ATFM execution.

ATFM Execution

4.2.1.6 ATFM execution, consists of three phases: Strategic, Pre-tactical, and Tactical. These phases should not be considered as discrete steps, but rather as a continuous plan, act and review cycle that is fully integrated with the ATM planning and post operations processes. It is important that operational stakeholders are fully involved in each phase.

Strategic

4.2.1.6.1 The ATFM strategic phase encompasses measures taken more than one day prior to the day of operation and much of this work is accomplished two months or more in advance.

4.2.1.6.1.1 This phase applies the outcomes of the ATM Planning activities. It takes advantage of the increased dialog between AUs and capacity providers, such as ANSPs and airports, in order to analyse airspace, airport and ATS restrictions, seasonal meteorological condition changes and significant meteorological phenomena. It also seeks to identify, as soon as possible, any discrepancies between demand and capacity in order to jointly define possible solutions with the least impact on traffic flows. These solutions are not to be frozen in time, but may be adjusted according to the demand foreseen in this phase.

4.2.1.6.1.2 The strategic phase includes:

a) a continuous data collection and interpretation process with a systematic and regular review of procedures and measures;

b) a process to review available capacity; and

c) if imbalances are identified, take the necessary steps to maximize and optimize all available capacity to adequately cope with projected demand and achieve performance targets.

4.2.1.6.1.3 The main output of this phase is the creation of a list of hypotheses, some of which are disseminated in aeronautical information publications that, through capacity forecasts, allow planners to find solutions for problematic areas while improving support to ATFM by anticipating the solution to possible traffic configurations.

Pre-Tactical

4.2.1.7 The ATFM pre-tactical phase encompasses measures taken one day prior to the operation.

4.2.1.7.1 This phase studies the demand for the day of the operation, compares it with the predicted available capacity on that day, and makes any necessary adjustments to the plan that was developed during the Strategic phase.

4.2.1.7.2 The main objective of the pre-tactical phase is to optimize capacity through an effective organization of resources (e.g., sector configuration management, use of alternate flight procedures, etc.).

4.2.1.7.3 The work methodology is based on a CDM process between the stakeholders (e.g., FMU, airspace managers, AUs).

4.2.1.7.4 The final result of this phase is an ATFM plan (i.e. ADP) that describes the necessary capacity resources and the measures still pending for managing the traffic. This activity uses hypotheses developed in the Strategic phase and adjusts them to the expected situation. The time limits of the activity are related to the precision of the forecasts and to the capabilities of the different stakeholders.

4.2.1.7.5 The ADP must be developed collaboratively and seeks to optimize efficiency of the ATM system and balance demand and capacity. The objective is to develop strategic and tactical outlooks for the applicable airspace or airport that can be used by stakeholders as a planning forecast.

4.2.1.7.6 It is recommended that, as a minimum, the ADP cover a 24-hour period. The plan may cover a shorter period provided that mechanisms are in place to update the plan on a regular basis.

4.2.1.7.7 The flight intentions of AUs should be consistent with the ADP developed during the strategic phase and with the adjustments made during the pre-tactical phase.

4.2.1.7.8 Once the process has been completed, the agreed measures, including ATFM measures, should be disseminated through an ATFM message, which may be distributed through the various aeronautical communication networks or other means such as internet, email, etc.

4.2.1.7.9 The tasks to be performed during this phase may include the following:

a) determine the capacity available in the various areas, based on the particular situation that day;

b) determine or estimate the demand;

c) conduct a comparative demand/capacity analysis;

d) study the airspace/airports that are expected to be saturated, flows affected, calculating the acceptance rates to be applied according to system capacity;

e) prepare a summary of ATFM measures to be proposed and submit them to the ATFM community for collaborative analysis and discussion; and

f) at an agreed-upon number of hours before the operation, conduct a last review in consultation with the affected ATS units and other stakeholders in order to determine the ATFM measures which will be published through the corresponding ATFM messaging system.

Tactical

4.2.1.8 During the ATFM tactical phase, measures are adopted on the day of the operation. Tactical management of traffic flows and capacity involves considering, in real time, those events that affect the plan and making the necessary modifications to it.

4.2.1.8.1 The tactical phase is aimed at ensuring that:

a) the measures taken during the strategic and pre-tactical phases solve the demand/capacity imbalances in the flows or areas of application;

b) the measures taken are the minimum required, and that unnecessary measures are avoided;

c) the existing capacity is maximized without jeopardizing safety; and

d) the measures are applied with due regard to equity and overall system optimization.

4.2.1.8.2 This phase seeks to minimize disturbances and take advantage of any opportunities that may arise. The need to adjust the original plan may result from staffing problems, significant meteorological phenomena, crises and special events, unexpected opportunities or limitations related to ground or air infrastructure, more precise flight plan data, the revision of capacity values, etc.

4.2.1.8.3 The provision of accurate information is of vital importance in this phase, since it permits short-term forecasts, including the impact of any event. There are different types of solutions that may be applied, depending on whether the aircraft are already airborne or about to depart.

4.2.1.8.4 Proactive planning and management requires the use of all the information available in forecasts. It is of vital importance to regularly assess the impact of ATFM measures and to adjust them, as much as possible, based on the information received from the various units that constitutes the system.

Post Operations Analysis

4.2.1.9 The final step in the ATFM planning and management process is the post-operations analysis phase.

4.2.1.9.1 During the post-operations analysis phase, an analytical process is carried out that measures, investigates and reports on operational processes and activities throughout all domains and external units relevant to an ATFM service. This process enables the development of best practices and/or lessons learnt for improving upon those operational processes and activities.

Note – A best practice is a method, process, or activity that upon evaluation demonstrates success, has had an impact, and can be repeated. A lesson learned documents the experience gained during an event, and provides valuable insight with respect to identifying method, process, or activity to avoid in specific situations.

4.2.1.9.2 While most of the post-operations analysis process may be carried out internally within the ATFM unit, there is a requirement for close coordination and collaboration with external stakeholders in order to optimize the output of the analysis process. By including ATFM stakeholders in the feedback process, collaboration fosters a more efficient and reliable way to achieve optimum results.

4.2.1.9.3 The post-operations analysis should be accomplished by evaluating, along with other items, the ATFM daily plan. Issues reported should be evaluated and analysed in order to learn from the actions reported and make appropriate adjustments and improvements in the future.

4.2.1.9.4 The post-operations analysis includes analysis of items such as anticipated and unanticipated events, ATFM measures and delays, the use of predefined scenarios, flight planning and airspace data issues. It compares the anticipated outcome (where assessed) with the actual measured outcome, generally in terms of delay and route extension, while taking into account performance targets.

4.2.1.9.5 All stakeholders within the ATFM service should provide feedback, preferably in a standardized electronic format, enabling information to be used in the post-operations analysis in an automated manner.

4.2.1.9.6 In complex areas, and in order to support the post-operations analysis process, an automated replay support tool, including graphical display, is recommended.

4.2.1.9.7 Post-operations analysis may be used to:

a) identify operational trends or opportunities for improvement;

b) further investigate the cause and effect relationship of ATFM measures to assist in the selection and development of future actions and strategies;

c) gather additional information with the goal of optimizing ATM system efficiency, or relating to ongoing events;

d) perform analysis of specific areas of interest, such as irregular operations, special events, or the use of reroute proposals; and

e) make recommendations on how to optimize ATM system performance while applying the minimum measures necessary.

4.2.1.9.8 It is important to ensure that applicable ATFM stakeholders be made aware of the results. The following process is recommended:

a) collection and assessment of data including comparison with targets;

b) broad review and further information gathering at a daily briefing;

c) weekly operations management meeting to assess result and recommend procedural, training and system changes where necessary to improve performance; and

d) periodic operations review meetings with stakeholders.

Figure 3 below provides an overview of the post-operations analysis cycle.

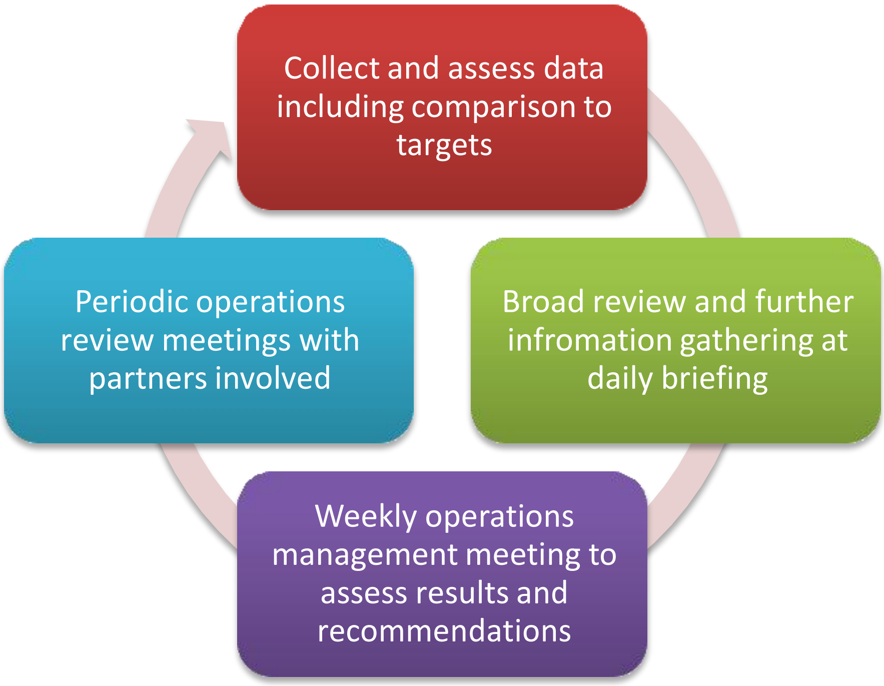


Figure 3. The Cycle of Post-Operations Analysis

Chapter 5

ATFM IMPLEMENTATION

5.1 How is an ATFM service implemented?

5.1.1 The ATFM implementation strategy should be developed in phases in order to ensure maximum utilization of the available capacity and enable all concerned parties to obtain sufficient experience. In order to maximize the use of all resources available, whether in terms of personnel, equipment, facilities and/or automated systems, the ATFM service should be planned, developed and implemented in stages.

5.1.2 The experience acquired in other regions and by some States permits ANSPs to apply basic ATFM procedures without the immediate need for a national or sub-regional ATFM Centre. While a number of sub-regional ATFM Centres already exists, the development of new sub-regional ATFM Centres will require additional study.

5.1.3 Over time, and in order to maximize the operational efficiency of airspaces and airports, consideration should be given to the establishment of Regional ATFM Centres to oversee subregional ATFM Centres in the provision of the ATFM service. If there are no sub-regional ATFM Centres, the Regional ATFM Centre would oversee the national ATFM units or the ATFM service provided by the ACCs.

5.1.4 It is also important that the procedures applied during the implementation process be developed in a harmonious manner among the various States to avoid risks to operational safety and efficiency. This entails establishing a national, sub-regional, and regional strategy to facilitate and harmonize the implementation process

5.1.5 In its initial applications, ATFM need not to involve complex procedures or sophisticated tools. The goal is to collaborate with system stakeholders and communicate operational information to AUs, ANSPs, and other stakeholders in a timely manner.

5.1.6 In the initial applications, this can be accomplished via point-to-point telephone calls designed to exchange pertinent meteorological information, system constraints, and other information of operational significance. Examples include relaying information on known runway closures, equipment maintenance, staffing constraints, volcanic activity, and reroute information. Significant benefits can be realized by applying such an initial level of ATFM service.

5.1.7 ATFM development: Initial steps

5.1.7.1 The following initial steps provide guidance concerning the development of an ATFM service:

a) establish the objectives, project management plan, and oversight of ATFM;

b) identify the personnel who will lead the development of ATFM;

c) identify and brief the stakeholders;

d) define the ATFM structure that will be established;

e) consider the facilities and equipment that will need to be procured for the implementation of ATFM;

f) develop or adopt and apply a model for establishing the Airport Acceptance Rate (AAR) at the appropriate airports;

g) develop or adopt and apply a model for establishing en route sector and terminal sector capacity;

h) identify the appropriate locations for FMUs and FMPs;

i) identify the personnel and operational phone numbers that will serve as the point of contact for ATFM issues at each stakeholder location. For example:

1) area control centre;
2) approach control;
3) control tower;
4) airline operations centre;
5) meteorological office;
6) military flight operations centre;
7) general aviation operations centre;
8) airport operations centre; and
9) other;

j) define the elements of common situational awareness:

1) identify and utilize meteorological information that can be collaboratively used to assess meteorological impact to the system such as:

i) METAR and TAF information;
ii) prognostic websites and charts;
iii) satellite websites and charts; and
iv) meteorological radar;

2) identify and utilize traffic display tools that can be collaboratively used to display traffic and geographical information.

k) identify the appropriate means of ATFM communication:

1) telephone conferencing systems
2) web-based conferencing systems
3) web-based information dissemination and discussion portal similar to a blog format
4) e-mail dissemination portal
5) electronic chat to support tactical discussion
3) operational information web pages

l) develop the applicable ATFM Operational Letters of Agreement.

m) develop the procedures and training materials for FMUs and FMPs.

n) develop the procedures and training materials for stakeholders.

o) discuss and develop the ATFM measures that will be applied in order to balance air traffic demand and capacity.

p) establish an implementation date for the ATFM service;

q) train the appropriate personnel regarding the processes and procedures necessary for ATFM implementation;

r) Implement the processes and procedures; and

s) evaluate the results and coordinate changes as necessary.

Chapter 6

ATFM MEASURES

6.1 What are ATFM Measures and how are they established and applied?

6.1.1 ATFM measures are techniques used to manage air traffic demand according to system capacity. Some ATFM measures must be considered as control instructions or procedures. The determination is based on the size of the event, the coordination process, and the duration of the event.

6.1.2 ATFM measures are important initiatives for managing the flow of air traffic and are applicable when it is necessary to manage fluctuations in the air traffic demand, but they do cause an impact to the AUs. It is important to consider this impact and implement the measures that are necessary for maintaining the safety and efficiency of the system. Therefore, air traffic management personnel should employ the least restrictive methods available in order to minimize delays.

6.1.3 The set of ATFM measures applicable to any given area should be discussed collaboratively between the ANSP and AUs during an ATFM strategy conference. Application parameters, processes and procedures will be understood by all stakeholders from the outset which will avoid misunderstandings during operations. Any foreseeable capacity reductions (e.g. scheduled runway maintenance) or addressing a significant growth in demand in face of a limited capacity during certain periods of time (e.g. special or unforeseen events) would also be discussed at that time.

6.1.4 ATFM measures may only be required during certain periods of time when airports and ATC sectors experience delays due to demand and capacity related issues.

6.2 Types of AFTM Measures

6.2.1 ATFM measures can take a variety of forms and typically span the pre-tactical and tactical phases of the ATFM time horizon. The list below is not exhaustive and provides guidance on where the various measures fall on the ATFM timeline. Figure 4 summarizes these ATFM measures.

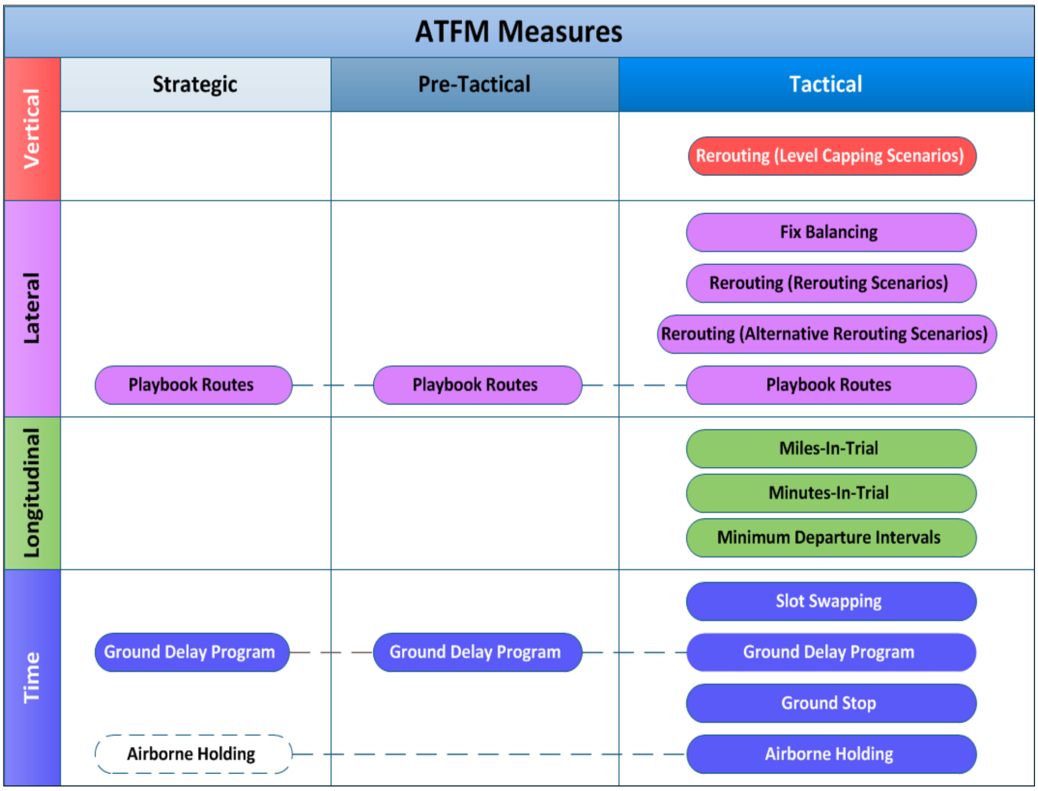


Figure 4. ATFM Measures

6.2.1.1 **Miles-in-trail (MIT).** A tactical ATFM measure. It is the number of miles required between aircraft that meet a specific criterion. The criteria may be separation, airport, fix, altitude, sector, or route specific. MIT are used to organize traffic into manageable flows, as well as to provide space to accommodate additional traffic (merging or departing) in the traffic flow.

6.2.1.2 **Minutes-in-trail (MINIT).** A tactical ATFM measure. It is the number of minutes required between successive aircraft. It is normally used in airspace that is not provided with surveillance, when transitioning from surveillance to non-surveillance airspace, or when the spacing interval is such that it would be difficult for a sector controller to measure it in terms of miles.

6.2.1.3 **Fix balancing.** A tactical ATFM measure. This is assigning an aircraft an arrival or departure fix other than that in the filed flight plan in order to distribute demand and avoid delays. This can be used, for example, during periods of convective weather where a standard instrument arrival (STAR) or a standard instrument departure (SID) is unusable.

6.2.1.4 **Rerouting.** A tactical ATFM measure. It is an ATC-assigned routing other than the one shown in the filed flight plan. Rerouting can take a variety of forms, depending on the tactical situation.

6.2.1.4.1 **Rerouting scenarios:** Mandatory diversion of flows to offload traffic from certain constrained areas.

6.2.1.4.2 **Level capping scenarios:** Carried out by means of flight level restrictions (e.g., flights from London to Paris TMA shall file below FL245).

6.2.1.4.3 **Alternative routing scenarios:** Routes which are made available to AUs on an optional basis to offload traffic from certain areas.

6.2.1.4.4 A rerouting is normally issued to:

a) ensure that aircraft operate along with a required flow of traffic;

b) remain clear of airspace under restrictions or reservations;

c) avoid excessively congested airspace; and

d) avoid areas of known meteorological conditions that aircraft are circumventing or refusing to fly through.

6.2.1.5 **Minimum Departure Intervals (MDIs).** A tactical ATFM measure. Carried out when ATC sets a departure flow rate of, for example, 3 minutes between successive departures. MDIs are typically applied for no more than 30 minutes at a time and are typically applied when a departure sector becomes excessively busy or when capacity is suddenly reduced (e.g., equipment failure, meteorological conditions, etc.).

6.2.1.6 Slot Swapping. A tactical ATFM measure. Can be applied either manually or via automated means. The ability to swap departure slots provides AUs the possibility to change departure order of their flights that are filed through a constrained area. This measure provides AUs with the ability to better manage their business model in a constrained environment.

6.2.1.7 **Playbook routes.** A strategic, pre-tactical, or tactical ATFM measure. These are a set of collaboratively developed, published, pre-defined routes to address reoccurring route scenarios. They aid in expediting route coordination during periods of system constraint.

6.2.1.8 **Ground delay programme (GDP).** A strategic, pre-tactical, or tactical ATFM measure. A GDP is an air traffic management process where aircraft are held on the ground in order to manage capacity and demand through a specific volume of airspace or at a specific airport. In the process, departure times are assigned that correspond to available entry slots to the constrained airspace or arrival slots to the constrained airport. The purpose of a GDP is to minimize airborne holding. It is a flexible programme and may be implemented in various forms depending upon the needs of the air traffic management system. GDPs are developed in a collaborative manner and are typically administered and managed by an FMU or national/subregional ATFM centre. If a GDP is scheduled to last for several hours, it may be necessary to revise the slots to reflect changing conditions. There must be a system in place to advise pilots of departure slots and any changes to the GDP.

6.2.1.9 **Ground stop (GS).** A tactical ATFM measure. It is a process that requires aircraft that meet specific criteria to remain on the ground. Due to a ground stop's potential impact on AUs, alternative ATFM measures should be explored and implemented prior to a GS, if time and circumstances permit. The GS is typically used:

a) in cases where capacity has been severely reduced at airports due to significant meteorological events or due to aircraft accidents/incidents;

b) to preclude extended periods of in-flight holding; to preclude sector/centre reaching near saturation levels or airport grid lock;

c) in the event a facility is unable or partially unable to provide air traffic services due to unforeseen circumstances; and

d) when routings are unavailable due to severe meteorological or catastrophic events.

6.2.1.10 **Airborne Holding.** A tactical ATFM measure that has been designed strategically. It is a process that requires aircraft to hold at a waypoint in a pre-defined standard in order to cope with short notice demand and capacity imbalances or to provide an inventory of aircraft that are in position to take advantage of short notice temporary increases in capacity such as during certain types of meteorological events.

6.2.1.10.1 During the strategic planning phase, stakeholders collaborate to determine suitable locations for the holding patterns. Analysis has shown that the optimal flight levels for airborne holding from a fuel efficiency perspective are FL200 – FL280. These flight levels provide a balance between the lesser fuel consumption for turbine-powered aircraft and the holding area size. Depending on the situation being considered, a lower altitude holding area can be designed in order to provide a small ready supply of holding aircraft that can take advantage of a short notice opportunity. Holding altitudes should be compatible with normal descent profiles in order to avoid excessive rates of descent and airspeeds and also to avoid inefficient holds at low altitudes.

6.2.1.10.2 Airborne holding is in tandem with Ground Delay Programmes and Ground Stops. Airlines may, in collaboration with the ANSP, choose to request that a small inventory of holding aircraft be maintained during periods of congestion in order to maintain arrival demand pressure on the approach and to avoid losing opportunities when departure demand is not constant or meteorological conditions are variable.

6.2.1.10.3 Airborne holding is a high workload measure for air traffic controllers and for pilots. Every effort must be made to simplify the procedures and minimize communications during the process. Consideration must also be given to potentially reduced sector capacity during airborne holding periods.

6.3 ATFM Measure Approval Authority

6.3.1 The coordination and approval of ATFM measures must be in accordance with the collaborative decision-making process established for the provisions of the ATFM service. Publication in national AIPs and/or regional supplementary procedures is recommended.

6.4 ATFM Measures Processing

6.4.1 Prior to implementation, the designated authority responsible for ATFM must identify the need for an ATFM measure, examine alternative options, and develop a justification for the ATFM measure. The ATFM authority will:

a) discuss and coordinate the proposed ATFM measure with the receiving facility and stakeholders prior to implementation;

b) notify affected facilities and stakeholders of the implementation in a timely and appropriate manner;

c) continuously monitor and assess the ATFM measures to ensure they are producing the desired results;

d) make any necessary adjustments, including the development of an exit strategy; and

e) coordinate with and notify affected facilities and stakeholders of modifications and cancellations in a timely and appropriate manner.

6.5 Application of ATFM Solutions

6.5.1 ATFM continuously and pro-actively considers all possible air traffic flow management solutions through an iterative process, from the strategic planning phase through to the execution of operations. The anticipation of any events according to new information makes it possible to minimise their impact on the ATM system or to take benefit of any opportunity and fine tune the plan accordingly.

6.5.2 To resolve capacity shortfalls and improve the management of the system while minimising constraints, a variety of air traffic flow management solutions may have to be considered. Examples are shown in Figure 5 below.

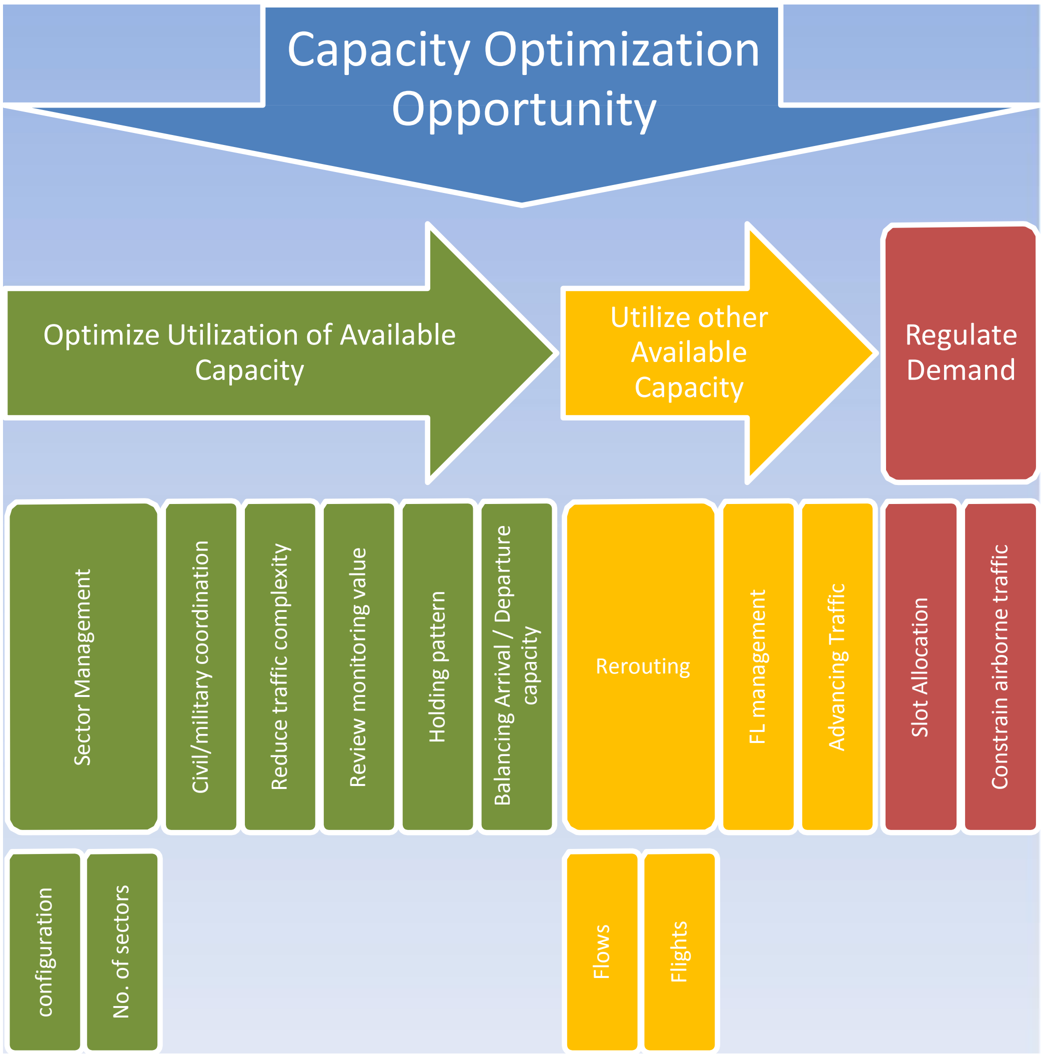


Figure 5. Capacity Optimization

6.5.3 Once the declared and available capacities have been established, air traffic demand can be monitored and assessed and ATFM measures can be coordinated and implemented to attain a balance in the system.

6.5.4 The following example provides a general idea of the steps involved in the actions/analyses to optimize the use of the ATM system:

a) determine capacities: review/assess airport/airspace sector capacities for accuracy;

b) assess demand: determine foreseen demand for a specific time frame, 15-minute period(s), hour(s), etc.;

c) analyse and compare: analyse and compare demand and capacity levels, as well as the periods in which the demand exceeds the available capacity. Automated tools greatly enhance the ATFM analytical process;

d) apply the CDM model: communicate the situation to the facilities/parties involved through the means available, using the CDM processes;

e) determine the action required for mitigating a demand/capacity imbalance: after collecting and requesting information, determine the ATFM measures that are appropriate for the situation;

f) disseminate information: inform the parties involved about the ATFM measures applied using the means available to that end;

g) monitor the situation: examine the situation periodically, as necessary, to make sure that the ATFM measure applied is mitigating the imbalance. If necessary, re-assess and make the corresponding adjustments; and

h) conduct an analysis after the event: following the event, conduct an analysis to determine the effectiveness of the ATFM measure, and catalogue the best work practices. This analysis may be conducted by reviewing the weekly or monthly report of the FMU/FMP.

6.6 ATFM Efficiency Calculation

6.6.1 ATFM measures should be based on principles set down in this guidance and all parties in the ATFM system should adhere to rules that ensure ATM system capacity is optimized in a safe and efficient manner and to the maximum extent possible. Efficiency takes into consideration fuel consumption and time factors and it should be noted that in some cases, the actions taken by ATFM units to balance capacity and demand will cause delay.

6.6.2 Delays have a great impact on AUs. Their route networks and schedules are built upon connections. The quality of these connections enables passengers to board on-going flights, ensures that aircraft are available for the next leg of flight, and manages the gate availability for subsequent aircraft. To AUs, the required service level requires on-time performance. From AUs perspective, every minute counts and delays represent costs. Although this perspective is understandable, it is not currently practical to measure ATFM delays to that degree. However, delays need to be accounted for and be analyzed so that impacts system performance.

6.6.3 As of yet, standardized ATFM delay calculation metrics across ANSPs have not yet been developed. This is due in part to the difficulties of defining what constitutes a delay as well as determining which, if any, party (such as ANSPs, airport authorities and AUs) has control over how delays are imposed or mitigated. In order to measure system efficiency and to identify issues affecting system performance, a global effort is needed to harmonize the definition of delay and methods of delay reporting. This effort should be a shared responsibility of the ANSPs, airports, AUs, and other stakeholders.

6.7 Principles of delay analysis

6.7.1 For practical and pragmatic reasons, the following considerations should be taken into account with regard to delays:

a) common definitions must be agreed upon across ANSPs and other stakeholders;

b) some ANSPs and airport authorities measure airlines On Time Departure performance, which then makes that metric important; and

c) delays should be calculated for each phase of flight.

6.7.1.1 Departure

a) all time in airline ramp/gate area should be measured;

b) taxi time should be as short as possible for environmental and cost reasons. Aircraft should be held at the gate (or at a suitable intermediate location) until they can taxi to the departure runway with minimal time spent in the departure queue;

c) all movement area delays should be measured, including taxi-out duration past normal taxi-out time; and

d) all time in penalty box/de-ice pads/etc should be measured.

6.7.1.2 En route

a) all airborne holding delays should be measured;

b) linear hold (route extensions, use of RTA, etc.) delays need to be measured; and

c) sub-optimal routes imposed due to ATM infrastructure should be measured at a macro level and discussed during strategic Collaborative Decision-Making conferences.

6.7.1.3 Arrival

a) on time arrival is more financially important to airlines than on time departure;

b) consequential delays caused by cascading effects, if these can be determined, should only be measured once (e.g., Flight 2 has a delayed departure due to the aircraft being delayed on the inbound leg should not count as an additional delay); and

c) all movement area delays should be measured, including taxi-in duration past normal taxi-in time.

6.8 Attribution and Accountability for ATFM Measures

6.8.1 There is a need for a common understanding among all ATFM actors on the reasons for ATFM measures and their accountable agencies (e.g. airport infrastructure, ANSP, external hazard, etc.). Appropriate and agreed definitions should be contained in local ATFM procedures. This is important both for a good operational understanding between operations staff and for performance reporting and regulatory oversight of the ATFM function where relevant. A set of guidelines of reasons for ATFM measures and accountable agencies is described below.

6.8.1.1 Factors under ANSP control

a) flight calibration/flight check;

b) equipment maintenance or failure;

c) ANSP staffing;

d) availability of mitigating strategies to mitigate the impact of capacity reductions due to

e) abnormal meteorological conditions;

f) flight arrival and departure sequencing; and

g) non-optimization of capacity and configurations.

6.8.1.2 Factors under State control

a) activation of restrictions or reservations of airspace that affects capacity;

b) special events: airshow, VIP activity, special sports events; and

c) availability of special use airspace during periods of adverse meteorological conditions or other constraints.

6.8.1.3 Factors under airport control

a) airport infrastructure and configuration;

b) airport construction affecting capacity;

c) runway closure;

d) taxiway closure;

e) de-icing delays (exceeding unimpeded normal processing time);

f) runway decontamination (sweeping, plowing);

g) runway capacity reduced by airport operator failure to decontaminate;

h) delay in completing a flight (deplaning) due to gate unavailability; and

i) delay in completing a flight (deplaning) due to service unavailability (ground transport, handling, customs, etc.).

6.8.1.4 Factors under airspace user control

a) inability to depart at ETD due to:

   1) delayed inbound aircraft; and

   2) flight preparation;

b) inability to depart at a controlled departure (slot) time that is at or later than ETD.

6.8.1.5 Uncontrollable

a) capacity reductions due to significant meteorological conditions or unforeseen events.

6.8.1.6 Delay classifications

a) departure delay (actual versus planned departure time) e.g. ATOT minus ETOT or AOBT minus EOBT;

b) ATFM delay, e.g. first CTOT minus EOBT;

c) airline scheduling practices;

d) time spent waiting in queue for take-off;

e) total airborne holding minutes;

f) route extension in time and distance, by flight phase; and

g) arrival delay (actual versus planned arrival time).

6.9 Reporting

6.9.1 For reporting purposes, stakeholders should report delays at least monthly and include trend analyses. Delays should be broken down by reason and geographically to support analysis. ANSPs are encouraged to provide the data electronically in a format that would support further processing by stakeholders.

6.9.2 Following the publication of delay reports, ANSPs should meet with stakeholders to discuss the results and attempt to identify mitigations and corrective actions to improve performance.

6.9.3 Studies' have shown that there is roughly a 4:1 difference in cost between applying ground delays versus applying delays via airborne holding.

[1] FAA Economic Information for Investment Analysis, dated April19, 2012

Chapter 7

DATA EXCHANGE

7.1 What data and information are exchanged in an ATFM service?

7.1.1 As a key enabler to support the global development and further harmonization of ATFM, the cooperation and coordination of ATFM activities between States must be enhanced. Therefore States should ensure that operational data from ANSPs (e.g. flight data information, delay information, meteorological information which have to be derived from a valid and authoritative source) are exchanged not only within their ICAO 4egions but also across ICAO regional boundaries, so that more efficient traffic flows can be achieved.

7.1.2 Data exchange is the sharing of information required for the effective provision of ATFM service. As depicted in Figure 6 below, the data to be shared include information related to the flight plan, capacity, demand, and ATFM measures for the purpose of cooperation and coordination of air traffic flow management activities between ATFM stakeholders.

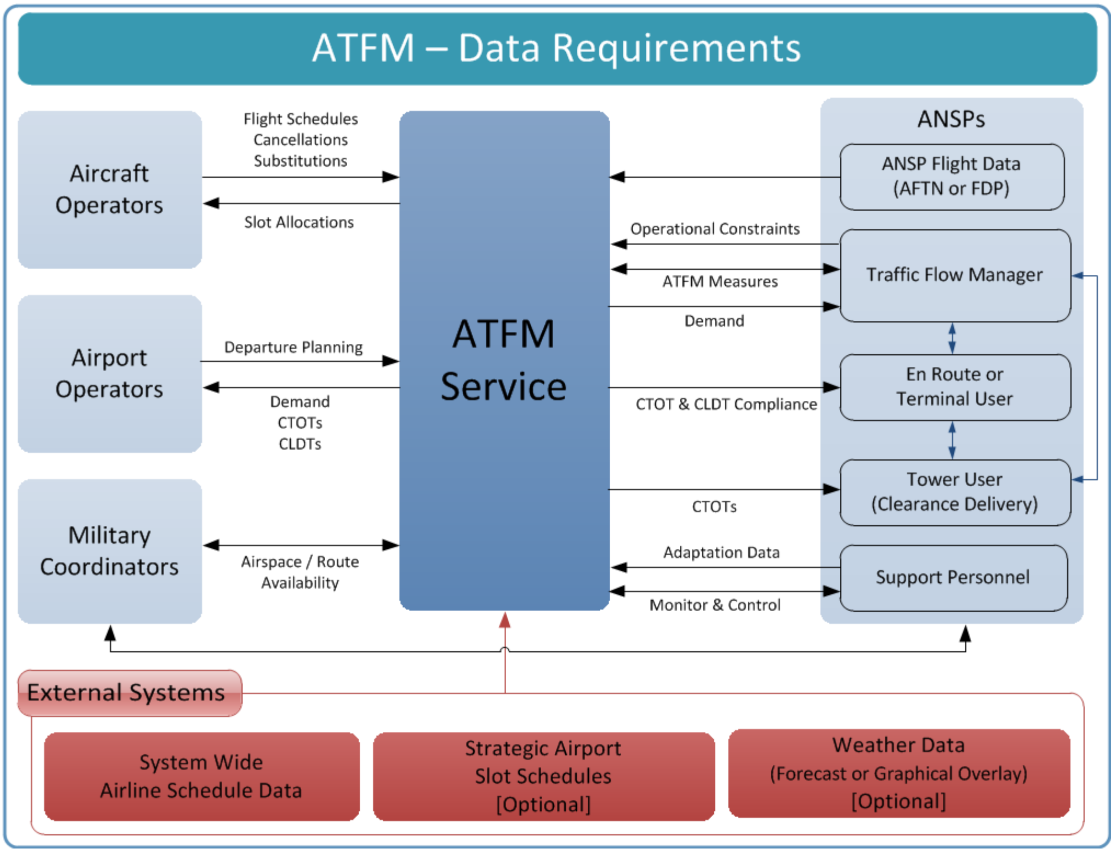


Figure 6. Data requirements.

7.1.3 The requirement for data sharing covers many different areas. As described earlier in this Manual, there is a requirement for the ATFM function to be constantly updated with information on the overall ATM resource (e.g., airspace status and airport infrastructure).

7.1.3.1 Many established ATFM units rely on databases that contain comprehensive details of the ATS organisation in their areas of responsibility. These databases contain essential information to ATFM planning and daily operations including ATS routes and routing systems, airports, SIDs, STARs, navigational aids (NAVAIDs), ATC sectorisation, etc.

7.1.3.2 Where such databases are available, the effectiveness of the ATFM service depends to a large extent on the completeness and accuracy of the associated information and on the timely exchange of data.

7.1.4 The ATFM unit also needs access to accurate and timely data with regards to the ATC demand. Throughout the various stages of the ATFM planning horizon (strategic, pre-tactical, tactical), AUs must provide descriptions of all flights intending to operate in the area under the responsibility of the ATFM unit. Accurate aircraft performance characteristics and meteorological models are also required in order to be able to correctly assess the impact of various operations.

7.1.5 It is of critical importance that the ATFM unit is provided with current information on the dynamic airport and airspace traffic demand and capacity situation in order to increase the accuracy of the tactical prediction.

7.1.6 Data information exchanged among stakeholders is applied to facilitate:

a) Strategic planning:

1) evaluate air traffic flows patterns;
2) evaluate capacity and demand problems and patterns;
3) collaborate and communicate with operational stakeholders;
4) validate and implement strategic ATFM measures for future events;

b) Pre-tactical planning:

1) monitor air traffic flows;
2) evaluate changing capacity and demand situations;
3) collaborate and communicate with operational stakeholders;
4) implement, revise, or cancel ATFM measures;

c) Tactical planning:

1) monitor air traffic flows;
2) evaluate changing capacity and demand situations;
3) collaborate and communicate with operational stakeholders;
4) implement, revise, or cancel ATFM measures;

d) Post operational analysis:

1) review and analyse previous day's (or even hour's) operation;
2) support and improve future planning functions and processes.

7.2 Benefits of Data Exchange

7.2.1 Data sharing and exchange facilitates the collaboration and interaction between national, as well as international, ATFM units and enables common situational awareness. It also allows for a coordinated and comprehensive system response to ever-changing conditions in the ATM system.

7.2.1.1 This enablement leads to increased safety and efficiency in air traffic operations, including: increased efficiency for traffic flows, reduced delays, enhanced predictability and reliability of AU schedules, and reduced impacts on the environment from greenhouse gas emissions and noise pollution.

7.2.1.2 It also optimizes contingency responses to unforeseen events and system disruptions.

7.3 International Data Exchange Specifications

7.3.1 To support the global development and harmonization of ATFM, ANSPs must ensure that the data shared is from a valid and authoritative source. ANSPs should utilize methodologies capable of data exchange that are secure, efficient, and in compliance with all applicable identified and agreed upon standards.

7.3.2 Flight data information is provided to ATFM units and operational stakeholders for the purpose of air traffic management. Such data should not be released to third parties unless this is covered by a pre-defined data policy.

7.3.3 Specifications for connectivity should conform to existing standards for this type of data exchange and be documented by interface control documents.

7.4 Data Type Description and Harmonization

7.4.1 Automated ATC information contained in ICAO message types is the foundation for data exchange programmes. Examples of the ICAO message types are listed below:

a) flight plan

b) flight amendment;

c) flight plan cancellation;

d) flight departure;

e) flight coordination; and

f) flight arrival.

7.5 ATFM Tools

7.5.1 Depending on the size and complexity of the ATFM service to be provided, a set of ATFM tools may be implemented to enable partial automation of ATFM. Figure 7 provides an overview of ATFM tools to support planning, prediction, execution and analysis of ATFM measures.

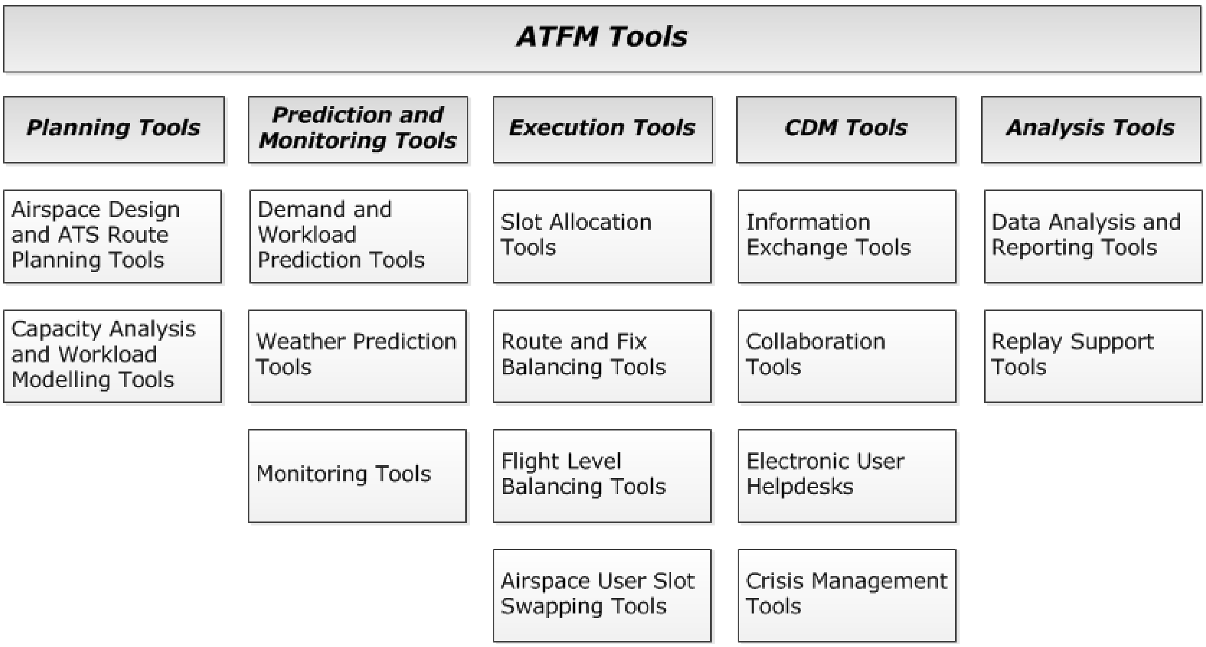


Figure 7. ATFM Tools

Note – If available, it is recommended to couple ATFM execution tools with ATC sequencing and metering tools, such as arrival and departure management systems (AMAN/DMAN), to achieve further capacity and efficiency benefits.

Chapter 8

ATFM COMMUNICATION

8.1 Communication

8.1.1 The communication and exchange of operational information among stakeholders on a real-time basis forms the backbone of ATFM. This exchange may be accomplished by a variety of means including telephone calls, web conferences, e-mail messages, electronic data exchange and web page displays. The purpose of the information exchange is to increase stakeholder situational awareness, improve operational decision-making, and enhance ATM system efficiency.

8.2 Stakeholder ATFM Communication

8.2.1 An ATFM unit requires several layers of communication. As a basis for the exchange of information, NOTAM and AIP supplements could be used to distribute instructions relating to the application of ATFM measures. For example, strategic ATFM routing information and certain ATFM operating procedures could be published as a NOTAM or in the AIP Supplement.

8.2.2 As the functionality of an ATFM unit develops, consideration should be given to developing a more ATFM specific communication structure for the notification of ATFM measures.

8.2.2.1 For example, to facilitate AU awareness, the ATFM unit could produce and distribute the ADP on the day prior to the operation in order to provide a summary of planned operations and ATFM measures in their area of responsibility and to distribute any specific instructions or communications requirements associated with those measures. This communication could also be updated by ADP amendments.

8.2.2.2 In order to ensure that AUs and other stakeholders can properly use and apply this information, a standard format should be employed.

8.2.3 In addition to the production and distribution of ADPs, the ATFM unit could produce ATFM Information Messages to provide information and guidance.

8.2.3.1 These messages could be used for the initial publication of changes to the availability of runways, ATS routes and airspace in the area, and serve as the vehicle for the initial publication of new and amended ATFM operating procedures which affect all users.

8.2.4 The ADPs and ATFM Information Messages could be transmitted via agreed-upon means to ATC units, AUs, and other stakeholders who wish to be included on the distribution list. These messages could also be made available on associated ATFM unit websites.

8.2.5 Each national AIP could include ATFM information on specific arrangements for dealing with ATFM issues and coordination matters. The AIPs could also include the telephone numbers of relevant ATFM units to contact for ATFM advice and information.

8.3 ATFM Communication Oversight

8.3.1 For consistency, the appropriate authority should ensure that there is a single office responsible for collecting, disseminating, monitoring, and providing oversight of the dissemination of ATFM information and ATFM measures. This oversight will ensure that applicable information is shared by all ANSPs and operational stakeholders in a timely and efficient manner.

8.3.2 Examples of applicable ATFM information include but are not limited to:

a) tactical level information such as current airport runway configurations;

b) airport acceptance rates;

c) airport departure demand;

d) en route sector demand and capacity imbalances;

e) runway closure or airport conditions;

f) NAVAID outages;

g) ATM infrastructure; and

h) activities on airspace under restrictions or reservations.

8.3.2.1 Specific categories of information will be determined by the ATFM unit in collaboration with stakeholders.

8.3.3 ATFM units should develop an internal operations manual for their respective facilities to address the ATFM measures process. For example, the operations manual could include provisions for:

a) procedures for coordinating, implementing and disseminating ATFM measures through specified means such as telephone calls, aeronautical messages, web pages, or any other suitable method;

b) constant monitoring and adjusting of ATFM measures; and

c) timely cancellation of ATFM measures.

8.4 Communicating ATFM Information

8.4.1 There is a requirement for AUs and ATFM units to communicate and exchange information for the purposes of CDM and information dissemination.

8.4.2 Because the involvement of ATFM units and AUs may vary significantly, the tools for exchange of information must be geared to meet the stakeholder capabilities and requirements.

8.4.3 When selecting communication methods, consideration should be given to maximizing the value and content of the information and minimizing the time and workload required.

8.4.4 The following communication methods are offered as examples:

a) scheduled telephone (or web) conferences. This consists of defining times at which the ATFM units will hold daily operational conferences to exchange ATFM information and to meet their operational needs;

b) tactical telephone conferences. This consists of establishing a procedure to convene non-scheduled ATFM teleconference, held in real-time and at a tactical level, in order to make the necessary operational adjustments; and

c) automated web page or ATFM operational information system. ATFM units may create a web page or an information system, containing relevant ATFM information (e.g. ADP). The purpose is to share information about the ATM system in order to develop a common situational awareness and minimize workload.

8.5 ATFM Web Pages

8.5.1 For ATFM units that elect to create web pages with relevant ATFM information, examples could include:

a) airport operational status information:

1) current and planned active runway configuration;
2) airport acceptance rate/departure rate;
3) information concerning delays – duration and outlook;
4) meteorological information;
5) scheduled flight inspections/calibrations;
6) ATFM measures;
7) low visibility procedures;
8) de-icing operations; and
9) airport or runway closures;

b) airspace operational status information:

1) actual and planned capacity by sector;
2) anticipated demand by sector;
3) meteorological conditions likely to affect capacity or demand;
4) special use airspace status; and
5) ATFM measures;

c) ATFM stakeholder planning teleconferences:

1) schedules; and
2) joining instructions;

d) ATFM strategic, pre-tactical, and tactical plans; and

e) links to ATFM-related information:

1) weather websites;
2) ACC and APP contact information;
3) Letters of Agreement;
4) route information;
5) GNSS operational status;
6) ATFM-related NOTAMs; and
5) contingency plans.

8.6 ATFM Terminology

8.6.1 What terminology/phraseology is used in ATFM?

8.6.2 One goal of this manual is to develop and promote standard terminology and phraseology for the exchange of ATFM telephone and automated messages. The information contained herein is intended to reflect the current use of plain language and provide a basis for harmonization.

8.6.3 ATFM operations should be conducted in a common language in a simple, concise, non-verbose manner. The use of local or regional colloquial terms or acronyms should be avoided due to possible confusion.

8.6.3.1 The exception would be coordination with stakeholders where the use of English may be required.

8.6.3.2 For interregional ATFM coordination, the English language should be used unless there is consensus to use another common language.

8.6.4 The use of standardized terminology as contained in this manual should be employed to guarantee global consistency on how ATFM messages are communicated among ATFM units. This includes the concept of modular and structured ATFM messages and defines the components as who, what, when, where and why.

8.6.5 As with any communication model, it is the responsibility of both parties (sender and receiver) to ensure that the message is clear, concise, correctly understood and applied as requested.

8.6.6 Each ATFM coordination message should have five components (who, what, when, where, why) that contain plain language elements and when combined provide a complete ATFM message.

a) **WHO**: This identifies the parties involved. Who is transmitting and receiving the message.

   Examples: CGNA THIS IS COLOMBIA FMU
   CENAMER ACC THIS IS PANAMA ACC
   CCFMEX THIS IS ATCSCC
   JCAB THIS IS CFMU

b) **WHAT**: This identifies the objective to be achieved.

   Examples: REQUEST 30 MILES IN TRAIL
   REQUEST 3 MINUTES IN TRAIL
   REQUEST GROUND STOP

c) **WHEN**: This identifies the time and/or duration of the ATFM objective to be achieved.

   Examples: FROM NOW UNTIL 1700 UTC
   FROM 2000 UTC TO 2130 UTC

d) **WHERE**: This identifies the location of the ATFM objective to be achieved. It is often preceded by a modifying clause, indicating what aircraft or traffic the restriction will apply to. The modifying clause and the location combination are used to construct the "where" component.

   Examples: FOR ALL AIRCRAFT LANDING EL DORADO INTERNATIONAL AIRPORT
   FOR ALL TRAFFIC LANDING CAIRO INTERNATIONAL AIRPORT
   FOR ALL TRAFFIC FILED VIA B881

e) **WHY**: This identifies the reason for the ATFM objective.

   Examples: DUE TO SEVERE WEATHER OVER
   EL DORADO INTERNATIONAL AIRPORT
   DUE TO A LONG-RANGE RADAR OUTAGE
   DUE TO EXCESS SECTOR DEMAND
   DUE TO AN AIRCRAFT INCIDENT

8.6.7 Message example. The following is an example of a complete message:

CGNA THIS IS COLOMBIA FMU. REQUEST 30 MILES IN TRAIL FOR ALL AIRCRAFT LANDING EL DORADO INTERNATIONAL AIRPORT FROM NOW UNTIL 1700 UTC DUE TO SEVERE WEATHER OVER EL DORADO INTERNATIONAL AIRPORT

8.6.8 Message amendment. The amendment of an ATFM message should include similar elements but with additional modifiers. These modifiers may include:

a) CHANGE;

b) AMEND;

c) REDUCE;

d) INCREASE; and

e) DECREASE.

8.6.8.1 Message amendment example.

GUAYAQUIL FMP THIS IS LIMA FMP, REDUCE YOUR MILES-IN-TRAIL TO JORGE CHAVEZ INTERNATIONAL AIRPORT FROM 30 MILES-IN-TRAIL TO 20 MILES-IN-TRAIL FROM 1400 UTC TO 1700 UTC DUE TO IMPROVING METEOROLOGICAL CONDITIONS AT JORGE CHAVEZ INTERNATIONAL AIRPORT

8.6.9 Message cancellation. The cancellation of an ATFM message should contain a cancelling word or phrase. Cancellation messages should also identify which message is being cancelled because several ATFM measures could be in place at one time. Normally, it is not necessary to state the reason for the cancellation, but it may be included. A cancelling word or phrase may include:

a) CANCEL;

b) RESUME;

c) RESUME NORMAL; and

d) RELEASE.

8.6.9.1 Message cancellation example.

CARACAS FMU THIS IS GEORGETOWN FMU, CANCEL THE GROUND STOP FOR CHEDDI JAGAN INTERNATIONAL AIRPORT DUE TO THE RUNWAY NOW OPEN

What resources are available to States regarding the various aspects of ATFM?

The information in the following Appendices pertains to the implementation of ATFM between 2006 and 2011 and represents the experiences of some States/International Organizations in the planning, implementation and application of ATFM. It provides samples and examples of information that can be used as resources and is designed to be helpful information with regard to implementing an ATFM service.

APPENDIX A

SAMPLE INTERNATIONAL ATFM OPERATIONS PLANNING TELEPHONE CONFERENCE FORMAT

Note.– This Appendix provides a sample format that can be used by an ATFM unit for facilitating an ATFM operations planning telephone (or web) conference.

<u>Greeting and introduction</u>

xxxxZ planning telcon
Covering the timeframe from xxxx UTC to xxxx UTC

<u>Situation</u>
The current situation is:

<u>Issues</u>
We will be discussing:

<u>Common Weather Products</u> – working from
1) the ICAO Area "_" Prog Chart, valid xxxx UTC for (Date)
2) the ICAO Area "_" IR Satellite photo, xxxx UTC for (Date)

<u>Planning discussion</u> – Recommend organizing the discussion by geographic areas (for example, from north to south, or east to west, in the regional airspace)

<u>Significant meteorological and atmospheric conditions</u>
Thunderstorm activity
Turbulence
Volcanic ash plumes

<u>Terminal discussion</u>
For select airports:
Airport/Sector Capacities
Projected terminal demand
Airport constraints, such as construction projects or NAVAID outages
<u>Anticipated traffic management measures</u>
Expanded miles-in-trail
Potential airborne holding
Potential ground stops

<u>En-route discussion</u>
En-route constraints, such as frequency outages or NAVAID outages
Route discussion and issues
<u>Anticipated traffic management measures</u>
Expanded miles-in-trail
Potential airborne holding

<u>Additions to the plan, including any pertinent tactical updates.</u>

<u>Stakeholder input, comments, and questions</u>

<u>Next Planning Telcon: xxxxZ</u>

APPENDIX B

SAMPLE ATM DATA EXCHANE AGREEMENTS

Note.– This Appendix provides a sample format regarding an agreement for the exchange of ATM data between States.

AGREEMENT ZZZZ

BETWEEN

(State name)

AND

(State name)

<u>THE EXCHANGE OF AIR TRAFFIC FLOW MANAGEMENT DATA</u>

ARTICLE I - <u>PURPOSE</u>

The purpose of this Agreement is to establish the terms and conditions for cooperation between (State name) and (State name) in the exchange of non-critical radar and flight data information. The exchange of data will enhance the cooperation and coordination of air traffic management (ATM) activities between (State name) and (State name).

ARTICLE II - <u>SCOPE OF WORK</u>

A. (State name) and (State name) agree to exchange flight data and other information concerning international and domestic instrument flight rules (IFR) aircraft to enhance the cooperation and coordination of ATM activities. This data will be used by each for the following purposes:

1. Maintenance of a complete and reliable database for such information;
2. Dissemination to aviation users; and
3. Enhancement of cooperation and coordination of air traffic flow management activities between (State name) and (State name).

ARTICLE III - <u>PROCEDURES</u>

A. Purpose of Use -- The exchange of flight data and other information shall be exclusively for the purposes set forth in this Agreement. The use of the information and data for purposes beyond the scope identified in this Agreement, or the release of any information or data to a third Party not identified in this Agreement, must be authorized in writing by the party from which the information or data originated.

B. Coordination -- The Parties will meet at such times and places as may be requested by either Party to jointly review the program and consider new procedures or requirements. Activities to accomplish the objectives will be discussed at bilateral/multilateral meetings and documented by Chairpersons in reports of those meetings.

C. Scope of Data -- The flight data or information to be exchanged shall not include any sensitive data on flights exempted by either Party for security or safety reasons. The exchange of flight data or information applicable to sensitive State and military aircraft will be provided for those areas where the Parties have responsibility for provision of air traffic services. The data shall be formatted to be usable in each system and exchanged using data communications systems as mutually agreed.

D. Types of Data -- Types of data to exchange include non-critical radar and flight data information concerning international and domestic instrument flight rules (IFR) aircraft, including flight and flight plan modifications, cancellations, amendments and related changes.

E. Communications Protocol -- The information shall be exchanged using agreed data communications protocol. Communications protocol and other necessary requirements shall be arranged as mutually agreed. The Parties agree to provide, at the earliest possible date, notice of proposals for the development of changes to hardware, software and documentation applicable to traffic management data and supporting interfaces.

F. Responsibility of Provision -- Except for technical or operational reasons, information and data will be exchanged continuously as it becomes available. Each Party shall operate and maintain communication hub(s) and line(s) to be used for data exchange.

ARTICLE IV - RELEASE OF DATA TO THIRD PARTIES

A. Data on State and military aircraft shall not be released to a third Party, unless approved through mutual agreement by both Parties.

B. All data may be released by (State name) or (State name) to aviation stakeholders through programs under the same terms and conditions found in the agreements entered into between the (State name) or (State name). Air Navigation Service Providers, aircraft operators, national security or safety authorities and research and development (R&D) institutes for ATM improvement are defined as aviation stakeholders. (State name)and (State name) shall be responsible for data administration in the provision for those Parties.

C. Each Party shall make every effort to ensure that the other Party's air traffic flow management data is not released or re-broadcast through unrestricted, public access mass media communications technology, such as the internet, without the written consent of the other Party.

ARTICLE V - FINANCIAL PROVISIONS

Each Party shall bear the cost of any activity performed by it under this Agreement.

ARTICLE VI - IMPLEMENTATION

A. The designated points of contact between xxx and yyy for coordination and management of this Agreement are:

1. For (State name): Manager
Address- phone-fax-e-mail
2. For (State name): Manager
Address- phone-fax-e-mail

B. The designated points of contact between (State name) and (State name) for technical issues under this Agreement are:

1. For (State name):

2. For (State name):

ARTICLE VII - ENTRY INTO FORCE AND TERMINATION

This Agreement will enter into force upon the date of the last signature and remain in effect for the duration of its associated Annex. Either Party may terminate the Agreement on six (6) months' written notice to the other Party.

ARTICLE VIII - AUTHORITY

The (State name) and (State name) agree to the terms of this Agreement as indicated by the signatures of their duly authorized officers.

____

(State name):_________________________	(State name):_________________________
By:________________________________	By:________________________________
Title:_____________________________	Title:_____________________________
Date:_____________________________	Date:_____________________________

APPENDIX C

DETERMINING AIRPORT ACCEPTANCE RATE

Note.– This Appendix provides an example of a simplified methodology for determining the acceptance rate at an airport. This methodology is based on the scientific process developed by the Federal Aviation Administration for establishing the acceptance rate.

- Definitions:

1) **Airport Acceptance Rate (AAR):** A dynamic parameter specifying the number of arrival aircraft that an airport, in conjunction with terminal airspace, ramp space, parking space, and terminal facilities can accept under specific conditions during any consecutive 60 minute period.

2) **Airport Primary Runway Configuration**: An airport configuration which handles 3 percent or more of the annual operations.

- Administrative considerations:

1) Identify the organization responsible for the establishment and implementation of AARs at select airports.

2) Establish optimal AARs for the airports identified.

3) Review and validate the airport primary runway configurations and associated AARs at least once each year.

- Determining AARs:

1) Calculate optimal AAR values for each airport runway configuration for the following weather conditions:

a) Visual Meteorological Conditions (VMC) - weather allows vectoring for visual approaches

b) Marginal VMC - weather does not allow vectoring for visual approaches, but visual

c) Instrument Meteorological Conditions (IMC) – visual approaches and visual separation on final are not possible

d) Low IMC – weather dictates Category II or III operations

- Calculate the optimal AAR as follows:

1) Determine the average ground speed crossing the runway threshold and the spacing interval required between successive arrivals

2) Divide the groundspeed by the spacing interval to determine the optimum AAR

3) FORMULA: Ground speed in knots at the runway threshold divided by spacing interval at the runway threshold in miles

NOTE: when the quotient is a fraction, round down to the next whole number

Example: 130 KTS / 3.25 nm = 40 Optimum AAR = 40 arrivals per hour

125 KTS / 3.0 nm = 41.66 round down to 41

Optimum AAR = 41 arrivals per hour

Or

Use table below

	Nautical miles between aircraft at the Runway Threshold									
	3	3.5	4	4.5	5	6	7	8	9	10
	Potential AAR									
Ground Speed at the Runway Threshold										
140 knots	46	40	35	31	28	23	20	17	15	14
130 knots	43	37	32	28	26	21	18	16	14	13
120 knots	40	34	30	26	24	20	17	15	13	12
110 knots	36	31	27	24	22	18	15	13	12	11

Table 1. Optimum AAR

- Identify any conditions that may reduce the optimum AAR. Conditions include:

1) Intersecting arrival and departure runways

2) Lateral distance between arrival runways

3) Dual use runways – runways that share arrivals and departures

4) Land and Hold Short operations

5) Availability of high speed taxiways

6) Airspace limitations and constraints

7) Procedural limitations (noise abatement, missed approach procedures)

8) Taxiway layouts

9) Meteorological conditions

- Determine the adjusted AAR using the previous factors for each runway used in an airport configuration.

1) Add the adjusted AARs for all runways used in an airport configuration to determine the optimal AAR for that runway configuration.

2) Real-time factors may require dynamic adjustments to the optimal AAR. These include:

   a) Aircraft type and fleet mix on final

b) Runway conditions

c) Runway/taxiway construction

d) Equipment outages

e) Approach control constraints

3) Formula:

POTENTIAL AAR – ADJUSTMENT FACTORS = ACTUAL AAR

RUNWAY CONFIGURATION	AAR for VMC	AAR for MARGINAL VMC	AAR for IMC
RWY 13	24	21	19
RWY 31	23	20	17

Table 2. Actual AAR - Example

APPENDIX D

DETERMINING SECTOR CAPACITY

Note.– This Appendix provides an example of a simplified methodology for determining sector capacity at an ACC. This methodology is based on the scientific process developed by the Federal Aviation Administration for establishing the sector capacity.

1) Sector capacity is determined using the average sector flight time in minutes from 7am to 7pm Monday through Friday.

2) For any 15-minute time period.

3) The formula used to determine sector capacity is:

$$\frac{(average\ sector\ flight\ time\ in\ minutes) \times (60\ seconds)}{36\ seconds} = Sector\ Capacity\ Value_{Optimum}$$

4) Steps:

a) manually monitor each sector, observe, and record the average flight time in minutes.

b) after that time is determined:

1) multiply that value by 60 seconds in order to compute the average sector flight time in seconds;

2) then divide by 36 seconds because each flight takes 36 seconds of a controller's work time; and

3) this is the sector capacity value (optimum).

5) Adjustments:

a) the optimum value for a sector is then adjusted for factors such as:

1) airway structure;

2) airspace volume (vertically and laterally);

3) complexity;

4) climbing and descending traffic;

5) terrain, if applicable;

6) number of adjoining sectors that require interaction; and

7) military operations.

Alternatively the table below can be used.

Average sector flight time (in minutes)	Optimum sector capacity value (aircraft count)
3 minutes	5 aircraft
4	7
5	8
6	10
7	12
8	13
9	15
10	17
11	18
12 minutes or more	18

Table 1. Simplified method

APPENDIX E

CAPACITY PLANNING AND ASSESSMENT PROCESS

Note.– This Appendix provides information developed by EUROCONTROL to provide information related to the ATFM capacity and planning assessment process.

1. A performance-driven process

The overriding objective is to develop a capacity assessment process that contributes to the requirement to:

"provide sufficient capacity to accommodate the demand in typical busy hour periods without imposing significant operational, economic or environmental penalties under normal circumstances."

To address this, an annual capacity planning and assessment process, a cyclical process that identifies and quantifies the capacity requirements for the short and medium-term, should be put in place.

To effectively determine future capacity requirements, it is necessary to monitor current capacity performance. The following indicators should be used:

- **Average ATFM Delay per flight**

  The average Air Traffic Flow Management (ATFM) delay per flight is the ratio between the total ATFM delay and the number of flights in a defined area over a defined period of time.

  The ATFM delay is described as the duration between the last take-off time requested by the aircraft operator and the take-off slot allocated by the ATFM function, in relation to an airport (airport delay) or sector (en-route delay) location.

- Effective Capacity

  "Effective capacity" is defined as the traffic volume that the ATM system in the area concerned could handle with one minute per flight average en-route ATFM delay. This capacity indicator is derived from a linear relationship between delay variation and traffic variation.

2. Methodology to Assess Future Capacity Requirements

The objective of a medium term planning and assessment exercise is to provide predictions of the capacity requirement for the ATM system. This can be done in different ways, but preferably through the use of a Future ATM Profile (FAP), a combination of different modelling and analysis tools.

FAP comprises ATFM simulation facilities as well as spreadsheet and macro-based analysis and reporting tools that assesses and quantifies how much capacity is delivered by specific airspace volumes within the current ATM system, and evaluates the current and future capacity requirements, at ACC and sector group level.

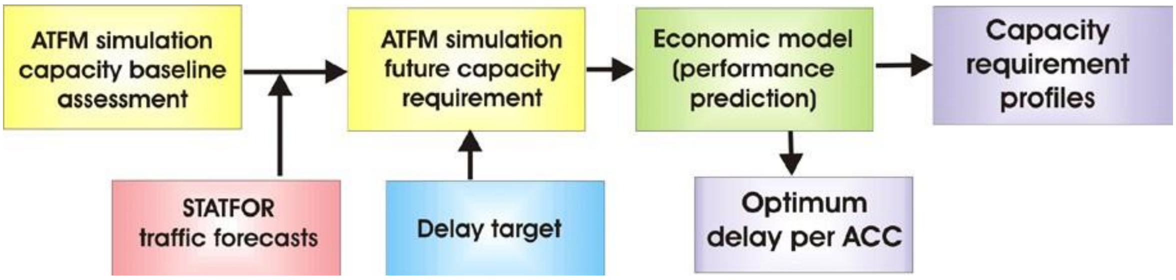
<u>Step 1</u>: In order to provide an accurate prediction of the capacity requirements of the concerned area, it is necessary to know the **current capacity offered.** FAP should establish a **capacity baseline** for each ACC and defined sector group.

<u>Step 2</u>: The next task is to provide a **prediction of the future demand** on each ACC (and defined sector group) over the next 5 years, according to the expected traffic growth and distribution over the future route network.

<u>Step 3</u>: FAP should carry out **an economic analysis**, balancing the cost of capacity provision and the cost of delay, on the assumption that each ACC is operating at or close to its economical optimum, and that the target level of delay has been achieved.

Step 4: FAP should then produce, for each ACC in the area concerned (if more than one) and each of the defined sector groups, a **5 year capacity requirement profile**. Percentage increases with respect to the measured capacity baseline are provided.

Figure 2: Key FAP processes:



3. Expected Demand on the Future Route Network

3.1 Medium-term capacity requirements

Medium-term capacity requirements at ACC or sector group level can only be assessed once one have a picture of the expected traffic volume and distribution over the future route network in the area concerned.

The expected demand at ACC or sector group level should be assessed by the FAP tool, from:

- the forecast traffic growth;
- the future route network evolution and traffic distribution, simulated by an airspace modelling tool;
- airport capacity constraints, assessed from information gathered from various sources on current and planned airport capacities.

3.2 Future Route Network Evolution and Traffic Distribution

The capacity requirement for an ACC or sector group is clearly dependent on the distribution of traffic over the network in the area concerned, horizontally and vertically. The demand to be accommodated in the future is determined, taking into account the desire of users to fly the most direct routes and optimum vertical profiles, in the context of the anticipated evolution of the route network.

Changes to the route network and traffic distribution can induce significant changes in terms of the demand (and therefore the required capacity) at individual ACCs, even during periods of reduced traffic growth.

It is assumed that aircraft will follow the shortest routes available on the network between city pairs according to the future route network, on essentially unconstrained vertical profiles. Nevertheless, some existing structural traffic distribution scenarios are retained. There is no ‘dispersion’ of flights between equivalent routes between city pairs.

Traffic flows respecting these assumptions should be simulated by the appropriate tools, and serve as an input to the FAP simulations. The result of these simulations should be a horizontal and vertical traffic distribution over the future route network, allowing the determination of the unconstrained demand in each ACC.

4. Cost Data and Economic Modelling

Capacity has a cost, but insufficient capacity, which in turn generates delay, has an even larger cost. Both capacity and delay costs are borne by airspace users. It is therefore necessary to determine the level of ATC capacity which can be justified from a cost point of view i.e. the optimum trade-off between delay and cost of ATC capacity.

The cost of capacity and the cost of delay are regional parameters depending on:

- total capacity provided
- marginal capacity cost (ATC complexity, price index, equipment, etc)
- total delay generated
- delay sensitivity (network effects, hourly traffic distribution)

- cost per minute of delay (traffic mix)

Consequently, each ACC has its own capacity cost and delay cost curves. These curves interrelate as network effects within the area concerned change according to changes in capacity offered at other ACCs.

The total cost curve (the sum of the delay cost and the capacity cost) determines the optimum cost model capacity for each ACC for the current traffic demand. However, to assess capacity requirements for the future, it is necessary to incorporate the future demand into the model in an updated total cost curve for each ACC.

4.1 Calculation of the Required Capacity Profiles

After the economic analysis or cost optimisation for the future traffic demand is carried out, the final step in the process takes place. FAP carries out another iterative ATFM simulation by increasing capacity at the ACC offering the best Return on Investment (ROI), until the overall delay target is reached.

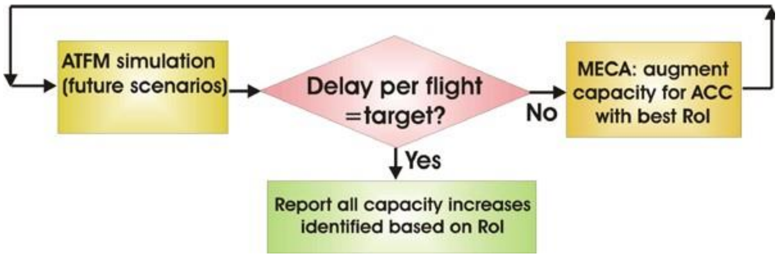


Figure 3: Iterative ATFM network simulations with best ROI to achieve target delay

When the agreed target delay is reached, the capacity target for each ACC is expressed in terms of the capacity increase that was necessary in order for the convergence to be achieved. Simulations are carried out for the final year of the planning cycle and for any year that there are changes to ACC or sector group configurations. Capacity levels are interpolated for intermediate years.

The capacity target level corresponds to the cost optimum delay for the ACC, to meet the overall delay target adopted by the appropriate authority, and represents the ACC capacity required to cover:

- the expected demand, and (if appropriate),
- the current capacity shortfall, i.e., the difference between the optimum capacity and the current capacity (as described in the previous section).

Figure 4 shows an ACC with a capacity surplus (blue), an ACC with a capacity shortfall (red) and an ACC with optimum capacity (green). For the ACC with optimum capacity, the requirement is only to cover the forecast traffic increase. For the ACC with a capacity shortfall, the requirement is to cover both the shortfall and the traffic increase, and for the one with a surplus, the requirement is to achieve the optimum capacity in the medium term, without costly over provision.

If the network delay is close to the target delay, the optimum delay at ACC level is an effective tool to identify areas that still have a capacity gap.

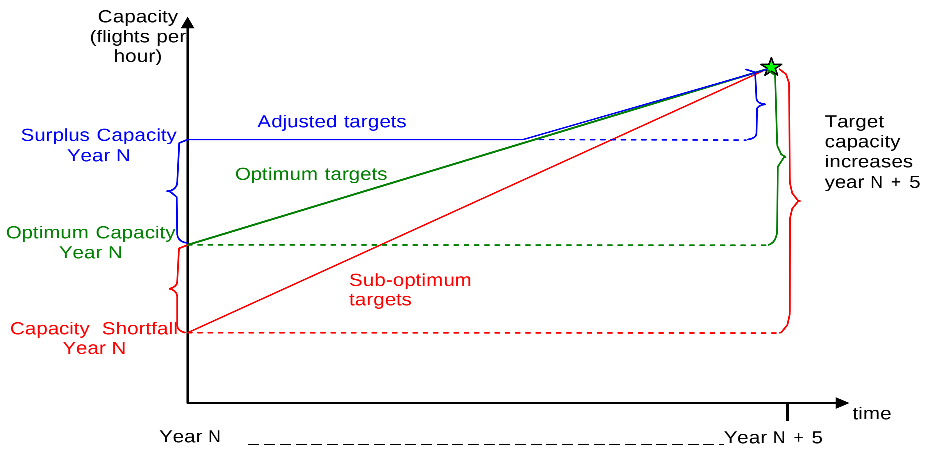


Figure 4: Current v. Target capacity

5. The Capacity Planning Work Programme

5.1 The table below describes the different phases of the annual work programme and lists the required actions and responsibilities.

EVENT	ACTION ATFM Function	ACTION ANSPS
<u>**Oct- Dec**</u> **Capacity planning meetings for the short- and medium-term**	Provide all relevant data to enable the ANSP to prepare a first draft of the local capacity plan • as data becomes available, and • at least 2 weeks before the meeting	Prepare the draft capacity plan prior to the meeting with capacity enhancement function (CEF) Ensure the participation of both planning and operational staff at the meeting
<u>**Nov - Dec**</u> **Completion of the capacity plan**	Complete the capacity chapter • by the end of December	Finalize the capacity plan • by the end of November
<u>**Nov -Feb**</u> **ATFM and capacity report for previous year**	Coordinate and agree with ANSPs the content with respect to the analysis of ACC performance • by end January Finalize report • by end February	Review and agree the ACC performance analysis content provided by ATFM Function • by end January
<u>**January**</u> **Agreement and development of the medium-term capacity profile scenarios**	Prepare the airspace scenario data for profile calculation following coordination with ANSPs • by end February	Provide ATFM Function with details of configuration changes (planned or proposed) during the 5 year planning cycle for ACCs and requested sector groups • by the end of January

<u>February</u> **Release of short- and medium-term traffic forecasts**	Convene meetings and provide the forum for all relevant information to be included in the short- and medium-term forecast • during the calendar year Provide the new Medium-Term traffic forecast • by the end of February Merge the short- and the medium-term traffic forecasts	To attend the user group meetings and to ensure that all information relevant to the traffic forecast is provided to the ATFM Function • by the end of December
<u>March</u> **Calculation of medium-term capacity profiles (including optimum delay per ACC)**	Calculate the optimum delay for each ACC • by mid March Calculate the capacity requirement profiles for ACCs and requested sector groups • by mid March	To agree the capacity profiles and optimum delay per ACC for use as a basis for the local capacity plan • by end April
<u>March</u> **Calculation of the delay forecast for the coming vacation season and next 2 years**	Make the delay forecast for the coming vacation season and the next 2 years • by mid March	To ensure that the local capacity plan is up-to-date and accurate and to communicate any changes to ATFM Function • before mid February
<u>March</u> **The annual meeting of a capacity planning task force**	Organize the task force meeting, invite contributions, compile the agenda and write the report	To attend the meeting, with the appropriate planning & operational participation and be prepared to share best practice capacity planning
<u>April</u> **Publication of the operations plan for the coming vacation season**	Incorporate the vacation capacity plans into the plans by mid March Release the first version of the vacation plan • by mid March	To ensure that up-to-date capacity information for the coming vacation season is made available, and that any changes are communicated to the ATFM Function for inclusion in the plan • by end February • as they occur, throughout the vacation season
<u>May</u> **Coordination and agreement of medium term capacity profiles**	Coordinate bilaterally with ANSPs and agree the profiles that will be used as the basis for local capacity planning in the medium-term • by end March	

	Present the capacity profiles to the next meeting of the appropriate authorities for approval • May meeting	
<u>June</u> **Publication of the medium-term ATM capacity plan**	Collect and consolidate all the local medium-term capacity plans and complete an analysis of the expected situation at network and local level • by end of April	
<u>July</u> **ACC capacity requirement profiles published**	To release document • by end of July	
<u>Jul - Aug</u> **ACC/sector group capacity baseline assessment period**	Inform ANSPs of the reference dates and request confirmation of data quality • by the end of June	To confirm that fully accurate sector capacity and opening scheme data will be provided to the ATFM Function • 1 week before the reference period
	Calculate the baselines for ACCs and requested sector groups, according to the airspace structure scenarios defined for the capacity profiles • by end August	
	In addition to the baseline assessment, calculate the capacity baselines using appropriate simulation and calculation tools • by end August	To ensure that the sector capacity and opening scheme data is sufficiently accurate for the baseline assessment • two AIRAC cycles before the start of the AIRAC containing the measurement period
<u>Sep - Oct</u> **ACC capacity baselines coordinated with the ANSPs**	Communicate the baseline results to ANSPs on a bilateral basis for discussion and agreement • by mid September	To agree the capacity baselines for the next planning cycle • prior to meeting of the appropriate authorities
	present the agreed ACC baselines to the next meeting of the appropriate authorities • October meeting	

Table1. Actions, Deadlines and Responsibilities

5.2 Capacity Planning Meetings

Once per year, the ATFM Function should visit the majority of ANSPs in the area concerned to collect information on capacity plans for the next five years and the coming vacation season. It is essential to the improvement of ATM capacity at overall network level for each ACC to have a robust capacity planning process and a realistic capacity plan.

ANSP capacity plans for each ACC should be published in a local implementation plan, together with other relevant capacity information (e.g. capacity delivered during the previous vacation season, future capacity requirements, expected performance in the medium term and the current and expected capacity of major airports).

Prior to each meeting, the ATFM Function provides the ANSP with a set of data to enable them to prepare the preliminary capacity plan, tailored to local conditions. The data set should include the following:

- A report and analysis of capacity delivered during the previous vacation season
- The value of the (vacation) capacity baseline indicator for each ACC and requested sector group
- The optimum delay for each ACC, to meet the network target delay
- A set of 5-year ACC capacity requirement profiles for high, low and medium traffic growth (shortest available routes over the future route network) and for the current route network
- Similar capacity requirement profiles for requested sector groups
- Detailed medium-term traffic forecast
- The latest short-term traffic forecast per State
- Short and medium-term delay forecast for each ACC
- Differences in demand between current routes and shortest routes and current routes and cheapest routes scenarios
- Other relevant capacity information

ANSPs prepare a first draft of the capacity plan for the meeting, which is discussed and updated in an interactive session, using appropriate simulation and calculation tools. To facilitate the discussion and ensure a realistic capacity plan, ANSPs should ensure the presence of both planning and operational staff.

The plan should detail the capacity enhancement actions planned each year of the capacity planning cycle, together with a realistic assessment of the contribution of these initiatives to the overall annual capacity increase.

Attachment A: Definitions of terms used in this Appendix

Elementary Sector: Primary component of the airspace structure, one or more of which may be combined to form a sector. In some cases the elementary sector can be the same as the operational sector; in other cases, the elementary sector is never open operationally without being combined with one or more other elementary sectors.

Sector: Primary operational component of the airspace structure that can be considered as an elementary capacity reference of the ATM system. A sector is made up of one or more elementary sectors.

Sector Group: Group of sectors that strongly interact with each other through close and complex coordination, satisfying the agreed concept of operations.

Traffic Volume: Airspace component based on traffic flow that serves as a reference to design the ATC sectors.

Sector capacity: The maximum number of flights that may enter a sector per hour averaged over a sustainable period of time (e.g. 3 hours), to ensure a safe, orderly and efficient traffic flow. Some ANSPs manage sector capacities tactically over a shorter period of time (e.g. 15 minutes). However, for global assessment purposes, the hourly figure is used as standard.

Declared Sector Capacity or Monitoring Value: The value the ANSP declares to the CFMU as the maximum number of flights per hour that can enter a sector before the application of an ATFM regulation becomes necessary. Several values may exist - depending on the ATC environment at the time (airspace, equipment, traffic pattern, staffing, weather etc.). The value can change according to the situation at the ACC.

Declared Traffic Volume Capacity: The capacity for a given period of time for a given traffic volume, as made known by the ANSP to the ATFM Function, so that it can provide the ATFM service. As with Sector Capacity, the value can change depending on the ATC environment at the time at the ACC.

ACC/ Sector Group Capacity: The theoretical maximum number of flights that may enter an ACC or sector group per hour, over a period of time (e.g. 3 hours), without causing excessive workload in any of the sectors. This capacity indicator is used for capacity planning and monitoring purposes and has no operational value. The indicator is calculated mathematically using a validated methodology.

Capacity Baseline: The value of the capacity indicator (see above) for the ACC and defined sector groups

Capacity Profile: The evolution of required capacity over the five-year planning cycle, considering certain assumptions, for a specified volume of airspace (ACC or defined sector group), in terms of absolute demand (flights per hour) and annual percentage increases. These values are published annually and are used as a basis for local capacity planning by ANSPs.

Network Effect: The network effect is the phenomenon where regulations placed on parts of the network affect the demand structure observed in other parts of the network. Network effects range from simple interactions of cause and effect, to more complex interactions between groups of sectors, where causes are repeatedly re-triggered by effects, involving several oscillations before a stable equilibrium is reached. Affected sectors could be adjacent, in the same region, or distant sectors located on the far side of the ECAC zone.

APPENDIX F

PLANNING PROCESS FOR ATFM IMPLEMENTATION

1. Initial Planning Steps

1.1 The first step is to conduct an ATM system review to understand the basic systems and to collect critical data. Terminal airspace analysis should include a terrain and environmental (including noise abatement) assessment as part of the review. At a minimum, the review should ensure that there is feedback from:

- aerodrome operators (including adjacent aerodromes);
- airspace users (including military agencies);
- ATS units;
- instrument flight procedure design organizations; and
- meteorological offices.

1.2 The following eight phases should be considered for the review and initial planning:

1. Briefings for senior decision-makers on the scope, objectives, and expected deliverables of the project.
2. Review Planning – preparation of questionnaires, timetable, personnel and resources required.
3. Specialist familiarization visits, interviews and data collection, which includes:
    - capacity assessment;
    - ATS communication and surveillance capabilities;
    - barriers to optimal use of available capacity;
    - possible capacity enhancements and costs of those enhancements; and
    - future changes that may affect the ATM system with regard to capacity.
4. Completion of current system review and analysis of options.
5. Stakeholder consultation of draft recommendations.
6. Analysis of stakeholder feedback and draft report preparation.
7. Stakeholder agreement.
8. Report for senior decision-makers.

2. Planning for Implementation

2.1 The decision to implement ATFM can be for en-route operations, or for a specific aerodrome and/or the terminal control area serving that aerodrome, or for all flight phases within a specific volume of airspace, as appropriate.

2.2 The following six phases need to be considered during ATFM implementation:

1. Consideration and procurement of ATFM facilities and tools.
2. Procedure development.
3. Training needs analysis.
4. Training development.
5. Initial ATFM implementation.
6. Review and measurement of outcomes.

2.3 The implementation of tactical ATFM capability can involve optimization of processes and the establishment of practices supporting ATFM at this operational phase such as:

- Airspace and ATS route re-design;
- Instrument flight procedure re-design;
    - Segregation of all SIDs from all STARs;
    - Simplification of SIDs and STARs.
- Establishment of agreed acceptance rates;

- Amendment of holding patterns to allow continuous descent operations (CDO) if possible and an orderly flow to the Initial Approach Fix (IAF) or TMA “gate”;
- Establishment of agreed flow “gates”;
  - Repositioning feeder fixes at uniform distances from the aerodrome.
- Prioritization of landing aircraft;
- Determination and industry notification of any periods where carriage of additional fuel for traffic delays is required;
- Establishment of flow coordination agreements between ACC and ATFM units when necessary;
- Training organization and simulation for ATFM;
- Enhancement of ATFM related knowledge, skills and procedures, for ATC personnel including:
    - use of standard phrases for delaying action (ICAO Doc 4444);
    - early advice to pilots of expected delays;
    - absorbing delays in the cruise if and where possible;
    - maximizing the use of speed control to achieve delays;
    - optimization of separation minima;
    - use of vectoring to:
      - Increase track miles to adjust time;
      - Meet set course times or Required Time of Arrival (RTA) if the aircraft does not have this internal capability;
      - Continuous descent during vectoring.
  - development of ATC skills in vectoring and holding for efficient sequencing;
  - any holding and vectoring for delay to be conducted outside congested terminal airspace;
  - terminal operations (re-sequencing missed approaches, speed control within terminal airspace, wind monitoring and runway change procedures, non-normal events such as short notice runway closure, rejected approaches);
  - aerodrome operations (wind monitoring, runway change procedures, non-normal events); and
  - use of new ATFM tools and terminologies.
- Development of any required additional competency measurements for inclusion in local ATC performance assessment tools;
- Enhancement of communication systems related to ATFM and CDM;
- ATM system adaptation changes; and,
- Industry engagement in ATFM policy decisions.

2.4 Definition of responsibilities

2.4.1 In establishing ATFM each stakeholder have specific responsibilities:

- Directorate-General of Civil Aviation
  - Authorization, regulation and oversight of the ATFM Plan.
- ANSP Headquarters (Programme Sponsor):
  - Agreement on objectives;
  - Providing progress briefings within HQ and to the DGCA;
  - Coordination with ATC managers;
  - Approval of procedure changes, training plans and competency criteria changes; and
  - Review of outcomes.
- ATS unit management
  - Management oversight and local sponsorship of the plan;
  - Provision of progress briefings and reporting to Program Sponsor;
  - Allocation of specialist staff;
  - Local review and approval of proposed procedure changes, training plans and competency criteria changes;
  - Local implementation of agreed ATFM Procedures;
  - Review of outcomes;
  - Quality Assurance/Safety Management Specialist;

    - Oversight En-route ATC aspects of the ATFM plan;
    - Ensure proposals comply with safety regulations; and
    - Inter-unit coordination agreements (as amended by the ATFM plan).
- Training Specialist
    - Training needs analysis and training development;
    - Development of specific competency criteria;
    - Close coordination and cooperation with ATS unit specialists;
    - Provision of expert information and advice on the current operating environment and control practices;
    - Data gathering activities;
    - Procedure recommendations;
    - Advice on training needs analysis and training development; and
    - Review of outcomes.

2.5 In order to determine a safe, orderly and ATC achievable per-hour arrival rate to each runway the following information must be considered for the training needs analysis:

- Radar separation standards.
- Wake turbulence separation standards.
- Visual separation by tower.
- Number of required departures per hour.
- Runway Occupancy time.
- Language and other airline-specific issues.

2.6 As a guide, the following underpinning knowledge and practical skills should be included in ATFM related competency assessment:

- Aircraft performance.
- Aircraft speed data.
    - holding pattern requirements
    - descent speed limitations
- Establishing a sequence.
- Coordinating the sequence.
- Changing the sequence.
- Vectoring for sequencing.
- Holding for sequencing.
- Application of available separation standards.
- Use of standard phraseologies.

3. **Structure**

3.1 The planned ATFM unit may be composed of Flow Management Units and Positions such as:

- Strategic management unit;
- Pre-Tactical Management Unit;
- Tactical Management Unit;
- Capacity Unit;
- Operability Monitoring Unit;
- Coordination and Decision Unit; and
- Flow Management Positions (established in the Area Control Centres and also in the Approach Control in the area of responsibility of the unit.

3.2 Duties

ATFM unit:

Strategic management unit – it is the duty of the strategic management unit to analyze, with at least more than one prior to the day of operation, the behavior of the demand and the volume of airspace, identifying situations of imbalance between demand and capacity, taking into consideration only scheduled flights and an estimation of general aviation flights, and planning the SLOT distribution at airports and volumes of airspace that present congestion and saturation scenarios.

Pre-tactical management unit – it is the duty of the pre-tactical management unit to update the plan set in the strategic management unit with more accurate information on the evolution of capacity and flight intentions (demand), taking into account the meteorological data, infrastructure, special events, etc. Usually, this update is carried out within a period of one day prior to day of the flight until the beginning of the tactical operation. And, during this time:

- Some traffic flows can be redirected;
- Less congested routes can be coordinated;
- Tactical measures will be decided; and
- The details of the ATFM planning for the next day will be disseminated to all concerned.

The evolution of the capacity and flight intentions request a growing volume of CDM interactions, involving, gradually, levels of decision making closer to the operation. The information to be processed in the pre-tactical management unit are the RPL, the FPL, the operations observed in the correlate days of the previous weeks, weather forecasts, inoperability due to scheduled or corrective maintenance, and other updated data that can contribute to the evaluation of the strategic planning. In this unit, measures are defined, for tactical application, with the purpose of mitigating possible impacts in case the scenarios provided above are confirmed.

Tactical Management Unit – Considering that the previous units provided an updated planning of the operations that will take place in the aerodromes and airspace, the duty of the tactical management unit is to track the occurrence of unexpected factors that may affect the capacity and/or demand, applying and monitoring the measures that will mitigate the impacts on the flow.

When the traffic demand exceeds, or is expected to exceed, the capacity of a particular volume of airspace or aerodrome, the unit shall inform the flow management position of the ATS unit concerned and other responsible ATS units. The airspace users who planned to fly in the affected area should be informed, as soon as possible, about the restrictions that will be applied.

In this unit, it also takes place a detailed monitoring of the weather, equipment and/or systems inoperability, and any other factors affecting capacity. At the same time, the demand must be permanently examined, observing the incoming of ATS messages. The proposed air traffic flow management measures should be evaluated within a CDM environment and, once set, disseminated to all interested parties. From then on, the established measures are continuously monitored and adjusted until their cancellation. All actions carried out in the tactical management unit must be registered and consolidated in a daily management report in order to support a quality evaluation of the services provided, creating indicators for the airspace and airport infrastructure planning.

Capacity Unit – It is the duty of the capacity unit to calculate the values for ATC capacity, according to the recommended methodology, as well as to evaluate those values periodically.

Operability Monitoring Unit – It is the duty of the operability monitoring unit to:

- Compile all information on the operational status of the elements that affect the air traffic flow, keeping other units informed about degradations;

- Generate operational reliability indexes of the elements that support the airport, terminal control area and enroute operations;

- Establish the operational priority for the maintenance and restoration of the degraded, inoperative or unavailable technical elements; and

- Monitor the actions carried out by maintenance, aiming at predicting the date and time normality is restored.

Coordination and Decision Unit – It is the duty of the coordination and decision unit to support CDM and the necessary coordination between airspace users, airport operators and civil and military aviation authorities. It is, usually, equipped with teleconference equipment; and

Flow Management Positions - It is the responsibility of the flow management positions (FMP) to:

- Inform, immediately, to the ATFM unit to which they are related to all changes on the infrastructure supporting airport, terminal control area and enroute operations that may generate an impact on the system (unavailability and/or restriction of aids, communication systems, radars, visualization and data processing systems, changes on procedures that affect the TMAs or FIRs, meteorological conditions, airport infrastructure unavailability, etc.);
- Coordinate with the ATFM unit, whenever deemed necessary, the adoption of ATFM measures in a given location or volume of airspace;
- Develop, monitor and analyze, together with the ATFM unit, ATFM measures, procedures and initiatives that are specific to their area of responsibility;
- Keep a complete record of all ATFM measures and procedures used, including description, start and end times, units involved and reasons;
- Develop, together with the FMP of adjacent units or with the APP supervisors and in coordination with the ATFM unit, strategies for arrival and departure of aircraft in order to balance demand and capacity for each aerodrome;
- Inform the ATFM unit on any use of air traffic flow control by the ATS units and monitor the impacts until its cancelation;
- Propose to the ATFM unit the cancelation of the ATFM measures when they are no longer necessary;
- Coordinate with the local airport administration in order to minimize the impact of blockages as regards the runways, taxiways, parking lots and others aerodrome facilities;
- Notify the units involved on ATFM measures; and
- In addition to the duties set forth in the preceding paragraphs, the FMP installed on ATS units must have knowledge of the procedures contained in the operational documentation pertinent to the unit, with the aim of supporting supervisors on duty in special situations that may arise.

OPERATIONAL REQUIREMENTS

For the implementation of its activities, the ATFM unit should have:

- Means (system or process) to monitor the functioning of all systems and equipment which are requisite for air navigation and air traffic management;
- Immediate access to all information made available by the aeronautical information management (AIM) units;
- Detailed meteorological information, including systems for reproducing images originating from weather satellites and/or meteorological radars;
- A database with appropriate coverage, reliability, consistency and integrity to carry out its activities. This database should contain, among other things, information about:
  - airports;
  - ATC capacity;
  - air traffic demand;
  - airspace structure;
  - navigation aids; and
  - statistics on the use of airports and volumes of airspace.
- Access to regular flight schedules and estimates of non-scheduled flights, looking towards the strategic and pre-tactical planning of air traffic flow management;

- Access to all flight plan messages and messages correlated for the tactical operation;
- Radar information, when available, with coverage of its respective area of responsibility and equipped with selection and filtering resources;
- Automated resources needed for performing its activities, particularly for the general knowledge of the whole system status, decision support, effectiveness evaluation of specific measures and performance indicators. Among others, it is recommended to automate the processes of:
  - data gathering, analysis and distribution;
  - data base maintenance;
  - demand evaluation;
  - sequencing of en route traffic aiming at and within terminal control area;
  - departure sequencing;
  - slot allocation; and
  - proposal of alternative routes.
- Means of voice and data communications required for systemic functional relations. The means of voice and data communications should include teleconference with, among others, the following units and/or users:
  - main airlines;
  - main ATS units;
  - flow management positions;
  - bodies related to aeronautical meteorology; and
  - military users.
- Qualified, experienced and, depending on the job, duly authorized staff to perform its activities;
- A situation room, specially equipped to serve as a place for contingency and crisis management, special operations and severe deterioration;
- Facilities devoted to the simulation, revisualization of events and training of its operations, and
- Charts of the airspace and airport structure.

Note – The FMP, depending on the implementation strategy of the ATFM service, should have the same requirements above, in smaller proportions in order to serve only the area of responsibility corresponding to the ATS unity they support.

OPERATIONAL CRITERIA

Moreover, for carrying out the Air Traffic Flow Management service, the ATFM unit and/or FMP should consider the following:

- The restoration of the technical means, after occasional inoperability, will take place according to the priorities established by the ATFM unit/FMP, based on the impact on the system capacity. In this activity, it should be given due consideration to the issues regarding the civil-military integration of the system;
- The use of airspaces reserved or under restrictions by other interested parties will be permitted only upon express manifestation of the ATFM unit/FMP following established procedures;
- The necessary measures to solve preventively the occurrence of saturation and congestion of volumes of airspace should be established collaboratively by ATS supervisors, involved airspace users and ATFM unit/FMP. In the absence of an agreement, the ATFM unit/FMP will arbitrate the measures it deems most appropriate, according to established procedures;
- The automation of the processes inherent to the ATFM unit/FMP should consider human factors. The architecture of the automated processes should consider the best relationship between the remote processing of data and the communications means;
- The requirement of experience in the selection of human resources for the ATFM unit/FMP should be understood as experience in ATS units in charge of areas of significant air traffic density;

- The ATFM unit/FMP will ensure continuity of the civil-military cooperation and optimal utilization of existing resources; and
- The determination of capacity values will be effected according to specific methodology and parameters, validation of results and periodic assessment.

-END-

Project	Title of the event	ICAO Nomenclature
RLA/06/901	Course Operational CGNA ATFM	

Duration (calendar days)	Starting date	Ending date	Closing date for nominations	Language(s)	Fees USD
10 days				Portuguese	Without cost for members of project RLA/06/901
Timetable	**Minimum vacancies**	**Maximum vacancies**			

Objective	Training of specialists of the Region in the processes of traffic analysis, implementation of measures, civil/military coordination processes, and exemption procedures.
Who should attend	Addressed to air traffic controllers, supervisors and personnel involved in ATFM tasks.
Contents	This course contemplates to develop the following: a) Airspace monitoring process; b) Analysis process of air traffic demand; c) Standards and procedures for the ATFM of a FMU/FMP dependence; d) Implementation of ATFM preliminary measures; e) TMI implementation; f) ATFM messaging; g) Development of international teleconferences; h) Coordination of special events; i) Civil/military coordination processes; and j) ATFM exemption procedures.
Candidate profile	Air traffic controllers trained in ATFM, CDM Airport Capacity and ATC Sectors, or involved in the processes of implementation and development of ATFM in their States.

Presentation of participants	Date	Hour	Place	Contact persons
	06/08/13	08:30		Mr. Julio Pereira, ATM/SAR ICAO Regional Officer tel. (511) 611 8686, ext. 104

Lodging	

APPENDIX K

STATUS OF IMPLEMENTATION IN PARAGUAY

A- AIRPORT	
Description of tasks	**Status of implementation**
1. Analysis of airport demand and capacity (runway capacity)	
1.1 Identify the personnel available in each State for calculating runway capacity.	Defined
1.2 Identify airports where runway capacity calculation is already available.	Defined
1.3 Identify, prioritise, and list airports that require runway capacity calculation.	Defined
1.4 Calculate runway capacity.	To be updated
1.5 Identify which airports exceed their runway capacity.	To be determined
1.6 Identify which airports have periods in which demand exceeds capacity, including simulations by the States, as necessary.	To be determined
1.7 Determine the operational factors affecting airport demand and capacity in order to optimise the use of existing capacity, including simulations, as necessary.	To be determined
1.8 Indicate airport capacity in terms of aircraft operations at the main airports.	Report to SAM/IG/13 (Completed)
2. Coordination with the ATM community	
2.1 Promote seminars for the ATFM community, taking into account the CDM concept for ATFM implementation, and start coordination as relevant.	Permanent
2.2 Consider the implementation of a CDM process at the main airports.	Permanent
2.3 The States will indicate which airports have this process in place.	Permanent
3. Infrastructure and database	
3.1 Establish a database format to be used for automation.	To be determined (SAM/IG/14)
4. Policy, standards and procedures 4.1 Request States to provide information on AIPs/AICs published on ATFM. 4.2 Standardise this information. 4.3 Update the information.	Adjust as required
5. Training 5.1 Draft ATFM training plans. 5.2 Train FMP/FMU/ATC personnel for the implementation of ATFM measures at airports. 5.3 Supervise training of the ATM community.	In permanent progress
6. Implementation go/no-go decision 6.1 Analyse factors affecting the implementation decision. 6.2 Declare pre-operational implementation within the defined area. 6.3 Declare definitive operational implementation within the defined area.	D.A.C.

7. Monitor system performance	
7.1 Develop performance indicators in accordance with the CDM manual.	To be determined 2014
7.2 Implement ATFM post-implementation monitoring programme at airports.	To be determined 2014
7.3 Develop an indicator monitoring programme.	To be determined 2014

B- AIRSPACE (ATC SECTOR)	
Description of tasks	**Status of implementation**
1. Analysis of airspace demand and capacity	
1.1 Conduct ATC sector calculations.	2 times/year
1.2 Identify the personnel available in each State for calculating airspace capacity.	Defined
1.3 Identify sectors where capacity calculation is already available.	Defined
1.4 Identify, prioritise, and list sectors that require capacity calculation.	To be determined 2014
1.5 Identify which sectors exceed their capacity.	To be determined 2014
1.6 Calculate airspace capacity (ATC sector) of State airspace regions.	In progress
1.7 Identify which airspace sectors have periods in which demand exceeds capacity, including simulations by States, as necessary.	To be determined 2014
1.8 Determine the operational factors affecting airspace demand and capacity in order to optimise the use of existing capacity, including simulations, as necessary.	To be determined 2014
1.9 Submit the conclusions regarding existing airspace capacity.	SAM/IG/14
2. Coordination with the ATM community	
2.1 Promote seminars for the ATFM community, taking into account the airspace capacity concept for ATFM implementation, and start coordination as relevant.	Permanent
3. Infrastructure and database	
3.1 The ATFM/IG will submit the basic requirements for a regional automated system.	SAM/IG/14
3.2 Coordinate implementation activities with the Automation Group.	SAM/IG/14
4. Policy, standards, and procedures	
4.1 Develop ATFM policies, taking into account the objectives and principles established in the CAR/SAM ATFM CONOPS.	Defined
4.2 Develop a strategy and frame of reference for the implementation of ATFM centralised units.	Defined
4.3 Develop a form/content for operational agreements between centralised ATFM units for inter-regional demand/capacity balancing.	To be determined
4.4 Define common situational awareness elements: * common display of traffic; * common display of weather conditions (Internet); * communications (teleconferences, web).	To be determined
4.5 Review the regional ATFM implementation roadmap to be used by States as FMU/FMP implementation guide.	Defined
4.6 Develop a regional strategy for the implementation of the flexible use of airspace (FUA). * assess management processes concerning the use of airspace; * improve current airspace management at national level so as to make dynamic adjustments in traffic flows in the tactical stage; * make improvements to ground ATS systems and related procedures in order to extend FUA through dynamic airspace management processes; * implement dynamic ATC sectorisation to optimise demand/capacity balancing and be able to respond to changing traffic flows in real time, and to accommodate user-preferred paths in the short term.	To be determined

5. Training	
5.1 Train personnel in sector capacity calculation and airspace ATFM-related issues.	In progress
5.2 Draft ATFM plans and training material.	In progress
5.3 Provide training to the personnel involved.	In progress
6. Implementation go/no-go decision	
6.1 Analyse factors affecting the implementation decision.	D.A.C.
6.2 Declare pre-operational implementation within the defined area.	
6.3 Declare definitive operational implementation within the defined area.	
7. Monitor system performance	
7.1 Develop performance indicators.	To be determined
7.2 Develop an indicator monitoring programme.	To be determined

APPENDIX L

CALCULATION OF CAPACITY, SILVIO PETTIROSSI INTERNATIONAL AIRPORT, ASUNCION - SGAS

Dirección Nacional de Aeronáutica Civil
Unidad Central del Flujo de Tránsito Aéreo

Runway capacity corresponding to Silvio Pettirossi International Airport - SGAS
Evaluated period: 16 to 31 May 2013
Total of days analyzed: 16 days

TOTAL OF OPERATIONS RWY 20	254

TOTAL OF OPERATIONS RWY 02	149

TOTAL IN BOTH RUNWAYS	403

RWY USE PER DAY

DATE	RWY 02	RWY 20	MOV. DAY
16-may	0	27	27
17-may	29	20	49
18-may	10	28	38
19-may	0	20	20
20-may	0	17	17
21-may	13	6	19
22-may	2	14	16
23-may	0	19	19
24-may	0	33	33

DATE	RWY 02	RWY 20	MOV. DAY
25-may	15	7	22
26-may	16	4	20
27-may	0	0	0
28-may	0	0	0
29-may	7	23	30
30-may	21	29	50
31-may	43	0	43
TOTAL	156	247	403

PERCENTAGE OF RWY USE

RWY 02	RWY 20
39%	61%

FLIGHT AVERAGE TIME (OM THR)

RWY 02

TM A	194,5
TM B	84
TM C	116,53
TM D	0

RWY 20

TM A	175,00
TM B	82,5
TM C	94,35
TM D	0

MTOPD Y MTOPP

RWY 02

MTOPD A	81,40909
MTOPD B	76,63636
MTOPD C	74,6
MTOPD D	0

RWY 20

MTOPD A	85,95238
MTOPD B	77,03448
MTOPD C	81,91667
MTOPD D	0

RWY 02

MTOPP A	75,46667
MTOPP B	68,27778
MTOPP C	75,86957
MTOPP D	0

RWY 20

MTOPP A	85,95652
MTOPP B	75,68182
MTOPP C	78,09091
MTOPP D	0

OCCUPATION AVERAGE TIME PER RWY

RWY 02

MATOP A	78,43788
MATOP B	72,45707
MATOP C	75,23478
MATOP D	0

RWY 20

MATOP A	85,95445
MATOP B	76,35815
MATOP C	80,00379
MATOP D	0

AIRCRAFT MIX

CAT	TOTAL DAYS	MIX %
A	160	39,7022
B	120	29,7767
C	123	30,5211
D	0	0
	403	=100%

RWY 02

	MATOP	MIX
TMOP A	78,437	39,7
TMOP B	72,457	29,77
TMOP C	75,234	30,521
TMOP D	0,000	0

TMOP RW02

75,67211 SEG

76 SEG

RWY 20

	MATOP	MIX
TMOP A	85,95	39,7
TMOP B	76,35	29,77
TMOP C	80	30,521
TMOP D	0	0

TMOP RW20

81,26835 SEG

81 SEG

C. AUX

CFP RWY 02

47,57367 — 48 SECONDS

CFP RWY 20

44,29769 — 44 SECONDS

C. AUX — PHYSICAL CAPACITY OF THE AERODROME

RWY 02 = CFP 02*%UP/100

RWY 20= CFP 20*%UP/100

RWY 02 = 1872

RWY 20= 2684 OPERATION

4556 /100 — 45,56

CFA = 46

FINAL APPROACH SPEED		RW 02	
	5 NM / Time OTH		
VA A	194,5	0,025707	NM/SEG
VA B	84	0,059524	NM/SEG
VA C	116,53	0,042907	NM/SEG
VA D	0	0	NM/SEG

FINAL APPROACH SPEED		RW 20	
	5 NM / Time OTH		
VA A	175,00	0,028571	NM/SEG
VA B	82,5	0,060606	NM/SEG
VA C	94,35	0,052994	NM/SEG
VA D	0	0	NM/SEG

FINAL AVERAGE APPROACH SPEED RW02

CAT A	1,020566	
CAT B	1,772024	
CAT C	1,309577	
CAT D	0	/100

SUM	4,102166	0,041022
VM RW 02= 0,04102 NM/SEG		

FINAL AVERAGE APPROACH SPEED RW20

CAT A	1,134286	
CAT B	1,804242	
CAT C	1,617435	
CAT D	0	/100
SUMA	4,555963	0,04556
VM RW20= 0,04556 NM/SEG		

SAFETY SEPARATION RWY 02

SS=

3,117649 NM	
	3 NM

SAFETY SEPARATION RWY 20

SS=

3,690328 NM	
	4 NM

SAFETY SEPARATION BETWEEN 2 LANDINGS

ST RW 02	SMR (2'30")+ SS (TMOP)
ST y TMST RW 02	285,6721 seg

SAFETY SEPARATION BETWEEN 2 LANDINGS

ST RW 20	SMR(3')+ SS (TMOP)
ST y TMST RW 20	321,2683 seg

ARRIVALS IN RWY 02 IN ONE HOUR

3600 SEG / TMST R02	ARR RWY 02 12,601	ARR RWY 02 13

ARRIVALS IN RWY 20 IN ONE HOUR

3600 SEG / TMST R20	ARR RWY 20 11,196	ARR RWY 20 11

TAKE-OFF IN RWY 02 IN ONE HOUR

ARR - 1 13-1= 12 TAKE-OFF PER HOUR

TAKE-OFF IN RWY 20 IN ONE HOUR

ARR - 1 11-1= 10 TAKE-OFF PER HOUR

THEORETICAL CAPACITY OF RWY 02

CTP= ARR + DES

25 AIRCRAFT

THEORETICAL CAPACITY OF RWY 20

CTP= ARR + DES

21 AIRCRAFT

DECLARED CAPACITY OF SILVIO PETTIROSSI AIRPORT RUNWAYS IS:

CPD= $\frac{(\%RWY\ 02 \times CTP\ 02)+(\%RWY\ 20 \times CTP\ 20)}{(\%\ RWY\ 02 + \%RWY\ 20)}$ 2256/100= 22,56

CPD= 23 AIRCRAFT

- - - - -

CALCULATION OF CAPACITY OF GUARANÍ INTERNATIONAL AIRPORT -SGES

Dirección Nacional de Aeronáutica Civil
Unidad Central del Flujo de Tránsito Aéreo

GOBIERNO NACIONAL
Construyendo Juntos Un Nuevo Rumbo

Runway capacity corresponding to Guaraní Airport – SGES
Evaluated period: 10 to 23 December 2013
Total of days analyzed: 14 days

TOTAL OPERATIONS RWY 05	78

TOTAL DE OPERATIONS RWY 23	78

TOTAL IN BOTH RUNWAYS	156

USE OF RWY PER DAY

DATE	RWY 05	RWY 23	MOV. DAY
10/12/2012	18	0	18
11/12/2012	9	2	11
12/12/2012	13	2	15
13/12/2012	8	2	10
14/12/2012	9	2	11
15/12/2012	5	2	7
16/12/2012	4	2	6
17/12/2012	8	2	10
18/12/2012	21	2	23
19/12/2012	19	2	21
20/12/2012	8	2	10
21/12/2012	0	2	2
22/12/2012	5	1	6
23/12/2012	5	1	6
TOTAL	132	24	156

PORCENTAGE OFDE RWY USE

RWY 05	RWY 23
85%	15%

FLIGHT AVERAGE TIME (OM THR)

RWY 05

TM A	0
TM B	132
TM C	123,73
TM D	140

RWY 23

TM A	0,00
TM B	0
TM C	119,5
TM D	120,5

MTOPD Y MTOPP

RWY 05

MTOPD A	133,92
MTOPD B	105,82
MTOPD C	257,75
MTOPD D	0

RWY 23

MTOPD A	110,33
MTOPD B	78
MTOPD C	224
MTOPD D	287

RWY 05

MTOPP A	88,53
MTOPP B	87,5
MTOPP C	37,05
MTOPP D	302

RWY 23

MTOPP A	71,66
MTOPP B	91
MTOPP C	82
MTOPP D	288

OCCUPATION AVERAGE TIME PER RWY

RWY 05

MATOP A	111,225
MATOP B	96,66
MATOP C	147,4
MATOP D	151

RWY 23

MATOP A	90,995
MATOP B	84,5
MATOP C	153
MATOP D	287,5

AIRCRAFT MIX

CAT	TOTAL DAYS	MIX %
A	95	60,8974
B	14	8,97436
C	43	27,5641
D	4	2,5641
	156	=100%

RWY 05

	MATOP	MIX
TMOP A	111,225	60,8974
TMOP B	96,66	8,97436
TMOP C	147,4	27,5641
TMOP D	151	2,5641

TMOP RW05

120,9091 SEG

121 SEG

RWY 23

	MATOP	MIX
TMOP A	90,995	60,8974
TMOP B	84,5	8,97436
TMOP C	153	27,5641
TMOP D	287,5	2,5641

TMOP RW23

112,5418 SEG

113 SEG

C. AUX

CFP RWY 02

29,77444

30 SECONDS

CFP RWY 20

31,98811

32 SECONDS

C. AUX

PHYSICAL CAPACITY OF AERODROME

RWY 05 = CFP 05*%UP/100
RWY 23= CFP 23*%UP/100

RWY 05 = 2550
RWY 23= 480
3030 /100

OPERATION 30,3

CFA = 30

FINAL APPROACH SPEED		RW 05	
	5 NM /	Time OTH	
VA A	0	0	NM/SEG
VA B	132	0,037879	NM/SEG
VA C	123,73	0,040411	NM/SEG
VA D	140	0,035714	NM/SEG

FINAL APPROACH SPEED		RW 23	
	5 NM /	Time OTH	
VA A	0,00	0	NM/SEG
VA B	0	0	NM/SEG
VA C	119,5	0,041841	NM/SEG
VA D	120,5	0,041494	NM/SEG

FINAL APPROACH AVERAGE SPEED RW05

CAT A	0	
CAT B	0,339938	
CAT C	1,113881	
CAT D	0,091575	/100
SUMA	1,545394	0,015454

VM RW 05= 0,01545 NM/SEG

FINAL APPROACH AVERAGE SPEED RW23

CAT A	0	
CAT B	0	
CAT C	1,15331	
CAT D	0,106394	/100
SUMA	1,259704	0,012597
VM RW23= 0,0126 NM/SEG		

SAFETY SEPARATION	RWY 05

SS=

1,869927 NM	
	2 NM

SAFETY SEPARATION	RWY 23

SS=

1,423466 NM	
	1,4 NM

SAFETY SEPARATION BETWEED 2 LANDINGS

ST RW 05	SMR (3'40")+ SS (TMOP)
ST y TMST RW 05	401 seg

SAFETY SEPARATION BETWEEN 2 LANDINGS

ST RW 23	SMR (3'32")+ SS (TMOP)
ST y TMST RW 23	385 seg

ARRIVALS IN RWY 05 IN ONE HOUR

3600 SEG / TMST R05	ARR RWY 05 8,977556	ARR RWY 05 9

ARRIVALS IN RWY 23 IN ONE HOUR

3600 SEG / TMST R23	ARR RWY 23 9,350	ARR RWY 23 9

TAKE-OFF IN RWY 05 IN ONE HOUR

ARR - 1 9-1= 8 TAKE-OFF PER HOUR

TAKE-OFF IN RWY 23 IN ONE HOUR

ARR - 1 9-1= 8 TAKE-OFF PER HOUR

THEORETICAL CAPACITY OF RWY 05

CTP= ARR + DES

17 AIRCRAFT

THEORETICAL CAPACITY OF RWY 23

CTP= ARR + DES

17 AIRCRAFT

DECLARED CAPACITY OF GUARANI AIRPORT RUNWAYS IS:

$$CPD = \frac{(\%RWY\ 05 \times CTP\ 05)+(\%RWY\ 23 \times CTP\ 23)}{(\%\ RWY\ 05 + \%RWY\ 23)} \qquad 1700/100= \qquad 17{,}00$$

CPD= 17 AIRCRAFT

Agenda Item 3: Criteria and procedures for the approval of performance-based navigation operations

3.1 Under this Agenda Item, WP/09 - *Status of development of new SRVSOP Advisory Circulars concerning the approval of aircraft and operators for advanced RNP (A RNP) and RNP 0.3 operations*, presented by the Secretariat, was discussed upon.

3.2 The Meeting recalled that the fourth edition of Doc 9613 – *Performance-Based Navigation (PBN) Manual*, was published under the authority of the ICAO Secretary General in March 2013, and that it contains advisory material, including criteria for the implementation of the Advanced RNP (A-RNP); and RNP 0.3 navigation specifications.

3.3 The Meeting took note that the Latin American Regional Safety Oversight Cooperation System (SRVSOP) had drafted Advisory Circulars 91-007 and 91-012, which establish the criteria for the approval of aircraft and operators for advanced RNP and RNP 0.2 operations, respectively. Same are shown in **Appendices A and B**, respectively, to this Agenda Item.

3.4 In this respect, the Meeting congratulated for the work carried out, taking into account that this documentation is the first of its kind drafted world-wide. With the aim of approving and using them in the Region, the Meeting deemed it convenient that the ICAO South American Regional Office distribute the advisory circulars to the States of the Region, and that they submit their comments by 30 July 2014. The comments received will be included in the advisory circulars and presented at SAM/IG/14 meeting, to be carried out in Lima in October 2014, for their approval. In this respect, the Meeting formulated the following conclusion:

Conclusion SAM/IG/13-6 Review of the advanced RNP (A-RNP) and RNP 0.3 advisory circulars

That, with the aim of approving Advisory Circulars AC 91-007 and AC 91-012 for Advanced RNP (A-RNP) and RNP 0.3 operations:

a) the ICAO South American Regional Office will send the States of the SAM Region and by 15 May 2014, the AC 91-007 and AC 91-012, for their review and comments;
b) SAM States will submit their comments by 15 August 2014; and
c) The SAM/IG Secretariat will include the comments received in the advisory circulars and present them at SAM/IG/14 meeting, for their approval.

APPENDIX A

ADVISORY CIRCULAR
CA 91-007

AIRCRAFT AND OPERATOR APPROVAL FOR ADVANCED RNP (A-RNP) OPERATIONS

A-RNP JOB AID

ADVISORY CIRCULAR

CA	**:**	**91-007**
DATE	**:**	**25/04/14**
REVISION	**:**	**Original**
ISSUED BY	**:**	**SRVSOP**

SUBJECT: AIRCRAFT AND OPERATOR APPROVAL FOR ADVANCED RNP (A-RNP) OPERATIONS

1. PURPOSE

This advisory circular (AC) establishes criteria on aircraft and operators approval for Advanced RNP (A-RNP) operations.

An operator may use alternate means of compliance, provided those means are acceptable to the Civil Aviation Administration (CAA).

The future tense of the verb or the term “shall” apply to operators who choose to meet the criteria set forth in this AC.

2. RELEVANT SECTIONS OF THE LATIN AMERICAN AERONAUTICAL REGULATIONS (LAR) OR EQUIVALENT

LAR 91: Sections 91.1015 and 91.1640 or equivalents

LAR 121: Section 121.995 (b) or equivalent

LAR 135: Section 135.565 (c) or equivalent

3. RELATED DOCUMENTS

Annex 6	Operation of aircraft
	Part I – International commercial air transport – Aeroplanes
	Part II – International general aviation - Aeroplanes
Annex 10	Aeronautical communications
	Volume I: Radio navigation aids
Annex 15	Aeronautical information services
ICAO Doc 9613	Performance based navigation (PBN) manual
ICAO Doc 4444	Procedures for air navigation services – Air traffic management (PANS-ATM)
ICAO Doc 8168	Procedures for air navigation services - Aircraft operations
	Volume I: Flight procedures
	Volume II: Construction of visual and instrument flight procedures

4. DEFINITIONS AND ABBREVIATIONS

4.1 Definitions

a) **Aircraft-based augmentation system (ABAS)**.- A system which augments and/or integrates the information obtained from the other GNSS elements with information available on board the aircraft. The most common form of ABAS is the receiver autonomous integrity monitoring (RAIM).

b) **Area navigation (RNAV)**.- A navigation method that allows aircraft to operate on any desired flight path within the coverage of ground or space-based navigation aids, or within the limits of the capability of self-contained aids, or a combination of both methods.

Note.- *Area navigation includes performance-based navigation as well as other RNAV operations that do not meet the definition of performance-based navigation.*

c) **Flight technical error (FTE)**.- The FTE is the accuracy with which an aircraft is controlled, as measured by the indicated aircraft position with respect to the indicated command or desired position. It does not include procedural blunder errors.

d) **Global navigation satellite system (GNSS)**.- A generic term used by the International Civil Aviation Organization (ICAO) to define any global position, speed, and time determination system that includes one or more main satellite constellations, such as GPS and the global navigation satellite system (GLONASS), aircraft receivers and several integrity monitoring systems, including aircraft-based augmentation systems (ABAS), satellite-based augmentation systems (SBAS), such as the wide area augmentation systems (WAAS), and ground-based augmentation systems (GBAS), such as the local area augmentation system (LAAS).

Distance information will be provided, at least in the immediate future, by GPS and GLONASS.

e) **Global positioning system (GPS)**.- The global positioning system (GNSS) of the United States is a satellite-based radio navigation system that uses precise distance measurements to determine the position, speed, and time in any part of the world. The GPS is made up by three elements: the spatial, the control, and the user elements. The GPS spatial segment nominally consists of, at least, 24 satellites in 6 orbital planes. The control element consists of 5 monitoring stations, 3 ground antennas, and one main control station. The user element consists of antennas and receivers that provide the user with position, speed, and precise time.

f) **Navigation specifications**.- Set of aircraft and flight crew requirements needed to support performance-based navigation operations within a defined airspace. There are two kinds of navigation specifications:

Required Navigation Performance (RNP) Specification.- A navigation specification based on area navigation that includes the requirement for on-board performance monitoring and alerting, designated by the prefix RNP; *e.g.,* RNP 4, RNP APCH, RNP AR APCH.

Area Navigation (RNAV) Specification.- A navigation specification based on area navigation that does not include the requirement for on-board performance monitoring and alerting, designated by the prefix RNAV; *e.g*., RNAV 5, RNAV 2, RNAV 1.

Note 1.- *The Manual on Performance-based Navigation (PBN) (Doc 9613), Volume II, contains detailed guidelines on navigation specifications.*

Note 2.- *The term RNP, formerly defined as "a statement of the navigation performance necessary for operation within a defined airspace", has been deleted from the Annexes to the Convention on International Civil Aviation because the RNP concept has been replaced by the PBN concept. In said Annexes, the term RNP is now only used within the context of the navigation specifications that require on-board performance control and alerting; e.g., RNP 4 refers to the aircraft and the operational requirements, including a lateral performance of 4 nautical miles (NM), with the requirement for on-board performance control and alerting as described in the PBN Manual of the International Civil Aviation Organization (ICAO) (Doc 9613).*

g) **Navigation system error (NSE)**.- The difference between the true position and the estimated position.

h) **Path definition error (PDE)**.- The difference between the defined path and the desired path at a given place and time.

i) **Performance-based navigation (PBN)**.- Area navigation based on performance requirements for aircraft operating along an ATS route, on an instrument approach procedure, or in a designated airspace.

Note.- *Performance requirements are expressed in navigation specifications (RNAV and RNP specifications) in terms of accuracy, integrity, continuity, availability, and functionality needed for the proposed operation in the context of a particular airspace concept.*

j) **Receiver autonomous integrity monitoring (RAIM)**.- A technique used in a GPS receiver/processor to determine the integrity of its navigation signals, using only GPS signals or GPS signals enhanced with barometric altitude data. This determination is achieved by a consistency check among redundant pseudo-range measurements. At least one additional available satellite is required with respect to the number of satellites that are needed for the navigation solution.

k) **RNP operations**.- Aircraft operations that use an RNP system for RNP navigation applications.

l) **RNP system**.- An area navigation system that supports on-board performance monitoring and alerting.

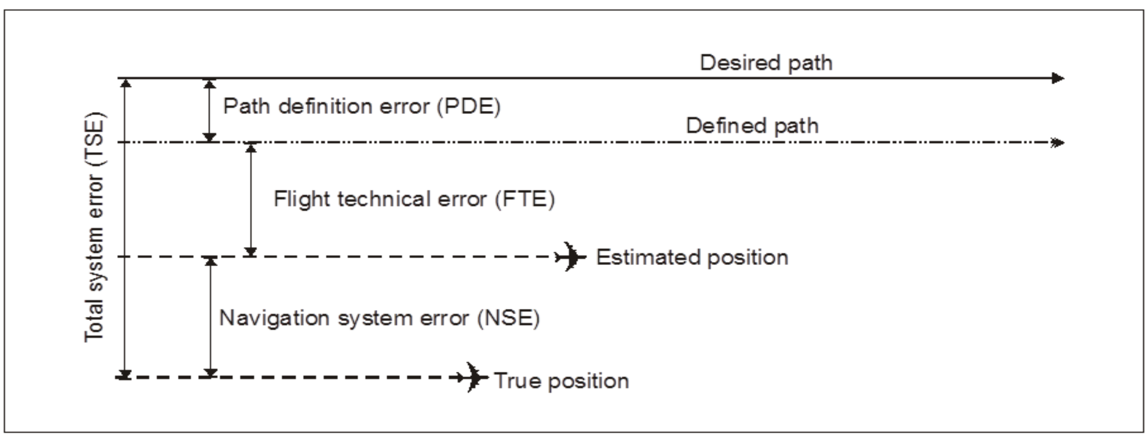
m) **Standard instrument arrival (STAR)**.- A designated instrument flight rule (IFR) arrival route linking a significant point, normally on an ATS route, with a point from which a published instrument approach procedure can be commenced.

n) **Standard instrument departure (SID)**.- A designated instrument flight rule (IFR) departure route linking the aerodrome or a specified runway of the aerodrome with a specified significant point, normally on a designated ATS route, at which the en-route phase of a flight commences.

o) **Total system error (TSE)**.- The difference between the true position and the desired position. This error is equal to the vector sum of the path definition error (PDE), flight technical error (FTE), and navigation system error (NSE).

Note.- *On occasions, the FTE is known as path steering error (PSE), and the NSE as position estimation error (PEE).*

Total system error (TSE)



p) **Waypoint (WPT)**.- A specified geographical location used to define an area navigation route or the flight path of an aircraft employing area navigation. Waypoints area identified as either:

Fly-by waypoint.- A waypoint which requires turn anticipation to allow tangential interception of the next segment of a route or procedure.

Fly over waypoint.- A waypoint at which a turn is initiated in order to join the next segment of a route or procedure.

4.2 Abbreviations

a)	ABAS	Aircraft-based augmentation system
b)	AC	Advisory circular
c)	ADS	Automatic dependent surveillance

d)	ADS-B	Automatic dependent surveillance - broadcast
e)	ADS-C	Automatic dependent surveillance – contract
f)	AFCS	Automatic flight control system
g)	AFM	Aircraft flight manual
h)	A-RNP	Advanced RNP
i)	AIP	Aeronautical information publication
j)	AIRAC	Aeronautical information regulation and control
k)	ANP	Actual navigation performance
l)	ANSP	Air navigation service providers
m)	AP	Automatic pilot
n)	APV	Approach procedure with vertical guidance
o)	APV/baro-VNAV	Approach procedure with vertical guidance/Barometric vertical navigation
p)	ARP	Aerodrome reference point
q)	ASBU	Aviation system block upgrades
r)	ATC	Air traffic control
s)	ATM	Air traffic management
t)	ATN	Aeronautical telecommunication network
u)	ATS	Air traffic service
v)	baro-VNAV	Barometric vertical navigation
w)	CA	Advisory circular (SRVSOP)
x)	CA	Course to an altitude
y)	CAA	Civil Aviation Administration/Civil Aviation Authority
z)	CDI	Course deviation indicator
aa)	CDU	Control and display unit
bb)	CF	Course to a fix
cc)	CPDLC	Controler-pilot data link communications
dd)	Doc	Document
ee)	DCPC	Direct controller-pilot communication
ff)	DF	Direct to a fix
gg)	DME	Distance-measuring equipment
hh)	DV	Flight dispatcher (SRVSOP)
ii)	EASA	European Aviation Safety Agency
jj)	EHSI	Electronic horizontal situation indicator
kk)	EPE	Estimated position error
ll)	EPU	Estimated position uncertainty
mm)	FA	Course from a fix to an altitude

nn)	FAA	Federal Aviation Administration (United States)
oo)	FAF	Final approach fix
pp)	FAP	Final approach point
qq)	FAS	Final approach segment
rr)	FD	Flight director
ss)	FM	Course from a fix to manual termination
tt)	Fly-by WPT	Fly-by way-point
uu)	Flyover WPT	Flyover way-point
vv)	FMS	Flight management system
ww)	FRT	Fixed radius transition
xx)	FTE	Flight technical error
yy)	GA	General aviation
zz)	GANP	Global air navigation plan
aaa)	GBAS	Ground-based augmentation system
bbb)	GNSS	Global navigation satellite system
ccc)	GLONASS	Global navigation satellite system
ddd)	GPS	Global positioning system
eee)	GS	Ground speed
fff)	HAL	Horizontal alerting limit
ggg)	HIL	Horizontal integrity limit
hhh)	HM	Holding to manual termination
iii)	HPL	Horizontal protection level
jjj)	HSI	Horizontal situation indicator
kkk)	IF	Initial fix
lll)	IFP	Instrument flight procedure
mmm)	IFR	Instrument flight rules
nnn)	IMC	Instrument meteorological conditions
ooo)	IPC	Illustrated parts catalogs
ppp)	LAAS	Local area augmentation system
qqq)	LAR	Latin American Aeronautical Regulations
rrr)	LNAV	Lateral navigation
sss)	LOA	Letter of authorisation/letter of acceptance
ttt)	LOI	Loss of integrity
uuu)	MCDU	Multifunction control and display unit
vvv)	MCM	Maintenance control manual
www)	MEL	Minimum equipment list
xxx)	MIO	Operations inspector manual (SRVSOP)

yyy)	NM	Nautical mile
zzz)	NAA	National airworthiness authority
aaaa)	NAVAID	Navigation aid
bbbb)	NDB	Non-directional radio beacon
cccc)	NOTAM	Notice to airmen
dddd)	NPA	Non-precision approach
eeee)	NSE	Navigation system error
ffff)	LNAV	Lateral navigation
gggg)	OACI	International Civil Aviation Organization
hhhh)	OM	Operations manual
iiii)	OEM	Original equipment manufacturer
jjjj)	OpSpecs	Operations specifications
kkkk)	PA	Precision approach
llll)	PANS-ATM	Procedures for air navigation services - Air traffic management
mmmm)	PANS-OPS	Procedures for air navigation services - Aircraft operations
nnnn)	PBN	Performance-based navigation
oooo)	PDE	Path definition error
pppp)	PEE	Position estimation error
qqqq)	PF	Pilot flying
rrrr)	PINS	Point-in-space
ssss)	POH	Pilot operating handbook
tttt)	P-RNAV	Precision area navigation
uuuu)	PSE	Path steering error
vvvv)	RAIM	Receiver autonomous integrity monitoring
wwww)	RF	Constant radius arc to a fix / Radius to fix
xxxx)	RNAV	Area navigation
yyyy)	RNP	Required navigation performance
zzzz)	RNP APCH	Required navigation performance approach
aaaaa)	RNP AR APCH	Required navigation performance authorisation required approach
bbbbb)	RTCA	Radio Technical Commission for Aviation
ccccc)	SBAS	Satellite-based augmentation system
ddddd)	SID	Standard instrument departure
eeeee)	SIS	Signal-in-space
fffff)	SRVSOP	Regional Safety Oversight Cooperation System
ggggg)	STAR	Standard instrument arrival
hhhhh)	STC	Supplemental type certificate
iiiii)	TF	Track to a fix

jjjjj)	TOAC	Time of arrival control
kkkkk)	TOGA	Take-off/go-around
lllll)	TSE	Total system error
mmmmm)	TSO	Technical standard order
nnnnn)	VA	Heading to an altitude
ooooo)	VI	Heading to an intercept
ppppp)	VM	Heading to a manual termination
qqqqq)	VMC	Visual meteorological conditions
rrrrr)	VNAV	Vertical navigation
sssss)	VOR	Very high frequency omnidirectional radio range
ttttt)	WAAS	Wide area augmentation system
uuuuu)	WGS	World geodetic system
vvvvv)	WPT	Waypoint

5. INTRODUCTION

5.1 The Advanced RNP (A-RNP) is designed for operations in oceanic/remote airspace, on the continental en-route structure, on arrival and departure routes and approaches.

5.2 This AC provides specific criteria on aircraft and operators approval for A-RNP operations on air traffic service (ATS) routes, standard instrument departures (SIDs), standard instrument arrivals (STARs) and approaches.

5.3 The qualification and operational authorizations encompass oceanic, remote, en-route, terminal area and approach operations, significantly reducing the amount of individual assessments associated with multiple, existing navigation specifications (or new ones that may be added), to only those aspects of operator criteria or operational examination that are not covered by the A-RNP qualification or operator approval.

5.4 The A-RNP also provides specific criteria for a single assessment of aircraft eligibility that will apply to more than one navigation accuracy requirement and multiple applications across all phases of flight.

5.5 With respect to the lateral navigation accuracy and functional requirements that pertain to other navigation applications that have been included in the area navigation (RNAV) and required navigation performance (RNP) advisory circulars published by the Latin American Regional Safety Oversight Cooperation System (SRVSOP), those shown in Table 1 are considered as being addressed in full by this navigation specification.

Table 1 - Navigation specifications addressed by A-RNP

Navigation specification	*SRVSOP PBN advisories circulars*
RNAV 5	AC 91-002
RNAV 1	AC 91-003
RNAV 2	AC 91-003
RNP 2	AC 91-005
RNP 1	AC 91-006

Navigation specification	*SRVSOP PBN advisories circulars*
RNP APCH: LNAV - LNAV/VNAV	AC 91-008
RNP APCH: LP - LPV	AC 91-011

5.6 For en-route and terminal applications, this navigation specification has requirements that only address the lateral aspects of navigation. For approaches, the lateral navigation accuracy and functional requirements are also addressed, while the vertical navigation (VNAV) requirements along the final approach segment (FAS) are as described within the RNP APCH navigation specification in SRVSOP AC 91-008 and/or AC 91-011, and are not reproduced in this AC.

5.7 This navigation specification, in common with others, may be associated in terms of an airspace design through either routes or instrument flight procedures (IFPs) with other functional elements included in this AC either as paragraphs or appendixes or through other AC, as shown in Table 2.

Table 2 - Additional functional elements

Description	*Reference*	*Performance/Functionality*
Higher continuity	8.2.1.2 c)	Optional
RNP scalability	Appendix 1, 1.4 a)	Optional
Radius to fix (RF)	Appendix 4	**Required**
Fixed radius transition (FRT)	Appendix 5	Optional
Time of arrival control (TOAC)	Appendix 6 *(to be developed)*	Optional
Baro-VNAV	CA 91-010	Optional

5.8 An A-RNP aircraft qualification can be more broadly applicable to multiple navigation specifications without the need for re-examination of aircraft eligibility. This enables an operator's approved procedures, training, etc., to be common to multiple navigation applications. The A-RNP aircraft qualification will also facilitate multiple operational specification approvals.

5.9 This AC does not address all the requirements that may be specified for operation on a particular route or in a particular area. These requirements are specified in other documents such as operating rules, aeronautical information publications (AIPs) and the *Regional Supplementary Procedures* (ICAO Doc 7030).

5.10 While operational approval primarily relates to the navigation requirements of the airspace, operators and flight crew are still required to take account of all operational documents relating to the airspace that are required by the appropriate State authority before conducting flights into that airspace.

5.11 For A-RNP some features/requirements may be required in one flight phase and optional or unnecessary in another. No distinctions are made regarding this flight phase association in providing a general set of criteria covering all phases and navigation applications. Where such differences are deemed important or the operational need is for one application, a more application specific navigation specification, e.g. RNP 1, is expected to be used instead.

5.12 The area navigation capability required for A-RNP will encompass the lateral aspects of the desired flight path. The predictability and performance monitoring and alerting for the lateral flight path will support a number of applications including closely spaced tracks, RNP departures/arrivals, and RNP approaches.

5.13 The accuracy, integrity and continuity requirements of this RNP navigation specification may enable implementation in airspace where there is no conventional navigation available. Alternatively, where conventional navigation is available, this will allow the decommissioning of existing very high frequency omnidirectional radio range (VOR) and non-directional radio beacon (NDB) facilities. This navigation specification also permits the implementation of higher density routes where, presently, there is insufficient ground NAVAID infrastructure to support such operations.

5.14 The A-RNP operation relies solely on the integrity of the RNP system without recourse to conventional means of navigation, such as VOR or NDB.

5.15 As conventional navigation may not be available, reversionary operation must be achieved by other means. Carriage of a single RNP system is considered generally acceptable such that where more stringent requirements (e.g. dual RNP system) exist, these carriage requirements must be promulgated through the State AIP and/or in Doc 7030. It is recommended that the Air navigation service provider (ANSP) develop alternate means to manage a system-wide failure. The solution for the implementation of a particular operation is expected to be established through safety cases.

5.16 This navigation specification provides guidance and criteria for the range of navigation accuracies identified by the PBN specifications listed in Table 1. It is intended that this navigation specification may also be applied for other navigation accuracy requirements not covered by the ones listed, e.g. less than 1 NM in terminal airspace applications. However, it is expected that the criteria of RNAV/RNP advisory circulars developed by the SRVSOP will be followed in determining how the operational requirements and application correlate to this navigation specification.

5.17 Where the final determination results in the identification of the A-RNP navigation specification as the appropriate standard, but where a different navigation accuracy requirement is necessary, this may require a re-examination of this aspect of aircraft qualification and compliance.

5.18 It is envisaged that A-RNP will be implemented in support of the ICAO Aviation System Block Upgrades (ASBU) and Global Air Navigation Plan (GANP).

Note.- *It should be noted that the application and implementation of A-RNP is complex. As such, adherence to the principles and processes described in this AC, is encouraged.*

6. GENERAL CONSIDERATIONS

6.1 Navigation aid infrastructure

a) A-RNP is based upon Global navigation satellite system (GNSS).

b) Multi-Distance-measuring equipment (DME) ground infrastructure is not required but may be provided based upon the State requirements, operational requirements and available services.

c) The detailed requirements of the operation will be set out in the State AIP and, where regional requirements are appropriate, will be identified in Doc 7030.

d) ANSPs should ensure operators relying on GNSS are required to have the means to predict the availability of GNSS fault detection (e.g. Aircraft-based augmentation system/Receiver autonomous integrity monitoring – ABAS/RAIM) to support the required navigation accuracy along the RNP route or procedure.

e) The on-board RNP system, GNSS avionics, the ANSP or other entities, may provide a prediction capability.

f) The AIP should clearly indicate when prediction capability is required and acceptable means to satisfy that requirement.

6.2 Communications and ATS surveillance

a) ATS surveillance may be used to mitigate the risk of gross navigation errors, provided that the procedure lies within the ATS surveillance and communications service volumes, and the ATS resources are sufficient for the task. For certain A-RNP navigation applications, radar surveillance may be required.

b) Where ATS surveillance relies upon the same system that supports the navigation function [e.g. Automatic dependent surveillance (ADS)], consideration has to be given to the risks associated with loss of navigation function, the impact on the ATS surveillance function and the requirement for appropriate mitigation techniques. This will typically be addressed through the regional or local State safety case prepared in support of the application.

c) The provisions relating to separation minima, including the communications and ATS surveillance requirements can be found in Annex 11 and PANS-ATM (Doc 4444) for the appropriate application. Controller-pilot data link communications (CPDLC) [Future air navigation system 1/A (FANS1/A)] and Automatic dependent surveillance - contract (ADS-C) or Automatic dependent surveillance - broadcast (ADS-B), or CPDLC [Aeronautical telecommunication network (ATN)] or ADS-B may be used providing they support the reporting rate required for the applications.

6.3 Obstacle clearance, route spacing and horizontal separation

a) Guidance for the application of A-RNP is provided in the Procedures for air navigation services – Aircraft operations (PANS-OPS) (Doc 8168) and Procedures for air navigation services – Air traffic management (PANS-ATM) (Doc 4444). It should be noted that the application of navigation accuracies of less than 1.0 NM, or where the operational requirement dictates a navigation accuracy greater than 1.0 NM with tenths of nautical miles, will be determined by the availability of appropriate procedure design and route spacing criteria

6.4 Publications

a) The State AIP should clearly indicate that the navigation application is A-RNP.

6.5 Parallel offset considerations

a) Where parallel offsets are applied and a course change exceeds 90 degrees, the navigation system can be expected to terminate the offset no later than the fix where the course change occurs. The offset may also be terminated if the route segment ends at a hold fix.

7. AIRWORTHINESS AND OPERATIONAL APPROVAL

7.1 For a commercial air transport operator to be granted a A-RNP approval, it must comply with two types of approvals:

a) the airworthiness approval, issued by the State of registry; and

b) the operational approval, issued by the State of the operator.

7.2 For general aviation operators, the State of registry will determine whether or not the aircraft meets the applicable A-RNP requirements and will issue the operational approval (*e.g.*, letter of authorisation – LOA).

7.3 Before filing the application, operators shall review all aircraft qualification requirements. Compliance with airworthiness requirements or equipment installation alone does not constitute operational approval.

7.4 This navigation specification provides technical and operational criteria but does not imply a need for recertification if an aircraft has been assessed in a prior qualification. Any operator with RNP operational approvals consistent with this navigation specification may conduct RNP or RNAV operations whose designated navigation accuracy is 0.3 (final approach only), 1, 2 and 5 NM, and which may have specified functional attributes, e.g. RF legs or FRTs (see Appendices 4 and 5 of this AC). It is expected that with A-RNP, the manufacturer's airworthiness approval/assessment will only be performed once and will be considered applicable to multiple applications. For the operators it is expected that operator procedures, maintenance, dispatch and other operations processes that satisfy the A-RNP criteria will be considered acceptable for RNAV 1, RNAV 2, RNAV 5, RNP 2, RNP 1 and RNP APCH operations down to LNAV and LNAV/VNAV minima (see SRVSOP AC 91-008). However, it is still recognized that the CAA granting the operational approval will still perform an assessment of the operator with due consideration given (i.e. credit) for any prior examinations and approvals, resulting in an abbreviated review and shorter approval cycle.

7.5 For other applications besides the ones just addressed, there may be additional requirements associated with the operation that will be factored into the assessment and reviews for the operational approval, even though the aircraft navigation performance may be satisfactory.

7.6 Existing manufacturer compliance findings and operator approvals that follow regulatory guidance consistent with the navigation specifications for RNAV 1, RNAV 2, RNAV 5, RNP APCH operations down to LNAV and LNAV/VNAV minima, RNP 1, and RNP 2 are not impacted by this navigation specification for the associated operations. If a manufacturer or operator has already obtained such approvals, a re-examination of the aircraft or operator for those operations relative to A-RNP by the CAA is unnecessary. In this latter case, the manufacturer and operator may only need to undertake the A-RNP airworthiness qualification and operator criteria to facilitate acceptance and flexibility for new applications predicated upon A-RNP capability or performance not covered by existing navigation specifications.

Note.- *Where appropriate, States may refer to previous operational approvals in order to expedite this process for individual operators where performance and functionality are applicable to the current request for operational approval.*

8. AIRWORTHINESS APPROVAL

8.1 Aircraft eligibility

a) The aircraft eligibility has to be determined through demonstration of compliance against the relevant airworthiness criteria and the requirements of 8.2. The aircraft original equipment manufacturer (OEM) or the holder of installation approval for the aircraft, e.g. Supplemental type certificate (STC) holder, will demonstrate compliance to the CAA and the approval can be documented in manufacturer documentation (e.g. service letters). Aircraft flight manual (AFM) entries are not required provided the CAA accepts manufacturer documentation.

b) The aircraft OEM or the holder of installation approval for the aircraft should document demonstration of compliance with the A-RNP capability and highlight any limitations of functionality and performance.

Note- *Requests for approval to use optional functionality (e.g. FRT) should address the aircraft and operational requirements as described in the corresponding paragraps, appendixes and AC included in Table 2 of this AC.*

8.2 Aircraft requirements

a) This section describes the aircraft performance and functional criteria for aircraft to qualify for applications requiring A-RNP. Aircraft eligible for A-RNP operations must meet all of the requirements of this section. The significant functional and performance requirements for A-RNP described herein are for RF legs, parallel offsets, RNAV holding, and the options for scalability, higher continuity, FRTs and TOAC.

b) Approved RNP AR systems are considered to meet the system performance monitoring and alerting requirements without further examination. However, this navigation specification contains additional functional requirements that are not included with the RNP AR APCH navigation specification, e.g. RF, RNAV holding, parallel offset and FRT. If such capabilities have been demonstrated and are contained in an approved RNP AR system, documentation of compliance may be all that is necessary. If such capabilities are added to an RNP AR system or part of a new RNP system, they will be subject to typical regulatory reviews, demonstrations, tests and approval.

c) To determine systems eligibility, the CAA should consider acceptance of manufacturer documentation of compliance for A-RNP, e.g. FAA ACs 90-105 (), 20-138 () or equivalents.

d) Communications and ATS surveillance equipment must be appropriate for the navigation application.

e) Some features/requirements may be required in one flight phase and optional or unnecessary in another. No distinctions are made regarding this flight phase association in providing a general set of criteria spanning all phases and navigation applications. Where such differences are deemed important, or the operational need is for one application, a more application-specific navigation specification, e.g. RNP 1 should be used instead.

8.2.1 On-board performance monitoring and alerting

8.2.1.1 General

a) On-board performance monitoring and alerting is required. This section provides the criteria for a total system error (TSE) form of performance monitoring and alerting that will ensure a consistent evaluation and assessment of compliance that can be applied across all of the possible applications as stated in 5.

b) The aircraft navigation system, or aircraft navigation system and flight crew in combination, is required to monitor the TSE, and to provide an alert if the accuracy requirement is not met or if the probability that the TSE exceeds two times the accuracy value is larger than 10^{-5}. To the extent operational procedures are used to satisfy this requirement, the crew procedure, equipment characteristics, and installation should be evaluated for their effectiveness and equivalence. Examples of information provided to the flight crew for awareness of navigation system performance include “Estimated position uncertainty - EPU”, “ACTUAL”, “Actual navigation performance - ANP”, and “Estimated position error - EPE”. Examples of indications and alerts provided when the operational requirement is or can be determined as not being met include “UNABLE RNP”, “Nav Accur Downgrad”, GNSS alert, loss of GNSS integrity, TSE monitoring [real time monitoring of navigation sytem error (NSE) and flight technical error (FTE) combined], etc. The navigation system is not required to provide both performance and sensor-based alerts, e.g. if a TSE-based alert is provided, a GNSS alert may not be necessary.

8.2.1.2 System performance

a) **Accuracy.-** During operations in airspace or on routes or procedures designated as RNP, the lateral TSE must be within the applicable accuracy (±0.3 NM to ±2.0 NM) for at least 95 per cent of the total flight time. The along-track error must also be within ± the applicable accuracy for at least 95 per cent of the total flight time. To satisfy the accuracy requirement, the 95 per cent FTE should not exceed one half of the applicable accuracy except for a navigation accuracy of 0.3 NM where the FTE is allocated to be 0.25.

Note.- *The use of a deviation indicator is an acceptable means of compliance for satisfying the FTE part of the lateral TSE with the scaling commensurate with the navigation application*.

b) **Integrity.-** Malfunction of the aircraft navigation equipment is classified as a major failure condition under airworthiness guidance material (i.e. 1×10^{-5} per hour).

c) **Continuity.-** Loss of function is classified as a minor failure condition for applications predicated on this navigation specification. Where a State or application establishes a classification of major, the continuity requirement may be typically satisfied by carriage of dual independent navigation systems.

d) **Signal-in-space (SIS).-** For GNSS RNP system architectures, the aircraft navigation equipment shall provide an alert if the probability of SIS errors causing a lateral position error greater than two times the applicable accuracy (2 × RNP) exceeds 1×10^{-7} per hour.

Note 1.- *The lateral TSE includes positioning error, FTE, PDE and display error. For procedures extracted from the on-board navigation database, PDE is considered negligible due to the navigation database requirements (12), and pilot knowledge and training (11).*

Note 2.- *For RNP systems where the architecture is an integrated, multi-sensor capability and where GNSS integrity is incorporated into a 2 × RNP integrity alert consistent with RTCA/EUROCAE DO-236/ED-75 when performance cannot be met, a separate GNSS integrity alert is not required.*

8.2.2 Criteria for specific navigation services

This section identifies unique issues for the navigation sensors.

a) **Global navigation satellite system (GNSS).-** The sensor must comply with the guidelines in FAA AC 20-138() or FAA AC 20-130A. For systems that comply with FAA AC 20-138(), the following sensor accuracies can be used in the total system accuracy analysis without additional substantiation: GNSS sensor accuracy is better than 36 meters (95 per cent), and augmented GNSS (GBAS or SBAS) sensor accuracy is better than 2 meters (95 per cent). In the event of a latent GNSS satellite failure and marginal GNSS satellite geometry, the probability the TSE remains within the procedure design obstacle clearance volume must be greater than 95 per cent.

Note.- *GNSS-based sensors output a horizontal integrity limit (HIL), also known as a horizontal protection level (HPL) (see FAA AC 20-138() and RTCA/DO-229D for an explanation of these terms). The HIL is a measure of the position estimation error assuming a latent failure is present. In lieu of a detailed analysis of the effects of latent failures on the TSE, an acceptable means of compliance for GNSS-based systems is to ensure the HIL remains less than twice the navigation accuracy, minus the 95 per cent of FTE, during the RNP operation.*

b) **Inertial reference system (IRS).-** An IRS must satisfy the criteria of SRVSOP LAR 121 Appendix G or equivalent. While Appendix G defines the requirement for a 2 NM per hour drift rate (95 per cent) for flights up to 10 hours, this rate may not apply to an RNP system after loss of position updating. Systems that have demonstrated compliance with LAR 121, Appendix G, can be assumed to have an initial drift rate of 8 NM/hour for the first 30 minutes (95 minutes) without further substantiation. Aircraft manufacturers and applicants can demonstrate improved inertial performance in accordance with the methods described in Appendix 1 or 2 of FAA Order 8400.12A.

Note.- *Integrated GPS/INS position solutions reduce the rate of degradation after loss of position updating. For "tightly coupled" GPS/IRUs, RTCA/DO-229C, Appendix R, provides additional guidance.*

c) **Distance measuring equipment (DME).-** For RNP procedures and routes, the RNP system may only use DME updating when authorized by the CAA. The manufacturer should identify any operating constraints (e.g. manual inhibit of DME) in order for a given aircraft to comply with this requirement.

Note 1.- *This is in recognition of States where a DME infrastructure and capable equipped aircraft are available, those States may establish a basis for aircraft qualification and operational approval to enable use of DME. It is not intended to imply a requirement for implementation of DME infrastructure or the addition of RNP capability using DME for RNP operations.*

Note 2.- *This does not imply an equipment capability must exist providing a direct means of inhibiting DME updating. A procedural means for the flight crew to inhibit DME updating or executing a missed approach if reverting to DME updating may meet this requirement.*

d) **VHF Omni-directional range station (VOR).-** For RNP procedures, the RNAV system must not use VOR updating. The manufacturer should identify any operating constraints (e.g. manual inhibit of VOR) in order for a given aircraft to comply with this requirement.

Note.- *This does not imply an equipment capability must exist providing a direct means of inhibiting VOR updating. A procedural means for the flight crew to inhibit VOR updating or executing a missed approach if reverting to VOR updating may meet this requirement.*

e) **For multi-sensor systems**, there must be automatic reversion to an alternate RNAV sensor if the primary RNAV sensor fails. Automatic reversion from one multi-sensor system to another multi-sensor system is not required.

8.3 Functional requirements

Appendix 1 contains the functional requirements that meet the criteria of this AC.

8.4 Continued airworthiness

a) The operators of aircraft approved to perform A-RNP operations, must ensure the continuity of the technical capacity of them, in order to meet technical requirements established in this AC.

b) Each operator who applies for A-RNP operational approval shall submit to the CAA of State of registry, a maintenance and inspection program that includes all those requirements of maintenance necessary to ensure that navigation systems continue fulfilling the A-RNP approval criteria.

c) The following maintenance documents must be revised, as appropriate, to incorporate A-RNP aspects:

1) Maintenance control manual (MCM);

2) Illustrated parts catalogs (IPC); and

3) Maintenance program.

d) The approved maintenance program for the affected aircrafts should include maintenance practices listed in maintenance manuals of the aircraft manufacturer and its components, and must consider:

1) that equipment involved in the A-RNP operation should be maintained according to directions given by manufacturer's components;

2) that any amendment or change of navigation system affecting in any way A-RNP initial approval, must be forwarded and reviewed by the CAA for its acceptance or approval of such changes prior to its implementation; and

3) that any repair that is not included in the approved/accepted maintenance documentation, and that could affect the integrity of navigation performance, should be forwarded to the CAA for acceptance or approval thereof.

e) Within the A-RNP maintenance documentation must be presented the training program of maintenance personnel, which inter alia, should include:

1) PBN concept;

2) A-RNP application;

3) equipment involved in an A-RNP operation; and

4) MEL use.

9. OPERATIONAL APPROVAL

Airworthiness approval alone does not authorise an applicant or operator to conduct A-RNP operations. In addition to the airworthiness approval, the applicant or operator must obtain an operational approval to confirm the suitability of normal and contingency procedures in connection to the installation of a given piece of equipment.

Concerning commercial air transport, the assessment of an application for A-RNP operational approval is done by the State of the operator, in accordance with standing operating rules [*e.g.*, LAR 121.995 (b) and LAR 135.565 (c)] or equivalents supported by the criteria described in this AC.

For general aviation, the assessment of an application for A-RNP operational approval is carried out by the State of registry, in accordance with standing operating rules (*e.g*., LAR 91.1015 and LAR 91.1640 or equivalents) supported by the criteria established in this AC.

9.1 Requirements to obtain operational approval

9.1.1 In order to obtain A-RNP approval, the applicant or operator will take the following steps, taking into account the criteria established in this paragraph and in Sections 10, 11, 12, and 13:

a) *Airworthiness approval*.- Aircraft shall have the corresponding airworthiness approvals, pursuant to Section 8 of this CA.

b) *Application*.- The operator shall submit the following documentation to the CAA:

1) *A-RNP operational approval application;*

2) *Description of aircraft equipment*.- The operator shall provide a configuration list with details of the relevant components and the equipment to be used for A-RNP operations. The list

shall include each manufacturer, model, and equipment version of GNSS equipment and software of the installed FMS.

3) *Airworthiness documents related to aircraft eligibility*.- The operator shall submit relevant documentation, acceptable to the CAA, showing that the aircraft is equipped with RNP systems that meet the A-RNP requirements, as described in Paragraph 8 of this AC. For example, the operator will submit the parts of the AFM or AFM supplement that contain the airworthiness statement.

4) *Training programme for flight crews and flight dispatchers (DV)*

(a) Commercial operators (*e.g*., LAR 121 and LAR 135 operators) will present to the CAA the A-RNP training curriculums to show that the operational procedures and practices and the training aspects described in Paragraph 11 have been included in the initial, upgrade or recurrent training curriculums for flight crews and DV.

Note.- *It is not necessary to establish a separate training programme if the A-RNP training identified in Paragraph 11 has already been included in the training programme of the operator. However, it must be possible to identify what aspects of A-RNP are covered in the training programme.*

(b) Private operators (*e.g*., LAR 91 operators) shall be familiar with and demonstrate that they will perform their operations based on the practices and procedures described in Paragraph 11.

5) *Operations manual and checklists*

(a) Commercial operators (*e.g.*, LAR 121 and 135 operators) must review the operations manual (OM) and the checklists in order to include information and guidance on the operating procedures detailed in Paragraph 10 of this AC. The appropriate manuals must contain the operating instructions for navigation equipment and contingency procedures. The manuals and checklists must be submitted for review along with the formal application in Phase 2 of the approval process.

(b) Private operators (*e.g.*, LAR 91 operators) must operate their aircraft based on the practices and procedures identified in Paragraph 10 of this CA.

6) *Minimum Equipment List (MEL)*.- The operator will send to the CAA for approval any revision to the MEL that is necessary to conduct A-RNP operations. If an A-RNP operational approval is granted based on a specific operational procedure, operators must modify the MEL and specify the required dispatch conditions.

7) *Maintenance*.- The operator will submit for approval a maintenance programme to conduct A-RNP operations.

8) *Training programme for maintenance personnel*.- Operators will submit the training curriculums that correspond to maintenance personnel in accordance with Paragraph 8.4 e).

9) *Navigation data validation programme*.- The operator will present the details about the navigation data validation programme as described in Appendix 2 to this AC.

c) *Training*.- Once the amendments to manuals, programmes, and documents submitted have been accepted or approved, the operator will provide the required training to its personnel.

d) *Validation flight*.- The CAA may deem it advisable to perform a validation flight before granting the operational approval. Such validation could be performed on commercial flights. The validation flight will be carried out according to Chapter 12, Volume II, Part II of the operations inspector manual (MIO) of the Regional Safety Oversight Cooperation System (SRVSOP).

e) *Issuance of the approval to conduct A-RNP operations*.- Once the operator has successfully completed the operational approval process, the CAA will grant the operator the authorization to conduct A-RNP operations.

1) LAR 121 and/or 135 operators.- For LAR 121 and/or LAR 135 operators, the CAA will issue

the corresponding operations specifications (OpSpecs) that will reflect the A-RNP approval.

2) *LAR 91 operators*.- For LAR 91 operators, the CAA will issue a letter of authorization (LOA).

10. OPERATING PROCEDURES

10.1 The operator and flight crews will become familiar with the following operating and contingency procedures associated with A-RNP operations.

a) **Pre-flight planning**

1) Operators and pilots intending to conduct RNP operations requiring A-RNP capability should indicate the appropriate application in the flight plan.

2) The on-board navigation data must be current and appropriate to the route being flown and for potential diversions. Navigation databases are expected to be current for the duration of the flight. If the AIRAC cycle is due to change during flight, operators and pilots should establish procedures to ensure the accuracy of navigation data, including suitability of navigation facilities used to define the routes and procedures for flight.

3) Operators using GNSS equipment should confirm the availability of RAIM by using RAIM availability prediction software taking account of the latest GNSS NOTAMs. Operators using SBAS augmentation should also check the relevant SBAS NOTAMs to determine the availability of SBAS. Notwithstanding preflight analysis results, because of unplanned failure of some GNSS or DME elements (or local interference), pilots must realize that integrity availability (or GNSS/DME navigation altogether) may be lost while airborne which may require reversion to an alternate means of navigation. Therefore, pilots should assess their capability to navigate in case of failure of the primary sensor or the RNP system.

b) **General operating procedures**

1) Operators and pilots should not request or file RNP routes, SIDs, STARs or approaches unless they satisfy all the criteria in the relevant State documents. The pilot should comply with any instructions or procedures identified by the manufacturer, as necessary, to comply with the performance requirements in this chapter.

Note.- *Pilots are expected to adhere to any AFM limitations or operating procedures required to maintain the RNP for the operation.*

2) At system initialization, pilots must confirm the navigation database is current and verify that the aircraft position has been entered correctly. Pilots must not fly an RNP route, SID, STAR or approach unless it is retrievable by name from the on-board navigation database and conforms to the chart. An RNP route, SID, STAR or approach should not be used if doubt exists as to the validity of the procedure in the navigation database.

Note.- *Flight crew may notice a slight difference between the navigation information portrayed on the chart and their primary navigation display. Differences of 3 degrees or less may result from equipment manufacturer's application of magnetic variation and are operationally acceptable.*

3) Cross-checking with conventional NAVAIDs is not required as the absence of integrity alert is considered sufficient to meet the integrity requirements. However, monitoring of navigation reasonableness is suggested, and any loss of RNP capability shall be reported to ATC. While operating on RNP Routes, SIDs, STARs or approaches, pilots are encouraged to use flight director and/or autopilot in lateral navigation mode, if available. Flight crew should be aware of possible lateral deviations when using raw path steering data or navigation map displays for lateral guidance in lieu of flight director. When the dispatch of a flight into RNP operations is predicated on use of the autopilot/flight director at the destination and/or alternate, the dispatcher/flight crew must determine that the autopilot/flight director is installed and operational.

c) **Manual entry of RNP**

If the navigation system does not automatically retrieve and set the navigation accuracy from the on-board navigation database for each leg segment of a route or procedure, the flight crew's operating procedures should ensure the smallest navigation accuracy for the route or procedure is manually entered into the RNP system.

d) **SID specific requirements**

1) Prior to flight, pilots must verify their aircraft navigation system is operating correctly and the correct runway and departure procedure (including any applicable en-route transition) are entered and properly depicted. Pilots who are assigned an RNP departure procedure and subsequently receive a change of runway, procedure or transition must verify the appropriate changes are entered and available for navigation prior to take-off. A final check of proper runway entry and correct route depiction, shortly before take-off, is recommended.

2) **Engagement altitude.-** The pilot must be able to use RNP equipment to follow flight guidance for lateral navigation no later than 153 m (500 ft) above the airport elevation. The altitude at which guidance begins on a given route may be higher (e.g. climb to 304 m (1 000 ft) then direct to …).

3) Pilots must use an authorized method (lateral deviation indicator/navigation map display/flight director/autopilot) to achieve an appropriate level of performance.

4) **GNSS aircraft.-** When using GNSS, the signal must be acquired before the take-off roll commences. For aircraft using FAA Technical standard order (TSO)-C129a equipment, the departure airport must be loaded into the flight plan in order to achieve the appropriate navigation system monitoring and sensitivity. For aircraft using FAA TSO-C145a/C146a equipment, if the departure begins at a runway waypoint, then the departure airport does not need to be in the flight plan to obtain appropriate monitoring and sensitivity.

e) **STAR specific requirements**

1) Prior to the arrival phase, the flight crew should verify that the correct terminal route has been loaded. The active flight plan should be checked by comparing the charts with the map display (if applicable) and the multifunction control and display unit (MCDU). This includes confirmation of the waypoint sequence, reasonableness of tracks and distances, any altitude or speed constraints, and, where possible, which waypoints are fly-by and which are fly-over. If required by a route, a check will need to be made to confirm that updating will exclude a particular NAVAID. A route must not be used if doubt exists as to the validity of the route in the navigation database.

Note.- *As a minimum, the arrival checks could be a simple inspection of a suitable map display that achieves the objectives of this paragraph.*

2) The creation of new waypoints by manual entry into the RNP system by the flight crew would invalidate the route and is not permitted.

3) Where the contingency procedure requires reversion to a conventional arrival route, necessary preparations must be completed before commencing the RNP route.

4) Route modifications in the terminal area may take the form of headings or "direct to" clearances and the flight crew must be capable of reacting in a timely fashion. This may include the insertion of tactical waypoints loaded from the database. Manual entry or modification by the flight crew of the loaded route, using temporary waypoints or fixes not provided in the database, is not permitted.

5) Pilots must verify their aircraft navigation system is operating correctly, and the correct arrival procedure and runway (including any applicable transition) are entered and properly depicted.

6) Although a particular method is not mandated, any published altitude and speed constraints must be observed. Approaches using temporary waypoints or fixes not provided in the navigation database are not permitted.

f) **Contingency procedures**

1) The pilot must notify ATC of any loss of the RNP capability (integrity alerts or loss of navigation), together with the proposed course of action. If unable to comply with the requirements of an RNP SID or STAR, pilots must advise ATS as soon as possible. The loss of RNP capability includes any failure or event causing the aircraft to no longer satisfy the A-RNP requirements of the route.

2) In the event of communications failure, the flight crew should continue with the A-RNP SID or STAR in accordance with the published lost communications procedure.

11. TRAINING PROGRAMMES

11.1 The training programme for flight crews and flight dispatchers (DV) shall provide sufficient training (*e.g*. using flight training devices, flight simulators or aircraft) on the aircraft´s RNP system to the extent necessary. The training programme will include the following topics:

a) The meaning and proper use of aircraft equipment/navigation suffixes;

b) Procedure characteristics as determined from chart depiction and textual description:

1) Depiction of waypoint types (fly-over, fly-by, RF and FRT), altitude and speed restrictions and path terminators as well as associated aircraft flight paths; and

2) Required navigation equipment for operation on RNP routes, SIDs, and STARs;

c) RNP system-specific information:

1) Levels of automation, mode annunciations, changes, alerts, interactions, reversions, and degradation;

2) Functional integration with other aircraft systems;

3) The meaning and appropriateness of route discontinuities as well as related flight crew procedures;

4) Monitoring procedures for each phase of flight (for example, monitor PROG or LEGS page);

5) Types of navigation sensors (GNSS) used by the RNP system and associated system prioritization/weighting/logic;

6) Turn anticipation with consideration to speed and altitude effects;

7) Interpretation of electronic displays and symbols; and

8) Automatic and/ or manual setting of the required navigation accuracy;

d) Understand the performance requirement to couple the autopilot/flight director to the navigation system's lateral guidance on RNP procedures, if required;

e) The equipment should not permit the flight crew to select a procedure or route that is not supported by the equipment, either manually or automatically (e.g. a procedure is not supported if it incorporates an RF leg and the equipment does not provide RF leg capability). The system should also restrict pilot access to procedures requiring RF leg capability or FRTs if the system can select the procedure, but the aircraft is not otherwise equipped (e.g. the aircraft does not have the required roll steering autopilot or flight director installed);

f) RNP equipment operating procedures, as applicable, including how to perform the following actions:

1) Verify currency and integrity of aircraft navigation data;

2) Verify successful completion of RNP system self-tests;

3) Initialize navigation system position;

4) Retrieve and fly a SID or a STAR with appropriate transition;

5) Adhere to speed and/or altitude constraints associated with a SID or STAR;

6) Select the appropriate STAR or SID for the active runway in use and be familiar with procedures to deal with a runway change;

7) Verify waypoints and flight plan programming;

8) Perform a manual or automatic runway update (with take-off point shift, if applicable);

9) Fly direct to a waypoint;

10) Fly a course/track to a waypoint;

11) Intercept a course/track. (Fly vectors, and rejoin an RNP route/procedure from the “heading” mode);

12) Determine cross-track error/deviation. More specifically, the maximum deviations allowed to support A-RNP must be understood and respected;

13) Where applicable, the importance of maintaining the published path and maximum airspeeds while performing RNP operations with RF legs or FRTs;

14) Insert and delete route discontinuity;

15) Remove and reselect navigation sensor input;

16) When required, confirm exclusion of a specific NAVAID or NAVAID type;

17) When required by the State aviation authority, perform gross navigation error check using conventional NAVAIDs;

18) Change arrival airport and alternate airport;

19) Perform parallel offset function if capability exists. Pilots should know how offsets are applied, the functionality of their particular RNP system and the need to advise ATC if this functionality is not available;

20) Perform RNAV holding function;

21) Flight crew contingency procedures for a loss of RNP capability; and

22) Manual setting of the required navigation accuracy;

Note.- *Operators are strongly encouraged to use manufacturer recommended training and operating procedures.*

g) Operator-recommended levels of automation for phase of flight and workload, including methods to minimize cross-track error to maintain route centre line; and

h) R/T phraseology for RNAV/RNP applications.

12. NAVIGATION DATABASE

a) The operator must obtain the navigation database from a supplier complying with RTCA DO 200A/EUROCAE Document ED 76, Standards for Processing Aeronautical Data, and the database must be compatible with the intended function of the equipment. Regulatory authorities recognize compliance to the referenced standard using an LOA or other equivalent document.

b) Discrepancies that invalidate an RNP Route, SID or STAR must be reported to the navigation database supplier and the affected route, SID or STAR must be prohibited by an operator’s notice to its flight crew.

c) For RNP procedures, the database supplier is discouraged from substitution of path terminators in lieu of those specified in the original AIP data. Where this is necessary, there must be coordination with the State or service provider to gain operational acceptability and approval for such substitutions.

d) Aircraft operators should consider the need to conduct ongoing checks of the operational navigation databases in order to meet existing quality system requirements.

13. OVERSIGHT, INVESTIGATION OF NAVIGATION ERRORS, AND WITHDRAWAL OF A-RNP APPROVAL

a) The operator will establish a process to receive, analyse, and follow up on navigation errors reports in order to determine appropriate corrective action.

b) Information indicating the potential for repeated errors may require modification of an operator´s training programme.

c) Information attributing multiple errors to particular pilots may necessitate remedial training or license review.

d) Repeated navigation error occurrences attributed to specific piece of navigation equipment should result in the cancellation of the approval for the use of that equipment.

APPENDIX 1

FUNCTIONAL REQUIREMENTS

1.1 Displays – guidance, situation and status

Item	*Function/Feature*	*Description*
a)	Continuous display of deviation.	1. The navigation system must provide the capability to continuously display to the pilot flying, on the primary flight instruments for navigation of the aircraft, the aircraft position relative to the RNP defined path. 2. For operations where the required minimum flight crew is two pilots, the means for the pilot not flying to verify the desired path and the aircraft position relative to the path must also be provided. 3. The display must allow the pilot to readily distinguish whether the cross-track deviation exceeds the navigation accuracy (or a smaller value). 4. The numeric display of deviation on a map display with an appropriately scaled deviation indicator is generally considered acceptable for monitoring deviation. 5. Moving map displays without an appropriately scaled deviation indicator may be acceptable depending on the task, flight crew workload, display characteristics, flight crew procedures and training.
b)	Identification of the active (To) waypoint.	The navigation system must provide a display identifying the active waypoint either in the pilot's primary optimum field of view, or on a readily accessible and visible display to the flight crew.
c)	Display of distance and bearing.	The navigation system must provide a display of distance and bearing to the active (To) waypoint in the pilot's primary optimum field of view. Where not viable, a readily accessible page on a control display unit, readily visible to the flight crew, may display the data.
d)	Display of groundspeed and time.	The navigation system must provide the display of groundspeed and time to the active (To) waypoint in the pilot's primary optimum field of view. Where not viable, a readily accessible page on a control display unit, readily visible to the flight crew, may display the data.
e)	Desired track display.	The navigation system must have the capability to continuously display to the pilot flying the aircraft desired track. This display must be on the primary flight instruments for navigation of the aircraft.
f)	Display of aircraft track.	The navigation system must provide a display of the actual aircraft track (or track angle error) either in the pilot's primary optimum field of view, or on a readily accessible and visible display to the flight crew.
g)	Failure annunciation.	The aircraft must provide a means to annunciate failures of

Item	*Function/Feature*	*Description*
		any aircraft component of the RNP system, including navigation sensors. The annunciation must be visible to the pilot and located in the primary optimum field of view.
h)	Slaved course selector.	The navigation system must provide a course selector automatically slaved to the RNP computed path.
i)	Display of distance to go.	The navigation system must provide the ability to display distance to go to any waypoint selected by the flight crew.
j)	Display of distance between flight plan waypoints.	The navigation system must provide the ability to display the distance between flight plan waypoints.
k)	Display of deviation.	The navigation system must provide a numeric display of the lateral deviation with a resolution of 0.1 NM or less.
l)	Display of active sensors.	The aircraft must display the current navigation sensor(s) in use. It is recommended that this display be provided in the primary optimum field of view. ***Note.-*** *This display is used to support operational contingency procedures. If such a display is not provided in the primary optimum field of view, crew procedures may mitigate the need for this display if the workload is determined to be acceptable.*

1.2 Path definition and flight planning

<table>
<tr><th>Item</th><th>Function/Feature</th><th>Description</th></tr>
<tr><td></td><td>Maintaining tracks and leg transitions.</td><td>The aircraft must have the capability to execute leg transitions and maintain tracks consistent with the following ARINC 424 path terminators:
ARINC 424 path terminators
<table>
<tr><td>Initial fix (IF)</td></tr>
<tr><td>Course to a fix (CF)</td></tr>
<tr><td>Direct to a fix (DF)</td></tr>
<tr><td>Track to a fix (TF)</td></tr>
<tr><td>Radius to fix (RF), see Appendix 4</td></tr>
<tr><td>Course to an altitude (CA)</td></tr>
<tr><td>Course from an fix to an altitude (FA)</td></tr>
<tr><td>Heading to an altitude (VA)</td></tr>
<tr><td>Course from a fix to manual termination (FM)</td></tr>
<tr><td>Heading to a manual termination (VM)</td></tr>
<tr><td>Heading to an intercept (VI)</td></tr>
<tr><td>Holding to manual termination (HM)</td></tr>
</table>
</td></tr>
</table>

		Where approval is sought for FRT in association with this navigation specification, the RNP system must have the capability to create FRTs between route segments, based upon the data contained in the aircraft navigation system database - see Appendix 5 of this AC. ***Note 1.-*** *Path terminators and the FRT are defined in ARINC 424, and their application is described in more detail in RTCA/EUROCAE documents DO-236B/ED-75B and DO-201A/ED-77.* ***Note 2.-*** *The list of path terminators includes a number that introduce variability in the flight path to be flown by the aircraft. For all RNP applications, the preferred path terminators are IF, DF, TF, and RF. Other path terminators may be used on the understanding that they will introduce less repeatability, predictability and reliability of aircraft lateral path performance.* ***Note 3.-*** *For the VA, VM and VI path terminators, if the aircraft is unable to automatically execute these leg transitions, they should be able to be manually flown on a heading to intercept a course or to go direct to another fix after reaching a procedure-specified altitude.*
b)	Leg transition.	Fly-by and fly-over fixes. The aircraft must have the capability to execute fly-by and fly-over fixes. For fly-by turns, the navigation system must limit the path definition within the theoretical transition area defined in EUROCAE ED-75B/ RTCA DO-236B. The fly-over turn is not compatible with RNP flight tracks and will only be used when there is no requirement for repeatable paths. FRTs: Where approval is sought for FRTs, the aircraft must have the capability to execute the function in accordance with Appendix 5 of this AC.
c)	Intercepts.	The RNP system should provide the ability to intercept the final approach at or before the final approach fix (FAF). This functional capability must provide the pilot with the ability to rejoin the published final approach track following a period when the aircraft has been flown manually or in Automatic flight control system (AFCS) heading mode, following ATC vectors to support final approach sequencing. The implementation method and visual information (MCDU and primary displays (map display/EHSI)) shall be sufficient to enable the correct re-acquisition of the track with a minimum of manual intervention on the MCDU. Due account must be taken of the workload associated with the re-acquisition and the impact of errors in leg sequencing.
d)	Holding.	A holding procedure will only normally be required at defined holding points on entry to terminal airspace. However, holding may be required by ATC at any point. A hold shall be defined by a point, the turn direction, an inbound track and an outbound distance. This data may be extracted from the database for published holds or may be manually entered for ad hoc ATC holds. ***Note.-*** *It is highly desirable that the RNP system provide a holding capability that includes the computation of the hold flight path, guidance*

		and/or cues to track the holding entry and path. The system with the minimum of crew intervention must be capable of initiating, maintaining and discontinuing holding procedures at any point and at all altitudes.
e)	Parallel offset.	Parallel offsets provide a capability to fly offset from the parent track, as defined by the series of waypoints. The turn defined for the parent track (fly-by or FRT) shall be applied in the offset track. Parallel offsets are applicable only for en-route segments and are not foreseen to be applied on SIDs, STARs or approach procedures. The activation of an offset shall be clearly displayed to the flight crew and the cross-track deviation indication during the operation of the offset will be to the offset track.
f)	Offset execution.	The system should be capable of flying tracks offset by up to 20 NM from the parent track. The presence of an offset should be continuously indicated; Tracks offset from the parent track shall be continued for all ATS route segments and turns until either: – Removed by the crew; or – Automatically cancelled following: • Amendment of the active flight plan by executing a "Direct-To"; • Commencement of a terminal procedure; • Where a course change exceeds 90°, the RNP system may terminate the offset at the fix where the course change occurs. The offset may also be terminated if the route segment ends at a hold fix. The flight crew shall be given advance notice of this cancellation. The cross-track offset distance should be manually entered into the RNP system to a resolution of 1 NM or better. Where parallel offsets are applied, the lateral track keeping requirement of RNP must be maintained referenced to the offset track. Where FRTs are applied, the offset track must be flown with the same turn radius as the parent track. The cross-track offset distance should be manually entered into the RNP system to a resolution of 1 NM or better. Where parallel offsets are applied, the lateral track-keeping requirement of RNP must be maintained referenced to the offset track.
g)	Entry and recovery from	Transitions to and from the offset track must maintain an

	offsets.	intercept angle of between 30° and 45°.
h)	Capability for a "direct-to" function.	The navigation system must have a "direct-to" function the flight crew can activate at any time. This function must be available to any fix. The navigation system must also be capable of generating a geodesic path to the designated "To" fix without "S-turning" and without undue delay.
i)	Altitudes and/or speeds associated with published terminal procedures.	Altitudes and/or speeds associated with published terminal procedures must be extracted from the navigation database.
j)	Capability to load procedures from the navigation database.	The navigation system must have the capability to load the entire procedure(s) to be flown into the RNP system from the on-board navigation database. This includes the approach (including vertical angle), the missed approach and the approach transitions for the selected airport and runway.
k)	Means to retrieve and display navigation data.	The navigation system must provide the ability for the flight crew to verify the procedure to be flown through review of the data stored in the on-board navigation database. This includes the ability to review the data for individual waypoints and for NAVAIDs.
l)	Magnetic variation.	For paths defined by a course (e.g. CF and FA path terminators), the navigation system should use the appropriate magnetic variation value in the navigation database.
m)	Changes in navigation accuracy.	The RNP system should automatically retrieve and set the navigation accuracy for each leg segment of a route or procedure from the on-board navigation database. When a change occurs to a smaller navigation accuracy, e.g. from RNP 1.0 to RNP 0.3, the change must be complete by the first fix defining the leg with the smaller navigation accuracy requirement. The timing of this change must also consider any latency in alerting from the RNP system. When the RNP system cannot automatically set the navigation accuracy for each leg segment, any operational procedures necessary to accomplish this must be identified. ***Note.-*** *One acceptable means to meet this requirement may be to require the flight crew to manually set the smallest navigation accuracy the route or procedure uses before commencing the route or procedure (i.e. prior to the ÍAF).* If the navigation accuracy for the RNP system has been set manually by the flight crew and following an RNP system change to the navigation accuracy required (e.g. the next flight path segment contains a different navigation accuracy), the RNP system should provide an alert to the flight crew.
	Automatic leg sequencing.	The navigation system must provide the capability to automatically sequence to the next leg and display the sequencing to the flight crew in a readily visible manner.

1.3 System

Item	*Function/Feature*	*Description*
a)	*Design assurance.*	The system design assurance must be consistent with at least a major failure condition for the display of misleading lateral or vertical guidance in RNP applications.
b)	*Navigation database.*	The aircraft navigation system must use an on-board navigation database, containing current navigation data officially promulgated for civil aviation, which can be updated in accordance with the AIRAC cycle; and allow retrieval and loading of procedures into the RNP system. The stored resolution of the data must be sufficient to achieve negligible PDE. The on-board navigation database must be protected against flight crew modification of the stored data. When a procedure is loaded from the database, the RNP system must fly the procedure as published. This does not preclude the flight crew from having the means to modify a procedure or route already loaded into the RNP system. However, the procedures stored in the navigation database must not be modified and must remain intact within the navigation database for future use and reference. The aircraft must provide a means to display the validity period for the on-board navigation database to the flight crew. The equipment should not permit the flight crew to either manually or automatically select a route that is not supported. A route is not supported if it incorporates an FRT and the equipment does not provide FRT capability. The RNP system should also restrict pilot access to routes requiring FRTs if the equipment can support the route, but the aircraft is not otherwise equipped (e.g. the aircraft does not have the required roll steering autopilot or flight director installed). ***Note.-*** *An alternate means of satisfying this requirement is to remove such routes from the navigation database.*

1.4 Optional capability

Item	*Function/Feature*	*Description*
a)	*RNP scalability*	The RNP system must be capable of manual or automatic entry and display of navigation accuracy requirements in tenths of NM between 0.3 and 1.0 NM. The RNP system must provide lateral deviation

Item	*Function/Feature*	*Description*
		displays and alerting appropriate to the selected navigation accuracy and application. ***Note.-*** *One means by which this can be achieved is as described in RTCA MOPS DO-283A. Another means is to develop lateral deviation displays and alerting as per RTCA/EUROCAE MASPS DO-236B/ED-75B.* ***Note.-*** *It is recognized that aircraft and equipment that are based upon GNSS standards such as RTCA DO-208() and DO-229() have RNP capabilities for lateral deviation and alerting that are generally associated with navigation accuracies of 0.3, 1.0, and 2.0 NM only. Such capability exists in a large portion of the aircraft fleet but may not be extended to other navigation accuracies or the means of compliance specified herein. Additionally, some of this fleet does provide the capability to select other navigation accuracies. Therefore, before a manufacturer implements or an operator applies this functional capability, it is recommended that they determine the effects of the resolution of a number of issues including:* *1) How their aircraft and systems will be affected or accommodated operationally when different navigation accuracy requirements are needed;* *2) Is there a basis for implementing improved functionality or operating procedures; and* *3) How such systems will need to be qualified, used by the flight crew and operationally approved.*

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APPENDIX 2

NAVIGATION DATA VALIDATION PROGRAMME

1. INTRODUCTION

The information stored in the navigation database defines the lateral and longitudinal guidance of the aircraft for A-RNP. Navigation database updates are carried out every 28 days. The navigation data used in each update are critical to the integrity of every A-RNP route. This appendix provides guidance on operator procedures to validate the navigation data associated with the A-RNP operations.

2. DATA PROCESSING

a) The operator will identify in its procedures the person responsible for the navigation data updating process.

b) The operator must document a process for accepting, verifying, and loading navigation data into the aircraft.

c) The operator must place its documented data process under configuration control.

3. INITIAL DATA VALIDATION

3.1 The operator must validate every A-RNP route to ensure compatibility with the aircraft and to ensure that the resulting paths are consistent with the published routes. As a minimum, the operator must:

a) compare the navigation data of A-RNP routes to be loaded into the FMS with valid charts and maps containing the published routes; and

b) once the A-RNP routes are validated, a copy of the validated navigation data shall be kept and maintained in order to compare them with subsequent data updates.

4. DATA UPDATING

Upon receiving a navigation data update and before using such data on the aircraft, the operator must compare the update with the validated routes. This comparison must identify and resolve any discrepancy in the navigation data. If there are significant changes (any change affecting the path or the performance of the route) in any part of the route, and if those changes are verified through the initial data, the operator must validate the amended route in accordance with the initial validation data.

5. NAVEGATION DATA SUPPLIERS

Navigation data suppliers must have a letter of acceptance (LOA) in order to process these data (*e.g*., FAA AC 20-153 or the document on the conditions for the issuance of letters of acceptance to navigation data suppliers by the European Aviation Safety Agency – EASA (EASA IR 21 Subpart G) or equivalent documents). A LOA recognises the data supplier as one whose data quality, integrity and quality management practices are consistent with the criteria of DO-200A/ED-76. The database supplier of an operator must have a Type 2 LOA and its respective suppliers must have a Type 1 or 2 LOA. The CAA may accept a LOA issued to navigation data suppliers or issue its own LOA.

6. AIRCRAFT MODIFICATIONS (DATABASE UPDATE)

If an aircraft system necessary for A-RNP operations is modified (*e.g*., change of software), the operator is responsible for validating the A-RNP routes with the navigation database and the modified system. This can be done without any direct assessment if the manufacturer confirms that the modification has no effect on the navigation database or on path calculation. If there is no such confirmation by the manufacturer, the operator must perform an initial validation of the navigation data with the modified system.

APPENDIX 3

A-RNP APPROVAL PROCESS

a) The A-RNP approval process consists of two types of approvals, airworthiness and operational. Although the two have different requirements, they must be considered in one single process.

b) This process is an orderly method used by the CAA to make sure that the applicants meet the established requirements.

c) The approval process is made up by the following phases:

1)	Phase one:	Pre-application
2)	Phase two:	Formal application
3)	Phase three:	Documentation evaluation
4)	Phase four:	Inspection and demonstration
5)	Phase five:	Approval

d) In *Phase one - Pre-application*, the CAA calls the applicant or operator to a pre-application meeting. At this meeting, the CAA informs the applicant or operator of all the operational and airworthiness requirements that it must meet during the approval process, including the following:

1) the contents of the formal application;

2) the review and evaluation of the application by the CAA;

3) the limitations (if any) applicable to the approval; and

4) conditions under which the A-RNP approval could be cancelled.

e) In *Phase two – Formal Application*, the applicant or operator submits the formal application along with all the relevant documentation, as established in Paragraph 9.1.1 b) of this AC.

f) In Phase three – *Documentation evaluation*, the CAA evaluates all the documentation and the navigation system to determine their eligibility and the approval method to be followed in connection with the aircraft. As a result of this analysis and evaluation, the CAA may accept or reject the formal application along with the documentation.

g) In *Phase four – Inspection and demonstration*, the operator will provide training to its personnel and will carry out the validation flight, if required.

h) In *Phase five* - Approval, the CAA issues the A-RNP approval once the operator has met the airworthiness and operational requirements. For LAR 121 and 135 operators, the CAA will issue the OpSpecs, and for LAR 91 operators, a LOA.

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APPENDIX 4

RADIUS TO FIX (RF) PATH TERMINATOR

1. INTRODUCTION

1.1 Background

This appendix addresses ARINC 424 RF path terminator functionality when used in association with A-RNP navigation specification. RF legs are a required capability for use with A-RNP rather than a minimum requirement. This functionality can be used in the initial and intermediate approach segments, the final phase of the missed approach, SIDs and STARs. The application of this appendix in the final approach or the initial or intermediate phases of the missed approach is prohibited. Such procedure segments wishing to apply RF would have to use the RNP AR specification.

1.2 Purpose

1.2.1 This appendix provides guidance to CAAs implementing instrument flight procedures (IFPs) where RF legs are incorporated into terminal procedures.

1.2.2 For the ANSP, it provides a consistent CAA recommendation on how to implement RF legs. For the operator, it provides training requirements. This appendix is intended to facilitate operational approval for existing RNP systems that have a demonstrated RF leg capability. An operational approval based upon this standard allows an operator to conduct operations on procedures containing RF legs globally.

1.2.3 This appendix also provides airworthiness and operational criteria for the approval of an RNP system incorporating an RF leg capability. Although the ARINC 424 RF leg functionality in this appendix is identical to that found in the RNP AR specification, the approval requirements when applied in association with A-RNP are not as constraining as those applied to RNP AR. This is taken into account in the related obstacle protection and route spacing criteria. ICAO Doc 9905 provides a continuous lateral protection of 2 × RNP for RNP AR applications, on the basis that the certification and approval process provides assurance that the integrity and continuity of the navigation solution will meet 10^{-7}. The demanding integrity and continuity requirements for RNP AR do not apply to the RF functionality described here as ICAO Doc 8168 provides additional buffers in the RF design criteria.

2. IMPLEMENTATION CONSIDERATIONS

2.1 Application of RF legs

2.1.1 The RF leg should be used when there is a requirement for a specific fixed radius curved path in a terminal procedure. The RF leg is defined by the arc centre fix, the arc initial fix, the arc ending fix and the turn direction. The radius is calculated by the navigation computer as the distance from the arc centre fix to the arc ending fix. RNP systems supporting this leg type provide the same ability to conform to the track-keeping accuracy during the turn as in the straight line segments. RF legs are intended to be applied where accurate repeatable and predictable navigation performance is required in a constant radius turn.

2.1.3 RF legs may be used on any segment of a terminal procedure except the FAS, the Initial missed approach phase or the intermediate missed approach phase. The criteria for designing procedures with RF legs are detailed in PANS-OPS (ICAO Doc 8168).

Note.- *Although the RF leg is designed to be applied within the extent of terminal procedures, during higher flight level/altitude segments aircraft may become bank angle limited. When designing terminal procedures with curved path segments, consideration should be given to the interface between the terminal procedure (SID or STAR) and the ATS route structure and whether it is more appropriate to implement the curved path segment through use of the FRT. The FRT design feature within an ATS route structure is provided for any such curved path requirements as part of the A-RNP specification.*

2.2 IFP design considerations and assumptions

2.2.1 The radius of turn depends upon the ground speed of the aircraft and the applied bank angle. From an IFP design perspective, the maximum ground speed of the aircraft is determined by the maximum allowable IAS, the turn altitude and the maximum tail wind. IFP design criteria for maximum IAS, turn altitude, bank angle and maximum tailwind are described in detail in PANS-OPS (ICAO Doc 8168).

2.2.2 When speed restrictions are required for departures they will be placed on the RF leg exit waypoint or a subsequent waypoint as required. For arrivals, the speed restriction should be applied to the waypoint associated with the beginning of the RF leg (path terminator of preceding leg).

2.2.3 The inbound and outbound legs will be tangential to the RF leg.

2.2.4 The requirements of an RF leg may be continued through to a sequential RF leg when implementing wrap-around instrument procedures, e.g. departures.

2.2.5 The procedure will be subjected to comprehensive validation checks prior to publication in order to assure flyability by the intended aircraft types.

3. GENERAL CONSIDERATIONS FOR USE OF RF LEGS

3.1 Benefits

RF legs provide a predictable and repeatable ground track during a turn and prevent the dispersion of tracks experienced in other types of turn construction due to varying aircraft speeds, turn anticipation, bank, roll rate, etc. Therefore, RF legs can be employed where a specified path must be flown during a turn. Additionally, because an RF leg traverses a specified distance it can be used to maintain aircraft longitudinal spacing between aircraft having the same speed. This is not necessarily true with other turn constructions such as fly-by transitions, because of the varying turn paths aircraft execute.

3.2 Publication considerations

Guidance for charting RF legs is provided in PANS-OPS (ICAO Doc 8168). The requirement for RF functionality must be clearly marked on the chart.

3.3 ATC coordination

3.1.1 It is expected that ATC will be familiar with RF leg benefits and their limitations, e.g. speed. ATC shall not allocate a speed that exceeds a constraint associated with the (design) flyability of an RF leg.

3.1.2 Aircraft must be established on the inbound track to the RF leg prior to it being sequenced by the navigation system. ATC must therefore not issue a Direct To clearance to a waypoint beginning an RF leg or a vector to intercept an RF leg.

4. AIRCRAFT REQUIREMENTS

4.1 RNP system-specific information

4.1.1 The navigation system should not permit the pilot to select a procedure that is not supported by the equipment, either manually or automatically (e.g. a procedure is not supported if it incorporates an RF leg and the equipment does not provide RF leg capability).

4.1.2 The navigation system should also prohibit pilot access to procedures requiring RF leg capability if the system can select the procedure, but the aircraft is not otherwise equipped (e.g. the aircraft does not have the required roll steering autopilot or flight director installed).

Note 1.- *One acceptable means to meet these requirements is to screen the aircraft's on-board navigation database and remove any routes or procedures the aircraft is not eligible to execute. For example, if the aircraft is not eligible to complete RF leg segments, then the database screening could remove all procedures containing RF leg segments from the navigation database.*

Note 2.- *Another acceptable means of compliance may be pilot training to identify and prohibit the use of procedures containing RF legs.*

4.2 On-board performance monitoring and alerting

The navigation system must have the capability to execute leg transitions and maintain a track consistent with an RF leg between two fixes. The lateral TSE must be within $\pm 1 \times$ RNP of the path defined by the published procedure for at least 95 per cent of the total flight time for each phase of flight and each autopilot and/or flight director mode requested.

Note 1.- *Industry standards for RF defined paths can be found in RTCA DO-236B/EUROCAE ED-75B (Sections 3.2.5.4.1 and 3.2.5.4.2).*

Note 2.- *Default values for FTE can be found in RTCA DO-283A. FAA AC 120-29A, 5.19.2.2 and 5.19.3.1, also provides guidance on establishing FTE values.*

4.3 System failure modes/annunciations

4.3.1 The RNP system shall provide a visible alert within the pilot's primary field of view when loss of navigation capability and/or loss of integrity (LOI) are experienced.

4.3.2 Any failure modes that have the potential to affect the RF leg capability should be identified. Failure modes may include loss of electrical power, loss of signal reception, RNP system failure, including degradation of navigation performance resulting in a loss of RNP containment integrity.

4.3.3 The ability of the aircraft to maintain the required FTE after a full or partial failure of the autopilot and/or flight director should be documented.

Note.- *If autopilot malfunction testing was performed for worst case failures, no further validation is required. In this case, the manufacturer is expected to provide a statement of confirmation.*

4.4 Functional requirements

4.4.1 An autopilot or flight director with at least "roll-steering" capability that is driven by the RNP system is required. The autopilot/flight director must operate with suitable accuracy to track the lateral and, as appropriate, vertical paths required by a specific RNP procedure.

4.4.2 An electronic map display depicting the RNP computed path of the selected procedure is required.

4.4.3 The flight management computer, the flight director system, and the autopilot must be capable of commanding and achieving a bank angle up to 25 degrees above 400 ft AGL.

4.4.4 The flight guidance mode should remain in lateral navigation while on an RF leg, when a procedure is abandoned or a missed approach/go-around is initiated [through activation of Take-off/go-around (TOGA) or other means] to enable display of deviation and display of positive course guidance during the RF leg. As an alternative means, crew procedures may be used that ensure that the aircraft adheres to the specified flight path throughout the RF leg segment.

4.5 Compliance demonstration

4.5.1 In seeking an airworthiness approval for a navigation system implementing the RF path terminator, the compliance demonstration supporting such an approval should be scoped to the airspace operational concept and the boundaries to which the RF leg is likely to be applied.

4.5.2 Consideration should be given to evaluation of the navigation system on a representative set of procedure designs under all foreseen operating conditions. The evaluation should address maximum assumed crosswind and maximum altitude with the aircraft operating in the range of expected airspeeds for the manoeuvre and operating gross weights. Procedure design constraints should include sequencing multiple, consecutive RF leg segments of varying turn radii, including consecutive RF leg segments reversing the direction of turn (i.e. reversing from a left-hand RF turn to a right-hand RF turn). Within the demonstration, the applicant should be seeking to confirm the FTE commensurate with the identified RNP navigation accuracy and that the RF turn entry and exit criteria are satisfied. Any limitations identified during the compliance demonstration should be documented. Flight crew procedures should be assessed, including identification of any limitations which surround the use of pilot selectable or automatic bank angle limiting functions and confirmation of those related to go-around or missed approach from an RF leg segment.

5. OPERATIONAL REQUIREMENTS

5.1 Background

This section identifies the operational requirements associated with the use of RF legs as scoped in 1.1 of this appendix. It assumes that the airworthiness approval of the aircraft and systems has been completed. This means that the basis for the RF leg function and the system performance has already been established and approved based upon appropriate levels of analysis, testing and demonstration. As part of this activity, the normal procedures, as well as any limitations for the function, will have been documented, as appropriate, in the aircraft flight and operations manuals.

5.2 Approval process

The approval process will follow the procedures established in Appendix 3 of this AC.

5.3 Aircraft eligibility

5.3.1 Relevant documentation acceptable to the CAA must be available to establish that the aircraft is equipped with an RNP system with a demonstrated RF leg capability. Eligibility may be established in two steps: first, recognizing the qualities and qualifications of the aircraft and equipment; and second, determining the acceptability for operations. The determination of eligibility for existing systems should consider acceptance of manufacturer documentation of compliance, e.g. FAA ACs 90-105, 90-101A, 20-138B, EASA AMC 20-26.

Note.- *RNP systems demonstrated and qualified for RNP AR operations using RF leg functionality are considered qualified with recognition that the RNP operations are expected to be performed consistent with the operators RNP AR approval. No further examination of aircraft capability, operator training, maintenance, operating procedures, databases, etc. is necessary.*

5.3.2 *Eligibility airworthiness documents*. The flight manual or referenced document should contain the following information:

a) A statement indicating that the aircraft meets the requirements for RNP operations with RF legs and has demonstrated the established minimum capabilities for these operations. This documentation should include the phase of flight, mode of flight (e.g. FD on or off, and/or AP on or off, and applicable lateral and vertical modes), minimum demonstrated lateral navigation accuracy, and sensor limitations, if any;

b) Any conditions or constraints on path steering performance (e.g. AP engaged, FD with map display, including lateral and vertical modes, and/or CDI/map scaling requirements) should be identified. Use of manual control with CDI only is not allowed on RF legs; and

c) The criteria used for the demonstration of the system, acceptable normal and non-normal configurations and procedures, the demonstrated configurations and any constraints or limitations necessary for safe operation should be identified.

5.4 Operational approval

5.4.1 The operational approval will follow the steps described in Section 9 of this AC.

5.4.2 *Issuance of the approval to conduct A-RNP operations with RF legs*.- Once the operator has successfully completed the operational approval process, the CAA will grant to the operator the authorization to conduct A-RNP operations with RF legs.

a) LAR 121 and/or 135 operators.- For LAR 121 and/or LAR 135 operators, the CAA will issue the corresponding operations specifications (OpSpecs) that will reflect the A-RNP authorization with RF legs.

b) LAR 91 operators.- For LAR 91 operators, the CAA will issue a letter of authorization (LOA).

5.4.2 Training documentation.- Commercial operators must have a training programme addressing the operational practices, procedures and training related to RF legs in terminal operations (e.g. initial, upgrade or recurrent training for pilot, dispatchers or maintenance personnel). Private operators should be familiar with the practices and procedures identified in 5.6 - Pilot knowledge and training of this appendix.

Note.- *It is not required to establish a separate training programme or regime if RNAV and RF leg training is already an integrated element of a training programme. However, it should be possible to identify what aspects of RF leg use are covered within a training programme.*

5.4.4 OMs and checklists.- OMs and checklists for commercial operators must address information/guidance on the SOP detailed in 5.5 - Operating procedures. Private operators should operate using the practices and procedures identified in 5.6 - Pilot knowledge and training. These SOP and practices must clearly define any aircraft limitations associated with RF leg execution (e.g. if the aircraft is not capable of executing RF leg segments, then the instructions to pilots must prohibit an attempt to fly a procedure requiring RF leg capability).

5.5 Operating procedures

5.5.1 The pilot must use either a flight director or autopilot when flying an RF leg. The pilot should comply with any instructions or procedures identified by the manufacturer as necessary to comply with the performance requirements in this appendix.

5.5.2 Procedures with RF legs will be identified on the appropriate chart.

5.5.3 When the dispatch of a flight is predicated on flying an RNP procedure with an RF leg, the dispatcher/pilot must determine that the installed autopilot/flight director is operational.

5.5.4 The pilot is not authorized to fly a published RNP procedure unless it is retrievable by the procedure name from the aircraft navigation database and conforms to the charted procedure. The lateral path must not be modified, with the exception of complying with ATC clearances/instructions.

5.5.5 The aircraft must be established on the procedure prior to beginning the RF leg.

5.5.6 The pilot is expected to maintain the centre line of the desired path on RF legs. For normal operations, cross-track error/deviation (the difference between the displayed path and the displayed aircraft position relative to the displayed path (i.e. FTE) should be limited to half the navigation accuracy associated with the procedure (e.g. 0.5 NM for RNP 1).

5.5.7 Where published, the pilot must not exceed maximum airspeeds associated with the flyability (design) of the RF leg.

5.5.8 If an aircraft system failure results in the loss of capability to follow an RF turn, the pilot should maintain the current bank and roll out on the charted RF exit course. The pilot should advise ATC as soon as possible of the system failure.

5.6 Pilot knowledge and training

5.6.1 The training programme must include:

a) The information in this appendix;

b) The meaning and proper use of RF functionality in RNP systems;

c) Associated procedure characteristics as determined from the chart depiction and textual description;

d) Associated levels of automation, mode annunciations, changes, alerts, interactions, reversions, and degradation;

Note.- *Manually selecting aircraft bank limiting functions may reduce the aircraft's ability to maintain its desired track and are not permitted. The pilots should recognize that manually selectable aircraft bank-limiting functions may reduce their ability to satisfy ATC path expectations, especially when executing large angle turns.*

e) Monitoring track-keeping performance;

f) The effect of wind on aircraft performance during execution of RF legs and the need to remain within the RNP containment area. The training programme should address any operational wind limitations and aircraft configurations essential to safely complete the RF turn;

g) The effect of ground speed on compliance with RF paths and bank angle restrictions impacting the ability to remain on the course centre line;

h) Interpretation of electronic displays and symbols; and

i) Contingency procedures.

5.7 Navigation database

Aircraft operators will be required to manage their navigation data base load either through the packing or through flight crew procedure, where they have aircraft systems capable of supporting the RF functionality, but as an operator they do not have an approval for its use.

APPENDIX 5

FIXED RADIUS TRANSITION (FRT)

1. INTRODUCTION

1.1 Background

1.1.1 The FRT is intended to define transitions along airways in the case where separation between parallel routes is also required in the transition, and the fly-by transition is not compatible with the separation criteria.

1.1.2 Increasing demand on intense airspace use and the need to progress horizontal airspace availability in areas with high traffic density requires the design of new airspace structures with closer spaced routes. In a lot of instances, turns will be required in the route network, for example, to circumnavigate reserved airspace, transit from one airway structure to another or to connect en-route airspace to terminal airspace. Therefore, reduced route spacing will only be possible if similar route spacing can be maintained in the turns. Initial applications are expected to be based on the route designator conventions stipulated in Annex 11 to the Convention on International Civil Aviation.

1.2 Purpose

The purpose of this appendix is to define the FRT navigation functionality, which is an enabler for applying closer route spacing along turns in the en-route network. This appendix may be associated with en-route A-RNP specification.

2. IMPLEMENTATION CONSIDERATIONS

2.1 Turn geometry

The geometry of the FRT is defined by the track change, θ (difference between outbound and inbound track in degrees), and the radius, R (see Figure 5 -1). Those two parameters define the turn centre, the lead distance Y, which is the distance from turn initiation towards the transition waypoint, and the abeam distance X, which is the distance between the transition waypoint and the point where the aircraft crosses the bisector of the turn. The latter two values are determined by the following expressions:

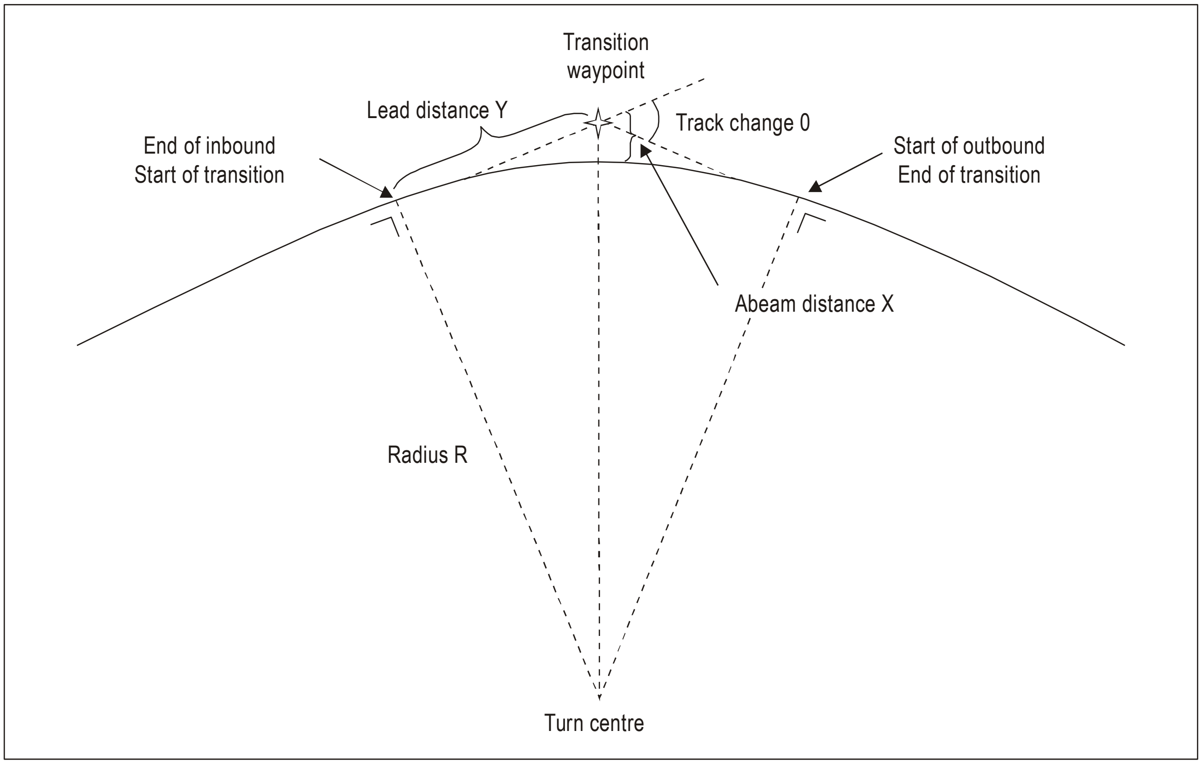
$$Y = R \tan(\theta/2)$$

$$X = R\left(\frac{1}{\cos(\theta/2)} - 1\right)$$

2.2 Aircraft bank angle

The FRT will result in a bank angle dependent upon ground speed. Therefore, during the turn, changes to airspeed and wind will result in varying bank angle. The turn radius must be selected to ensure that the bank angle remains within acceptable limits for cruise operations.

Figure 5-1 - Fixed radius transition



2.3 Application of FRT

2.3.1 The FRT should be used when there is a requirement for a specific fixed radius curved path en route. The radius is calculated, and the curved path is seamlessly joined with the associated route segments by the RNP system. RNP systems supporting this path transition provide the same ability to conform to the track-keeping accuracy during the turn as in the straight line segments. FRTs are expected to be applied where accurate repeatable and predictable navigation performance is required for what is, in effect, a constant radius fly-by turn.

2.3.2 The FRT may be associated as an optional requirement for routes defined using the A-RNP navigation specification:

2.4 Route design considerations and assumptions

2.4.1 The radius of turn should be either 22.5 NM to be used on upper routes (e.g. FL 200 and above) or 15 NM to be used on lower routes (e.g. FL190 and below). The selected radius should be published for the appropriate waypoint(s) in the AIP for the route. Other radius of turn values can be considered, but must be evaluated against the bounds of aircraft performance.

2.4.2 The inbound and outbound route segments will be tangential to the FRT as computed by the navigation system.

2.4.3 FRTs will not be constructed by the RNP system where the track change is greater than 90 degrees.

2.4.4 For FRTs where the next flight path segment requires a different navigation accuracy, the navigation accuracy applicable to the complete FRT must be the largest one. For example, when a transition occurs from a path segment requiring an accuracy of 1.0 NM to a path segment requiring an accuracy of 2.0 NM, the navigation accuracy of 2.0 NM must apply throughout the FRT.

2.4.5 Where there is a transition from one airway to another airway, both requiring an FRT at the common transition waypoint, the larger of the two radii applicable to the common transition waypoint shall be selected.

3. AIRCRAFT REQUIREMENTS

3.1 Functional requirements

The system must be able to define transitions between flight path segments using a three-digit numeric value for the radius of turn (to 1 decimal place) in nautical miles, e.g. 15.0, 22.5.

3.2 On-board performance monitoring and alerting

3.2.1 The navigation system must have the capability to execute a flight path transition and maintain a track consistent with a fixed radius between two route segments. The lateral TSE must be within ±1 × RNP of the path defined by the published procedure for at least 95 per cent of the total flight time for each phase of flight and any manual, autopilot and/or flight director mode. For path transitions where the next route segment requires a different TSE and the path transition required is an FRT, the navigation system may retain the navigation accuracy value for the previous route segment throughout the entire FRT segment. For example, when a transition occurs from a route segment requiring an accuracy value of 2.0 to a route segment requiring an accuracy value of 1.0, the navigation system may use an accuracy value of 2.0 throughout the FRT.

Note.- *Default values for FTE can be found in RTCA DO-283A. FAA AC 120-29A, 5.19.2.2 and 5.19.3.1, also provides guidance on establishing FTE values.*

3.3 Display requirements

3.3.1 The aircraft system shall provide means for the flight crew to monitor the FTE during the FRT.

3.3.2 FTE monitoring shall be provided by means of displaying the curved path of the FRT on a moving map display (navigation display) with pilot selectable range and numerical indication of the cross-track value.

3.4 Navigation database

The navigation database will specify the radius associated with a particular fix, along an airway.

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APPENDIX 6

TIME OF ARRIVAL CONTROL (TOAC)

(To be developed)

A-RNP JOB AID

REQUEST TO CONDUCT A-RNP OPERATIONS

1. Introduction

This job aid was developed by the Latin American Regional Safety Oversight Cooperation System (SRVSOP) to provide States, operators, and inspectors with guidance on the process to be followed by an operator in order to obtain an A-RNP authorization.

2. Purpose of the job aid

2.1 To give operators and inspectors information on the main reference documents of A-RNP.
2.2 To provide tables showing the contents of the application, the associated reference paragraphs, the place in the application of the operator where A-RNP elements are mentioned and columns for inspector comments and follow-up on the status of various elements of A-RNP.

3. Actions recommended for the inspector and operator

Some recommendations for use of the job aid follow:

3.1 At the pre-application meeting with the operator, the inspector reviews the "basic events of the A-RNP approval process" described in Part 1 of this job aid, in order to provide an overview of the approval process events.
3.2 The inspector reviews this job aid with the operator in order to establish the form and content of the A-RNP approval application.
3.3 The operator uses this job aid as a guide to collect the documents/annexes of the A-RNP application.
3.4 The operator inserts in the job aid references showing in what part of its documents are the A-RNP programme elements located.
3.5 The operator submits the job aid and the application to the inspector (documents/annexes).
3.6 The inspector indicates in the job aid whether an item is in compliance or needs corrective action.
3.7 The inspector informs the operator as soon as possible when a corrective action by the operator is required.
3.8 The operator provides the inspector with the revised material when so requested.
3.9 The CAA provides the operator with the operational specifications (OpSpecs) or a letter of authorisation (LOA), as applicable, when the tasks and documents have been completed.

4. Structure of the job aid

Parts	Topics	Page
Part 1	General information	3
Part 2	Information on aircraft and operator identification	5
Part 3	Operator application (Annexes and documents)	7
Part 4	Contents of the operator application for A-RNP	9
Part 5	Guide to determine the eligibility of A-RNP aircraft	13
Part 6	Basic pilot procedures for A-RNP operations	17

5. Main sources of documents, information, and contacts

To access the A-RNP job aid, enter to the Web page of the ICAO/SAM Regional Office (www.lima.icao.int) under the SRVSOP link or directly to the following address: http://www1.lima.icao.int/srvsop/document

6. Main reference documents

Reference Document	Title
Annex 6	Operation of aircraft
ICAO Doc 9613	Performance based navigation (PBN) manual
AMC 20-5	Acceptable means of compliance for airworthiness approval and operational criteria for the use of the NAVSTAR Global positioning system (GPS)
AC 20-130A	Airworthiness approval of navigation or flight management systems integrating multiple navigation sensors
AC 20-138A	Airworthiness approval of global navigation satellite system (GNSS) equipment
TSO-C115b	Airborne area navigation equipment using multi-sensor inputs
TSO-C129a	Airborne supplemental navigation equipment using the global positioning system (GPS)
TSO-C145a	Airborne navigation sensors using the global positioning system (GPS) augmented by the wide area augmentation system (WAAS)
TSO-C146a	Stand-Alone airborne navigation equipment using the global positioning system (GPS) augmented by the wide area augmentation system (WAAS)

PART 1: GENERAL INFORMATION

Basic events in the A-RNP approval process

	Action by the operator	Action by the CAA
1	Establishes the need to obtain A-RNP authorization.	
2	Reviews the AFM, AFM supplement or Type certificate data sheet (TCDS), or other appropriate documents [*e.g.,* service bulletins (SB), service letters (SL), etc.] to determine the eligibility of the aircraft for A-RNP operations. The operator contacts the aircraft or avionics manufacturer, if necessary, to confirm A-RNP or higher eligibility of the aircraft.	
3	Contacts the CAA to schedule a pre-application meeting to discuss the operational approval requirements.	
4		During the pre-application meeting, establishes: • the form and contents of the application; • the documents that support A-RNP approval • the date in which the application will be submitted for evaluation • the need to conduct a validation flight observed by the CAA.
5	Submits the application at least 60 days before start-up of A-RNP operations.	
6		Reviews the request of the operator.
7	Once the amended manuals, programmes, and documents have been approved, provides training to flight crews, flight dispatchers, and maintenance personnel, and conducts a validation flight, if required by the CAA.	Only if required, participates in the validation flight.
8		Once the operational and airworthiness requirements have been met, issues the operational approval in the form of OpSpecs for LAR 121 or 135 operators or equivalent operators, or a LOA for LAR 91 operators or equivalent operators, as appropriate.

Notes related to the approval process

1. **Responsible authority**

    a. **Commercial air transport (LAR 121 and/or 135 regulations or equivalent).-** The **State of registry** determines that the aircraft meets the airworthiness requirements. The **State of the operator** issues the A-RNP approval (*e.g.,* OpSpecs).

    b. **General aviation (LAR 91 regulations or equivalent).-** The **State of registry** determines that the aircraft meets the airworthiness requirements and issues the operational approval (*e.g.,* a LOA).

2. The CAA does not need to issue a LOA or equivalent document for each individual area of operation in the case of LAR 91 operators.

3. LAR 121 and/or 135 operators with A-RNP approval must list this approval in the OpSpecs.

4. Related sections of the Latin American Aeronautical Regulations (LAR) or equivalent regulations

    a. LAR 91 Sections 91.1015 and 91.1640 or equivalents

    b. LAR 121 Section 121.995 (b) or equivalent

    c. LAR 135 Section 135.565 (c) or equivalent

5. Related ICAO Documents

    a. Annex 6 to the Convention on International Civil Aviation – Operation of Aircraft

    b. Annex 10 to the Convention on International Civil Aviation – Aeronautical telecommunications

    c. Annex 15 to the Convention on International Civil Aviation – Aeronautical information services

    d. ICAO Doc 9613 – Performance-based navigation (PBN) manual

    e. ICAO Doc 4444 – Procedures for air navigation services – Air traffic management

PART 2: INFORMATION ON THE IDENTIFICATION OF AIRCRAFT AND OPERATORS

NAME OF THE OPERATOR: ____

Aircraft manufacturer, model, and series	Registration numbers	Serial numbers	A-RNP system Number, manufacturer, and model	RNP specification

DATE OF PRE-APPLICATION MEETING ____

DATE ON WHICH THE APPLICATION WAS RECEIVED ____

DATE ON WHICH THE OPERATOR INTENDS TO BEGIN A-RNP OPERATIONS _______________________

IS THE CAA NOTIFICATION DATE APPROPRIATE? YES _____ NO _____

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PART 3 – OPERATOR APPLICATION (ANNEXES AND DOCUMENTS)

Annex	Title of Annex/Document	Indication of inclusion by the operator	Comments by the inspector
A	**Operator letter requesting A-RNP authorization**		
B	**Airworthiness documents showing aircraft eligibility for A-RNP.** AFM, AFM revision, AFM supplement, or Type certificate data sheet (TCDS) showing RNP system eligibility for A-RNP or less. Statement by the manufacturer.- Aircraft that have a statement by the manufacturer documenting compliance with SRVSOP CA 91-007 criteria or equivalent, meet the performance and functional requirements of said document.		
C	**Aircraft modified to meet A-RNP standards. Documentation on aircraft inspection and/or modification, if applicable.** Maintenance records documenting the installation or modification of aircraft systems (*e.g.,* FAA Form 337 – major repairs and alterations).		
D	**Maintenance programme** • For aircraft with established A-RNP system maintenance practices, the list of references of the document or programme. • For recently installed A-RNP systems, the maintenance practices for their review.		
E	**Minimum equipment list (MEL) (only for operators conducting operations based on a MEL):** MEL showing provisions for A-RNP systems.		
F	**Training** **1. LAR 91 operators or equivalent: Training method:** Training at home, LAR 142 training centres, or other training courses, course		

Annex	Title of Annex/Document	Indication of inclusion by the operator	Comments by the inspector
	completion records. **2. LAR 121 and/or 135 operators or equivalent:** Training programmes (training curricula) for flight crews, flight dispatchers, and maintenance personnel.		
G	**Operating policies and procedures** **1. LAR 91 operators or equivalent:** Operations manual (OM) or sections to be attached to the application, corresponding to A-RNP operating procedures and policies. **2. LAR 121 and/or 135 operators or equivalent:** Operations manual and checklists.		
H	**Navigation database** **Details of the navigation data validation programme.**		
I	**Withdrawal of A-RNP approval** Indication of the need to follow up on navigation error reports submitted and the possibility of withdrawal of A-RNP approval.		
J	**Validation flight plan:** Only if required by the CAA.		

CONTENTS OF THE APPLICATION TO BE SUBMITTED BY THE OPERATOR

____ **A-RNP COMPLIANCE DOCUMENTATION OF THE AIRCRAFT/NAVIGATION SYSTEMS**

____ **OPERATING PROCEDURES AND POLICIES**

____ **SECTIONS OF THE MAINTENANCE MANUAL RELATED TO THE A-RNP SYSTEM (if not previously reviewed)**

Note 1: Documents may be grouped in a single folder or may be sent as individual documents.

PART 4: CONTENTS OF THE OPERATOR APPLICATION FOR A-RNP OPERATIONS

#	Contents of the A-RNP application by the operator	Reference paragraphs CA 91-007	In what Annexes/Documents of the operator can the application contents be located (e.g. Annex A)	Comments and/or recommendations by the inspector	Follow-up by the inspector: Item status and date
1	**Operator request letter** Statement of intent to obtain A-RNP authorization.				
2	**Description of aircraft equipment.**				
3	**Eligibility of A-RNP systems.** Airworthiness documents establishing the eligibility of the A-RNP navigation system, its approval status, and a list of the aircraft for which the approval is being requested.				
4	**Training programme** **1. LAR 121 or 135 operators or equivalent: Training programmes:** Operators will develop an initial and periodic training programme for flight crews, flight dispatchers, if applicable, and maintenance personnel. **2. LAR 91 operators or equivalent: Training methods:** The following methods are acceptable for these operators: Training at home, LAR 142 training centres, or other training courses.				

#	Contents of the A-RNP application by the operator	Reference paragraphs CA 91-007	In what Annexes/Documents of the operator can the application contents be located (e.g. Annex A)	Comments and/or recommendations by the inspector	Follow-up by the inspector: Item status and date
5	**Operating procedures** **1. LAR 121 and/or 135 operators or equivalent:** Operations manual and checklists**.** **2. LAR 91 operators or equivalent:** Operations manual or section of the operator application documenting A-RNP policies and procedures.				
6	**Maintenance practices** • For aircraft with established maintenance practices for A-RNP navigation systems, the operator will provide document references. • For newly installed A-RNP systems, the operator will provide maintenance practices for their review.				
7	**Update of the minimum equipment list (MEL)** Applicable to operators conducting operations according to a MEL.				
8	**Navigation data validation programme**				
9	**Withdrawal of A-RNP approval** Indication of the need for follow-up on the navigation error reports and the possibility				

#	Contents of the A-RNP application by the operator	Reference paragraphs CA 91-007	In what Annexes/Documents of the operator can the application contents be located (e.g. Annex A)	Comments and/or recommendations by the inspector	Follow-up by the inspector: Item status and date
	of withdrawal of the A-RNP approval.				
10	**Validation flight plan, only if required** The validation flight plan will be presented only if required.				

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PART 5 – GUIDE TO DETERMINE THE ELIGIBILITY OF A-RNP AIRCRAFT

#	Topics	Reference paragraphs CA 91-007	Location in the Annexes of the operator	Comments and/or recommendations by the inspector	Follow-up by the inspector: Item status and date
1	**Aircraft eligibility requirements for A-RNP operations** **General**				
1a	RNP 2 navigation specification requires GNSS as the primary navigation sensor, either as a stand-alone navigation system or as part of a multi-sensor system.				
2	**Navigation sensors**				
2a	**Global navigation satellite system (GNSS).-** The sensor must comply with the guidelines in FAA AC 20-138() or FAA AC 20-130A. For systems that comply with FAA AC 20-138(), the following sensor accuracies can be used in the total system accuracy analysis without additional substantiation: GNSS sensor accuracy is better than 36 meters (95 per cent), and augmented GNSS (GBAS or SBAS) sensor accuracy is better than 2 meters (95 per cent). In the event of a latent GNSS satellite failure and marginal GNSS satellite geometry, the probability the TSE remains within the procedure design obstacle clearance volume must be greater than 95 per cent.				

#	Topics	Reference paragraphs CA 91-007	Location in the Annexes of the operator	Comments and/or recommendations by the inspector	Follow-up by the inspector: Item status and date
	Note.- *GNSS-based sensors output a horizontal integrity limit (HIL), also known as a horizontal protection level (HPL) (see FAA AC 20-138() and RTCA/DO-229D for an explanation of these terms). The HIL is a measure of the position estimation error assuming a latent failure is present. In lieu of a detailed analysis of the effects of latent failures on the TSE, an acceptable means of compliance for GNSS-based systems is to ensure the HIL remains less than twice the navigation accuracy, minus the 95 per cent of FTE, during the RNP operation.*				
2b	**Inertial reference system (IRS).-** An IRS must satisfy the criteria of SRVSOP LAR 121 Appendix G or equivalent. While Appendix G defines the requirement for a 2 NM per hour drift rate (95 per cent) for flights up to 10 hours, this rate may not apply to an RNP system after loss of position updating. Systems that have demonstrated compliance with LAR 121, Appendix G, can be assumed to have an initial drift rate of 8 NM/hour for the first 30 minutes (95 minutes) without further substantiation. Aircraft manufacturers and applicants can demonstrate improved inertial performance in accordance with the methods described in Appendix 1 or 2 of FAA Order 8400.12A. ***Note.-*** *Integrated GPS/INS position solutions reduce the rate of degradation after loss of position updating. For "tightly coupled" GPS/IRUs, RTCA/DO-229C, Appendix R, provides additional guidance.*				
2c	**Distance measuring equipment (DME).-**				

#	Topics	Reference paragraphs CA 91-007	Location in the Annexes of the operator	Comments and/or recommendations by the inspector	Follow-up by the inspector: Item status and date
	For RNP procedures and routes, the RNP system may only use DME updating when authorized by the CAA. The manufacturer should identify any operating constraints (e.g. manual inhibit of DME) in order for a given aircraft to comply with this requirement. ***Note 1.-*** *This is in recognition of States where a DME infrastructure and capable equipped aircraft are available, those States may establish a basis for aircraft qualification and operational approval to enable use of DME. It is not intended to imply a requirement for implementation of DME infrastructure or the addition of RNP capability using DME for RNP operations.* ***Note 2.-*** *This does not imply an equipment capability must exist providing a direct means of inhibiting DME updating. A procedural means for the flight crew to inhibit DME updating or executing a missed approach if reverting to DME updating may meet this requirement.*				
2d	**VHF Omni-directional range station (VOR).-** For RNP procedures, the RNAV system must not use VOR updating. The manufacturer should identify any operating constraints (e.g. manual inhibit of VOR) in order for a given aircraft to comply with this requirement. ***Note.-*** *This does not imply an equipment capability must exist providing a direct means of inhibiting VOR updating. A procedural means for the flight crew to inhibit VOR updating or executing a missed approach if reverting to VOR updating may meet this requirement.*				

#	Topics	Reference paragraphs CA 91-007	Location in the Annexes of the operator	Comments and/or recommendations by the inspector	Follow-up by the inspector: Item status and date
2e	**For multi-sensor systems**, there must be automatic reversion to an alternate RNAV sensor if the primary RNAV sensor fails. Automatic reversion from one multi-sensor system to another multi-sensor system is not required.				
2f	Carriage of a single RNP system is considered generally acceptable (e.g., in continental en-route airspace or approach). As conventional navigation may not be available, reversionary operation must be achieved by other means.				
2g	Where more stringent requirements (e.g. dual RNP system) exist (e.g. A-RNP operations in oceanic and remote airspace) these carriage requirements must be promulgated through the State AIP and/or in Doc 7030.				
3	**On-board performance monitoring and alerting requirements**				
3a	For A-RNP operations on-board performance monitoring and alerting is required				
3b	The aircraft navigation system, or aircraft navigation system and flight crew in combination, is required to monitor the TSE, and to provide an alert if the accuracy				

#	Topics	Reference paragraphs CA 91-007	Location in the Annexes of the operator	Comments and/or recommendations by the inspector	Follow-up by the inspector: Item status and date
	requirement is not met or if the probability that the TSE exceeds two times the accuracy value is larger than 10^{-5}. To the extent operational procedures are used to satisfy this requirement, the crew procedure, equipment characteristics, and installation should be evaluated for their effectiveness and equivalence. Examples of information provided to the flight crew for awareness of navigation system performance include “Estimated position uncertainty - EPU”, “ACTUAL”, “Actual navigation performance - ANP”, and “Estimated position error - EPE”. Examples of indications and alerts provided when the operational requirement is or can be determined as not being met include “UNABLE RNP”, “Nav Accur Downgrad”, GNSS alert, loss of GNSS integrity, TSE monitoring [real time monitoring of navigation sytem error (NSE) and flight technical error (FTE) combined], etc. The navigation system is not required to provide both performance and sensor-based alerts, e.g. if a TSE-based alert is provided, a GNSS alert may not be necessary.				
4	**System performance**				
4a	**Accuracy.-** During operations in airspace or on routes or procedures designated as				

#	Topics	Reference paragraphs CA 91-007	Location in the Annexes of the operator	Comments and/or recommendations by the inspector	Follow-up by the inspector: Item status and date
	RNP, the lateral TSE must be within the applicable accuracy (±0.3 NM to ±2.0 NM) for at least 95 per cent of the total flight time. The along-track error must also be within ± the applicable accuracy for at least 95 per cent of the total flight time. To satisfy the accuracy requirement, the 95 per cent FTE should not exceed one half of the applicable accuracy except for a navigation accuracy of 0.3 NM where the FTE is allocated to be 0.25. ***Note.-*** *The use of a deviation indicator is an acceptable means of compliance for satisfying the FTE part of the lateral TSE with the scaling commensurate with the navigation application*.				
4b	**Integrity.-** Malfunction of the aircraft navigation equipment is classified as a major failure condition under airworthiness guidance material (i.e. 1×10^{-5} per hour).				
4c	**Continuity.-** Loss of function is classified as a minor failure condition for applications predicated on this navigation specification. Where a State or application establishes a classification of major, the continuity requirement may be typically satisfied by carriage of dual independent navigation systems.				
4d	**Signal-in-space (SIS).-** For GNSS RNP system architectures, the aircraft navigation equipment shall provide an alert if the				

#	Topics	Reference paragraphs CA 91-007	Location in the Annexes of the operator	Comments and/or recommendations by the inspector	Follow-up by the inspector: Item status and date
	probability of SIS errors causing a lateral position error greater than two times the applicable accuracy (2 × RNP) exceeds 1 × 10^{-7} per hour. ***Note 1.-*** *The lateral TSE includes positioning error, FTE, PDE and display error. For procedures extracted from the on-board navigation database, PDE is considered negligible due to the navigation database requirements (12), and pilot knowledge and training (11).* ***Note 2.-*** *For RNP systems where the architecture is an integrated, multi-sensor capability and where GNSS integrity is incorporated into a 2 × RNP integrity alert consistent with RTCA/EUROCAE DO-236/ED-75 when performance cannot be met, a separate GNSS integrity alert is not required.*				
5	**Aircraft eligibility requirements for A-RNP operations.**				
	The aircraft eligibility has to be determined through demonstration of compliance against the relevant airworthiness criteria and the requirements of 8.2. The aircraft original equipment manufacturer (OEM) or the holder of installation approval for the aircraft, e.g. Supplemental type certificate (STC) holder, will demonstrate compliance to the CAA and the approval can be documented in manufacturer documentation (e.g. service letters). Aircraft flight manual (AFM) entries are not required provided the CAA accepts				

#	Topics	Reference paragraphs CA 91-007	Location in the Annexes of the operator	Comments and/or recommendations by the inspector	Follow-up by the inspector: Item status and date
	manufacturer documentation.				
	The aircraft OEM or the holder of installation approval for the aircraft should document demonstration of compliance with the A-RNP capability and highlight any limitations of functionality and performance. ***Note-*** *Requests for approval to use optional functionality (e.g. FRT) should address the aircraft and operational requirements as described in the corresponding paragraps, appendixes and AC included in Table 2 of this AC.*				
5	**Functional requirements – See Appendix 1 of AC 91-007**				
6	**Maintenance requirements – See Paragraph 8.4 of AC 91-007**				
7	**Navigation database** Details of the navigation data validation programme				

PART 6 - BASIC PILOT PROCEDURES FOR A-RNP OPERATIONS

Topics		Reference paragraphs CA 91-007	Location in the Annexes of the operator	Comments and/or recommendations by the CAA	Follow-up by the Inspector: Item status and date
Operating procedures					
1	**Pre-flight planning**				
	Operators and pilots intending to conduct RNP operations requiring A-RNP capability should indicate the appropriate application in the flight plan.				
	The on-board navigation data must be current and appropriate to the route being flown and for potential diversions. Navigation databases are expected to be current for the duration of the flight. If the AIRAC cycle is due to change during flight, operators and pilots should establish procedures to ensure the accuracy of navigation data, including suitability of navigation facilities used to define the routes and procedures for flight.				
	Operators using GNSS equipment should confirm the availability of RAIM by using RAIM availability prediction software taking account of the latest GNSS NOTAMs. Operators using SBAS augmentation should also check the relevant SBAS NOTAMs to determine the availability of SBAS. Notwithstanding preflight analysis results, because of unplanned failure of some GNSS or DME elements (or local interference), pilots must realize that integrity availability (or GNSS/DME				

	Topics	Reference paragraphs CA 91-007	Location in the Annexes of the operator	Comments and/or recommendations by the CAA	Follow-up by the Inspector: Item status and date
	navigation altogether) may be lost while airborne which may require reversion to an alternate means of navigation. Therefore, pilots should assess their capability to navigate in case of failure of the primary sensor or the RNP system.				
2	**General operating procedures**				
	Operators and pilots should not request or file RNP routes, SIDs, STARs or approaches unless they satisfy all the criteria in the relevant State documents. The pilot should comply with any instructions or procedures identified by the manufacturer, as necessary, to comply with the performance requirements in this chapter. ***Note.-*** *Pilots are expected to adhere to any AFM limitations or operating procedures required to maintain the RNP for the operation.*				
	At system initialization, pilots must confirm the navigation database is current and verify that the aircraft position has been entered correctly. Pilots must not fly an RNP route, SID, STAR or approach unless it is retrievable by name from the on-board navigation database and conforms to the chart. An RNP route, SID, STAR or approach should not be used if doubt exists as to the validity of the procedure in the navigation database. ***Note.-*** *Flight crew may notice a slight difference between the navigation information portrayed on the chart and their primary navigation display. Differences of 3 degrees or less may result from equipment manufacturer's application of magnetic variation*				

	Topics	Reference paragraphs CA 91-007	Location in the Annexes of the operator	Comments and/or recommendations by the CAA	Follow-up by the Inspector: Item status and date
	and are operationally acceptable.				
	Cross-checking with conventional NAVAIDs is not required as the absence of integrity alert is considered sufficient to meet the integrity requirements. However, monitoring of navigation reasonableness is suggested, and any loss of RNP capability shall be reported to ATC. While operating on RNP Routes, SIDs, STARs or approaches, pilots are encouraged to use flight director and/or autopilot in lateral navigation mode, if available. Flight crew should be aware of possible lateral deviations when using raw path steering data or navigation map displays for lateral guidance in lieu of flight director. When the dispatch of a flight into RNP operations is predicated on use of the autopilot/flight director at the destination and/or alternate, the dispatcher/flight crew must determine that the autopilot/flight director is installed and operational.				
	Manual entry of RNP				
	If the navigation system does not automatically retrieve and set the navigation accuracy from the on-board navigation database for each leg segment of a route or procedure, the flight crew's operating procedures should ensure the smallest navigation accuracy for the route or procedure is manually entered into the RNP system.				

	Topics	Reference paragraphs CA 91-007	Location in the Annexes of the operator	Comments and/or recommendations by the CAA	Follow-up by the Inspector: Item status and date
	SID specific requirements				
	Prior to flight, pilots must verify their aircraft navigation system is operating correctly and the correct runway and departure procedure (including any applicable en-route transition) are entered and properly depicted. Pilots who are assigned an RNP departure procedure and subsequently receive a change of runway, procedure or transition must verify the appropriate changes are entered and available for navigation prior to take-off. A final check of proper runway entry and correct route depiction, shortly before take-off, is recommended.				
	Engagement altitude.- The pilot must be able to use RNP equipment to follow flight guidance for lateral navigation no later than 153 m (500 ft) above the airport elevation. The altitude at which guidance begins on a given route may be higher (e.g. climb to 304 m (1 000 ft) then direct to …).				
	Pilots must use an authorized method (lateral deviation indicator/navigation map display/flight director/autopilot) to achieve an appropriate level of performance.				
	GNSS aircraft.- When using GNSS, the signal must be acquired before the take-off roll commences. For aircraft using FAA Technical standard order (TSO)-C129a equipment, the departure airport must be loaded into the flight plan				

	Topics	Reference paragraphs CA 91-007	Location in the Annexes of the operator	Comments and/or recommendations by the CAA	Follow-up by the Inspector: Item status and date
	in order to achieve the appropriate navigation system monitoring and sensitivity. For aircraft using FAA TSO-C145a/C146a equipment, if the departure begins at a runway waypoint, then the departure airport does not need to be in the flight plan to obtain appropriate monitoring and sensitivity.				
	STAR specific requirements				
	Prior to the arrival phase, the flight crew should verify that the correct terminal route has been loaded. The active flight plan should be checked by comparing the charts with the map display (if applicable) and the multifunction control and display unit (MCDU). This includes confirmation of the waypoint sequence, reasonableness of tracks and distances, any altitude or speed constraints, and, where possible, which waypoints are fly-by and which are fly-over. If required by a route, a check will need to be made to confirm that updating will exclude a particular NAVAID. A route must not be used if doubt exists as to the validity of the route in the navigation database. ***Note.-*** *As a minimum, the arrival checks could be a simple inspection of a suitable map display that achieves the objectives of this paragraph.*				
	The creation of new waypoints by manual entry into the RNP system by the flight crew would invalidate the route and is not permitted.				

	Topics	Reference paragraphs CA 91-007	Location in the Annexes of the operator	Comments and/or recommendations by the CAA	Follow-up by the Inspector: Item status and date
	Where the contingency procedure requires reversion to a conventional arrival route, necessary preparations must be completed before commencing the RNP route.				
	Route modifications in the terminal area may take the form of headings or “direct to” clearances and the flight crew must be capable of reacting in a timely fashion. This may include the insertion of tactical waypoints loaded from the database. Manual entry or modification by the flight crew of the loaded route, using temporary waypoints or fixes not provided in the database, is not permitted.				
	Pilots must verify their aircraft navigation system is operating correctly, and the correct arrival procedure and runway (including any applicable transition) are entered and properly depicted.				
	Although a particular method is not mandated, any published altitude and speed constraints must be observed. Approaches using temporary waypoints or fixes not provided in the navigation database are not permitted.				
	Contingency procedures				
	The pilot must notify ATC of any loss of the RNP capability (integrity alerts or loss of navigation), together with the proposed course of action. If unable to comply with the requirements of an RNP				

Topics		Reference paragraphs CA 91-007	Location in the Annexes of the operator	Comments and/or recommendations by the CAA	Follow-up by the Inspector: Item status and date
	SID or STAR, pilots must advise ATS as soon as possible. The loss of RNP capability includes any failure or event causing the aircraft to no longer satisfy the A-RNP requirements of the route.				
	In the event of communications failure, the flight crew should continue with the A-RNP SID or STAR in accordance with the published lost communications procedure.				

SRVSOP contacts:

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Job aid: A-RNP
Version: 1
Date: 25/04/2014

APPENDIX B

ADVISORY CIRCULAR
CA 91-012

AIRCRAFT AND OPERATOR APPROVAL FOR RNP 0.3 OPERATIONS

RNP 0.3 JOB AID

ADVISORY CIRCULAR

CA	**:**	**91-012**
DATE	**:**	**25/04/14**
REVISION	**:**	**Original**
ISSUED BY	**:**	**SRVSOP**

SUBJECT: AIRCRAFT AND OPERATOR APPROVAL FOR RNP 0.3 OPERATIONS

1. PURPOSE

This advisory circular (AC) establishes criteria on aircraft and operators approval for RNP 0.3 operations.

An operator may use alternate means of compliance, provided those means are acceptable to the Civil Aviation Administration (CAA).

The future tense of the verb or the term "shall" apply to operators who choose to meet the criteria set forth in this AC.

2. RELEVANT SECTIONS OF THE LATIN AMERICAN AERONAUTICAL REGULATIONS (LAR) OR EQUIVALENT

LAR 91: Sections 91.1015 and 91.1640 or equivalents

LAR 121: Section 121.995 (b) or equivalent

LAR 135: Section 135.565 (c) or equivalent

3. RELATED DOCUMENTS

Annex 6	Operation of aircraft
	Part I – International commercial air transport – Aeroplanes
	Part II – International general aviation – Aeroplanes
	Part III – International operations - Helicopters
Annex 10	Aeronautical communications
	Volume I: Radio navigation aids
Annex 15	Aeronautical information services
ICAO Doc 9613	Performance based navigation (PBN) manual
ICAO Doc 4444	Procedures for air navigation services – Air traffic management (PANS-ATM)
ICAO Doc 8168	Procedures for air navigation services - Aircraft operations
	Volume I: Flight procedures
	Volume II: Construction of visual and instrument flight procedures

4. DEFINITIONS AND ABBREVIATIONS

4.1 Definitions

a) **Aircraft-based augmentation system (ABAS).-** A system which augments and/or integrates the information obtained from the other GNSS elements with information available on board the aircraft. The most common form of ABAS is the receiver autonomous integrity monitoring (RAIM).

b) **Area navigation (RNAV)**.- A navigation method that allows aircraft to operate on any desired flight path within the coverage of ground or space-based navigation aids, or within the limits of the capability of self-contained aids, or a combination of both methods.

Note.- Area navigation includes performance-based navigation as well as other RNAV operations that do not meet the definition of performance-based navigation.

c) **Flight technical error (FTE)**.- The FTE is the accuracy with which an aircraft is controlled, as measured by the indicated aircraft position with respect to the indicated command or desired position. It does not include procedural blunder errors.

d) **Global navigation satellite system (GNSS)**.- A generic term used by the International Civil Aviation Organization (ICAO) to define any global position, speed, and time determination system that includes one or more main satellite constellations, such as GPS and the global navigation satellite system (GLONASS), aircraft receivers and several integrity monitoring systems, including aircraft-based augmentation systems (ABAS), satellite-based augmentation systems (SBAS), such as the wide area augmentation systems (WAAS), and ground-based augmentation systems (GBAS), such as the local area augmentation system (LAAS).

Distance information will be provided, at least in the immediate future, by GPS and GLONASS.

e) **Global positioning system (GPS)**.- The global positioning system (GNSS) of the United States is a satellite-based radio navigation system that uses precise distance measurements to determine the position, speed, and time in any part of the world. The GPS is made up by three elements: the spatial, the control, and the user elements. The GPS spatial segment nominally consists of, at least, 24 satellites in 6 orbital planes. The control element consists of 5 monitoring stations, 3 ground antennas, and one main control station. The user element consists of antennas and receivers that provide the user with position, speed, and precise time.

f) **Navigation specifications**.- Set of aircraft and flight crew requirements needed to support performance-based navigation operations within a defined airspace. There are two kinds of navigation specifications:

Required Navigation Performance (RNP) Specification.- A navigation specification based on area navigation that includes the requirement for on-board performance monitoring and alerting, designated by the prefix RNP; *e.g.,* RNP 4, RNP APCH, RNP AR APCH.

Area Navigation (RNAV) Specification.- A navigation specification based on area navigation that does not include the requirement for on-board performance monitoring and alerting, designated by the prefix RNAV; *e.g*., RNAV 5, RNAV 2, RNAV 1.

Note 1.- *The Manual on Performance-based Navigation (PBN) (Doc 9613), Volume II, contains detailed guidelines on navigation specifications.*

Note 2.- *The term RNP, formerly defined as "a statement of the navigation performance necessary for operation within a defined airspace", has been deleted from the Annexes to the Convention on International Civil Aviation because the RNP concept has been replaced by the PBN concept. In said Annexes, the term RNP is now only used within the context of the navigation specifications that require on-board performance control and alerting; e.g., RNP 4 refers to the aircraft and the operational requirements, including a lateral performance of 4 nautical miles (NM), with the requirement for on-board performance control and alerting as described in the PBN Manual of the International Civil Aviation Organization (ICAO) (Doc 9613).*

g) **Navigation system error (NSE).-** The difference between the true position and the estimated position.

h) **Path definition error (PDE).-** The difference between the defined path and the desired path at a given place and time.

i) **Performance-based navigation (PBN)**.- Area navigation based on performance requirements for aircraft operating along an ATS route, on an instrument approach procedure, or in a designated airspace.

Note.- *Performance requirements are expressed in navigation specifications (RNAV and RNP specifications) in terms of accuracy, integrity, continuity, availability, and functionality needed for the proposed operation in the context of a particular airspace concept.*

j) **Receiver autonomous integrity monitoring (RAIM)**.- A technique used in a GPS receiver/processor to determine the integrity of its navigation signals, using only GPS signals or GPS signals enhanced with barometric altitude data. This determination is achieved by a consistency check among redundant pseudo-range measurements. At least one additional available satellite is required with respect to the number of satellites that are needed for the navigation solution.

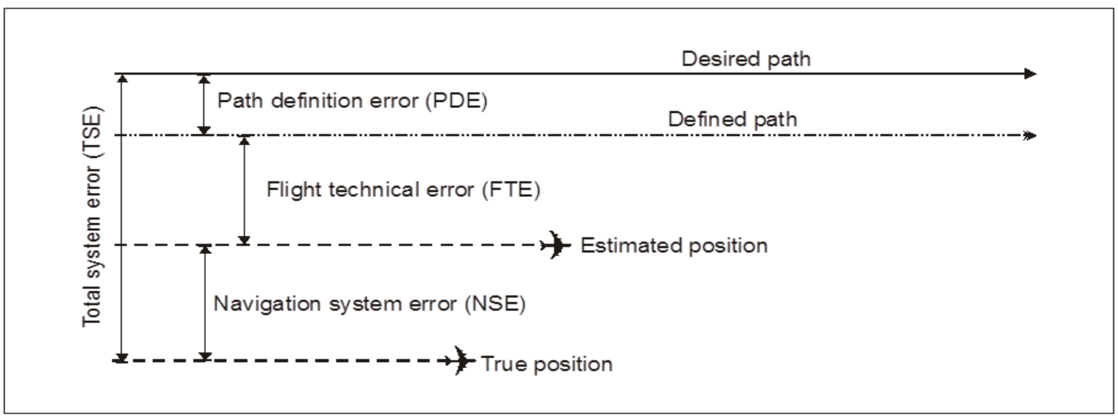
k) **RNP operations**.- Aircraft operations that use an RNP system for RNP navigation applications.

l) **RNP system**.- An area navigation system that supports on-board performance monitoring and alerting.

m) **Total system error (TSE).-** The difference between the true position and the desired position. This error is equal to the vector sum of the path definition error (PDE), flight technical error (FTE), and navigation system error (NSE).

Note.- *On occasions, the FTE is known as path steering error (PSE), and the NSE as position estimation error (PEE).*

Total system error (TSE)



n) **Waypoint (WPT).** A specified geographical location used to define an area navigation route or the flight path of an aircraft employing area navigation. Waypoints area identified as either:

Fly-by waypoint. - A waypoint which requires turn anticipation to allow tangential interception of the next segment of a route or procedure.

Fly over waypoint. - A waypoint at which a turn is initiated in order to join the next segment of a route or procedure.

4.2 Abbreviations

a)	ABAS	Aircraft-based augmentation system
b)	AC	Advisory circular
c)	AFM	Aircraft flight manual
d)	AIP	Aeronautical information publication
e)	AIRAC	Aeronautical information regulation and control
f)	ANP	Actual navigation performance
g)	ANSP	Air navigation service providers
h)	AP	Automatic pilot

i)	APV	Approach procedure with vertical guidance
j)	APV/baro-VNAV	Approach procedure with vertical guidance/Barometric vertical navigation
k)	ATC	Air traffic control
l)	ATM	Air traffic management
m)	ATN	Aeronautical telecommunication network
n)	ATS	Air traffic service
o)	baro-VNAV	Barometric vertical navigation
p)	CA	Advisory circular (SRVSOP)
q)	CA	Course to an altitude
r)	CAA	Civil Aviation Administration/Civil Aviation Authority
s)	CDI	Course deviation indicator
t)	CDU	Control and display unit
u)	CF	Course to a fix
v)	Doc	Document
w)	DF	Direct to a fix
x)	DME	Distance-measuring equipment
y)	DV	Flight dispatcher (SRVSOP)
z)	EASA	European Aviation Safety Agency
aa)	EHSI	Electronic horizontal situation indicator
bb)	EPE	Estimated position error
cc)	EPU	Estimated position uncertainty
dd)	FA	Course from a fix to an altitude
ee)	FAA	Federal Aviation Administration (United States)
ff)	FAF	Final approach fix
gg)	FAP	Final approach point
hh)	FAS	Final approach segment
ii)	FD	Flight director
jj)	FGS	Flight guidance system
kk)	FM	Course from a fix to manual termination
ll)	Fly-by WPT	Fly-by way-point
mm)	Flyover WPT	Flyover way-point
nn)	FMS	Flight management system
oo)	FRT	Fixed radius transition
pp)	FTE	Flight technical error
qq)	GA	General aviation
rr)	GBAS	Ground-based augmentation system

ss)	GNSS	Global navigation satellite system
tt)	GLONASS	Global navigation satellite system
uu)	GPS	Global positioning system
vv)	GS	Ground speed
ww)	HEMS	Helicopter emergency service
xx)	HSI	Horizontal situation indicator
yy)	IF	Initial fix
zz)	IFP	Instrument flight procedure
aaa)	IFR	Instrument flight rules
bbb)	IMC	Instrument meteorological conditions
ccc)	IPC	Illustrated parts catalogs
ddd)	LAAS	Local area augmentation system
eee)	LAR	Latin American Aeronautical Regulations
fff)	LNAV	Lateral navigation
ggg)	LOA	Letter of authorisation/letter of acceptance
hhh)	LOI	Loss of integrity
iii)	MCDU	Multifunction control and display unit
jjj)	MCM	Maintenance control manual
kkk)	MEL	Minimum equipment list
lll)	MIO	Operations inspector manual (SRVSOP)
mmm)	NM	Nautical mile
nnn)	NAA	National airworthiness authority
ooo)	NAVAID	Navigation aid
ppp)	NDB	Non-directional radio beacon
qqq)	NOTAM	Notice to airmen
rrr)	NPA	Non-precision approach
sss)	NSE	Navigation system error
ttt)	LNAV	Lateral navigation
uuu)	OACI	International Civil Aviation Organization
vvv)	OM	Operations manual
www)	OEM	Original equipment manufacturer
xxx)	OpSpecs	Operations specifications
yyy)	PA	Precision approach
zzz)	PANS-ATM	Procedures for air navigation services - Air traffic management
aaaa)	PANS-OPS	Procedures for air navigation services - Aircraft operations
bbbb)	PBN	Performance-based navigation
cccc)	PDE	Path definition error

dddd)	PEE	Position estimation error
eeee)	PF	Pilot flying
ffff)	PINS	Point in Space
gggg)	PNF	Pilot not flying
hhhh)	POH	Pilot operating handbook
iiii)	P-RNAV	Precision area navigation
jjjj)	PSE	Path steering error
kkkk)	RAIM	Receiver autonomous integrity monitoring
llll)	RF	Constant radius arc to a fix / Radius to fix
mmmm)	RFM	Rotorcraft flight manual
nnnn)	RNAV	Area navigation
oooo)	RNP	Required navigation performance
pppp)	RNP APCH	Required navigation performance approach
qqqq)	RNP AR APCH	Required navigation performance authorisation required approach
rrrr)	RTCA	Radio Technical Commission for Aviation
ssss)	R/T	Radio/Transmitter
tttt)	SBAS	Satellite-based augmentation system
uuuu)	SID	Standard instrument departure
vvvv)	SIS	Signal-in-space
wwww)	SRVSOP	Regional Safety Oversight Cooperation System
xxxx)	STAR	Standard instrument arrival
yyyy)	STC	Supplemental type certificate
zzzz)	TF	Track to a fix
aaaaa)	TOGA	Take-off/go-around
bbbbb)	TSE	Total system error
ccccc)	TSO	Technical standard order
ddddd)	VA	Heading to an altitude
eeeee)	VI	Heading to an intercept
fffff)	VM	Heading to a manual termination
ggggg)	VMC	Visual meteorological conditions
hhhhh)	VNAV	Vertical navigation
iiiii)	VOR	Very high frequency omnidirectional radio range
jjjjj)	WAAS	Wide area augmentation system
kkkkk)	WGS	World geodetic system
lllll)	WPT	Waypoint

5. INTRODUCTION

5.1 This navigation specification is intended for aircraft/helicopter RNP 0.3 operations en route and in the terminal airspace of airports as well as operations to and from heliports and for servicing offshore rigs. RNP 0.3 accuracy may also be used en route to support operations at low level in mountainous remote areas and, for airspace capacity reasons, in high density airspace.

5.2 The RNP 0.3 navigation specification is applicable to departure, en route, arrival (including the initial and intermediate approach segments), and to the final phase of the missed approach. This navigation specification addresses continental, remote continental and offshore operations and may be applied in ATM environments both with and without ATS surveillance. Route length restrictions may be applicable for en-route operations meeting RNP 0.3.

5.3 The large majorities of IFR helicopters are already equipped with TSO C145/146 systems and moving map displays, and require autopilot including stability augmentation for IFR certification.

5.4 While this specification has been defined primarily for helicopter applications, this does not exclude the application to fixed wing operations where demonstrated performance is sufficient to meet the functional and accuracy requirements of this specification for all phases of flight.

5.5 Fulfilling the accuracy requirements of this specification may be achieved by applying operational limitations, which could include but are not necessarily limited to the maximum permitted airspeed and requirements for autopilot coupling. The latter requirement does not impact the helicopter eligibility since an autopilot is needed as part of the IFR helicopter certification.

5.6 A number of navigation systems using GNSS for positioning will be capable of being approved for RNP 0.3 operations if suitably integrated into the flight guidance system (FGS)/flight display system. However, this specification takes advantage of known functionality and the on-board performance monitoring and alerting capability of many TSO-C145/C146 GPS systems which are installed in a wide range of IFR helicopters.

5.7 This specification enables a significant part of the IFR helicopter fleet to obtain benefit from PBN. Specifically, in the following operations:

- ✓ reduced protected areas, potentially enabling separation from fixed wing traffic to allow simultaneous non-interfering operations in dense terminal airspace;
- ✓ low-level routes in obstacle-rich environments reducing exposure to icing environments;
- ✓ seamless transition from en route to terminal route;
- ✓ more efficient terminal routing in an obstacle-rich or noise-sensitive terminal environment, specifically in consideration of helicopter emergency service IFR operations between hospitals; and
- ✓ transitions to helicopter point-in-space approaches and for helicopter departures.

5.8 Helicopter en-route operations are limited by range and speed and can often equate to the dimensions of terminal fixed wing operations.

5.9 This AC does not address all the requirements that may be specified for particular operation. These requirements are established in other documents, such as the aeronautical information publication (AIP) and ICAO Doc 7030 – Regional Supplementary Procedures.

5.10 While operational approval primarily relates to the navigation requirements of the airspace, the operators and pilots must consider all operational documents relating to the airspace, which are required by the CAA, before conducting flights into RNP 0.3 airspace.

5.11 The material described in this CA has been developed based on the following document:

- ✓ ICAO Doc 9613, Volume II, Part C, Chapter 7 – Implementing RNP 0.3.

6. GENERAL CONSIDERATIONS

6.1 Navigation aid infrastructure

a) The RNP 0.3 specification is based upon GNSS; its implementation is not dependent on the availability of SBAS.

b) DME/DME based RNAV systems will not be capable of consistently providing RNP 0.3 performance, therefore it should not be planned the implementation of RNP 0.3 operations through application of DME/DME-based navigation.

c) Operators must not use RNP 0.3 in areas of known navigation signal (GNSS) interference.

d) Operators relying on GNSS are required to have the means to predict the availability of GNSS fault detection (e.g. ABAS RAIM) to support operations along the RNP 0.3 ATS route.

e) The on-board RNP system, GNSS avionics, the ANSP or other entities may provide a prediction capability.

f) The AIP should clearly indicate when prediction capability is required and acceptable means to satisfy that requirement. This prediction will not be required where the navigation equipment can make use of SBAS augmentation and the planned operation will be contained within the service volume of the SBAS signal.

Note.- *When the operator of an SBAS-equipped aircraft is permitted to disregard the requirement for a RAIM prediction in an SBAS service area, the operator shall check SBAS NOTAMS prior to the flight to ensure the availability of the SBAS signal-in-space (SIS).*

6.2 Communications and ATS surveillance

a) The application of this navigation specification is not dependent upon the availability of ATS surveillance or communications.

6.3 Obstacle clearance, route spacing and horizontal separation

a) Guidance on obstacle clearance is provided in PANS-OPS (Doc 8168, Volume II); the general criteria in Parts I and III apply, and assume normal operations.

b) The route spacing supported by this AC will be determined by a safety study for the intended operations which will depend on the route configuration, air traffic density and intervention capability, etc. Horizontal separation standards are published in PANS-ATM (Doc 4444).

6.4 Publications

a) The departure and arrival procedure design should comply with normal climb and descent profiles for the operation considered and identify minimum segment altitude requirements.

b) The navigation data published in the State AIP for the procedures and supporting NAVAIDS must meet the requirements of Annex 15 - *Aeronautical Information Services*.

c) All procedures must be based upon WGS-84 coordinates.

d) The AIP should clearly indicate whether the navigation application is RNP 0.3.

e) The available navigation infrastructure shall be clearly designated in all the appropriate charts (*e.g.*, GNSS).

f) The required navigation standard (*e.g.*, RNP 0.3) for all RNP 0.3 operations shall be clearly designated in all the appropriate charts.

6.5 Additional considerations

a) Additional flight crew operational procedures and operational limitations may be required to ensure that FTE is bounded and appropriate alerting is available to meet the requirements of the RNP 0.3 specification for all phases of flight. Therefore, this performance should only be demanded where it is operationally needed (e.g. RNP 0.3 ATS routes should not be implemented where RNP 2 routes would be sufficient to enable the operation).

7. AIRWORTHINESS AND OPERATIONAL APPROVAL

7.1 For a commercial air transport operator to be granted a RNP 0.3 approval, it must comply with two types of approvals:

a) the airworthiness approval, issued by the State of registry; and

b) the operational approval, issued by the State of the operator.

7.2 For general aviation operators, the State of registry will determine whether or not the aircraft meets the applicable RNP 0.3 requirements and will issue the operational approval (*e.g.*, letter of authorisation – LOA).

7.3 Before filing the application, operators shall review all aircraft qualification requirements. Compliance with airworthiness requirements or equipment installation alone does not constitute operational approval.

8. AIRWORTHINESS APPROVAL

8.1 Aircraft requirements

8.1.1 Systems

a) The following systems meet the accuracy, integrity and continuity requirements of these criteria:

1) Aircraft with E/TSO-C145a and the requirements of E/TSO-C115B FMS, installed for IFR use in accordance with FAA AC 20-130A;

2) Aircraft with E/TSO-C146a equipment installed for IFR use in accordance with FAA AC 20-138 or AC 20-138A; and

3) Aircraft with RNP 0.3 capability certified or approved to equivalent standards (e.g. TSO-C193).

8.1.2 General

a) For RNP 0.3 operations on-board performance monitoring and alerting is required. This section provides the criteria for a TSE form of performance monitoring and alerting that will ensure a consistent evaluation and assessment of compliance for RNP 0.3 applications.

b) The aircraft navigation system, or aircraft navigation system and the pilot in combination, is required to monitor the TSE, and to provide an alert if the accuracy requirement is not met or if the probability that the lateral TSE exceeds two times the accuracy value is larger than 10^{-5}. To the extent operational procedures are used to satisfy this requirement, the crew procedure, equipment characteristics, and installation should be evaluated for their effectiveness and equivalence. Examples of information provided to the pilot for awareness of navigation system performance include “EPU”, “ACTUAL”, “ANP” and “EPE”. Examples of indications and alerts provided when the operational requirement is or can be determined as not being met include “UNABLE RNP”, “Nav Accur Downgrad”, GNSS alert limit, loss of GNSS integrity, TSE monitoring (real time monitoring of NSE and FTE combined), etc. The navigation system is not required to provide both performance and sensor-based alerts, e.g. if a TSE based alert is provided, a GNSS alert may not be necessary.

8.1.3 On-board performance, monitoring and alerting

a) **Accuracy.-** During operations in airspace or on ATS routes designated as RNP 0.3, the lateral TSE must be within ±0.3 NM for at least 95 per cent of the total flight time. The along-track error must also be within ±0.3 NM for at least 95 per cent of the total flight time. To meet this performance requirement, an FTE of 0.25 NM (95 per cent) may be assumed.

Note.- *For all RNP 0.3 operations, the use of a coupled FGS is an acceptable means of complying with this FTE assumption (see RTCA DO-208, Appendix E, Table 1). Any alternative means of FTE bounding, other than coupled FGS, may require FTE substantiation through an airworthiness demonstration.*

b) **Integrity.-** *Malfunction of the aircraft navigation equipment is classified as a major failure condition under* airworthiness regulations (i.e. 1×10^{-5} per hour).

c) **Continuity.-** For the purpose of this specification, loss of function is a major failure condition for remote continental and offshore operations. The carriage of dual independent long-range navigation systems may satisfy the continuity requirement. Loss of function is classified as a minor failure condition for other RNP 0.3 operations if the operator can revert to a different available navigation system and proceed to a suitable airport.

d) **Signal-in-space (SIS).-** The aircraft navigation equipment shall provide an alert if the probability of SIS errors causing a lateral position error greater than 0.6 NM exceeds 1×10^{-7} per hour.

8.1.4 **Bounding FTE for equipment not monitoring TSE performance**

a) RNP 0.3 operations require coupled FGS to meet the allowable FTE bound unless the manufacturer demonstrates and obtains airworthiness approval for an alternate means of meeting the FTE bound. The following may be considered as one operational means to monitor the FGS FTE:

1) FTE should remain within half-scale deflection (unless there is other substantiated FTE data);

2) Pilots must manually set systems without automatic CDI scaling to not greater than 0.3 NM full-scale prior to commencing RNP 0.3 operations; and

3) Aircraft with electronic map display, or another alternate means of flight path deviation display, must select appropriate scaling for monitoring FTE.

b) Automatic monitoring of FTE is not required if the necessary monitoring can be achieved by the pilot using available displays without excessive workload in all phases of flight. To the extent that compliance with this specification is achieved through operational procedures to monitor FTE, an evaluation of the pilot procedures, equipment characteristics, and installation must ensure their effectiveness and equivalence, as described in the functional requirements and operating procedures.

c) PDE is considered negligible if the quality assurance process is applied at the navigation database level (Section 12) and if operating procedures (Section 10) are applied.

8.2 **Aircraft eligibility requirements for RNP 0.3 operations**

a) The aircraft eligibility must be determined through demonstration of compliance against the relevant airworthiness criteria and the requirements of 8.1.

b) The original equipment manufacturer (OEM) or the holder of installation approval for the aircraft, e.g. STC holder, will demonstrate compliance to their CAA, and the approval can be documented in manufacturer documentation (e.g. service letters).

c) AFM entries are not required provided the State accepts manufacturer documentation.

Note.- *Requests for approval to use optional functionality (e.g. RF legs) should address the aircraft and operational requirements as described in Appendix 4.*

8.3 **Functional requirements**

Appendix 1 contains the functional requirements that meet the criteria of this AC.

8.4 **Continued airworthiness**

a) The operators of aircraft approved to perform RNP 0.3 operations, must ensure the continuity of the technical capacity of them, in order to meet technical requirements established in this AC.

b) Each operator who applies for RNP 0.3 operational approval shall submit to the CAA of State of registry, a maintenance and inspection program that includes all those requirements of maintenance necessary to ensure that navigation systems continue fulfilling the RNP 0.3 approval criteria.

c) The following maintenance documents must be revised, as appropriate, to incorporate RNP 0.3 aspects:

1) Maintenance control manual (MCM);

2) Illustrated parts catalogs (IPC); and

3) Maintenance program.

d) The approved maintenance program for the affected aircrafts should include maintenance practices listed in maintenance manuals of the aircraft manufacturer and its components, and must consider:

1) that equipment involved in the RNP 0.3 operation should be maintained according to directions given by manufacturer's components;

2) that any amendment or change of navigation system affecting in any way RNP 0.3 initial approval, must be forwarded and reviewed by the CAA for its acceptance or approval of such changes prior to its implementation; and

3) that any repair that is not included in the approved/accepted maintenance documentation, and that could affect the integrity of navigation performance, should be forwarded to the CAA for acceptance or approval thereof.

e) Within the RNP 0.3 maintenance documentation must be presented the training program of maintenance personnel, which inter alia, should include:

1) PBN concept;

2) RNP 0.3 application;

3) equipment involved in an RNP 0.3 operation; and

4) MEL use.

9. OPERATIONAL APPROVAL

Airworthiness approval alone does not authorise an applicant or operator to conduct RNP 0.3 operations. In addition to the airworthiness approval, the applicant or operator must obtain an operational approval to confirm the suitability of normal and contingency procedures in connection to the installation of a given piece of equipment.

Concerning commercial air transport, the assessment of an application for RNP 0.3 operational approval is done by the State of the operator, in accordance with standing operating rules [*e.g.*, LAR 121.995 (b) and LAR 135.565 (c)] or equivalents supported by the criteria described in this AC.

For general aviation, the assessment of an application for RNP 0.3 operational approval is carried out by the State of registry, in accordance with standing operating rules (*e.g.*, LAR 91.1015 and LAR 91.1640 or equivalents) supported by the criteria established in this AC.

9.1 Requirements to obtain operational approval

9.1.1 In order to obtain RNP 0.3 approval, the applicant or operator will take the following steps, taking into account the criteria established in this paragraph and in Sections 10, 11, 12, and 13:

a) *Airworthiness approval*.- Aircraft shall have the corresponding airworthiness approvals, pursuant to Paragraph 8 of this CA.

b) *Application*.- The operator shall submit the following documentation to the CAA:

1) *RNP 0.3 operational approval application;*

2) *Description of aircraft equipment*.- The operator shall provide a configuration list with details of the relevant components and the equipment to be used for RNP 0.3 operations. The list shall include each manufacturer, model, and equipment version of GNSS equipment and software of the installed FMS.

3) *Airworthiness documents related to aircraft eligibility*.- The operator shall submit relevant documentation, acceptable to the CAA, showing that the aircraft is equipped with RNP systems that meet the RNP 0.3 requirements, as described in Paragraph 8 of this AC. For example, the operator will submit the parts of the AFM or AFM supplement that contain the airworthiness statement.

4) *Training programme for flight crews and flight dispatchers (DV)*

(a) Commercial operators (*e.g.*, LAR 121 and LAR 135 operators) will present to the CAA the RNP 0.3 training curriculums to show that the operational procedures and practices and the training aspects described in Paragraph 11 have been included in the initial, upgrade or recurrent training curriculums for flight crews and DV.

Note.- *It is not necessary to establish a separate training programme if the RNP 0.3 training identified in Paragraph 11 has already been included in the training programme of the operator. However, it must be possible to identify what aspects of RNP 0.3 are covered in the training programme.*

(b) Private operators (*e.g.*, LAR 91 operators) shall be familiar with and demonstrate that they will perform their operations based on the practices and procedures described in Paragraph 11.

5) *Operations manual and checklists*

(a) Commercial operators (*e.g.*, LAR 121 and 135 operators) must review the operations manual (OM) and the checklists in order to include information and guidance on the operating procedures detailed in Paragraph 10 of this AC. The appropriate manuals must contain the operating instructions for navigation equipment and contingency procedures. The manuals and checklists must be submitted for review along with the formal application in Phase 2 of the approval process.

(b) Private operators (*e.g.*, LAR 91 operators) must operate their aircraft based on the practices and procedures identified in Paragraph 10 of this AC.

6) *Minimum Equipment List (MEL)*.- The operator will send to the CAA for approval any revision to the MEL that is necessary to conduct RNP 0.3 operations. If a RNP 0.3 operational approval is granted based on a specific operational procedure, operators must modify the MEL and specify the required dispatch conditions.

7) *Maintenance*.- The operator will submit for approval a maintenance programme to conduct RNP 0.3 operations.

8) *Training programme for maintenance personnel*.- Operators will submit the training curriculums that correspond to maintenance personnel in accordance with Paragraph 8.4 e).

9) *Navigation data validation programme*.- The operator will present the details about the navigation data validation programme as described in Appendix 2 to this AC.

c) *Training*.- Once the amendments to manuals, programmes, and documents submitted have been accepted or approved, the operator will provide the required training to its personnel.

d) *Validation flight*.- The CAA may deem it advisable to perform a validation flight before granting the operational approval. Such validation can be performed on commercial flights. The validation flight will be carried out according to Chapter 12, Volume II, Part II of the operations inspector manual (MIO) of the Regional Safety Oversight Cooperation System (SRVSOP).

e) *Issuance of the approval to conduct RNP 0.3 operations*.- Once the operator has successfully completed the operational approval process, the CAA will grant the operator the authorization to conduct RNP 0.3 operations.

1) LAR 121 and/or 135 operators.- For LAR 121 and/or LAR 135 operators, the CAA will issue the corresponding operations specifications (OpSpecs) that will reflect the RNP 0.3 approval.

2) *LAR 91 operators*.- For LAR 91 operators, the CAA will issue a letter of authorization (LOA).

10. OPERATING PROCEDURES

10.1 The operator and flight crews will become familiar with the following operating and contingency procedures associated with RNP 0.3 operations.

a) **Pre-flight planning**

1) Operators and pilots intending to conduct operations on RNP 0.3 ATS routes, including SIDs and STARs, initial and intermediate approach, must file the appropriate flight plan suffixes.

2) The on-board navigation data must be current and include appropriate procedures. Navigation databases are expected to be current for the duration of the flight. If the AIRAC cycle is due to change during flight, operators and pilots should establish procedures to ensure the accuracy of the navigation data, including the suitability of navigation facilities defining the routes and procedures for flight.

b) **RNP 0.3 availability prediction**

1) RAIM prediction is not required where the equipment uses SBAS augmentation and the planned operations are within the service volume of the SBAS system.

2) In areas and regions where SBAS is not usable or available, RAIM availability for the intended route should be checked prior to flight.

3) Operators can verify the availability of RAIM to support RNP 0.3 operations via NOTAMs (where available) or through GNSS prediction services.

4) The CAA may provide specific guidance on how to comply with RAIM prediction.

5) Operators should be familiar with the prediction information available for the intended ATS route.

6) RAIM availability prediction should take into account the latest GNSS constellation NOTAMs and avionics model (when available). The ANSP, avionics manufacturer, or the RNP system may provide this service.

7) In the event of a predicted, continuous loss of RNP 0.3 of more than 5 minutes for any part of the RNP 0.3 operation, the flight planning should be revised (e.g. delaying the departure or planning a different ATS route). If the prediction service is temporarily unavailable, ANSPs may still allow RNP 0.3 operations to be conducted.

8) RAIM availability prediction software does not guarantee the availability of GNSS. Rather, prediction tools simply assess the expected capability to meet the RNP. Because of potential unplanned failures of some GNSS elements, pilots/ANSPs must consider the loss of RAIM (or GNSS navigation altogether) while airborne may require reversion to an alternative means of navigation. Therefore, pilots should assess their capability to navigate in case of failure of GNSS navigation and consider the actions necessary to successfully divert to an alternate destination.

c) **General operating procedures**

1) The pilot must comply with any instructions or procedures the manufacturer identifies necessary to comply with the performance requirements in this chapter.

Note.- *Pilots are expected to adhere to all AFM/RFM limitations or operating procedures required to maintain RNP 0.3 performance for the ATS route. This shall include any speed restrictions needed to ensure maintenance of RNP 0.3 navigation accuracy.*

2) Operators and pilots should not request or file RNP 0.3 procedures unless they satisfy all the criteria in the relevant State documents. If an aircraft not meeting these criteria receives

a clearance from ATC to conduct an RNP 0.3 operation, the pilot must advise ATC that he/she is unable to accept the clearance and must request alternate instructions.

3) The operator must confirm the availability of GNSS for the period of intended operations along the intended ATS route using all available information and the availability of NAVAID infrastructure required for any (non-RNAV) contingencies.

4) At system initialization, the pilot must confirm the navigation database is current and verify that initial position of the aircraft is entered correctly. The pilot must also verify proper entry of their desired ATS route and any ATC changes to that ATS route upon initial clearance and any subsequent change of ATS route. The pilot must ensure the waypoints sequence depicted by their navigation system matches the ATS route depicted on the appropriate chart(s) and their assigned ATS route.

Note.- *The pilot may notice a slight difference between the navigation information portrayed on the chart and their primary navigation display. Differences of 3 degrees or less may result from the equipment manufacturer's application of magnetic variation and are operationally acceptable.*

5) The pilot must not attempt to fly an RNP 0.3 instrument flight procedure (IFP) unless it is retrievable by name from the on-board navigation database and conforms to the charted procedure. However, the pilot may subsequently modify a procedure by inserting or deleting specific waypoints in response to ATC clearances. The pilot may select the ATS route to be flown for the en-route section of the flight from the database or may construct the ATS route by means of selection of individual en-route waypoints from the database. The manual entry or creation of new waypoints, by manual entry of latitude and longitude or rho/theta values is not permitted. Additionally, pilots must not change any SID or STAR database waypoint type from a fly-by to a fly-over or vice versa.

6) The pilot should cross-check the flight plan clearance by comparing charts or other applicable resources with the navigation system textual display and the aircraft/rotorcraft map display, if applicable. If required, the pilot should also confirm exclusion of specific NAVAIDs in compliance with NOTAMs or other pilot procedures.

7) There is no pilot requirement to cross-check the navigation system's performance with conventional NAVAIDs as the absence of an integrity alert is considered sufficient to meet the integrity requirements. However, the pilot should monitor the reasonableness of the navigation solution and report any loss of RNP 0.3 capability to ATC. In addition, the pilot must continuously monitor the lateral deviation indicator (or equivalent navigation map display) during all RNP 0.3 operations.

8) The pilot is expected to maintain centre line, as depicted by on-board lateral deviation indicators, during all RNP operations unless authorized to deviate by ATC or under emergency conditions. For normal operations on straight segments or FRTs, cross-track error/deviation (the difference between the RNP system computed path and the aircraft position relative to the path) should be limited to ±½ the navigation accuracy associated with the procedure (0.15 NM). Brief deviations from this standard (e.g. overshoots or undershoots) during track changes (fly-by and fly-over turns), up to a maximum of one times the navigation accuracy (i.e. 0.3 NM for RNP 0.3), are allowable.

Note.- *Some systems do not display or compute a path during track changes (fly-by and fly-over turns). As such, the pilots of these aircraft may not be able to adhere to the lateral navigation accuracy requirement (e.g. 0.15 NM) during these turns. However, the pilot is expected to satisfy the operational requirement during intercepts following turns and on straight segments.*

9) If ATC issues a heading assignment taking the aircraft/rotorcraft off an ATS route, the pilot should not modify the flight plan in the RNAV system until receiving a new ATC clearance to rejoin the ATS route or the controller confirms a new ATS route clearance. When the aircraft is following an ATC heading assignment, the specified accuracy requirement does not apply.

10) Manually selecting aircraft bank limiting functions may reduce the aircraft's ability to maintain its desired track and is not recommended. The pilot should recognize manually

selectable aircraft bank-limiting functions might reduce their ability to satisfy path requirements of the procedure, especially when executing large angle turns. This should not be construed as a requirement to deviate from flight manual procedures; rather, pilots should be encouraged to avoid the selection of such functions except where needed for flight safety reasons.

d) **Aircraft/rotorcraft with RNP selection capability**

The pilot of an aircraft/rotorcraft with a manual RNP input selection capability should select RNP 0.3 for all RNP 0.3 ATS routes.

e) **RNP 0.3 SID specific requirements**

1) Prior to commencing take-off, the pilot must verify the aircraft RNP system is available, operating correctly, and the correct airport/heliport and departure data are loaded and properly depicted (including the aircraft's initial position). A pilot assigned an RNP 0.3 departure procedure and subsequently issued a change to the procedure or a transition from the procedure must verify that the appropriate changes are entered and available for navigation prior to take-off. A final check of proper departure entry and correct route depiction, shortly before take-off, is recommended.

2) The GNSS signal must be available and acquired by the aircraft's GNSS avionics before the take-off.

3) *Engagement of system after take-off.-* When required, the pilot must be able to engage (i.e. couple) the FGS prior to reaching the first waypoint defining a procedure requiring RNP 0.3 in accordance with this specification.

f) **RNP 0.3 STAR specific requirements**

1) Prior to the arrival phase, the pilot should verify loading of the correct terminal route. The active flight plan should be checked by comparing the charts (paper or electronic) with the map display (if applicable) and the MCDU. This includes confirmation of the waypoint sequence, reasonableness of track angles and distances, any altitude or speed constraints, and, where possible, identification of which waypoints are fly-by and which are fly-over or which represent the beginning or end of a radius-to-fix leg segment. An ATS route must not be used if the pilot has any reason to doubt the validity of the ATS route in the navigation database.

Note.- *As a minimum, the arrival checks can be a simple inspection of a suitable map display that achieves the objectives of this paragraph.*

2) The creation of new waypoints by manual entry into the RNP 0.3 system by the pilot would not create a valid ATS route and is unacceptable at all times.

3) Where contingency procedures require reversion to a conventional IFP, the pilot must complete all necessary preparation for such reversion (e.g. manual selection of NAVAID) before commencing any portion of the IFP.

4) Procedure modifications in the terminal area may take the form of ATC-assigned radar headings or "direct to" clearances, and the pilot must be capable of reacting in a timely fashion. This may include a requirement for the pilot to insert tactical waypoints loaded from the on-board navigation database. The pilot must not make manual entries or modify and create temporary waypoints or fixes that are not provided in the on-board navigation database.

5) The pilot must verify their aircraft navigation system is operating correctly, and the correct arrival procedure (including any applicable transition) is entered and properly depicted. Although a particular method is not mandated, the pilot must adhere to any published altitude and speed constraints associated with an RNP 0.3 operation.

g) **Contingency procedures**

1) The pilot must notify ATC of any loss of the RNP 0.3 capability (integrity alerts or loss of

navigation) together with the proposed course of action. If unable to comply with the requirements of an RNP 0.3 ATS route for any reason, the pilot must advise ATC as soon as possible. The loss of RNP 0.3 capability includes any failure or event causing the aircraft to no longer satisfy the RNP 0.3 requirements of the desired ATS route.

2) In the event of communications failure, the pilot should continue with the published lost communications procedure.

11. TRAINING PROGRAMMES

11.1 The training programme for flight crews and flight dispatchers (DV) shall provide sufficient training (*e.g*. using flight training devices, flight simulators or aircraft) on the aircraft´s RNP system to the extent necessary. The training programme will include the following topics:

a) The information in this AC;

b) The meaning and proper use of aircraft/helicopter equipment/navigation suffixes;

c) Procedure characteristics as determined from chart depiction and textual description;

d) Depiction of waypoint types (fly-over and fly-by) and path terminators (provided in Section 1.4.3.4 AIRINC 424 path terminators and any other types used by the operator) as well as associated aircraft/helicopter flight paths;

e) Required navigation equipment and MEL for operation on RNP 0.3 ATS routes;

f) RNP system-specific information:

1) Levels of automation, mode annunciations, changes, alerts, interactions, reversions, and degradation;

2) Functional integration with other aircraft systems;

3) The meaning and appropriateness of route discontinuities as well as related flight crew procedures;

4) Pilot procedures consistent with the operation (e.g. monitor PROG or LEGS page);

5) Types of navigation sensors utilized by the RNP system and associated system prioritization/weighting/logic/limitations;

6) Turn anticipation with consideration for airspeed and altitude effects;

7) Interpretation of electronic displays and symbols used to conduct an RNP 0.3 operation; and

8) Understanding of the aircraft configuration and operational conditions required to support RNP 0.3 operations (i.e. appropriate selection of CDI scaling/lateral deviation display scaling);

g) RNP equipment operating procedures, as applicable, including how to perform the following actions:

1) Verifying currency and integrity of aircraft navigation data;

2) Verifying successful completion of RNP system self-tests;

3) Entry of and update to the aircraft navigation system initial position;

4) Retrieving and flying an IFP with appropriate transition;

5) Adhering to speed and/or altitude constraints associated with an RNP 0.3 IFP;

6) Impact of pilot selectable bank limitations on aircraft/rotorcraft ability to achieve the required accuracy on the planned route;

7) Selecting the appropriate STAR or SID for the active runway in use and be familiar with

flight crew procedures required to deal with a runway change;

8) Verifying waypoint and flight plan programming;

9) Flying direct to a waypoint;

10) Flying a course/track to a waypoint;

11) Intercepting a course/track;

12) Following vectors and rejoining an RNP ATS route from “heading” mode;

13) Determining cross-track error/deviation. More specifically, the maximum deviations allowed to support RNP 0.3 must be understood and respected;

14) Inserting and deleting route discontinuities;

15) Removing and reselecting navigation sensor inputs;

16) When required, confirming exclusion of a specific NAVAID or NAVAID type;

17) Changing the arrival airport/heliport and the alternate airport;

18) Performing a parallel offset function, if the capability exists. The pilot should know how to apply offsets within the functionality of their particular RNP system and the need to advise ATC if this functionality is not available; and

19) Performing a conventional holding pattern;

h) Operator-recommended levels of automation for phase of flight and workload, including methods to minimize cross-track error to maintain route centre line;

i) R/T phraseology for RNAV/RNP applications; and

j) Contingency procedures for RNAV/RNP failures.

12. NAVIGATION DATABASE

a) Navigation data management is addressed in Annex 6, Part 1, Chapter 7. In support of this, the operator must obtain the navigation database from a supplier complying with RTCA DO 200A/EUROCAE document ED 76, Standards for Processing Aeronautical Data, and the database must be compatible with the intended function of the equipment. The CAA recognizes compliance to the referenced standard using an LOA or other equivalent document.

b) The operator must report any navigation database discrepancies that invalidate a SID, STAR or initial/intermediate approach procedure to the navigation database supplier, and the operator must prohibit their pilots from attempting an affected SID or STAR.

c) Aircraft operators should consider the need to conduct ongoing checks of the operational navigation databases in order to meet existing quality system requirements.

13. OVERSIGHT, INVESTIGATION OF NAVIGATION ERRORS, AND WITHDRAWAL OF RNP 0.3 APPROVAL

a) The operator will establish a process to receive, analyse, and follow up on navigation errors reports in order to determine appropriate corrective action.

b) Information indicating the potential for repeated errors may require modification of an operator´s training programme.

c) Information attributing multiple errors to particular pilots may necessitate remedial training or license review.

d) Repeated navigation error occurrences attributed to specific navigation equipment should result in cancellation of the operational approval permitting use of that equipment during RNP 0.3 operations.

APPENDIX 1

FUNCTIONAL REQUIREMENTS

The following navigation displays and functions (installed per AC 20-130A and AC 20-138A or equivalent airworthiness installation advisory material) are required.

Paragraph	*Functional requirement*	*Explanation*
a)	Navigation data, including a failure indicator, must be displayed on a lateral deviation display (CDI, EHSI) and/or a navigation map display. These must be used as primary flight instruments for the navigation of the aircraft, for manoeuvre anticipation and for failure/status/integrity indication.	Non-numeric lateral deviation display (e.g. CDI, EHSI), with a to/from indication and a failure annunciation, for use as primary flight instruments for navigation of the aircraft, for manoeuvre anticipation, and for failure/status/integrity indication, with the following five attributes: 1) The capability to continuously display to the pilot flying, on the primary flight instruments for navigation of the aircraft (primary navigation display), the computed path and aircraft position relative to the path. For operations where the required minimum flight crew is two pilots, the means for the pilot not flying to verify the desired path and the aircraft position relative to the path must also be provided. 2) Each display must be visible to the pilot and located in the primary field of view (±15° from the pilot's normal line of sight) when looking forward along the flight path. 3) The lateral deviation display scaling should agree with any implemented alerting and annunciation limits. 4) The lateral deviation display must also have a full-scale deflection suitable for the current phase of flight and must be based on the required track-keeping accuracy. 5) The display scaling may be set automatically by default logic: automatically to a value obtained from a navigation database, or manually by pilot procedures. The full-scale deflection value must be known or must be available for display to the pilot commensurate with the required track-keeping accuracy. 6) The lateral deviation display must be automatically slaved to the computed path.

		The course selector of the deviation display should be automatically slewed to the computed path. As an alternate means of compliance, a navigation map display can provide equivalent functionality to a lateral deviation display as described in 1 to 6 above, with appropriate map scales and giving equivalent functionality to a lateral deviation display. The map scale should be set manually to a value appropriate for the RNP 0.3 operation.
b)	The following system functions are required as a minimum within any RNP 0.3 equipment.	1) The capability to continuously display to the pilot flying, on the primary flight instruments for navigation of the aircraft (primary navigation display), the computed path and aircraft position relative to the path. For operations where the required minimum flight crew is two pilots, the means for the pilot not flying to verify the desired path and the aircraft position relative to the path must also be provided. 2) A navigation database, containing current navigation data officially promulgated for civil aviation, which can be updated in accordance with the AIRAC cycle and from which IFR procedures and ATS routes or waypoint data corresponding to the coordinates of significant points on ATS routes, can be retrieved and loaded into the RNP system. The stored resolution of the data must be sufficient to achieve negligible PDE. The database must be protected against pilot modification of the stored data. 3) The means to display the validity period of the navigation data to the pilot. 4) The means to retrieve and display data stored in the navigation database relating to individual waypoints and NAVAIDs, to enable the pilot to verify the ATS route to be flown. 5) Capacity to load from the database into the RNP system the entire Instrument flight procedure (IFP) and the ATS route to be flown.
c)	The means to display the following items, either in the pilot's primary field of view, or on a readily accessible display page.	1) The active navigation sensor type. 2) The identification of the active (To) waypoint.

		3) The ground speed or time to the active (To) waypoint. 4) The distance and bearing to the active (To) waypoint.
d)	The capability to execute a “Direct to” function.	
e)	The capability for automatic leg sequencing with the display of sequencing to the pilot.	
f)	The capability to execute RNP 0.3 terminal procedures extracted from the on-board navigation database, including the capability to execute fly-over and fly-by turns.	
g)	The capability to automatically execute leg transitions and maintain tracks consistent with the following ARINC 424 path terminators, or their equivalent. – Initial fix (IF) – Course to a fix (CF) – Course to an altitude (CA) – Direct to a fix (DF) – Track to a fix (TF)	***Note.-*** *Path terminators are defined in ARINC 424, and their application is described in more detail in RTCA documents DO-236B and DO-201A.*
h)	The capability to automatically execute leg transitions consistent with Heading to an altitude (VA), Heading to a manual termination (VM) and Heading to an intercept (VI) ARINC 424 path terminators, or must be able to be manually flown on a heading to intercept a course or to go direct to another fix after reaching a procedure-specified altitude.	
i)	The capability to automatically execute leg transitions consistent with Course to an altitude (CA) and Course from a fix to manual termination (FM) ARINC 424 path terminators, or the RNAV system must permit the pilot to readily	

	designate a waypoint and select a desired course to or from a designated waypoint.	
j)	The capability to load an ATS route from the database, by name.	
k)	The capability to display an indication of the RNP 0.3 system failure, in the pilot's primary field of view.	
l)	The system shall be capable of loading numeric values for courses and tracks from the on-board navigation database.	

APPENDIX 2

NAVIGATION DATA VALIDATION PROGRAMME

1. INTRODUCTION

The information stored in the navigation database defines the lateral and longitudinal guidance of the aircraft for RNP 0.3. Navigation database updates are carried out every 28 days. The navigation data used in each update are critical to the integrity of every RNP 0.3 route. This appendix provides guidance on operator procedures to validate the navigation data associated with the RNP 0.3 operations.

2. DATA PROCESSING

a) The operator will identify in its procedures the person responsible for the navigation data updating process.

b) The operator must document a process for accepting, verifying, and loading navigation data into the aircraft.

c) The operator must place its documented data process under configuration control.

3. INITIAL DATA VALIDATION

3.1 The operator must validate every RNP 0.3 route to ensure compatibility with the aircraft and to ensure that the resulting paths are consistent with the published routes. As a minimum, the operator must:

a) compare the navigation data of RNP 0.3 routes to be loaded into the FMS with valid charts and maps containing the published routes; and

b) once the RNP 0.3 routes are validated, a copy of the validated navigation data shall be kept and maintained in order to compare them with subsequent data updates.

4. DATA UPDATING

Upon receiving a navigation data update and before using such data on the aircraft, the operator must compare the update with the validated routes. This comparison must identify and resolve any discrepancy in the navigation data. If there are significant changes (any change affecting the path or the performance of the route) in any part of the route, and if those changes are verified through the initial data, the operator must validate the amended route in accordance with the initial validation data.

5. NAVEGATION DATA SUPPLIERS

Navigation data suppliers must have a letter of acceptance (LOA) in order to process these data (*e.g*., FAA AC 20-153 or the document on the conditions for the issuance of letters of acceptance to navigation data suppliers by the European Aviation Safety Agency – EASA (EASA IR 21 Subpart G) or equivalent documents). A LOA recognises the data supplier as one whose data quality, integrity and quality management practices are consistent with the criteria of DO-200A/ED-76. The database supplier of an operator must have a Type 2 LOA and its respective suppliers must have a Type 1 or 2 LOA. The CAA may accept a LOA issued to navigation data suppliers or issue its own LOA.

6. AIRCRAFT MODIFICATIONS (DATABASE UPDATE)

If an aircraft system necessary for RNP 0.3 operations is modified (*e.g.*, change of software), the operator is responsible for validating the RNP 0.3 routes with the navigation database and the modified system. This can be done without any direct assessment if the manufacturer confirms that the modification has no effect on the navigation database or on path calculation. If there is no such confirmation by the manufacturer, the operator must perform an initial validation of the navigation data with the modified system.

APPENDIX 3

RNP 0.3 APPROVAL PROCESS

a) The RNP 0.3 approval process consists of two types of approvals, airworthiness and operational. Although the two have different requirements, they must be considered in one single process.

b) This process is an orderly method used by the CAA to make sure that the applicants meet the established requirements.

c) The approval process is made up by the following phases:

1)	Phase one:	Pre-application
2)	Phase two:	Formal application
3)	Phase three:	Documentation evaluation
4)	Phase four:	Inspection and demonstration
5)	Phase five:	Approval

d) In *Phase one - Pre-application*, the CAA calls the applicant or operator to a pre-application meeting. At this meeting, the CAA informs the applicant or operator of all the operational and airworthiness requirements that it must meet during the approval process, including the following:

1) the contents of the formal application;

2) the review and evaluation of the application by the CAA;

3) the limitations (if any) applicable to the approval; and

4) conditions under which the RNP 0.3 approval could be cancelled.

e) In *Phase two – Formal Application*, the applicant or operator submits the formal application along with all the relevant documentation, as established in Paragraph 9.1.1 b) of this AC.

f) In Phase three – *Documentation evaluation*, the CAA evaluates all the documentation and the navigation system to determine their eligibility and the approval method to be followed in connection with the aircraft. As a result of this analysis and evaluation, the CAA may accept or reject the formal application along with the documentation.

g) In *Phase four – Inspection and demonstration*, the operator will provide training to its personnel and will carry out the validation flight, if required.

h) In *Phase five* - Approval, the CAA issues the RNP 0.3 approval once the operator has met the airworthiness and operational requirements. For LAR 121 and 135 operators, the CAA will issue the OpSpecs, and for LAR 91 operators, a LOA.

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APPENDIX 4

RADIUS TO FIX (RF) PATH TERMINATOR

1. INTRODUCTION

1.1 Background

This appendix addresses ARINC 424 RF path terminator functionality when used in association with RNP 0.3 navigation specification. RF legs are a required capability for use with RNP 0.3 rather than a minimum requirement. This functionality can be used in the initial and intermediate approach segments, the final phase of the missed approach, SIDs and STARs. The application of this appendix in the final approach or the initial or intermediate phases of the missed approach is prohibited. Such procedure segments wishing to apply RF would have to use the RNP AR specification.

1.2 Purpose

1.2.1 This appendix provides guidance to CAAs implementing instrument flight procedures (IFPs) where RF legs are incorporated into terminal procedures.

1.2.2 For the ANSP, it provides a consistent CAA recommendation on how to implement RF legs. For the operator, it provides training requirements. This appendix is intended to facilitate operational approval for existing RNP systems that have a demonstrated RF leg capability. An operational approval based upon this standard allows an operator to conduct operations on procedures containing RF legs globally.

1.2.3 This appendix also provides airworthiness and operational criteria for the approval of an RNP system incorporating an RF leg capability. Although the ARINC 424 RF leg functionality in this appendix is identical to that found in the RNP AR specification, the approval requirements when applied in association with RNP 0.3 are not as constraining as those applied to RNP AR. This is taken into account in the related obstacle protection and route spacing criteria. ICAO Doc 9905 provides a continuous lateral protection of 2 × RNP for RNP AR applications, on the basis that the certification and approval process provides assurance that the integrity and continuity of the navigation solution will meet 10^{-7}. The demanding integrity and continuity requirements for RNP AR do not apply to the RF functionality described here as ICAO Doc 8168 provides additional buffers in the RF design criteria.

2. IMPLEMENTATION CONSIDERATIONS

2.1 Application of RF legs

2.1.1 The RF leg should be used when there is a requirement for a specific fixed radius curved path in a terminal procedure. The RF leg is defined by the arc centre fix, the arc initial fix, the arc ending fix and the turn direction. The radius is calculated by the navigation computer as the distance from the arc centre fix to the arc ending fix. RNP systems supporting this leg type provide the same ability to conform to the track-keeping accuracy during the turn as in the straight line segments. RF legs are intended to be applied where accurate repeatable and predictable navigation performance is required in a constant radius turn.

2.1.3 RF legs may be used on any segment of a terminal procedure except the FAS, the Initial missed approach phase or the intermediate missed approach phase. The criteria for designing procedures with RF legs are detailed in PANS-OPS (ICAO Doc 8168).

Note.- *Although the RF leg is designed to be applied within the extent of terminal procedures, during higher flight level/altitude segments aircraft may become bank angle limited. When designing terminal procedures with curved path segments, consideration should be given to the interface between the terminal procedure (SID or STAR) and the ATS route structure and whether it is more appropriate to implement the curved path segment through use of the FRT. The FRT design feature within an ATS route structure is provided for any such curved path requirements as part of the A-RNP specification.*

2.2 Instrument flight procedure (IFP) design considerations and assumptions

2.2.1 The radius of turn depends upon the ground speed of the aircraft and the applied bank angle. From an IFP design perspective, the maximum ground speed of the aircraft is determined by the maximum allowable IAS, the turn altitude and the maximum tail wind. IFP design criteria for maximum IAS, turn altitude, bank angle and maximum tailwind are described in detail in PANS-OPS (ICAO Doc 8168).

2.2.2 When speed restrictions are required for departures they will be placed on the RF leg exit waypoint or a subsequent waypoint as required. For arrivals, the speed restriction should be applied to the waypoint associated with the beginning of the RF leg (path terminator of preceding leg).

2.2.3 The inbound and outbound legs will be tangential to the RF leg.

2.2.4 The requirements of an RF leg may be continued through to a sequential RF leg when implementing wrap-around instrument procedures, e.g. departures.

2.2.5 The procedure will be subjected to comprehensive validation checks prior to publication in order to assure flyability by the intended aircraft types.

3. GENERAL CONSIDERATIONS FOR USE OF RF LEGS

3.1 Benefits

RF legs provide a predictable and repeatable ground track during a turn and prevent the dispersion of tracks experienced in other types of turn construction due to varying aircraft speeds, turn anticipation, bank, roll rate, etc. Therefore, RF legs can be employed where a specified path must be flown during a turn. Additionally, because an RF leg traverses a specified distance it can be used to maintain aircraft longitudinal spacing between aircraft having the same speed. This is not necessarily true with other turn constructions such as fly-by transitions, because of the varying turn paths aircraft execute.

3.2 Publication considerations

Guidance for charting RF legs is provided in PANS-OPS (ICAO Doc 8168). The requirement for RF functionality must be clearly marked on the chart.

3.3 ATC coordination

3.1.1 It is expected that ATC will be familiar with RF leg benefits and their limitations, e.g. speed. ATC shall not allocate a speed that exceeds a constraint associated with the (design) flyability of an RF leg.

3.1.2 Aircraft must be established on the inbound track to the RF leg prior to it being sequenced by the navigation system. ATC must therefore not issue a Direct To clearance to a waypoint beginning an RF leg or a vector to intercept an RF leg.

4. AIRCRAFT REQUIREMENTS

4.1 RNP system-specific information

4.1.1 The navigation system should not permit the pilot to select a procedure that is not supported by the equipment, either manually or automatically (e.g. a procedure is not supported if it incorporates an RF leg and the equipment does not provide RF leg capability).

4.1.2 The navigation system should also prohibit pilot access to procedures requiring RF leg capability if the system can select the procedure, but the aircraft is not otherwise equipped (e.g. the aircraft does not have the required roll steering autopilot or flight director installed).

Note 1.- *One acceptable means to meet these requirements is to screen the aircraft's on-board navigation database and remove any routes or procedures the aircraft is not eligible to execute. For example, if the aircraft is not eligible to complete RF leg segments, then the database screening could remove all procedures containing RF leg segments from the navigation database.*

Note 2.- *Another acceptable means of compliance may be pilot training to identify and prohibit the use of procedures containing RF legs.*

4.2 On-board performance monitoring and alerting

The navigation system must have the capability to execute leg transitions and maintain a track consistent with an RF leg between two fixes. The lateral TSE must be within ±1 × RNP of the path defined by the published procedure for at least 95 per cent of the total flight time for each phase of flight and each autopilot and/or flight director mode requested.

Note 1.- *Industry standards for RF defined paths can be found in RTCA DO-236B/EUROCAE ED-75B (Sections 3.2.5.4.1 and 3.2.5.4.2).*

Note 2.- *Default values for FTE can be found in RTCA DO-283A. FAA AC 120-29A, 5.19.2.2 and 5.19.3.1, also provides guidance on establishing FTE values.*

4.3 System failure modes/annunciations

4.3.1 The RNP system shall provide a visible alert within the pilot's primary field of view when loss of navigation capability and/or loss of integrity (LOI) are experienced.

4.3.2 Any failure modes that have the potential to affect the RF leg capability should be identified. Failure modes may include loss of electrical power, loss of signal reception, RNP system failure, including degradation of navigation performance resulting in a loss of RNP containment integrity.

4.3.3 The ability of the aircraft to maintain the required FTE after a full or partial failure of the autopilot and/or flight director should be documented.

Note.- *If autopilot malfunction testing was performed for worst case failures, no further validation is required. In this case, the manufacturer is expected to provide a statement of confirmation.*

4.4 Functional requirements

4.4.1 An autopilot or flight director with at least "roll-steering" capability that is driven by the RNP system is required. The autopilot/flight director must operate with suitable accuracy to track the lateral and, as appropriate, vertical paths required by a specific RNP procedure.

4.4.2 An electronic map display depicting the RNP computed path of the selected procedure is required.

4.4.3 The flight management computer, the flight director system, and the autopilot must be capable of commanding and achieving a bank angle up to 25 degrees above 400 ft AGL.

4.4.4 The flight guidance mode should remain in lateral navigation while on an RF leg, when a procedure is abandoned or a missed approach/go-around is initiated [through activation of Take-off/go-around (TOGA) or other means] to enable display of deviation and display of positive course guidance during the RF leg. As an alternative means, crew procedures may be used that ensure that the aircraft adheres to the specified flight path throughout the RF leg segment.

4.5 Compliance demonstration

4.5.1 In seeking an airworthiness approval for a navigation system implementing the RF path terminator, the compliance demonstration supporting such an approval should be scoped to the airspace operational concept and the boundaries to which the RF leg is likely to be applied.

4.5.2 Consideration should be given to evaluation of the navigation system on a representative set of procedure designs under all foreseen operating conditions. The evaluation should address maximum assumed crosswind and maximum altitude with the aircraft operating in the range of expected airspeeds for the manoeuvre and operating gross weights. Procedure design constraints should include sequencing multiple, consecutive RF leg segments of varying turn radii, including consecutive RF leg segments reversing the direction of turn (i.e. reversing from a left-hand RF turn to a right-hand RF turn). Within the demonstration, the applicant should be seeking to confirm the FTE commensurate with the identified RNP navigation accuracy and that the RF turn entry and exit criteria are satisfied. Any limitations identified during the compliance demonstration should be documented. Flight crew procedures should be assessed, including identification of any limitations which surround the use of pilot selectable or automatic bank angle limiting functions and confirmation of those related to go-around or missed approach from an RF leg segment.

5. OPERATIONAL REQUIREMENTS

5.1 Background

This section identifies the operational requirements associated with the use of RF legs as scoped in 1.1 of this appendix. It assumes that the airworthiness approval of the aircraft and systems has been completed. This means that the basis for the RF leg function and the system performance has already been established and approved based upon appropriate levels of analysis, testing and demonstration. As part of this activity, the normal procedures, as well as any limitations for the function, will have been documented, as appropriate, in the aircraft flight and operations manuals.

5.2 Approval process

The approval process will follow the procedures established in Appendix 3 of this AC.

5.3 Aircraft eligibility

5.3.1 Relevant documentation acceptable to the CAA must be available to establish that the aircraft is equipped with an RNP system with a demonstrated RF leg capability. Eligibility may be established in two steps: first, recognizing the qualities and qualifications of the aircraft and equipment; and second, determining the acceptability for operations. The determination of eligibility for existing systems should consider acceptance of manufacturer documentation of compliance, e.g. FAA ACs 90-105, 90-101A, 20-138B, EASA AMC 20-26.

Note.- *RNP systems demonstrated and qualified for RNP AR operations using RF leg functionality are considered qualified with recognition that the RNP operations are expected to be performed consistent with the operators RNP 0.3 approval. No further examination of aircraft capability, operator training, maintenance, operating procedures, databases, etc. is necessary.*

5.3.2 *Eligibility airworthiness documents*. The flight manual or referenced document should contain the following information:

a) A statement indicating that the aircraft meets the requirements for RNP operations with RF legs and has demonstrated the established minimum capabilities for these operations. This documentation should include the phase of flight, mode of flight (e.g. FD on or off, and/or AP on or off, and applicable lateral and vertical modes), minimum demonstrated lateral navigation accuracy, and sensor limitations, if any;

b) Any conditions or constraints on path steering performance (e.g. AP engaged, FD with map display, including lateral and vertical modes, and/or CDI/map scaling requirements) should be identified. Use of manual control with CDI only is not allowed on RF legs; and

c) The criteria used for the demonstration of the system, acceptable normal and non-normal configurations and procedures, the demonstrated configurations and any constraints or limitations necessary for safe operation should be identified.

5.4 Operational approval

5.4.1 The operational approval will follow the steps described in Section 9 of this AC.

5.4.2 *Issuance of the approval to conduct RNP 0.3 operations with RF legs*.- Once the operator has successfully completed the operational approval process, the CAA will grant to the operator the authorization to conduct RNP 0.3 operations with RF legs.

a) LAR 121 and/or 135 operators.- For LAR 121 and/or LAR 135 operators, the CAA will issue the corresponding operations specifications (OpSpecs) that will reflect the RNP 0.3 authorization with RF legs.

b) LAR 91 operators.- For LAR 91 operators, the CAA will issue a letter of authorization (LOA).

5.4.2 Training documentation.- Commercial operators must have a training programme addressing the operational practices, procedures and training related to RF legs in terminal operations (e.g. initial, upgrade or recurrent training for pilot, dispatchers or maintenance personnel). Private operators should be familiar with the practices and procedures identified in 5.6 - Pilot knowledge and training of this appendix.

Note.- *It is not required to establish a separate training programme or regime if RNAV and RF leg training is already an integrated element of a training programme. However, it should be possible to identify what aspects of RF leg use are covered within a training programme.*

5.4.4 OMs and checklists.- OMs and checklists for commercial operators must address information/guidance on the SOP detailed in 5.5 - Operating procedures. Private operators should operate using the practices and procedures identified in 5.6 - Pilot knowledge and training. These SOP and practices must clearly define any aircraft limitations associated with RF leg execution (e.g. if the aircraft is not capable of executing RF leg segments, then the instructions to pilots must prohibit an attempt to fly a procedure requiring RF leg capability).

5.5 Operating procedures

5.5.1 The pilot must use either a flight director or autopilot when flying an RF leg. The pilot should comply with any instructions or procedures identified by the manufacturer as necessary to comply with the performance requirements in this appendix.

5.5.2 Procedures with RF legs will be identified on the appropriate chart.

5.5.3 When the dispatch of a flight is predicated on flying an RNP procedure with an RF leg, the dispatcher/pilot must determine that the installed autopilot/flight director is operational.

5.5.4 The pilot is not authorized to fly a published RNP procedure unless it is retrievable by the procedure name from the aircraft navigation database and conforms to the charted procedure. The lateral path must not be modified, with the exception of complying with ATC clearances/instructions.

5.5.5 The aircraft must be established on the procedure prior to beginning the RF leg.

5.5.6 The pilot is expected to maintain the centre line of the desired path on RF legs. For normal operations, cross-track error/deviation (the difference between the displayed path and the displayed aircraft position relative to the displayed path (i.e. FTE) should be limited to half the navigation accuracy associated with the procedure (e.g. 0.15 NM for RNP 0.3).

5.5.7 Where published, the pilot must not exceed maximum airspeeds associated with the flyability (design) of the RF leg.

5.5.8 If an aircraft system failure results in the loss of capability to follow an RF turn, the pilot should maintain the current bank and roll out on the charted RF exit course. The pilot should advise ATC as soon as possible of the system failure.

5.6 Pilot knowledge and training

5.6.1 The training programme must include:

a) The information in this appendix;

b) The meaning and proper use of RF functionality in RNP systems;

c) Associated procedure characteristics as determined from the chart depiction and textual description;

d) Associated levels of automation, mode annunciations, changes, alerts, interactions, reversions, and degradation;

Note.- *Manually selecting aircraft bank limiting functions may reduce the aircraft's ability to maintain its desired track and are not permitted. The pilots should recognize that manually selectable aircraft bank-limiting functions may reduce their ability to satisfy ATC path expectations, especially when executing large angle turns.*

e) Monitoring track-keeping performance;

f) The effect of wind on aircraft performance during execution of RF legs and the need to remain within the RNP containment area. The training programme should address any operational wind limitations and aircraft configurations essential to safely complete the RF turn;

g) The effect of ground speed on compliance with RF paths and bank angle restrictions impacting the ability to remain on the course centre line;

h) Interpretation of electronic displays and symbols; and

i) Contingency procedures.

5.7 Navigation database

Aircraft operators will be required to manage their navigation data base load either through the packing or through flight crew procedure, where they have aircraft systems capable of supporting the RF functionality, but as an operator they do not have an approval for its use.

RNP 0.3 JOB AID

REQUEST TO CONDUCT RNP 0.3 OPERATIONS

1. Introduction

This job aid was developed by the Latin American Regional Safety Oversight Cooperation System (SRVSOP) to provide States, operators, and inspectors with guidance on the process to be followed by an operator in order to obtain a RNP 0.3 authorization.

2. Purpose of the job aid

2.1 To give operators and inspectors information on the main reference documents of RNP 0.3.
2.2 To provide tables showing the contents of the application, the associated reference paragraphs, the place in the application of the operator where RNP 0.3 elements are mentioned and columns for inspector comments and follow-up on the status of various elements of RNP 0.3.

3. Actions recommended for the inspector and operator

Some recommendations for use of the job aid follow:

3.1 At the pre-application meeting with the operator, the inspector reviews the "basic events of the RNP 0.3 approval process" described in Part 1 of this job aid, in order to provide an overview of the approval process events.
3.2 The inspector reviews this job aid with the operator in order to establish the form and content of the RNP 0.3 approval application.
3.3 The operator uses this job aid as a guide to collect the documents/annexes of the RNP 0.3 application.
3.4 The operator inserts in the job aid references showing in what part of its documents are the RNP 0.3 programme elements located.
3.5 The operator submits the job aid and the application to the inspector (documents/annexes).
3.6 The inspector indicates in the job aid whether an item is in compliance or needs corrective action.
3.7 The inspector informs the operator as soon as possible when a corrective action by the operator is required.
3.8 The operator provides the inspector with the revised material when so requested.
3.9 The CAA provides the operator with the operational specifications (OpSpecs) or a letter of authorisation (LOA), as applicable, when the tasks and documents have been completed.

4. Structure of the job aid

5. Main sources of documents, information, and contacts

To access the RNP 0.3 job aid, enter to the Web page of the ICAO/SAM Regional Office (www.lima.icao.int) under the SRVSOP link or directly to the following address: http://www1.lima.icao.int/srvsop/document

6. Main reference documents

Reference Document	Title
Annex 6	Operation of aircraft
ICAO Doc 9613	Performance based navigation (PBN) manual
AMC 20-5	Acceptable means of compliance for airworthiness approval and operational criteria for the use of the NAVSTAR Global positioning system (GPS)
AC 20-130A	Airworthiness approval of navigation or flight management systems integrating multiple navigation sensors
AC 20-138A	Airworthiness approval of global navigation satellite system (GNSS) equipment
TSO-C115b	Airborne area navigation equipment using multi-sensor inputs
TSO-C129a	Airborne supplemental navigation equipment using the global positioning system (GPS)
TSO-C145a	Airborne navigation sensors using the global positioning system (GPS) augmented by the wide area augmentation system (WAAS)
TSO-C146a	Stand-Alone airborne navigation equipment using the global positioning system (GPS) augmented by the wide area augmentation system (WAAS)

PART 1: GENERAL INFORMATION

Basic events in the RNP 0.3 approval process

	Action by the operator	Action by the CAA
1	Establishes the need to obtain RNP 0.3 authorization.	
2	Reviews the AFM, AFM supplement or Type certificate data sheet (TCDS), or other appropriate documents [*e.g.,* service bulletins (SB), service letters (SL), etc.] to determine the eligibility of the aircraft for RNP 0.3 operations. The operator contacts the aircraft or avionics manufacturer, if necessary, to confirm RNP 0.3 or higher eligibility of the aircraft.	
3	Contacts the CAA to schedule a pre-application meeting to discuss the operational approval requirements.	
4		During the pre-application meeting, establishes: • the form and contents of the application; • the documents that support RNP 0.3 approval • the date in which the application will be submitted for evaluation • the need to conduct a validation flight observed by the CAA.
5	Submits the application at least 60 days before start-up of RNP 0.3 operations.	
6		Reviews the request of the operator.
7	Once the amended manuals, programmes, and documents have been approved, provides training to flight crews, flight dispatchers, and maintenance personnel, and conducts a validation flight, if required by the CAA.	Only if required, participates in the validation flight.
8		Once the operational and airworthiness requirements have been met, issues the operational approval in the form of OpSpecs for LAR 121 or 135 operators or equivalent operators, or an LOA for LAR 91 operators or equivalent operators, as appropriate.

Notes related to the approval process

1. **Responsible authority**

    a. **Commercial air transport (LAR 121 and/or 135 regulations or equivalent).-** The **State of registry** determines that the aircraft meets the airworthiness requirements. The **State of the operator** issues the RNP 0.3 approval (*e.g.,* OpSpecs).

    b. **General aviation (LAR 91 regulations or equivalent).-** The **State of registry** determines that the aircraft meets the airworthiness requirements and issues the operational approval (*e.g.,* an LOA).

2. The CAA does not need to issue a LOA or equivalent document for each individual area of operation in the case of LAR 91 operators.

3. LAR 121 and/or 135 operators with RNP 0.3 approval must list this approval in the OpSpecs.

4. Related sections of the Latin American Aeronautical Regulations (LAR) or equivalent regulations

    a. LAR 91 Sections 91.1015 and 91.1640 or equivalents

    b. LAR 121 Section 121.995 (b) or equivalent

    c. LAR 135 Section 135.565 (c) or equivalent

5. Related ICAO Documents

    a. Annex 6 to the Convention on International Civil Aviation – Operation of Aircraft

    b. Annex 10 to the Convention on International Civil Aviation – Aeronautical telecommunications

    c. Annex 15 to the Convention on International Civil Aviation – Aeronautical information services

    d. ICAO Doc 9613 – Performance-based navigation (PBN) manual

    e. ICAO Doc 4444 – Procedures for air navigation services – Air traffic management

PART 2: INFORMATION ON THE IDENTIFICATION OF AIRCRAFT AND OPERATORS

NAME OF THE OPERATOR: ____

Aircraft manufacturer, model, and series	Registration numbers	Serial numbers	RNP 0.3 system Number, manufacturer, and model	RNP specification

DATE OF PRE-APPLICATION MEETING ____

DATE ON WHICH THE APPLICATION WAS RECEIVED ____

DATE ON WHICH THE OPERATOR INTENDS TO BEGIN RNP 0.3 OPERATIONS _________________________

IS THE CAA NOTIFICATION DATE APPROPRIATE? YES _____ NO _____

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PART 3 – OPERATOR APPLICATION (ANNEXES AND DOCUMENTS)

Annex	Title of Annex/Document	Indication of inclusion by the operator	Comments by the Inspector
A	**Operator letter requesting RNP 0.3 authorization**		
B	**Airworthiness documents showing aircraft eligibility for RNP 0.3.** AFM, AFM revision, AFM supplement, or Type certificate data sheet (TCDS) showing RNP system eligibility for RNP 0.3 or less. Statement by the manufacturer.- Aircraft that have a statement by the manufacturer documenting compliance with SRVSOP CA 91-012 criteria or equivalent, meet the performance and functional requirements of said document.		
C	**Aircraft modified to meet RNP 0.3 standards. Documentation on aircraft inspection and/or modification, if applicable.** Maintenance records documenting the installation or modification of aircraft systems (*e.g.,* FAA Form 337 – major repairs and alterations).		
D	**Maintenance programme** • For aircraft with established RNP 0.3 system maintenance practices, the list of references of the document or programme. • For recently installed RNP 0.3 systems, the maintenance practices for their review.		
E	**Minimum equipment list (MEL) (only for operators conducting operations based on a MEL):** MEL showing provisions for RNP 0.3 systems.		
F	**Training** **1. LAR 91 operators or equivalent: Training method:** Training at home, LAR 142 training centres, or other training courses, course		

Annex	Title of Annex/Document	Indication of inclusion by the operator	Comments by the Inspector
	completion records. **2. LAR 121 and/or 135 operators or equivalent:** Training programmes (training curricula) for flight crews, flight dispatchers, and maintenance personnel.		
G	**Operating policies and procedures** **1. LAR 91 operators or equivalent:** Operations manual (OM) or sections to be attached to the application, corresponding to RNP 0.3 operating procedures and policies. **2. LAR 121 and/or 135 operators or equivalent:** Operations manual and checklists.		
H	**Navigation database** **Details of the navigation data validation programme.**		
I	**Withdrawal of RNP 0.3 approval** Indication of the need to follow up on navigation error reports submitted and the possibility of withdrawal of RNP 0.3 approval.		
J	**Validation flight plan:** Only if required by the CAA.		

CONTENTS OF THE APPLICATION TO BE SUBMITTED BY THE OPERATOR

____ **RNP 0.3 COMPLIANCE DOCUMENTATION OF THE AIRCRAFT/NAVIGATION SYSTEMS**

____ **OPERATING PROCEDURES AND POLICIES**

____ **SECTIONS OF THE MAINTENANCE MANUAL RELATED TO THE RNP 0.3 SYSTEM (if not previously reviewed)**

Note 1: Documents may be grouped in a single folder or may be sent as individual documents.

PART 4: CONTENTS OF THE OPERATOR APPLICATION FOR RNP 0.3 OPERATIONS

#	Contents of the RNP 0.3 application by the operator	Reference paragraphs CA 91-012	In what Annexes/Documents of the operator can the application contents be located (e.g. Annex A)	Comments and/or recommendations by the inspector	Follow-up by the inspector: Item status and date
1	**Operator request letter** Statement of intent to obtain RNP 0.3 authorization.				
2	**Description of aircraft equipment.**				
3	**Eligibility of RNP 0.3 systems.** Airworthiness documents establishing the eligibility of the RNP 0.3 navigation system, its approval status, and a list of the aircraft for which the approval is being requested.				
4	**Training programme** **1. LAR 121 or 135 operators or equivalent: Training programmes:** Operators will develop an initial and periodic training programme for flight crews, flight dispatchers, if applicable, and maintenance personnel. **2. LAR 91 operators or equivalent: Training methods:** The following methods are acceptable for these operators: Training at home, LAR 142 training centres, or other				

#	Contents of the RNP 0.3 application by the operator	Reference paragraphs CA 91-012	In what Annexes/Documents of the operator can the application contents be located (e.g. Annex A)	Comments and/or recommendations by the inspector	Follow-up by the inspector: Item status and date
	training courses.				
5	**Operating procedures** 1. **LAR 121 and/or 135 operators or equivalent:** Operations manual and checklists**.** 2. **LAR 91 operators or equivalent:** Operations manual or section of the operator application documenting RNP 0.3 policies and procedures.				
6	**Maintenance practices** • For aircraft with established maintenance practices for RNP 0.3 navigation systems, the operator will provide document references. • For newly installed RNP 0.3 systems, the operator will provide maintenance practices for their review.				
7	**Update of the minimum equipment list (MEL)** Applicable to operators conducting operations according to a MEL.				
8	**Navigation data validation programme**				

#	Contents of the RNP 0.3 application by the operator	Reference paragraphs CA 91-012	In what Annexes/Documents of the operator can the application contents be located (e.g. Annex A)	Comments and/or recommendations by the inspector	Follow-up by the inspector: Item status and date
9	**Withdrawal of RNP 0.3 approval** Indication of the need for follow-up on the navigation error reports and the possibility of withdrawal of the RNP 0.3 approval.				
10	**Validation flight plan, only if required** The validation flight plan will be presented only if required.				

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PART 5 – GUIDE TO DETERMINE THE ELIGIBILITY OF RNP 0.3 AIRCRAFT

#	Topics	Reference paragraphs CA 91-012	Location in the Annexes of the operator	Comments and/or recommendations by the inspector	Follow-up by the inspector: Item status and date
1	**Aircraft eligibility requirements for RNP 0.3 operations**				
1a	RNP 0.3 navigation specification requires GNSS as the primary navigation sensor, either as a stand-alone navigation system or as part of a multi-sensor system.				
2	**Systems** The following systems meet the accuracy, integrity and continuity requirements of AC 91-012 criteria:				
2a	Aircraft with E/TSO-C145a and the requirements of E/TSO-C115B FMS, installed for IFR use in accordance with FAA AC 20-130A				
2b	Aircraft with E/TSO-C146a equipment installed for IFR use in accordance with FAA AC 20-138 or AC 20-138A				
2c	Aircraft with RNP 0.3 capability certified or approved to equivalent standards (e.g. TSO-C193)				
3	**On-board performance monitoring and alerting requirements**				

#	Topics	Reference paragraphs CA 91-012	Location in the Annexes of the operator	Comments and/or recommendations by the inspector	Follow-up by the inspector: Item status and date
3a	For RNP 0.3 operations on-board performance monitoring and alerting is required				
3b	The aircraft navigation system, or aircraft navigation system and the pilot in combination, is required to monitor the TSE, and to provide an alert if the accuracy requirement is not met or if the probability that the lateral TSE exceeds two times the accuracy value is larger than 10^{-5}. To the extent operational procedures are used to satisfy this requirement, the crew procedure, equipment characteristics, and installation should be evaluated for their effectiveness and equivalence. Examples of information provided to the pilot for awareness of navigation system performance include “EPU”, “ACTUAL”, “ANP” and “EPE”. Examples of indications and alerts provided when the operational requirement is or can be determined as not being met include “UNABLE RNP”, “Nav Accur Downgrad”, GNSS alert limit, loss of GNSS integrity, TSE monitoring (real time monitoring of NSE and FTE combined), etc. The navigation system is not required to provide both performance and sensor-based alerts, e.g. if a TSE based alert is provided, a GNSS alert may not be necessary.				
4	**Bounding FTE for equipment not monitoring TSE performance**				

#	Topics	Reference paragraphs CA 91-012	Location in the Annexes of the operator	Comments and/or recommendations by the inspector	Follow-up by the inspector: Item status and date
4a	RNP 0.3 operations require coupled FGS to meet the allowable FTE bound unless the manufacturer demonstrates and obtains airworthiness approval for an alternate means of meeting the FTE bound. The following may be considered as one operational means to monitor the FGS FTE: 1) FTE should remain within half-scale deflection (unless there is other substantiated FTE data); 2) Pilots must manually set systems without automatic CDI scaling to not greater than 0.3 NM full-scale prior to commencing RNP 0.3 operations; and 3) Aircraft with electronic map display, or another alternate means of flight path deviation display, must select appropriate scaling for monitoring FTE.				
4b	Automatic monitoring of FTE is not required if the necessary monitoring can be achieved by the pilot using available displays without excessive workload in all phases of flight. To the extent that compliance with this specification is achieved through operational procedures to monitor FTE, an evaluation of the pilot procedures, equipment characteristics, and installation must ensure their effectiveness and equivalence, as described in the functional requirements and operating procedures.				

#	Topics	Reference paragraphs CA 91-012	Location in the Annexes of the operator	Comments and/or recommendations by the inspector	Follow-up by the inspector: Item status and date
4c	PDE is considered negligible if the quality assurance process is applied at the navigation database level (Section 12) and if operating procedures (Section 10) are applied.				
5	**Aircraft eligibility requirements for RNP 0.3 operations.**				
5a	The aircraft eligibility must be determined through demonstration of compliance against the relevant airworthiness criteria and the requirements of 8.1.				
5b	The original equipment manufacturer (OEM) or the holder of installation approval for the aircraft, e.g. STC holder, will demonstrate compliance to their CAA, and the approval can be documented in manufacturer documentation (e.g. service letters).				
5c	AFM entries are not required provided the State accepts manufacturer documentation				
5d	***Note.-*** *Requests for approval to use optional functionality (e.g. RF legs) should address the aircraft and operational requirements as described in Appendix 4.*				
6	**Functional requirements – See Appendix 1 of AC 91-012** Functional requirements must meet the criteria described in Appendix 1 of AC 91-012				

#	Topics	Reference paragraphs CA 91-012	Location in the Annexes of the operator	Comments and/or recommendations by the inspector	Follow-up by the inspector: Item status and date
7	**Navigation database** Details of the navigation data validation programme				

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PART 6 - BASIC PILOT PROCEDURES FOR RNP 0.3 OPERATIONS

Topics		Reference paragraphs CA 91-012	Location in the Annexes of the operator	Comments and/or recommendations by the CAA	Follow-up by the Inspector: Item status and date
Operating procedures					
1	**Pre-flight planning**				
	Operators and pilots intending to conduct operations on RNP 0.3 ATS routes, including SIDs and STARs, initial and intermediate approach, must file the appropriate flight plan suffixes.				
	The on-board navigation data must be current and include appropriate procedures. Navigation databases are expected to be current for the duration of the flight. If the AIRAC cycle is due to change during flight, operators and pilots should establish procedures to ensure the accuracy of the navigation data, including the suitability of navigation facilities defining the routes and procedures for flight.				
2	**RNP 0.3 availability prediction**				
	RAIM prediction is not required where the equipment uses SBAS augmentation and the planned operations are within the service volume of the SBAS system.				
	In areas and regions where SBAS is not usable or available, RAIM availability for the intended route				

Topics		Reference paragraphs CA 91-012	Location in the Annexes of the operator	Comments and/or recommendations by the CAA	Follow-up by the Inspector: Item status and date
	should be checked prior to flight				
	Operators can verify the availability of RAIM to support RNP 0.3 operations via NOTAMs (where available) or through GNSS prediction services.				
	The CAA may provide specific guidance on how to comply with RAIM prediction.				
	Operators should be familiar with the prediction information available for the intended ATS route.				
	RAIM availability prediction should take into account the latest GNSS constellation NOTAMs and avionics model (when available). The ANSP, avionics manufacturer, or the RNP system may provide this service.				
	In the event of a predicted, continuous loss of RNP 0.3 of more than 5 minutes for any part of the RNP 0.3 operation, the flight planning should be revised (e.g. delaying the departure or planning a different ATS route). If the prediction service is temporarily unavailable, ANSPs may still allow RNP 0.3 operations to be conducted.				
	RAIM availability prediction software does not guarantee the availability of GNSS. Rather, prediction tools simply assess the expected capability to meet the RNP. Because of potential unplanned failures of some GNSS elements,				

	Topics	Reference paragraphs CA 91-012	Location in the Annexes of the operator	Comments and/or recommendations by the CAA	Follow-up by the Inspector: Item status and date
	pilots/ANSPs must consider the loss of RAIM (or GNSS navigation altogether) while airborne may require reversion to an alternative means of navigation. Therefore, pilots should assess their capability to navigate in case of failure of GNSS navigation and consider the actions necessary to successfully divert to an alternate destination.				
3	**General operating procedures**				
	The pilot must comply with any instructions or procedures the manufacturer identifies necessary to comply with the performance requirements in this chapter. ***Note.-*** *Pilots are expected to adhere to all AFM/RFM limitations or operating procedures required to maintain RNP 0.3 performance for the ATS route. This shall include any speed restrictions needed to ensure maintenance of RNP 0.3 navigation accuracy.*				
	Operators and pilots should not request or file RNP 0.3 procedures unless they satisfy all the criteria in the relevant State documents. If an aircraft not meeting these criteria receives a clearance from ATC to conduct an RNP 0.3 operation, the pilot must advise ATC that he/she is unable to accept the clearance and must request alternate instructions.				
	The operator must confirm the availability of GNSS for the period of intended operations along the intended ATS route using all available information				

	Topics	Reference paragraphs CA 91-012	Location in the Annexes of the operator	Comments and/or recommendations by the CAA	Follow-up by the Inspector: Item status and date
	and the availability of NAVAID infrastructure required for any (non-RNAV) contingencies.				
	At system initialization, the pilot must confirm the navigation database is current and verify that initial position of the aircraft is entered correctly. The pilot must also verify proper entry of their desired ATS route and any ATC changes to that ATS route upon initial clearance and any subsequent change of ATS route. The pilot must ensure the waypoints sequence depicted by their navigation system matches the ATS route depicted on the appropriate chart(s) and their assigned ATS route. ***Note.-*** *The pilot may notice a slight difference between the navigation information portrayed on the chart and their primary navigation display. Differences of 3 degrees or less may result from the equipment manufacturer's application of magnetic variation and are operationally acceptable.*				
	The pilot must not attempt to fly an RNP 0.3 instrument flight procedure (IFP) unless it is retrievable by name from the on-board navigation database and conforms to the charted procedure. However, the pilot may subsequently modify a procedure by inserting or deleting specific waypoints in response to ATC clearances. The pilot may select the ATS route to be flown for the en-route section of the flight from the database or may construct the ATS route by means of selection of individual en-route waypoints from the database. The manual entry or creation of new waypoints, by manual entry of latitude and longitude or rho/theta				

	Topics	Reference paragraphs CA 91-012	Location in the Annexes of the operator	Comments and/or recommendations by the CAA	Follow-up by the Inspector: Item status and date
	values is not permitted. Additionally, pilots must not change any SID or STAR database waypoint type from a fly-by to a fly-over or vice versa.				
	The pilot should cross-check the flight plan clearance by comparing charts or other applicable resources with the navigation system textual display and the aircraft/rotorcraft map display, if applicable. If required, the pilot should also confirm exclusion of specific NAVAIDs in compliance with NOTAMs or other pilot procedures.				
	There is no pilot requirement to cross-check the navigation system's performance with conventional NAVAIDs as the absence of an integrity alert is considered sufficient to meet the integrity requirements. However, the pilot should monitor the reasonableness of the navigation solution and report any loss of RNP 0.3 capability to ATC. In addition, the pilot must continuously monitor the lateral deviation indicator (or equivalent navigation map display) during all RNP 0.3 operations.				
	The pilot is expected to maintain centre line, as depicted by on-board lateral deviation indicators, during all RNP operations unless authorized to deviate by ATC or under emergency conditions. For normal operations on straight segments or FRTs, cross-track error/deviation (the difference between the RNP system computed path and the aircraft position relative to the path) should be limited to ±½ the navigation accuracy associated				

Topics		Reference paragraphs CA 91-012	Location in the Annexes of the operator	Comments and/or recommendations by the CAA	Follow-up by the Inspector: Item status and date
	with the procedure (0.15 NM). Brief deviations from this standard (e.g. overshoots or undershoots) during track changes (fly-by and fly-over turns), up to a maximum of one times the navigation accuracy (i.e. 0.3 NM for RNP 0.3), are allowable. ***Note.-*** *Some systems do not display or compute a path during track changes (fly-by and fly-over turns). As such, the pilots of these aircraft may not be able to adhere to the lateral navigation accuracy requirement (e.g. 0.15 NM) during these turns. However, the pilot is expected to satisfy the operational requirement during intercepts following turns and on straight segments.*				
	If ATC issues a heading assignment taking the aircraft/rotorcraft off an ATS route, the pilot should not modify the flight plan in the RNAV system until receiving a new ATC clearance to rejoin the ATS route or the controller confirms a new ATS route clearance. When the aircraft is following an ATC heading assignment, the specified accuracy requirement does not apply.				
	Manually selecting aircraft bank limiting functions may reduce the aircraft's ability to maintain its desired track and is not recommended. The pilot should recognize manually selectable aircraft bank-limiting functions might reduce their ability to satisfy path requirements of the procedure, especially when executing large angle turns. This should not be construed as a requirement to deviate from flight manual procedures; rather, pilots should be encouraged to avoid the selection of such functions				

	Topics	Reference paragraphs CA 91-012	Location in the Annexes of the operator	Comments and/or recommendations by the CAA	Follow-up by the Inspector: Item status and date
	except where needed for flight safety reasons.				
4	**Aircraft/rotorcraft with RNP selection capability**				
	The pilot of an aircraft/rotorcraft with a manual RNP input selection capability should select RNP 0.3 for all RNP 0.3 ATS routes.				
5	**RNP 0.3 SID specific requirements**				
	Prior to commencing take-off, the pilot must verify the aircraft RNP system is available, operating correctly, and the correct airport/heliport and departure data are loaded and properly depicted (including the aircraft's initial position). A pilot assigned an RNP 0.3 departure procedure and subsequently issued a change to the procedure or a transition from the procedure must verify that the appropriate changes are entered and available for navigation prior to take-off. A final check of proper departure entry and correct route depiction, shortly before take-off, is recommended.				
	The GNSS signal must be available and acquired by the aircraft's GNSS avionics before the take-off.				
	Engagement of system after take-off.- When required, the pilot must be able to engage (i.e. couple) the FGS prior to reaching the first waypoint defining a procedure requiring RNP 0.3 in				

	Topics	Reference paragraphs CA 91-012	Location in the Annexes of the operator	Comments and/or recommendations by the CAA	Follow-up by the Inspector: Item status and date
	accordance with this specification.				
6	**RNP 0.3 STAR specific requirements**				
	Prior to the arrival phase, the pilot should verify loading of the correct terminal route. The active flight plan should be checked by comparing the charts (paper or electronic) with the map display (if applicable) and the MCDU. This includes confirmation of the waypoint sequence, reasonableness of track angles and distances, any altitude or speed constraints, and, where possible, identification of which waypoints are fly-by and which are fly-over or which represent the beginning or end of a radius-to-fix leg segment. An ATS route must not be used if the pilot has any reason to doubt the validity of the ATS route in the navigation database. ***Note.-*** *As a minimum, the arrival checks can be a simple inspection of a suitable map display that achieves the objectives of this paragraph.*				
	The creation of new waypoints by manual entry into the RNP 0.3 system by the pilot would not create a valid ATS route and is unacceptable at all times.				
	Where contingency procedures require reversion to a conventional IFP, the pilot must complete all necessary preparation for such reversion (e.g. manual selection of NAVAID) before commencing				

	Topics	Reference paragraphs CA 91-012	Location in the Annexes of the operator	Comments and/or recommendations by the CAA	Follow-up by the Inspector: Item status and date
	any portion of the IFP.				
	Procedure modifications in the terminal area may take the form of ATC-assigned radar headings or “direct to” clearances, and the pilot must be capable of reacting in a timely fashion. This may include a requirement for the pilot to insert tactical waypoints loaded from the on-board navigation database. The pilot must not make manual entries or modify and create temporary waypoints or fixes that are not provided in the on-board navigation database.				
	The pilot must verify their aircraft navigation system is operating correctly, and the correct arrival procedure (including any applicable transition) is entered and properly depicted. Although a particular method is not mandated, the pilot must adhere to any published altitude and speed constraints associated with an RNP 0.3 operation.				
7	**Contingency procedures**				
	The pilot must notify ATC of any loss of the RNP 0.3 capability (integrity alerts or loss of navigation) together with the proposed course of action. If unable to comply with the requirements of an RNP 0.3 ATS route for any reason, the pilot must advise ATC as soon as possible. The loss of RNP 0.3 capability includes any failure or event causing the aircraft to no longer satisfy the RNP 0.3				

Topics		Reference paragraphs CA 91-012	Location in the Annexes of the operator	Comments and/or recommendations by the CAA	Follow-up by the Inspector: Item status and date
	requirements of the desired ATS route.				
	In the event of communications failure, the pilot should continue with the published lost communications procedure.				

SRVSOP contacts:

Marcelo Ureña Logroño: Regional Officer, Flight Safety, ICAO SAM Office e-mail: murena@icao.int

Job aid: RNP 0.3
Version: 1
Date: 25/03/2014

Agenda Item 4: Assessment of operational requirements in order to determine the implementation of communications, navigation, and surveillance (CNS) capabilities improvement for en-route and terminal area operations

4.1 Under this Agenda Item, the following papers were analysed upon:

a) WP/08 – Brazil and Peru AMHS interconnection, presented by Brazil;
b) WP/10 - Follow-up to the implementation of activities under Project D1, SAM ATN architecture, presented by the Secretariat;
c) WP/11 - Follow-up to the implementation of the web-based RAIM availability prediction service, presented by the Secretariat; and
d) WP/13 - Follow-up to the activities of Project D2 - Ground-ground and air-ground applications in the SAM Region, presented by the Project D2 Coordinator.

4.2 The afore mentioned working papers dealt with the following topics:

a) Activities carried out by the Project D1 - ATN Architecture in the SAM Region;
b) Activities conducted by the Project D2 - ATN Ground-ground and Air-ground Applications in the SAM Region;
c) RAIM prediction service; and
d) Action plan for CNS improvements.

Activities carried out by the Project D1 - ATN Architecture in the SAM Region

Progress made in REDDIG II implementation

4.3 The Meeting recalled that:

a) Phase 2 included REDDIG II installation and had started in November 2013. To date, all REDDIG member States had deposited their corresponding contibutions;

b) With regard to the effective implementation of the new infrastructure, it was important to highlight that the role of the focal points nominated by States will be fundamental for the success of all actions. Their main functions will be to participate in the installation of the corresponding REDDIG II nodes, the provisional and final node acceptances, the obtaining of the frequency licenses, and the equipment customs clearances; and

c) All information related with project RLA/03/901 - *System for the Management of the REDDIG and the Administration of the Satellite Segment* is available at the website: http://www1.lima.icao.int/reddig/

4.4 The Meeting took note that, as preparatory activities for the effective implementation of REDDIG II:

a) A technical-operational meeting had been held in Lima, Peru, from 26 to 28 March 2014 (for the REDDIG focal points), to coordinate the REDDIG II nodes implementation activities;

b) On 21 April 2014, the Factory Training (FT) course started, which will end on next 9 May, while on 12 May, the Factory Acceptance Test (FAT) course will start and end on 16 May, and

c) The dispatch of the material to the various States will begin next June, while in August, four theoretical-practical courses will be carried out in Rio de Janeiro, Brazil.

4.5 Once these stages are completed, all nodes will be simultaneously installed in September 2014. Thereafter, the provisional on-site acceptance tests (PSAT) will start, foreseeing a general start-up in November 2014, and the final acceptance, in December. **Appendix A** to this Agenda Item presents the REDDIG II chronogramme of activities.

4.6 The Meeting took note that, with REDDIG II implementation, the Region will count with a network able to support current services as well as the new ones foreseen in the *Air Navigation System Performance-Based Air Navigation System Implementation Plan for the SAM Region* (PBIP). The new services will be part of the requirements of the corresponding modules of the Aviation System Block Upgrades (ASBU) methodology, Blocks 0 and 1, mainly concerning global data and systems interoperability through information management across the system, with global interoperability (Performance improvement area (PIA) 2 – *Global interoperability of data and systems through information management across the system).*

Situation of Project D1

4.7 The Meeting considered that the only pending activity was the follow-up to REDDIG II implementation.

Activities conducted by the Project D2 - ATN Ground-ground and Air-ground Applications in the SAM Region

Follow-up to AMHS operational interconnection

4.8 The Meeting took note of the progress made to date in the various interconnections:

a) *Brazil – Argentina* (both from the same provider): The progress made to date was recognized upon by the Meeting, as the first phases were satisfactorily completed, hoping that the operation will be ready by August 2014;

b) *Paraguay - Brazil* (same provider): Necessary coordinations were carried out in order that the first trials between both States start during the week of 28 April 2014.

c) *Brazil – Peru* (different providers): the problems why the effective interconnection had not been achieved were largely and thoroughly discussed, arriving to the following conclusions:
   - There has been a credential access problem in the Brazil-Peru direction (stage/level application), while in the Peru-Brazil direction, there are connection problems at the COTP layer. In both cases, the exact origins of the inconveniences have not been found (see **Appendix B** to this Agenda Item).

- During the week starting on 28 April, the trials will begin again in Lima, with the ground assistance of the providers, Comsoft and Atech. Brazil offered that, in the event necessary and on the basis of the results of this new setting, Atech staff could be available in Lima in June (when Comsoft staff will also be available), with the aim of carrying out, together with Comsoft staff, identical tests but with a local connection, in order to dismiss certain causes thought to be the problem.
- It is evident that the solution to this connection in particular, will solve a great number of other connection problems, therefore its vital importance.

d) *Uruguay – Argentina* (different providers): first trials were conducted during April, and will continue during May, with the assistance of both providers; and

e) *Brazil – Spain* (different providers): the trials interrupted due to inconveniences in the CAFTSAT network recommenced this week, with the successful exchange of messages. Therefore, conditions would be appropriate in order that real traffic is exchanged between both Regions as of the end of the last quarter of 2014.

4.9 Finally, note was taken of the rest of the AMHS interconnections, foreseen and indicated in **Appendix C**, which have been previously and largely coordinated, and totally aligned with the Declaration of Bogota.

4.10 In this regard, note was taken of the request from the delegate of Chile during the initial plenary meeting, in order that TBD (to be determined) be inserted in the various tables where said State is mentioned. In this sense, the Meeting recalled the importance that States keep their implementation commitments for the 2014-2016 period. With regard to the Chile-Peru MoU drafted in 2011, Chile updated and sent it to Peru, who also examined and signed it. The document was delivered to the Secretariat for its remittance to the aeronautical administration of Chile, at the end of April 2014.

International AIDC operational connection in the SAM Region

4.11 With regard to this activity, the Meeting was informed that:

a) An AIDC course for ATS controllers had been carried out in Montevideo, Uruguay, from 9 to 13 December 2013, with the support of Uruguay, Argentina and project RLA/06/901;

b) In addition, the Seminar/Workshop on Technical and Operational Aspects for the Implementation of Automation in the SAM Region was held in Sao José dos Campos, Brazil, from 24 to 28 February 2014;

c) Trials carried out:
- Successfully between Asunción and Ezeiza. In this respect, Argentina and Paraguay have started with the necessary arrangements for AIDC operation, scheduled for December 2014.
- Partially successful (correct in one direction, but not in the other) between Ecuador-Peru (started in March 2014) and Chile-Argentina (started in April 2014). In both cases, tests will continue until solving the inconveniences to enable the start-up.

- The results of the trials scheduled between Curitiba–Asunción and Colombia–Panamá are being awaited for, while more tests between Peru–Colombia and Ecuador–Colombia were requested. In this respect, the Secretariat will schedule web teleconferences to follow-up in the completion of the pending trials, and continue until their operation.

4.12 The Meeting considered upon the need that the States of the Region that had committed in implementing AIDC interconnection (Declaration of Bogota), comply with the drafting of the respective Memorandum of Understanding (MoU) and use the model established to this end.

Implementation of a tool for RAIM availalbility prediction in the SAM Region

4.13 The Meeting recognized that:

a) RLA/06/901 Project Document (Version J) had been amended to include the RAIM availability prediction service, and circulated to RLA/06/901 member States on 27 September 2013 for their signature and delivery to the ICAO SAM Regional Office before 16 October 2013;
b) The public tender process for the implementation of the RAIM prediction service was initiated by the ICAO Technical Cooperation Bureau (TCB) on 23 August 2013;
c) The bids were assessed by the ICAO TCB in Montreal, on 1-3 October 2013, with the participation of the CNS Officer of the SAM Regional Office, representatives of Brazil and TCB officers;
d) Bids were assessed based on a pre-established evaluation criterion known to the companies participating in the process. Three companies submitted a bid, but only two were assessed, since the other was discarded by the TCB on grounds of not complying with tender regulations;
e) Based on the technical and commercial evaluation, one company was proposed to be designated as the awardee. SAM/IG/12 meeting analysed the evaluation and endorsed the results for the implementation of a web based RAIM availability prediction service;
f) To date, the ICAO TCB has sent Contract 22501411 to the awardee, for its signature (see **Appendix D** to this Agenda Item); and
g) It is necessary that the States that have not yet adhered to the service (Guyana, French Guiana (France) and Suriname), be urged to do so.

4.14 The implementation of the RAIM availability prediction service will initially require coordination among the States of the Region, the Secretariat and the provider of this service, for the definition of the website, the mode of access through the assignment of a password, as well as verification regarding the veracity of the information. This activity will be carried out on a continuous manner through web teleconferences. The teleconferences will start once ICAO signs the contract with DWI, provider of the RAIM prediction service.

4.15 In addition, once the service is available and operational, States should make use of it, urging its efficient use to all interested parties.

4.16 The Meeting deemed convenient that the SAM advisory circulars on PBN procedures be amended, in order that that the existence of the RAIM availability prediction service is mentioned therein. In this respect, the Meeting formulated the following conclusion:

Conclusion SAM/IG/13-7 Implementation of the RAIM availability prediction service in the SAM Region

That, with the aim of achieving a successful implementation of the RAIM availability prediction service and its effective use by States:

a) SAM States, the Secretariat and the RAIM service provider carry out necessary coordinations through web teleconferences to define, among other aspects, the website format, the mode of access to the service with the assignment of a password, as well as verification of the veracity of the information;
b) The Secretariat make the amendments required to the SAM advisory circular son PBN procedures to mention the existence of the RAIM availability prediction service;
c) States of the Region that have not adhered to the prediction service inform of their intent to join same; and
d) RLA/06/901 member States, once the service is operational, make us of it and motivate its use by all interested parties.

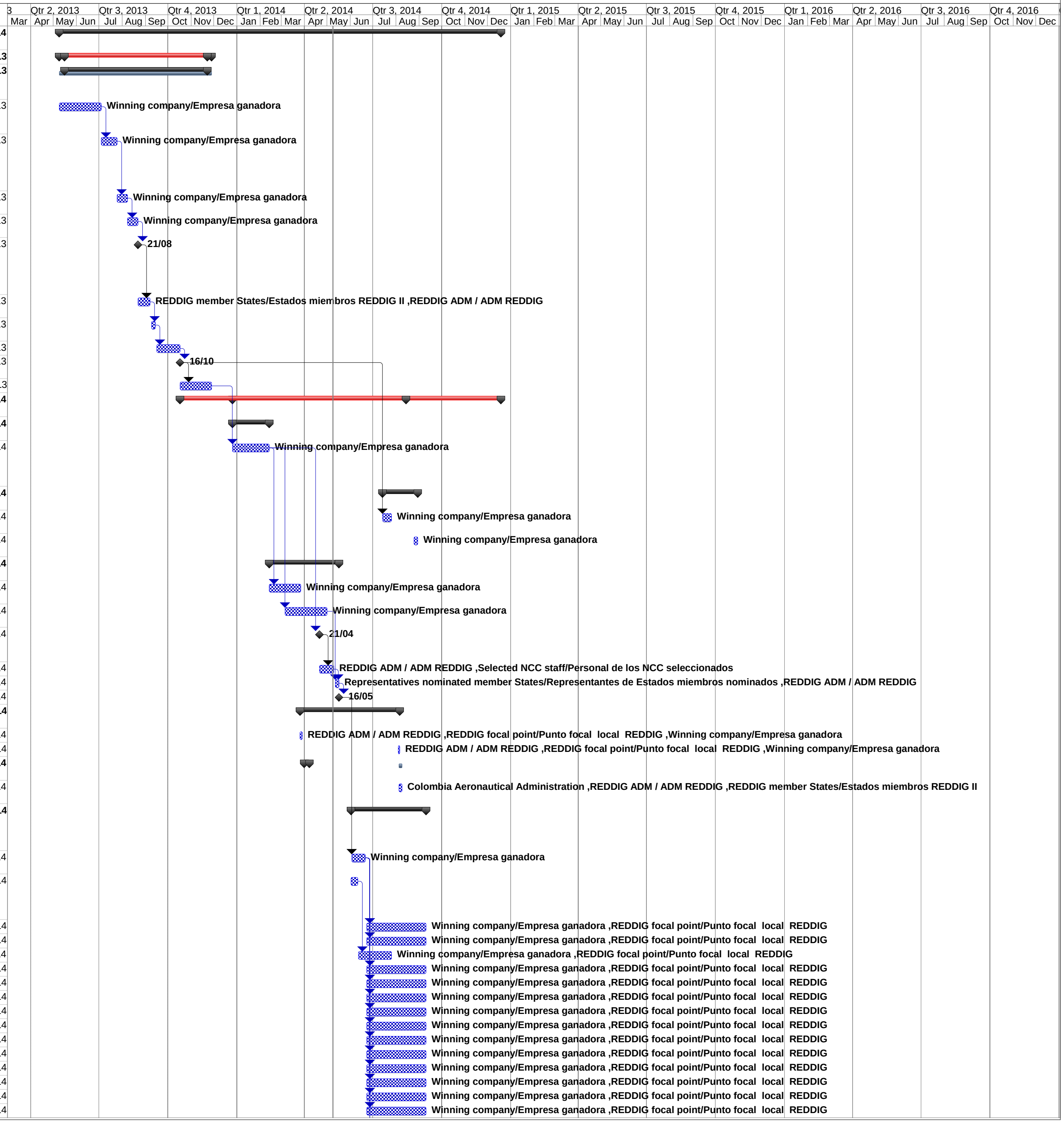
Action plans for CNS improvements

4.17 With regard to the Guideline for the Improvement of Communications, Navigation and Surveillance Systems for Satisfying Operational Requirement in the Short- and Medium-Term for En-Route and Terminal Area Operations", the Meeting recalled the need to keep duly updated the national action plans presented by States and uploaded in the ICAO SAM Regional Office website, in particular, the national IP networks.

4.18 In this respect and considering that this data base has converted itself into a basic planning tool, States are urged to update them before SAM/IG/14 meeting.

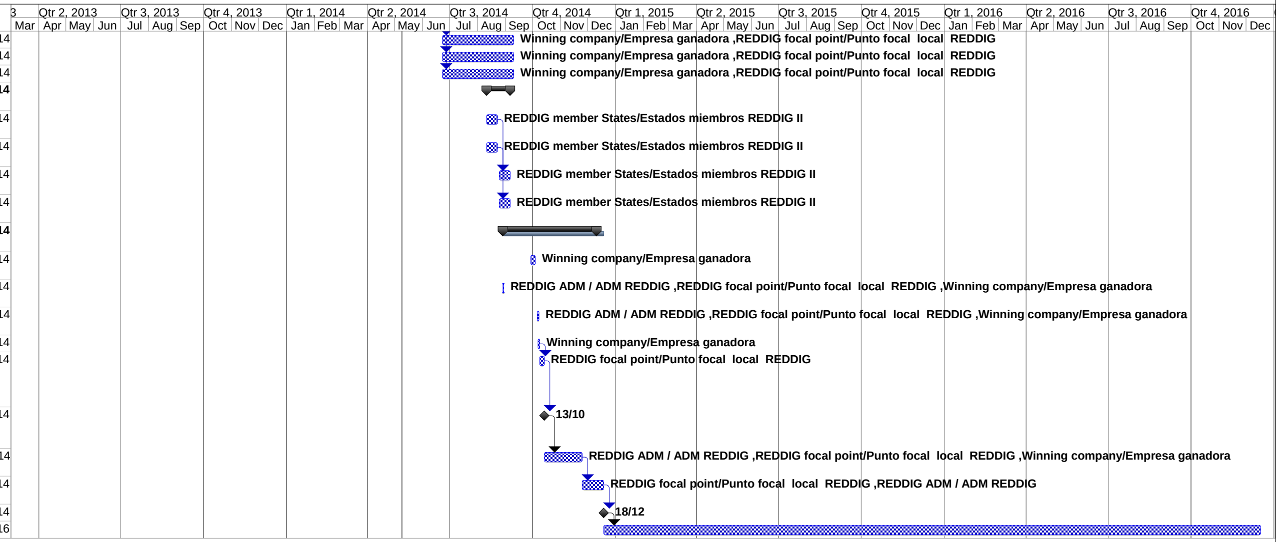
APPENDIX A / APENDICE A
TENTATIVE TIME SCHEDULE / PHASES / PROGRAMA TENTATIVO - FASES

ID	Nom de la tâche	Duration	Start	Finish
1	**Tentative REDDIG II implementation work programme / Programa tentativo de trabajo implantacion REDDIG II**	**421 days**	**Thu 09/05/13**	**Thu 18/12/14**
2	**Phase 1 - Project / Fase 1 - Proyecto**	**136.57 days**	**Thu 16/05/13**	**Fri 22/11/13**
3	**Documentation drafting and approval process / Proceso de elaboración y aprobación documentación**	**136.57 days**	**Thu 16/05/13**	**Fri 22/11/13**
4	REDDIG II preliminary design installation / Preparación diseño preliminar instalación REDDIG II (SDD)	40 days	Thu 09/05/13	Wed 03/07/13
5	Preparation of installation and training procedures documentation and NMS documentaion preparation / Preparacion documentos de procedimiento de instalacion y capacitacion y ptrparacion documentacion del sistema NMS	15 days	Thu 04/07/13	Wed 24/07/13
6	FAT protocol preparation / Preparacion protocolo FAT	10 days	Thu 25/07/13	Wed 07/08/13
7	SAT protocol preparation / Preparacion protocolo SAT	10 days	Thu 08/08/13	Wed 21/08/13
8	Documentation submittance (SDD, FAT/SAT protocol, on-site installation procedure, training manuals) to ICAO / Envio documentación (SDD, protocolo FAT/SAT, procedimiento instalacion sitio, manuales de capacitación) a OACI	0 days	Wed 21/08/13	Wed 21/08/13
9	Documentation review / Revision de la documentacion	12 days	Thu 22/08/13	Fri 06/09/13
10	Technical-operational meeting / Reunión tecnico-operacional	5 days	Mon 09/09/13	Fri 13/09/13
11	Final design/Diseño finalizado	23 days	Mon 16/09/13	Wed 16/10/13
12	Documentation reviewed and approved / Documentos revisados y aprobados	0 days	Wed 16/10/13	Wed 16/10/13
13	Schedule DRM /Cronograma DRM	30 days	Thu 17/10/13	Wed 27/11/13
14	**Phase 2 - REDDIG II implementation / Fase 2 - Implantación de la REDDIG II**	**215.29 days**	**Thu 17/10/13**	**Thu 14/08/14**
15	**Purchasing and integration of VSAT equipment / Adquisición e itnegración equipos VSAT**	**35 days**	**Thu 26/12/13**	**Wed 12/02/14**
16	Purchasing of equipment and remittance to company HQ for integration / Adquisición de equipos y envío a la sede de la empresa ganadora para su integración	7 wks	Thu 26/12/13	Wed 12/02/14
17	**Preparation of ground backbone network / Preparación red medular terrestre**	**35 days**	**Mon 14/07/14**	**Fri 29/08/14**
18	Hiring of service for all nodes / Contratación de servicio para todos los nodos	2 wks	Mon 14/07/14	Fri 25/07/14
19	Comisionamiento red terrestre/Ground back bone commisioning	1 wk	Mon 25/08/14	Fri 29/08/14
20	**Integration at factory, training and FAT / Integracion en fábrica, entrenamiento y FAT**	**67 days**	**Thu 13/02/14**	**Fri 16/05/14**
21	Equipment assembling at factory / Ensamblar equipos en fábrica	6 wks	Thu 13/02/14	Wed 26/03/14
22	Network configuration and pre-test / Configuracion y pre-test de la red	8 wks	Thu 06/03/14	Wed 30/04/14
23	Documentation submittance for on-factory-training / Envío documentación para entrenamiento en fábrica	0 wks	Mon 21/04/14	Mon 21/04/14
24	On-factory-training / Entrenamiento en fábrica	3 wks	Mon 21/04/14	Fri 09/05/14
25	FAT	5 days	Mon 12/05/14	Fri 16/05/14
26	FAT signature / Firma FAT	0 days	Fri 16/05/14	Fri 16/05/14
27	**REDDIG II Technical Operational Meeting/Reunión Técnica Operacional REDDIG II**	**95 days?**	**Wed 26/03/14**	**Tue 05/08/14**
28	RTO Meeting/Reunión RTO	3 days	Wed 26/03/14	Fri 28/03/14
29	RTO Meeting/Reunión RTO	2 days?	Mon 04/08/14	Tue 05/08/14
30	**Preparatory REDDIG II Course/ Curso preparatorio REDDIG II**	**5 days**	**Mon 31/03/14**	**Mon 07/04/14**
31	REDDIG II preliminary course in Bogotá/ Curso preparatorio preliminar de la REDDIG II en Colombia	4 days	Tue 05/08/14	Fri 08/08/14
32	**Remittance of equipment to sites (customs clearance 1 month approx) / Envío de los equipos a los sitios (liberación equipos aduana 1 mes tiempo estimado)**	**72 days?**	**Mon 02/06/14**	**Tue 09/09/14**
33	Preparation of equipment remittance / Preparación para envio de equipos	2.8 wks	Tue 03/06/14	Fri 20/06/14
34	Preparación para el envio equipos REDDIG II a Rio para entrenamiento/Preparation for the remittance of REDDIG II equipment in Rio for training	7 days?	Mon 02/06/14	Tue 10/06/14
35	Ezeiza	11.4 wks	Mon 23/06/14	Tue 09/09/14
36	La Paz	11.4 wks	Mon 23/06/14	Tue 09/09/14
37	Rio de Janeiro	6.4 wks	Thu 12/06/14	Fri 25/07/14
38	Santiago	11.4 wks	Mon 23/06/14	Tue 09/09/14
39	Bogota	11.4 wks	Mon 23/06/14	Tue 09/09/14
40	Guayaquil	11.4 wks	Mon 23/06/14	Tue 09/09/14
41	Georgetown	11.4 wks	Mon 23/06/14	Tue 09/09/14
42	Cayenne	11.4 wks	Mon 23/06/14	Tue 09/09/14
43	Asuncion	11.4 wks	Mon 23/06/14	Tue 09/09/14
44	Lima	11.4 wks	Mon 23/06/14	Tue 09/09/14
45	Paramaribo	11.4 wks	Mon 23/06/14	Tue 09/09/14
46	Piarco	11.4 wks	Mon 23/06/14	Tue 09/09/14
47	Montevideo	11.4 wks	Mon 23/06/14	Tue 09/09/14
48	Maiquetia	11.4 wks	Mon 23/06/14	Tue 09/09/14



APPENDIX A / APENDICE A
TENTATIVE TIME SCHEDULE / PHASES / PROGRAMA TENTATIVO - FASES

ID	Nom de la tâche	Duration	Start	Finish
49	Manaus	11.4 wks	Mon 23/06/14	Tue 09/09/14
50	Recife	11.4 wks	Mon 23/06/14	Tue 09/09/14
51	Curitiba	11.4 wks	Mon 23/06/14	Tue 09/09/14
52	**Theoretical-practical course in Rio de Janeiro / Curso teórico-práctico en Río de Janeiro**	**20 days**	**Mon 11/08/14**	**Fri 05/09/14**
53	Session 1 (10 Spanish-speaking) / Sesión 1 (10 personas en español)	2 wks	Mon 11/08/14	Fri 22/08/14
54	Session 2 (10 Spanish-speaking) / Sesión 2 (10 persons en español)	2 wks	Mon 11/08/14	Fri 22/08/14
55	Session 3 (8 Spanish-speaking) / Sesión 3 (8 personas en español)	2 wks	Mon 25/08/14	Fri 05/09/14
56	Session 4 (8 English-speaking) / Sesión 4 (8 personas en inglés)	2 wks	Mon 25/08/14	Fri 05/09/14
57	**On-site installation activities / Actividades de instalación en el sitio**	**74 days**	**Fri 29/08/14**	**Wed 10/12/14**
58	Simultaneous on-site installation / Instalación todos los sitios en forma simultánea	1 wk	Mon 29/09/14	Fri 03/10/14
59	Verificación red terrestre /Ground backbone consideration	1 day	Fri 29/08/14	Fri 29/08/14
60	Verificación servicio satelite /Satellite service verification	2 days	Mon 06/10/14	Tue 07/10/14
61	Switching REDDIG I to REDDIG II	2 days?	Tue 07/10/14	Wed 08/10/14
62	PSAT / NAT (provisional and network acceptance test) Validation States members (Focal point) / (Prueba de aceptacion provisional y de red) Validacion Estados miembros (Puntos focales)	3 days	Thu 09/10/14	Mon 13/10/14
63	PSAT / SAT Signature(State member through REDDIG focal point) / Firma (Estados miembros a traves de los puntos focales)	0 days	Mon 13/10/14	Mon 13/10/14
64	Operational Readness Demonstration (ORD) / Demostracion de operacion efectiva	30 days?	Tue 14/10/14	Mon 24/11/14
65	FNAT (Final acceptance test) / (Prueba de aceptacion final)	3.6 wks	Tue 25/11/14	Thu 18/12/14
66	FSAT signature / Firma FSAT	0 days	Thu 18/12/14	Thu 18/12/14
67	Two (2) years' guarantee / Dos (2) años de garantía	104.2 wks	Fri 19/12/14	Fri 16/12/16



APPENDIX B / APÉNDICE B

INTERCONNECTION TRIALS – BRASILIA AND LIMA MTAs

PRUEBAS DE INTERCONEXIÓN - MTA BRASILIA Y MTA LIMA

a. **Brasilia MTA Data / Datos MTA Brasilia**:

a) Name/Nombre: MTA-SBBR-3

b) Address/Dirección IP: 172.16.1.183

b. **Lima MTA Data / Datos MTA Lima**:

c) Name/Nombre: MTA-SPIM-1

d) Address/Dirección IP: 172.16.1.183

1. <u>Brasilia → Lima Connection / Conexión Brasilia → Lima</u>

Print screen of the “wireshark” tool for the connection from Brasilia /

Captura de las pantallas de la herramienta “Wireshark” para la conexión a partir de Brasilia

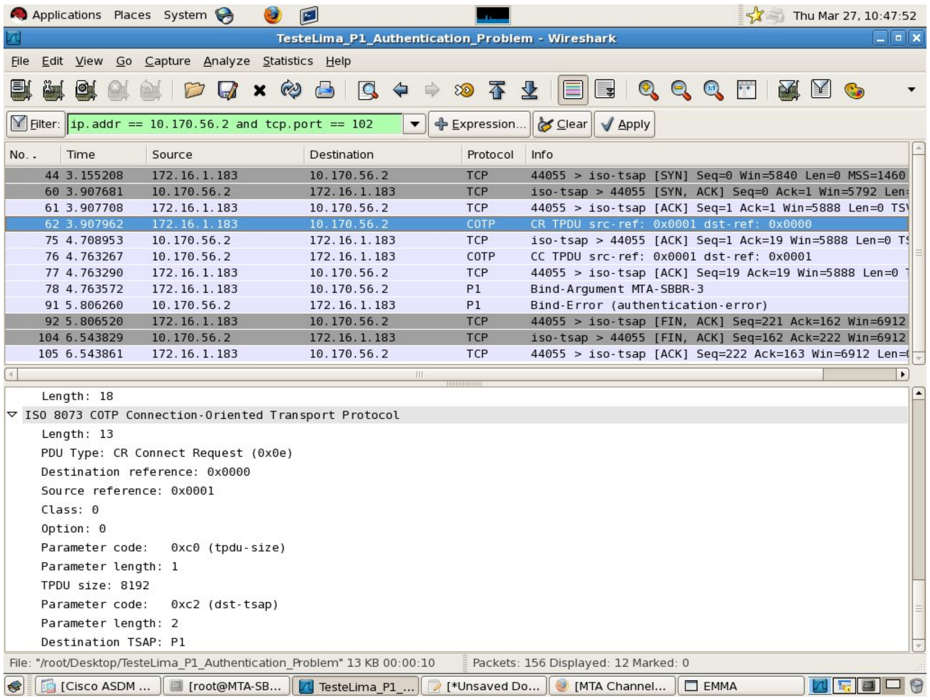


Fig. 1 – Protocol / Protocolo COTP – Connection Request (CR) MTA-Brasilia

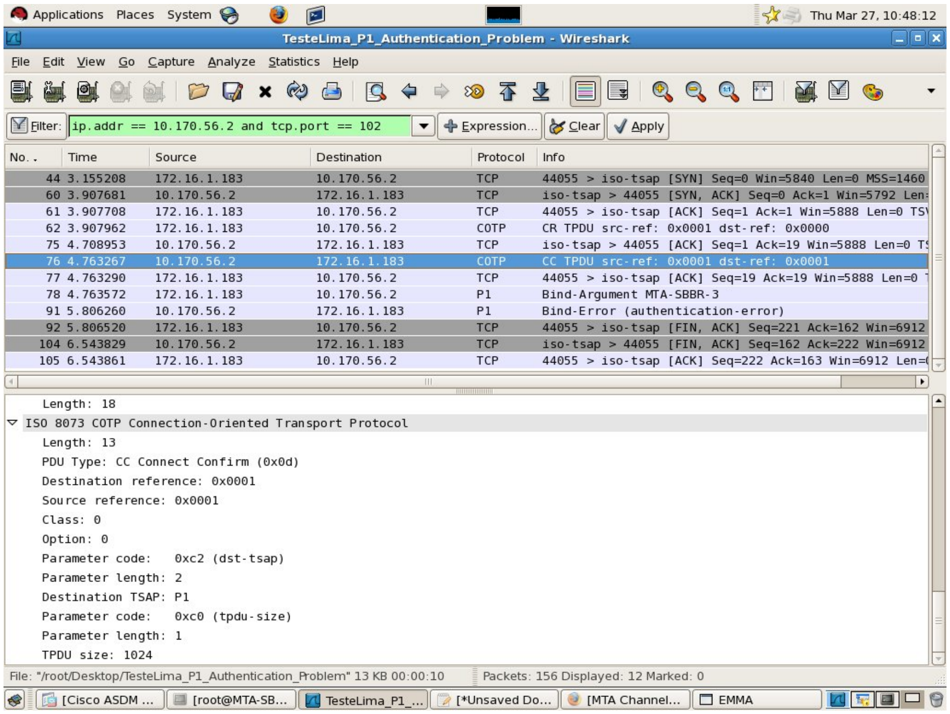


Fig. 2 – Protocol / Protocolo COTP – Connection Confirm (CC) MTA-Lima

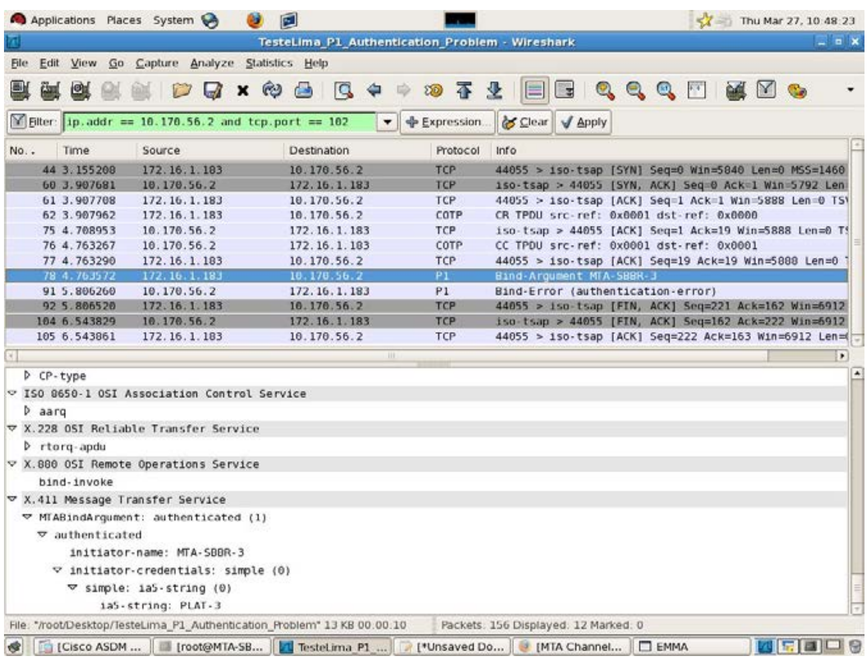


Fig. 3 – Protocol P1 – remittance of credentials by MTA Brasilia /
Protocolo P1 – envío de las credenciales por MTA-Brasilia

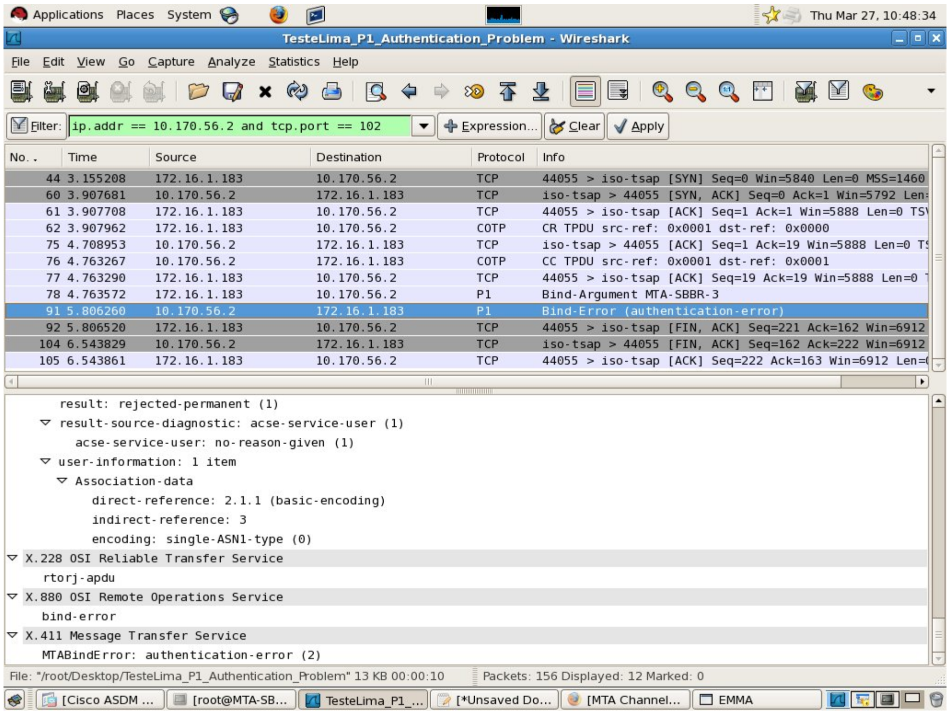


Fig. 4 – Protocol P1 – Rejection of credentials by MTA Lima/
Protocolo P1 – rechazo de las credenciales por el MTA-Lima

"Log" del MTA- Brasilia (MTA-EVENT):

```
3/27 14:24:59 x400p1 29408 (pp ) P1InitConnFail chan:x400p1 theirmtaname:MTA-SPIM-1 theirpa:"\"P1\"/Internet=10.170.56.2+102" ourmtaname:MTA-SBBR-3 rtse_type:normal appcon:3 recov:false dialogmode:mono auth_req:18 our_auth_req:10 bindtype:simple fail_reason:"E-MTA_X400-Authentication Credentials rejected" failreason:""
 3/27 14:40:05 x400p1 29678 (pp ) P1InitConnFail chan:x400p1 theirmtaname:MTA-SPIM-1 theirpa:"\"P1\"/Internet=10.170.56.2+102" ourmtaname:MTA-SBBR-3 rtse_type:normal appcon:3 recov:false dialogmode:mono auth_req:18 our_auth_req:10 bindtype:simple fail_reason:"E-MTA_X400-Authentication Credentials rejected" failreason:""
 3/27 14:40:05 x400p1 29680 (pp ) P1InitConnFail chan:x400p1 theirmtaname:MTA-SPIM-1 theirpa:"\"P1\"/Internet=10.170.56.2+102" ourmtaname:MTA-SBBR-3 rtse_type:normal appcon:3 recov:false dialogmode:mono auth_req:18 our_auth_req:10 bindtype:simple fail_reason:"E-MTA_X400-Authentication Credentials rejected" failreason:""
 3/27 14:55:08 x400p1 29935 (pp ) P1InitConnFail chan:x400p1 theirmtaname:MTA-SPIM-1 theirpa:"\"P1\"/Internet=10.170.56.2+102" ourmtaname:MTA-SBBR-3 rtse_type:normal appcon:3 recov:false dialogmode:mono auth_req:18 our_auth_req:10 bindtype:simple fail_reason:"E-MTA_X400-Authentication Credentials rejected" failreason:""
 3/27 14:55:08 x400p1 29937 (pp ) P1InitConnFail chan:x400p1 theirmtaname:MTA-SPIM-1 theirpa:"\"P1\"/Internet=10.170.56.2+102" ourmtaname:MTA-SBBR-3 rtse_type:normal appcon:3 recov:false dialogmode:mono auth_req:18 our_auth_req:10 bindtype:simple fail_reason:"E-MTA_X400-Authentication Credentials rejected" failreason:""
```

2. Lima → Brasilia Connection / Conexión Lima → Brasilia

Print screen of the “wireshark” tool for the connection from Lima /

Captura de las pantallas de la herramienta “Wireshark” para la conexión a partir de Lima.

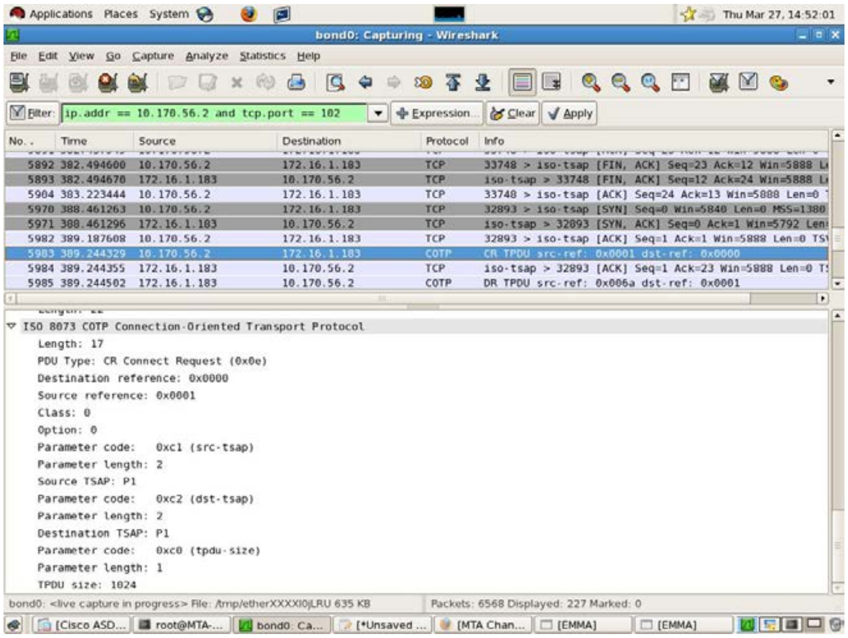


Fig. 4 – Protocol / Protocolo COTP - Connection Request (CR) MTA Lima

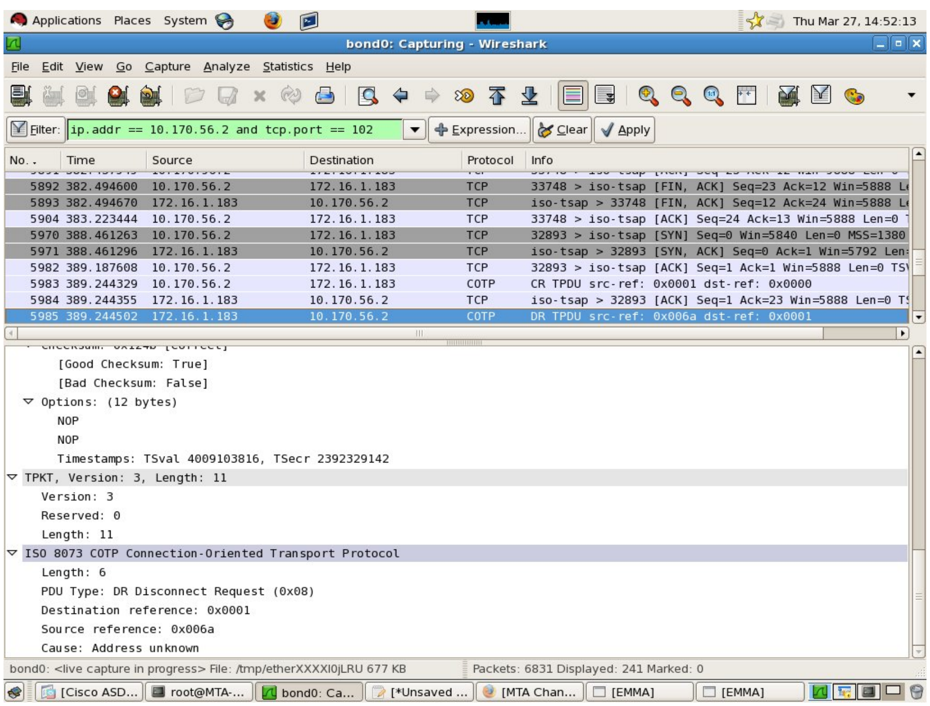


Fig. 5 – Protocol / Protocolo COTP – Disconnect Request (DR) MTA Brasilia

APPENDIX C / APENDICE C

AMHS INTERCONNECTION REQUIREMENTS AND DATES OF IMPLEMENTATION
REQUERIMIENTOS DE INTERCONEXIÓN AMHS Y FECHAS DE IMPLEMENTACION

STATE ESTADO	AMHS INTERCONNECTION REQUIREMENT/ REQUERIMIENTO DE INTERCONEXION AMHS	DATE OF IMPLEMENTATION/ FECHA IMPLEMENTACION	REMARKS/ OBSERVACIONES
Argentina	Bolivia	Mar 2016	
	Brasil	Dic 2013	
	Chile	Dic 2014	
	Paraguay	Mar 2012	Implemented/Implantado
	Perú	Jul 2014	
	Uruguay	Dic 2015	
Bolivia	Argentina	Mar 2016	
	Brasil	Abr 2016	
	Perú	May 2016	
Brazil/Brasil	Argentina	Dic 2013	
	Bolivia	Abr 2016	
	Colombia	Dic 2014	
	Guyana	Mar 2015	
	French Guiana/ Guyana Francesa	TBD	AMHS implementation pending/ Falta Implantación AMHS
	Paraguay	Jul 2014	
	Perú	Jul 2014	
	Surinam	Mar 2016	
	Uruguay	Dic 2015	
	Venezuela	Dic 2014	
Chile	Argentina	~~Dic 2014~~ TBD	Informed by Chile delegate during SAM/IG/13 / Informado por delegado de Chile durante SAM/IG/13
	Perú	~~Dic 2014~~ TBD	Informed by Chile delegate during SAM/IG/13 / Informado por delegado de Chile durante SAM/IG/13
Colombia	Brasil	Dic 2014	
	Ecuador	Dic 2014	
	Panamá	Dic 2014	
	Perú	Sep 2010	Implemented/Implantado
	Venezuela	Mar 2015	

STATE ESTADO	AMHS INTERCONNECTION REQUIREMENT/ REQUERIMIENTO DE INTERCONEXION AMHS	DATE OF IMPLEMENTATION/ FECHA IMPLEMENTACION	REMARKS/ OBSERVACIONES
Ecuador	Colombia	Dic 2014	
	Perú	Julio 2012	Implemented/Implantado
	Venezuela	May 2015	
French Guiana (France)/ Guyana Francesa (Francia)	Brasil	TBD	AMHS implementation pending/ Falta Implantación AMHS
	Venezuela	TBD	AMHS implementation pending/ Falta Implantación AMHS
Guyana	Brasil	Mar 2015	
	Surinam	Jun 2011	Implemented/Implantado
	Venezuela	Dic 2014	
Panamá	Colombia	Dic 2014	
Paraguay	Argentina	Mar 2012	Implemented/Implantado
	Brasil	Jul 2014	
Perú	Argentina	Jul 2014	
	Bolivia	May 2016	
	Brasil	Jul 2014	
	Chile	Dic 2014	
	Colombia	Sep 2010	Implemented/Implantado
	Ecuador	Jul 2012	Implemented/Implantado
	Venezuela	Dic 2014	
Suriname	Brasil	Mar 2016	
	Guyana	Jun 2011	Implemented/Implantado
	Venezuela	Mar 2016	
Uruguay	Argentina	Dic 2015	
	Brasil	Dic 2015	
Venezuela	Brasil	Dic 2014	
	Colombia	Mar 2015	
	Ecuador	May 2015	
	Guyana	Dic 2014	
	French Guiana Guyana Francesa	TBD	AMHS implementation pending/ Falta Implantación AMHS
	Perú	Dic 2014	
	Surinam	Mar 2016	

APPENDIX C / APENDICE C

AMHS INTERCONNECTION REQUIREMENTS AND DATES OF IMPLEMENTATION
REQUERIMIENTOS DE INTERCONEXIÓN AMHS Y FECHAS DE IMPLEMENTACION

STATE ESTADO	AMHS INTERCONNECTION REQUIREMENT/ REQUERIMIENTO DE INTERCONEXION AMHS	DATE OF IMPLEMENTATION/ FECHA IMPLEMENTACION	REMARKS/ OBSERVACIONES
Argentina	Bolivia	Mar 2016	
	Brasil	Dic 2013	
	Chile	Dic 2014	
	Paraguay	Mar 2012	Implemented/Implantado
	Perú	Jul 2014	
	Uruguay	Dic 2015	
Bolivia	Argentina	Mar 2016	
	Brasil	Abr 2016	
	Perú	May 2016	
Brazil/Brasil	Argentina	Dic 2013	
	Bolivia	Abr 2016	
	Colombia	Dic 2014	
	Guyana	Mar 2015	
	French Guiana/ Guyana Francesa	TBD	AMHS implementation pending/ Falta Implantación AMHS
	Paraguay	Jul 2014	
	Perú	Jul 2014	
	Surinam	Mar 2016	
	Uruguay	Dic 2015	
	Venezuela	Dic 2014	
Chile	Argentina	~~Dic 2014~~ TBD	Informed by Chile delegate during SAM/IG/13 / Informado por delegado de Chile durante SAM/IG/13
	Perú	~~Dic 2014~~ TBD	Informed by Chile delegate during SAM/IG/13 / Informado por delegado de Chile durante SAM/IG/13
Colombia	Brasil	Dic 2014	
	Ecuador	Dic 2014	
	Panamá	Dic 2014	
	Perú	Sep 2010	Implemented/Implantado
	Venezuela	Mar 2015	

STATE ESTADO	AMHS INTERCONNECTION REQUIREMENT/ REQUERIMIENTO DE INTERCONEXION AMHS	DATE OF IMPLEMENTATION/ FECHA IMPLEMENTACION	REMARKS/ OBSERVACIONES
Ecuador	Colombia	Dic 2014	
	Perú	Julio 2012	Implemented/Implantado
	Venezuela	May 2015	
French Guiana (France)/ Guyana Francesa (Francia)	Brasil	TBD	AMHS implementation pending/ Falta Implantación AMHS
	Venezuela	TBD	AMHS implementation pending/ Falta Implantación AMHS
Guyana	Brasil	Mar 2015	
	Surinam	Jun 2011	Implemented/Implantado
	Venezuela	Dic 2014	
Panamá	Colombia	Dic 2014	
Paraguay	Argentina	Mar 2012	Implemented/Implantado
	Brasil	Jul 2014	
Perú	Argentina	Jul 2014	
	Bolivia	May 2016	
	Brasil	Jul 2014	
	Chile	Dic 2014	
	Colombia	Sep 2010	Implemented/Implantado
	Ecuador	Jul 2012	Implemented/Implantado
	Venezuela	Dic 2014	
Suriname	Brasil	Mar 2016	
	Guyana	Jun 2011	Implemented/Implantado
	Venezuela	Mar 2016	
Uruguay	Argentina	Dic 2015	
	Brasil	Dic 2015	
Venezuela	Brasil	Dic 2014	
	Colombia	Mar 2015	
	Ecuador	May 2015	
	Guyana	Dic 2014	
	French Guiana Guyana Francesa	TBD	AMHS implementation pending/ Falta Implantación AMHS
	Perú	Dic 2014	
	Surinam	Mar 2016	

APPENDIX D / APENDICE D

Contract No. 22501411

between the

International Civil Aviation Organization

and DW International Limited

for the Provision of a

SAM Regional Receiver Autonomous Integrity Monitoring (RAIM) Prediction Availability Service and associated equipment

for

the SAM Regional States (Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Paraguay, Peru, Panama, Uruguay and Venezuela)

1.0 Introduction, Definitions and Abbreviations

1.1 Introduction

1.1.1 This Contract is entered into between the International Civil Aviation Organization (ICAO) acting on behalf of and as mandatary for the Governments of Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Paraguay, Peru, Panama, Uruguay and Venezuela (the "SAM Regional States"), specifically their respective Civil Aeronautic Administration (CAA), and DW International Limited. In entering into this Contract, ICAO acts solely for and/or on behalf of the SAM Regional States, who have agreed to indemnify and hold harmless ICAO, including its personnel, from any and all actions, claims or other demands arising out of any act performed by ICAO in relation to the Contract.

1.2 Definitions and Abbreviations

Contract Term	Definition
"ICAO", means	The International Civil Aviation Organization, with Headquarters at 999 University Street, Montreal, Quebec, Canada, H3C 5H7.
"SAM Regional States", means	The Governments of Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Paraguay, Peru, Panama, Uruguay and Venezuela; specifically their respective Civil Aeronautic Administration (CAA)
"Contractor", means	DW International Limited with Headquarters at Winchfield Lodge, Old Potbridge Road, Hook, Hants, RG27 8BT, UK.
"Contractor's Appointed Representative", means	An officer notified to ICAO as being authorized to act on behalf of the Contractor.
"ICAO's Appointed Representative", means	An officer notified to the Contractor by the ICAO Director, Technical Co-operation Bureau, as being authorized to act on behalf of ICAO.
SAM Regional States's Appointed Representative", means	An officer notified to ICAO and the Contractor as being authorized to act on behalf of the SAM Regional States.
"RAIM PROJECT GROUP", means	A project group established by the SAM Regional States to take responsibility for the review of technical milestones (System Design Document, Data Centre Inspection, Provisional and Final Site Acceptance Test) of this Contract.
RAIM PROJECT GROUP's Appointed Representative	An officer notified to ICAO and the Contractor as being authorized to act on behalf of the RAIM PROJECT GROUP.
"Turnkey", means	A type of contract where the Contractor is responsible for the design and provision of fully operational equipment/system(s) and services in accordance with the terms of the Contract.

"Day", means	Unless otherwise specified, a calendar day.

NB: Words in the singular shall also include the plural and vice versa where the context requires or admits.

2.0 Scope of Contract

2.1 This Contract covers the design and provision of a SAM Regional Receiver Autonomous Integrity Monitoring (RAIM) Prediction Availability Service through a web page, (hereinafter the "SRRPAS") and the provision of related hardware and services to ensure subsequent operation support and hosting of the SRRPAS during the ORD period and for four (4) years after Final Site Acceptance Test (hereinafter the "Services") to be supplied to the SAM Regional States as outlined in Attachments I, II, VII and IX. The Contract includes the provision of all necessary hardware, software (and perpetual software user licenses), project management services, training and documentation, in order to design the SRRPAS, test, commission, host and support operations of the SRRPAS for four (4) years, with DW International Limited as prime Contractor.

3.0 Status of ICAO

3.1 The Contractor recognizes that ICAO has the status of a mandatary of the SAM Regional States.

3.2 Neither the Contractor nor its personnel shall be considered as an employee or an agent of ICAO.

3.3 Unless otherwise provided for in this Contract, ICAO shall not be liable for claims of any kind arising in connection with the performance of this Contract.

4.0 Responsibilities

4.1. **Contractor Responsibilities**

4.1.1 This Contract, as detailed herein, is a Turnkey contract with all insurance prepaid. The Contractor shall be responsible for the design, provision, training, commissioning and satisfactory Site Acceptance of the SRRPAS and the provision of the hardware and Services necessary to host and support operations of the SRRPAS during four (4) years.

4.1.2 During the implementation of the Contract and as a result therefrom, the Contractor shall act as to limit to a minimum any potential impact and/or disruption on all current civil aviation and aeronautical operations in the SAM Regional States. Should there be any foreseeable adverse impact and/or disruption of the existing related operations during installation and commissioning, an appropriate transition plan shall be submitted to the RAIM PROJECT GROUP by the Contractor and be planned in full coordination with the SAM Regional States.

4.1.3 The Contractor shall be solely responsible for the adequate design and co-ordinated functioning of the SRRPAS supplied under this Contract.

4.1.4 The Contractor shall provide the database of waypoints within the SAM airspace SRRPAS website design (hereinafter the "Data").

4.1.5 The Contractor shall ensure an availability of the SRRPAS of minimum 99.5%. Any outage will be subject to discount formula included in Attachment I, Technical Specifications Compliance Document, Section E, Article 5.

4.1.6 The Contractor shall alert the RAIM PROJECT GROUP/ SAM Regional States at least ten (10) days prior to any preventative maintenance or service updates that may impact the SRRPAS availability or performance.

4.1.7 The Contractor shall provide quarterly summaries of support issues to the RAIM PROJECT GROUP, starting from the Final Site Acceptance Test (FSAT).

4.2 **ICAO Responsibilities**

4.2.1 ICAO, using its best efforts, shall be responsible for facilitating the completion of this Contract and shall undertake in this respect the following:

i. Review of Bank Guarantees;
ii. Payment of invoices submitted as per Article 5.2;
iii. Co-ordination of Project Review Meetings with the RAIM PROJECT GROUP;
iv. Co-ordination of training with the SAM Regional States, RAIM PROJECT GROUP and the Contractor;
v. Other administrative matters which could reasonably be expected of ICAO to enable the execution of the Contract.

4.3 **SAM Regional States Responsibilities**

4.3.1 The SAM Regional States shall provide the funds necessary to cover the price of this Contract.

4.3.2 The SAM Regional States, through the RAIM PROJECT GROUP, shall be responsible for the review of the System Design Document, and Site Acceptance test/Data Centre Inspection procedures and results (Provisional Site Acceptance/Data Centre Inspection and Final Site Acceptance Test).

5.0 Prices and Payment Terms

5.1 **Prices**

5.1.1 The total price of this Contract is **US $328,789 (three hundred and twenty-eight thousand, seven hundred and eighty-nine United States dollars)**.

5.1.2 The summary of prices in Attachment II includes the SRRPAS and all Services related to this Contract. These prices shall remain firm for four (4) years after Final Site Acceptance of the

SRRPAS. All prices are inclusive of insurance up to commissioning. Such prices are exclusive of taxes and import duties on all goods and/or services imported under this Contract into the SAM Regional States. In the event that any taxes or import duties are levied on the Contractor by the Authorities in the SAM Regional States on the imported goods and/or services, arrangements will be made by the Authorities in the concerned country to withdraw the levy or such taxes or import duties will be paid by the SAM Regional States directly.

5.1.3 The prices for the services and supplies subcontracted and carried out in the SAM Regional States, if any, include all applicable taxes.

5.1.4 The Contractor may substitute, upon agreement with ICAO/SAM Regional States, originally tendered equipment with equipment having similar or better characteristics without price increase.

5.2 **Payment Schedule and Invoicing**

5.2.1 All invoices shall be issued to ICAO Finance Branch for payment in accordance with the payment schedule as indicated below:

Ref.	Payment Term
1	**US $95,914** upon satisfactory Final Site Acceptance Test (FSAT) of the SRRPAS with acceptable Bank Guarantee
2	**US $77,625** one (1) year after satisfactory FSAT
3	**US $77,625** two (2) years after satisfactory FSAT
4	**US $77,625** three (3) years after satisfactory FSAT

5.2.2 Correct invoices shall be accepted by ICAO for the above payments provided they are accompanied or preceded by the documents as set forth in Articles 5.2.2.1 to 5.2.2.4, using the table references as indicated under Article 5.2.1.

5.2.2.1 **Payment at satisfactory Final Site Acceptance and submission of an acceptable Bank Guarantee**:
The Contractor shall submit:
i. One (1) original invoice plus two (2) copies covering **US $95,914**;
ii. One (1) original Final Site Acceptance Certificate duly signed as per Article 13.8;
iii. Acceptable Bank Guarantee, as per Article 6.1.

5.2.2.2 **Progress Payment one (1) year after satisfactory FSAT:**
The Contractor shall submit:
i. One (1) original invoice plus two (2) copies covering **US $77,625**;
ii. Written confirmation of the RAIM PROJECT GROUP of satisfactory provision of the Services;

5.2.2.3 **Progress Payment two (2) years after satisfactory FSAT**:
i. One (1) original invoice plus two (2) copies covering **US $77,625**;
ii. Written confirmation of the RAIM PROJECT GROUP of satisfactory provision of the Services;

5.2.2.4 **Final Payment three (3) years after satisfactory FSAT:**

The Contractor shall submit:

i. One (1) original invoice plus two (2) copies covering **US $77,625**;

ii. Written confirmation of the RAIM PROJECT GROUP of satisfactory provision of the Services;

5.2.3 All payments shall be effected by bank transfer to the Contractor's account indicated on the invoices within thirty (30) days after receipt of correct invoice and documentation as outlined in Article 5.2.2. The bank charges for such transfers shall be borne by the Contractor.

6.0 Bank Guarantee

6.1 The payment at Final Site Acceptance as shown in Article 5.2.1, Ref. 1 above, shall be secured by a Bank Guarantee acceptable to ICAO as per the model under Attachment IV that shall be submitted to ICAO at the latest with the invoice for the payment. The guarantee shall remain valid and at its full value for the duration of the Contract.

6.2 Should the Contract duration be extended beyond the expiry date of the Bank Guarantee, the Contractor is responsible for extending its validity accordingly, including any costs connected therewith. Written confirmation of the extension of the Bank Guarantee must be received by ICAO no later than two (2) weeks prior to the expiry date of the Guarantee(s) concerned. In case the Contractor fails to comply with the requirement for such an extension, ICAO shall have the right to withdraw against the Guarantee(s) up to the full value of the amount guaranteed. Any costs connected therewith, and any costs related to the subsequent re-establishment of the Bank Guarantee, shall be borne by the Contractor.

7.0 Documentation

7.1 Language & Standards

7.1.1 Unless otherwise specified, all reports and correspondence concerning this Contract shall be in English and in the metric system of weights and measures and in other internationally accepted units. The SRRPAS must be available in English, Spanish and Portuguese language.

7.2 System Design Document (SDD)

7.2.1 The Contractor shall provide, within fifteen (15) days of Contract coming into force, for the RAIM PROJECT GROUP's evaluation and approval, three (3) hard copies and one (1) soft copy (electronic format) of a detailed System Design Document (SDD) of the SRRPAS hardware/software included under this Contract (two copies to the RAIM PROJECT GROUP and one copy to ICAO for information purposes). As a minimum, the SDD shall include the following:

i. All relevant technical descriptions of the SRRPAS hardware/software based on the personalization of the Contractual configuration;

ii. Training Course Outlines;

iii. Detailed implementation schedule in weekly segments;

iv. Detailed description of the hosting and operation support plan.

7.2.2 The Contractor shall allow a minimum of fifteen (15) days after receipt by the RAIM PROJECT GROUP of the SDD, for the RAIM PROJECT GROUP to review and comment on it. Following the RAIM PROJECT GROUP's review, the Contractor shall be responsible for modifying and revising the SDD, taking into account the RAIM PROJECT GROUP's comments, and shall accordingly re-submit two (2) revised copies of the SDD within fifteen (15) days from said review. The System Design Document shall be considered an integral part of this Contract upon approval by the RAIM PROJECT GROUP.

7.2.3 The Contractor must consider that the review of the SDD by the RAIM PROJECT GROUP is for the purpose of ascertaining conformance with the scope of the Contract as mentioned under Article 2. Therefore, such review shall not relieve the Contractor from its responsibility in case of errors and omissions in the document or for meeting all requirements of the Contract.

7.3 Technical and Operational Manuals

7.3.1 The Contractor shall provide the SAM Regional States with three (3) sets of Operational Manuals in soft copy (in Spanish, Portuguese and English), setting out in detail the procedures for operation of the SRRPAS under this Contract.

7.3.2 An operation manual shall be made available for SRRPAS users accessible via the web site.

8.0 Meetings

8.1 Kick-Off Meeting

8.1.1 The Contractor shall arrange a Kick-Off Meeting within one week after Contract coming into force. The meeting shall be held between the Contractor and the RAIM PROJECT GROUP remotely via a web-conference.

8.2 Design Review Meeting

8.2.1 The Contractor shall arrange a Design Review Meeting within two weeks after submitting the revised System Design Document, as per Article 7.2. The meeting shall be held between the Contractor, ICAO's and the SAM Regional States's Appointed Representatives, at a mutually agreed location.

8.2.2 The purpose of the meeting shall be to review the system design as outlined in the System Design Document (SDD).

8.3 Progress Review Meeting

8.3.1 Progress Review Meetings shall be arranged on an "As-Needed" basis.

9.0 Delivery and Completion

9.1 Delivery, installation and commissioning of the SRRPAS shall take place in accordance with the

Contract Implementation Schedule in Attachment IX and shall not exceed **eleven (11) weeks** from the date of Coming into Force of this Contract. The Services shall be provided by the Contractor for four (4) years after FSAT of the SRRPAS.

9.2 The Contractor shall submit to ICAO, together with the SDD, a detailed Contract Implementation Schedule, presented in weekly segments from Contract award to commissioning, based on the Contract Implementation Schedule in Attachment IX.

9.3 If delivery of the SRRPAS is delayed by a cause constituting a *force majeure* as per Article 36, the delivery schedule shall be extended for such period as is reasonable having regard to all the circumstances of the case. However, if delivery of the SRRPAS or the Services are delayed by any such circumstances for more than 90 Days, ICAO shall be entitled, without granting additional extension, to terminate the contract pursuant to Article 37.

9.4 If the Contractor fails to deliver in accordance with the Contract Implementation Schedule at Attachment IX, except for reasons solely attributable to ICAO and/or the SAM Regional States, and adjusted for any extension to which the Contractor may be entitled under Article 36, ICAO shall be entitled if the delay exceeds forty-five (45) days, without granting any additional extension, at ICAO's option, to terminate the Contract for default pursuant to Article 37, or to maintain the Contract, accept late delivery and recover damages under Article 35 or any other right or remedy which ICAO has under the terms of this Contract, or by law.

9.5 All equipment storage and associated costs, if any, will be the responsibility of the Contractor.

10.0 Export Licences

10.1 In all cases where export licences are required for the export of the SRRPAS or Services, obtaining any such licences shall be the responsibility solely of the Contractor. The mere fact that required export licences cannot be obtain and/or maintained by the Contractor shall not be considered in and by itself a circumstance constituting force majeure under Article 36.1. Should any Governmental entity refuse, delay or hinder the Contractor’s ability to obtain or maintain any such licence, the Contractor shall promptly consult with ICAO.

11.0 Intentionally left blank.

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13.0 Site Acceptance Tests including Data Centre Inspection (DCI)

13.1 The Site Acceptance Tests (SAT) will be conducted in three phases, namely:

i. Provisional Site Acceptance Test including Data Centre Inspection (PSAT/DCI)
ii. Operational Readiness Demonstration (ORD) phase
ii. Final Site Acceptance Test (FSAT)

The ORD period of thirty (30) days between the PSAT/DCI and FSAT will be used as rectification of SRRPAS deficiencies evidenced at PSAT/DCI , requiring full rectification by FSAT and as SRRPAS continuity verification. Minor deficiencies shall not prohibit PSAT/DCI to be accepted by the RAIM PROJECT GROUP.

13.2 The PSAT/DCI Testing and Procedures shall demonstrate and verify the SRRPAS performance and technical functional characteristics under this Contract in a true operational environment. Upon the FSAT, the Contractor is responsible for removing any adverse comments or remarks observed during the PSAT/DCI.

13.3 The PSAT/DCI shall include the inspection of the hardware and software of the system that provide the SRRPAS and verify the functionality of the SRRPAS, the WEB page of the service for the SAM Region and the SAM database at the Contractor's designated data centre(s). Additionally, the PSAT/DCI shall verify the operation of the SRRPAS and provision of Services from the ICAO Regional Office in Lima, Peru or any other country of the SAM Regional States.

13.4 The Contractor shall submit for the RAIM PROJECT GROUP's review and approval at least thirty (30) days prior to the scheduled commencement of the PSAT/DCI , copied to ICAO, the proposed Provisional Site Acceptance Test and Data Centre Inspection Procedures in Spanish language (if the language normally used by the Contractor is other than Spanish, a set of documents shall be delivered in Spanish and English). The RAIM PROJECT GROUP shall notify the Contractor of its comments and decision within fifteen (15) days thereafter. The Contractor shall modify the PSAT/DCI procedures accordingly and shall resubmit the procedures within five (5) days from said review.

13.5 The PSAT/DCI shall be conducted in the presence of the RAIM PROJECT GROUP's Appointed Representative(s) whose names shall be advised to the Contractor at least three (3) weeks prior to the commencement of the PSAT/DCI. Following the satisfactory completion of the tests, the RAIM PROJECT GROUP shall sign and issue a PSAT/DCI Certificate. If the RAIM PROJECT GROUP's Appointed Representative does not issue and sign the PSAT/DCI Certificate, he shall immediately notify the Contractor in writing with proper reference to any tests in the approved PSAT/DCI schedule or to any part of the Specifications which the SRRPAS has failed to meet. It is agreed between the Parties that minor failures which do not adversely affect the performance or operation of the SRRPAS for the purpose intended and subsequently subject to modification by the Contractor at no extra cost, shall not be considered as items preventing PSAT/DCI Acceptance.

13.6 If the system or sub-system fails to pass one or more of the tests, i.e. the tests show that the system is non-compliant with the requirements of the specifications, then the Contractor shall correct the cause of the failure(s). The RAIM PROJECT GROUP reserve the right to have all the tests or any single test performed again, on the SRRPAS under this Contract. All such costs shall be borne by the Contractor, including travel and subsistence costs (covering accommodation, meals and local transportation) for the RAIM PROJECT GROUP's representative(s) re-participation.

13.7 Notwithstanding any other rights of, or remedies available to ICAO/ the RAIM PROJECT GROUP under the Contract, in case the SRRPAS remain defective or otherwise do not conform to the specifications or other requirements of the Contract after the PSAT/DCI, ICAO/ the RAIM PROJECT GROUP, at its sole option, may reject or refuse to accept the SRRPAS, and within thirty (30) days following receipt of notice from ICAO/ the RAIM PROJECT GROUP of such rejection or refusal to accept the SRRPAS, the Contractor shall, in sole option of ICAO/ the RAIM PROJECT GROUP:

i) modify the SRRPAS in a manner that would enable the SRRPAS to conform to the specifications or other requirements of the Contract; *or*,
ii) replace the SRRPAS with hardware/software of equal or better quality; *and*,
iii) pay all costs relating to the modification or replacement of the SRRPAS.

13.8 The Final Site Acceptance Certificate (Attachment VI) shall be signed thirty (30) days after the Provisional Site Acceptance/Data Centre Inspection, if all deficiencies and observations encountered at PSAT/DCI have been rectified and if no operational fault occurs on the SRRPAS under this Contract, and as per the following:

i. PSAT/DCI is successful;
ii. All observations and comments evidenced at PSAT/DCI are successfully rectified or in accordance with Article 13.6;
iii. All Training Programs have been satisfactorily completed;
iv. All Documentation.

13.9 Minor defects that do not affect the operation and service of the SRRPAS , shall not permit the RAIM PROJECT GROUP to refuse to sign the Final Site Acceptance Certificate(s) and the Contractor shall undertake to resolve those defects at their own expense and in an agreed time frame.

13.10 The Contractor shall allow the participation of three (3) personnel (two (2) from the SAM Regional States and one (1) from the RAIM PROJECT GROUP) for the PSAT/DCI and shall provide air travel (economy class) from and to the respective SAM Regional State, terminal transportation (airport to hotel and return), medical travel insurance and DSA costs (US $477/day/person) for three days covering the participation at the PSAT/DCI.

13.11 The start-up of the SRRPAS and provision of the Services shall commence upon approval of PSAT/DCI, at which time the Contractor shall start the provision of the SRRPAS for 24 hours a day, 7 days a week (24x7). The Services will be in a pre-operational phase for the ORD period and will continue for four (4) years after the FSAT.

14.0 Training

14.1 Training shall be provided as outlined in Attachment VII.

14.2 All training shall be conducted in Spanish and English.

14.3 Upon completion of each training course, a certificate shall be issued as per the model at Attachment VIII. A copy of the signed certificate shall be submitted to ICAO at the address indicated in Article 42.1.

15.0 Intentionally left blank.

16.0 Service Level Agreement

16.1 The Contractor shall provide operation support and hosting for the SRRPAS available 24 hours a day, 7 days a week (24x7), as per Attachment X.

16.2 Any upgrading and modification of the SRRPAS and/or software associated with the defaults of the SRRPAS and/or software shall be provided by the Contractor at no extra cost to the SAM Regional States within the expected period of the SRRPAS operation.

17.0 SRRPAS Title/Insurance

17.1 The title in and all intellectual property rights in the SRRPAS and the Data as defined in Article 4.1.4 shall be vested at all times with ICAO. At least six (6) months prior to the end of the duration of this Contract or upon termination (including but not limited to non-performance by, or bankruptcy or insolvency of the Contractor, or in the case of force majeure) the Contractor shall provide to ICAO/ the SAM Regional States the web site design of the SRRPAS with the source code, the Data, the URL of the SRRPAS and all other materials produced or prepared or collected in consequence of or in the course of the execution of the Contract.

17.2 The title in and to, and risk of loss or damage to the hardware related to this Contract shall remain with the Contractor.

17.3 The Contractor shall be responsible for all insurance under this Turnkey project. The Contractor shall therefore provide and thereafter maintain all necessary insurances, including but not limited to insurance against all risks in respect of its property, equipment, devices and programs utilized by the Contractor in the execution of this Contract. The Contractor shall also provide and thereafter maintain liability insurance in an adequate amount to cover third party claims for death or bodily injury, loss of or damage to property arising from or in connection with the provision of Services and the SRRPAS under this Contract or the operation of any vehicles, boats, air planes, or other equipment owned or leased by the Contractor. The insurance shall be maintained by the Contractor for the duration of the Contract.

17.4 The Contractor shall arrange that all insurance policies referred to in the preceding paragraph of this Article, shall include ICAO/ the SAM Regional States, and where appropriate, the subcontractor concerned, together with the Contractor as the insured. The Contractor shall, upon request, provide ICAO with satisfactory evidence of the insurance required under this Article 17.

18.0 Contractor's Responsibility for Employees

18.1 The Contractor shall be responsible for the professional and technical competence of its employees and will select for work under this Contract reliable individuals who will perform effectively in the implementation of the Contract, respect the local customs and conform to a high standard of moral and ethical conduct.

18.2 The Contractor, its director(s), officer(s), employees and servants shall conform to all applicable laws, regulations and ordinances promulgated by legally constituted authorities of the SAM Regional States.

18.3 The Contractor expressly acknowledges that the minimum supplier eligibility criteria contained in the supplier eligibility declaration is maintained and is applicable throughout the duration of the Contract.

19.0 Assignment of Personnel

19.1 The Contractor shall not assign any personnel other than those referred to in this Contract for the performance of work in the field without the prior written approval of ICAO. Prior to assigning any other personnel for the performance of work in the field, the Contractor shall submit to ICAO for its consideration the curriculum vitae of any person the Contractor proposes to assign for such service.

20.0 Removal of Personnel.

20.1 Upon written request from ICAO, the Contractor shall withdraw from the field any personnel provided under this Contract and shall replace such personnel by others acceptable to ICAO, if ICAO so requests.

20.2 Such request for withdrawal or replacement shall not be considered as termination in part or in whole of this Contract under the provisions of Article 37 (Termination).

20.3 All costs and additional expenses resulting from any withdrawal or replacement for whatever reason of any of the Contractor's personnel shall be at the Contractor's expense.

21.0 Workmen's Compensation and Other Insurance

21.1 The Contractor shall provide and thereafter maintain appropriate workmen's compensation and liability insurance, with respect to and, prior to the departure for, overseas employment under this Contract of all employees who are hired outside SAM Regional States, and who are not citizens of any of the SAM Regional States. The Contractor shall, upon request, provide ICAO with satisfactory evidence of the insurance required under this Article.

21.2 The Contractor shall comply with the labour laws of the countries of the SAM Regional States providing for benefits covering injury or death in the course of employment.

22.0 Indemnification

22.1 The Contractor shall indemnify, save and hold harmless, and defend, at its own expense, ICAO/the SAM Regional States, their officials, agents, servants and employees, from and against all suits, claims, demands and liability of any nature or kind, including their costs and expenses, arising out of the acts or omissions of the Contractor or the Contractor's employees, officers, agents or sub-Contractors, in the performance of this Contract. This provision shall extend, *inter alia*, to claims and liability in the nature of workmen's compensation claims, product liability and liability arising out of the use of patented inventions or devices, copyrighted material or other intellectual property by the Contractor, its employees, officers, agents, servants, or sub-Contractors. The obligations under this clause do not lapse upon termination of this Contract.

23.0 Encumbrances/Liens

23.1 The Contractor shall not cause or permit any lien, attachment or other encumbrance by any person to be placed on file in any public office or on file with ICAO against any monies due or to become due for any work done or material furnished under the Contract, or by reason of any other claim or demand against the Contractor.

24.0 Confidential Nature of Documents and Information/Public Disclosure

24.1 All technical, financial or other documentation and data compiled by or received by the Contractor under this Contract shall be the property of ICAO, and as such, shall be treated as confidential, and shall be delivered only to the ICAO authorized officials upon completion of work under this Contract.

24.2 The Contractor shall not communicate at any time to any other person, Government or authority external to ICAO, any information known by reason of its association with ICAO, which has not been made public except with the authorization of ICAO; nor shall the Contractor at any time use such information for private advantage. These obligations do not lapse upon termination of the Contract.

24.3 Unless authorized in writing by ICAO, the Contractor shall not disclose the particulars of the Contract, advertise or make otherwise public the fact that it is performing, or has performed, services for ICAO.

25.0 Copyright, Patents and Other Proprietary Rights

25.1 Unless otherwise specified, ICAO/the SAM Regional States shall be entitled to all intellectual property and other proprietary rights including but not limited to copyrights, patents and trademarks, with regard to documents, software, or the SRRPAS and other materials which are produced or prepared or collected in consequence of or in the course of the execution of the Contract. At ICAO's request, the Contractor shall take all necessary steps, execute all necessary documents and generally assist in securing such proprietary rights for the benefit of ICAO/ the SAM Regional States in compliance with the requirements of the applicable law.

25.2 It is the Contractor's responsibility to ensure that no intellectual property nor other proprietary rights, including but not limited to, copyrights, patents and trademarks are violated and to defend at its own expense any suit or proceedings based on any claim of an infringement, provided that the Contractor is notified promptly in writing and is given full and complete authority, information and assistance for the defense of same. Should any equipment purchased under this Contract be held to constitute an infringement and its use is enjoined, the Contractor shall obtain for ICAO or the SAM Regional States as the case may be, the right to continue using such equipment or systems, or modify the equipment so that it is not infringing yet performing the task, or remove such equipment or systems and grant ICAO/the SAM Regional States a full refund therefore.

26.0 Officials Not to Benefit

26.1 The Contractor warrants that no official of ICAO / the SAM Regional States has been or shall be admitted by the Contractor to any direct or indirect benefit arising from this Contract or the award thereof.

27.0 Source of Instructions

27.1 The Contractor shall neither seek nor accept instructions from any authority external to ICAO in connection with the performance of the work under this Contract. The Contractor shall refrain from any action, which may adversely affect ICAO/the SAM Regional States and shall fulfill its commitments with fullest regard for the interest of ICAO/the SAM Regional States.

28.0 Assignment

28.1 The Contractor shall not assign, transfer, pledge or make other disposition of this Contract or any part thereof or of any of the Contractor's rights, claims or obligations under this Contract except with the prior written consent of ICAO.

29.0 Subcontracting

29.1 In the event the Contractor requires the services of subcontractor(s), it will be the full responsibility of the Contractor to ensure himself, by means of effective certificates, physical inspections and precisely formulated subcontracts, that subcontractors meet the technical specifications, standards and regulations stipulated in this Contract. The Contractor shall be fully responsible for the quality of the supplies and services provided by subcontractors in the framework of this Contract.

30.0 Contract Amendments

30.1 This Contract including the Attachments may, by agreement between the parties, be amended at any time during the execution of the project.

30.2 Contract amendments shall be effective only when executed and delivered on behalf of ICAO and the Contractor by persons duly authorized in writing to do so.

31.0 Direction of Contract and Interpretation of Specifications

31.1 The Contractor shall perform the work in accordance with the decisions and directions of ICAO given under this Article and any further consequential decisions and directions given by ICAO in the performance of this Contract. Upon notification by ICAO of the details of any failure by the Contractor to meet its obligations, the Contractor shall take corrective action as soon as possible but in any event within two (2) weeks, failing which ICAO reserves the right to terminate the Contract in accordance with Article 37.1. Such directions shall be given in writing. If verbal instructions must be given, such shall be confirmed in writing within seven (7) days. In case of any decisions and/or directions of ICAO in the performance of the Contract constituting a deviation, change or amendment to the original specifications and which may give rise to additional expenses, the Contractor may submit to ICAO for its consideration a statement detailing the cost consequences of such deviation, change or amendment. Any such deviation, change or amendment, in order to be effective, shall be executed by way of a Contract amendment in accordance with Article 30.2 prior to its implementation.

31.2 ICAO reserves the right of adjudication should any question arise at any time prior to approval of the SRRPAS regarding the interpretation of any provision of the specifications and any other technical documentation incorporated in this Contract.

31.3 ICAO may order the Contractor in writing to suspend all or any part of the work for a period of time deemed appropriate by ICAO/the SAM Regional States. In this case, the Contract shall be amended in accordance with Article 30.2 and the Contractor may submit to ICAO for its consideration a statement detailing the reasonable costs of such amendment.

32.0 Regulatory Requirements

32.1 It shall be the Contractor’s responsibility to ensure that it is fully in compliance with all applicable laws, enactments, rules, regulations, patents and procedures of the civil aviation industry which have been established by the SAM Regional States, its relevant regulatory bodies or by any regulatory body with jurisdiction over any aspect of the scope of works of the Contract.

33.0 Licences

33.1 If any licence or permit is required for the performance of the Contract, the Contractor shall obtain any such licence or permit.

34.0 Intentionally left blank.

35.0 Damages

35.1 Subject to the provisions of Article 36 (Force Majeure) hereof and without prejudice to any action which ICAO is empowered to take pursuant to the provision of any Article of this Contract or by law, if the Contractor fails to effect delivery, installation and Final Site Acceptance of the

SRRPAS as applicable in accordance with the Contract, then the Contractor shall become liable to pay to ICAO liquidated damages in this Contract's currency at the rate of half of one percent ***(0.5%)*** of the price of this Contract in respect of each week the said delivery, installation or operability is delayed, provided that payments in respect of liquidated damages to ICAO shall be limited to an amount ***not exceeding six percent (6%)*** of the total price of this Contract.

35.2 Notwithstanding Article 35.1, in case of the Contractor's significant delay in the implementation of the project or its negligent failure to fulfill any of its obligations under the terms of the Contract, ICAO/the SAM Regional States shall have the right to claim and recover from the Contractor all proven damages incurred by ICAO, or the SAM Regional States, or both. Save in the case of gross negligence, the total liability of the Contractor for such proven damages shall not exceed the total value of the Contract and shall exclude indirect or punitive damages. The recovery of proven damages shall not be excluded for the period of delay referred to in Article 35.1, but shall not be claimed in addition to the liquidated damages.

35.3 If the availability of the SRRPAS falls below 99.5%, the Contractor shall become liable to pay damages to be calculated as per the formula in Attachment I, Technical Specifications Compliance Document, Section E, Article 5.6.

35.4 Without prejudice to any right to recover any sum under this Article, ICAO/the SAM Regional States is entitled to require the Contractor to fulfil all obligations under the Contract.

35.5 ICAO/the SAM Regional States reserves the right to recover its damages by means of set-off, withholding of payments and/or recourse to the Bank Guarantee/Performance Bond.

36.0 Force Majeure

36.1 *Force Majeure* as used herein shall mean acts of God, laws or regulations, industrial disturbances, acts of the public enemy, civil disturbances, explosions and any other similar cause of equivalent force not caused by nor within the control of either party and which neither party is able to overcome. As soon as possible after the occurrence of any cause constituting *force majeure*, the Contractor shall give notice and full particulars in writing to ICAO of such *force majeure* if the Contractor is thereby rendered unable, wholly or in part, to perform its obligations and meet its responsibilities under this Contract. In this event, the following provisions shall apply:

a) The obligations and responsibilities of the Contractor under this Contract shall be suspended to the extent of its inability to perform them and for as long as such inability continues;

b) The term of this Contract shall be extended for a period equal to the period of suspension taking, however, into account any special conditions which may cause the time for completion of the work to be different from the period of suspension;

c) If the Contractor is rendered permanently unable, wholly or in part, by reason of *force majeure* to perform its obligations and meet its responsibilities under this Contract, ICAO shall have the right to terminate this Contract on the same terms and conditions as are provided for in Article 37 (Termination);

d) For the purpose of the preceding subsection, ICAO may consider the Contractor permanently unable to perform in case of any period of suspension in excess of ninety (90) days. Any such period of ninety (90) days or less shall be deemed temporary inability to perform.

37.0 Termination

37.1 ICAO may terminate this Contract for cause or default in whole or in part at any time, upon giving written notice to the Contractor. The termination notice shall be sent by certified mail, return receipt requested. Upon receipt of notice of termination, the Contractor shall take immediate steps to bring the work and services to a close in a prompt and orderly manner, shall reduce expenses to a minimum and shall not undertake any forward commitment from the date of receipt of notice of termination.

37.2 ICAO shall pay the Contractor for work and service satisfactorily performed and accepted by the RAIM PROJECT GROUP, for expenses necessary for the prompt and orderly termination of the work, and for such urgent and essential work as the Contractor is asked by ICAO to complete. In the event such termination is caused by the Contractor's negligence or fault, no payment shall be due from ICAO to the Contractor except for work and services completed to ICAO's satisfaction and accepted by the RAIM PROJECT GROUP.

37.3 ICAO may terminate this Contract at any time should ICAO's mandate be curtailed or terminated. In such case the Contractor shall be reimbursed by ICAO/the SAM Regional States for all reasonable costs incurred by the Contractor prior to receipt of the notice of termination.

38.0 Bankruptcy

38.1 Should bankruptcy or winding-up procedures be initiated against the Contractor, or should the Contractor be adjudged bankrupt, or should the Contractor make a general assignment for the benefit of its creditors, or should a receiver be appointed on account of the Contractor's insolvency, ICAO may, without prejudice to any other right or remedy it may have under the terms of this Contract, terminate this Contract forthwith by giving the Contractor written notice of such termination in accordance with the provisions of Article 37.

38.2 The Contractor must advise ICAO within twenty-four (24) hours of the occurrence of any event described in this Article.

39.0 Change in Ownership

39.1 The Contractor shall inform ICAO as early as possible of any change or anticipated change in the status of the Contractor or its ownership that may affect its ability to deliver the SRRPAS or render the Services mentioned herein, as soon as such information is known to the Contractor.

40.0 Settlement of Disputes

40.1 **Amicable Settlement: Negotiations**

The parties shall use their best efforts to settle amicably through negotiation any dispute, controversy or claim arising out of, or relating to, this Contract or the breach, termination or invalidity thereof, within a time period of ninety (90) days.

40.2 **Arbitration**

Any dispute, controversy or claim arising out of or relating to this Contract, or the breach, termination or invalidity thereof, unless settled amicably under the preceding paragraph of this Article within ninety (90) days, shall be referred by either party to arbitration in accordance with the UNCITRAL Arbitration Rules then prevailing. The parties agree that the arbitration be conducted by an arbitral tribunal consisting of a sole arbitrator. If the parties cannot agree on a sole arbitrator within sixty (60) days, the appointment of the arbitrator shall be made in accordance with Article 8 of the UNCITRAL Arbitration Rules. The place of arbitration shall be Montreal, Quebec, Canada, and it shall be conducted in the English language.

41.0 Applicable Law

41.1 This Contract shall be governed by the laws of the Province of Quebec, Canada, without regard to its conflict of laws principles.

42.0 Notices

42.1 Any notices given by the parties to the Contract shall be sent in writing addressed as follows:

ICAO To:
Director, Technical Co-operation Bureau
Attn.: Chief, Procurement Section
Technical Co-operation Bureau
International Civil Aviation Organization
999 University Street
Montreal, Quebec, Canada H3C 5H7

Contractor To:
DW International Limited
Mr. John Wilde, CEO
Winchfield Lodge
Old Potbridge Road
Hook
Hants
RG27 8BT, UK

42.2 Notices hereunder shall be effective when received.

43.0 ICAO Privileges and Immunities

43.1 Nothing in or relating to this Contract shall be deemed a waiver, express or implied, of any immunity from suit or legal process or any privilege, exemption or other immunity enjoyed or which may be enjoyed by ICAO, its officers and staff, either pursuant to the *Convention on the Privileges and Immunities of the Specialized Agencies* or other conventions, agreements, laws or decrees of an international character.

44.0 Use of Name, Emblem or Official Seal of ICAO

44.1 Unless authorized in writing by ICAO, the Contractor shall not advertise or otherwise make public the fact that it is performing, or has performed services for ICAO, or use the name, emblem or official seal of ICAO or any abbreviation of the name of ICAO for advertising purposes or for any other purpose.

45.0 Complete Nature of Agreement

45.1 This Contract constitutes the complete and exclusive statement of the Contract between the parties and supersedes all proposals or all other communications, verbal and/or written arrangements or agreements, between the parties relating to the subject matter of this Contract, unless the Contract is changed, amended or modified in accordance with Article 30 of this Contract.

46.0 Partial Invalidity

46.1 If any provision of this Contract is or becomes invalid, illegal or unenforceable by force of law, the validity, legality and enforceability of the remaining provisions shall not in any way be affected or impaired thereby.

47.0 List of Attachments

Attachment	Description
I	Technical Specifications Compliance Document
II	Scope of Supply and Pricing
III	Intentionally left blank
IV	Payment Bank Guarantee
V	Intentionally left blank
VI	Model SAT Certificate
VII	Training Description
VIII	Model of Training Course Completion Certificate

IX	Contract Implementation Schedule
X	Operation support and hosting of SRRPAS

48.0 Coming into Force

48.1 The Contract shall come into force at the time of signature of the Contract by ICAO and DW International Limited.

49.0 Signatures

The Signatures hereunder are those of authorized officers empowered to enter into Contractual obligations.

Signed on ____, on behalf of:
Date

____________________________ ____________________________

ICAO
Technical Co-operation Bureau

DW International Limited

International Civil Aviation Organization

Contract No. 22501411 for the Provision of .

Attachment I
Technical Specifications

1) Technical Specifications Compliance Document from DW International Limited (12 pages)

2) Glossary of acronyms (1 page)

3) Questions and Answers (Set 1) published on the ICAO Tendering website on 10 September 2013 (2 pages)

4) Questions and Answers (Set 2) published on the ICAO Tendering website on 13 September 2013 (1 page)

With regards to 1) Technical Specifications Compliance Document, the terms “SRRP”, “SRRAP” and “SARRPS” shall all have the meaning of SRRPAS.

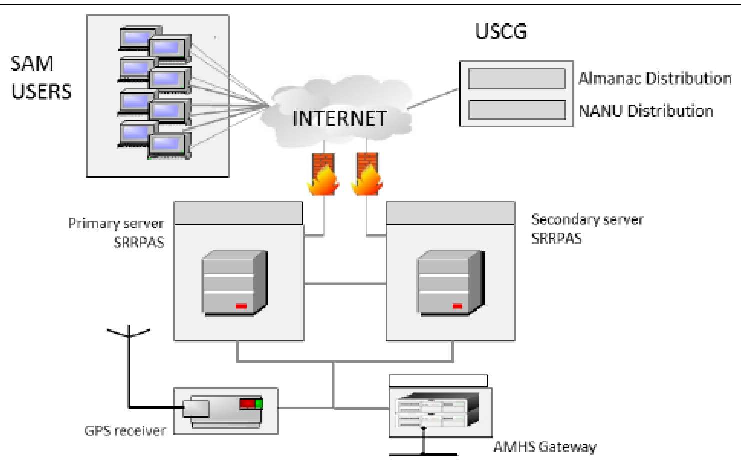
In case of discrepancies, the text of the Contract shall take precedence on this Technical Specifications Compliance Document.

International Civil Aviation Organization

Contract No. 22501411 for the Provision of .

1) Technical Specifications Compliance Document from DW International Limited (12 pages)

	SECTION A – INTENT AND STANDARDS	Compliance / Non Compliance
1	**OBJECTIVE**	
1.1	The International Civil Aviation Organization (ICAO), on behalf of the Governments of Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, French Guiana (France), Guyana, Paraguay, Peru, Panama, Suriname, Uruguay and Venezuela intends to procure, on a turnkey basis, the implementation of a SAM Regional RAIM (Receiver Autonomous Integrity Monitoring) prediction availability service for an initial period of four (4) years through a WEB page functioning the 24 hour per seven day a week (24/7) to support the PBN procedures en route, terminal and approach area.	C (See Section 0)
2	**OBJECTIVE OF SAM REGIONAL RAIM PREDICTION AVAILIBILITY SERVICE (SRRPAS)**	
2.1	To In order to achieve this objective, the aeronautical authorities of the Region have agreed that the SRRPAS shall ensure:	N/A
2.1.1.1	To provide users of an on-line status of the prediction availability of GPS RAIM the 24 hours/7 days a week (24/7) to support the PBN RNAV/RNP operations at Regional level and to each State of the SAM Region.	C (See Section 3.1)
2.1.1.2	To develop a web site for the SRRPAS.	C (See Section 3.1)
2.1.1.3	To be easily expandable to cover the availability of the RAIM prediction service in other constellations of satellite navigation systems (GALILEO, GLONASS, Beidou).	C (See Section 3.1)
2.1.1.4	To cover all regional airspace for RNAV/RNP operations for both Fault Detection (FD) and Fault Detection and Exclusion (FDE) capable receivers.	C (See Section 3.1)
3	**SCOPE**	
3.1	The Project contemplates that the Successful Bidder shall provide:	
	a) SAM Regional RAIM Prediction Availability Service (FD and FDE capable receivers) for the following PBN/RNAV /RNP operations	
	En route - Oceanic and remote continental area: RNP 10, RNP 4, RNP 2, Advanced RNP - Continental area: RNAV 5, RNAV 2, RNAV 1, RNP 2, Advanced RNP, RNP 0.3	C (See Section 3.1)
	Terminal - RNAV 5, RNAV 2, RNAV 1, RNP 1, Advanced RNP, RNP 0.3	C (See Section 3.1)
	Approach - RNAV 1 (Initial, intermediate, missed approach segments) - RNP 1 (Initial, intermediate, missed approach segments) - RNP 0.3 (Initial, intermediate, missed approach segments)	C (See Section 3.1)

	- Advanced RNP (all segments) - RNP APCH (all segments) - RNP AR APCH (Optional) - Departure - RNAV 2, RNAV 1, RNP 1, Advanced RNP, RNP 0.3	
b)	Provision of database of waypoints within SAM airspace SRRPAS website design.	C (See Section 4.1.3)
c)	The develop of a WEB page for he SRRPAS	C (See Section 3.1)
d)	To maintain and manage the WEB page for the SRRPAS	C (See Section 3.1)
e)	The SRRPAS application shall be hosted on an dual application server with a database back- end providing highly available file storage facilities	C (See Section 5.1)
4	**BASIC TECHNICAL CHARACTERISTICS**	
4.1	The hardware shall consist of two servers, one for the redundant primary and mirror (2 in total) See Figure 1 for SRRPAS architecture:	C (See Section 5.1)
	 **Figure 1 SRRPAS Architecture**	
5	**GENERAL CONSIDERATIONS**	
5.1	The Successful Bidder shall be responsible for the implementation of a SRRPAS, a design of a WEB page, acquisition, installation, hosting and commissioning of the required equipment and services, with all the accessories and facilities and to maintain and manage the SRRPAS.	C (See Section 3.1)
5.2	The system shall be installed , hosted and operated on the place of the bid winner installation and deployed across two geographically dispersed servers, at two different Data Centres, offering 24/7 service with a 99.5% availability.	C (See Section 5.1)
6	**RULES AND STANDARDS**	
6.1	All designs, materials, manufacturing techniques and workmanship shall be in accordance with the highest accepted international standards.	C (See Section 9.1)
6.2	Where applicable, the system shall fully comply with or exceed the requirements of the following documents (latest edition plus any related amendments):	

	a)	the standards and recommended practices of the International Civil Aviation Organization (ICAO) contained in the Annexes, as well as the provisions of its manuals, documents and circulars concerning aeronautical telecommunications, the ATN, CNS/ATM systems, and air traffic services. The Successful Bidder is responsible for complying also with the new standards, amendments and recommendations issued during the implementation of the project;	C (See Section 3.1)
	b)	those applied by public carriers in each State; and	C (See Section 3.2)
	c)	the ISO 9000 certification in terms of its methods and lines of production.	C (See Section 9.5)
6.3	If at the time of the publication of this document the specific rules and standards mentioned in any of the other Sections have been revoked, superseded or updated, the new rules or standards shall be deemed as applicable.		C (See Section 3.1)
7	**ALTERNATIVES**		
7.1	Bidders are invited to bid for any alternative that, in their opinion, meets, or exceeds the requirements of, this specification. Any such alternative or variation shall be fully and clearly defined and substantiated so as to easily determine such equivalence or superiority.		N/A
8	**BIDDER'S EXPERIENCE**		
8.1	The Bidder shall demonstrate broad experience in the RAIM Prediction Availability Service implementation The Bidder shall include a list of customers to whom it has supplied the same service during the last five (5) years. The list shall contain the names, addresses and references of customers that can be contacted.		C (See Section 3.4)
8.2	The Bidder shall submit at least three (3) letters of reference with the contact names of different customers with similar projects in different locations to enable verification of the level of compliance of the services previously provided. ICAO or the AAA may contact such customers to check the accuracy of the information submitted.		C (See Annex E)
8.3	The Bidder shall demonstrate that the level of quality of its personnel is commensurate to the service to be supplied, presenting also, the certification of each specialist to enable him for each task to be developed to provide the service in this specification.		C (See Annex A)
8.4	The service provider shall be a leading company worldwide, with an experience proven and recognised in the international markets.		C (See Section 3.4)
9	**BIDDER'S DOCUMENTATION**		
9.1	Statement of compliance: all bids shall be accompanied by a Statement of Compliance, in the form of a copy of the specifications, indicating in the right column whether it Complies (C) or Does not Comply (NC). If the bid states that it complies, any reference, indication, comment or subsequent note to the contrary shall not release the Bidder from the responsibility for the compliance stated. The Bidder shall make reference to the statement of compliance, indicating what section of its documentation substantiates such statement. Failure to provide such definitive indication with respect to any requirement can invalidate its bid.		C (See Annex G)

9.2	The Bidder shall submit its bid in Spanish and English, in two (2) hard copies and one (1) electronic copy. See Section D, Technical Documentation for further details. The official language of the tender will be English.	C (Section N/A)
9.3	Each Bidder shall submit the appropriate technical documentation containing data sheets, performance data, drawings, illustrations, pictures, etc., of the system being offered to enable full and detailed assessment of the bidder as a whole, in accordance with that stated in Section C. The financial bid shall provide detailed costs of the services required in this technical specification.	C (Section 5 and Financial Proposal)
9.4	The proposal shall include documentation on operational commands, and other information that the Bidder may deem appropriate.	C (See Annex F)
9.5	The Bidder shall submit, together with its bid, a timetable of major activities to be carried out concerning the design, manufacturing, provision, Inspection, installation, and commissioning (see other details in Section E).	C (See Section 9.3)
9.6	Additionally, the Bidder shall submit the available operational manuals (as described in Section D) as part of the proposal.	C (See Section 5.5)
	SECTION B – GENERAL REQUIREMENTS	
1	**REQUIREMENTS**	
1.1	**GENERAL GUIDELINES**	
1.1.1.1	The Bidder shall provide the organizational chart of the company and resumes of its technical staff involved in the tasks provided for in the provision of the services (management and technical).	C (See Section 2.2 and Annex A)
1.1.1.2	The Bidder shall prepare a project timetable for the implementation of the SRRPA	C (See Section 9.3)
1.1.1.3	The Successful Bidder shall be fully responsible for the design, selection of components and materials, and installation techniques, to ensure total integration and full compatibility between the main components and all auxiliary units.	C (See Section 3.1)
1.1.1.4	Within forty-five (45) days following the signing of the contract, the Successful Bidder shall submit for the approval of ICAO a detailed System Design Document (SDD) for the implementation of the SRPP	C (See Section 9.3)
1.1.1.5	The Successful Bidder shall appoint properly qualified personnel in sufficient number to perform the work within the proposed timeframes.	C (See Section 9.1)
1.1.1.6	The Successful Bidder shall prepare and submit Inspection tests for approval, and shall conduct the performance tests.	C (See Section 8.1)
1.1.1.7	The Successful Bidder shall prepare and submit the Final Acceptance Test (PSAT) protocols for approval.	C (See Section 8.1)
1.1.1.8	The Successful Bidder shall be responsible for host maintain and manage the SRRAPS	C (See Section 3.1)
1.1.1.9	The Successful Bidder shall submit the operation manual.	C (See Section 8.1)
1.2	**BIDDER'S RESPONSIBILITIES**	
1.2.1.1	The Bidder shall assume full responsibility for the following issues:	N/A
	a) Project proposal, organisation and distribution of all works.	C (See Section 8.1)
	b) Any deviation from the specifications must be corrected at its own expense.	C (See Section 8.1)
	SECTION C – TECHNICAL REQUIREMENTS	

1	**INTRODUCTION**	
1.1	**SRRPS OVERVIEW**	
	General Features	
1.1.1.1	SRRPAS will be developed such that User can access up to date information about the GPS Satellite constellation and calculated RAIM unavailability pertinent to their operations.	C (See Section 3.3)
1.1.1.2	SRRPAS shall make information available to Users over the Internet and shall ensure that the most up to date GPS Satellite constellation data available is used as the basis for RAIM calculations and constellation status reports. The System will use a variety of information sources to collate the best available GPS constellation data. Information shall be made available both graphically and in a textual form.	C (See Section 3.3)
1.1.1.3	SRRPAS shall be configured such that it is resilient and will provide 99.5% availability. The System shall be deployed in a mirrored configuration with two independent and geographically distributed server installations. The two server installations shall be synchronised to ensure that continuity is preserved regardless of the server used by the User. The SRRPAS software will be designed such that the switch between the primary site and the mirror site in the event of a failure occurs automatically, without human input.	C (See Section 3.3)
1.1.1.4	SRRPAS shall ensure that the User is made aware of the provenance and source of the constellation data used by the tools. The System will ensure that the Tools use a consistent constellation data set by means of the Constellation Mediator system function.	C (See Section 3.3)
1.1.1.5	The System shall maintain calculation audit logs that capture the following information: - Calculation parameters and results. - Data and time of the calculation.	C (See Section 3.3)
1.1.1.6	In addition the System shall ensure that data provided to Users is logged for audit purposes. At a minimum, the system will record sufficient information to allow the User to be identified and for the information provided to the User to be recreated.	C (See Section 3.3)
1.1.1.7	The System shall be designed to enable it to be easily expanded to provide an integrity prediction capability for Galileo, GLONASS, Beidou and future navigation systems.	C (See Section 3.3)
2	**GPS RAIM PREDICTION SERVICE TECHNICAL APPROACH**	
2.1	SRRPAS shall be a web-based tool with access for SAM regional customers. The information in the web site must be presented in English, Spanish and Portuguese. The main URL and mirror URL shall be defined in conjunction with ICAO on behalf of the SAM States.	C (See Section 4)
2.2	The following sections define the proposed tools and functions within SRRPAS.	C (See Section 4.1)
2.2.1.1	**GPS Status Tool**	
2.2.1.1.1	The GPS Status Tool shall allow the view of the GPS Satellite constellation based on the latest almanac and NANUs (Notice Advisory to Navigation Users) issued by the US Coast Guard.	C (See Section 4.1.1)

2.2.1.1.2 The GPS Status Tool shall present the number of operational satellites in the GPS constellation based on the information current at the time of the request to inform users whether or not there are sufficient satellites to meet the minimum requirements for PBN/RNAV/RNP operations shown in Section A, paragraph 3.1 a). Also the almanac used and NANUs that may affect the satellite availability during the period of time requested, shall be displayed.	C (See Section 4.1.1)
2.2.1.1.3 The GPS Status Tool shall be configured to provide the status of the GPS constellation for a 72 hour period calculated from the midnight previous to the time at which the status request was made (times are in UTC).	C (See Section 4.1.1)
2.2.1.2 Terminal/Approach Tool	
2.2.1.2.1 The Terminal/Approach Tool shall use algorithms to calculate the predicted RAIM availability for a 72 hour period for specific Aerodromes. The algorithms shall be used in Terminal mode addressing the RAIM requirements for GNSS receivers operating in Terminal operations (±1NM) in Approach mode addressing the RAIM requirements for GNSS receivers operating in Approach operations (±0.3NM), and RNP AR APCH (optional). Both the Fault Detection (FD) and Fault Detection and Exclusion (FDE) algorithms should be provided, with FD set as the default.	C (See Section 4.1.2)
2.2.1.2.2 The Terminal/Approach Tool shall provide a graphical output and a tabular output each of which shall display the predicted RAIM outages over the scenario period for each of the selected aerodromes.	C (See Section 4.1.2)
2.2.1.2.3 The Terminal/Approach Tool shall be configured to return the status of the GPS constellation for a 72 hour period calculated from the midnight previous to the time at which the status request was made (times are in UTC).	C (See Section 4.1.2)
2.2.1.2.4 The Terminal/Approach Tool should allow up to 10 aerodromes to be specified. Aerodromes are selected by entering their ICAO identifier.	C (See Section 4.1.2)
2.2.1.2.5 The Terminal/Approach Tool shall calculate the predicted RAIM availability at the Aerodrome Reference Point (ARP) for baro (pressure altitude) aided and non-baro aided GNSS user equipment at 1 minute intervals throughout the scenario time. The sample time is taken to be the mid-point of a 1 minute period. Therefore a RAIM outage detected at a single sample time will have a duration of 1 minute starting 30 seconds prior to the sample time and ending 30 seconds after the sample time.	C (See Section 4.1.2)
2.2.1.3 Visibility Tool	
2.2.1.3.1 The SRRPAS has to calculate the location of the GPS satellites relative to a fixed receiver position for a given time duration.	C (See Section 4.1.4)
2.2.1.3.2 The Visibility Tool shall provide the following output options:	
a) Graphical sky plot representation of the visible satellites.	C (See Section 4.1.4)
b) Tabular representation of the visible satellites. (A table of azimuth and elevation values and the visibility status for each satellite at each sample time in the scenario is displayed, azimuth and elevation are displayed in decimal degrees, all satellites shall be included regardless of visibility and "health".	C (See Section 4.1.4)
c) Visibility Tool shall require user-configurable parameters as inputs, like:	C (See Section 4.1.4)

- Receiver Position - Mask angle - Scenario duration - Number of samples required to calculate the satellite visibility - UTC date and time - Etc.	
2.2.1.4 Route Tool	
2.2.1.4.1 The Route Tool shall calculate the predicted RAIM availability for points along a defined route using either the RAIM algorithm in En-Route mode or the Terminal mode.	C (See Section 4.1.3)
2.2.1.4.2 A route shall be defined by a series of waypoints selected, or input, by the user. The tool shall maintain a list of current en-route waypoints and navaids in the South American Region area which shall be selected by ICAO identifier. The tool shall provide to the user the possibility to define custom waypoints by entering an identifier, State, latitude and longitude	C (See Section 4.1.3)
2.2.1.4.3 The system must contain a database of waypoints inside South American Region airspace and easily configured by the user.	C (See Section 4.1.3)
2.2.1.4.4 The defined route and the results of the RAIM check shall be able to be saved and to be reviewed for the session.	C (See Section 4.1.3)
2.2.1.4.5 The User has the capability to select other angles.	C (See Section 4.1.3)
2.2.1.4.6 Both the Fault Detection (FD) and Fault Detection and Exclusion (FDE) algorithms shall be provided.	C (See Section 4.1.3)
2.2.1.4.7 The tool has to calculate the anticipated RAIM availability for points spaced at one minute intervals along the route, based upon the Time Offset values entered, and displays any anticipated RAIM outages that equal or exceed 5 minutes (User configurable).	C (See Section 4.1.3)
2.2.1.4.8 The Route Tool has to provide a graphical output and a tabular output each displaying the predicted RAIM outages over the scenario period. Both displays have also to show the anticipated outages if the start time is delayed, or brought forward, by 5, 10 or 15 minutes.	C (See Section 4.1.3)
3 SRRPAS HOSTING AND OPERATIONAL FACTORS	
3.1 SRRPAS shall be managed and operated by the successful bidder and shall be deployed across two geographically dispersed servers, at two different Data Centres, offering 24/7 service with a minimum availability of 99.5%. (See Figure 1 for SRRPAS architecture).	C (See Section 5.1)
3.2 SRRPAS application shall be hosted on an application server with a database back- end providing highly available file storage facilities.	C (See Section 5.1)
3.3 The server shall be fault-tolerant and shall include support for hot-swapping of essential hardware such as disks and power supplies.	C (See Section 5.1)
3.4 The hardware shall consist of two servers, one for the redundant primary and mirror (2 in total) with the following minimum specification: a) Redundant Pair of firewalling Devices. b) Redundant Pair of Hardware Load Balancers balancing traffic at layer 4, 100Mbit access switch ports with 1Gbps trunks between distribution, aggregation and core switching layers.	C (See Section 5.1)

	c) Multiple upstream internet providers shall be provided. d) Servers provided with the following minimum configuration that will be update during the implementation planning phase of the project (Processor (Quad 2.0Ghz) – 4Gb Ram – 2x 72Gb SAS 10k Disks in Raid 1).	
3.5	**IP SECURITY**	
3.5.1.1	SRRPAS server infrastructure shall be protected by a dual firewall system. The internal network clusters shall be hosted on a private network segment with a private address range – not directly accessible from outside the firewall. Only web traffic, email traffic and management traffic shall be permitted through the firewall.	C (See Section 5.2)
3.5.1.2	SRRPAS shall be patched with software security updates (OS, Database, etc.) as they become available.	C (See Section 5.2)
3.5.1.3	Local physical security measures shall be implemented.	C (See Section 5.2)
3.6	**CONSTELLATION DATA MEDIATOR**	
3.6.1.1	SRRPAS shall maintain an up to date record of the GPS satellite constellation as well as scheduled changes to the constellation in order to ensure that the System calculations are based on the best available data.	C (See Section 5.4)
3.6.1.2	The System shall obtain constellation data and constellation updates from a number of sources, as follows: a) United States Coast Guard (USCG). b) Almanac. c) Unscheduled outages/changes (NANU). d) AFTN/AMHS (as a future option). e) Unscheduled outages/changes (NOTAM).	C (See Section 5.4)
3.6.1.3	The constellation data mediator subsystem will provide the system with the best available picture of the constellation for the calculation time periods supported by the Tools.	C (See Section 5.4)
3.6.1.4	The constellation data mediator subsystem shall also carry out the recalculation of static data in response to a constellation change to ensure that RAIM outage predictions are current and reliable.	C (See Section 5.4)
3.6.1.5	The Constellation Data Mediator subsystem will be written to be resilient to errors in the data feeds from the external data sources. SRRPA will not update reference constellation data until it is verified as good with respect to format validity, range checking.	C (See Section 5.4)
3.6.1.6	By using multiple data sources, GRPS will be able to use the best data available if one or more of the data sources is not functioning correctly. SRRPA will allow customisation of audit logging and notifications to system administrators based on errors detected in the source data (availability or content) to allow timely manual override of default behaviour and investigation of the issue if necessary.	C (See Section 5.4)
3.6.1.7	The topographic data source of the application should come from a sufficiently reliable source.	C (See Section 5.4)
3.7	**SRRPAS HELPDESK**	
3.7.1.1	The bid winner should respond to queries related to SRRPAS and its operation via the SRRPAS Helpdesk, contactable via an Email address to be specified.	C (See Section 5.5)
3.7.1.2	The bid winner shall assist in resolving issues at application level, specifically: a) To support the quality of the GPS RAIM predictions, b) Monitoring and validation of the US Notice Advisory to NAVSTAR Users (NANU) Service and GPS NOTAMs.	C (See Section 5.5)

3.8	**BID OPTIONAL REQUIREMENTS**	
3.8.1.1	The bidder shall submit as optional within the bid, the following:	
	a) Implementation in the menu functions, the generation of PDOP/ GDOP both graphical and numerical to have the option of generating research processes within states that require it.	C (See Section 7)
	b) Removal of artificial obstacles in the SAM terminal which will host the simulation in the approach phase, allowing a more accurate GPS RAIM simulation.	C (See Section 4.1.6)
	SECTION D – SPARE PARTS, ACCESSORIES, TEST EQUIPMENT & TECHNICAL DOCUMENTATION	
1	**TECHNICAL DOCUMENTATION**	
1.1	The bid winner will supply an operational manual with the description of all the function of the SRRAP in soft-copy, in the English and Spanish language.	C (See Section 5.5)
	SECTION E – SERVICES, TESTS AND ACCEPTANCE	
1	**DATA CENTRE INSPECTION**	
1.1	The tenderer undertakes to submit for AAA/ICAO's approval at least forty-five (45) days prior to the scheduled commencement of the inspection, a Data-centre Inspection Plan and Procedures. ICAO shall notify the tenderer of its decision within thirty (30) days thereafter, and after an agreement has been reached, the plan/procedures shall form part of the eventual contract. Any changes in the plan/procedures initiated by the tenderer will be without cost to AAA/ICAO and subject to AAA/ICAO's approval.	C (See Section 9.3)
1.2	The Data Centre Inspection includes the inspection of the hardware and software of the system that provide the SRRPAS. The software include the functionality of the SRRPAS, the WEB page of the service for the SAM Region and the SAM database.	C (See Section 5.3)
1.3	All results of the data centre inspection shall be duly recorded and shall be signed by the tenderer's representative and AAA/ICAO representatives.	C (See Section 5.3)
1.4	All observations agreed on and discrepancies noted during the Data Centre Inspection are to be corrected by the tenderer.	C (See Section 8.1(b))
1.5	The tenderer shall arrange for a maximum of (2) inspections, to run consecutively for the facilities.	C (See Section 5.3)
1.6	ICAO's appointed representative(s) together with AAA's representative(s) shall be entitled to enter the facilities of the tenderer at reasonable times during the normal working hours to witness the work in progress.	C (See Section 5.3)
1.7	The Inspection shall be conducted in the presence of ICAO's appointed representative and representatives from AAA whose names shall be advised to the tenderer at least three weeks prior to the commencement of tests. Following the satisfactory completion of the tests, ICAO shall sign and issue a Inspection Certificate. It has been considered that three people will participate in the Inspection, one on behalf of ICAO and the remaining two on behalf of the AAA.	C (See Section 5.3)
1.8	The costs of stay and passages from the three persons will be included in the offer of the bidder. It has been considered a minimum of three days (total) for the Inspections.	C (See Financial Proposal)

1.9	If ICAO's appointed representative does not issue and sign the Inspection Certificate, he shall immediately notify the tenderer in writing with proper reference to any tests in the approved Test schedule or to any part of the Specifications which the equipment has failed to meet. It is agreed between the parties that minor failures, which do not adversely affect the performance or operation of the equipment for the purpose intended and subsequently subject to modification by the tenderer at no extra cost, shall not be considered as items preventing Acceptance.	C (See Section 8.1(b))
1.10	With respect to ICAO's reason for non-acceptance, the tenderer shall give notice to ICAO stating how it intends to rectify in order that ICAO may repeat the tests that not initially comply and also the tests in respect of those parts affected by the rectification. The tenderer shall bear all costs associated with the re-testing (i.e. travel, accommodation and subsistence costs for ICAO's/AAA's representative(s) re-participation).	C (See Section 8.1(b))
1.11	In the event of ICAO or AAA's representatives failing to be present at the time and place appointed by the tenderer for the Factory Acceptance Tests, the tenderer may proceed with the tests which shall be deemed to have been made in the presence of ICAO and AAA's representatives and the tenderer shall sign the Factory Acceptance Certificate for corresponding purposes which shall have the same meaning and value as if it had been signed by ICAO. A copy of the test results must be submitted to ICAO for review prior to shipment.	C (See Section 8.1(b))
2	**TRAINING**	
2.1	**GENERAL ASPECTS**	
2.1.1.1	The Bidder shall include in its proposal a two-day operational training on the SRRPAS. The training will be carried out on-line.	C (See Section 6)
3	**INSTALLATION**	
3.1	Nil.	N/A
4	**SITE ACCEPTANCE TESTS AND START-UP**	
4.1	The SAT shall be conducted in three(3) phases as follows: a) Provisional Site Acceptance Test (PSAT) b) Operational Readiness Demonstration (ORD) phase (30 days) c) Final Site Acceptance Test (FSAT)	C (See Section 9.3)
4.2	The contractor shall provide written test plans and procedures, in Spanish language (If the language normally used by the Successful Bidder is other than Spanish, a set of documents shall be delivered in English) for the PSAT and FSAT. Copies of the detailed test plan and procedures are to be provided to ICAO/AAAs for approval not less than 30 days prior to the conduct of the tests. The SAT shall be witnessed by AAA/ICAO representatives.	C (See Section 8.1(a))
4.2.1.1	Note that the Successful Bidder shall introduce the comments, and corrections suggested by ICAO/AAAs and shall re-submit such documents for approval, at no additional cost for ICAO/AAA.	C (See Section 8.1(b))
4.2.1.2	Any delays in the execution of the contract resulting from the non-approval of the aforementioned plans and procedures shall be attributable to the Successful Bidder and shall not give the right to extensions in the execution timeframes established in the contract.	C (Section N/A)
4.3	The test plans and procedures shall contain at least the following: a) Detailed test timetable, by day	C (See Section 8.1)

	b) Test sites and schedules c) List of participants on behalf of the Successful Bidder d) Purpose of the test e) General description of the SRRAP to be tested. f) Description of test procedures and steps g) Lists/tables with expected results h) Complete operational manuals of the equipment to be tested	
4.4	The successful bidder shall demonstrate at PSAT phase, using mutually agreed upon test procedures, that all the equipment provided within this project is compliant to the technical specification and requirements. All deficiencies identified at the PSAT phase shall be corrected by the successful bidder prior to the FSAT phase.	C (See Section 8.1(c))
4.5	PSAT tests shall be conducted for the service operation , covering at least the following aspects: a) Connectivity to the WEB page b) Functionality of all the parts of the SARRPS described in Section C part 2 c) Verify the content and quality of the data base of location and waypoint of the SAM Region d) Documentation	C (See Section 8.2)
4.6	There shall be a 30 day period between the PSAT and FSAT phases. During this period of 30 days, the AAA personnel shall be operating the system normally in order to identify any defects, adjustments, , etc. which shall be corrected by the successful bidder prior to the FSAT	C (See Section 9.3)
4.7	When all the deficiencies identified during the PSAT and all abnormal situations identified during the 30 days operational readiness test phase are corrected, then the FSAT can take place.	C (See Section 8.1(b))
4.8	The contractor shall provide the test equipment required for the SAT (if any).	C (See Section 8.1)
4.9	All results of the SAT shall be duly recorded and shall be signed by the contractor. These results shall form the basis for the installation acceptance and for station records.	C (See Section 8.1)
4.10	During acceptance (PSAT, ORD and SAT), the Project Office may include additional testing, as necessary, in order to ensure the correct operation of the supply of the website. These tests shall be automatically included as a supplement to the official test programme.	C (See Section 8.1)
	Start-up	
4.11	The start-up of the service will commence upon approval of PSAT. The Successful Bidder will start the provision of the SRRPAS for the 24 hours a day, 7 days a week (24x7). The service will be in a preoperational phase for of 30 day period	C (See Section 9.3)
5	**GUARANTEES / PERFORMANCE OF THE SERVICES**	
5.1	The Successful Bidder shall maintain the quality of the service during the term of the contract, 24 hours per day, 7 days a week (24x7).	C (See Section 5.1)
5.2	The Successful Bidder shall provide access to a support centre to handle queries about the functionality of the service.	C (See Section 5.5)

5.2.1.1	In the event of unavailability of the service, a user may contact this centre via an email or phone call to report the event. In this act, the Successful Bidder must provide the relevant claim number for its use in the discount calculation referred in this section, as well as send an email to the user and to the ICAO SAM Regional Office	C (See Section 5.5)
5.2.1.2	Once the claim has been solved, the Successful Bidder will send an email to the ICAO monitoring bureau, and to every user who made the complaint, informing the solution and indicating the time it was settled and the number of claim.	C (See Section 5.5)
5.2.1.3	The time between the start of the contingency registered in the number of claim and its end, registered in the e-mail sent by the Successful Bidder, is the corresponding to Ti = "total time of unavailability" mentioned below. In case that a month registers several contingencies, the Ti will account for the total unavailability time.	C (See Section 5.5)
5.3	Preventive maintenance should be performed during the period of the services, without prejudice to the service operation, and must be communicated with a minimum of 10 (ten) business days via fax or e-mail.	C (See Section 5.5)
5.4	The Successful Bidder shall provide to ICAO at the time of the commencement of the contract, the list of the persons in charge for the service provision in hierarchical order.	C (See Section 9.1)
	Discounts due to outage	
5.5	The Successful Bidder shall provide a discount for the disruption in the prediction services if the required availability in these specifications is not met (99.5%).	C (See Section 5.5)
5.6	If the responsible of the failure is the Successful Bidder, penalties will be applied consisting in the reduction in the payment of the cost of the service, according to the following scheme:	C (See Section 5.5)
$I=\frac{T_i \times P}{T_o}$	Where: I = monthly discount in USD, relative to the service n fault. To = operation period (01 month), in minutes. Ti = total time of unavailability of the service , occurred during the considered operation period (01 month), in minutes. P = monthly price of the Contract in USD.	
5.7	The tenderer shall also warrant that all services delivered under an eventual contract shall perform in accordance with and conform to all specifications, descriptions, and other requirements included in the offer and shall be without defects in materials, workmanship and design. Failing to accomplish these performance criteria, the tenderer must modify/add and/or exchange the inadequate equipment and/or software, if necessary, to provide the specified functions.	C (See Section 5.1)
5.8	Approval or acceptance of the tenderer's designs or acceptance of the system shall not prejudice ICAO/AAA's rights under this Article.	C (Section N/A)
5.9	The rights under this Article shall be enforceable by the AAAs and ICAO respectively.	C (Section N/A)
5.10	ICAO's and AAA's rights under this Article are not exclusive and any other rights provided in this Contract or by Law are reserved.	C (Section N/A)

2) Glossary of acronyms (1 page)

For purposes of this Contract, the following acronyms will apply:

AAA	Aeronautic Administrations Authorities
AFTN	Aeronautical fixed telecommunication network
AMHS	Air Traffic Services Message Handling Services
Beidou	Global Navigation Satellite System (GNSS) developed in China
FD	Fault Detection
FDE	Fault Detection and Exclusion
FSAT	Final Site Acceptance Test
GALILEO	Global Navjgation Satellite System developed the European Union (EU)
GDOP	Geometric Dilution of Precision
GLONASS	Global Navigation Satellite System of Russia
GPS	Global Positioning System
IP	Internet Protocol
PBN	Performance-based Navigation
PDOP	Positional Dilution of Precision
PSAT	Provisional Site Acceptation Test
NANU	NAVSTAR Users Advertisement Service
RAIM	Receiver Autonomous Integrity Monitoring
RNAV	Area Navigation
RNP	Required Navigation Performance
RNP APCH	Required Navigation Performance in Approach
RNP AR APCH	RNP Authorization Required Approach
SRRPAS	SAM Regional RAIM Prediction Availability Service
URL	Uniform Resource Locator
USCG	United States Coast Guard
UTC	Universal Time Coordinated

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3) Questions and Answers (Set 1) published on the ICAO Tendering website on 10 September 2013 (2 pages)

(1) Attachment I 2 (g) "In addition, two hard copies of the technical information only must also be sent to each of the offices below by courier or express mail before the closing date and time." Only one address is listed - are there additional addresses?

Response: This was an error, only two hard copies should be sent to the office in Montreal as indicated.

(2) Attachment I 2 (g) Address reads: "SEALED TENDER ST-22501200" Should this be changed to ST-22501411?

Response: Yes, please.(A revised attachment I is being issued to reflect this change as well as the one in question 1).

(3) Attachment II Section A In COMPLIANCE STATEMENT “Tenderer must state below, against every item, Compliance or Non Compliance. Failure to complete and return this form may invalidate the bid.”• or “9.1 Statement of compliance: all bids shall be accompanied by a Statement of Compliance, in the form of a copy of the specifications, indicating in the right column whether it Complies (C) or Does not Comply (NC).“ Which is it? Should we put “Compliance”• or “C” or is either OK?

Response: Both instructions are referring to the same thing, Section A is a reminder of 9.1.

(4) Can we add cross-references to Attachment II as well as statements of compliance / non-compliance to meet the requirement of "Section 9.1 The Bidder shall make reference to the statement of compliance, indicating what section of its documentation substantiates such statement. Failure to provide such definitive indication with respect to any requirement can invalidate its bid." For example: "Compliance (See Paragraph 4.3 above)"

Response: Yes, you must state compliance/non-compliance in the corresponding column in Attachment and also provide the cross-reference to substantiate the statement.

(5) Attachment II Section A “9.2 The Bidder shall submit its bid in Spanish and English, in two (2) hard copies and one (1) electronic copy. See Section D, Technical Documentation for further details. The official language of the tender will be English.”• Attachment I 6. Language “The offer shall be in English.”• Is the bid to be submitted in English only or English and Spanish?

Response: Technical offers have to be presented in English and Spanish (English version will prevail in case of a discrepancy) as indicated in Attachment II, Section A, para. 9.2 of the tender documentation.

(6) Attachment II Section B “1.1.9 The Successful Bidder shall submit the operation manual.”• As part of the proposal or part of the contract?

Response: The successful bidder will provide it as part of the Contract.

(7) Attachment II Section E “1.8 The costs of stay and passages from the three persons will be included in the offer of the bidder. It has been considered a minimum of three days (total) for the Inspections.”• Please advise of the constraints applied to accommodation and travel are there specific hotels or airlines to be used?

Response: The cost for the hotel portion is based on the UN Daily Subsistence Allowance of the city where the Inspection will take place. The cost of the airfare should be based on regular economy airfare.

(8) Attachment II Section E "4.2 The contractor shall provide written test plans and procedures, in Spanish language (If the language normally used by the Successful Bidder is other than Spanish, a set of documents shall be delivered in English) for the PSAT and FSAT. " Please confirm that the test plans and procedures can be provided in English only.

Response: If the primary language of the bidder is other than Spanish, the documents must be submitted in Spanish and English. If the primary language is Spanish, only Spanish documents need to be provided.

(9) (13) When submitted the financial proposal, are we permitted to submit the proposal via the "Submit Document"• portal on the ICAO procurement website or is the financial breakdown to be included within the "Additional Information"• dialogue box when submitting a Quote?

Response: The financial proposal must submitted as a detailed document with the breakdown of the prices and may be ONLY submitted through ICAO's web tendering portal.

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4) Questions and Answers (Set 2) published on the ICAO Tendering website on 13 September 2013 (1 page)

(1) Attachment I 6. Language "The offer shall be in English. In the event an order is awarded and unless otherwise specified, the language of all services, manuals, instructions, technical documentation, etc. provided for under the Contract shall be in English and Spanish. All labelling on the controls and instruments, if applicable, must be in the language of each respective country." Does this mean that the SRRPAS website should provide instruction in spanish, portuguese and French ? Spanish English and Portuguese

Please provide a list of all languages in which the website interface should be provided?

Response: The SRRPAS WEB language required is English, Spanish and Portuguese (Section C paragraph 2.1)

(2) Attachment II Section A “9.4 The proposal shall include documentation on operational commands, and other information that the Bidder may deem appropriate.”• Please clarify what is meant by "operational commands"?

Response: For operational commands means instruction of operation for the use of the application in the WEB page

(3) Attachment II Section C “3.8 Bid Optional requirements 3.8.1 The bidder shall submit as optional within the bid, the following: a) Implementation in the menu functions, the generation of PDOP/ GDOP both graphical and numerical to have the option of generating research processes within states that require it. b) Removal of artificial obstacles in the SAM terminal which will host the simulation in the approach phase, allowing a more accurate GPS RAIM simulation.”• Can it be clarified whether realtime monitoring of actual satellite signals will be required under this option?

Response: Yes, please quote a standard system and quote as an option the price of a real time monitoring system.

(4) Attachment II Section E 5.6 Please specify the length of the month. Is it calendar month or standardised?

Response: Standarized

(5) Could you clarify the meaning of point b) "Removal of artificial obstacles in SAM terminal which will host the simulation in the approach phase, allowing a more accurate GPS RAIM simulation?" One potential understanding of this requirement is that the SRRPAS may take into account the GPS satellites line-of-sight masking due to the aerodrome obstacles present in the terminal airspace (areas 1 and 2, as per ICAO Annex 15) during RNP AR approach operations. Is our understanding correct ?

Response: Yes it is correct

Attachment II
Scope of Supply and Pricing
All prices in USD

Item	**Qty**	**Description**	**Unit Price (USD)**	**Total (USD)**
1	Lot	Development of: SAM Regional RAIM prediction availability service (FD and FDE capable receivers) for the following PBN/RNAV/RNP operation: En route / Terminal / Approach	7,060	7,060
2	4 Years	Operation Support and Hosting of: SAM Regional RAIM prediction availability service (FD and FDE capable receivers) for the following PBN/RNAV/RNP operation: En route / Terminal / Approach, after FSAT	80,000	320,000
3	1 Set	Technical Documentation (PSAT, FSAT and Operation Manual in electronic format)	4,100	4,100
4	1	Data Centre Inspection: For three (3) representatives from RAIM PROJECT GROUP/SAM Regional States, for three (3) days	10,415	10,415
5	2 Days	Training - two days operational training (on-line)	1,100	2,200
6	1	Site Acceptance Test (SAT and Start-Up)	6,000	6,000
7	Lot	Guarantee/Performance of the Service (for the duration of the contract, 24 hours per day 7 days a week)	Included within Item 2	
			Sub Total	*349,775*
			6% Discount	-20,987
			Total Contract Price for complete duration of the Contract (Implementation time plus four (4) years of operation support and hosting after FSAT)	**328,789**

Options: see next page.

Options:

(A)	RNP AR APCH RAIM Predictions below 0.3 NM		**Price (USD)**
	(a) For up to 1,500 RNP AR APCH Predictions.	Per Month	5,400
	(b) Per additional request over 1,500 used in (a) above.	Per Additional Request	5
(B)	GNSS Performance Monitoring and Recording		
	1 Master Site (including software and hardware installation)	From	175,000 per site
	1 Remote Site (including software and hardware installation) and networking with the Master Site	From	75,000 per site
	Please note, these prices are subject to the following: Timely access to site as organised by the ANSP. Distance between Receiver Site and Server Site. Deployment and Commissioning Schedule. Travel & Subsistence. Required equipment availability. Provision of available communications network and adequate power supply. Site survey at cost to ANSP undertaken prior to final quote being issued. Local import taxes.		
	Please note that bulk discounts may apply to multi-site network		
	Terrain / Artificial Obstacle Screening		
(C)	For RNP AR APCH Procedures only where DWI has full access to all required procedure designs and ancillary information.	From	5,000 per procedure

The price of the options are valid for the duration of the contract (i.e. up to four (4) years after FSAT).

Attachment III

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Attachment IV
Payment Bank Guarantee - Sample

BANK GUARANTEE
(PAYMENT GUARANTEE / PERFORMANCE BOND)

Dear Sirs,

You concluded a Contract No.__________, with Messrs. __________ on _____________ for the provision of ____________at a price of US $_____________. As security for the possible claim for the refund of US $ ____________ in the event that the systems as upgraded and/or installed under this Contract fail to perform in accordance with the terms of the Contract and/or in the manner intended and at the level of performance quality defined in the Contract and its attachments and/or accepted international standards, an indemnity by a bank shall be furnished.

At the request of Messrs. _________, we, the ________, hereby irrevocably undertake to refund to you on your first demand, irrespective of the validity of the effects of the above-mentioned Contract and waiving all rights of objection and defence arising from said Contract, the amount of US $_________

upon receipt of your written and duly signed request for payment and your written confirmation that the ___________ System, installed by Messrs. __________ as specified in the above-mentioned Contract have failed to perform in accordance with the terms of the Contract and/or in the manner intended and at the level of performance quality defined in the Contract and its attachments and/or accepted international standards.

It expires, however, on ________ in full and automatically, if your written request for payment and your written confirmation are not in our possession on or before that date.

This undertaking shall be interpreted in accordance with the laws of the Province of Quebec, Canada, place of arbitration is Montreal.

Yours sincerely,

Please note that such a bank guarantee must be confirmed by a first class bank. If the warranty has to be extended beyond the expiry date of the Bank Guarantee, or if any outstanding issues remain unresolved at such date, the Contractor is responsible for extending its validity for the full amount accordingly, including any costs connected therewith. Written confirmation of the extension of the Bank Guarantee(s) must be received by ICAO no later than two weeks prior to the expiry date of the Guarantee(s) concerned. In case the Contractor fails to comply with the requirement for such an extension, ICAO shall have the right to withdraw against the Guarantee(s) up to the full value of the amount guaranteed. Any costs connected therewith, and any costs related to the subsequent re-establishment of the Bank Guarantee, shall be borne by the Contractor.

Attachment V

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Attachment VI
Model SAT Certificate - Sample

The present certificate is to attest that the Site Acceptance Tests as stipulated in Article 13.0 of Contract _____________, signed on _________________________, between ICAO and _________________ has been carried out and proved to be satisfactory, for the following items (or part of items) : Comments (if any) :

____
ICAO Representative

____
Contractor Representative

____
Date

____
Date

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Attachment VII
Training Description

The Contractor shall provide operational training in one (1) session for the SAM Regional States over two (2) days.

Course outline:

- Principles of RAIM.
- User interface and administration.
- Helpdesk/support issues.

The training shall be held on-line via web conference.

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Attachment VIII
Model of Training Course Completion Certificate - Sample

The present certificate is to attest that the following Training course has been completed successfully in accordance with the terms of the Contract ___________, between ICAO and ______________________.

Course Title : ______________________________________

Date : ____

____
ICAO Representative

____
Contractor Representative

____
Date

____
Date

Attachment IX
Contract Implementation Schedule

Item	Completion Date (weeks)	Activity
1	T0	Contract Coming into force
2	T0 + 1	Kick-Off Meeting (Web-conference).
3	T0 + 2	System Design Document
5	T0 +	Data Centre Inspection and PSAT
6	T0 +	Provision of training via web-conference
7	T0 + 11 (=T1)	FSAT / Start of operation support and hosting, Year 1
8	T1 + 52	Start of operation support and hosting, Year 2
9	T1 + 104	Start of operation support and hosting, Year 3
10	T1 + 156	Start of operation support and hosting, Year 4
11	T1 + 208	Completion of operation support and hosting, Year 4

As per Article 9.2, the Contractor shall submit, together with the SDD, an up to date and detailed Implementation Schedule, which shall contain, as a minimum, the above milestones. The time frame of eleven (11) weeks until FSAT of the SRRPAS as per Article 9.1 shall remain unchanged.

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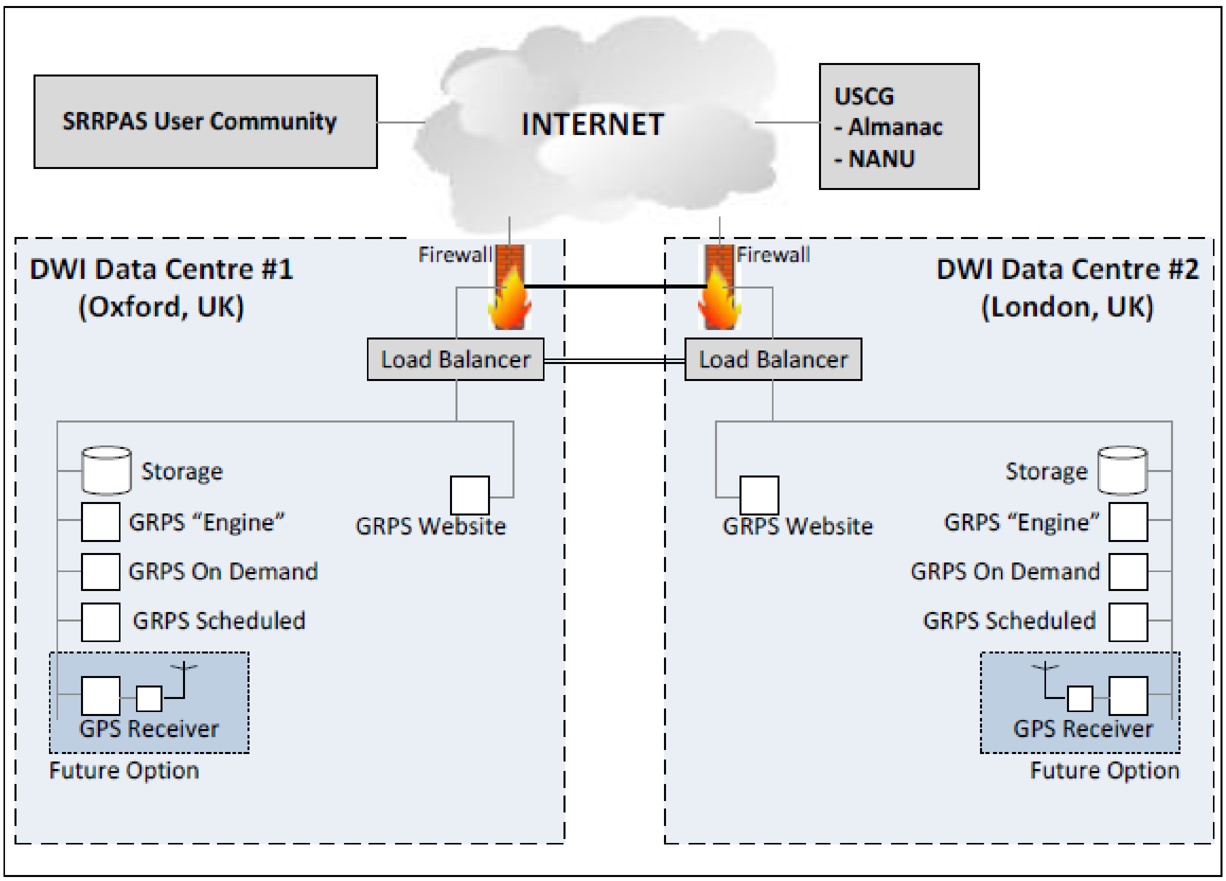
Attachment X
Operation support and hosting of SRRPAS

Operation support and hosting, available 24 hours a day, 7 days a week (24x7):

<DW International to submit detailed breakdown of services provided for operation support and hosting of the SRRPAS>

HOSTING:

The SRRPAS shall be operated by the Contractor and deployed across two geographically dispersed servers, at two different Data Centres, offering 24/7 service with a better than 99.5% availability. The below figure shows a high level depiction of the SRRPAS architecture.



The SRRPAS shall be hosted on an application server with a database back-end providing highly available file storage facilities. The server shall be fault-tolerant and shall include support for hot-swapping of essential hardware such as disks and power supplies.

The hardware shall consist of two servers, one for the redundant primary and mirror (2 in total) with the following minimum specification:

- Redundant Pair of Cisco firewalling Devices with IPSEC.
- Redundant Pair of Hardware Load Balancers balancing traffic at layer 4 100Mbit access switch ports with 1Gbps trunks between distribution, aggregation and core switching layers.
- Multiple upstream Internet providers shall be provided.
- Servers provided shall be HP Proliant DL360 G5 – E5335 Processor (Quad 2.0Ghz) – 4Gb Ram – 2x 72Gb SAS 10k Disks in Raid 1.

State of the art fire suppression facilities and fully backed up power supplies shall ensure the highest possible levels of availability for hosted systems. The SRRPAS shall be supported by a 24/7 monitoring and support presence on site in the Data Centre. Spare hardware shall be kept on site to enable fast recovery from failure.

The SRRPAS shall be subjected to a rigorous backup regime with daily system backups and off-site media storage.

The Contractor shall warrant that the SRRPAS conforms to the performance and hosting levels described above and in Attachment I, Technical Specifications Compliance Document, Section E, Article 5.7.

Operation support/ SRRPAS helpdesk:

The Contractor shall respond to queries related to the SRRPAS and its operation via the dedicated SRRPAS Helpdesk. The Contractor shall assist in resolving issues at application level, specifically:

- To support the quality of the GPS RAIM predictions.
- Monitoring and validation of the US Notice Advisory to NAVSTAR Users (NANU) Service and GPS NOTAMs/Almanacs.

The Contractor shall provide a dedicated point of contact for support issues, with the following support in English:

Email helpdesk:

- Automated issue ticket threading.
- Follow up and resolution in office hours (GMT).
- Reply timescale guarantee.

<DW International to provide email address for reaching the helpdesk>

Phone support:

- Emergency out of hours site down issues.
- Manned 24/7.
- On-call system for out-of-hours issues.
- On site data centre resource when necessary 24/7.

<DW International to provide phone numbers for reaching the helpdesk.>

Agenda Item 5: Operational implementation of new ATM automated systems and integration of the existing systems

5.1 Under this Agenda Item, the Meeting analysed the following papers:

a) WP/14 - *Follow-up to the interconnection of automated systems*, presented by the Secretariat;
b) WP/15 – *FPL Errors/Duplications*, presented by IATA;
c) WP/16 – *Pre-indicators on possible mid-air collisions*, presented by the Secretariat;
d) WP/17 – *Activities to be taken under consideration in the action plan of the Project Improve ATM Situational Awareness in the SAM Region*, presented by the Project C2 Coordinator C2*;*
e) WP/37 – *Intercambio de Datos Radar entre Sistemas Automatizados*, presented by Argentina; and
f) IP/09 – *Expanding ATS surveillance coverage via space-based ADS-B*, presented by Canada.

Follow-up to Project C1 (ATM automation) activities

5.2 The Meeting was informed of the results obtained during the Seminar/Workshop on Technical and Operational Aspects for the Implementation and Operation of Automated ATC Systems in the SAM Region, carried out in Sao Jose dos Campos, Brazil, 24 to 28 February 2014.

5.3 The Meeting took note of the conclusions and aspects pertaining to the seminar/workshop, shown in **Appendix A** to this Agenda Item. From the conclusions formulated, the following are to be highlighted:

a) Need to update the six (6) Memoranda of Understanding (MoU) established in the Region for the interconnection of automated systems between adjacent ACCs and signed between States with indications of their reach, implementation dates and focal points;
b) Need that all States of the Region update the SICD document;
c) Drafting and signature of new MoUs for the interconnection of automated systems considered of priority in the Declaration of Bogota for the period 2014-2016;
d) The possibility of using ASTERIX Cat 62/63 protocol for the fusion with the ASTERIX Cat 1/2 and 34/48 traces from the radars, be it via Multi Sensor Tracking, or mosaic, in the Atech SAGITARIO system;
e) The definition of a minimum set of AIDC messages to carry out coordinations and transfers, to be examined by the operational area of each State; and
f) The conduct of AIDC interconnection trials between the following States: Argentina–Paraguay, Argentina–Chile, Brazil–Paraguay and Brazil-Chile.

5.4 Also, the Meeting took note of the scheduling of the new seminar/workshop on automation, aimed at ATS personnel. It has been considered that same will be carried out in Lima, Peru, from 18 to 22 August 2014.

5.5 With regard to the AIDC trials, the Meeting took note of the progress made to date, which is described under Agenda Item 4.

5.6 Nevertheless, the topic related with the category of the ASTERIX protocol to be used in the interconnection of surveillance data between States was the main subject of discussion during the work of the Automation Group.

5.7 In this respect, the Meeting was informed that the INDRA AIRCON 2100 system installed in the Region does not have the capacity of fusing the system tracks (ASTERIX) with the rest of the sensor tracks, and that the implementation of this capability in the current systems would be a very costly solution.

5.8 On the other hand, Brazil indicated that the new Atech SAGITARIO system counts with this capacity and that same was demonstrated at the Seminar/Workshop on Technical and Operational Aspects for the Implementation and Operation of Automated ATC Systems in the SAM Region.

5.9 In addition, Brazil informed the Meeting that it had made consultations with the EUROCONTROL group, responsible for ASTERIX support, with regard to the fusion of the ASTERIX 62 protocol and other ASTERIX protocols into a radar data processor, receiving indications that even though this was unusual in Europe, this type of function was not forbidden and feasible for implementation.

5.10 As a result of the analysis, the Meeting deemed convenient that, for the moment, radar data interconnection between Brazil and the adjacent States having an INDRA system installed would not be undertaken until a feasible implementation is found for both parties.

5.11 In this regard, the Meeting examined the table containing the dates for the establishment of the interconnections, presented in **Appendix B** to this Agenda Item, as well as the updating of the MoU between Argentina-Brazil and Brazil-Peru. The Group also updated the MoU between Argentina-Chile y Argentina-Uruguay.

5.12 The Meeting took note of the IATA proposal to use a methodology for the submittance of flight plan information directly by the airlines through the AFTN/AMHS, with the aim of reducing human factor-related errors, which are around 90% of the errors in the flight plans. In this sense, taking into account that some States have started initiatives for the remittance of flight plans through the Internet or other means, it was decided that this proposal be sent to States for analysis by and applicability in each State and in the Region. In addition, the Meeting deemed convenient that the States of the Region inform of the actions being undertaken to mitigate the errors presented in the flight plans. In this respect, the Secretariat will send a letter requesting the afore indicated information.

Follow-up to the activities of Project C2 - Improve ATM Situational Awareness in the SAM Region

5.13 The Meeting examined SAM/IG/13-WP/17, through which the Project Coordinator informed of the progress achieved and the pending deliverables.

5.14 In this respect, the Meeting deemed it pertinent to draft an action plan for the implementation of ADS-B in the SAM Region, in accordance with the SAM PBIP harmonized with ASBU. For this task, consideration was given to count with the support of Brazil and Peru. The action plan will be presented at SAM/IG/14 Meeting.

5.15 With regard to the *Guideline on technical / operational considerations for MLAT implementation* pending development, the designation of a Brazilian expert is being awaited for, who will count with the support from experts of Bolivia and Peru. The Guideline will be presented at SAM/IG/14.

5.16 As to the pending *Guideline on technical considerations in support of ATFM*, the revised guide from the ATFM Group is expected, in order to have the operational requirements for the development of the guideline very well-defined.

5.17 The deliverables of the Project Improve ATM Situational Awareness in the SAM Region were updated, in accordance with the changes made to the tasks of the Project. The updated table is shown in **Appendix C** to this Agenda Item.

5.18 The Meeting was informed that many near-collision incidents had presented themselves in the Region, due to alarms in the TCAS RAs. In this regard, the Meeting considered convenient that automation at the ATS units and their interconnection would mitigate the occurrence of many of these events.

Considerations of space ADS-B

5.19 With regard to space ADS-B, the Meeting was informed that this new technology would become globally operational in 2017. The implementation of this system is due to the initiative of NAV CANADA, ENAV, Irish Aviation Authority (IAA), NAVIAIR (the ANSP for Denmark) and Iridium.

5.20 In this respect, to ensure the operational implementation of this system, amendments would have to be made to the use of the 1090 Mhz frequency, basically with respect to its protection on the side of the aircraft facing the satellite.

5.21 Therefore, the Meeting deemed convenient that the States of the Region, in view of the reach and usefulness of the system, count with the support necessary at the regional fora in preparation for the International Telecommunications Union (ITU) Fifteenth World Radiocommunication Conference (WRC-15), as well as in the WRC-15 itself, for the amendments required to provide greater protection to the 1090 Mhz frequency.

5.22 In addition, the Meeting considered of interest that NAV Canada would be invited to attend the Nineteenth Meeting on the improvement of Air Traffic Services over the South Atlantic (SAT/19), to be held in Buenos Aires, Argentina, from 4 to 8 August 2014, with the aim that it present in detail the technical-operational aspects of the satellite ADS-B and the advantages in its use.

APPENDIX A

CONCLUSIONS FORMULATED AT THE SEMINAR/WORKSHOP ON TECHNICAL AND OPERATIONAL ASPECTS FOR THE IMPLEMENTATION AND OPERATION OF ATC AUTOMATED SYSTEMS IN THE SAM REGION

(Sao José dos Campos, Brazil, 24 to 28 February 2014)

General considerations on the interconnection of automated systems

1. When implementing automated at ATS units, SAM States should take under consideration the regional document drafted to this end, uploaded in the ICAO SAM website http://www.icao.int/sam/pages/edocumentsdisplay.aspx?area=cns: Preliminary document containing automated systems requirements (SSS).

2. For the interconnection of automated systems in the SAM Region, States should consider the following documentation as support material, uploaded in the ICAO SAM website http://www.icao.int/sam/pages/edocumentsdisplay.aspx?area=cns:

   a) Plan for the regional interconnection of automated systems at the ACC;
   b) SICD document;
   c) Memorandum of Understanding (MoU) for the interconnection of automated systems between two States having adjacent ACCs; and
   d) Guide for AIDC implementation through the interconnection of adjacent automated centres.

3. States should inform of the changes made to the automated systems, with the aim of keeping the SICD document duly updated.

4. Draft MoU between parties involved, before starting with the interconnection of automated systems.

5. States should participate in the regional automation events programmed by ICAO.

6. Update the MoU established to date, introducing changes product of:

   a) Updating the implementation dates in accordance with the priorities established in the Bogota Declaration;
   b) Naming of new focal points; and
   c) New technical/operational considerations.

7. The updating of the already established MoUs (6) will be carried out at SAM/IG/13 meeting (Lima, Peru, 21-25 April 2014).

8. Comply with the interconnection of automated systems goals, in accordance with the commitment made by the directors general of civil aviation through the Bogota Declaration.

Surveillance systems considerations regarding interconnection of automated systems

9. ASTERIX 62 can be joined in a multisensor tracking or mosaic with radar tracks transmitted with ASTERIX 1, 2, 34 and 48 protocols, and use it as radar control within the area of responsibility (implemented in the ATECH automated systems, Model Sagitario, at the Atlántico, Brasilia, Curitiba, Manaus and Recife ACCs).

10. No calibration is required for the radar processor receiving the ASTERIX 62 protocol, under the premise that all control centres are under a unique time reference system (GPS).

11. With the aim of verifying the joining of the ASTERIX 62 protocol with other ASTERIX protocol (1.2.34 y 48), a teleconference will be conducted on the second week of May 2014 between the Brazil and Chile focal points, to coordinate the holding of trials. ASTERIX 65 protocol will also be tested.

12. The ICAO SAM Regional Office counts with focal points to coordinate the interconnection of automated systems with the following States: Argentina, Brazil, Chile, Ecuador, Peru, Uruguay and Venezuela. It is required that the remaining States having automated systems installed report on the names of the people to act as focal points to coordinate the required interconnections.

13. Establish a solution for the Exchange of radar data between States having difficulties in their implementation, particularly in the Exchange and processing of radar data using the ASTERIX 62 and ASTERIX 1, 2, 34 y 48 protocols.

14. The use of the 63 protocol is optional and would be used under agreement of the parties involved.

Communications systems considerations regarding interconnection of automated systems

15. Establish operational agreements defining the AIDC messages to be used within the minimum package of AIDC messages established in the Region, and take them under consideration in the respective operational letters of agreement.

16. That States of the Region having AIDC in their automated systems coordinate the holding of trials with adjacent States. In this regard, the holding of AIDC tests between the Curitiba ACC and Ezeiza ACC, Curitiba ACC and Santiago ACC and the Asunción ACC with the Curitiba ACC and Ezeiza ACC was considered upon.

17. A teleconference will be conducted on 12 March 2014 (already carried out) to establish the initial implementation coordinations for AIDC interconnection between Argentina-Brazil, Argentina-Paraguay, Brazil-Chile and Brazil-Paraguay.

18. Towards an integration between countries, the flight plan data processors can be provided by various providers (companies), but the data processing must possess the intelligence necessary to process what is compulsory and what is optional, without any type of rejection. The guide published by the ICAO SAM Regional Office, *Guide for AIDC implementation through the interconnection of adjacent automated centres*, defines what is compulsory and what is optional.

19. The messages selected for the AIDC should be part of the operational document of agreement for the coordination and transfer of messages.

20. In an integration of two control centres from two States, account should be taken on the possibility of having different equipment in their AIDC systems.

21. The discussions pertaining to the States' equipment should be addressed mainly to meet the operational needs of the control centres.

22. In this respect, were there to be differences in the States equipment systems, these should be discussed upon with their respective providers and operational managers.

23. For the normal coordination of AIDC, the ABI, CPL, CDN, ACP and LAN messages have been considered as of priority within the minimum set of messages in the SAM AIDC guide.

24. For a coordination where the transfer levels are kept to a determined fixed level, a process can be used with the ABI, EST and ACP messages.

25. For the transfer, the messages to use are the TOC, LAM and AOC.

26. In the event of not receiving an AIDC message, the coordination will be carried out via ATS speech circuit. Before the start-up of the AIDC, it is necessary that ATS staff receive the appropriate training and that they practice for a period maximum of two months, for their adaptation to automated operations.

APPENDIX B / APENDICE B

INTERCONNECTION OF AUTOMATED SYSTEMS – DATES OF IMPLEMENTATION
FECHAS DE IMPLANTACIÓN INTERCONEXION SISTEMAS AUTOMATIZADOS

State/ Estado	AIDC and Radar Data Interconnection Requirements/ Requerimientos de Interconexión AIDC y Datos Radar	MoU Date of Implementation/ Fecha Implantación MoU	AIDC and Radar Data Interconnection Date/ Fecha Interconexión AIDC y Datos Radar	Remarks/ Observaciones
Argentina	Bolivia	TBD	TBD	Bolivia has no automated systems/ Bolivia no cuenta con sistemas automatizados
	Brasil	2009	Aug 2014	Radar data exchange pending definition/ Pendiente definición intercambio datos radar
	Chile	2010	Jul 2014	Radar data exchange will be gradually implemented/ Se implantará el intercambio de datos radar en forma gradual
	Paraguay	May 2014	Dec 2014	
	Uruguay	2009	Jun 2014	
Bolivia	Brasil	TBD	TBD	Bolivia has no automated systems/ Bolivia no cuenta con sistemas automatizados
	Chile	TBD	TBD	
	Paraguay	TBD	TBD	
	Peru	TBD	TBD	
Brazil/Brasil	Colombia	Oct 2014	Jul 2015	
	Guyana	TBD	TBD	Define requirement/ Definir requerimiento
	French Guiana (France)	TBD	TBD	Define requirement/ Definir requerimiento
	Paraguay	Oct 2014	Mar 2015	
	Peru	2012	Sep 2014	Radar data exchange pending definition/ Pendiente definición intercambio datos radar
	Suriname	TBD	TBD	Define requirement/ Definir requerimiento
	Uruguay	2009	Aug 2014	Radar data exchange pending definition/ Pendiente definición intercambio datos radar
	Venezuela	2011	Dic 2013	
Chile	Peru	~~Jun 2014~~ TBD	~~Mar 2015~~TBD	Informed by Chile delegate during SAM/IG/13/ Informado por delegado Chile durante SAM/IG/13

State/ Estado	AIDC and Radar Data Interconnection Requirements/ Requerimientos de Interconexión AIDC y Datos Radar	MoU Date of Implementation/ Fecha Implantación MoU	AIDC and Radar Data Interconnection Date/ Fecha Interconexión AIDC y Datos Radar	Remarks/ Observaciones
Colombia	Ecuador	May 2014	Dic 2014	
	Panamá	May 2014	Dic 2014	
	Peru	Oct 2014	Jul 2015	
	Venezuela	Dec 2014	Dic 2015	
Ecuador	Peru	Oct 2013	Jun 2014	
French Guiana (France)/ Guyana Francesa (Francia)	Surinam	TBD	TBD	Define requirement/ Definir requerimiento
Guyana	Surinam	TBD	TBD	Define requirement/ Definir requerimiento
	Venezuela	TBD	TBD	Define requirement/ Definir requerimiento

APPENDIX C

SAM Region	PROJECT DESCRIPTION (PD)	PD N° C2	
Programme	**Project Title**	**Starting Date**	**Ending Date**
ATM Automation and Situational Awareness *(Programme Coordinator: Onofrio Smarrelli*)	Improve ATM Situational Awareness in the SAM Region *Project Coordinator: Paulo Vila (Peru)* *Contributing experts: José Rubira, Marcos Vidal and Jorge Otiniano (Peru); Javier Vittor (Argentina), André Jansen (Brazil)*	October 2011	May 2014
Objective	Develop guidelines supporting the implementation of improvements in the situational awareness of ATS units in the South American Region		
Scope	Guidelines supporting the implementation of various applications, such as common traffic visualization, common meteorological conditions visualization and communications in general • Analysis of the current surveillance infrastructure and identification of necessary improvements to support en route and terminal airspaces, airspace classification, PBN and ATFM • Implementation of ADS-B, ADS-c and/or MLAT surveillance systems at selected airspaces • Minimum common electronic information and data bases required in support of decision-making process and alert systems towards an interoperable situational awareness among centralized ATFM units • Implement flight plan data process systems (new FPL format) and data communications tools among ACC´s • Implement advanced automation support tools to contribute towards the sharing of aeronautical information		
Metrics	Drafting of following documents: • Regional surveillance strategy for the implementation of systems in support of improvement of situational awareness – revised • Evaluation of the surveillance systems coverage in the SAM Region - completed • Guideline on technical/operational considerations for ADS-B implementation – completed • Guideline on technical/operational considerations for MLAT implementation - completed • Guideline on technical considerations in support of ATFM implementation – completed • Guideline for the presentation of MET products in graphic fomat - completed		
Strategy	• All tasks will be conducted by experts nominated by States and organizations of the SAM Region members of the Project *Improve ATM situational awareness in the SAM Region*, under management of the project coordinator. Communications among project members, as well as between the project coordinator and programme coordinator, shall be carried out through teleconferences and the Internet. • Once studies are completed, the results will be submitted to the ICAO programme coordinator as a final consolidated document for its analysis, review, approval and presentation at the GREPECAS PPRC		

Goals	• Regional surveillance strategy for the implementation of systems in support to situational awareness improvement for July 2012 (completed) • Evaluation of SAM surveillance systems coverage for October 2012 (completed) • Guideline on technical/operational considerations for ADS-B implementation for June 2012 (completed) • Guideline for technical/operational considerations for MLAT implementation for May 2014
Justification	• Improve situational awareness has been identified as a great support for ATM, contributing in the increase of safety and in flight efficiency • In addition, a close relationship with the other programmes and their respective projects is necessary, with the aim of collecting the operational requirements demanded by the mentioned applications and their respective tentative implementation dates • This project contributes to the implementation of modules B0 ASUR, B0 SURV, B0 NOPS and B0 AMET of the *Air Navigation System Performance-Based Implementation Plan for the SAM Region (SAM PBIP)*
Related Projects	• Air Navigation Systems in Support of PBN • Automation • ATFM • ATN Ground-ground and Air-ground Applications

Project Deliverables	Relationship with Performance Based Regional Plan aligned with ASBU	Responsible	Status of Implementation[1]	Delivery Date	Remarks
Evaluation of surveillance infrastructure and identification of surveillance systems improvements					
Evaluation of current surveillance systems coverage in the SAM Region	PFF SAM CNS 04 B0 ASUR	Paulo Vila (Peru)		October 2012	Presented as Appendix to the Guideline on technical/operational considerations for ADS-B implementation.
Drafting of regional plan for ADS-B and MLAT implementation					
Guideline on technical/ operational considerations for ADS-B implementation	PFF SAM CNS 04 B0 SURF B0 ASUR	José Rubira (Peru) Marco Vidal (Peru)		October 2012	The Guideline includes comments from Brazil, Chile and Guyana, presented through SAM/IG/11-WP/06. The Meeting approved the Guide. Peru will later include considerations to determine the values recommended for NIC, SIL and NAC for operational application.
Guideline on technical/ operational considerations for MLAT implementation	PFF SAM CNS 04 B0 SURF B0 ASUR	(Brazil)		October 2014	The Guideline has not been started, as MLAT installation in Brazil is being awaited for.

1 ***Gray****: Activity has not started*
Green*: Activity has or will deliver planned milestone as scheduled*
Yellow*: Activity is behind schedule on milestone, but still within acceptable parameters to deliver milestone on time*
Red*: Activity has failed to deliver milestone on time, mitigation measures need to be identified and implemented*

Project Deliverables	Relationship with Performance Based Regional Plan aligned with ASBU	Responsible	Status of Implementation[1]	Delivery Date	Remarks
Guideline on technical considerations in support of ATFM implementation	PFF SAM ATM 05 B0 NOPS	Pending designation		TBD	The guideline will base itself on the CAR/SAM ATFM Manual approved through GREPECAS Conclusion 16/35. The ATFM Guide is being awaited for in order to define the operational requirements enabling the drafting of this Guideline.
Guideline for the presentation of MET products in graphical format	PFF SAM MET 03 B0 AMET	Jorge Otiniano (Peru)		2013	The document was delivered to the Secretariat (MET) for its review by the corresponding meteorology specialists.
Action plan for regional ADS-B implementation	BO 84	Paulo Vila (Peru)		October 2014	The action plan will be drafted by experts from Brazil and Peru.
Resources necessary	Experts in the carrying out of the deliverables				

Agenda Item 6: Transition from AIS to AIM

Status of implementation of electronic terrain and obstacle data (e-TOD) surveys in Areas 1 and 2

6.1 By analysing this Agenda item, the Meeting recalled that electronic terrain and obstacle data is to be used in various air navigation applications, namely:

a) the ground proximity warning system (GPWS), the main function of which is to avoid flight into terrain, and the minimum safe altitude warning (MSAW) system;

b) establishment of contingency procedures to be applied in emergencies during missed approach or rejected take-off;

c) analysis of aircraft operating limitations;

d) instrument procedure design (including circling approach procedure);

e) establishment of en-route cruise descent procedure and location for en-route emergency landing;

f) advanced surface movement guidance and control system (A-SMGCS); and

g) production of aeronautical charts and on-board databases.

6.2 Likewise, the Meeting recognized that the data can also be used in other applications, such as flight simulators and synthetic vision systems, and can help determine altitude restrictions or eliminate obstacles that represent a hazard for air navigation.

6.3 The Meeting noted that the electronic terrain and obstacle data sets for Areas 1 and 2 cover the following:

- **Area 1**: the entire territory of a State;
- **Area 2**: within the vicinity of an aerodrome, subdivided as follows:
  - **Area 2a**: a rectangular area around a runway that comprises the runway strip plus any clearway that exists;
  - **Area 2b**: an area extending from the ends of Area 2a in the direction of departure, with a length of 10 km and a splay of 15% to each side;
  - **Area 2c**: an area extending outside Area 2a and Area 2b at a distance of not more than 10 km from the boundary of Area 2a; and
  - **Area 2d**: an area outside the Areas 2a, 2b, and 2c up to a distance of 45 km from the aerodrome reference point, or to an existing TMA boundary, whichever is nearest.

6.4 Taking into account the importance of updating the progress in the implementation of electronic terrain and obstacle data (e-TOD) survey on Areas 1 and 2, States provided updated information contained in **Appendices A** and **B** to this part of the Report.

Update of aerodrome obstacle database

6.5 IATA emphasized the importance of updating the aerodrome obstacle database for safety purposes, as identified by the analytical groups of the Regional Aviation Safety Group – Pan America. SAM States were urged to update the database by inserting the new obstacles at their international aerodromes using WGS-84 systems.

6.6 The Meeting requested IATA to submit the Secretariat a list with those aerodromes identified as to require updating their aerodrome database, for the Regional Office to send a State letter asking for such update.

E-TOD implementation

6.7 The Meeting analysed as well the various important factors that need to be taken into consideration during the source data acquisition planning phase. These platforms include satellite-based, aerial-based and ground-based systems, along with the availability of ancillary sources, such as States AIP and the internet. Before the source data is acquired an organization needs to analyse the cost-effectiveness, acquisition methods, accuracy requirements as well as integrity and availability of the source data. One important factor is that source data collection methods that are incorporated for Areas 3 and 4, could technically be used for Areas 1 or 2, but are usually cost prohibitive.

6.8 Concerning the cost of this implementation, the Meeting considered it should be taken into account the possibility of performing the implementation of Area 2 –to be made available by 12 November 2015- through ICAO Technical Cooperation.

6.9 With regard to the aforesaid, the Meeting requested the Secretariat to send a State letter explaining the complexities of this implementation and to consult on the possibility of performing same through ICAO Technical Cooperation, with an international tender. It is estimated that the cost of e-TOD implementation should be proportional to the amount and complexity of airports to be surveyed in each State.

E-TOD training

6.10 The Meeting also asked the Secretariat to consult on the possibility of having e-TOD survey performing organizations to offer States e-TOD training courses or workshops. In such sense, it was deemed it advisable to conduct such courses or workshops in each State, in order to spread participation to all experts in this area.

6.11 Regarding the above, Jeppesen offered to cooperate with the region in the conduction of e-TOD courses for the States, coordinating them in such a manner as to optimise financial resources.

6.12 Depending on the number of States that required such training, the Secretariat of the ICAO South American Regional Office would coordinate the structure and venue of the course ensuring the best cost-benefit ratio for States and Jeppesen, to which it acknowledged for its offering, taking into account the proximity of the implementation date for Area 2, as defined in Annex 15.

Follow-up to the implementation of quality management systems (QMS) in AIM

6.13 Regarding this matter, the Meeting noted that 5 States are QMS certified in the SAM Region: **Brazil, Chile, Ecuador, French Guiana,** and **Paraguay.**

6.14 The Secretariat highlighted that the status of QMS implementation is very relevant for Headquarters, since the status of implementation in each State will be shown in the ICAO website throughout 2014 and therefore, the data collected must be sent for analysis. In the specific case of QMS implementation, the value to be taken into account is quality certification. Taking into account the aforesaid, the Meeting deemed it convenient to update the status of QMS implementation in the SAM Region, as shown in **Appendix C** to this part of the Report.

Aeronautical Information Management in the Brazilian AIM

6.15 The Meeting noted the development of Aeronautical Information Management in Brazil, as presented on IP/03, thanking the Brazilian Administration for the information provided.

APÉNDICE A / APPENDIX A

SEGUIMIENTO NIVEL DE IMPLANTACIÓN DE LA NORMA PARA LA PROVISIÓN DE DATOS ELECTRÓNICOS SOBRE EL TERRENO (E-TOD) PARA EL ÁREA 1 (Ref.: Anexo 15, 10.1.3)

FOLLOW-UP LEVEL OF IMPLEMENTATION OF THE STANDARD FOR THE PROVISION OF ELECTRONIC TERRAIN OBSTACLE DATA (E-TOD) FOR THE AREA 1 (Ref.: Annex 15, 10.1.3)

ESTADOS / STATES	**ARG**	**BOL**	**BRA**	**CHI**	**COL**	**ECU**	**GUY**	**FGU**	**PAN**	**PAR**	**PER**	**SUR**	**URU**	**VEN**
Modelo digital – DIGITAL MODEL														
¿Dispone la Oficina de un Modelo Digital del Terreno (MDT) o de un Modelo Digital de Elevación (MDE) u otro? (Especifique) / Does the Office have a Model for Digital Terrain (MDT) or a Model for Digital Elevation (MDE) or other? (Specify).	N	N[1]	Y[1]	N	Y[1]	N	N	Y[1]	N	N	N	N	N	Y
¿De dónde los obtuvo? (¿de la propia organización, de organización externa -¿cuál?) / Where did you obtain it? (from your organisation, an external organization - which?).	-	-	Y[2]	N	Y[2]	N	-	Y[2]	N	N	N	N	N	*[1]
¿Qué precisión tiene dicho modelo? / Which accurateness does this model have?	-	-	Y[3]	N	Y[3]	N	-	Y[3]	-	N	N	N	N	*[2]
¿Cumple con Tabla A8-1; requisitos de los datos sobre el terreno para el Área 1 del Anexo 15? / Does it comply with Table A8-1; data requirements for Annex 15, Area 1?	-	N/A	N[4]	N	N	N	N/A	Y[4]	-	N	N	N	N	Y
¿Dicho modelo cumple con la serie de Normas ISO 19110? (Sí/No) / Does such model comply with the series of ISO Standard 19110? (Yes/No)	-	N[4]	N[5]	N	Y[4]	N	N/A	Y[5]	-	N	N	-	N	Y
¿Qué precisión tiene dicho modelo? Which is the accurateness of such model?	-	-	-	-	-	-	N/A	-	-	-	N	-	-	*[3]

ESTADOS / STATES	ARG	BOL	BRA	CHI	COL	ECU	GUY	FGU	PAN	PAR	PER	SUR	URU	VEN
Obstáculos – OBSTACLES														
¿Dispone de una base de datos de obstáculos que abarque todo el territorio de su país? (Si/ No) / Is there an obstacle data base covering all territory in your country? (Yes/No).	Y[1]	N	Y[6]	N	Y[5]	N	N	Y[6]	P	N	N[1]	N	N[1]	N[4]
¿Cómo los obtuvo? (¿de la propia organización, de organización externa? -¿cuál?) / How did you get them (from your organization, from an external organization? – which?	Y[2]	N	Y[7]	N	Y[6]	N	N/A	Y[7]	-	N	Y[2]	-	N[2]	*[5]
¿Dichos datos cumplen con la serie de Normas ISO 19110? (Sí/No) / Does the data comply with the series of ISO Standard 19110? (Yes/No).	Y[3]	N	N[8]	N	N	N	N/A	N[8]	-	N	N	-	N[3]	Y
¿Cumple con Tabla A8-2; requisitos de los datos sobre obstáculos para el Área 1 del Anexo 15? / Does it comply with Table A8-1; data requirements on terrain for Annex 15 Area 1?	-	N	N[9]	N	N	N	N/A	N[9]	-	N	N	N	Y	Y
Planificación – PLANNING														
¿Ha establecido la Oficina un plan detallado con las tareas, plazos, análisis de riesgos, aspectos económicos y demás para la ejecución del proyecto de implantación del e-TOD para el Área 1? (Si/No). (Si la respuesta es Si, indicar plan y fechas de cumplimiento). / Has your office established a detailed plan with tasks, risk analysis, economical aspects, etc, for the execution of the e-TOD implementation project for Area 1 (Yes/No). (If answer is Yes, indicate plan and dates of compliance).	Y[4]	N	Y[10]	Y[1]	N	Y[1]	N	Y[10]	N	N	N	N	Y[4]	N

ESTADOS / STATES	ARG	BOL	BRA	CHI	COL	ECU	GUY	FGU	PAN	PAR	PER	SUR	URU	VEN
¿Ha definido la Oficina un manual de especificaciones técnicas para dicha implantación? (Si/No). (Consultar si se puede acceder al mismo). / Has the office defined a manual with technical specifications for such implementation? (Yes/No). (Ask if there is easy access to the same).	Y[5]	Y	Y[11]	Y	Y	Y	N	Y[11]	Y	Y	Y	Y	Y[5]	N
¿Ha definido y firmado Acuerdos de Nivel de Servicio (SLA) con los proveedores de datos? (Sí/ No). (Consultar si se puede obtener una copia modelo de los mismos). / Has your office defined and signed service level agreements (SLA) with data providers? (Yes/No). (Ask if there is an available copy of the same).	Y[6]	N	N	N	N	N	N	N[12]	N	N	N	N	Y[6]	N
¿Dispone de un programa de capacitación para aquellas personas que tengan que operar con los datos del e-TOD en la dependencia AIS? (Si/No). (Consultar si se puede acceder al mismo). / Is there a training programme for those persons that have to operate with e-TOD data in AIS unit? (Yes/ No). (Ask if the same may be accessed).	N	N	N[12]	N	Y	Y[2]	N	Y[13]	N	N	N	N	N	N
¿Se han tenido en cuenta los conceptos operacionales en este proyecto? (Si/No). (Comentar el plan). / Have operational concepts been taken into account? (Yes/No). (Comments on the plan).	N	N	N	N	Y	Y[3]	N	N[14]	-	N	N	N	N	-

ESTADOS / STATES	ARG	BOL	BRA	CHI	COL	ECU	GUY	FGU	PAN	PAR	PER	SUR	URU	VEN
¿La Oficina dispone de equipamiento y programas para la gestión de la información referida a e-TOD? (Sí/No). (En caso de respuesta Sí, indicar característica de los equipos y programas). / Does the office have equipment and programmes for information management referred to e-TOD? (Yes/No). (In case answer is Yes, indicate the characteristic of equipment and programmes).	N	N	Y[13]	N	Y[7]	Y[4]	N	N[15]	Y	N	Y[3]	N	Y[7]	N
¿Se han definido cronogramas y especificaciones para la carga y verificación de los datos referidos al e-TOD? (Sí/No). (En caso de respuesta Sí, indicar tiempos y formas de la verificación). / Have schedules and specifications been defined for the load and data verification referred to e-TOD? (Yes/No). (In case answer is Yes, indicate times and ways to check).	N[7]	N	Y[14]	N	N	Y[5]	N	N[16]	N	N	N	N	Y[8]	N

Y = Si / Yes
[1, 2, ….] = Ver comentarios / See comments
N = No
P = Parcialmente / Partially
N/A = No aplicable / Not applicable
S/R = Sin respuesta / Without answer

COMENTARIOS DE LOS ESTADOS / COMMENTS BY STATES

ESTADOS/ STATES	COMENTARIOS / COMMENTS
ARG	[1] Se dispone de datos de obstáculos que se están incorporando a una base de datos. / Obstacle data available, data being incorporated in a data base. [2] El proveedor es el departamento de aeródromos. / Aerodrome Department is the provider. [3] Se está evaluando. / Under assessment. [4] Está en proceso de elaboración. / In process of preparation. [5] Está en proceso de elaboración. / In process of preparation. [6] Está en proceso de elaboración. / In process of preparation. [7] En proceso de realización con el proveedor. / Under process of implementation by the provider.
BOL	[1] Las elevaciones de los obstáculos están en base a las elevaciones proporcionadas por el Estado Plurinacional de Bolivia. / Obstacles are in base to elevations provided by Plurinational State of Bolivia. [2] Del Instituto Geográfico Militar/IGM. / From the IGM. [3] Las elevaciones del IGM tiene una precisión de 1 x 10^{-4}. / IGM elevations have a precision of 1 x 10^{-4}. [4] No se tiene implantado el Sistema de Gestión de la Calidad. / Quality assurance system is not implemented.
BRA	[1] Brasil tiene un modelo digital para terreno (MDT) para el Área e-TOD 1 (todo el territorio nacional). Para las otras áreas Brasil adoptará modelo digital de superficie (MDS). / Brazil has the digital terrain model (DTM) for the e-TOD Area 1 (all national territory). For the other areas, Brazil will adopt the digital surface model (DSM). [2] El modelo digital de terreno para el Área 1 e-TOD comprende líneas de contorno y puntos ploteados en 3D obtenidos de las cartas aeronáuticas con una escala de 1:250,000 y cartas topográficas con escalas de 1:100,000 y 1:50,000. Las Cartas Aeronáuticas se producen por el ICA y las cartas topográficas se producen por agencias federales encargadas de la cartografía del territorio nacional. Para áreas del territorio nacional en que no existen los productos mencionados, se usa el modelo digital de terreno derivado del SRTM y disponible libre de cargo por el gobierno de EEUU. El modelo digital de superficie para las otras áreas se encuentra en preparación por parte de ICA (Instituto de la Cartografía Aeronáutica, la agencia brasileña responsable de la preparación de cartas aeronáuticas, publicaciones AIS e e-TOD), y se obtiene por medio de fotografías aéreas. / The digital terrain model for the e-TOD Area 1 comprises contour lines and points plotted in 3D obtained from the aeronautical charts with a scale of 1:250,000 and topographical charts with scales of 1:100,000 and 1:50,000. Aeronautical charts are produced in the Air Force Institute of Cartography (ICA) and topographical charts are produced by federal agencies that have the allocation of mapping the national territory. For areas of national territory where the mentioned products do not exist, it is used the digital terrain model derived from the Shuttle Radar Topography Mission (SRTM) and available free of charge by the U.S. Government. The digital surface model for the other e-TOD areas is being made by ICA (Aeronautical Cartography Institute, the Brazilian agency responsible for the aeronautical charts, AIS publications and e-TOD) through aerophotogrammetry. [3] La precisión del modelo digital de terreno para un área particular geográfica dependerá de la información utilizada, de acuerdo a los siguientes valores:/ The accurateness of the model digital terrain for a particular geographic area will depend on the input used, according to the following values: • Cartas aeronáuticas a escala/aeronautical charts at scale of 1:250,000 = altimetry (±50 m to 70 m) and planimetry (±125m to 250 m); • Cartas topográficas a escala/topographical charts at scale of 1:100,000 = altimetry (±-25 m to 37.5 m) and planimetry (±50m to 100 m);

ESTADOS/ STATES	COMENTARIOS / COMMENTS
	• Cartas topográficas a escala/topographical charts at scale of 1:50.000 = altimetry (±10 m to 15 m) and planimetry (± 25m to 50 m); • SRTM =±20m en altimetría, pero hay discrepancias en areas que presentan valores de altitud / SRTM =±20m in altimetry, but there are discrepancies in areas that present altitude values. Se obtendrá la precisión del modelo digital de superficie con el fin de cumplir con las recomendaciones de la OACI. / The accurateness of the digital surface model will be obtained in order to comply with the recommendations of the ICAO. [4] Todos los ítems cumplen con los requerimientos, con la excepción de la precisión vertical y precisión horizontal, cuando el modelo digital de terreno se obtiene por la carta a escala 1:250,000, carta a escala 1:100,000 y por SRTM debido a que dichos datos comprenden valores menos exactos que aquellos definidos en la Tabla A8-1. / All items comply with the requirements with the exception of vertical accuracy and horizontal accuracy, when the digital terrain model is obtained by aeronautical chart at scale of 1:250,000, topographical chart at scale of 1:100,000 and by SRTM because such data comprises values less accurate than those defined in Table A8-1. [5] Las series de la norma ISO 19110 todavía serán estudiadas e implantadas. / The series of ISO Standard 19110 will still be studied and implemented. [6] Hay una base de datos nacional, pero no se asegura que el 100% de obstáculos de más de 100 metros sean registrados en la base de datos, tal como se requiere en el Anexo 15 para el área 1 e-TOD, debido a regulaciones recientes que son efectivas desde el 2011 (Orden No.256/GM5). / There is a national database, but it is not assured that 100% of obstacles of more than 100 meters are registered in the database, as required by Annex 15 for the e-TOD area 1, due to the recent regulations that are effective as of 2011 (order N.256/GM5). [7] Los obstáculos se obtienen a través de estudios topográficos llevados a cabo por el ICA o a través de diversas organizaciones nacionales responsables del control regional de los obstáculos y la navegación. / Obstacles are obtained through topographic survey conducted by the air force institute of cartography (ICA) or through the other organizations that are responsible for the regional control of obstacles and air navigation. [8] Las series ISO 19110 aún serán estudiadas e implantadas. / The series of ISO standard 19110 will still be studied and implemented. [9] Los datos obtenidos por el ICA cumplen con la Tabla A8-2. Los datos procedentes de fuentes externas sólo se incluirán en la base de datos de obstáculos si cumplen con los requisitos de la Tabla A8-2, debido a la nueva legislación (CIRCEA 53-2), que entró en vigor en 2013. Sin embargo, no es posible garantizar el cumplimiento de estos requisitos para los datos existentes en la base de datos antes de que la legislación citada. / Data from external sources will only be included in the database of obstacles if they comply with the requirements of Table A8-2, due to new legislation (CIRCEA 53-2), which entered into force in 2013. However, it is not possible to ensure compliance with these requirements for existing data in the database before the cited legislation. [10] El plan de Acción está implantado / Action Plan implemented [11] Brasil estableció un manual de especificaciones técnicas que definen el proceso de recolección, procesamiento, distribución y almacenamiento de los datos recogidos por fotogrametría. Sin embargo, se está evaluando la posibilidad de adoptar otros métodos de recolección de datos, así como la adición de mejoras en el proceso que se utiliza en la actualidad, por lo que este manual está en proceso de revisión. / Brazil established a technical specification manual defining the process of collecting, processing, distribution and storage of the data collected through photogrammetry. However, other methods of data collection are being considered, as well as adding improvements to the process that is used today, so this manual is under revision. [12] Los técnicos que trabajan con la adquisición y tratamiento de datos Aerofotogramétricos tenían formación adecuada, sin embargo, no existe un plan

ESTADOS/ STATES	COMENTARIOS / COMMENTS
	formal para el mantenimiento de la capacitación. El establecimiento de este plan es parte del Proyecto AIM-BR, creado para gestionar la transición del AIS a AIM. / Technicians working with the acquisition and processing of photogrammetric data has proper training, however, there is no formal plan for continuous training. The establishment of this plan is part of AIM-BR Project, created to manage the transition from AIS to AIM. [13] El sector responsable de e-TOD está equipado con 4 estaciones de trabajo con ajuste apropiado para la actividad, incluidos los monitores y ratones 3D y almacenamiento de datos de alta capacidad. Los programas más utilizados son ArcGIS, ERDAS LPS y Global Mapper. / The sector responsible for e-TOD is equipped with 4 workstations appropriate for the activity, including monitors and mice 3D and high data storage capacity. The most used programs are ArcGIS, ERDAS LPS and Global Mapper. [14] Se establecieron las especificaciones de carga y verificación de datos e-TOD, formalizado en una guía de instrucciones para los operadores. El cronograma establecido se está revisando, y será parte del plan del proyecto e-TOD (véase la respuesta 10). / Load and e-TOD data verification specifications were established, formalized in an instruction guide for operators. The schedules are being revised, and will be part of the e-TOD project plan (see item 10).
CHI	[1] Hay establecido un grupo de trabajo que ha definido un Proyecto de Plan con tareas, plazos, análisis de riesgos y aspectos económicos para la implantación de la Áreas 1, 2, 3 y 4. El citado Proyecto de Plan está en una etapa de evaluación, por lo cual aún no se ha definido un calendario de ejecución. / There is a work group which has defined a Plan Project with tasks, deadlines, risk analysis and economical aspects for the implementation of Areas 1, 2, 3 and 4. The mentioned Plan Project is under assessment, and for this reason an implementation calendar has not been defined yet.
COL	[1] Se dispone de un DTM. / There is a DTM. [2] Instituto Geográfico Agustín Codazzi. IGAC. [3] 30 metros. / 30 mts. [4] Es producido con estándares IPGH. / Produced with IPGH standards. [5] Base de datos Programa FEAMAN, GFEAMAN, ARGIS, MICROESTATION / Data Base Programme FEAMAN, GFEAMAN, ARGIS, MICROESTATION. [6] Diversas fuentes externas / Different external sources [7] Programas FEAMAN, GFEAMAN, ARGIS, MICROESTATION / Programmes FEAMAN, GFEAMAN, ARGIS, MICROESTATION.
ECU	[1] El Plan de implementación e-TOD – SIG está planificado realizarlos desde el 2014 al 2016. / e-TOD - SIG implementation plan is planned to be carried out starting in 2014 to 2016. [2] Dentro del proyecto de implantación del SIG y e-TOD, se contempla la capacitación del personal AIM responsable del mismo. / Training of AIM personnel responsible for the SIG and e-TOD Project is contemplated within its implementation. [3] El plan contempla los nuevos requisitos que emanan del concepto operacional de ATM mundial; los servicios de información aeronáutica deben integrarse en un concepto más amplio de gestión de la Información Aeronáutica centrada en los datos y también se tiene en cuenta lo establecido en la hoja de ruta de transición del AIS al AIM de Ecuador. / The plan contemplates new requirements which emanate from the global ATM operational concept; the aeronautical information services must be integrated within an ample concept of aeronautical information management centered in data and also what is established in the roadmap for transition from AIS to AIM of Ecuador. [4] Personal AIS/MAP con experiencia y conocimientos básicos de GIS. / AIS/MAP personnel with experience and basic knowledge of GIS. Software Microstation 95, ArcGIS 9 (En proceso de compra de licencias). / Microstation 95, ArcGIS 9 software (under process of licenses acquisition).

ESTADOS/ STATES	COMENTARIOS / COMMENTS
	[5] El cronograma estará basado en tiempo establecido para el desarrollo del proyecto, seguimiento a través de Indicadores de cumplimiento de cada etapa./The Schedule is based in time established for the development of the project, follow-up through indicators of compliance in each stage.
GUY	Estamos en el proceso de entrenar al personal para establecer una dependencia MAP para el AIS. / We are in the process of of training personnel to establish a MAP unit for the AIS.
FGU	[1] Modelo Terreno Digital (DTM). / Digital Terrain Model (DTM). [2] Organización externa: Institut Geographique National (the French National Geodetic and Mapping Agency) – ver AIC A 2008_31 (https://www.sia.aviation- ‐ civile.gouv.fr/dossier%5Caicfrancea%5CAIC_A_2008_31_EN.pdf). Las condiciones para adquirir estos datos (licencias) se encuentran en el catálogo IGN. / External organization: Institut Geographique National (the French National Geodetic and Mapping Agency) – see AIC A 2008_31 (https://www.sia.aviation- ‐ civile.gouv.fr/dossier%5Caicfrancea%5CAIC_A_2008_31_EN.pdf). The conditions relating to acquisition of these datasets (licensing) are provided in the IGN catalogue. [3] El producto IGN BD ALTI® es una descripción de referencia terrestre del territorio Francés. Los Modelos DTM (Modelos Terrestres Digital) y contornos describiendo el terreno a diferentes escalas (de 1:50 000 a 1:1 000 000) se derivan del BD ALTI ®. El BD ALTI® consiste en archivos de vector estructurados del escaneo de contornos del terreno francés. El intervalo de contorno puede variar de 5 a 40 m. Los datos se ingresan en mapas IGN a 1:25 000 a 1:50 000 y de fotografías adicionales a 1:20 000; 1:30.000 y 1:60 000. / IGN BD ALTI® product is a terrain reference description of French territory. DTM (Digital Terrain Models) and contours describing the terrain at different scales (from 1:50 000 to 1:1 000 000) are derived from the BD ALTI ®. The BD ALTI® consists of structured vector files from scanning all the contours of French terrain. The contour interval can range from 5 to 40 m. Data is entered on IGN maps at 1:25 000 at 1:50 000 and from additional aerial photographs at 1:20 000; 1:30.000 and 1:60 000. [4] Excepto en áreas escarpadas donde el IGN-F recolecta datos adicionales para mejorar la precisión. / Except in very steep areas where IGN-F is collecting additional data to improve accuracy. [5] Los metadatos se pueden obtener gratuitamente en el website de IGN-F, en francés. / Metadata is provided free on IGN-F website, in French. [6] La recolección y evaluación de los datos existentes está en proceso. Nuevos estudios se realizan cada año (por ejemplo en Guyana Francesa en 2011 y en el Caribe en 2012). / Gathering and assessments of existing data are on going. New surveys are scheduled every year (e.g. in French Guiana in 2011 and the Caribbean in 2012). Obstrucciones aisladas artificiales aparecen en el AIP francés. / Artificial Isolated Obstructions are listed in French AIP; (see/ver: https://www.sia.aviation-civile.gouv.fr/aip/enligne/uk/..%5CPDF_AIPparSSection%5CAIP%20FRANCE%5CENR%5C5%5C1201_ENR--5.4.pdf). [7] De nuestra organización con apoyo de IGN-F. / From our organization with IGN-F support. [8] En proceso, con apoyo de IGN-F. / On going with IGN-F support. [9] La evaluación de datos existentes está en proceso, con apoyo de IGN-F. Los datos nuevos serán compatibles de conformidad con los acuerdos de nivel servicios (SLA) con los proveedores de datos. / Assessments of existing data are on going with IGN-F support. New data will be compliant according to service level agreements (SLA) with data providers. [10] En proceso, con apoyo de IGN-F. / On going with IGN-F support. [11] EUROCONTROL está escribiendo un Manual de Datos de Obstáculos del Terreno, un material de guía de datos de obstáculo en el terreno, de acuerdo al Anexo 15 de la OACI. La primera edición del Manual de Datos de Obstáculos del Terreno ha sido evaluado por un Estudio de Pilotos Suizo-Francés para poner el e-TOD en práctica. / EUROCONTROL (European organisation for the safety of air navigation) is writing a “Terrain and Obstacle Data Manual”, a guidance material on the provision of Terrain and Obstacle Data (TOD) in accordance with ICAO Annex 15. First release of “Terrain and Obstacle Data Manual” has been evaluated through a Swiss-French Pilot Study in view of putting eTOD into practice.

ESTADOS/ STATES	COMENTARIOS / COMMENTS
	[12] En proceso. / On-going, [13] El entrenamiento en todas las ediciones geodéticas y de cartas. / The training is global on all the geodetic and charting issues. [14] En proceso. / On-going. [15] Varios Sistemas de Información Geográfica (GIS) como ESRI ArcGIS. / Various Geographic Information Systems (GIS) such as ESRI ArcGIS. [16] En proceso. / On-going.
PER	[1] Sólo se dispone de información gráfica aislada de obstáculos de algunos aeródromos y que aparecen en algunas cartas aeronáuticas, no se encuentra en una base de datos. / Only isolated obstacle graphical information available of some aerodromes and shown in some aeronautical charts, not found in a data base. [2] De levantamientos topográficos realizados por la propia organización. / Topographical surveying by same organization. [3]Se cuenta con equipos de medición GPS R8 diferencial y estación total TOPOCON 7500, 02 estaciones de trabajo HP Z800, software de diseño CAD./ GPS R8 differential measuring equipment available and total station TOPOCON 7500, 02 workstations HP Z800, CAD design software.
URU	[1] En proceso. / On-going. [2] En proceso. De la propia Organización y externa. IGM – Instituto Geográfico Militar. / Ongoing. From the organisation and outised source. IGM. [3] En proceso. / Ongoing. [4] 2011 - 2015 [5] En proceso. / On-going. [6] En proceso. / On-going. [7] Sistema de Información Geográfica ARC-GIS ESRI. / Geographical Information System ARC-GIS ESRI. [8] 2011 – 2015.
VEN	*[1] De organización externa. / Outside sources. Souttle Radar Topography Mission-National Geospatial Inteligence Agency (NGA) y/and National Aeronautics and Space Administration (NASA). *[2] 90 metros. / 90 mts. *[3] 90 metros. / 90 mts. *[4] Se tiene archivos de trabajos geodésicos para los Aeropuertos Internacionales de Venezuela, donde hay obstáculos en el alrededor y aprox del aeropuerto. / There are geodetic work files for International Airports in Venezuela, where there are obsctacles around and approx to the airport. [5] Los archivos mencionados anteriormente se obtuvieron por trabajos de la propia organización. / The files previously mentioned were obtained by works of the same organisation. El Servicio AIS de Venezuela a fines de 2013 adquirió un GIS que está en Fase 1 de ejecución (completar Base de datos estructurados y no estructurados) para generar un AIP electrónico. En la Fase 2 se adquirirá el Módulo e-TOD para gestionar la base de datos e-TOD de obstáculos y terreno que afectan las Áreas 1, 2 y 3 de los aeropuertos internacionales y espacios aéreos adyacentes.en Venezuela. / By end 2013 AIS Service in Venezuela acquired a GIS which is in execution phase 1 (complete structured and no structured database) to generate electronic AIP. In phase 2 e-TOD module will be acquired to manage e-TOD obstacle and terrain database affecting Areas 1, 2 and 3 of international airports and adjacent airspace in Venezuela.

APÉNDICE B / APPENDIX B

SEGUIMIENTO NIVEL DE IMPLANTACIÓN DE LA NORMA PARA LA PROVISIÓN DE DATOS ELECTRÓNICOS SOBRE EL TERRENO y OBSTÁCULOS PARA EL ÁREA 2 (E-TOD) (Ref.: Anexo 15, Cap.10)

FOLLOW-UP LEVEL OF IMPLEMENTATION OF THE STANDARD FOR THE PROVISION OF ELECTRONIC TERRAIN and OBSTACLE DATA (E-TOD) FOR THE AREA 2 (Ref.: Annex 15, Chap.10)

ESTADOS /STATES	ARG	BOL	BRA	CHI	COL	ECU	GUY	FGU	PAN	PAR	PER	SUR	URU	VEN
Modelo digital – DIGITAL MODEL														
¿Tiene su Estado desarrollado un Plan de Acción para proporcionar a partir del 12 de noviembre de 2015 los datos electrónicos sobre obstáculos situados en el ÁREA 2 que constituyan un peligro para la seguridad aérea?/ Has your State developed an Action Plan to provide from 12 November 2015, electronic data on obstacle located on AREA 2 that constitute a hazard to air safety?	N	N	Y	P1	N	P			Y	Y	N		N	N
¿Tiene su Estado desarrollado un Plan de Acción para proporcionar a partir del 12 de noviembre de 2015 los datos electrónicos sobre terreno correspondiente al ÁREA 2a? / Has your State developed an Action Plan to provide from 12 November 2015, electronic data on terrain corresponding to AREA 2a?	N	Y	Y	Y	N	P			Y	N	N		N	N

ESTADOS /STATES	ARG	BOL	BRA	CHI	COL	ECU	GUY	FGU	PAN	PAR	PER	SUR	URU	VEN
¿Tiene su Estado desarrollado un Plan de Acción para proporcionar a partir del 12 de noviembre de 2015 los datos electrónicos sobre <u>terreno</u> correspondiente a la trayectoria de despegue? / Has your State developed an Action Plan to provide from 12 November 2015, electronic data on <u>terrain</u> corresponding to the take-off path?	N	N	Y	Y	N	P			Y	O/G	N		N	N
¿Tiene su Estado desarrollado un Plan de Acción para proporcionar a partir del 12 de noviembre de 2015 los datos electrónicos sobre <u>terreno</u> correspondiente al área delimitada por las extensiones laterales de las superficies limitadoras de obstáculo de Aeródromo? / Has your State developed an Action Plan to provide from 12 November 2015, electronic data on <u>terrain</u> corresponding to the area bounded by the lateral extensions of the aerodrome obstacle limitation surfaces?	N	Y	Y	Y	N	N			Y	N	N		N	N
Obstáculos – OBSTACLES														
¿Tiene su Estado desarrollado un Plan de Acción para proporcionar a partir del 12 de noviembre de 2015 los datos electrónicos sobre <u>obstáculos</u> situados en el ÁREA 2a que penetran la superficie de recopilación de datos sobre obstáculos apropiada especificada en el APN 8 del Anexo 15? / Has your State developed an Action Plan to provide from 12 November 2015, electronic data on <u>obstacle</u> located in AREA 2a that penetrate the appropriate obstacle data collection surface specified on Appendix 8 to Annex 15?	N	Y	Y	Y	N	P			Y	Y	N		N	N

ESTADOS /STATES	ARG	BOL	BRA	CHI	COL	ECU	GUY	FGU	PAN	PAR	PER	SUR	URU	VEN
¿Tiene su Estado desarrollado un Plan de Acción para proporcionar a partir del 12 de noviembre de 2015 los datos electrónicos sobre objetos situados en el área de la trayectoria de despegue que sobresalgan de una superficie plana que tenga una pendiente de 1,2% y el mismo origen que el área de trayectoria de despegue? / Has your State developed and Action Plan to provide from 12 November 2015, electronic data on objects located in the take-off path area that protrude from a flat surface with a slope of 1,2% and have the same origin as the take-off path?	N	N	Y	Y	N	P			Y	Y1	N		N	N
¿Tiene su Estado desarrollado un Plan de Acción para proporcionar a partir del 12 de noviembre de 2015 los datos electrónicos sobre penetraciones de las superficies limitadoras de obstáculos del aeródromo? / Has your State developed and Action Plan to provide from 12 November 2015, electronic data on penetrations to aerodrome obstacle limitation surfaces?	N	Y1	Y	Y	N	P			Y	O/G	N		N	N

Y = SI / Yes
1, 2, …. = Ver comentarios / See comments
N = No
P = Parcialmente / Partially
N/A = No aplicable / Not applicable
S/R = Sin respuesta / Without answer
O/G= En marcha/ On Going

ESTADOS/ STATES	COMENTARIOS DE LOS ESTADOS / COMMENTS BY STATES
ARG	
BOL	No hay Base de datos. / No Data Base.
BRA	Plan de acción desarrollado e implementado. /Action Plan developed and implemented.
CHI	Y1 Parcialmente. Area 2d no considerada por alto costo de implantación. / Partially. Area 2d not considered due to high implementation cost. Año 2014 Datos de Aeropuerto Arturo Benitez . / Year 2014 data of Arturo Benitez airport. Año 2015 Aeropuertos de Challuta (Arica), Aeropuerto Diego Aracena (Iquique) y Aeropuerto Cerro Moreno (Antofagasta). / Year 2015 Challuta Airport (Arica), Diego Aracena Airport (Iquique) and Cerro Moreno Airport (Antofagasta).
COL	
ECU	Basados en la Declaración de Bogotá firmada en 2013. Se estima que el Ecuador podrá proporcionar los datos electrónicos sobre el terreno a partir de noviembre de 2016, de acuerdo al plan de trabajo establecido en la Hoja de Ruta del AIS al AIM. El cumplimiento parcial se debe a que el AIS no podrá realizar hasta el año 2015 el levantamiento de la información requerida para el Área 2 de todos sus aeropuertos. / Based on the Declaration of Bogota signed on 2013. It is foreseen that Ecuador will be able to submit electronic terrain data by November 2016, according to the work plan established by the AIS to AIM roadmap. The partial compliance is due to the fact that Ecuador will not be able to collect the information required for Area 2 in all airports until 2015.
FGU	
GUY	
FGU	
PAR	Y1 Solo Aeropuerto Pettirossi. / Only Pettirossi Airport.
PER	

ESTADOS/ STATES	COMENTARIOS DE LOS ESTADOS / COMMENTS BY STATES
URU	Se está trabajando en la recopilación de datos sobre obstáculos a nivel de todo el país, pero no específicamente sobre el Área 2. / We are working gathering data about obstacles at the whole country, but not specifically on the Area 2. No dispone por el momento de un Modelo Digital del Terreno. / A Digital Terrain Model is not available at this moment.
VEN	El Servicio AIS de Venezuela a fines de 2013 adquirió un GIS que está en Fase 1 de ejecución (completar Base de datos estructurados y no estructurados) para generar un AIP electrónico. En la Fase 2 se adquirirá el Módulo e-TOD para gestionar la base de datos e-TOD de obstáculos y Terreno que afectan las Áreas 1, 2 y 3 de los aeropuertos internacionales y espacios aéreos adyacentes.en Venezuela. / By end 2013 AIS Service in Venezuela acquired a GIS which is in execution phase 1 (complete structured and no structured database) to generate electronic AIP. In phase 2 e-TOD module will be acquired to manage e-TOD obstacle and terrain database affecting Areas 1, 2 and 3 of international airports and adjacent airspace in Venezuela.

APÉNDICE / APPENDIX C

ESTADO DE IMPLANTACIÓN DEL QMS EN LA REGIÓN SAM / STATUS OF QMS IMPLEMENTATION IN THE SAM REGION

ESTADO/ STATE	EN PROCESO/ IN PROCESS	IMPLANTADO/ IMPLEMENTED	AUDITADO/ AUDITED	CERTIFICADO/ CERTIFIED	% DE EJECUCIÓN/ % OF EXECUTION	FECHA FINAL/ FINAL DATE	OBSERVACIONES/ REMARKS
Argentina	X				50	SEP 2014	Se están identificando y describiendo procesos. / Processes are being identified and described. ARO/AIS Sep 2014.
Bolivia	X				30	JUL 2015	
Brasil/ Brazil	X	X	X	X	100	-------	NOTAM, AIP y MAP certificado / certified y ARO en proceso / in process. 85% completado / completed. 2014.
Colombia	X	X	X		90	SEP 2014	Actualmente se efectúan auditorías internas de control de la implantación y se ajustan los procedimientos y registros inherentes al proceso AIM. / Currently internal control audits are carried out to control implementation and registrations inherent to AIM are adjusted.
Chile		X	X	X	100	-------	ISO 9001:2008

ESTADO/ STATE	EN PROCESO/ IN PROCESS	IMPLANTADO/ IMPLEMENTED	AUDITADO/ AUDITED	CERTIFICADO/ CERTIFIED	% DE EJECUCIÓN/ % OF EXECUTION	FECHA FINAL/ FINAL DATE	OBSERVACIONES/ REMARKS
Ecuador		X	X	X	100	-------	ISO 9001:2008. En proceso de re-certificación para los años 2014 al 2016. / ISO 9001:2008. In process of re-certification by 2014 to 2016
Guyana	X				25	DIC / DEC 2015	Algo de entrenamiento recibido. / Some training received. Personal temporal. / Temporary Staff.
Guayana Francesa / French Guiana				X			
Panamá / Panama	X				50	AGO / AUG 2015	Con adquisición de nuevos sistemas automatizados se están efectuando cambios en los procesos y procedimientos. / With the acquisition of new automated systems changes in processes and procedures are being made.
Paraguay		X	X	X	100	-------	ISO 9001:2008. Paraguay Re-Certificado 2013 / Paraguay Re-certificated 2013.
Perú / Peru	X				60	AGO / AUG 2015	Se estableció un equipo de trabajo para QMS en el AIM / A work team for QMS has been established at AIM.
Suriname	X				45	AGO / AUG 2014	

ESTADO/ STATE	EN PROCESO/ IN PROCESS	IMPLANTADO/ IMPLEMENTED	AUDITADO/ AUDITED	CERTIFICADO/ CERTIFIED	% DE EJECUCIÓN/ % OF EXECUTION	FECHA FINAL/ FINAL DATE	OBSERVACIONES/ REMARKS
Uruguay	X				95	MAR 2015	
Venezuela	X				70	NOV 2014	Información por correo electrónico. / Information through e-mail.
Fecha de actualización / Date updated:			**25/04/2014**				

Agenda Item 7: Other issues

Matters related to safety and coordination procedures in Letters of Operational Agreement

7.1 The Meeting took note that the Thirteenth Meeting of the GREPECAS Scrutiny Group (GTE/13), held in Lima on 9 to 13 September 2013, made a safety assessment of RVSM airspace in CAR/SAM FIRs. The meeting noted the evolution of large height deviations (LHDs) in the CAR/SAM FIRs, mainly in M and N categories.

7.2 An analysis of the high number of "M" and "N" coded LHDs shows the need for a better coordination between adjacent air traffic control units, which could be achieved by sensitising and training controllers in coordination matters, and by better describing the procedures in the Letters of Operational Agreement.

7.3 Upon reviewing the points of transfer corresponding to the SAM Region in **Table 1**, the Meeting felt that consideration should be given, both specifically and generally, to the inclusion in the Letters of Agreement of procedures to mitigate this type of errors, especially at the points shown in the following table:

LHD	**YEARS**	
Points	**2012**	**8 months of 2013**
VESKA	**80**	**34**
PIGBI	**35**	**19**
VAKUD	**28**	**17**
PALAS	**24**	**11**
SBAODIII2	**22**	**22**
SBAOSUEO	**23**	**21**
IREMI	**19**	**12**
BEROX	**14**	**12**

Table 1

7.4 The Meeting also noted that some FIRs had decided to automate transfers to minimize problems with flight plan reception, flight plan duplication, the lack of transfer specifications on aircraft attitude (climb/descent), or the delivery of a flight at the level at which traffic will be delivered.

7.5 The Secretariat requested the States signing the Letters of Agreement to take into account these issues in their updates, as a matter of priority for safety purposes.

Flow control measures established in coordination procedures contained in ATS Letters of Operational Agreement

7.6 The Meeting took note that an inconvenient practice established in the Region was the introduction of traffic flow restrictions by means of NOTAMs or ATFM messages, limiting flow to one aircraft every 10 minutes, regardless of flight level or regardless of transfer point.

7.7 In this regard, the Meeting was informed that at the ATS 06/14 Multilateral Meeting held in Santa Cruz, Bolivia, on 10-14 February 2014, the participating States analysed these subjects and agreed to draft a paragraph on coordination, asking not to apply this kind of flow controls in view of their negative impact on safety, capacity and efficiency, and on the workload of air traffic controllers in adjacent FIRs.

7.8 In said meeting, the text used by States in their Letters of Agreement was as follows:

<u>FLOW CONTROL MEASURES</u>: *Flow control measures may by applied with the least possible impact on ACCs involved. Restrictions at transfer points involving time spacing with independency of flight level affecting capacity and efficiency of the considered airspace and of other non-adjacent FIRs, may be avoided. At the same time, supervisors of both ACC, consensually, will manage flexibility of measures and consider special cases by establishing holding points, if necessary, at the FIR implementing the measure.*

7.9 The Meeting analysed the negative impact on the capacity, efficiency, and safety of adjacent airspaces, the significant increase of controller workload, and financial damages to users and passengers.

7.10 In this regard, the Secretariat recommended the use of text on flow control measures used at the ATS 06/14 Multilateral Meeting for inclusion in the Letters of Agreement, as a standard to ensure capacity, efficiency, and safety in face of air traffic control measures that are not consistent with the ATFM Operational Concept.

7.11 Some States expressed that if there were some type of measures that were inconsistent with the ATFM concept, they would warrant a declaration of contingency, and accordingly, the Contingency Plan approved amongst the States should be put in practice.

7.12 Moreover, the Meeting considered of utmost priority that necessary and urgent actions should be taken for States to avoid the adoption of unilateral flow restrictions, mainly such based on time, not considering the possibility of vertical separation, as for instance, the acceptance of only one aircraft every 10 minutes, regardless of flight level. Such measures could severely affect air traffic flow.

7.13 In this regard, the Meeting agreed that in case flow control measures would be required, separations based on distance should be applied by taking advantage of existing ATS surveillance tools. The adoption of such measures should be based on well-founded studies of ATS sector capacities and previously coordinated with ATC dependencies responsible for ATC supply in adjacent FIRs.

7.14 In such regard, the Meeting adopted following Conclusion:

Conclusion SAM-IG/13-8: Actions on air traffic flow control measures

That in view of air traffic flow operational restrictions, SAM States adopt following measures:

a) consider the text on flow control measures used in the ATS 06/14 Multilateral Meeting, or similar, for inclusion in the Letters of Operational Agreement between ATS dependencies;

b) consider of utmost priority to take necessary and urgent actions to avoid the adoption of unilateral flow restrictions that could severely affect air traffic flow;

c) implement air traffic flow control measures, if necessary, based on well-founded studies of ATS sector capacities, and coordinate same previously with ATC dependencies responsible for ATS supply in adjacent FIRs.

d) consider the application of gradual control measures using as far as possible separations based on distance, by taking advantage of existing ATS surveillance tools;

e) use in messages established for communicating flow control measures, terminology and format as detailed in Manual on Air Traffic Flow Management for CAR/SAM Regions, Version 1.1, October 2010, Chapters 12 and 13.

Updated Letters of Operational Agreement

7.15 The States that updated their Letters of Operational Agreement are listed in **Appendix A** to this part of the report.

Contingency Plans of Argentina with Paraguay and Bolivia

7.16 The administrations of Argentina, Bolivia, and Paraguay attached the Contingency Plans to the Letters of Agreement updated at the ATS 06/14 Multilateral Meeting.

Alternate aerodrome selection provisions

7.17 At the request of IATA, the Meeting analysed amendment 36 to Annex 6, Part I, "*Alternate aerodrome selection and fuel planning provisions*".

7.18 The Meeting took note that the main purpose of amendment 36 was to introduce globally harmonized planning criteria for the selection of alternate aerodromes and pre-flight calculation of total fuel supply.

7.19 Under the conditions mentioned on the amendment 36, the exception to avoid selecting a destination alternate aerodrome was a feasible option for the airlines while increasing the efficiency, reducing the CO_2 emission and keeping a high level of safety for the operations.

7.20 In this regard, the Meeting instructed the Secretariat to prepare a working paper for the next SAM/IG meeting, since this implementation required a Regional Agreement, and the proposal had many implications that must be taken into consideration within a regional context.

SAM ATS route optimisation

7.21 Under this agenda item, the Meeting recalled that the Route Optimisation Programme was analysed by the ATS/RO meetings, in accordance with the agreed planning.

7.22 In this regard, the Secretariat received information on the implementation of Route UN775 in Argentinian airspace, which had been previously analysed in Version 2 of the Route Network. Given its significant operational benefits, it was important to begin the amendment process.

7.23 The Secretariat recalled that the platform used by Headquarters for proposals of amendment to the Air Navigation Plan was migrating to a new system within the on-line amendment restructuring plan and, therefore, approval by the Council could take longer than usual.

7.24 It was agreed with Argentina that the publication of the corresponding AIC for the implementation of Route UN775 would have to wait until receiving the approval of the Council, which would be communicated directly by the Secretariat to the focal point of the Administration in order to follow the AIM processes 56 days before the AIRAC date.

7.25 The proposals set forth in the second part of the implementation of Version 2 are still scheduled for November, provided any required coordination is done *via* teleconference and the States provide timely data as needed to support the corresponding amendments.

7.26 Regarding the above, the Secretariat acknowledged the delegate of IATA for providing supplementary information for the amendment of Route UN775.

Peruvian airspace reorganisation programme and implementation of performance-based navigation - PROESA /PBN

7.27 On this matter, the Meeting took note that the PROESA Project of Peru has completed the PBN design phase and was starting validation activities, to which end it had the support of domestic air operators LAN and TACA, facilitating flight simulation to analyse and obtain feedback on aircraft performance and safety aspects. Likewise, the IATA Office in Lima provides significant technical support.

7.28 At the same time, the PROESA operational scenario and airspaces are being fed to the simulator database of the new Lima ACC (AIRCON 2100 radar system) with a view to analysing safety aspects - SMS, as well as tactical elements and workloads for the management of the new procedures and ATS routes. With this, the system would be ready for the stage of training of CORPAC ATCO personnel.

7.29 The Secretariat acknowledged the information and congratulated the implementation team for the progress made. Full information on this Project is contained in SAM/IG/13-IP/10.

Air traffic control simulator of Ecuador

7.30 The Meeting took note that the implementation of the Air Traffic Simulator Project was completed in 2013 and was delivered to the institution in September of that same year. Since then, 18 training courses have been provided on Aerodrome control, Radar Control, and Area Control. Furthermore, study programmes have been developed and On-the-job training (OJT), Air Traffic Control Oversight, and ATM courses have started. Full information on this Project is found in SAM/IG/13-IP/11.

Implementation of activities contemplated in Project RLA/06/901

7.31 The Meeting took note of the scope of the activities supported by Project RLA/06/901, which include ongoing projects in the AGA, AIM, ATM, CNS and MET areas that need to receive support for the implementation of their priorities, in accordance with the regional plan.

7.32 It was also noted that Project Document RLA/06/901 signed by the participating States included, as its executing mechanism, the Coordination Committee Meeting (RCC) that is held annually, in which the Secretariat submits to the States an annual report on project implementation. The States assess the project and the Secretariat also submits to the consideration of the States the plan of activities for the subsequent year and its budget.

7.33 However, the Meeting indicated that the activities proposed for receiving Project support be analysed by the respective technical fora, either the SAM/IG or other mechanism established by the SAM Regional Office.

7.34 Taking into account the increased complexity of the decision-making process for setting priorities, given the increased number of activities supported by Project RLA/06/901, the Meeting considered that the proposed activities should be duly substantiated with full background information so that States could consider their inclusion within Project activities. Likewise, the Meeting insisted on the need to continue with the normal practice of publishing working papers duly in advance to allow for a better assessment by the States, 30 days in advance.

IATA safety events indicators

7.35 The Meeting noted, by heads of delegation of SAM States, that safety events presented by IATA, based on information collected from the Flight Operations Quality Assurance (FOQA), offer objective data on such events. Such data was presented on the Nineteenth Meeting of the Regional Aviation Safety Group – Pan America (RASG-PA) Executive Steering Committee, which indicated the requirement of immediate actions to be taken by Regional Offices and States.

7.36 Considering the above, as well as the relevance and clarity of the data presented, the Meeting adopted following Conclusion:

Conclusion SAM/IG/13-9 IATA safety events indicators for SAM States

Encourage States to develop, jointly with operators, Secretariat and other ATM community stakeholders deemed relevant, the methodology allowing the use of the data on safety events and indicators registered by airlines through IATA, in order to identify and mitigate any potential risk to operations, setting goals, priority areas and action plan.

CARTAS DE ACUERDO OPERACIONAL - SUDAMÉRICA
OPERATIONAL LETTERS OF AGREEMENT - SOUTH AMERICA

ESTADO / STATE	ACC	Cartas de Acuerdo Internacionales / International Letter of Agreement	Existe requisito operacional para Carta de Acuerdo (Si/No) / Is there an operational requirement for Letter of Agreement (Yes/No)	Fecha de la Carta vigente/ Date of the LOA in force	Existe necesidad de actualizar la Carta de Acuerdo (Si/No) / Is there a need to update the Letter of Agreement (Yes/No)	Borrador enviado a la Oficina SAM (Si/No) / Draft sent to SAM Regional Office (Yes/No)	Borrador final enviado a la Oficina SAM (Si/No) / Final Draft sent to SAM Regional Office (Yes/No)	Carta de Acuedo firmada / Letter of Agreement signed
ARGENTINA	Comodoro Rivadavia	Punta Arenas	SI/YES	2006	SI/YES			NO
		Johannesburgo	SI/YES	2010	SI/YES			NO
	Ezeiza	Montevideo	SI/YES	2011	SI/YES			NO
		Santiago	SI/YES	2006	SI/YES			NO
		Johannesburgo	SI/YES	2010	SI/YES			NO
		Puerto Montt	SI/YES	2006	SI/YES			NO
		Declaración Conjunta / Joint Declaration Gobierno de Argentina - Reino Unido / UK	SI/YES[1]	1991	SI/YES			NO
	Mendoza	Santiago	SI/YES	2006	SI/YES			NO
	Córdoba	Antofagasta	SI/YES	2006	SI/YES			NO
		La Paz	SI/YES	2014	NO			SI/YES
	Resistencia	Asunción	SI /YES	2014	NO			SI/YES
		Curitiba	SI/YES	2011	SI/YES			NO
		La Paz	SI/YES	2014	NO			SI/YES
		Montevideo	SI/YES	2011	SI/YES			NO

[1] Nota 1/Note 1: Existe un procedimiento operacional transitorio que involucra a las FIRs Atlántico, Montevideo y Ezeiza (Reunión Multilateral ATM/CNS, Lima, Perú 14-18 de setiembre de 2009) / There exists a transitory operational procedure involving FIRs Atlantico, Montevideo and Ezeiza (ATM/CNS Multilateral Meeting, Lima, Peru 14-18 September 2009

ESTADO / STATE	**ACC**	**Cartas de Acuerdo Internacionales / International Letter of Agreement**	**Existe requisito operacional para Carta de Acuerdo (Si/No) / Is there an operational requirement for Letter of Agreement (Yes/No)**	**Fecha de la Carta vigente/ Date of the LOA in force**	**Existe necesidad de actualizar la Carta de Acuerdo (Si/No) / Is there a need to update the Letter of Agreement (Yes/No)**	**Borrador enviado a la Oficina SAM (Si/No) / Draft sent to SAM Regional Office (Yes/No)**	**Borrador final enviado a la Oficina SAM (Si/No) / Final Draft sent to SAM Regional Office (Yes/No)**	**Carta de Acuedo firmada / Letter of Agreement signed**
BOLIVIA	La Paz	Amazónico	SI/YES	26/07/14	NO	SI/YES		
		Curitiba	SI/YES	26/07/14	NO	SI/YES		
		Asunción	SI/YES	20/03/14	NO	SI/YES		
		Córdoba	SI/YES	20/03/14	NO	SI/YES		
		Resistencia	SI/YES (nuevo / new)	20/03/14	NO	SI/YES		
		Antofagasta	SI/YES	18/12/08	SI/YES	SI/YES		
		Lima	SI/YES	24/06/14	NO	SI/YES		
BRASIL / BRAZIL	Atlántico							
		Cayenne	SI/YES	20/01/05	SI/YES	NO	NO	NO
		Dakar	SI/YES	20/01/04	SI/YES	NO	NO	NO
		Johannesburgh	SI/YES	11/11/13	NO	NO	NO	NO
		Montevideo	NO	--	SI/YES	NO	NO	NO
		Asunción	SI/YES	07/07/05	SI/YES	NO	NO	NO
		Luanda	SI/YES	08/07/04	SI/YES	NO	NO	NO
	Curitiba	Montevideo	SI/YES	18/11/10 AP.1 26/05/11	NO	NO	SI/YES	SI/YES
		Resistencia	SI/YES	18/11/10 AP.1 26/05/11	NO	NO	NO	NO
		Asunción	SI/YES	18/11/10	SI/YES	SI/YES	SI/YES	SI/YES
		La Paz	SI/YES	18/11/10	SI/YES	SI/YES	SI/YES	SI/YES
		La Paz (Corumbá/Puerto Suarez)	SI/YES	18/11/10	SI/YES	SI/YES	SI/YES	SI/YES

ESTADO / STATE	ACC	Cartas de Acuerdo Internacionales / International Letter of Agreement	Existe requisito operacional para Carta de Acuerdo (Si/No) / Is there an operational requirement for Letter of Agreement (Yes/No)	Fecha de la Carta vigente/ Date of the LOA in force	Existe necesidad de actualizar la Carta de Acuerdo (Si/No) / Is there a need to update the Letter of Agreement (Yes/No)	Borrador enviado a la Oficina SAM (Si/No) / Draft sent to SAM Regional Office (Yes/No)	Borrador final enviado a la Oficina SAM (Si/No) / Final Draft sent to SAM Regional Office (Yes/No)	Carta de Acuedo firmada / Letter of Agreement signed
BRASIL / BRAZIL	Brasilia	La Paz	SI/YES	18/11/10	SI/YES	SI/YES	NO	NO
	Amazónica	La Paz	SI/YES	18/11/10	SI/YES	SI/YES	SI/YES	SI/YES
		Lima	SI/YES	18/11/10	SI/YES	SI/YES	SI/YES	SI/YES
		Bogotá	SI/YES	18/11/10	SI/YES	SI/YES	SI/YES	SI/YES
		Maiquetía	SI/YES	18/11/10	SI/YES	SI/YES	SI/YES	SI/YES
		Georgetown	SI/YES	20/01/05	SI/YES	SI/YES	NO	NO
		Paramaribo	SI/YES	20/01/05	SI/YES	NO	NO	NO
		Cayenne	SI/YES	20/01/05	SI/YES	SI/YES	SI/YES	SI/YES
COLOMBIA	Barranquilla	Panamá						
		Kingston	SI/YES	30/08/13	NO	NO		
		Curaçao						
		Maiquetía						
	Bogotá	Guayaquil	SI/YES		SI/YES	SI/YES		
		CENAMER	SI/YES	15/05/13	NO	NO		
		Panamá	SI/YES	09/09/08	SI/YES	SI/YES		
		Maiquetía	SI/YES	20/04/12	SI/YES	SI/YES		
		Amazónico	SI/YES	11/09/07	SI/YES	SI/YES		
CHILE	Santiago	Córdoba		14/02/08	SI/YES			
		La Paz		18/12/08	SI/YES			
		Lima		18/12/08	SI/YES			
	Isla de Pascua	Lima		18/12/08	SI/YES			
	Puerto Montt	Ezeiza	SI/YES	14/02/08	SI/YES			
		Comodoro Rivadavia	SI/YES	14/02/08	SI/YES			

ESTADO / STATE	ACC	Cartas de Acuerdo Internacionales / International Letter of Agreement	Existe requisito operacional para Carta de Acuerdo (Si/No) / Is there an operational requirement for Letter of Agreement (Yes/No)	Fecha de la Carta vigente/ Date of the LOA in force	Existe necesidad de actualizar la Carta de Acuerdo (Si/No) / Is there a need to update the Letter of Agreement (Yes/No)	Borrador enviado a la Oficina SAM (Si/No) / Draft sent to SAM Regional Office (Yes/No)	Borrador final enviado a la Oficina SAM (Si/No) / Final Draft sent to SAM Regional Office (Yes/No)	Carta de Acuedo firmada / Letter of Agreement signed
CHILE	Punta Arenas	Comodoro Rivadavia	SI/YES	14/02/08	SI/YES			
	Santiago	Mendoza	SI/YES	14/02/08	SI/YES			
		Córdoba	SI/YES	14/02/08	SI/YES			
		Ezeiza	SI/YES	14/02/08	SI/YES			
ECUADOR	Guayaquil	CENAMER						
		Bogotá						
		Lima						
FRANCIA / FRANCE	Rochambeau	Paramaribo	SI/YES	06/11/13	NO		NO	SI/YES
		Piarco	SI/YES	20/01/05	SI/YES	NO		
		Atlántico	SI/YES	03/08/12	NO		NO	SI/YES
		Amazónico	SI/YES	20/01/09	SI/YES	SI/YES		
		Dakar	SI/YES	03/12/12	NO		NO	SI/YES
GUYANA	Georgetown	Maiquetía	SI/YES	20/01/05	SI/YES	SI/YES		
		Piarco	SI/YES	20/01/05	SI/YES	NO		
		Paramaribo	SI/YES	20/01/05	SI/YES	NO		
		Amazónico	SI/YES	20/01/05	SI/YES	SI/YES		
PANAMÁ	Panamá	Bogotá						
		CENAMER						
		Kingston						
		Barranquilla						

ESTADO / STATE	ACC	Cartas de Acuerdo Internacionales / International Letter of Agreement	Existe requisito operacional para Carta de Acuerdo (Si/No) / Is there an operational requirement for Letter of Agreement (Yes/No)	Fecha de la Carta vigente/ Date of the LOA in force	Existe necesidad de actualizar la Carta de Acuerdo (Si/No) / Is there a need to update the Letter of Agreement (Yes/No)	Borrador enviado a la Oficina SAM (Si/No) / Draft sent to SAM Regional Office (Yes/No)	Borrador final enviado a la Oficina SAM (Si/No) / Final Draft sent to SAM Regional Office (Yes/No)	Carta de Acuedo firmada / Letter of Agreement signed
PARAGUAY	Asunción	Resistencia	SI/YES	20/03/14	NO	NO		
		Córdoba	SI/YES	20/03/14	NO	NO		
		La Paz	SI/YES	24/06/14 Vigencia	NO	NO		
		Curitiba						
PERÚ	Lima	Guayaquil	SI/YES	23/12/11	SI/YES	NO		
		Bogotá	SI/YES	26/06/14	NO	--		
		Amazónico	SI/YES	16/05/09	NO	--		
		La Paz	SI/YES	26/06/14	NO	SI/YES		
		Antofagasta	SI/YES	18/12/08	SI/YES	NO		
SURINAME	Paramaribo	Georgetown						
		Piarco						
		Rochambeau						
		Amazónico						
URUGUAY	Montevideo	Curitiba	SI/YES	18/11/19 AP.1 25/05/11	SI/YES	NO		Actualizadas 24/04/14
		Atlántico	SI/YES	*Nil	SI/YES	NO		NO
		Resistencia[2]	SI/YES	10/03/11	SI/YES	NO		25/04/14
		Ezeiza	SI/YES	10/03/11	SI/YES	NO		25/04/14

[2] Nota 2 / Note 2: Existe un procedimiento operacional transitorio que involucra a las FIRs Atlántico, Montevideo y Ezeiza (Reunión Multilateral ATM/CNS, Lima, Perú, 14-18 de septiembre 2009) / There exists a transitory operational procedure involving FIRs Atlantico, Montevideo and Ezeiza (ATM/CNS Multilateral Meeting, Lima, Peru, 14-18 September 2009).

ESTADO / STATE	ACC	Cartas de Acuerdo Internacionales / International Letter of Agreement	Existe requisito operacional para Carta de Acuerdo (Si/No) / Is there an operational requirement for Letter of Agreement (Yes/No)	Fecha de la Carta vigente/ Date of the LOA in force	Existe necesidad de actualizar la Carta de Acuerdo (Si/No) / Is there a need to update the Letter of Agreement (Yes/No)	Borrador enviado a la Oficina SAM (Si/No) / Draft sent to SAM Regional Office (Yes/No)	Borrador final enviado a la Oficina SAM (Si/No) / Final Draft sent to SAM Regional Office (Yes/No)	Carta de Acuedo firmada / Letter of Agreement signed
VENEZUELA		Bogotá	En proceso de actualización / In updating process	23/04/14	NO			
		Barranquilla	NO	JUN 09	NO	NO		
		Curaçao	SI/YES	JUN 11	SI/YES			
		San Juan	SI/YES	JUN 08	SI/YES			
		Piarco	SI/YES	SEP 10	SI/YES			
		Georgetown	SI/YES	DIC 04	SI/YES			
		Amazónico	En proceso de actualización / In updating process	23/04/14	NO			