SAM/IG/1

INTERNATIONAL CIVIL AVIATION ORGANIZATION

First Workshop/Meeting of the SAM Implementation Group
Regional Project RLA/06/901

(SAM IG/1)

FINAL REPORT

Lima, Peru, 21 to 25 April 2008

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INDEX

i - Index i-1

ii - History of the Meeting ii-1
Place and duration of the Meeting ii-1
Opening ceremony and other matters ii-1
Schedule, Organization, Working Methods, Officers and Secretariat ii-1
Working languages ii-1
Agenda ii-2
Attendance ii-2

iii - List of participants iii-1

Report on Agenda Item 1: 1-1
Optimization of the ATS routes structure in Terminal and en-route airspace and implementation of performance based navigation (PBN) in the SAM Region.

Report on Agenda Item 2: 2-1
Implementation of air traffic flow management (ATFM) in the SAM Region.

Report on Agenda Item 3: 3-1
Assessment of operational requirements in order to determine the implementation of improvement of communications and surveillance (CNS) capabilities for en-route and terminal area operations.

Report on Agenda Item 4: 4-1
Operational implementation of new ATM automated systems and integration of the existing systems

Report on Agenda Item 5: 5-1
Other Issues

HISTORY OF THE MEETING

ii-1 PLACE AND DURATION OF THE MEETING

The First Workshop/Meeting of the SAM Implementation Group (SAM/IG/1) was held at the premises of the ICAO South American Regional Office in Lima, Peru, under the auspices of Regional Project RLA/06/901.

ii-2 OPENING CEREMONY AND OTHER MATTERS

Mr. Jose Miguel Ceppi, Regional Director of the ICAO South American Office, greeted the participants and expressed his gratitude to DGCA Peru, and to the Peruvian Corporation and Commercial Aviation (CORPAC) for the continuous support provided to activities developed at regional scale by the South American Office, as well as to the civil aviation authorities and national and private organizations of the ICAO South American Region. He pointed out the importance of issues to be dealt with in the agenda of the First Workshop/Meeting, which will permit the optimization of international air navigation and its results, will converge in a air traffic management system as envisaged in the global ATM operational concept. Last, he emphasized that the goal of Project RLA/06/901, which sponsored this First Implementation Workshop/Meeting, is to attain interoperability and continuity for all users during all the flight phases through regions, to satisfy safety levels agreed, to procure economically optimal operations, to be environmentally sustainable, and to satisfy national safety requirements.

Mr. Ernesto Lopez Mareovich, General Director of Civil Aviation of Peru, welcomed the participant highlighting the importance that issues to be examined have at regional level, opening the meeting.

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

The Meeting agreed to hold its sessions from 0800 to 1500 hours, with appropriate breaks. The work was done with the Meeting as a Single Committee, Working Groups and Ad-hoc Groups.

Mr. Rafael Sánchez Greiner, delegate from Venezuela, served as Chairman of the Meeting and Rapporteur of the Scrutiny Working Group.

Mr. Jorge Fernández Demarco, RO/ATM/SAR of ICAO Regional Office, Lima, acted as Secretary, assisted by Messrs. Onofrio Smarrelli, RO/CNS, and Alberto Orero, RO/ATM/SAR/AIM, from the Lima Office. Likewise, the Secretariat had the support of the Implementation Groups Rapporteurs, conformed during the Meeting/Workshop to analyze de different agenda items.

ii-4 WORKING LANGUAGES

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

ii-5 AGENDA

The following agenda was adopted:

Agenda Item 1: Optimization of the ATS routes structure in Terminal and en-route airspace and implementation of performance based navigation (PBN) in the SAM Region.

Agenda Item 2: Implementation of air traffic flow management (ATFM) in the SAM Region.

Agenda Item 3: Assessment of operational requirements in order to determine the implementation of improvement of communications and surveillance (CNS) capabilities for en-route and terminal area operations.

Agenda Item 4: Operational implementation of new ATM automated systems and integration of the existing systems

Agenda Item 5: Other issues

ii-6 ATTENDANCE

The meeting was attended by 30 participants from 8 States of the SAM Region, and 3 International Organizations, ALTA, ARINC and IATA. The list of participants is shown in pages iii-1 to iii-5.

ii-7 LIST OF CONCLUSIONS

Conclusion No.	Conclusion Title	Page
1-1	CAR/SAM PBN Roadmap	1-3
1-2	Revision of Table CNS 2 A of FASID	3-1
1-3	Update of Tables CNS 1Ba and 1Bb of FASID	3-2
1-4	Update of Tables CNS 4A of FASID	3-3
1-5	Adoption of Action Plan models to improve communications and surveillance systems for the en-route and terminal area operations	3-3
1-6	Hiring of experts for the activities aimed at improving communications and surveillance systems	3-4
1-7	Adoption of the Action Plan for the regional interconnection of automated systems	4-5

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Agenda Item 1: Optimization of the ATS routes structure in Terminal and en-route airspace and implementation of performance based navigation (PBN) in the SAM Region.

Performance-based navigation (PBN)

1.1 The meeting recalled that according with the Global Air Navigation Plan planning reviewed (Doc 9750), planning was focused in the group of Global Plan Initiatives (GPIs). These initiatives are options for improvement for air traffic management, which, as they are implemented, will result in a direct improvement in performance. Project RLA/06/901 proposes, among other activities, to provide assistance to States and Organizations participating in the implementation of initiative GPI-5 – Performance-Based Navigation.

1.2 The meeting expressed that a significant number of aircraft have the capacity required for area navigation (RNAV) and the required navigation performance (RNP). These capacities should be further exploited to develop more efficient routes and aircraft paths that are not directly linked to air navigation ground aids. Some RNAV-equipped aircraft are also capable of better meeting runway sequencing requirements, especially through the use of the "required time of arrival" function of the flight management system (FMS).

1.3 The performance-based navigation (PBN) concept, recognises that, when designating operations, a clear distinction must be made between aircraft operations that require an airborne autonomous performance control and alert system (RNP) and those that do not require it (RNAV). The global navigation satellite navigation (GNSS)-oriented PBN permits a seamless, harmonious and profitable navigation from departure to final approach, thus resulting in safety, efficiency and capacity benefits. Short-term GNSS applications are aimed at enabling the early introduction of satellite-based air navigation, without the need to invest in infrastructure, using the basic satellite constellations and the integrated multiple-sensor systems on board the aircraft. The use of these systems already provides greater reliability of non-precision approach operations at some airports.

Situation foreseen upon completion of the project

1.4 At the end of the project, the coordinated and homogeneous implementation of performance-based navigation through the use of various initiatives of the global air navigation plan in the SAM region will have been accomplished, together with the exchange of experiences throughout the process, and of information and knowledge through meetings, seminars and other training activities, with a view to the application of the performance-based navigation (PBN) concept, which will translate into greater capacity and efficiency through reduced separation minima, thus benefiting operators that equip their aircraft to meet performance requirements. PBN will also enhance safety, particularly during approach, through a reduction of controlled flight into terrain events.

Immediate objectives of Project RLA/06/901

1.5 The Project has defined several immediate objectives oriented towards the implementation of a safe, integrated, interoperable, and cost-efficient regional ATM system, within a global safety and interoperability framework that meets the needs of international civil aviation**.** Immediate objective N° 1 contemplates the development and implementation of ATM and CNS operabilities based on the global air navigation plan initiatives that will lead to the transition from an air traffic management system based on ground systems to another one based on aircraft performance. In this connection, Immediate Objective N° 1 contemplates a series of activities oriented to performance-based navigation (PBN) framed within GPIs 5, 7, 10, 11, 12 and 21. For a better ease of reference, these activities are attached as **Appendix A** to this part of the report.

1.6 It was also recalled that GREPECAS/14, through Conclusion 14/41 has defined and approved ATM Performance Objectives supported by a series of Global Plan Initiatives which includes ATS routes structure optimisation, within the terminal, and en-route airspace and the implementation of RNP approaches which shall enable to obtain benefits in the fields of environment, efficiency and safety. For a better reference, **Appendix B** to this part of the report includes these performance objectives.

CAR/SAM Roadmap for Performance-based navigation

1.7 The meeting recalled that during GREPECAS/14 (San Jose, Costa Rica, 16 – 20 April 2007), an implementation strategy for performance-based navigation (PBN) was also established in the CAR and SAM Regions at short-term (until 2010) and mid-term (2011-2015) which was included in Document CAR/SAM PBN Roadmap. In view of the above, the GREPECAS/14 meeting approved Conclusion 14/46, *"CAR/SAM Roadmap for PBN"*, encouraging States/Territories/International Organizations to adopt and apply the CAR/SAM PBN Roadmap, as approved by GREPECAS.

1.8 PBN implementation planning in the CAR/SAM Regions was practically completed with the approval of the CAR/SAM PBN Roadmap, being now the main task of the PBN Task Force to harmonise PBN implementation in the CAR and SAM Regions, taking into account the need to avoid multiple ATC procedures and operational approval processes.

1.9 Keeping in mind that CAR/SAM PBN Roadmap proposes the implementation of RNAV5 en-route and that it shall involve more than one State, Territory and International Organization, it shall be appropriate that CAR and SAM implementation groups apply the RNAV and RNP navigation specifications described in such roadmap.

1.10 Regarding RNAV/RNP implementation in terminal areas and approach, guidelines have also been prepared so that States develop their own national plans of action.

1.11 PBN Manual, ICAO Doc 9613, *Manual on Required Navigation Performance (RNP),* has valuable material and has been taken as reference for the preparation of national regulations, as well as in implementation programmes for the PBN concept. In view of the above, the meeting formulated the following Conclusion:

Conclusion SAM/IG/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.

Proposed Terms of Reference and Work Programme for South American Region PBN Implementation Group (SAM/PBN/IG)

1.12 The complexity of the tasks to be developed by the SAM implementation Group, led to the need for the creation of a PBN implementation group in the SAM Region (SAM/PBN/IG), with the main objective to assist States in the development of its activities, evaluate the guidance material developed by experts hired by Project RLA/06/901, and watch that activities described in the corresponding action plans be complied.

1.13 The SAM/PBN/IG established a group for the drafting of documentation in order to prepare the documents for its meetings as well as the report in each SAM/IG meeting, with the support of the Secretariat, of matters dealing with PBN.

SAM/PBN/IG Terms of Reference and Work Programme

1.14 The meeting prepared the Terms of Reference and Work Programme for the SAM Region PBN Implementation Working Group (SAM/PBN/IG) shown in **Appendix D** to this part of the report.

1.15 The SAM/PBN/IG high level tasks should be divided in specific tasks, with the establishment of specific deliverables that may be developed by experts hired by Project RLA/06/901. These tasks must be analyzed in each SAM/IG meeting for comments, changes deemed pertinent and validation.

Action plan for the implementation of RNAV/5 for en-route operations

1.16 The meeting was of the opinion that States concerned must prepare their own PBN implementation plans, which include regional planning as shown in the roadmap. These national implementation plans shall have, among other issues, the action plans that include those activities related, dates and responsible person of each activity.

1.17 On the other hand, the meeting revised a regional action plan corresponding to RNAV 5 implementation for en-route operations, introduced the pertinent changes, established starting and ending dates for each activity, and adopted it as guideline to be followed by States. The referred plan is shown in **Appendix E** to this part of the report.

Action plan for the implementation of RNAV/RNP for terminal area and approach operations

1.18 In order to provide the States with guidance, the meeting reviewed model implementation plans for terminal area and approach operations, this activity shall be developed by each State following the PBN Roadmap.

1.19 The model action plans for terminal area and approach operations were analyzed and the changes deemed pertinent were introduced, and were adopted by the meeting. These action plans are shown in **Appendices F** and **G**, respectively, to this part of the report, and may be used as guidelines by the national PBN implementation groups in SAM States.

Requirements for the development of guidelines for the implementation of RNAV 5 and TMAS/approach, through the hiring of an expert

1.20 The experience gained at the AP/ATM meetings regarding the implementation of RVSM and RNAV routes as well as the development of the PBN roadmap and other guidelines proved to be a significant success in the SAM Region, taking air navigation to a new level of safety and efficiency.

1.21 However, the development of the above-mentioned material was dependant upon the isolated initiative of some of the participants at the AP/ATM meetings. The complexity of the tasks of project RLA 06/901 will not permit this work model to continue, since the experts attending the meetings are not exclusively committed to a particular project and are normally responsible for other activities in their respective State.

1.22 PBN implementation will require the development of detailed guidance material for the States and International Organizations, mainly covering three aspects:

a) Analysis of experiences in other regions;

b) Data collection on, and analysis of, air traffic movement to identify main flows;

c) Data collection on, and analysis of air navigation infrastructure (communications, navigation, surveillance, meteorology, AIS).

1.23 As agreed in the First Meeting of the Project RLA/06/901 Coordination Committee (Lima, Peru, 5 December 2007), these tasks could be carried out through the hiring of experts on this matter. In this connection, the SAM/IG/1 meeting concluded that, a work programme should be prepared in order to comply with the first tasks. The consultant shall analyze and process the aforementioned information clearly showing the current situation in States that participate in the Project, and, as far as possible, of all States in the SAM Region. The updated working programme of the consultant is shown as **Appendix H** to this part of the report and is aligned with tasks of Project RLA/06/901.

Coordination between Project RLA/06/901 and RLA/99/901

1.24 Based on the relation existing between the activities on Required Navigation Performance and those implemented by Project RLA/99/901, the Secretariat was requested to establish a coordination mechanism between both projects in order to channelize PBN requirements between both projects.

Optimization of the ATS route network in the SAM Region

1.25 The meeting noted that Project RLA/98/003, through its support to the meetings of ATM authorities and planners (AP/ATM), enabled the revision and implementation of new RNAV routes proposed by the States, Territories, International Organizations, and IATA, with a view to modifying the RNAV route network as necessary in order to contribute to the reduction of some paths and thus achieve a compatible transition from the en-route flight phase to the terminal control area (TMA).

1.26 As a result of the work carried out at the aforementioned meetings, 69 RNAV routes have been implemented, 72 have been modified, and 13 have been eliminated. Accordingly, the ICAO Council has approved the respective amendments to the CAR/SAM ANP Route Network.

1.27 Likewise, various situations have been identified based on follow-up and assessment activities, *inter alia*:

a) Some routes have not met the expectations in terms of their use by operators, despite the fact they insisted on their implementation.

b) It was noted that, although properly implemented, some routes were being scarcely used, the operators preferring to use less direct ATS routes, which resulted in higher operational costs and, in some cases, reduced airspace capacity and flexibility;

c) A large number of RNAV routes have not yet been linked through the SID and STAR procedures established at the TMAs, making flight and ATC system operation more difficult;

d) Airspace complexity is more related to air traffic flow than to airspace design *per se*. Therefore, in some cases, low-traffic routes could be maintained provided the corresponding operational benefits are achieved.

1.28 The optimization of the ATS route structure in terminal (SID/STAR RNAV) and en-route (RNAV) airspace, as well as the implementation of RNP approaches, are associated with **Result 1.1 of Immediate Objective N° 1 of Project RLA/06/901**, Implementation of performance-based navigation (PBN). Within the framework of this optimization, the ATS route network will continue to be improved, and, if applicable, conventional routes that are not used by airspace users will be phased out and replaced by RNAV routes. Likewise, it was recognized the need that States review their respective national RNAV route implementation programmes to make them compatible with the RNAV implementation programme of the SAM Region, defining actual implementation requirements, analyzing the possible impact that the implementation would have on the airspace, aircraft fleet, and in the provision of air traffic services, and to establish the relevant coordination activities that will permit an integrated, harmonious, and timely implementation of more direct RNAV routes.

1.29 Within this process, and in coordination with the military authorities, policies will be established on the use of temporarily or permanently restricted airspaces or special use airspaces, taking

into account the need to avoid, inasmuch as possible, the adoption of airspace restrictions, especially those of a permanent nature, thus enabling a flexible use of airspace (FUA) and, consequently, optimized airspace management in the Region, while reducing the operational costs for airspace users.

1.30 This implementation will benefit the environment and the operational efficiency, reducing fuel consumption, using preferred flight paths, increasing airspace capacity, using state-of-the-art technologies (*e.i.*, FMS-based arrivals) and ATC decision-support tools (*e.i.*, separation and sequencing), increasing aerodrome capacity and efficiency, improving aerodrome safety, and preserving the environment.

1.31 The meeting agreed to continue reviewing, implementing, modifying and eliminating routes in the SAM Region in order to continue to optimize the ATS route structure of the SAM Region, as well as with the preparation of a national RNAV route implementation programme in the Region.

1.32 Further, the meeting reviewed new RNAV routes proposed by LAN through IATA, and also to review and coordinate the necessary modifications in the RNAV Routes network so as to enable the reduction of some trajectories. In order to deal with this matter, several Ad-hoc groups were created, integrated by delegations of IATA and the FIRs involved, to analyze the feasibility of its implementation. The preliminary analysis carried out by the ad-hoc groups is shown in **Appendix I** to this part of the report.

1.33 It was also recalled that the Ad-hoc groups created to carry out the works mentioned in aforementioned paragraphs, would take a period of thirty (30) days as of the finalization of this meeting in order to review within the environment of their respective administrations and propose the changes deemed pertinent. Likewise, it was agreed that the communication channels to use for these coordinations would be the use of tele-conferences previously agreed through e-mail. The results of such coordinations would be informed to the Secretariat in order to proceed to the preparation of the corresponding proposal for amendment to the CAR/SAM ANP ATS Table.

1.34 Finally, the meeting agreed that for the holding and continuity of the necessary coordination for the implementation, realignment or elimination of routes, the methodology described in the previous paragraph will be used, being the Secretariat in charge of centralizing all the information of the results obtained. To this end, States involved shall keep the Secretariat informed regarding the points of contact designated by the corresponding administrations.

Pre-operational trails in the Montevideo-Buenos Ares air bridge

1.35 The administrations of Argentina and Uruguay informed the meeting that by 5 May operational trials of the air bridge between Montevideo and Buenos Aires to substantially save fuel, flight time, pay load and improvement of the environment. This route saves 53 NM.

Implementation of route RNAV VOR CRR/VOR FNO

1.36 In dealing with this issue, the Ad-hoc group in charge of the issue, kept in mind that during the AP/ATM/13 meeting, Brazil proposed that flights from Montevideo to Europe and the flights from Europe to Montevideo in their trajectory on the Brazilian airspace, pass through the Brasilia and

Curitiba FIRs, which have a great density air traffic, so as not to have delays. The implementation of RNAV route between VOR CRR (S34°50.0´ W056°01.5´) and VOR FNO (S03°52.2´ W032°25.8´) would enable flights with more short trajectories between Montevideo and Europe, passing through VOR FNO with time and fuel savings, without entering a great density air traffic airspace in the Brasilia and Curitiba FIRs.

1.37 To this respect, Uruguay expressed their agreement for the implementation of the same, and therefore both administrations in initiating the process of implementation of the new route and communicate ICAO Regional Office the coordinates in the FIRs involved in a term not longer than 60 days.

1.38 Also, the delegation of Uruguay, taking into consideration to the proximity of route UM540 with the trajectory proposed deemed pertinent to analyse together with the administration of Brazil, the elimination or maintenance of segment CRR-POA of such route.

Implementation of RNAV route RNAV UL 797

1.39 The Ad-hoc group integrated by delegations of Bolivia and Chile agreed to the implementation of route UL 797, in accordance with Appendix I.

Implementation of route UM530 in the segment VOR BRS until VOR RBC

1.40 The administrations of Brazil, Bolivia and IATA carried out the necessary coordinations for the implementation of route UM530 in the segment VOR BRS until VOR RBC.

Coordination between Implementation Groups

1.41 Regarding this issue, the Meeting considered convenient that the task force be conformed by representatives of each State participating in project RLA/06/901 in order to carry out coordinations and necessary works in their respective States, thus being PBN/IG focal points. Likewise, this would invite the other States not participating yet in the project to be part of the Implementation Group.

1.42 Finally, the meeting agreed on the need that the implementation working groups should count with a coordination mechanism among them, thus agreed in forming a coordination group conformed by the President of the Implementation Group, by a Coordinator and by the other rapporteurs of the other implementation groups:

a) President of the Implementation Group: Mr. Rafael Sánchez Greiner
b) Coordinator: Mr. Roberto Arca
c) Implementation groups Rapporteurs: Messrs. Víctor Marcelo de Virgilio (SAM-ATFM/IG); Julio Pereira (SAM-PBN-IG); Antonio Marcos Costa Fonseca (SAM-AUTO/IG); Raymundo Hurtado (SAM-CNS/IG);

1.43 The operation of these groups has been planned through available communications electronic means and meetings the day before each Implementation Group (SAM/IG) meeting in order to coordinate the development of the meeting and other issues considered necessary.

APPENDIX A

IMMEDIATE OBJECTIVE N° 1

Results	Activities	Party responsible for each activity
1.1 Implementation of performance-based navigation (PBN) – (GPIs 5, 7, 10, 11, 12, and 21).	1.1.1. Obtain and complete the information, learning about the current status in the participating States and organisations with respect to: a) Available CNS infrastructure, with the corresponding coverage and plans for future facilities; b) Characteristics of available ATM automated systems and future automation plans; c) Aircraft fleet operating in the CAR/SAM ATS route network and its RNAV and RNP capabilities, including capacity for arrival procedures based on the flight management system (FMS) and future plans of the users; d) Airworthiness and operational approval capabilities; e) Airports that might derive operational benefits from the use of RNAV and/or RNP; f) Status of implementation of WGS 84; g) Existing SIDs and STARs connecting international airports to ATS routes; h) Real-time and accelerated simulation of operations; i) Cost-benefit analysis of facilities; j) Safety assessment models; k) Regulation of GNSS use (secondary, primary means) l) Documentation concerning the training of air traffic controllers; m) Terminal control area design and control. Start up date: week 1 Estimated duration: 2 weeks	ATM, RO
	1.1.2. Analyse the application of GNSS to support all flight stages, including: a) The required ground navigation infrastructure for the operations contemplated in current plans, based on the development of system technology; b) En-route operations without using precision values with RNAV-5 (continental airspaces) and with RNP-4 (oceanic airspaces); c) TMA operations (RNAV 1) and approaches (RNP 0,3 and RNP AR), with ABAS;	ATM, CNS, RO

	d) Operational benefits of using GBAS, taking into account the impact of the implementation of Galileo and the L5 frequency on the GPS, likely implementation dates, and the convenience of including APV operations in the planning. Start up date: week 3 Estimated duration: 2 weeks	
	1.1.3. Develop a model action plan based on the information processed in 1.1.1 and 1.1.2, to be used by the participating States and organisations in the implementation of PBN in TMA and approach, according to the following regional planning: I. Short term (until 2010) a) Terminal area operations, including standard instrument departures and arrivals (RNAV 1 in radar environments with the proper navigation infrastructure and RNP 1 in non-radar environments without the proper DME coverage infrastructure); and b) Instrument flight rule approaches (RNP 0.3 in as many aerodromes as possible and in all international airports, and RNP AR in airports deriving operational benefits). II. Medium term (2011 to 2015) a) Terminal area operations, including standard instrument departures and standard instrument arrivals (extended application of RNAV1/RNP1 and mandatory use of RNAV1/RNP1—exclusionary airspace—in TMAs with greater air traffic density); and b) Instrument flight rule approaches (extended application of RNP 0.3 in as many aerodromes as possible and in all international airports, RNP AR in airports deriving operational benefits, and start-up of the application of GLS procedures). Start-up date: week 5 Estimated duration: 1 week	ATM, OR
	1.1.4. Develop guidelines based on the information processed under 1.1.1, 1.1.2, and 1.1.3, to be used by the participating States and organisations in the implementation of PBN in TMA and approach, including the following main tasks:	ATM, RO

	a) Cost-benefit analysis; b) Safety assessment; c) Design of procedures; d) Real-time and accelerated simulation of operations; e) ATC automated systems; f) Training of air traffic controllers; g) Aircraft and operator approval; h) Terminal control area design and management; i) Model regulations for GNSS application (primary, secondary means, operational restrictions, etc.). Start-up date: week 6 Estimated duration: 4 weeks	
	1.1.5. Develop an action plan based on the information processed under 1.1.1 and 1.1.2 for the implementation of PBN for en-route operations, according to the following regional planning: I. Short term (until 2010) Oceanic airspace RNP 10 and continental airspace RNAV 5. II. Medium term (2011 to 2015) Oceanic airspace RNP 4 and selected continental airspaces RNP 2. Start-up: week 10 Estimated duration: 1 week	ATM, OR
	1.1.6. Prepare a working paper supporting the submission of the model action plan and guidelines for PBN implementation in TMAs and approach, and the action plan for PBN implementation, for consideration and approval. Start-up date: week 11 Estimated duration: 1 week	ATM, RO
	1.1.7 Submit the working paper to the consideration of the corresponding GREPECAS bodies through the established channels. Start-up date: to be determined Estimated duration:	RO

	1.1.8 Make the necessary adjustments or changes to the material mentioned in 1.1.6 based on the comments generated, and update the proposal and working paper for consideration and approval by GREPECAS. Start-up date: to be determined Estimated duration:	ATM, RO
	1.1.9 Process, edit, and distribute the material, introducing the amendments made by GREPECAS during its approval. Start-up date: to be determined Estimated duration:	RO
	1.1.10 Determine and develop the necessary material for PBN implementation for en-route operations, in coordination with the participating States and organisations, taking into account environmental protection methods and procedures, and including the following aspects: a) PBN operational concept; b) Cost-benefit analysis; c) Aircraft and operator approval requirements and processes; d) Modification of national norms and airspace regulations; e) RNAV and RNP document formats to be included in the CAR/SAM web; f) Required AICs/NOTAMs and AIP supplements; g) Amendment to Doc 7030 as required; h) Amendments to the corresponding letters of agreement; i) Procedures for pilots and ATC; j) Procedures to accommodate non-RNAV and non-RNP aircraft where applicable; k) Transition procedures, if necessary; l) ATC training; m) Post-implementation follow-up plan. Start-up date: to be determined Estimated duration:	ATM, CBA, OPS, AIR, RO
	1.1.11 Provide assistance to the participating States and organisations for the implementation of the PBN implementation action plan, including the programming of the necessary coordination and training activities. Start-up date: to be determined Estimated duration:	ATM, OPS, AIR, RO

	1.1.12 Prepare a final report on activities performed, including relevant recommendations. Start-up date: to be determined Estimated duration:	ATM

APPENDIX B

ATM PERFORMANCE OBJECTIVES FOR CAR AND SAM REGIONS

<table>
<tr><th colspan="4">OPTIMIZE THE ATS ROUTE STRUCTURE IN BOTH TERMINAL AND EN-ROUTE AIRSPACE</th></tr>
<tr><th colspan="4">Benefits</th></tr>
<tr><td>Environment
Efficiency</td><td colspan="3">• reductions in fuel consumption;
• ability of aircraft to conduct flight more closely to preferred trajectories;
• increase in airspace capacity;
• facilitate utilization of advanced technologies (e.g., FMS based arrivals) and ATC decision support tools (e.g., metering and sequencing), thereby increasing efficiency.</td></tr>
<tr><th colspan="4">Strategy
Short term (2010)
Medium term (2011 - 20015)</th></tr>
<tr><th>TASK</th><th>DESCRIPTION</th><th>START-END</th><th>STATUS</th></tr>
<tr><td>AOM</td><td>En-route airspace
• analyze the en-route ATS route structure and implement all identifiable improvements;
• implement all remaining regional requirements (e.g. RNP 10 routes); and
• Finalize implementation of WGS-84
• monitorear el avance de la implementación
• develop a strategy and work programme to design and implement a trunk route network, connecting major city pairs in the upper airspace and for transit to/from aerodromes, on the basis of PBN and, in particular, RNAV/5, taking into account interregional harmonization;
In terminal airspace
• develop a regional strategy and work programme for implementation of optimized standard instrument departures (SIDs), standard instrument arrivals (STARs), instrument flight procedures, holding, approach and associated procedures, on the basis of PBN and, in particular RNAV/1 and 2; and
• monitor implementation progress</td><td>2005-2010

2008-2011</td><td></td></tr>
<tr><td>References</td><td colspan="3">GPI/5: performance-based navigation, GPI/7: dynamic and flexible ATS route management, GPI/8: collaborative airspace design and management, GPI/10: terminal area design and management, GPI/11: RNP and RNAV SIDs and STARs and GPI/12: FMS-based arrival procedures.</td></tr>
</table>

IMPLEMENT RNP APPROACHES			
Benefits			
Efficiency **Safety**	• **Improvements in capacity and efficiency at aerodromes.** • **Improvements in safety at aerodromes.**		
Strategy (2008-2015)			
TASK	**DESCRIPTION**	**START-END**	**STATUS**
AOM	• development of a regional strategy and work programme for implementation of RNP approaches at aerodromes where aircraft weighing 5700 kg or more are operated, on the basis of the transition plan as follows: Stage 1 – Evaluate existing procedures, determine compatibility of use with RNAV overlay routes Stage 2 – Carry out cost benefit analysis and safety assessments of RNAV procedures Stage 3 – Use existing radar vectoring patterns as the basis for RNAV departure and arrival tracks Stage 4 – Evaluating and simulation of procedures Stage 5 – Design stand-alone RNAV procedures Stage 6 – Training phase Stage 7 – Publish new procedures and introduce into new service, meet AIRAC dates Stage 8 – Operational review Stage 9 – Removal of conventional procedures • monitor implementation progress		
References	GPI/5: performance-based navigation, GPI/7: dynamic and flexible ATS route management, GPI/8: collaborative airspace design and management, GPI/10: terminal area design and management, GPI/11: RNP and RNAV SIDs and STARs and GPI/12: FMS-based arrival procedures.		

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APPENDIX C

PBNRM

INTERNATIONAL CIVIL AVIATION ORGANIZATION

CAR/SAM ROADMAP FOR PERFORMANCE-BASED NAVIGATION

(Lima, July 2007)

Version 1.3

Table of Contents

Table of Contents 2

Executive Summary 3

Explanation of Terms 4

Acronyms 5

Introduction 6

PBN concepts 9

Benefits of performance-based navigation 9

Implementation of performance-based navigation 10

Safety assessments 13

Post-implementation activities 18

Appendix A -Reference documentation for developing operational and airworthiness approvals 15

1. EXECUTIVE SUMMARY

1.1. Following RVSM implementation on 20 January 2005, the main tool for optimising the airspace structure is the implementation of performance-based navigation (PBN), which will foster the necessary conditions for the utilisation of RNAV and RNP capabilities by a significant portion of airspace users in the CAR/SAM Regions.

1.2. In view of the need for detailed navigation planning, it was deemed advisable to prepare a PBN Roadmap to provide proper guidance to air navigation service providers, airspace operators and users, regulating agencies, and international organisations, on the evolution of navigation, as one of the key systems supporting air traffic management, which describes the RNAV and RNP navigation applications that should be implemented in the short, medium and long term in the CAR/SAM Regions.

1.3. The CAR/SAM PBN Roadmap was developed by the CAR/SAM States and International Organizations, together with the international organizations concerned (IATA, IFALPA, IFATCA), and is intended to assist the main stakeholders of the aviation community plan the future transition and their investment strategies.

1.4. The CAR/SAM PBN Roadmap will be the basic material for the development of a broader CAR/SAM navigation strategy, which will serve as guidance for regional projects for the implementation of air navigation infrastructure, such as SBAS, GBAS, etc., as well as for the development of national implementation plans.

1.5. This document begins with a brief description of the need for a roadmap, the strategic objectives of the document, and the principles on which the implementation will be based. It should be noted that, during the transition period, conventional air navigation procedures would continue to be applied in order to safeguard the operations of users that are not RNAV- and/or RNP-equipped.

1.6. It then explains the PBN implementation strategy for both en-route and terminal area operations. It also analyses briefly the PBN concept, and lists the benefits of implementing this concept.

1.7. A review is made of data concerning the regular traffic of passengers on CAR/SAM airlines during the 1994-2004 period, CAR/SAM traffic forecasts, and traffic trends up to the year 2015.

1.8. It furthermore defines the implementation of performance-based navigation in the short, medium, and long term with respect to en-route operations, TMA operations (SIDs and STARs), and IFR approaches, broadly establishing the requirements and specifications for each stage.

1.9. The PBN Manual provides guidance of RNAV/RNP navigation specifications and encompasses two types of approvals: airworthiness, exclusively relating to the approval of aircraft; and operational, dealing with the operational aspects of the operator. RNAV/RNP approval will be granted to operators that comply with these two types of approvals.

1.10. The implementation of the performance based navigation forecast significant safety-related changes in the airspace structure as well as to the ATC system. .

1.11. After the implementation of PBN as part of the airspace concept, the total system needs to be monitored to ensure that the safety of the system is maintained. A System Safety Assessment shall be conducted during and after implementation and evidence collected to ensure that the safety of the system is assured.

2. EXPLANATION OF TERMS

2.1 The drafting and explanation of this document is based on the understanding of some particular terms and expressions that are described below:

CAR/SAM PBN Roadmap. Document offering appropriate guidance for air navigation service providers, airspace operators and users, regulating agencies, and international organizations, on the evolution of navigation, as one of the key systems supporting air traffic management, which describes the RNAV and RNP navigation applications that should be implemented in the short, medium and long term in the CAR/SAM Regions.

Area navigation (RNAV). A method of navigation which permits aircraft operation on any desired flight path within the coverage of ground or spaced-based navigation aids or within the limits of the capability of self-contained aids, or a combination of these

> *Note.— Area navigation includes performance based navigation as well as other operations that do not meet the definition of performance based navigation.*

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 in terms of accuracy, integrity, continuity, availability and functionality needed for the proposed operation in the context of a particular airspace concept.*

Navigation specification. A set of aircraft and air crew requirements needed to support performance based navigation operations within a defined airspace. There are two kinds of navigation specifications:

> ***RNP specification.*** A navigation specification based on area navigation that includes the requirement for performance monitoring and alerting, designated by the prefix RNP, e.g. RNP 4, RNP APCH.
>
> ***RNAV specification.*** A navigation specification based on area navigation that does not include the requirement for performance monitoring and alerting, designated by the prefix RNAV, e.g.

RNAV 5, RNAV 1.

Note.— The Performance Based Navigation Manual *(Doc 9613), Volume II contains detailed guidance on navigation specifications*

3. ACRONYMS

3.1 Lista de Acrónimos/ List of Acronyms

ADS/B	Vigilancia dependiente automatica-radiodifusión Automatic dependent surveillance-broadcasting
ADS/C	Vigilancia dependiente automática-contrato Automatic dependent surveillance-contract
ANS	Servicios de navegación aérea Air navigation services
ANSP	Proveedores de Servicios de Navegación Aérea/Air Navigation Service Providers
ASM	Gestión del espacio aéreo/ Airspace Management
ATC	Control de tránsito aéreo/ Air Traffic Control
ATFM	Gestión de afluencia del tránsito aéreo/ Air Traffic Flow Management
ATM	Gestión del tránsito aéreo/ Air Traffic Management
ATN	Red de telecomunicaciones aeronáuticas/ Aeronautical Telecommunication Network
ATS	Servicio de tránsito aéreo/ Air Traffic Services
CAR/SAM	Regiones Caribe y Sudamérica/Caribbean/South American Regions
CNS/ATM	Comunicaciones, navegación y vigilancia/Gestión del tránsito aéreo/ Communications, Navigation and Surveillance/Air Traffic Management
CPDLC	Comunicaciones por enlace de datos controlador-piloto /Controller-Pilot Data Link Communications
CTA	Area de control /Control Area
DME	Equipo Radiotelemetrico/Distance-Measuring Equipment
FAR	Regulación federal de aviación/Federal Aviation Regulation
FANS-1/A	Sistemas de navegación aérea del futuro – Aviónica/ Future Air Navigation Systems - Avionics
FDE	Detección y eliminación de fallas / Fault Detection and Exclusion
FIR	Región de información de vuelo /Flight Information Region
FMS	Sistema de gestión de vuelo /Flight Management System
GBAS	Sistema de Aumentación con Base en Tierra/Ground-Based Augmentation System
GLS	Sistema de aterrizaje GBAS / GBAS Landing System
GNE	Error de navegación grave / Gross Navigation Error
GNSS	Sistema mundial de navegación por satélite / Global Navigation Satellite System
GPMS	Sistema de monitoreo de la performance del GPS / GPS Performance Monitoring System
GREPECAS	Grupo Regional de Planificación y Ejecución CAR/SAM/ CAR/SAM Regional Planning and Implementation Group
GRAS	Sistema de Aumentación Terrestre Regional / Ground Regional Augmentation System
HF	Alta frecuencia/ High Frequency
IATA	Asociación del Transporte Aéreo Internacional/ Internacional Air Transport Association
ICD	Documento de control de interfaz / Interface Control Document
IFALPA	Federación Internacional de Asociaciones de Pilotos de Líneas Aéreas/International Federation of Air Line Pilots' Associations
IFATCA	Federación Internacional de Asociaciones de Controladores de Tránsito Aéreo/International Federation of Air Traffic Controllers' Associations

IRU/INS	Unidad de referencia inercial/Sistema de navegación inercial/ Inertial Reference Unit/Inertial Navigation System
JAA	Autoridades Conjuntas de Aviación Civil/Joint Aviation Authorities
JAR	Regulaciones Conjuntas de Aviación Civil/Joint Aviation Regulations
NAT	Atlántico septentrional /North Atlantic
NDB	Radiofaro no direccional /Non-Directional Beacon
NOTAM	Aviso al Personal Encargado de las Operaciones de Vuelo/Notice to Airmen
PBN	Navegación Basada en la Performance /Performance-Based Navigation
RNAV	Navegación de área/Area Navigation - RNAV Route: Ruta de navegación de área/Area navigation route
RNP	Performance de navegación requerida /Required Navigation Performance
RNP AR	Requerimiento de aprobación para la performance de navegación requerida/ Required Navigation Performance Aproval Required
RNPC	Capacidad de la performance requerida de navegación/Required navigation performance capacity
RNPSORSG	Grupo de Estudio sobre RNP y Requerimientos Operacionales Especiales/RNP and Special Operational Requirements Study Group
SARPS	Normas y métodos recomendados (ICAO)/ Standards and Recommended Practices (ICAO)
SATCOM	Comunicaciones por satélite/Satellite Communications
SBAS	Sistema de Aumentación de Base Satelital/Satellite-based Augmentation System
SID	Salida Normalizada por Instrumentos/Standard Instrument Departure
SSR	Radar secundario de vigilancia/Secondary Surveillance Radar
STAR	Llegada Normalizada por Instrumentos/Standard Instrument Arrival
TLS	Nivel de seguridad deseado/Target Level of Safety
TMA	Area Terminal/Terminal Area
VHF	Muy alta frecuencia /Very High Frequency
VDL	Enlace de datos en VHF/ VHF Data Link
VOR/DME	Radiofaro omnidireccional VHF/Equipo radiotelemétrico/Very High Frequency Omnidirectional Radio Range/Distance-Measuring Equipment

4. INTRODUCTION

Need for a roadmap

4.1 Following RVSM implementation on 20 January 2005, the main tool for optimising the airspace structure is the implementation of performance-based navigation (PBN), which will foster the necessary conditions for the utilisation of RNAV and RNP capabilities by a significant portion of airspace users in the CAR/SAM Regions.

4.2 Current planning by the Regional Planning and Implementation Groups is based on the Air Navigation Plans and the Regional CNS/ATM Plans. Currently, these plans are mostly made up by tables that do not contain the necessary details for the implementation of each of the CNS and ATM elements.

4.3 In view of the need for detailed navigation planning, it was deemed advisable to prepare a PBN Roadmap to provide proper guidance to air navigation service providers, airspace operators and users, regulating agencies, and international organisations, on the evolution of navigation, as one of the key systems supporting air traffic management, which describes the RNAV and RNP navigation applications that should be implemented in the short and medium term in the CAR/SAM Regions.

4.4 Furthermore, the CAR/SAM PBN Roadmap will be the basic material for the development of a broader CAR/SAM navigation strategy, which will serve as guidance for regional projects for the implementation of air navigation infrastructure, such as SBAS, GBAS, etc., as well as for the development of national implementation plans.

Objectives

4.5 The CAR/SAM PBN roadmap has the following strategic objectives:

a) To ensure that the implementation of the navigation item of the CNS/ATM system is based on clearly established operational requirements.
b) To avoid unnecessarily imposing the mandate for multiple equipment on board or multiple systems on ground.
c) To avoid the need for multiple airworthiness and operational approvals for intra- and inter-regional operations.
d) To prevent commercial interests from outdoing ATM operational requirements, generating unnecessary costs for CAR/SAM States and International Organizations, as well as for airspace users.
e) To explain in detail the contents of the CAR/SAM Air Navigation Plan and of the CAR/SAM CNS/ATM Plan, describing potential navigation applications.

4.6 Furthermore, the CAR/SAM PBN Roadmap will provide a high-level strategy for the evolution of the navigation applications to be implemented in the CAR/SAM Regions in the short term (2006-2010), medium term (2011-2015). This strategy is based on the concepts of Area Navigation (RNAV) and Required Navigation Performance (RNP), which will be applied to aircraft operations involving instrument approaches, standard departure (SID) routes, standard arrival (STAR) routes, and ATS routes in oceanic and continental areas.

4.7 The CAR/SAM PBN Roadmap was developed by the CAR/SAM States and International Organizations together with the international organizations concerned (IATA, IFALPA, IFATCA), and is intended to assist the main stakeholders of the aviation community plan a gradual transition to the RNAV and RNP concepts. The main stakeholders of the aviation community that benefit from this roadmap are:

- Airspace operators and users.
- Air navigation service providers.
- Regulating agencies.
- International organizations.

4.8 This roadmap is intended to assist the main stakeholders of the aviation community plan the future transition and their investment strategies. For example, airlines and operators can use this roadmap to plan future equipage and additional navigation capability investments; air navigation service providers can plan a gradual transition for the evolving ground infrastructure. Regulating agencies will be

able to anticipate and plan for the criteria that will be needed the future.

Principles

4.9 The implementation of PBN in the CAR/SAM Regions shall be based on the following principles:

a) Conduction of cost-benefit analyses to justify the implementation of the RNAV and/or RNP concepts in each particular airspace;
b) Conduction of pre- and post-implementation safety assessments to ensure the application and maintenance of the established target levels of safety;
c) Development of airspace concepts, applying airspace modelling tools as well as real-time and accelerated simulations, which identify the navigation applications that are compatible with the aforementioned concept.
d) Continued application of conventional air navigation procedures during the transition period, to guarantee the operations by users that are not RNAV- and/or RNP-equipped.

PBN implementation strategy

En-route operations

4.10 It is impossible to include the whole CAR/SAM airspace in a single Implementation Plan for En-Route Operations, since the restructuring of the CAR/SAM airspace for PBN application would become an extremely complicated task.

4.11 Likewise, the establishment of a single RNAV or RNP navigation specification for the CAR/SAM Regions is unlikely, bearing in mind the differences in air traffic complexity and movement, as well as the differences in CNS infrastructure, which will probably lead to the application of different airspace concepts in the CAR/SAM Regions.

4.12 Thus, the most appropriate strategy is the implementation of PBN by routing areas in CAR and SAM scenarios, according to their own airspace concepts and infrastructure characteristics, which may involve a group of States/Territories and International Organizations. This implementation strategy will be applied by the States/Territories/International Organizations themselves and will permit the establishment of the RNAV or RNP navigation specifications for the various areas that will be harmonised within the scope of GREPECAS.

TMA operations

4.13 TMA operations have their own characteristics, taking into account the applicable separation minima between aircraft and between aircraft and obstacles. It also involves the diversity of aircraft, including low-performance aircraft flying in the lower airspace and conducting arrival and departure procedures on the same path or close to the paths of high-performance aircraft.

4.14 In this sense, the States/Territories and International Organizations shall develop their own national plans for the implementation of PBN in TMAs, based on the CAR/SAM PBN Roadmap, seeking the harmonisation of the applicable RNAV and/or RNP criteria to avoid the need for multiple operational approvals for intra- and inter-regional operations, and the applicable aircraft separation criteria that will be soon published by ICAO Headquarters.

5. PBN CONCEPTS

5.1 Performance based navigation specifies RNAV system performance requirements for aircraft operating along an ATS route, on an instrument approach procedure or in an airspace.

5.2 Performance requirements are defined in terms of accuracy, integrity, continuity, availability and functionality needed for the proposed operation in the context of a particular airspace concept. Performance requirements are identified in navigation specifications which also identify which navigation sensors and equipment may be used to meet the performance requirement.

5.3 There are both RNP navigation specifications and RNAV navigation specifications. A RNP specification includes a requirement for onboard performance monitoring and alerting and is designated as a RNP X. A RNAV specification does not have such requirements and is designated as RNAV X.

5.4 Performance based navigation therefore depends on:

- the RNAV system and installation on the aircraft being approved to meet the performance and functional requirements of the navigation specification prescribed for RNAV operations in an airspace; and
- Air crew satisfying the operating requirements set out by the regulator for RNAV operations; and
- A defined airspace concept which includes RNAV operations; and
- an available Navaid infrastructure;

Note: Additional information may be obtained in the Performance Based Navigation Manual, Doc 9613.

6. BENEFITS OF PERFORMANCE-BASED NAVIGATION

6.1 Air traffic growth in the CAR/SAM Regions is foreseen at mid term, at the same time that the economical activity. A growth of 6.2, 5.5 y 5.6, % of regular passenger air traffic of CAR/SAM Regions airlines is foreseen in 2005/2006/2007, respectively, as compared to global growth forecast of 7.6, 6.5 and 6.2%, respectively. At long term, airlines passengers air traffic in the Region is expected to grow at an average of 4.0% until year 2015. This growth may lead to air traffic congestion periods which may guide to ATM lack of efficiency.

6.2 In order to ensure ATM efficiency and avoid unnecessary restrictions to airspace users, specifications should be avoided as to how to satisfy navigation requirements indicating only which is the performance and navigation functionality required from the RNAV system. Under the PBN concept, the generic navigation requirements are defined based on operational requirements. Thus, users may evaluate the available options as regards technology and air navigation services which could permit to satisfy these requirements. The solution elected should be the most cost-effective

6.3 The development of the Performance Based Navigation Concept recognizes that advanced aircraft RNAV systems are achieving a predictable level of navigation performance accuracy which, together with an appropriate level of functionality, allows a more efficient use of available airspace to be realized. It also takes account of the fact that RNAV systems have developed over a 40 year period and as a result there are a large variety of implementations. Identifying navigation requirements rather than on the means of meeting the requirements will allow use of all RNAV systems meeting these requirements irrespective of the means by which these are met.

6.4 The main benefits derived from the implementation of PBN are:

a) Increased airspace safety through the implementation of continuous and stabilised descent procedures that avoid controlled flight into terrain (CFIT);
b) Reduced aircraft flight time due to the implementation of optimal flight paths, with the resulting savings in fuel and environmental protection.
c) Use of the RNAV and/or RNP capabilities that already exist in a significant percentage of the aircraft fleet flying in CAR/SAM airspace.
d) Improved airport and airspace arrival paths in all weather conditions, and the possibility of meeting critical obstacle clearance and environmental requirements through the application of optimised RNAV or RNP paths.
e) Implementation of more precise approach, departure, and arrival paths that will reduce dispersion and will foster smoother traffic flows.
f) Reduced delays in high-density airspaces and airports through the implementation of new parallel routes and new arrival and departure points in TMAs.
g) Possible reduction of spacing between parallel routes to accommodate more traffic in the same flow.
h) Reduced workload for air traffic controllers and pilots due to reduced communications time.

7. IMPLEMENTATION OF PERFORMANCE-BASED NAVIGATION

7.1 ATM operational requirements

7.1.1 The Global ATM System makes necessary to adopt an airspace concept able to provide an operational scenerio that includes Routes Network, Minimum separation, Assessment of obstacles clearance, and CNS infrastructure that satisfies safety specific strategic objectives, capacity, efficiency, environment and technology addressed for the implementation of performance based navigation.

7.1.2 In this regard, the following programmes will be developed in different areas:

a) traffic and cost benefit studies
b) automation necessary update
c) operations simulation in different scenarios
d) ATC personnel training
e) FPL processing
f) AIS support
g) WGS 84 implementation
h) uniform classification of adjacent and regional airspaces
i) RNAV/RNP application in SIDs and STARs
j) RNAV routes implementation and coordination

7.2 RNAV/RNP approval will cover to types of approvals: airworthiness, which will exclusively deal with aircrafts approval, and operations, which will take care of the operational aspects of air transport operators. The fulfilment of these types of approvals will permit operators to obtain RNAV/RNP approval.

7.3 **Short term (up to 2010)**

7.3.1 En-route operations

Taking into account air traffic low density in oceanic airspaces, no significant changes are expected in the present airspace structure that will demand changes in applied RNAV navigation specifications. The only exception will be RNP-10 application in the WATRS Airspace, which will demand a significant change in the CAR Region airspace structure. In airspaces where RNP-10 is applied (EUR/SAM Corridor, Lima-Santiago de Chile Routes and South Atlantic Random Routes System), no short-term changes are expected.

In the continental airspace, RNAV-5 implementation in selected airspaces is expected, where possible to obtain operational benefits and available CNS infrastructure is able to support it.

7.3.2 TMA operations (SIDs and STARs)

7.3.2.1 The application of RNAV-1 in State-selected TMAs, in radar environments, with ground navigation infrastructure is expected, which permits DME/DME and DME/DME/INS operations. In this phase mixed operations (equipped and non-equipped) will be admitted, and RNAV-1 operations shall be initiated when an adequate percentage of air operations are approved.

7.3.2.2 In non-radar environments and/or in environments that do not count with adequate ground navigation infrastructure, the application of RNP-1 is expected in State-selected TMAs with exclusive application of GNSS, whenever an adequate percentage of air operations are approved. In this TMA will also be admitted approved and non-approved aircrafts. The application of overlay procedures or exclusive RNP procedures will depend on air traffic complexity and density.

7.3.3 IFR approaches

7.3.3.1 Approach procedures for PBN should be implemented as approach procedures with vertical guidance (APV) utilizing Baro-VNAV for runways either as the primary approach or as a back-up for precision approaches for all instrument runway ends, based on the RNP APCH or RNP AR APCH navigation specifications.

Note.- PBN manual, Volume II, Attachment A contains the Specifications for utilizing Baro-VNAV in conjunction with RNP APCH.

7.3.3.2 The application of RNP APCH approach procedures (basic GNSS) is expected in the maximum possible of State-selected international airports, maintaining conventional approach procedures for non-equipped aircraft.

7.3.3.3 The application of RNP AR approach procedures is expected in State-selected airports, where operational benefits can be obtained, based on the existence of significant obstacles.

Short Term (until 2010)	
Airspace	**RNAV or RNP navigation specification**
Route (Oceanic o Remote)	RNP 10 Corridor EUR/SAM and Santiago/Lima/AORRA/WATRS
Route (Continental)	RNAV 5 in selected airspaces
TMA	RNAV-1 in radar environment and with adequate ground navigation infrastructure.
	RNP 1 – No radar environment and/or without appropriate DME coverage.
Approach	RNP APCH in most possible airports and in all international airports. RNP AR APCH in airport where there are operational benefits.
• Non compulsory installation of RNAV equipment on board of non equipped aircraft in TMA and APP • Mixed Operations (equipped and non equipped aircraft) in TMA and APP • Required RNAV 2 equipment above FL350 for flights to/from United States.	

7.4 **Medium term**

7.4.1 En-route operations

7.4.1.1 The application of RNP 4 in the oceanic airspace is expected, with utilization of ADS/CPDLC, in order to allow the use of lateral and longitudinal separation of 30 NM. This application will depend on the evolution of the aircraft fleet flying in the airspace.

7.4.1.2 In this phase, the application of RNP-2 is expected in selected areas of the continental airspace, with high air traffic density and exclusive application of GNSS, depending on the analysis of ground infrastructure, which will indicate whether it is possible to use RNAV applications. The

establishment of a backup system will be necessary as well as the development of contingency procedures in the event of GNSS failure. The application of RNP-2 will facilitate the PBN application in non surveillance airspace. With the exclusive application of GNSS more control of the GNSS signal is needed, through GPS Monitoring Systems that include NOTAM, FDE, etc.

7.4.2 TMA operations

7.4.2.1 In this phase, it is expected to extend the application of RNAV (RNP) 2/1 in State-selected TMAs, depending of ground infrastructure and of aircrafts navigation capacity. In TMAs of high air traffic complexity and movement (excluding airspaces), the use of RNAV or RNP 1 equipments will be mandatory. In TMAs of less air traffic complexity, mixed operations will be admitted (equipped or non-equipped).

7.4.3 IFR approaches

7.4.3.1 In this phase the extended application of procedures RNP APCH and RNP AR in selected airports (as mentioned under par. 7.3.3) is expected. Also, the initiation of application of GLS procedure is expected to guarantee a smooth transition between TMA phase and the approximation has, basically using GNSS for the two phases.

Medium Term (2011-2015)	
Airspace	**RNAV or RNP navigation specification**
Route (Oceanic or Remote)	RNP 4 in the oceanic airspace
Route (Continental)	RNP 2 in selected airspaces
TMA (SID/STAR)	Expansion of RNAV-1 or RNP-1 application Compulsory RNAV 1 or RNP 1 approval for aircraft operating in greater air traffic density TMAs (exclusionary airspace)
Approach	Expansion of RNP APCH and RNP AR APCH application Application of GBAS procedures**
• RNP2 required equipment over FL290 for flights to/from United States. ** *GBAS procedures are currently not covered under the PBN concept*	

8. SAFETY ASSESSMENT

8.1 The implementation of the performance based navigation requires safety-related changes in the airspace structure as well as to the ATC system, including new procedures that only shall be applied after a safety assessment has demonstrated that an acceptable level of safety will be met. For these purposes, safety assessment shall be carried out in accordance with ICAO provisions.

8.2 After the PBN implementation, all the system should be monitored in order to ensure to maintain safety. In case of unforeseen events, dependency in charge of monitoring should propose and coordinate with all interested parts the implementation of mitigating measures as soon as possible.

APPENDIX A

Reference documentation for developing operational and airworthiness approvals

Organisation	Code	Title
ICAO	Doc 9613	Performance Based Navigation (PBN)
ICAO	State Letter AN 1 1145-07122	PBN Key provisions
ICAO	Doc 8168 – OPS/611	Vol. I and II, Aircraft operations
ICAO	Doc 4444	Procedures for air navigation services – Air traffic management
ICAO	Doc 8733	CAR/SAM air navigation plan
ICAO	Doc 7030	Regional supplementary procedures (SUPPS)
FAA	Order 8400.10	Required navigation performance 10 (RNP 10) operational approval
FAA	AC 90-96	Approval of US operators and aircraft to operate under instrument flight rules (IFR) in European airspace designated for basic area navigation (BRNAV/RNP 5)
FAA	AC 90-100A	US Terminal and en route area navigation
FAA	AC 90-101	Approval guidance for RNP procedures with SAAAR
FAA	Order 8260.52	United States standards for required navigation performance (RNP) approach procedures with special aircraft and aircrew authorization required (SAAAR)
JAA	Leaflet No. 2 (TGL 2) Rev 1	Guidance material on airworthiness approval an operational criteria for the use of navigation systems in European airspace designated for basic RNAV operations
JAA	Leaflet No. 3 (TGL 3) Rev 1	Interim guidance material on airworthiness approval and operational criteria for the use of the NAVSTAR Global Positioning System (GPS)
JAA	Leaflet No. 10 (TGL 10)	Airworthiness an operational approval for precision RNAV operations in designated European airspace
EUROCONTROL	Doc 003-93	Area navigation equipment: operational requirements and functional requirements
RTCA	Do-236B	Minimum aviation system performance standards: Required navigation performance for area navigation
RTCA	Do-238A	Minimum operational performance standards for required navigation performance for area navigation

Documentation availability

The documentation described in paragraph 1 of this document may be obtained at the following websites:

a) Copies of EUROCONTROL documents may be requested from EUROCONTROL, Documentation Centre, GS4, Rue de la Fusee, 96, B-1130 Brussels, Belgium; (Fax: 32 2729 9109). Website: http://www.ecacnav,com.

b) Copies of EUROCAE documents may be purchased from EUROCAE, 17 rue Hamelin, 75783 Paris Cedex 16, France (Fax: 33 1 4505 7230). Web site: http://www.eurocae.org.

c) Copies of FAA documents may be obtained from the Superintendent of Documents, Government Printing Office, Washington, DC 20402-9325, USA. Website: http://www.faa.gov/certification/aircraft/ (Regulation and guidance library).

d) Copies of RTCA documents may be obtained from RTCA Inc., 1140 Connecticut Avenue, N.W., Suite 1020, Washington, DC 20036-4001, USA, (Tel: 1 202 833 9339). Website: www.rtca.org.

e) Copies of ARINC documents may be obtained from Aeronautical Radio Inc., 2551 Riva Road, Annapolis, Maryland 24101-7465, U.S.A. Website: http://www.arinc.com.

f) Copies of JAA documents are available from the JAA´s Publisher Information Handling Services (IHS). Information on prices, where and how to order is available in the JAA website: http://www.jaa.nl and in the IHS websites: http://www.global.his.com and http://www.avdataworks.com.

g) Copies of EASA documents may be obtained from EASA (European Aviation Safety Agency), 101253, D-50452 Koln, Germany.

h) Copies of ICAO documents may be purchased from the Document Sales Unit, International Civil Aviation Organization, 999 University Street, Montreal, Québec, Canada H3C 5H7, Fax: 1 514 954 6769, or at: sales_unit@icao.org, or through national agencies.

APPENDIX D

TERMS OF REFERENCE AND WORK PROGRAMME FOR THE SAM REGION PBN IMPLEMENTATION GROUP (SAM/PBN/IG)

1. TERMS OF REFERENCE

Develop guidance material for RNAV/RNP implementation processes in the en-route, terminal, and approach flight phases, taking into account the performance-based navigation (PBN) concept, according to the ICAO Strategic Objectives and Global Plan Initiatives (GPI) on this matter and the CAR/SAM PBN Roadmap (GPI 5, 7, 10, 11, 12, 20 and 21).

2. WORK PROGRAMME

a) Evaluate a PBN Implementation Action Plan for En-Route Operations, taking into account the CAR/SAM Roadmap, with a view to optimising the ATS route structure.
Note: Implementation by SAM Implementation Group.

b) Develop the tasks of the action plan for PBN implementation for en-route operations assigned to the SAM/PBN/IG.

c) Evaluate a Model Action Plan for PBN Implementation in the TMA.
Note: Implementation by SAM States, and if such were the case, insert the necessary tasks.

d) Evaluate a Model Action Plan for PBN Implementation for approach operations.
Note: Implementation by SAM States.

e) Develop guidelines for PBN implementation for TMA and approach operations including: cost-benefit analysis, safety assessment, air navigation procedures construction, ATC simulations (real time and accelerated time), ATC automated systems, air traffic controllers training, approval of aircraft and operators, design and management for Terminal Control Area, Regulation model on the GNSS application (Primary Means, Supplementary, operational restrictions, etc).

f) Establish training requirements, including airspace planning, air navigation procedures construction, operators and airworthiness approval, safety assessment and airspace monitoring.

g) Verify the status of implementation of WGS-84.

h) Follow-up of PBN implementation for en-route, TMA, and approach operations to ensure its intra- and inter-regional harmonisation.

i) In coordination with the GREPECAS ATM/CNS Subgroup, ATM Committee, PBN Task Force, consider the necessary activities to ensure harmonisation of PBN implementation in the CAR and SAM Regions.

3. COMPOSITION

Argentina, Bolivia, Brazil, Chile, Ecuador, Perú, Uruguay, Venezuela and IATA.

4. RAPPORTEUR

Julio Pereira, Brazil.

APPENDIX E

En-route PBN Action Plan (RNAV-5) in Short Term
(GPI 1, 4, 5, 7, 8, 10, 11, 12, 16, 21, 23)

	Start	End	Responsible	Remarks
1. **Assessment and Data Collection**				
1.1 Assessment of existent data for: a) Cost-Benefit Analysis b) Fleet capability assessment c) Identification of international traffic flows d) Safety Assessment	June/2008	SAM/IG/2	SAM/PBN/IG (Project RLA/06/901)	
1.2 Analyse the need for new data collection	June/2008	SAM//IG/2	SAM/PBN/IG (Project RLA/06/901)	
2. Airspace Structure				
2.1 Analyse fleet navigation capability.	June/2008	SAM/IG/2	SAM/PBN/IG (Project RLA/06/901) IATA	
2.2 Reorganise the network or implement new routes, based on the PBN concept analysis, as necessary.	SAM/IG/2	SAM/IG/4	SAM/PBN/IG (Project RLA/06/901)	
2.3 Determine and make ATC simulations, as necessary.	SAM/IG/2	SAM/IG/4	States	
3. Prepare Cost-Benefit Analysis				
3.1 Prepare Cost-Benefit Analysis for PBN implementation	SAM/IG/2	SAM/IG/4	SAM/PBN/IG (Project RLA/06/901)	

	Start	End	Responsible	Remarks
4. Safety Assessment				
4.1 Determine which methodology shall be used for safety assessment	SAM/IG/2	SAM/IG/4	CARSAMMA	
4.2 Prepare a data collection programme for airspace safety assessment.	SAM/IG/2	SAM/IG/4	CARSAMMA	
4.3 Prepare airspace safety assessment.	SAM/IG/2	SAM/IG/4	CARSAMMA	
5. Establish collaboration decision making (CDM) process.)				
5.1 Coordinate implementation needs with ATS users, aircraft operators, military authorities, etc.	SAM/IG/2	SAM/IG/4	SAM/PBN/IG States	
5.2 Establish a definitive implementation date.	SAM/IG/1	SAM/IG/4	SAM/PBN/IG States	States should analyse viability of tentative date in coordination with national operators and military authorities.
5.3 Establish a SAM PBN website within SAM Office website.	SAM/IG/1	SAM/IG/2	Regional Office SAM	
6. ATC Automated Systems				
6.1 Evaluate the PBN implementation impact in ATC Automated Systems.	June/2008	SAM/IG/2	SAM/PBN/IG (Project RLA/06/901)	
6.2 Implement the necessary changes in he ATC Automated Systems.	SAM/IG/2	TBD	States	

	Start	End	Responsible	Remarks
7. Aircraft and operators approval				
7.1 Evaluate regulations for GNSS use, considering its application in the navigation specification RNAV-5.	June/2008	SAM/IG/2	SAM/PBN/IG (Project RLA/06/901)	
7.2 Analyse aircraft and operators approval requirements (pilots, dispatchers and maintenance personnel), as established in PBN manual, and prepare the necessary documentation.	June/2008	SAM/IG/2	Regional Project RLA/99/901 Safety Oversight Cooperation System	
7.3 Publish operational approval process.	SAM/IG/2	SAM/IG/3	States	
7.4 Start with aircraft and operators approval.	SAM/IG/3	SAM/IG/5	States	
7.5 Establish and keep up to date a registry of approved aircraft and operators.	SAM/IG/3	Permanent	CARSAMMA States	
7.6. Verify the operation within the continuous monitoring plan (aircraft and procedures)	Nov/2010	Permanent	States	
8. Standards and Procedures				
8.1 Publish the AIC to notify PBN implementation planning.	June/2008	SAM/IG/2	SAM/PBN/IG (Project RLA/06/901)	
8.2 Publish AIC to report PBN implementation planning.	SAM/IG/2	SAM/IG/3	States	
8.3 Develop AIP Supplement Model containing applicable regulations and procedures, including corresponding flight contingencies.	SAM/IG/4	SAM/IG/5	SAM/PBN/IG (Project RLA/06/901)	
8.4 Publish AIP Supplement containing applicable standards and procedures, including with the corresponding flight contingencies.	SAM/IG/5	SAM/IG/6	States	
8.5 Review Procedural Manuals of the ATS units involved.	SAM/IG/5	SAM/IG/6	States	

	Start	End	Responsible	Remarks
8.6 Update letters of Agreement between ATS units, if necessary.	SAM/IG/5	SAM/IG/6	States	
8.7 Develop regional documentation, if necessary	SAM/IG/3	SAM/IG/4	SAM/PBN/IG (Project RLA/06/901)	
8.8 Direct amendment proposal to Doc. 7030, if necessary.	SAM/IG/5	SAM/IG/6	SAM Regional Office	
8.9 Revision of practices and procedures to improve fuel consumption management and environmental care.	SAM/IG/1	Permanent	SAM/PBN/IG (Project RLA/06/901)	
9. Training				
9.1 Develop a training programme and documentation for pilots, dispatchers and maintenance personnel	SAM/IG/4	SAM/IG/5	Regional Project RLA/99/901	
9.2 Develop a training programme and documentation for Air Traffic Controllers and AIS Operators.	SAM/IG/4	SAM/IG/5	SAM/PBN/IG (Project RLA/06/901)	
9.3 Conduct training programmes (pilots, dispatchers, air traffic controllers, AIS operators)	SAM/IG/5	SAM/IG/6	States	
9.4 Develop operators-oriented activities, indicating plans and operative and economic benefits expected.	SAM/IG/1	SAM/IG/3	States	
10. Decision for implementation				
10.1 Evaluate operational documentation availability (ATS, OPS/AIR)	July/2010	N/A	States	
10.2 Evaluate approved aircraft and operators	July/2010	N/A	States	
10.4 Publish "trigger" NOTAM	Nov/2010	N/A	States	

	Start	End	Responsible	Remarks
11. System Performance Monitoring				
11.1 Develop en-route operations post-implementation monitoring programme.	SAM/IG/4	SAM/IG/5	SAM/PBN/IG (Project RLA/06/901)	
11.2 Execute en-route operations post-implementation monitoring programme.	Nov/2010	Nov/2011	States	
Pre operational implementation date	Nov/2010	N/A		
Definitive implementation date	Nov/2011	N/A		

APPENDIX F

PBN Action Plan Model for Terminal Area (TMA) **GPI 5, 7, 8, 10, 11, 12**			
	Start	**End**	**Responsible**
1. **Assessment and Data Collection**			
1.1 Assessment of existent data for: a) Cost-Benefit Analysis b) Fleet capability assessment c) Identification of main traffic flows d) Safety oversight assessment			
1.2 Analyse the need to collect new data.			
2 Airspace Structure			
2.1 Identify SID/STARs/RNAV TMA that will be implemented in a short term.			
2.2 Identify improvements to SID and/or STARS procedures, as per main traffic flows in TMA.			
2.3 Analyse aircraft fleet navigation capacity operating in the TMA.			
2.4 Use the existing radar vectorial guidance patterns as a basis for the design of trajectories for arrivals and departures.			
2.5 Develop an airspace structure for TMA, including SID and STAR.			
2.6 Determine and make ATC simulations, as necessary.			

3. Prepare Cost-Benefit Analysis			
3.1 Prepare preliminary Cost-Benefit analysis.			
3.2 Prepare final Cost-Benefit analysis.			
4 Safety Oversight Assessment			
4.1 Develop a safety oversight assessment model, if necessary**.**			
4.2 Develop a Data-Collection Programme for safety oversight assessment**.**			
4.3 Develop a preliminary safety oversight assessment.			
4.4 Develop a final safety oversight assessment.			
5. Establish collaboration in decision-making (CDM) process			
5.1 Coordinate implementation needs with ATS users, aircraft operators and military authorities.			
5.2 Establish implementation date.			
5.3 Send appropriate material for publication purposes to SAM PBN website within SAM Office website			
5.4 Report implementation progress to the ICAO SAM Regional Office.			
6 ATC Automated Systems			
6.1 Assess impact of PBN implementation in ATC automated systems.			
6.2 Implement the necessary changes in ATC automated changes.			

7 Aircraft and operators approval			
7.1 Assess the regulations on the use of GNSS, considering its application in the RNAV-1 navigation specification.			
7.2 Analyse aircraft approval requirements, crews and operators requirements, as established in PBN manual and develop the necessary documentation.			
7.3 Publish process of operational approval.			
7.4 Start aircraft and operators approval.			
7.5 Establish and keep up to date a record of approved aircraft and operators.			
7.6. Verify the operation within the continuous monitoring plan (aircraft and procedures).			
8. Standards and procedures			
8.1 Prepare and publish AIC reporting PBN implementation planning.			
8.2 Publish AIP Supplement containing applicable standards and procedures, including adequate contingency procedures.			
8.3 Review Procedural Manuals of the ATS units involved.			
8.4 Establish certification process for navigation data-base suppliers. Note: This activity assumes that quality of data inserted in States AIPs is adequate.			
8.5 Flight inspection for publication of SIDs and STARs, procedures, etc.			
8.6 Determine the requirements and make flight inspection for publication of SID and STAR procedures.			
8.7 Update letters of operational agreement between ATS units, as necessary			
9. Training			
9.1 Develop a training programme and documentation for pilots, dispatchers and maintenance personnel.			
9.2 Develop a training programme and documentation for air traffic controllers and AIS operators.			

9.3 Conduct training programmes (pilots, dispatchers, maintenance personnel, air traffic controllers, AIS operators, etc.)			
9.4 Develop operators-oriented activities, indicating plans and operative and economic benefits expected.			
10. Implementation decision			
10.1 Evaluate operational documentation availability (ATS, OPS/AIR).			
10.2 Evaluate approved aircraft and operators.			
10.3 Publish "trigger" NOTAM.			
11. System Performance Monitoring			
11.1 Develop post-implementation monitoring programme for TMA operations.			
11.2 Execute post-implementation monitoring programme for TMA operations.			
Pre operational implementation date			
Definitive implementation date			

APPENDIX G

PBN Action Plan Model for Approach GPI 1, 12, 16, 21, 23

1 Airspace structure	**Start**	**End**	**Responsible**
1.1 Analyse aircraft fleet capacity operating in selected airport.			
1.2 Evaluate pertinent radio navigation aid infrastructure, if necessary.			
1.3 Develop RNP approach procedures			
1.4 Determine and make ATC simulations, as necessary			
2 Cost-benefit analysis			
2.1 Prepare cost-benefit analysis			
3. Airspace safety oversight assessment			
3.1 Develop safety oversight assessment			
4. Establish collaboration-decision making (CDM) process			
4.1 Coordinate implementation needs with ATS users, aircraft operators and military authorities.			
4.2 Establish implementation date.			
4.3 Send appropriate material for publication purposes to SAM PBN website within ICAO SAM Office website.			
4.4 Report implementation progress to ICAO SAM Regional Office.			

5. ATC Automated Systems			
5.1 Evaluate the PBN implementation impact in ATC Automated Systems.			
5.2 Implement the necessary changes in he ATC Automated Systems.			
6. Aircraft and operators approval			
6.1 Acknowledge the national implementation programme and required navigation specifications.			
6.2 Analyse approval requirements for aircraft, crew and operators for en-route navigation specifications, terminal areas/approach, as established in the PBN manual.			
6.3 Publish operational approval process.			
6.4 Approval of aircraft and operators (for each type of procedure and specification)			
6.5 Establish and keep an updated record for approved aircraft and operators.			
6.6. Verify operation within the continuous monitoring programme (aircraft and procedures).			
7. Standards and procedures			
7.1 Assess the regulations on the use of GNSS and if such were the case, proceed to its publication.			
7.2 Prepare and publish AIC reporting PBN implementation planning.			
7.3 Publish AIP supplement containing applicable standards and procedures.			
7.4 Review operational model of ATS units involved.			
7.5 Determine requirements and carry out verification/Flight inspection for publication of APP procedures, etc.			

7.6 Update letters of operational agreement between ATS units.			
8. Training			
8.1 Develop training and documentation program for pilots, dispatchers and maintenance personnel.			
8.2 Develop training programme and documentation for Air Traffic Controllers and AIS Operators.			
8.3 Conduct training programmes (pilots, dispatchers, maintenance personnel, air traffic controllers, AIS operators).			
8.4 Develop operators-oriented activities, indicating plans and operative and economic benefits expected.			
9. Implementation decision			
9.1 Evaluate operational documentation availability (ATS, OPS/AIR)			
10. System Performance Monitoring			
10.1 Develop post-implementation APP operations monitoring programme.			
10.2 Execute post-implementation APP operations monitoring programme.			
Pre-operational implementation date			
Definitive implementation date			

APPENDIX H

ACTIVITIES OF THE EXPERT TO BE CARRIED OUT IN PROJECT RLA/06/901 WITH REGARD TO PBN, AT THE SHORT TERM

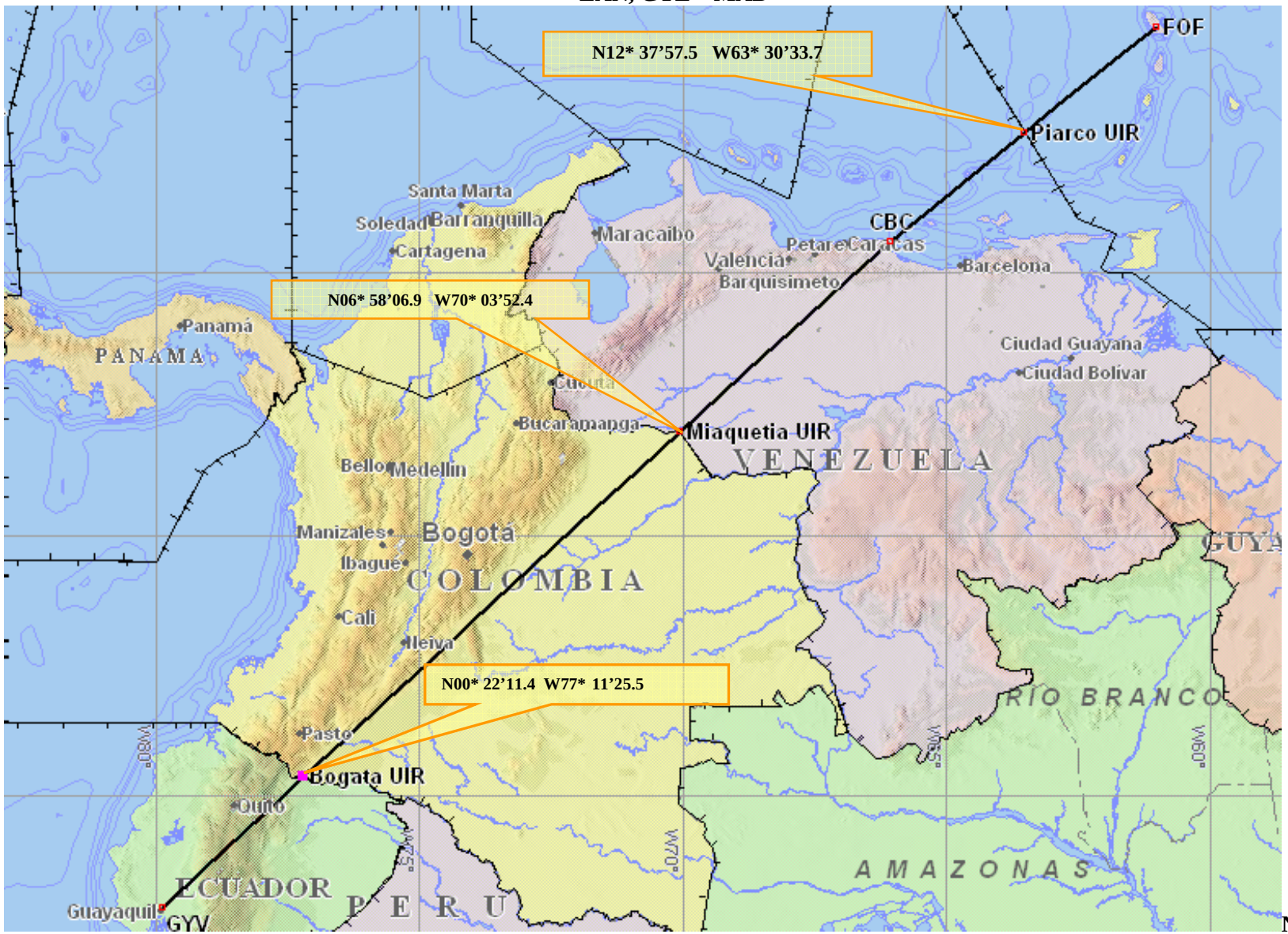
Results	Activities	Party responsible for each activity
1.1 Implementation of performance-based navigation (PBN) – (GPIs 5, 7, 10, 11, 12, and 21).	1.1.1. Obtain and complete the information, learning about the current status in the States and other organisations, if such were the case, with respect to: a) Available CNS infrastructure, with the corresponding coverage and plans for future facilities; b) Characteristics of available ATM automated systems and future automation plans; c) Aircraft fleet operating in the CAR/SAM ATS route network and its RNAV and RNP capabilities, including capacity for arrival procedures based on the flight management system (FMS) and future plans of the users; d) Airworthiness and operational approval capabilities; e) Airports that might derive operational benefits from the use of RNAV and/or RNP; f) Status of implementation of WGS 84; g) Existing SIDs and STARs connecting international airports to ATS routes; h) Real-time and accelerated simulation of operations; i) Cost-benefit analysis of facilities; j) Safety assessment models; k) Regulation of GNSS use; l) The certification regulation of air navigation data providers (RNAV1 and RNP APCH); m) Documentation concerning the training of air traffic controllers; n) Evaluate PBN implementation impact in ATC automated systems; o) Analyse existing data on air traffic movement, with a view to: i) cost-benefit analysis ii) fleet capacity assessment iii) identification of main traffic flows iv) safety assessment.	ATM Expert, RO

	p) Identify the need for data collection and additional data analysis. Start up date: week 1 Estimated duration: 2 weeks	

APÉNDICE / APPENDIX I

ESPACIO AÉREO SUPERIOR / UPPER AIRSPACE **Guayaquil – Madrid**		
Designador **Designator** (aquí los puntos significativos) (significant points here)	**Latitud** **Latitude** (en grados-minutos y segundos)/ (in degrees-minutes and seconds)	**Longitud** **Longitude** (en grados-minutos y segundos) / (in degrees-minutes and seconds)
Guayaquil VOR	S02° 07’42.0	W79° 52’01.0
Guayaquil / Bogota UIR	N00° 22’11.4	W77° 11’25.5
Bogota / Miaquetia UIR	N06° 58’ 06.9	W70° 03’52.4
Miaquetia / Piarco UIR	N12° 37’57.5	W63° 30’33.7
Fort De France VOR	N14° 35’26.7	W61° 01’22.7

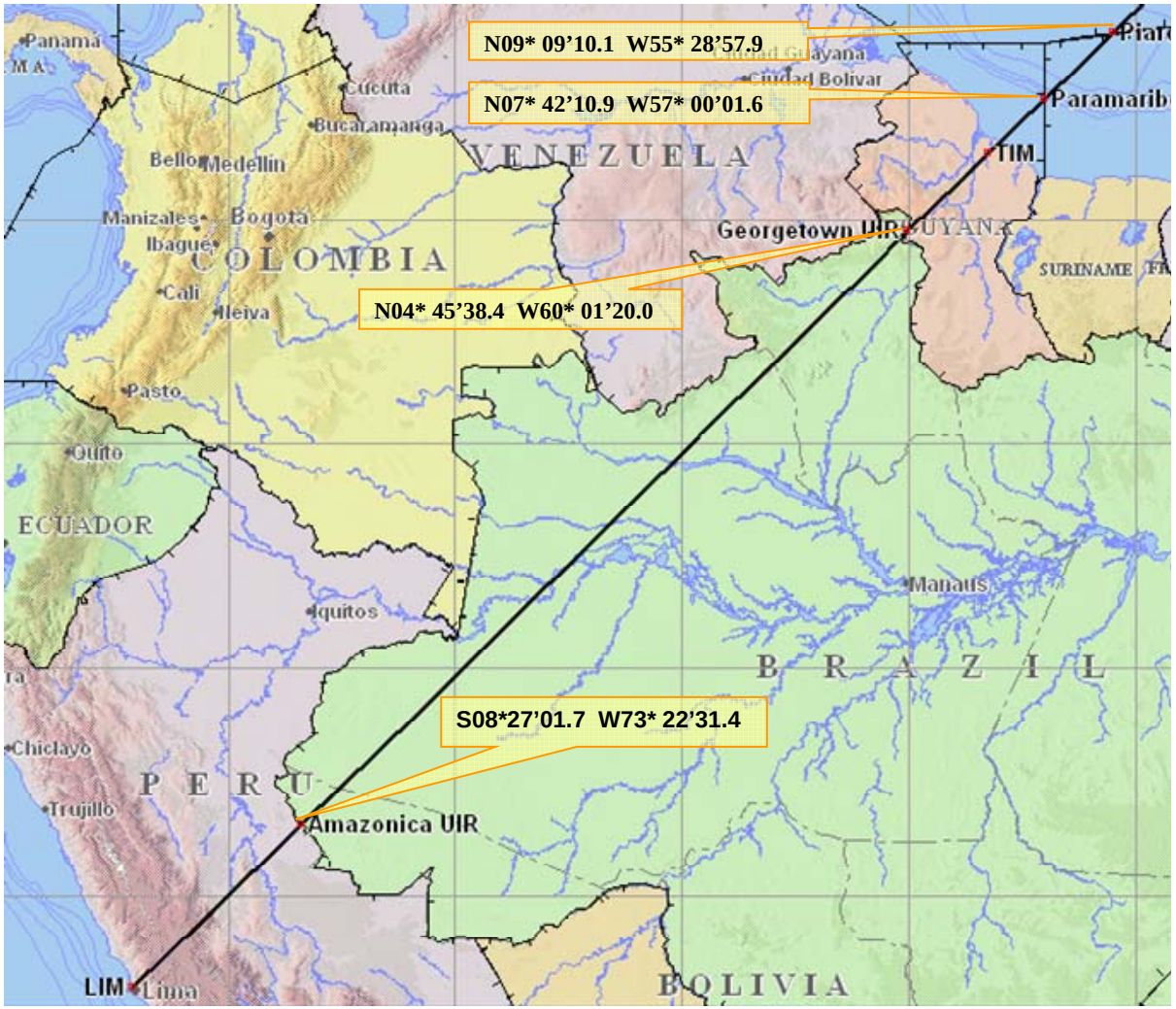
LAN, GYE – MAD



Nueva Ruta/New Route: GYV/Vor directo/direct CBC/Vor directo/direct FOF/Vor /

ESPACIO AÉREO SUPERIOR / UPPER AIRSPACE **Lima – Madrid**		
Designador **Designator** (aquí los puntos significativos) (significant points here)	**Latitud** **Latitude** (en grados-minutos y segundos)/ (in degrees-minutes and seconds)	**Longitud** **Longitude** (en grados-minutos y segundos) / (in degrees-minutes and seconds)
Lima VOR	S12 00 30.08	W77 07’22.4
Lima / Amazonica UIR	S08 27’01.7	W73 22’31.4
Amazonica / Georgetown UIR	N04 45’38.4	W60 01’20.0
Georgetown / Paramaribo UIR	N07 42’10.9	W57 00’01.6
Paramaribo / Piarco UIR	N09 09’10.1	W55 28’57.9

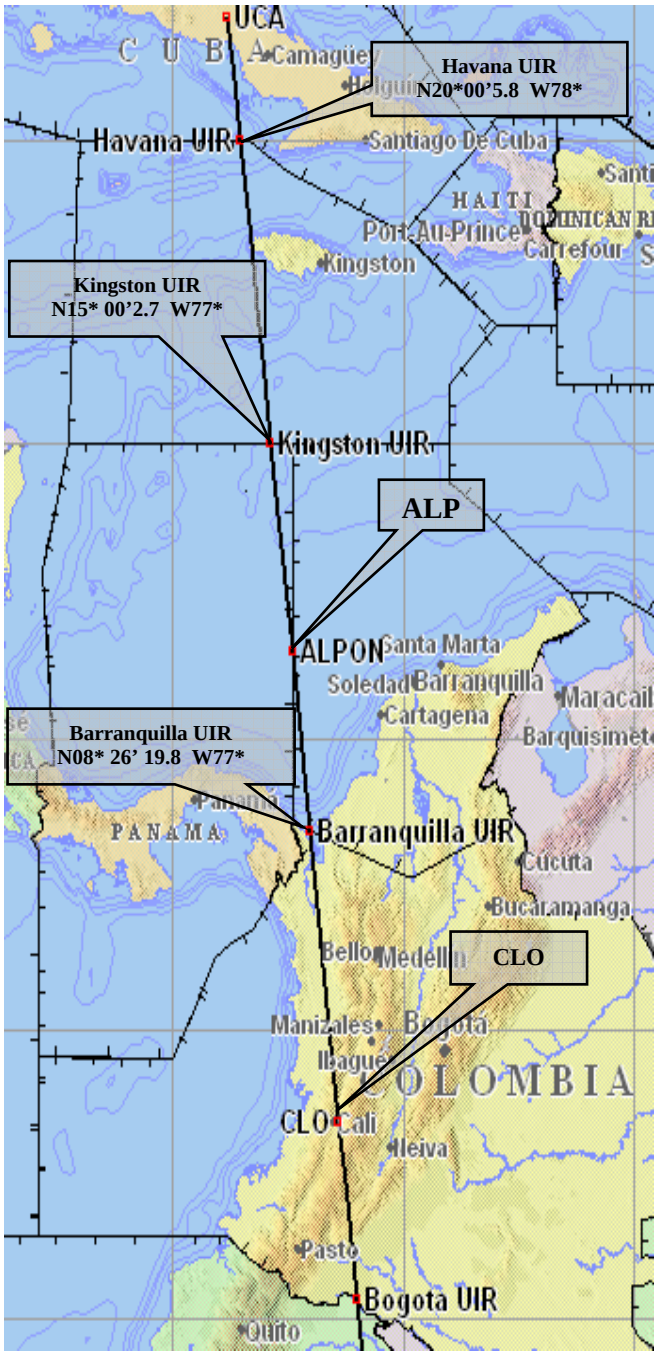
LAN, LIM – MAD
Nueva Ruta: LIM/Vor directo TIM/Vor

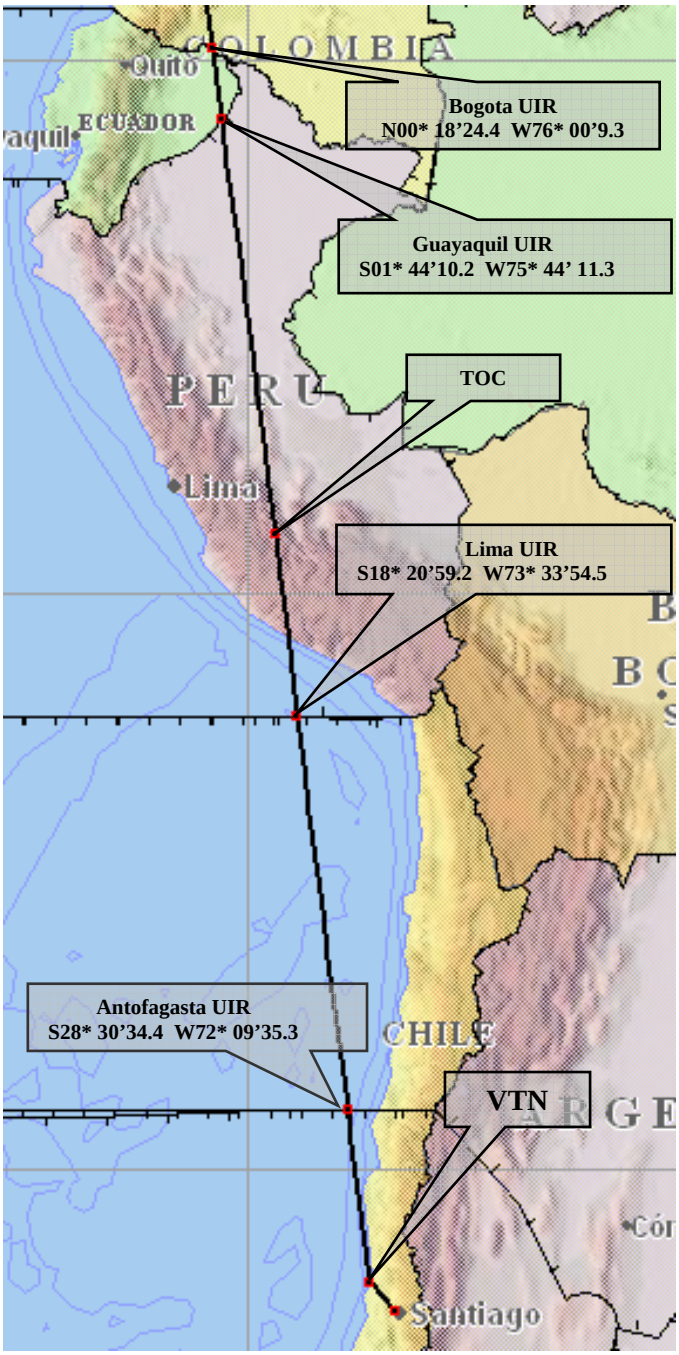


ESPACIO AÉREO SUPERIOR / UPPER AIRSPACE **Santiago – Miami**		
Designador **Designator** (aquí los puntos significativos) (significant points here)	**Latitud** **Latitude** (en grados-minutos y segundos)/ (in degrees-minutes and seconds)	**Longitud** **Longitude** (en grados-minutos y segundos) / (in degrees-minutes and seconds)
Santiago VOR SCL	S33° 25'11.0	W70° 47'04.0
Ventanas VTN VOR	S32° 44'19.0	W71° 29'46.0
Santiago / Antofagasta UIR	S28° 30'34.4	W72° 09'35.3
Antofagasta / Lima UIR	S18° 20'59.2	W73° 33'54.5
Tocto TOC VOR	S13° 21'22.0	W74° 11'29.0
Lima / Guayaquil UIR	S01° 44'10.2	W75° 44'11.3
Guayaquil / Bogota UIR	N00° 18'24.4	W76° 00'9.3
Cali CLO VOR	N03° 24'07.0	W76° 24'20.0
Bogota / Barranquilla UIR	N08° 26'19.8	W77° 01'36.8
ALPON Intersection	N11° 29'06.0	W77° 25'00.0
Panama / Kingston UIR	N15° 00'2.7	W77° 52'2.7
Kingston / Havana UIR	N20° 00'5.8	W78° 32'10.9
Ciego De Avilla UCA VOR	N22° 00'54.2	W78° 48'56.9

LAN, SCL – MIA

Nueva Ruta/New route: VTN/Vor directo/direct TOC/Vor directo/direct CLO/Vor directo/direct UCA/Vor





PROPUESTA DE NUEVA AEROVÍA PARA LAS OPERACIONES SANTIAGO-MIAMI-SANTIAGO
PROPOSED NEW AIRWAY FOR OPERATIONS IN SANTIAGO-MIAMI-SANTIAGO

Nueva Ruta/New route: VTN/Vor directo/direct VOR TOC/Vor directo/direct VOR CLO/Vor directo/direct VOR UCA/Vor

ESTUDIO OPERACIONAL COMPARATIVO
B767-300ER

PROPUESTA DE NUEVAS RUTA S

SECTOR	DISTANCE (NM)	AVG. WIND COMPONENT (KT)	AIR TIME (HR : MIN)	BLOCK TIME (HR : MIN)	TRIP FUEL (KG)	ALTERNATE	TAKEOFF FUEL (KG)	TAKEOFF WEIGHT (KG)	PAYLOAD (KG)	OVERFLIGHT FEES (USD $)
Guayaquil-Madrid (Ruta Actual)	4939	5	10:40	10:55	54306	Valencia	60209	177808	25000	4393.32
Guayaquil-Madrid (Ruta Nueva)	4913	5	10:34	10:49	53817	Valencia	59781	177381	25000	4318.58
Lima-Madrid (Ruta Actual)	5233	5	11:14	11:29	57865	Valencia	63828	181428	25000	6354.98
Lima-Madrid (Ruta Nueva)	5174	5	11:08	11:23	57419	Valencia	63382	180982	25000	6311.96
Santiago-Miami (Ruta Actual)	3721	-6	8:19	8:34	40620	Nassau	46695	164295	25000	2761.68
Santiago-Miami (Ruta Nueva)	3685	-6	8:16	8:31	40231	Nassau	46305	163906	25000	2816.16

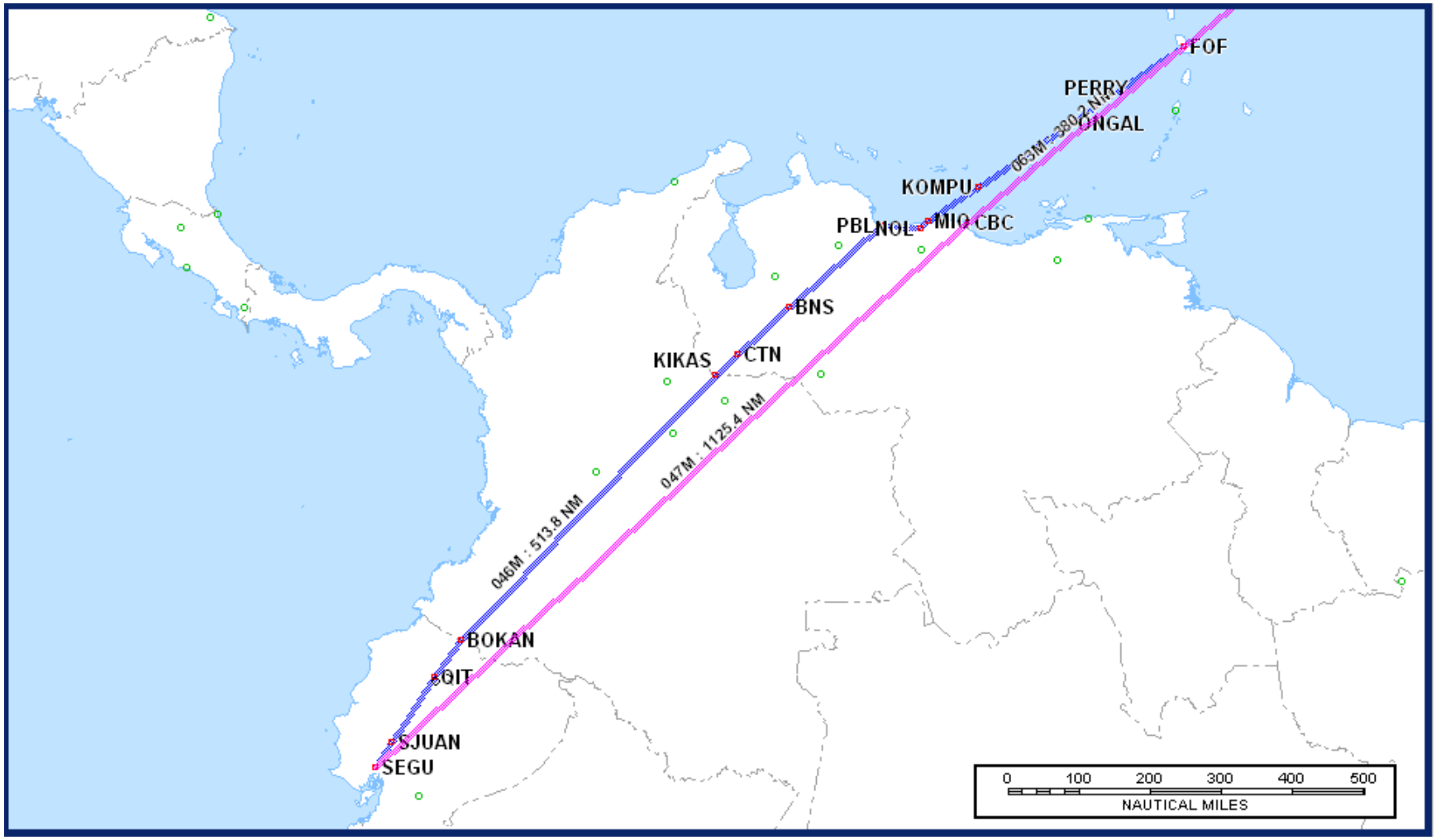
NOTAS : 1.- Las componentes de vientos (W/C) son el 85% de probabilidad de los vientos estadísticos del año.
2.- El Peso Seco de Operación (DOW) considerado es 92600 kg.
3.- Descripción rutas nuevas: Guayaquil-Madrid GYV CBC FOF LUTAK UZ19 BUSEN UN870 RAKOD UH90 TLD TLD1C
Lima-Madrid LIM TIM LUTAK UZ19 BUSEN UN870 RAKOD UH90 TLD TLD1C
Santiago-Miami ESLAR3 VTN TOY TOC CLO UCA URSUS FLIPR1

Departamento de Estudios Operacionales
Subgerencia Control Vuelo y Estudios Operacionales

19-Jun-07

PROPUESTA DE NUEVA AEROVÍA PARA LAS OPERACIONES GUAYAQUIL-MADRID-GUAYAQUIL
PROPOSED NEW AIRWAY FOR OPERATIONS GUAYAQUIL-MADRID-GUAYAQUIL

Nueva Ruta/New route: GYV/Vor directo/direct VOR CBC/Vor directo/direct VOR FOF/Vor



PROPUESTA DE NUEVA AEROVÍA PARA LAS OPERACIONES LIMA-MADRID-LIMA

Nueva Ruta: LIM/Vor directo TIM/Vor

Guayaquil to Madrid LAN Route Request ATM 13

Savings Summary

FLIGHT NUMBER	FROM	TO	WEEKLY FREQ.	AIRCRAFT TYPE	SAVINGS SUMMARY					
					Distance Saved	Minutes Saved	Reduced CO2 Tons	Annual Fuel Lbs. Saved	Fuel Savings @ $2.00/Gal. (USD / YR)	* Total Operational Savings (USD / YR)
LA 1730	GYE	MAD	MTWTF*S	B767-300	26	4	346	242,758	$72,465.00	$289,860
IB 6634	GYE	MAD	MTWTFSS	A340-300	26	4	561	393,354	$117,419.00	$469,676
A7 924	GYE	MAD	**W****	A340-300	26	4	80	56,194	$16,774.25	$67,097
TOTAL SAVINGS - ANNUALLY							988	692,305	$206,658	$826,633

* Note: Total operational savings include fuel savings. CO2 calculated @ 3.14 Lb. Per Lb. Jet fuel.

Lima to Madrid LAN Route Request ATM 13

Savings Summary

FLIGHT NUMBER	FROM	TO	WEEKLY FREQ.	AIRCRAFT TYPE	SAVINGS SUMMARY					
					Distance Saved	Minutes Saved	Reduced CO2 Tons	Annual Fuel Lbs. Saved	Fuel Savings @ $2.00/Gal. (USD / YR)	* Total Operational Savings (USD / YR)
IB 6652	LIM	MAD	MTWTFSS	A340-300	60	8	1,123	786,708	$234,838.25	$939,353
A7 924	LIM	MAD	MT*TFSS	A330-200	60	8	962	674,322	$201,290.00	$805,160
LP 706	LIM	MAD	*T*T**S	B767-300	60	8	346	242,758	$72,465.00	$289,860
TOTAL SAVINGS - ANNUALLY							2,432	1,703,787	$508,593	$2,034,373

* Note: Total operational savings include fuel savings. CO2 calculated @ 3.14 Lb. Per Lb. Jet fuel.

Santiago to Miami LAN Route Request ATM 13

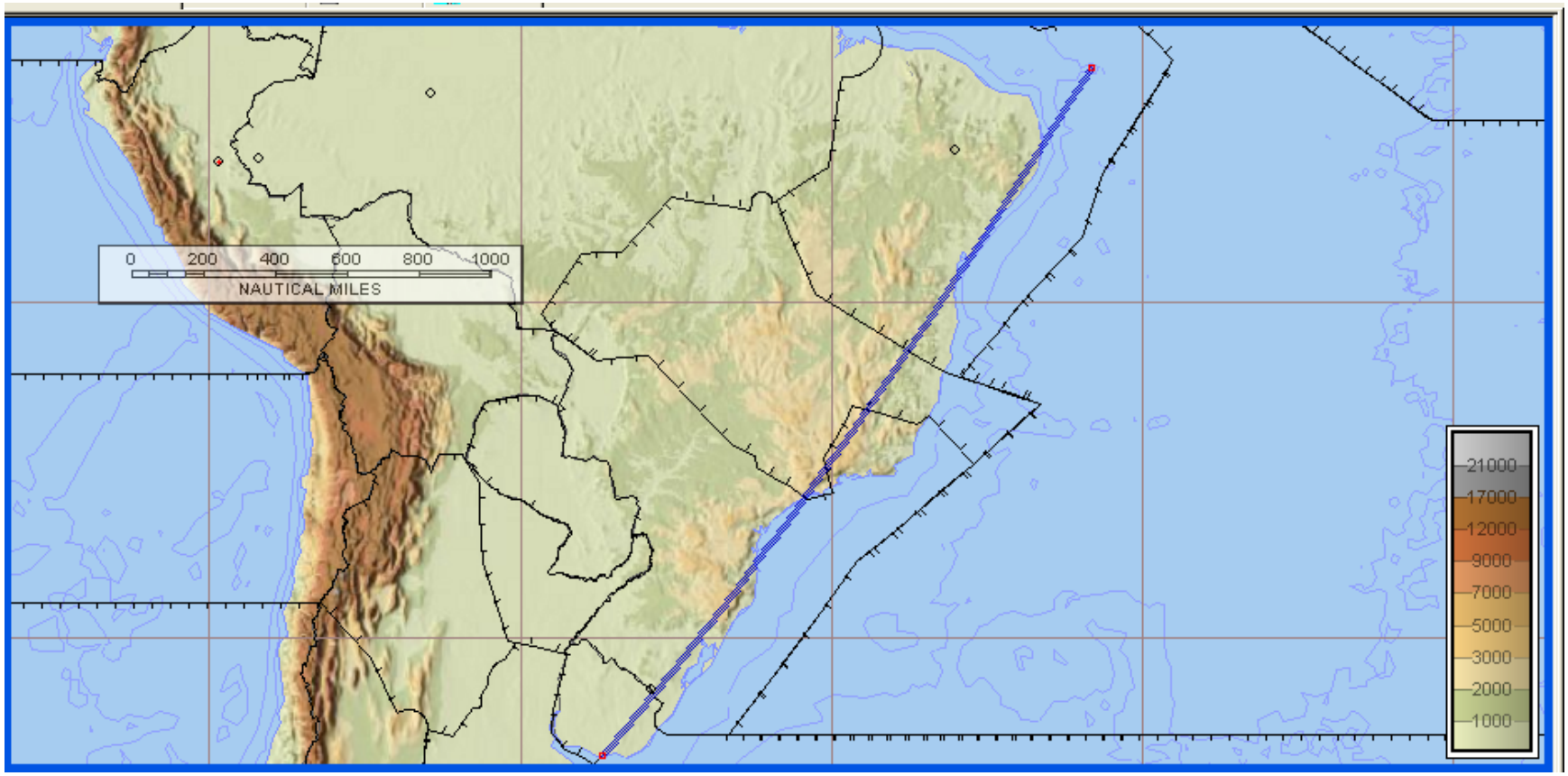
Savings Summary

FLIGHT NUMBER	FROM	TO	WEEKLY FERQ.	AIRCRAFT TYPE	SAVINGS SUMMARY					
					Distance Saved	Minutes Saved	Reduced CO2 Tons	Annual Fuel Lbs. Saved	Fuel Savings @ $2.00/Gal. (USD / YR)	* Total Operational Savings (USD / YR)
AA912	SCL	MIA	MTWTFSS	B767-300	45	6	606	424,827	$126,814.00	$507,256
LA500	SCL	MIA	MTWTFSS	B767-300	45	6	606	424,827	$126,814.00	$507,256
LA 502	SCL	MIA	***TFS*	B767-300	45	6	346	242,758	$72,465.00	$289,860
TOTAL SAVINGS - ANNUALLY							1,559	1,092,412	$326,093	$1,304,372
COMBINED TOTAL SAVINGS - ANNUALLY							4,979	3,488,504	$1,041,345	$4,165,378

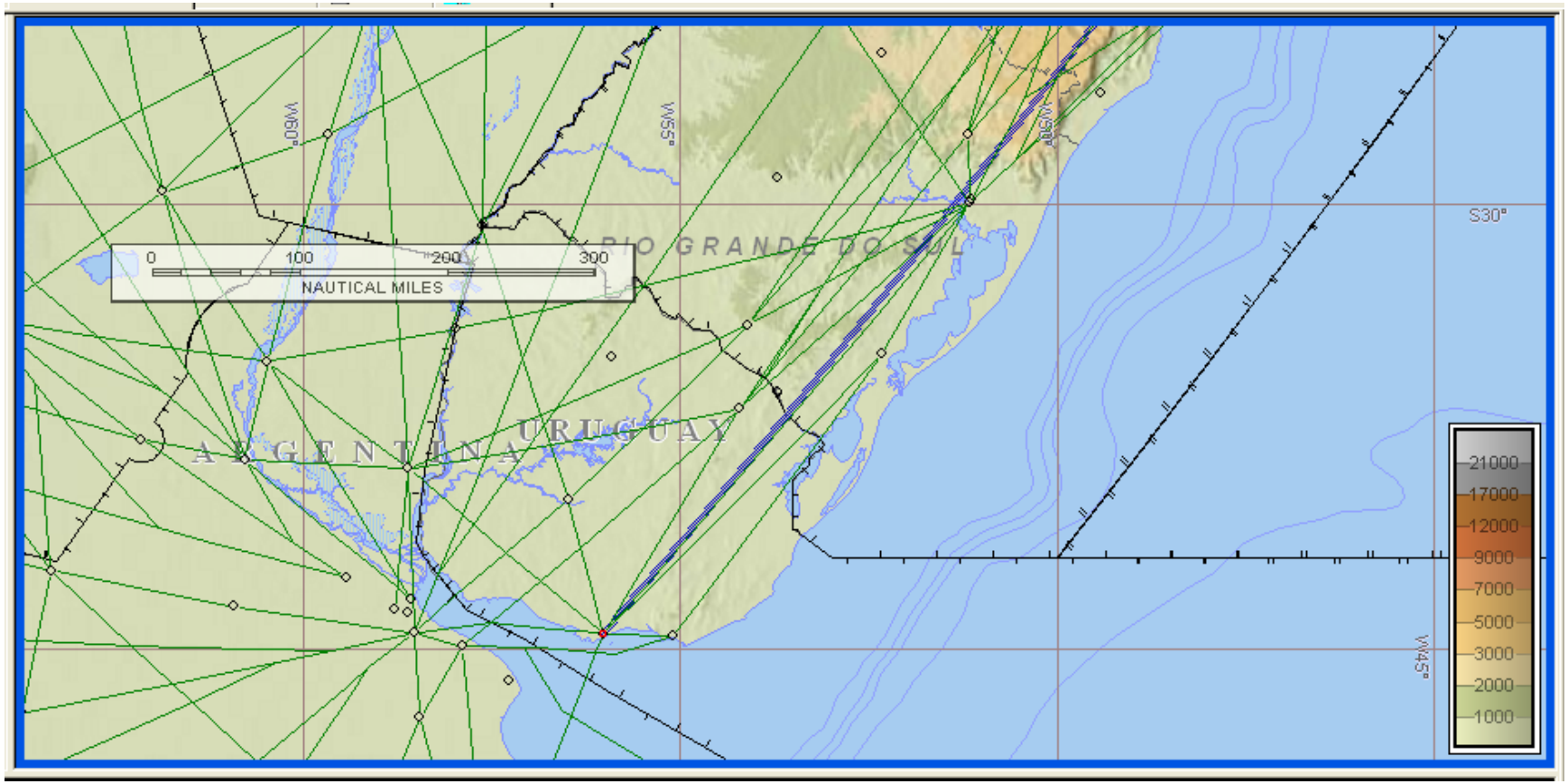
* Note: Total operational savings include fuel savings. CO2 calculated @ 3.14 Lb. Per Lb. Jet fuel.

ESPACIO AÉREO SUPERIOR / UPPER AIRSPACE UL-797		
Designador Designator	**Latitud Latitude**	**Longitud Longitude**
Iquique	20° 34’ 16’’ S	070° 11’ 00’’ W
ILPEM	*20° 57’ 42’’ S*	068° 23’ 06’’ W
SUCRE	19° 00’ 41’’ S	065° 17’ 31’’ W
VIRU VIRU	17° 37’ 42 s	063° 09’ 00 W

Ruta RNAV CRR- FNO



Ruta RNAV CRR- FNO



Agenda Item 2: Implementation of air traffic flow management (ATFM) in the SAM Region

2.1 When addressing this topic, the meeting considered that, in keeping with the revised Global Air Navigation Plan (Doc. 9750), the planning of the global ATM system would focus on the Global Plan Initiatives (GPIs) and that, in this regard, project RLA/06/901 sought, *inter alia*, to assist the participating States and organisations in the implementation of the air traffic flow management concept (ATFM), with the support of Global Plan Initiative No. 6 (GPI 6), ATFM.

2.2 Under project RLA/06/901, Immediate Objective 1.2 envisages the regional implementation of ATFM where necessary, through the completion of specific tasks that will permit an evolutionary implementation with measurable objectives. See **Appendix A** to this part of the report.

CAR/SAM ATFM operational concept (CAR/SAM ATFM CONOPS)

2.3 The Meeting noted that the fourteenth meeting of GREPECAS (GREPECAS/14) reviewed the CONOPS and, in the understanding that it was an evolutionary document that could be amended as necessary, adopted Conclusion 14/49 – Adoption of the ATFM operational concept for the CAR/SAM Regions, stipulating that CAR/SAM States/Territories/International Organisations should adopt the CAR/SAM ATFM operational concept (ATFM CONOPS) and establish a work programme to enable the implementation of the ATFM CONOPS. Subsequently, some changes were introduced as a result of lessons learned during the development and implementation of ATFM by the FAA Air Traffic Control System Command Centre (ATSCSCC), the NAVCANADA National Operations Centre (NOC) and the Mexico Flow Control Centre (CCFMEX).

2.4 The CAR/SAM ATFM CONOPS is a high-level document. Its main objective is to define and regulate the homogeneous implementation of ATFM in the CAR/SAM Regions. Although ATFM planning in the CAR and SAM Regions is done jointly, the implementation *per se* will be done on the basis of the needs of each of the regions involved. In this sense, a single ATFM operational concept for both regions will permit a harmonised implementation and will ensure an effective and equitable service.

2.5 In keeping with the above, the meeting noted that the CONOPS also set forth a simple implementation strategy involving a phased development to ensure maximum use of available capacity and to enable all stakeholders to gain sufficient experience. Consequently, implementation in the SAM Region should begin with the implementation of basic ATFM procedures at the airports and gradually move to more complex stages, without the immediate need for an ATFM regional centre, since its implementation would require more in-depth studies to define the operational concepts, system requirements and institutional aspects. For better reference, **Appendix B** contains the CAR/SAM ATFM CONOPS.

2.6 The Meeting noted that GREPECAS/13 had considered that two scenarios should be taken into account: CAR and SAM, but that they could be modified as the operational concept and implementation plans were developed. The strategy was to develop a harmonised planning for a CAR and SAR inter-regional ATFM system.

2.7 It also deemed it necessary to develop harmonious procedures to be applied among ATFM units during the implementation process, in order to avoid safety risks. This implies the establishment of a regional and inter-regional strategy to facilitate and harmonise the whole

implementation. The ATFM Task Force would fulfil these planning and harmonisation objectives. For the implementation, two scenarios would be established, based on the operational requirements and characteristics of each CAR and SAM Regions. Consideration was also given to the creation of two ATFM implementation groups, one for each region.

2.8 Furthermore, GREPECAS/13 agreed that operational implementation should be gradual, in keeping with Doc 9854 – Global air traffic management operational concept, in order to permit a phased implementation and acquire the necessary skills for proper implementation.

2.9 Accordingly, the meeting agreed that, when implementing air traffic flow management, the aeronautical administrations of the SAM Region should take into account the ATFM CONOPS.

Requirements for the development of guidelines for ATFM implementation in the SAM Region, through the hiring of experts

2.10 The Meeting considered that ATFM implementation in the SAM Region would require the development of detailed guidelines for States and International Organisations, including the following three aspects:

a) Review experience in other regions

b) Obtain and complete the information, taking note of the status in the participating States and organisations.

c) Obtain and complete the information, taking note of the status in the participating States and organisations regarding the electronic databases required for the evolutionary phases of the ATFM system.

2.11 In this sense, the Meeting felt that the development of the material required for ATFM implementation would demand the hiring of experts to work full time in the fulfilment of some of the tasks of the action plan. Consequently, the Meeting considered that, for this first phase, tasks 1.2.1 and 1.2.2 described in Appendix A should be assigned to an expert hired by project RLA/06/901. The result of this work would be presented at the SAM/IG/2 meeting.

Short-term action plan for ATFM implementation in the SAM Region

2.12 The Meeting assessed the model action plan for the first phase of ATFM implementation and introduced the necessary changes, as well as the dates for the completion of tasks and those responsible for such tasks, and adopted the Action Plan that appears in **Appendix C** to this part of the report.

Terms of Reference and Work Programme of the SAM ATFM implementation group (SAM/ATFM/IG)

2.13 The Meeting developed the Terms of Reference and Work Programme for the **SAM/ATFM/IG** as shown in **Appendix D** to this part of the report.

2.14 The SAM/ATFM/IG established a drafting group charged with preparing the working documents for its meetings, and with drafting the report of each SAM/IG meeting on ATFM, as a way of supporting the Secretariat.

2.15 Likewise, the Meeting deemed it advisable for the task force to be made up of representatives of each State participating in project RLA/06/901, in order to coordinate and work in their respective States and to act as focal points for the ATFM/IG. Likewise, the other States that were not yet participating in the project were invited to be part of the Implementation Group.

2.16 Furthermore, the Meeting considered that the members of the ATFM/IG should hold periodic teleconferences, coordinated in advance, in order to assess the progress made in the tasks contained in the action plan.

Methodology for estimating airport and airspace capacity

2.17 Brazil offered a training course on methods to estimate airport and airspace capacity for ATFM focal points that were part of the ATFM/IG. In this regard, the Meeting felt the need to request the support of project RLA/06/901 to conduct such a course in March 2009 in Rio de Janeiro, at the CGNA, where it would be possible to have a practical demonstration or, otherwise, at the site the project Coordination Committee deemed more convenient for budgetary reason.

2.18 The Meeting took note and acknowledged the offer made by Brazil regarding the methodology used in Brazil to estimate airport and airspace capacity. To that end, in June 2008, Brazil would provide the ATFM/IG with the aforementioned methodology for its review and possible recommendation for application in the SAM Region. It also agreed to request those States that were already applying a methodology to estimate airport capacity to inform the SAM/IG accordingly.

Dissemination of regional ATFM implementation activities

2.19 Based on the collaborative decision-making (CDM) concept, the Meeting considered that the aeronautical community should be informed about ATFM regional planning.

APPENDIX A

PROJECT RLA/06/901 OBJECTIVE N° 1

1.2 Regional implementation of air traffic flow management (ATFM) wherever necessary to improve airspace capacity and operational efficiency -(GPI 6)	1.2.1 Elaborate a survey to obtain and complete the information, learning about the current status in the participating States and organisations with respect to: a) The methods for estimating airport and ATC capacity; b) ATFM procedures for the following phases: ✓ Airport strategic ✓ Airport tactical ✓ Airspace strategic ✓ Airspace tactical Start-up date: week 12 Estimated duration: 1 week	ATM, AGA, RO
	1.2.2 Elaborate a survey to obtain and complete the information, learning about the current status in the participating States and organisations of the electronic databases required for the ATFM evolutionary phases, in relation to the following aspects: a) Flow management data processing and display: ✓ Flight planning and flight plan processing data (FPL, RPL, etc.); ✓ Airspace and airport structure data; ✓ Display of the situation in the air; ✓ Automatic messages to support decision-making (access to SLOTS, reporting of delays, alternate routes, etc.); ✓ Monitoring of the operational status of air navigation infrastructure; ✓ Capacity of the airport acceptance regime (AAR); ✓ ATC capacity; ✓ Air traffic demand; ✓ Airspace structure and ATS route network; ✓ Radio navigation aids, radar, etc.;	ATM, AIS, AGA, CNS, MET, RO

	✓ Aircraft performance. b) Surveillance system data (SSR, ADS, etc.); c) AIS/MAP (mapping, ATFM advisories, AIRAC updates, etc.); d) Meteorological information (MET); e) Data for historical and statistical analysis of air operations, meteorology, etc.; f) Communication systems in support of collaborative decision-making (CDM) with: ✓ Other centralised ATFM systems; ✓ Other FMUs and/or FMPs and/or ATS units; ✓ Operators and users (airlines, general aviation, State aircraft, etc.); ✓ Airport authorities; ✓ Meteorological authorities; ✓ Aeronautical information services. g) The necessary communication requirements to effectively support centralised air traffic flow management in its linkage with: ✓ Other centralised ATFM systems; ✓ FMUs, FMPs and/or ATS units involved; ✓ Operators and users; ✓ Airport authorities; ✓ Meteorological authorities; ✓ Aeronautical information services; ✓ The transmission of ADS and radar data to the ATFMC. Start-up date: week 13 Estimated duration: 1 week	
	1.2.3 Develop model action plans based on the information processed under 1.2.1 and 1.2.2, to be used by the participating States and organisations for the implementation of: a) Airport strategic ATFM; b) Airport tactical ATFM; c) Airspace strategic ATFM; and d) Airspace tactical ATFM. Start-up date: week 14 Estimated duration: 4 weeks	ATM, RO

	1.2.4 Develop guidelines, based on the information processed in the preceding activities, to be used by the participating States and organisations for the implementation of flow management units (FMUs) or flow management positions (FMPs) and for the incorporation of new procedures applicable to FMUs or FMPs concerning: a) Airport strategic ATFM; b) Airport tactical ATFM; c) Airspace strategic ATFM; and d) Airspace tactical ATFM. Start-up date: week 18 Estimated duration: 4 weeks	ATM, RO
	1.2.5 Develop a model action plan, based on the material processed in the preceding activities, for the implementation of the centralised ATFM in each of the CAR and SAM Regions. Start-up date: week 22 Estimated duration: 1 week	ATM, RO
	1.2.6 Draft a working paper to support the submittal of the action plan for the implementation of the centralised ATFM for consideration and approval. Start-up date: week 23 Estimated duration: 1 week	ATM,RO
	1.2.7 Submit the working paper introducing the plan to the consideration of the corresponding GREPECAS bodies through the established channels. Start-up date: to be determined Estimated duration:	RO
	1.2.8 Make the necessary adjustments or changes to the plan based on the comments generated, and update the proposal and the working paper for consideration and approval by GREPECAS. Start-up date: to be determined Estimated duration:	ATM, RO

	1.2.9 Process, edit, and distribute the plan, introducing the amendments that GREPECAS may have made in the course of its approval. Start-up date: to be determined Estimated duration:	RO
	1.2.10 Identify and develop the necessary material for the implementation of the centralised ATFM, in coordination with the participating States and organisations, taking into account environmental protection practices and procedures, and including the following aspects: a) Cost-benefit analysis; b) Definition of data collection plans; c) Determination of the required automated systems, including performance parameters and the necessary tests and assessments; d) Updating of the CAR/SAM ATFM operational concept, if necessary; e) Drafting of a handbook on common operational procedures for air traffic flow management, including, *inter alia*, the following aspects: ✓ Procedures applicable to the strategic, pre-tactical, and tactical phases; ✓ Procedures for coordination and teleconferencing with FMUs/FMPs, ATS units, ATFMC, users, airports, and other organisations involved; ✓ Collaborative decision-making procedures; ✓ Methodology to determine airport and ATS capacity; ✓ Procedure to keep ATFM databases permanently updated; ✓ Procedures for pilots and ATC; ✓ Required ATFM messages. f) Models of the required AICs/NOTAMs and AIP supplements; g) ATFM document formats to be included in the CAR/SAM web; h) Amendment to Doc 7030, if necessary; i) Amendments to the corresponding letters of agreement; j) ATC simulations;	ATM, CNS, AIS, RO

	k) Harmonisation of applicable ANP requirements; l) ATFM training; m) Contingency plans. Start-up date: to be determined Estimated duration:	
	1.2.11 Provide assistance to the participating States and organisations for the execution of the ATFM implementation action plan, including the programming of the necessary coordination and training activities. Start-up date: to be determined Estimated duration:	ATM, OR
	1.2.12 Draft a final report of the activities carried out, including relevant recommendations. Start-up date: to be determined Estimated duration:	ATM

APPENDIX B

INTERNATIONAL CIVIL AVIATION ORGANIZATION

Caribbean/South American Air Traffic Flow Management Concept of Operation

(CAR/SAM ATFM CONOPS)

Version	1.2
Date	June 2007

FOREWORD

The *Caribbean/South American ATFM Concept of Operations (CAR/SAM ATFM CONOPS)* is published by the ATM/CNS Subgroup of the Caribbean/South American Regional Planning and Implementation Group (GREPECAS). It describes *an* air traffic flow management *operational* concept to be applied in both regions.

The GREPECAS and its contributory bodies will issue revised editions of the Document as required to reflect ongoing implementation activities.

Copies of the *CAR/SAM ATFM Concept of Operations* can be obtained by contacting:

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The present edition (Version 1.2) includes all revisions and modifications until June 2007. Subsequent amendments and corrigenda will be indicated in the Record of Amendment and Corrigenda Table, according to the procedure established in page 3.

The publication of amendments and corrigenda is regularly announced through correspondence with States, and the ICAO web site, which holders of this publication should consult. The space below is provided to keep a record of such amendments.

RECORD OF AMENDMENTS AND CORRIGENDA

AMENDMENTS			
No.	Date applicable	Date entered	Entered by
1	20/06/07	20/06/007	ATFM/TF/3

CORRIGENDA			
No.	Date applicable	Date entered	Entered by

AMENDMENTS TO THE DOCUMENT

1. The CAR/SAM ATFM CONOPS is a regional document that includes aeronautical, scientific, and technological advances related to ATFM. It also includes the operational experiences gained in the CAR/SAM Regions, as well as in other ICAO Regions, that may affect ATFM concepts and procedures.

2. Due to its unique and regional focus, the CAR/SAM ATFM CONOPS is also a dynamic document and is in continuous progress and permeable in order to accept every modification originated by the ATM/CNS subgroup. This will allow for constant improvement based on experience gained from aeronautical disciplines and activities, enable its harmonious implementation in the CAR/SAM Regions, and ensure air operations efficiency and maintain agreed levels of safety.

3. In order to keep this ATFM CONOPS updated and make the required changes and/or modifications, the following amendment procedures have been established.

4. The ATFM CONOPS consists of a series of loose-leaf pages organized in sections and parts describing the concepts and procedures applicable to ATFM operations in the CAR/SAM Regions.

5. The framework of the sections and parts, as well as the page numbering have been developed so as to provide flexibility, facilitating the review or the addition of new texts. Each Section is independent and includes an introduction giving its purpose and status.

6. Pages bear the date of publication, as applicable. Replacement pages are issued as necessary and any portions of the pages that have been revised are identified by a vertical line in the margin. Additional material will be incorporated in the existing Sections or will be the subject of new Sections, as required.

7. Changes to text are identified by a vertical line in the margin in the following manner:

Italics	*for new or revised text;*
Italics	*for editorial modification which does not alter the substance or meaning of the text; and*
Strikethrough	~~for deleted text.~~

8. The absence of change bars, when data or page numbers have changed, will signify re-issue of the section concerned or re-arrangement of text (e.g. following an insertion or deletion with no other changes).

Page

Document content

Foreword 02
Record of amendments and corrigenda 03
Document amendments 04
Document content 05
Glossary of Acronyms 06
Explanation of Terms and expressions 07
Executive summary 09
1. History 10
2. Purpose of the document 11
3. Actors involved in ATFM 11
4. Trends and passenger traffic forecast in the main airports of the CAR/SAM Regions 12
5. Main traffic flows 12
6. Identification of areas and/or routes where air traffic congestion is produced 13
7. Objectives, Principles and Functions of a Centralized ATFM 13
8. Equipment requirements for FMU/FMP and centralized ATFM 15
9. Personnel requirements for FMU/FMP and centralized ATFM 15
10. Operational procedures 15
11. ATFM implementation strategy 16
12. Special flights exempt from the application of ATFM measures 18
13. Contingency plan 18

Appendix A

Routing areas and main traffic flows identified in the CAR/SAM Regions 19

Appendix B

General considerations for the implementation process of a centralised ATFM 23

GLOSARIO DE ACRÓNIMOS/ACRONYMS GLOSSARY

ACC	Centro de control de área Area control center Aeronautical fixed service
AFTN	Red de telecomunicaciones fijas aeronáuticas Aeronautical fixed telecommunication network
AIP	Publicación de Información aeronáutica Aeronautical Information Publication
AIS	Servicio de información aeronáutica Aeronautical information service
ANP	Plan navegación aérea Air navigation plan
ANS	Servicios de navegación aérea Air navigation services
ANSP	Proveedor de servicios de navegación aérea Air navigation service provider
AO	Operador de aeronave Aircraft operator
APP	Oficina de control de aproximación Approach control office
ATC	Control de tránsito aéreo Air traffic control
ATFM	Gestión de la afluencia del tránsito aéreo Air traffic flow management
ATM	Gestión del tránsito aéreo Air traffic management
ATS	Servicios de tránsito aéreo Air traffic services
CAA	Administración de aviación civil Civil aviation authority
CAR/SAM	Regiones Caribe y Sudamérica Caribbean and South American Regions
CATFM	Dependencia de Gestión de la afluencia del tránsito centralizada Centralized air traffic flow management unit
CBA	Análisis de costo/beneficios Cost/benefit analysis
CNS/ATM	Comunicaciones, navegación y vigilancia/gestión del tránsito aéreo Communications, navigation, and surveillance/air traffic management
FDPS	Sistema de procesamiento de datos de vuelo Flight data processing system
FIR	Región de información de vuelo Flight information region
FMU	Dependencia de organización de la afluencia Flow management unit
FMP	Puestos de gestión de afluencia Flow management position

FPL	Plan de vuelo Flight plan
GREPECAS	Grupo regional de planificación y ejecución CAR/SAM CAR/SAM regional planning and implementation group
MET	Servicios meteorológicos para la navegación aérea Meteorological services for air navigation
OACI/ICAO	Organización de aviación civil internacional International civil aviation organization
PANS ATM	Procedimientos para los servicios de navegación aérea –Gestión de tránsito aéreo Procedures for Air Navigation Services –Air traffic management
PIRG	Grupo regional de planificación y ejecución Planning and implementation regional group
TBD	A ser determinado To be determined
TMA	Area de control terminal Terminal management area
TWR	Torre de control Control Tower
WWW	Red mundial World Wide Web

Explanation of terms and expressions

The writing and explanation of some terms and particular expressions used in this document are defined for a better understanding.

Air traffic management system. A system that provides ATM through the collaborative integration of humans, information, technology, facilities and services, supported by air and ground- and/or space-based communications, navigation and surveillance.

Capacity (for ATFM purposes). The maximum number of aircraft that can be accommodated in a given time period by the system or one of its components (throughput).

Demand. The number of aircraft requesting to use the ATM system in a given time period.

Efficiency. The ratio of the cost of ideal flight to the cost of procedurally constrained flight.

Homogeneous ATM area. An airspace with a common air traffic management interest, based on similar characteristics of traffic density, complexity, air navigation system infrastructure requirements or other specified considerations wherein a common detailed plan will foster the implementation of interoperable CNS/ATM systems.

Note.— Homogeneous ATM areas may extend over States, specific portions of States, orgroupings of smaller States. They may also extend over large oceanic and continental en-route areas. They are considered as areas of shared interest and requirements.

Major traffic flow. A concentration of significant volumes of air traffic on the same or proximate flight trajectories.

Note.— Major traffic flows may cross several homogeneous ATM areas with different characteristics.

Routing area. A defined area encompassing one or more major traffic flows for the purpose of developing a detailed plan for the implementation of interoperable CNS/ATM systems.

Note.— A routing area may cross several homogeneous ATM areas with different characteristics.
A routing area specifies common interests and requirements among underlying homogeneous areas, for which a detailed plan for the implementation of CNS/ATM systems and procedures either for the airspace or for the aircraft will be specified.

Centralized ATFM. A centralized unit responsible for the provision of air traffic flow management within a specific area.

ATM Community. All the organizations, bodies or entities which might participate, collaborate and cooperate in the planning, development, use, regulation, operation and maintenance of the ATM System.

Air Traffic Flow Management (ATFM). A service established with the objective of contributing to a safe, orderly and expeditious flow of air traffic by ensuring that ATC capacity is utilized to the maximum extent possible and that the traffic volume is compatible with the capacities declared by the appropriate ATS authority.

Air Traffic Management. *The aggregation of the airborne functions and ground-based functions (air traffic services, airspace management and air traffic flow management) required to ensure the safe and efficient movement of aircraft during all phases of operations.*

Flight Management Position/Unit – FMP/FMU). A position or working unit established in an appropriate air traffic control unit to ensure the necessary interphase between the local ATFM and a centralized ATFM units related to air traffic flow management – ATFM.

Air Traffic Volume. The number of aircraft within a defined airspace or aircraft movement area in an aerodrome, within a specific time frame.

Executive summary

GREPECAS considered that early ATFM implementation shall ensure optimum air traffic flow towards specific areas or through them during periods in which the demand exceeds or is foreseen to exceed available capacity of the ATC system. Therefore, an ATFM system should reduce aircraft delays both in flight and ground and avoid system overloading.

In this connection, GREPECAS approved the operational concept described herein, which reflects the expected order of events which might occur and should assist and guide the planners in the design and gradual development of ATFM system, in order to provide safety and effectiveness, and ensure an optimum air traffic flow towards certain areas or through them during periods in which the demand exceeds or is foreseen to exceed the available capacity of the ATC system.

The main actors involved in air traffic flow management *are* the organizations, bodies or entities which might participate, collaborate and cooperate in the planning, development, use, regulation, operation and maintenance of the ATFM System.

From the analysis of the statistics it may be noted that during the period 1994-2004, the passengers regular traffic (in PKP) of airlines in the Latin American and Caribbean Region grew at an average annual rate of 3.3% (in comparison to the 5.1% annual rate of global growth, foreseeing that air traffic growth continues to gradually improve at mid term, at the same time that the economical activity.

The total of operations of the main airports of the CAR Region in the period 2002 to 2005 reflected a positive trend of 1.92%. However, in the same period the trend in the SAM Region was negative –0.56% being the global trend positive 0.66% for both regions.

Also, several airspaces with common interests have been identified *with regard to* air traffic management, based on similar characteristics of traffic density, complexity and air navigation system infrastructure requirements within which a common plan shall foster the implementation of the ATM Global Operational Concept. A description of such homogeneous and routing areas is attached *to the* CAR/SAM ATFM CONOPS.

As established in ICAO documents, air traffic flow management should be implemented within a region or within other defined areas as a centralised ATFM organization, with the support of flow management units (FMU) established in each ACC within the region or area of application.

In view of the above, this document describes the main objectives of the Centralized ATFM Facility which include: assist ATC in making the maximum use of its airspace and capacity; issue flow management initiatives, as required ,in order to maintain a safe, orderly and expeditious flow of air traffic; ensure that air traffic volume is compatible with declared capacities; develop a description of the principles and functions of flow management units; and establish the requirements for equipping flow management units and Centralized ATFM Facilities.

In the current operational concept, GREPECAS establishes a simple implementation strategy through the development in phases in order to ensure maximum utilisation of available capacity and permit all parties concerned to obtain sufficient experience. The implementation would be initiated with the application of basic ATFM procedures in airports and in an evolutionary manner to reach more complex phases, without

the immediate need for a regional ATFM centre, since its implementation would demand further studies to define operational concepts, systems requirements and institutional aspects for its implementation.

Finally, GREPECAS deemed pertinent to establish exceptions for the application of ATFM measures for aircraft performing ambulance flights, humanitarian flights, search and rescue operations and State aircraft in international flights, leaving at the discretion of the States/Territories and International Organizations the measures to be adopted on this matter for domestic flights. It also set out that for a partial or total interruption of flow management and/or support services the corresponding contingency will also be available.

1. History

1.1 ICAO CNS/ATM Systems received support from the Tenth Air Navigation Conference held in 1991 at ICAO Headquarters in Montreal, Canada. The same year, the CAR/SAM Regional Planning and Implementation Group (GREPECAS) started to work towards a regional application of this new air navigation services concept.

1.2 Further, at the Eleventh Air Navigation Conference (AN-Conf/11, Montreal September 2003), States supported and approved the new ICAO ATM Global Operational Concept, which encourages the implementation of a services management system which enables an operationally continuous regional airspace through the application of a series of ATM functions.

1.3 As per the guidance principles established by ICAO Council with regard to the facilitation of the inter-regional harmonization, the regional plans for CNS/ATM systems implementation in the regions should be prepared in accordance to the general profiles defined in the Global Air Navigation Plan for CNS/ATM Systems. After a careful analysis of the guidance principles of this Global Plan, GREPECAS adopted them and incorporated characteristics inherent to the CAR/SAM Regions, using as a basis the definitions of Homogeneous Areas and Main Traffic Flows. Homogeneous areas are those airspace portions with ATM requirements and similar complexity degrees, while main air traffic flows are airspaces where a significant amount of air traffic exists.

1.4 From the analysis carried out by ICAO/UNDP Project RLA/98/003, it may be inferred that while in general terms in the CAR/SAM Regions environment, currently no traffic congestions are registered requiring a complex flow management, they have been identified in some airports and airspace sectors, mainly in special periods and specific hours, where some congestions are already produced, which should be avoided.

1.5 In view of the above, GREPECAS considered that the early implementation of the ATFM shall ensure an optimum air traffic flow towards some areas or through them, during periods in which the demand exceeds or is foreseen to exceed the available capacity of the ATC system. Therefore, an ATFM system should reduce aircraft delays both in flight and ground and avoid system overloading. The ATFM system shall assist the ATC to comply with its objectives and achieve a more effective utilisation of the airspace and airports available capacity. ATFM should also ensure that air operations safety is not compromised in case unacceptable levels of air traffic congestion occur and at the same time ensure that air traffic is effectively administered without applying unnecessary restrictions to flow.

2. Purpose of the document

2.1 The CAR/SAM ATFM CONOPS document is a high level description of service to be provided in the CAR/SAM Regions during a specific time horizon. It explains the current situation as well as the future situation which will be reached through a series of specific stages.

2.2 The operational concept described herein reflects the expected order of events and should assist and guide the planners in the design and gradual development of the ATFM system. The concept is designed to promote safety, efficiency, and an optimum flow of traffic in areas where demands exceed, or is forecast to exceed, the available capacity of the ATM system.

3. Actors involved in ATFM

3.1 The ATFM community includes organizations, bodies or entities which could participate collaborate and cooperate in the planning, development, utilisation, regulation, operation and maintenance of ATFM system. Among them, the following may be emphasized:

3.2 ***Aerodrome Community***. Includes aerodromes, aerodromes authorities and other parties involved in the provision and operation of the physical infrastructure needed to support the take-off, landing and ground handling of aircraft.

3.3 ***Airspace Providers***. Refers in general terms to Contracting States in their owner capacity with legal authority to permit or deny access to their airspace sovereignty. The expression may also be applied to organizations of the State to which the responsibility has been assigned to establish standards and guidelines for the airspace use.

3.4 ***Airspace users***. Refers mainly to airlines and pilots.

3.5 ***ATM service providers.*** Constituted by all the organizations and personnel (i.e. controllers, engineers, technicians) implied in the provision of ATFM services to airspace users.

3.6 ***Military aviation.*** Refers to the personnel and material of military organizations as wardens and their vital role in States' security.

3.7 ***International Civil Aviation Organization (ICAO)***. Considered as the only international organization responsible for efficiently coordinating the implementation activities of global ATM which lead to a real, continuous global ATM.

4. Trends and traffic forecasts in the main airports of the CAR/SAM Regions

4.1 During the period 1994-2004, the Latin American and Caribbean Region's airlines passengers' regular traffic (in PKP) grew at an annual average of 3.3% (in comparison to the global annual average growth rate of 5.1%). Until year 2000 privatisation of national carriers, fusions and inter-regional alliances, together with a wide rationalization of fleets and routes, counted among the measures that enabled airlines of the regions to capture a greater portion of traffic of United States – Latin America and Caribbean, one of the aviation markets with greater growth rate. After high traffic growth rates in 1997 and 1998 (9.5% and 7.8% respectively), the passengers traffic decreased in 1999 in a 0.3% but it was recovered in 2000 with a growth rate of 4.4%, decreasing again in 2001 in 5.1%. The traffic decreased in 1.6% in 2002 before recovering in 2003 (3.8%) and 2004 (8.4%). In some CAR/SAM areas the traffic growth in 2005 registered scopes of up to 13%.

4.2 Aircraft movement in the main airports in the period 2002-2005 would indicate that, in the CAR Region the total operations reflect a positive trend of 1.92% observing that in some States particularly, positive trends are reflected that vary from 2.42% to 6.41%. In the SAM Region, the total of operations reflected a negative trend of -0.56% between years 2002 to 2005 observing that some States particularly reflect positive trends which vary from 0.85% to 4.79%.

4.3 Making a balance of the previous information, it is observed that during years 2002 to 2005 the global trend in the CAR/SAM Regions is reflected in a positive 0.66%. It is foreseen that the traffic growth continues to gradually improve at mid term at the same time than economical activity.

5. Main traffic flows

5.1 The CAR/SAM air navigation plan has identified several airspaces with common interests as regards air traffic management, based on similar characteristics of traffic density, complexity and air navigation system infrastructure requirements within which a common plan shall foster the implementation of the ATM Global Concept. Within these routing areas the main traffic flows have also been identified following the same or close flight trajectories between pairs of cities.

5.2 These routing areas and the respective traffic flows are described in the Table shown as **Appendix A** to this document.

6. Identification of areas and/or routes where traffic congestion is produced

6.1 Currently, saturation periods have been identified in several airports and traffic flows *in* some portions of the CAR/SAM FIRs. In view of this, it is necessary that CAR/SAM States, Territories, and International Organizations maintain and disseminate to all interested parties *a list of* the saturation periods of their respective airports, terminal areas and traffic flows.

7. Objectives, principles and functions of a Centralized ATFM Facility

Objective of the Centralized ATFM Facility

7.1 As established in the PANS ATM (Doc 4444), air traffic flow management should be implemented within a region, *or other defined area*, as a *C*entralized ATFM Facility with the support of flow management positions (FMP) established in each ACC within the region or area of application.

7.2 The objective of the Centralized ATFM Facility is to enhance efficiency and safety of air traffic operations by demand and capacity balancing and traffic synchronization. This may be accomplished by the use of flow management initiatives to maintain a safe, orderly and expeditious air traffic circulation while ensuring that the traffic volume is compatible with the declared capacities.

7.3 Consequently, States, Territories, and International Organizations may define whether a Flow Management Unit, and the associated Flow Management Positions, should be established in the interim phase before the implementation of the Centralized ATFM Facility can be accomplished.

Principles in which ATFM will be based

7.4 Regional ATFM structure should be developed according to agreed upon guidelines as stated herein and in such a manner that each State/Territory and International Organization of the CAR/SAM Regions has access to a Centralized ATFM Facility.

The implementation of the Centralized ATFM Facility should be based on the following principles:

a) Be at the disposal of all States/Territories and International Organizations in the region under their responsibility, taking into consideration the requirements of ATFM community members.

b) Use a common, comprehensive, and permanently updated database.

c) Take appropriate measures well in advance to accomplish demand and capacity balancing.

d) Maintain close and continuous coordination with FMUs and/or FMPs, aircraft and airport operators, and other pertinent Centralized ATFM Facilities.

e) Take measures *to* ensure that restrictions and delays are equitably balanced among the airspace users.

f) Apply quality management to the services provided.

g) Use the collaborative decision making (CDM) process as the basis for developing and implementing ATFM measures.

h) Favor, to the maximum possible, the use of the existing capacity without compromising safety.

i) Contribute *to* the achievement of the global plan initiatives (GPIs).

j) Provide the flexibility necessary to enable operators to change their arrival or departure schedules, even with short notice.

Functions of a Centralized ATFM Facility

7.6 To provide ATFM service, the Centralized ATFM Facility should*:*

a) Establish and maintain a *regional* database that includes:
- the air navigation infrastructure, ATS units and registered aerodromes;
- pertinent ATC sector and airport capacity;
- forecast flight data.

b) Establish a method for displaying:
- a chart of forecast air traffic demand;
- a comparison *of demand and* available capacity *for pre-determined areas;* and
- the time-frame of *forecast* air traffic overloads.

c) Make the appropriate coordination to attempt to increase available capacity, when necessary.

d) When demand will exceed available capacity, coordinate, communicate, and apply ATFM measures in a timely manner.

e) Carry out a follow-up on the result of measures adopted.

f) Coordinate ATFM measures with the other Centralized ATFM Facilities, when so required.

8. Equipment requirements for FMU/FMP and Centralized ATFM Facility

8.1 The implementation of ATFM in the CAR/SAM Regions requires identifying and determining the minimum equipment requirements and communication links for implementing a Centralized ATFM Facility, FMU, and/or FMP.

Note: A detailed description of these requirements is shown in **Appendix B** to this document.

9. Human resource planning and training requirements for FMU/FMP and Centralized ATFM Facility

9.1 Establishment of a Centralized ATFM Facility, FMU, or FMP requires careful human resource planning and training. ATFM training shall be designed to include segments regarding techniques to balance demand and capacity, traffic synchronization, benefits of optimizing traffic flows and creating operational efficiency, techniques for managing change in the operational environment, and the process for ensuring high levels of service to the customers.

10. Operational procedures

10.1 The operational procedures *for* the Centralized ATFM Facility, FMUs and FMPs should be developed in separate documents. After consultation with all applicable parties, changes, if necessary. shall be agreed upon and published as amendments to operational procedures.

10.2 The purpose of these documents shall be to:

- *establish the functions and responsibilities of personnel working in the Centralized ATFM Facility, FMUs and FMPs in regard to implementing flow management service.*

- *describe the procedures to be used between the Centralized ATFM Facility, FMUs, and FMPs.*

- *describe the air traffic flow management initiatives and messages that may be applied*

10.3 ATFM initiatives should be designed to address specific daily traffic flows, flight series, or specific flights. To this end, traffic management planning, strategy development, and day-to-day monitoring, should be conducted. With regard to the above, ATFM activities should be developed in three phases: strategic - up to 48 hours before the day of the operation; pre-tactical - during 48 hours prior to the operation day; and, tactical - during the day of the operation. During all three ATFM phases, responsible facilities should maintain a close liaison with system stakeholders to ensure efficient and equitable service.

11. ATFM Implementation Strategy

11.1 The operational concept establishes a simple implementation strategy. This strategy should be developed in phases, so as to ensure maximum utilisation of the available capacity and enable all concerned parties to obtain sufficient experience.

11.2 The experience acquired in other Regions and by some States in the CAR/SAM Regions permits States/Territories and International Organizations to apply basic ATFM procedures in airports, without the immediate need for a Centralized ATFM Facility. Such a facility will demand extensive studies to define operational concepts, requirements of systems and institutional aspects for ATFM implementation in the CAR/SAM Regions.

Airports

11.3 Normally the adoption of ATFM strategic measures at airports located in airspaces of low traffic density, avoids congestion and saturation of such airspace. Another aspect to be considered is that the adoption of ATFM strategic measures at airports are simpler to apply, keeping in mind that they only demand a data collection of flight intentions (RPL, Official Airline Guide - OAG, flight lists etc) and reduce use of automation and existing infrastructure tools. In this stage, the airport slot allocation to operators should also consider non-regular flights.

11.4 The implementation process of ATFM in the CAR/SAM Regions should start with the establishment of a common methodology of calculating airport capacity which would enable identification of airports where periods exist in which demand is higher than capacity. With that identification, measures could be adopted with a view to optimise the utilisation of the existing capacity.

11.5 ATFM strategic measures at airports may be limited to the use of Airport Slots with the objective of achieving the balance between the demand of regular flights and airport capacity. The application of slots would ensure a smooth hourly distribution of these flights at airports.

11.6 The necessary capacity for other airspace users (non-regular flights) should also be kept in mind when developing airport slot allocation procedures.

11.7 The evolution of ATFM measures in airports should evolve towards the inclusion of non-regular flights in balancing procedures between demand and capacity. The adoption of ATFM tactical measures in airports would be still of low complexity. However, it would demand an increase in the data collection program for non-regular flights in order to include these FPLs. Also, in addition to the use of automation tools efficient communications means between with aircraft operators which perform non-regular flights must be established.

11.8 It is expected that ATFM strategic measures at airports will be sufficient to solve specific problems at airports where there is a significant demand of regular flights. ATFM tactical measures would be applied mainly to airports in which a significant amount of non-regular flights are carried out.

Airspace

11.9 From the experience acquired in demand and airport capacity management, States/Territories and International Organizations should consider analysis of airspace capacity, especially in areas where ATFM measures at airports are not sufficient to solve congestion and airspace saturation problems. The ATFM strategic measures should avoid congestion and airspace saturation. The adoption of these ATFM measures would be of low complexity since it would only include their influence in the establishment of airports slots. However, it would demand the use of more sophisticated automation and infrastructure tools, in order to identify congestion or saturation in control sectors.

11.10 It is expected that strategic ATFM measures in the airspace are sufficient to prevent overload of control sectors, mainly in those airspaces in which there is a significant excess demand.

11.11 If demand and capacity balancing cannot be accomplished with the application of ATFM airspace strategic measures, States/Territories and International Organizations should move to more complex solutions. This involves ATFM tactical measures related to airspace, including dynamic procedures that are applied to flights scheduled in the near-term. The adoption of airspace tactical measures would be increasingly complex since it would include the application of slots, based on continuous analysis of the demand and capacity. This analysis would require the use of additional automation and infrastructure tools to those applied in in the previous phase, which permit the assignment of slots, addressed to avoid overloads of airspace sectors and airports.

11.12 It is expected that airspace tactical ATFM be implemented only in States/Territories and International Organizations where there is a clear operational requirement, keeping in mind that the complexity of the application of tactical measures in airspace implies a significant investment in automated systems, data bases, telecommunications system and human resources training.

11.13 States/Territories and International Organizations who decide to implement airspace tactical ATFM measures should develop standards, procedures and operational manuals applicable to ATFM service.

Centralized ATFM Facility implementation strategy in the CAR/SAM Regions

11.14 GREPECAS/13 was of the opinion that two CAR and SAM scenarios should be taken into account, but that they could be modified insofar as the operational concept development and the implementation plans progress. The strategy is to develop a harmonized planning of a CAR and SAM interregional ATFM system.

11.15 In order to maximise its efficiency, it was considered that the Centralized ATFM Facility should have the responsibility for providing service to the maximum extension of airspace possible, provided that this is homogeneous. In accordance with ATFM planning in the CAR and SAM Regions, it will have at least two Centralized ATFM Facilities one for each region.

11.16 It was also considered necessary that the procedures during all the implementation process be developed in a harmonious manner among the ATFM Facilities to avoid risking operational safety. This entails establishing a regional and interregional strategy to facilitate and harmonize all the implementation process. The ATFM Task Force will accomplish these planning and harmonization objectives. For implementation, two scenarios will be established depending on the individual operational needs and features of the CAR and SAM Region. The activation of two ATFM Implementation Groups was considered, one for each Region.

11.17 It was considered that operational implementation should be carried out in phases, according to ICAO Doc 9854 – Global Air Traffic Management Operational Concept, in order to permit a progressive implementation and acquire necessary expertise for an adequate implementation.

11.18 In order to harmonize the National Plans with the Regional CAR/SAM ATFM Regional Plan, it is highly recommended that the States, Territories and International Organizations take the following required measures: make a closer follow-up of the regional development of the ATFM, prepare an ATFM implementation program, asses the impact that ATFM will have in the national ATM system, and establish pertinent coordinations to accomplish a regionally harmonized implementation.

12 Special flights exempt from application of ATFM measures

12.1 Aircraft that file flight plans as air ambulance flights, humanitarian flights, search and rescue operations, and State aircraft would be exempt from the application of ATFM measures. States would continue to have jurisdiction on these aircraft when they file as domestic flights.

13 Contingency plan

13.1 In case of a partial or total interruption of the flow management service and/or support services, ATFM and FMUs/FMPs will have corresponding contingency plans prepared in accordance with GREPECAS guidelines. These contingency plans will help ensure the safe and orderly movement of air traffic -- although not necessarily efficient -- and the plans will be incorporated into the operational procedures documents associated with the Centralized ATFM Facilities and FMUs/FMPs.

APPENDIX A

Table

Routing Areas and Main Traffic Flows Identified in the CAR/SAM Regions

-1- Routing Area (AR)	-2- Traffic flows	-3- FIRs involved	-4- Type of area	-5- Remarks
Caribbean/South American Regions (CAR/SAM)				
AR 1	Buenos Aires-Santiago de Chile	Ezeiza, Mendoza, Santiago	Low density Continental	SAM intra-regional traffic flow
	Buenos Aires-Sao Paulo/Río de Janeiro	Ezeiza, Montevideo, Curitiba, Brasilia	Low density Continental	SAM intra regional traffic flow
	Santiago de Chile-Sao Paulo/Rio de Janeiro	Santiago, Mendoza, Córdoba, Resistencia, Asunción, Curitiba, Brasilia	Low density Continental	SAM intra regional traffic flow
	Sao Paulo/Rio de Janeiro-Europe	Brasilia, Recife	Continental / Low density Oceanic	SAM/AFI/EUR inter regional traffic flow
AR 2	Sao Paulo/Río de Janeiro-Miami	Brasilia, Manaus, Maiquetía, Curacao, Kingston, Santo Domingo, Port au Prince, Habana, Miami	Continental / Low density Oceanic	CAR/SAM/NAM inter- and intra-regional traffic flow
	Sao Paulo/Río de Janeiro- New York	Brasilia, Belem, Paramaribo, Georgetown, Piarco, Rochambeau, San Juan (New York)	Continental / Low density Oceanic	CAR/SAM/NAM/ NAT inter- and intra-regional traffic flow
AR 3	Sao Paulo/Río de Janeiro- Lima	Brasilia, Curitiba, La Paz, Lima	Low density Continental	SAM intra-regional traffic flow
	Sao Paulo/Río de Janeiro- Los Angeles	Brasilia, Porto Velho, Bogotá, Barranquilla, Panamá, Central América, Mérida, México, Mazatlán (Los Angeles)	Low density Continental	CAR/SAM/NAM inter- and intra-regional traffic flow
AR 4	Santiago - Lima - Miami	Santiago, Antofagasta, Lima, Guayaquil, Bogotá, Barranquilla, Panamá, Kingston, Habana, Miami.	Continental / Low density Oceanic	CAR/SAM/NAM inter- and intra-regional traffic flow

-1- Routing Area (AR)	-2- Traffic flows	-3- FIRs involved	-4- Type of area	-5- Remarks
	Buenos Aires - New York	Ezeiza, Resistencia, Asunción, La Paz, Porto Velho, Manaus, Maiquetía, Curacao, Santo Domingo, Miami (New York)	Continental / Low density Oceanic	CAR/SAM/NAM/ NAT NAM inter- and intra-regional traffic flow
	Buenos Aires - Miami	Ezeza, Resistencia, Córdoba, La Paz, Porto Velho, Bogotá, Barranquilla, Kingston, Habana, Miami	Continental / Low density Oceanic	CAR/SAM/NAM NAM inter- and intra-regional traffic flow
AR 5	North of South America - Europe	Guayaquil, Bogotá, Maiquetía, Piarco (NAT-EUR)	Continental / high density Oceanic	SAM/NAT/EUR inter-regional traffic flow
AR 6	Santiago - Lima - Los Angeles	Santiago, Antofagasta Lima, Guayaquil, Central Amérca, México	Low density oceanic	CAR/SAM /NAM intra- and inter-regional traffic flow
AR 7	South America – South Africa	Ezeiza, Montevideo, Brasilia, Johanesburgo (AFI)	Low density oceanic	SAM/AFI inter-regional traffic flow
	Santiago de Chile - Isla de Pascua - Papeete (PAC)	Santiago, Pascua, Tahiti	Low density oceanic	SAM/PAC inter-regional traffic flow
GM-1	Mexico, Toluca, Guadalajara, Monterrey, Mazatlán, La Paz, Acapulco, Puerto Vallarta, Huatulco, Cancún Gulf of Mexico— North America	Mexico, Houston, Miami; Albuquerque; Los Angeles	Continental/oceanic high density	CAR/NAM inter-regional major traffic flow
	Cancún, Guatemala, El Salvador, Nicaragua, Honduras, Costa Rica – Miami	Mexico, Central America, Havana, Miami	Continental/oceanic high density	CAR/NAM interregional traffic flow
GM-2	Mexico, Cancun, La Havana, Nassau — Europe	Mexico, Havana, Miami -NAT-EUR	Continental/oceanic high density Major traffic flow	CAR/NAM/NAT/ EUR inter-regional traffic flow
GM-3	Costa Rica, Panama, Honduras Kingston, Haiti, Santo Domingo San Juan,	Central America, Panama, Kingston, Port-au-Prince, Curacao, Santo	Oceanic high density	CAR/ NAT/EUR intra and interregional major traffic flow

-1- Routing Area (AR)	-2- Traffic flows	-3- FIRs involved	-4- Type of area	-5- Remarks
	The Caribbean — Europe	Domingo, San Juan – EUR		
	North America – East Caribbean	New York, Miami, Havana, San Juan, Santo Domingo Piarco	Oceanic high density	West Atlantic Route System CAR/NAM inter-regional traffic flow

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APPENDIX B

General Considerations for the implementation process of a Centralized ATFM

The implementation of the Centralized ATFM should consider the following requirements:

a) Access to the operational status of the air navigation infrastructure.

b) Access to aeronautical information and cartography.

c) Access to meteorological information.

d) Database of:

- aerodromes;
- airport capacity;
- ATC capacity
- Air traffic demand
- Airspace structure
- Radio navigation aids
- Aircraft performance; and
- Utilization of airports and control sectors.

e) Access to flight planning data (FPL, RPL, etc.).

f) Flight plans processing.

g) Access to surveillance data (SSR, ADS, etc.)

h) Automated resources:

- Processing and data visualization system for flow management, having, among other thing, the following sub-systems:

  - Flight data processing
  - Airspace and airports structure data;
  - Situation analysis (capacity and demand);
  - Presentation of air traffic situation;
  - Monitoring of the operational status of the infrastructure;
  - Support to collaborative decision making (ATC slots, alternate routes, etc.).
  - Database maintenance.

i) Communication to coordinate with:

- Other centralized ATFMs
- Operators (airlines, general aviation, State, etc.);
- Airport management;
- FMUs and/or FMPs and/or ATS units;
- Aeronautical meteorological units;
- AIS units.

j) Human resources

- qualified personnel;
- support personnel;
- recurrent training.

k) Use of adequate tools for statistics

l) Infrastructure

- buildings
- equipment
- electrical power
- air conditioning
- supplies
- software

m) Implementation of FMUs and/or FMPs, as required.

n) Redundancy of critical systems.

****

APPENDIX C

Action Plan for the Implementation of ATFM at SAM Airports			
A: AIRPORT			
Task description	**Start**	**End**	**Responsible party (designate individual or organisation in charge)**
1. Airport demand/capacity analysis	**Sep 2008**	**Apr 2010**	
1.1 Prepare ATFM survey	N/A	Aug 2008	Project RLA06/901 RO
1.2 Send survey to the States of the Region	Aug 2008	SAM/IG/2	RO
1.3 Review the methodology presented by Brazil for estimating airport capacity	June 2008	SAM/IG/2	ATFM/IG
1.4 Send response to survey	N/A	SAM/IG/2	E
1.5 Assess survey results	N/A	SAM/IG2	ATFM/IG
1.6 Course offered by Brazil on Airport Capacity Estimate	Mar 2009	Mar 2009	Brazil
1.7 The States estimate the airport capacity of their major airports	Jul 2009	SAM/IG/5	E
1.8 Identify airports where the demand sometimes exceeds capacity, including, if necessary, simulations by the States	Aug 2009	SAM/IG/5	E
1.9 Identify operational factors affecting airport demand and capacity in order to optimise the use of existing capacity, including simulations, if necessary	May 2009	SAM/IG/5	E
1.10 Submit the conclusions on airport capacity	**N/A**	SAM/IG/5	E
2. Coordination with the ATM community	**Sep 2008**	**Jun 2009**	
2.1 Present initial AIC model	SAM/IG/2	SAM/IG/2	ATFM/IG
2.2 Publish initial AIC	SAM/IG/2	AIRAC date/2009	E
2.3 Organise the ATFM community taking into account the CDM concept for ATFM implementation, and begin the relevant coordination	May 2009	Jun 2009	E
2.4 Inform the GREPECAS ATM Subgroup	N/A	ATM/6	RO
3. Infrastructure and database	**Aug 2008**	**Apr 2009**	
3.1 Send the results of the survey developed by the hired expert to the Automation Group	SAM/IG/2	SAM/IG/2	RO

3.2 Coordinate implementation activities with the Automation Group	N/A	Ongoing	Internal coordination
4. Policy, standards, and procedures	**Nov 2008**	**Apr 2010**	
4.1 Hire expert to draft the manuals on ATFM measures and FMU and FMP procedures	N/A	SAM/IG/3/4	Project RLA06/901 RO
4.2 Present and assess the Manuals on ATFM Measures for Airports, and the FMU and FMP Procedural Handbook	N/A	SAM/IG/3/4	ATFM/IG
4.3 Present the model AIC Supplement	N/A	SAM/IG/4	ATFM/IG
4.4 Approve the AIC Supplement	N/A	SAM/IG/4	SAM/IG/4
4.5 Publish the AIP Supplements	N/A	Mar 2010	E
5. Training	**Sep 2008**	**Dec 2010**	
5.1 Draft ATFM training plans	SAM/IG/4	SAM/IG/5	E
5.2 Train the team on decision-making at airports	Jun 2009	Jun 2009	E
5.3 Hire expert to draft Manual on the Introduction to ATFM for the ATM Community	SAM/IG/3	SAM/IG/4	Project RLA06/901 RO
5.4 Present and assess the Manual for the Introduction to ATFM for the ATM Community	SAM/IG/4	SAM/IG/4	SAM/IG/4 ATFM/IG
5.5 Train the members of the ATM community in the CEDM and ATFM concepts	TBD	TBD	E
5.6 Train the staff in ATFM measures for airports	SAM/IG/4	SAM/IG/5	E
5.7 Monitor the training of the ATM community	Jul 2010	SAM/IG/6	E/SAM/IG
6. Final implementation decision	**N/A**	**SAM/IG/6**	
6.1 Review factors affecting the implementation decision	**SAM/IG/6**	**N/A**	E
6.2 Declare the pre-operational implementation in the defined area	**N/A**	**N/A**	E
6.3 Declare the final operational implementation in the defined area	**N/A**	**N/A**	E

7. Monitor system performance	**SAM/IG/7**	**SAM/IG/8**	CARSAMMA
7.1 Draft the ATFM post-implementation follow-up programme at airports	SAM/IG/6	SAM/IG/7	ATFM/IG
7.2 Implement the ATFM post-implementation follow-up programme at airports	SAM/IG/7	TBD	SAM/IG/X
Tentative pre-operational implementation date	**N/A**	**Oct 2010**	
Tentative definitive implementation date	**N/A**	**Dec 2010**	

Note:

E	States
SAM/IG	SAM Implementation Group
ATFM/IG	ATFM Implementation Group
OR	Regional Office

Action Plan for ATFM Implementation in the SAM Region			
B- AIRSPACE			
Task description	**Start**	**End**	**Responsible party (designate individual or office in charge)**
1. Airspace demand and capacity analysis			
1.1 Analyse the methodology to estimate airspace capacity presented by Brazil	Jun 2008	TBD	
1.2 Prepare an airspace demand survey	TBD	TBD	
1.4 Attend the course on Airspace Capacity Estimate	**TBD**	**TBD**	
1.5 The States estimate airspace capacity at the major airports	**TBD**	**TBD**	
1.6. Identify airspace sectors where demand sometimes exceeds capacity, including simulations by the States, if necessary	**TBD**	**TBD**	
1.7 Identify operational factors affecting airspace demand and capacity in order to optimise the use of existing capacity, including simulations if necessary	**TBD**	**TBD**	
1.8 Present the conclusions on airspace capacity	**TBD**		
2. Coordination with the ATM community	**Sep 2008**	**Jun 2009**	
2.1 The ATM community considers the implementation of ATFM in the airspace	Sep 2008	Jun 2009	
3. Infrastructure and database	**TBD**	**Dec 2013**	
3.1 Send requirements to the Automation Group, as stipulated in Appendix B of the ATFM CONOPS	TBD	TBD	
3.2 Coordinate implementation activities with the Automation Group	N/A	Dec 2013	
4. Policy, standards, and procedures	**TBD**	**Jun 2013**	
4.1 Develop ATFM policies, taking into account the objectives and principles established in the CAR/SAM ATFM CONOPS	**TBD**	**TBD**	
5. Training	**TBD**	**May 2013**	
5.1 Train the team on airspace data collection	Jun 2009	Jun 2009	
5.2 Train the staff on strategic ATFM measures for the airspace			
5.3 Develop ATFM plans and training material	**TBD**	TBD	

5.4 Train the personnel involved	TBD	TBD	
6. Final implementation decision	**N/A**	**Sep 2013**	
6.1 Analyse factors affecting the implementation decision	**N/A**	**TBD**	
6.2 Declare pre-operational implementation in the area defined	**N/A**	**TBD**	
6.3 Declare definitive operational implementation in the area defined	**N/A**	**TBD**	
7. Monitor system performance	**TBD**	**N/A**	
7.1 Draft ATFM post-implementation follow-up programme	TBD	Aug 2013	
7.2 Implement ATFM post-implementation follow-up programme	Dec 2013	N/A	
Tentative pre-operational implementation date	**N/A**	**Jul 2013**	
Tentative definitive implementation date	**N/A**	**Dec 2013**	

APPENDIX D

TERMS OF REFERENCE AND WORK PROGRAMME FOR THE SAM REGION AIR TRAFFIC FLOW MANAGEMENT IMPLEMENTATION GROUP (SAM/ATFM/IG)

1. TERMS OF REFERENCE

Develop specific studies and guidance material for the implementation of a SAM Air Traffic Flow Management implementation system, according to the ICAO Strategic Objectives and Global Plan Initiatives (GPI) on this matter (GPI 1, 6 and 7).

2. WORK PROGRAMME

a) Review existing national plans on ATFM; as well as other ATFM plans in other regions or international organizations;
b) Review ATFM technical and operational aspects;
c) Prepare the necessary ATFM documentation;
d) Develop an Action Plan Model for ATFM Airport Strategic implementation and the corresponding guidelines, for the implementation of FMU or FMP.
e) Develop an Action Plan Model for Airport Tactical ATFM implementation and the corresponding guidelines, for the incorporation of new procedures applicable in FMU and FMP.
f) Develop an Action Plan Model for ATFM Airspace Strategic implementation and the corresponding guidelines, for the incorporation of new procedures applicable in FMU and FMP.
g) Develop an Action Plan Model for ATFM Airspace Tactical implementation and the corresponding guidelines, for the incorporation of new procedures applicable in FMU and FMP.
h) Develop an Action Plan Model for a SAM ATFM Centralised implementation.
i) Follow-up of ATFM implementation in order to ensure its intra and inter-regional harmonisation, as well as among States involved.
j) Establish training requirements with regard to ATFM.
k) In coordination with the GREPECAS ATM/CNS Subgroup, ATM Committee, ATFM Task Force, consider the necessary activities to ensure harmonisation of ATFM standards and procedures in the CAR and SAM Regions.

3. COMPOSITION

Argentina, Brazil, Bolivia, Chile, Ecuador, Peru, Uruguay, Venezuela and IATA.

4. RAPPORTEUR

Víctor Marcelo de Virgilio (Argentina).

Assisted by

José Vagner Vital (Brazil).

Agenda Item 3: Assessment of operation requirements in order to determine the implementation of communications and surveillance capacity improvement for en-route and terminal area operations

Action plan for the implementation of communications and surveillance capacity improvement for en-route and terminal area operations

3.1 While analyzing this issue, the Meeting took into account that Project RLA/06/901, within the results for the implementation of initiatives of the Global Air Navigation Plan, has considered -among other results- the implementation of communication and surveillance capacity improvement for en-route and terminal area operations, with the purpose of achieving benefits in the ATM in the short and medium term.

3.2 The activities considered in Project RLA/06/901 for the implementation of communications and surveillance capacity improvement for en-route and terminal area operations are, in first instance, the assessment of the implementation status of SAM Region fixed and mobile communications and surveillance services, implementation plans for the improvement of national communication networks of SAM States, implementation status or implementation plans in the SAM Region related to systems AMHS, AIDC, VDL, HFDL, AMSS and ADS.

3.3 Other activity considered in Project RLA/06/901 is the assessment of current and planned ATS operational requirements in the short and medium term, aimed at improving capacity, efficiency and safety of air traffic management operations in the SAM Region.

3.4 Last in this first phase, the development of an action plan for the implementation of communications and surveillance systems improvement, considering the technical and operational activities aforementioned, has been planned.

Air-ground communications systems improvement

3.5 For the assessment of activities aimed at the improvement of voice and data air-ground communications systems, Table CNS 2A of FASID is being presented (see **Appendix A** of this working paper), which was reviewed by GREPECAS/14 meeting. When analyzing Appendix A, it could be observed that most of the voice services requirements for air-ground communications have been implemented, while the data communications requirements for air-ground operations are planned to be implemented starting 2008. In this regard, the meeting considered the need to update FASID Table CNS 2A, formulating the following recommendation:

Conclusion SAM/IG/1-2 Revision of Table CNS 2 A of FASID

That the States members of Project RLA/06/901 review and update Table CNS 2A of FASID **(***Aeronautical Mobile Service and AMSS)* presented as Appendix A to the report of this agenda item, and forward it to ICAO Regional Office before 30 May 2008.

3.6 Likewise, the Plan of Activities for CAR/SAM, shown in **Appendix B** to this part of the report, was taken into consideration for the planning and implementation of air-ground data links, the same formulated by GREPECAS through Conclusion 13/72 "*Regional Strategy for updating evolutive implementation of air-ground data links plan*"; as well as CAR/SAM Regional Programme for the implementation of air-ground data links presented in **Appendix C** to this part of the report, also formulated by GREPECAS through Conclusion 13/72

3.7 The Meeting, based on information presented in Appendices A, B and C to the report of this agenda item, and taking into consideration current ATS operational requirements and those presented in the Meeting for the short and medium term, proceeded to elaborate a model of action plan for implementing ground-air voice and data communications systems in the SAM Region for the short and medium term. The action plan model for the improvement of the en-route and terminal area operations of communications systems is being presented as **Appendix D** to the report of this agenda item.

Ground-ground communications systems improvement

3.8 In this regard, the Meeting noticed that, presently, data (AFTN) and voice communications requirements for the fix aeronautical service specified in Tables CNS 1 A and 1C of FASID are totally implemented in the SAM Region. With the start-up of REDDIG VSAT digital network in September 2003, availability of voice and data circuits between ATS units of the SAM Region has considerably incremented. In this respect, the Meeting agreed on the need to update Tables CNS 1Ba (*ATN Router Plan*) and 1Bb (*ATN Ground Ground Application Plan*) of FASID, formulating the following recommendation:

Conclusion SAM/IG/1-3 Update of Tables CNS 1Ba and 1Bb of FASID

That SAM States review and update tables CNS 1Ba (*ATN Router Plan*) and 1Bb (*ATN Ground Ground Application Plan*) of FASID being presented as **Appendix E** to the report of this agenda item and forward them to ICAO Regional Office before 30 June 2008.

3.9 Data communications between different ATS, AIS, MET units in the SAM Region is sent through AFTN. Most of the AFTN centres implemented in the SAM Region have been in operation for more than 10 years, with consequent maintenance problems.

3.10 In this regard, AMHS systems implementation plans are aimed to replace AFTN systems in most of the SAM Region States. Presently in the Region, AMHS systems are operating in Argentina, Paraguay and Ecuador (Guayaquil). However, the implementation of an AMHS system in Chile, Brazil and Peru is planned for the present year. These systems implementation jointly with REDDIG services and current plans for the interconnection with other regional networks such as MEVA II and CAFSAT will importantly contribute to the short- and medium-term improvement of ground-ground data communications.

3.11 The Meeting, taking note of information presented in Appendix E (Planning of ATN ground-ground applications as well as ATN routers), of current plans for the implementation of AMHS systems, and short- and medium-term ATS requirements presented in the Meeting, elaborated an short- and medium- term action plan for the improvement of ground-ground voice and data communications

systems in the SAM Region. The action plan model for the improvement of ground-ground communications systems is being presented as **Appendix F** to the report of this agenda item.

Surveillance systems improvement

3.12 **Appendix G** to this part of the report presents Table CNS 4 of FASID that indicates surveillance requirements in CAR/SAM Regions. In this regard, the Meeting considered the need to update Table CNS 4A of FASID, formulating the following recommendation :

Conclusion SAM/IG/1-4 Update of Tables CNS 4A of FASID

That SAM States review and update Table CNS 4A (*Surveillance System)* of FASID being presented as Appendix G to the report of this agenda item and forward it to ICAO Regional Office before 30 May 2008.

3.13 Likewise, GREPECAS CNS Committee Surveillance Task Force elaborated an initial strategy for the implementation of surveillance systems in the CAR/SAM Regions, which is being presented as **Appendix H** to this part of the report.

3.14 The Meeting elaborated an action plan for the implementation of surveillance systems having in consideration requirements of surveillance systems implementation specified in Table CNS 4 A of FASID and the initial strategy for surveillance systems implementation. The model of the action plan for surveillance systems improvement is being presented as **Appendix I** to the report of this agenda item.

3.15 The Meeting, considering the assessment of activities necessary for improving ground-air, ground-ground communications and surveillance systems formulated the following conclusion:

Conclusion SAM/IG/1-5 Adoption of Action Plan Models for the improvement of communications and surveillance systems for en-route and terminal area operations

When carrying out activities for the improvement of communications and surveillance systems for en-route and terminal area operations, the action plan models are to be taken into account for the improvement of ground-air, ground-ground communications and surveillance systems being presented as Appendices D, F and I to the report of this agenda item.

3.16 Objective No. 1, item 1.3, of Project RLA/06/901 establishes the tasks to be carried out for the implementation of the improvement of communications and surveillance capacities. For better reference, tasks planned to be executed during year 2008 are being included as **Appendix J** to this part of the report.

3.17 Likewise, and having in consideration the development of the pertinent deliverables that should be discussed during the Second Meeting of SAM Implementation Group (SAM/IG/2) to be held under Project RLA/06/901, the Meeting agreed on the hiring of the necessary experts for the executions of tasks described under items 1.3.1, 1.3.2, 1.3.3 and 1.3.6.

3.18 In this regard, the Meeting agreed on the following Conclusion:

Conclusion SAM/IG/1-6 Hiring of experts for the activities aimed at improving communications and surveillance systems.

That Project RLA/06/901, in order to contribute to the activities related to communications and surveillance improvement for en-route and terminal area operations:

a) Hire an expert to carry out activities indicated in items 1.3.1, 1.3.2, 1.3.3 and 1.3.6 regarding the improvement of ground-air and ground-ground communications systems for a three-week period from 18 August to 8 September 2008.

b) Hire an expert to carry out activities indicated in items 1.3.1, 1.3.2, 1.3.3 and 1.3.6 regarding the improvement of surveillance systems for a three-week period from 18 August to 8 September 2008.

Terms of Reference and Work Programme

3.19 **Appendix K** to this part of the report presents the Terms of Reference and Work Programme for the Task Force for the implementation of communications and surveillance (CNS) capacities improvement for en-route and terminal area operations (SAM/CNS/IG).

3.20 The SAM/CNS/IG Group nominated a writing committee in order to elaborate working documentation for its meetings as well as for the preparation of the report of each SAM/IG meeting related to CNS issue, with the support of the Secretariat.

3.21 On the other hand, the meeting considered convenient that the task force be conformed by representatives of each State participating in the project RLA/06/901 for taking care of coordination and the necessary works in their respective State, acting as focal points of the SAM/CNS/IG Group. Likewise, the other States not yet participating in the Project are invited to integrate this Implementation Group.

Other considerations

3.22 The Meeting considered that within the activities to improve communications and surveillance systems, activities related to the improvement of navigation systems should be added. These aspects will be analyzed during the Second Workshop/Meeting of the SAM Implementation Group of Project RLA/06/901.

APPENDIX A

Table CNS 2A C Tableau CNS 2A C Tabla CNS 2A

AERONAUTICAL MOBILE SERVICE AND AMSS
SERVICE MOBILE AÉRONAUTIQUE ET SMAS
SERVICIO MÓVIL AERONÁUTICO Y SMAS

EXPLANATION OF THE TABLE

Column

1 The name of the State and the locations within the same where the service is provided.

2 The required services or functions are provided. Suitable abbreviations for these services or functions are listed below.

ACC-L	Area control service for flights up to FL 250.
ACC-SR-I	Area radar control service up to FL 250.
ACC-SR-U	Area radar control service up to FL 450.
ACC-U	Area control service up to FL 450.
AFIS	Aerodrome flight information service.
APP-L	Approach control services below FL 120.
APP-I	Approach control service below FL 250.
APP-PAR	Precision approach radar service up to FL 40.
APP-SR-I	Surveillance radar approach control service up to FL 250.
APP-SR-L	Surveillance radar approach control service up to FL 120.
APP-SR-U	Surveillance radar approach control service up to FL 450.
APP-U	Approach control service below FL 450.
ATIS	Automatic terminal information service.
D-ATIS	Data link-automatic terminal information service.
CLRD	Clearance delivery.
FIS	Flight information service.
VHF-ER	VHF C Extended range.
GP	Facility providing VHF or HF en-route general purpose system (GPS) communication. These facilities provide air-ground radiotelephony for all categories of messages listed in Annex 10, Volume II, 5.1.8. This system of communication is normally indirect, i.e. exchanged through the intermediary of a third person who is usually a communicator at an aeronautical station.
SMC	Surface movement control up to limits of aerodrome.

TWR Aerodrome control service.

VOLMET VOLMET broadcast.

3 Number of voice VHF channels for the corresponding services indicated in column 2. The number of implemented channels is shown in parentheses.

4 Number of VHF channels for data communication for the corresponding services indicated in column 2. The implementation date (month/year) is shown in parentheses.

5 HF network designators for the corresponding services indicated in column 2. The number of implemented frequencies is shown in parentheses.

6 Requirement for HF data link (x) for the corresponding services indicated in column 2. The implementation date (month/year) of the service is shown in parentheses.

7 Requirement for satellite voice communications (x) for the corresponding services indicated in column 2. The implementation date (month/year) of the service is shown in parentheses.

8 Requirement for satellite data communications (x) for the corresponding services indicated in column 2. The implementation date (month/year) of the service is shown in parentheses.

9 Requirement for Mode S data communications (x) for the corresponding services indicated in column 2. The implementation date (month/year) of the service is shown in parentheses.

10 Remarks.

Note.C The implementation year for the data links and satellite voice communication are indicated by two digits.

EXPLICATION DU TABLEAU

Colonne

1 Nom de l=État et des emplacements de cet État où le service est assuré.

2 Services ou fonctions requis assurés. Les abréviations utilisées ont les significations suivantes:

ACC-L Contrôle régional jusqu=au FL 250

ACC-SR-I Contrôle radar régional jusqu=au FL 250

ACC-SR-U Contrôle radar régional jusqu=au FL 450

ACC-U Contrôle régional jusqu=au FL 450

AFIS Service d=information de vol d=aérodrome

APP-L Contrôle d=approche au-dessous du FL 120

APP-I Contrôle d=approche au-dessous du FL 250

APP-PAR Radar d=approche de précision jusqu=au FL 40

APP-SR-I Contrôle d=approche au radar de surveillance jusqu=au FL 250

APP-SR-L Contrôle d=approche au radar de surveillance jusqu=au FL 120

APP-SR-U	Contrôle d=approche au radar de surveillance jusqu=au FL 450
APP-U	Contrôle d=approche au-dessous du FL 450
ATIS	Service automatique d=information de région terminale
D-ATIS	Service automatique d=information de région terminale par liaison de données
CLRD	Délivrance des autorisations
FIS	Service d=information de vol
VHF-ER	VHF à portée étendue
GP	Installation de communications VHF ou HF en route d=emploi général (GP). Permet des communications radiotéléphoniques air-sol pour toutes les catégories de messages énumérées dans l=Annexe 10, Volume II, 5.1.8. Système normalement indirect, c=est-à-dire dans lequel les communications se font par l=intermédiaire d=un tiers, généralement un opérateur de télécommunications situé dans une station aéronautique.
SMC	Contrôle des mouvements à la surface jusqu=aux limites de l=aérodrome
TWR	Contrôle d=aérodrome
VOLMET	Émissions VOLMET

3 Nombre de canaux vocaux VHF pour les services indiqués dans la colonne 2. Le nombre des canaux mis en œuvre est indiqué entre parenthèses.

4 Nombre de canaux VHF pour les communications de données des services indiqués dans la colonne 2. La date de mise en œuvre (mois/année) est indiquée entre parenthèses.

5 Identification du réseau HF pour les services indiqués dans la colonne 2. Le nombre de fréquences utilisées est indiqué entre parenthèses.

6 Besoin d=une liaison de données HF (X) pour les services indiqués dans la colonne 2. La date de mise œuvre (mois/année) est indiquée entre parenthèses.

7 Besoin de communications vocales par satellite (X) pour les services indiqués dans la colonne 2. La date de mise en œuvre (mois/année) est indiquée entre parenthèses.

8 Besoin de communications de données par satellite (X) pour les services indiqués dans la colonne 2. La date de mise en œuvre (mois/année) est indiquée entre parenthèses.

9 Besoin de communications de données mode S (X) pour les services indiqués dans la colonne 2. La date de mise en œuvre (mois/année) est indiquée entre parenthèses.

10 Remarques

Note.C L=année de mise en œuvre des liaisons de données et des communications vocales par satellite est indiquée par deux chiffres.

EXPLICACIÓN DE LA TABLA

Columna

1 El nombre del Estado y de las localidades dentro del mismo donde se proporciona el servicio.

2 Se proporcionan los servicios o funciones que se requieren. Se enumeran a continuación las abreviaturas correspondientes a estos servicios o funciones.

ACC-L	Servicio de control de área hasta el FL 250
ACC-SR-I	Servicio de control de área radar hasta el FL 250
ACC-SR-U	Servicio de control de área radar hasta el FL 450
ACC-U	Servicio de control de área hasta el FL 450
AFIS	Servicio de información de vuelo de aeródromo
APP-L	Servicio de control de aproximación por debajo del FL 120
APP-I	Servicio de control de aproximación por debajo del FL 250
APP-PAR	Servicio radar para la aproximación de precisión hasta el FL 40
APP-SR-I	Servicio de aproximación de control con radar de vigilancia hasta el FL 250
APP-SR-L	Servicio de aproximación de control con radar de vigilancia hasta el FL 120
APP-SR-U	Servicio de aproximación de control con radar de vigilancia hasta el FL 450
APP-U	Servicio de control de aproximación por debajo del FL 450
ATIS	Servicio automático de información terminal
D-ATIS	Servicio automático de información terminal por enlace de datos
CLRD	Servicio de entrega de autorización de tránsito
FIS	Servicio de información de vuelo
VHF-ER	VHF CAlcance ampliado
GP	Instalación que proporciona comunicaciones VHF o HF en ruta para fines generales (GPS). Estas instalaciones suministran transmisión radiotelefónica aeroterrestre en todas las categorías de mensajes citadas en el Anexo 10, Vol II, 5.1.8. En este sistema las comunicaciones son normalmente indirectas, es decir, que son intercambiadas por intermedio de un tercero que habitualmente es un operador de comunicaciones de una estación aeronáutica.
SMC	Control del movimiento en la superficie hasta los límites del aeródromo.
TWR	Servicio de control de aeródromo.
VOLMET	Radiodifusiones VOLMET.

3 Número de canales VHF para comunicaciones orales para los correspondientes servicios indicados en la Columna 2. El número de canales implantados se indica entre paréntesis.

4 Número de canales VHF para comunicaciones en datos para los correspondientes servicios indicados en la Columna 2. La fecha de implantación (mes/año) se indica entre paréntesis.

5 Designadores de red HF para comunicaciones orales para los correspondientes servicios indicados en la Columna 2. El número de frecuencias implantados se indica entre paréntesis.

6 Requisito para enlace de datos HF (x) para los correspondientes servicios indicados en la Columna 2. La fecha de implantación (mes/año) del servicio se indica entre paréntesis.

7 Requisito para comunicaciones orales por satélite (x) para los correspondientes servicios indicados en la Columna 2. La fecha de implantación (mes/año) del servicio se indica entre paréntesis.

8 Requisito para comunicaciones de datos por satélite (x) para los correspondientes servicios indicados en la Columna 2. La fecha de implantación (mes/año) del servicio se indica entre paréntesis.

9 Requisito para comunicaciones de datos en Modo S (x) para los correspondientes servicios indicados en la Columna 2. La fecha de implantación (mes/año) del servicio se indica entre paréntesis.

10 Observaciones.

Nota.C El año de implementación para los enlaces de datos y comunicaciones orales por satélite se indican en dos dígitos.

Country and location Pays et emplacement País y localidad	Service or function Service ou fonction Servicio o función	VHF voice Voix VHF Voz VHF	VHF data Données VHF Datos VHF	HF voice Voix HF Voz HF	HF data Données HF Datos HF	Satellite voice Voix satellite Voz por satélite	Satellite data Données satellite Datos por satélite	Mode S Modo S	Remarks Remarques Observaciones
1	2	3	4	5	6	7	8	9	10
ANGUILLA (United Kingdom)									
TQPF THE VALLEY/Wall Blake, Anguilla I.	TWR	(1) 1							
ANTIGUA AND BARBUDA									
TAPA SAINT JOHNS/ V.C. Bird Antigua I.	APP TWR SMC APP-SR-I D-ATIS	1 (1) 1 (1) 1 (1) 1 1							
ARGENTINA									
SAEU BUENOS AIRES	ACC-U GP	11(11) 2(2)	2 (06/08)	SAM-1(2) SAM-2 (2)	X (06/10)	X (06/10)	X (06/10)		
SABE BUENOS AIRES/ Aeroparque Jorge Newbery	APP-L APP-SR-I TWR SMC ATIS CLRD	2 (2) 2(2) 2(2) 1 (1) 1 (1) 1 (1)							
SAEZ BUENOS AIRES/ Ezeiza, Ministro Pistarini	APP-SR-I APP-L ATIS SMC TWR ~~CLRD~~	2 (2) 2(2) 1 (1) 1 (1) 2 (2) ~~1*~~							* ~~Implementation by 2002~~ ~~*Mise en œuvre en 2002~~ ~~*Implantación prevista en 2002~~
SADD BUENOS AIRES/Don Torcuato	TWR SMC	1 (1) 1 (1)							
SADF BUENOS AIRES/San Fernando	APP TWR SMC	1 1 (1) 1 (1)							
SARI CATARATAS DEL IGUAZU/My. Carlos Eduardo K.	TWR	2 (2)							
SAVF COMODORO RIVADAVIA	ACC-U ACC-L GP	2 (2) 1 (1) 1 (1)	1 (06/10)	SAM-1 (2)	X (06/10)	X (06/10)	X (06/10)		
SAVC COMODORO RIVADAVIA/General Mosconi	APP TWR	1(1) 2 (2)							Implementation by 2008 Implementación prevista en 2008
SACF CORDOBA	ACC-U GP	4 (4) 1	1 (06/09)	SAM-1 (1)					Implementation by 2008 Implementación

Country and location Pays et emplacement País y localidad	Service or function Service ou fonction Servicio o función	VHF voice Voix VHF Voz VHF	VHF data Données VHF Datos VHF	HF voice Voix HF Voz HF	HF data Données HF Datos HF	Satellite voice Voix satellite Voz por satélite	Satellite data Données satellite Datos por satélite	Mode S Modo S	Remarks Remarques Observaciones
1	2	3	4	5	6	7	8	9	10
									prevista en 2008
SACO CORDOBA/Ing. A. Taravella	APP-SR-I TWR SMC	1(1) 2 (2) 1 (1)							
SARF FORMOSA/Formosa	APP-L TWR	1(1) 1 (1)							
SASJ JUJUY/Gobernador Guzmán	APP-SR-1 TWR	1(1) 1 (1)							
SAZM MAR DEL PLATA/ Brig. Gral. B. de la Colina	APP-SR-I TWR SMC ATIS	1 (1) 1 (1) 1 (1) 1 (1)							
SAMF MENDOZA	ACC-U GP	3 (3) 1 (1)	1 (06/10)	SAM-1 (1)					
SAME MENDOZA/El Plumerillo	APP-SR-I TWR SMC ATIS	1 1 (1) 1 (1) 1 (1)							
SAZN NEUQUEN/Presidente Perón	APP TWR	1 1 (1)							
SARP POSADAS/Libertador Gral. D. José de San Martín	APP-L TWR	1(1) 1 (1)							
SARR RESISTENCIA	ACC-U GP	3 (3) 1 (1)	1 (06/06)	SAM-1 (1)	X (06/06)				
SARE RESISTENCIA/ Resistencia	APP-SR-I TWR ATIS	1 (1) 1 (1) 1							Implementation by 2008 Mise en œuvre en 2008 Implantación prevista en 2008
SAWG RIO GALLEGOS/ Piloto Civil N. Fernández	APP-L TWR ATIS GP	1 (1) 1 (1) 1 (1) 1(1)							
SAWE RIO GRANDE/ Rio Grande	APP TWR	1 1 (1)							
SAAR ROSARIO/Rosario	APP-L TWR ATIS	1 (1) 1 (2) 1							Implementation by 2002 Mise en œuvre en 2002 Implantación prevista en 2002
SASA SALTA/Salta	APP-L TWR GP	1(1) 1 (1) 2 (2)							Implementation by 2008

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1	2	3	4	5	6	7	8	9	10
									Implementación prevista en 2008
SAZS SAN CARLOS DE BARILOCHE/San Carlos de Bariloche	APP-SR-I TWR ATIS	1 1 (1) 1 (1)							
SANT TUCUMAN/Tte. Benjamin Matienzo	APP-L TWR GP	1(1) 1 (2) 1 (1)							
SAWH USHUAIA/Malvinas	APP-L	1 (1)							Implementation by 2008 Implementación prevista en 2008
Argentinas	TWR GP	1 (1) 1 (1)							
ARUBA (Netherlands)									
TNCA ORANJESTAD/ Reina Beatriz, Aruba I.	APP-SR-L APP-L TWR SMC D-ATIS	1 (1) 1 (1) 1 (1) 1 (1) 1 (1)							
BAHAMAS									
MYBS ALICE TOWN/ South Bimini, Bimini I.	TWR	1							
MYSM COCKBURN TOWN/ San Salvador I.	TWR	1							
MYGF FREEPORT/Intl., Grand Bahama I.	APP-U APP-L TWR SMC	1 1 1 1							
MYEG GEORGETOWN/ Georgetown, Exuma Intl.	APP-L TWR	1 1							
MYEM GOVERNOR=S HARBOUR/ Governor=s Harbour, Eleuthera I.	APP-L TWR	1 1							
MYNA NASSAU	ACC-U GP ACC-L	3 1 1							
MYNN NASSAU/Intl., New Providence I.	APP-I TWR SMC APP-SR-I D-ATIS	1 1 1 1 1							
MYEH NORTH ELEUTHERA/ New Providence I.	TWR	1 1							
MYLS STELLA MARIS/Long Island I.	TWR	1							

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1	2	3	4	5	6	7	8	9	10
MYAT TREASURE CAY/ Treasure Cay, Abaco I.	TWR APP-L	1 1							
MYGW WEST END/West End, Grand Bahama I.	TWR	1							
BARBADOS									
TBPB BRIDGETOWN/ Grantley Adams Intl.	APP-U APP-I TWR SMC APP-SR-U D-ATIS	1 5 1 1 1 1							
BELIZE									
MZBZ BELIZE/Intl.	APP-I APP-I TWR SMC D-ATIS	1 1 1 1 1							
BOLIVIA									
SLCB COCHABAMBA/Jorge Wilsterman	TWR APP-I SMC	1 (1) 2 (1) 1 (1)							
SLLP LA PAZ	ACC-U ACC-U ~~GP~~ ACC-L	1 1 (1)-ER ~~1~~ 1 (1)	1 (06/06)	SAM-1 (3) SAM-2 (3)	X (06/06)				
SLLP LA PAZ/El Alto Intl.	APP-I TWR SMC ~~ATIS~~	3 1 (1) 1 (1) ~~1~~							
SLVR SANTA CRUZ/Viru-Viru Intl.	APP-I TWR SMC ~~ATIS~~	3 (1) 1 (1) 1 (1) ~~1~~							
SLTJ TARIJA/Oriel Lea Plaza	APP-I TWR	1 (1) 1 (1)							
SLTR TRINIDAD/Tte. Av. Jorge Henrich Arauz	APP-I TWR SMC	2 (1) 1 (1) 1							
BRAZIL									
SB.. AMAZONICA	ACC-SR-U GP	24 (24) 1	2 (06/08)	SAM-2 (4)	X (06/08)				
SB.. ATLANTICA	ACC-U			SAM-2 (4) SAT-1 SAT-2	X (06/08)	X (06/08)	X (06/68)		
SBBE BELEM/Val de Câes Intl.	APP-SR-I TWR SMC	4 (4) 1 (1) 1 (1)							

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1	2	3	4	5	6	7	8	9	10
SBCF BELO HORIZONTE/	APP-SR-I	4 (4)							
Tancredo Neves Intl.	TWR	1 (1)	1 (06/01)						
	SMC	1 (1)							
	CLRD	1 (1)							
	ATIS	1 (1)							
SBBS BRASILIA	ACC-SR-U	16 (16)	8 (06/08)	SAM-2 (4)	X (06/08)				
SBBR BRASILIA/Brasilia Intl.	APP-SR-I	4 (3)							
	TWR	1 (1)							
	SMC	1 (1)							
	CLRD	1 (1)	1 (06/01)						
	ATIS	1 (1)							
SBBV BOA VISTA/	APP-I	1 (1)							
Boa Vista Intl.	TWR	2 (2)							
	SMC	1							
SBKP CAMPINAS/Viracopos	APP-SR-I	1 (1)							
Intl.	TWR	1 (1)							
	SMC	1							
SBCG CAMPO GRANDE/	APP-SR-I	1 (1)							
Campo Grande Intl.	TWR	1 (1)							
	ATIS	1							
SBCR CORUMBA/	AFIS	1 (1)							
Corumba Intl.									
SBCZ CRUZEIRO DO SUL/	AFIS	1 (1)							
Cruzeiro do Sul Intl.									
SBCY CUIABA/Marechal	APP-SR-I	1 (1)							
Rondon Intl.	TWR	1 (1)							
SBCW CURITIBA	ACC-SR-U	10 (10)	2 (06/08)	SAM-2 (4)	X (06/08)				
SBCT CURITIBA/	APP-SR-I	3 (3)							
Afonso Peña Intl.	TWR	2 (2)							
	ATIS	1							
	SMC	1 (1)							
	CLRD	1 (1)							
SBFL FLORIANÓPOLIS/	APP-SR-I	3 (3)							
Hercílio Luz Intl.	TWR	2 (2)							
	SMC	1							
SBFZ FORTALEZA/	APPBSR-I	2 (2)							
Pinto Martins Intl.	TWR	1 (1)							
	SMC	1 (1)							
	CLRD	1 (1)							
SBFI FOZ DO IGUACU/	APP-SR-I	2 (2)							
Cataratas Intl.	TWR	1 (1)							
SBMQ MACAPA/	APP-I	1							
Macapa Intl.	TWR	1							
SBEG MANAUS/Eduardo	APP-SR-I	4 (4)							
Gomes Intl.	TWR	1 (1)							
	SMC	1 (1)							

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1	2	3	4	5	6	7	8	9	10
SBNT NATAL/Augusto Severo Intl.	APP-SR-I TWR SMC CLRD	4 (4) 2 (2) 1 (1) 1							
SBPP PONTA PORÃ/ Ponta Porã Intl.	AFIS	1 (1)							
SBPA PORTO ALEGRE/ Salgado Filho Intl	APP-SR-I TWR SMC CLRD ATIS	4 (4) 1 (1) 1 (1) 1 1							
SBRE RECIFE	ACC-SR-U GP	16 (16) 1	5 (06/08)	SAT-2 (4)	X (06/08)				
SBRF RECIFE/Guararapes Intl.	APP-SR-I TWR SMC ATIS CLRD	4 (4) 1 (1) 1 (1) 1 1							
SBGL RIO DE JANEIRO/ Galeão Antonio Carlos Jobim Intl.	APP-SR-I TWR SMC CLRD ATIS	6 (6) 2 (2) 1 (1) 1 (1) 1 (1)	1 (06/01)						
SBSV SALVADOR/Deputado Luis Eduardo Magalhães Intl.	APP-SR-I TWR SMC GP ATIS	4 (4) 1 (1) 1 (1) 1 1							
SBSN SANTAREM/ Santarem Intl.	APP-I TWR	2 (2) 1 (1)							
SBSL SÃO LUIS/Marechal Cunha Machado Intl.	APP-I TWR	1 (1) 1 (1)							
SBGR SÃO PAULO/ Guarulhos Intl.	TWR SMC CLRD ATIS	3 (3) 1 (1) 1 (1) 1 (1)	1 (06/01)						
SBTT TABATINGA/ Tabatinga Intl.	AFIS	1 (1)							
SBUG URUGUAIANA/ Rubem Berta Intl.	AFIS	1 (1)							
CAPE VERDE									
GVSC SAL I.	ACC-U ACC-L	2-ER 1		SAT-1 SAT-2					
CAYMAN ISLANDS (United Kingdom)									
MWCB CAYMAN BRAC/ Gerrard Smith Intl.	TWR SMC	1 (1) 1							

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1	2	3	4	5	6	7	8	9	10
MWCR GEORGETOWN/ Owen Roberts Intl.	APP-I TWR SMC D-ATIS	1 -1 1 1 (1)							
CHILE									
SCFA ANTOFAGASTA/ Cerro Moreno	APP-SR-I TWR SMC ~~ATIS~~ GP	2 (2) 1 (1) 1 (1) ~~1~~ 1 (1)-ER	2 (06/08)	SAM-1 (4)	X (06/08)	X (06/08)	X (06/08)		
SCAR ARICA/Chacalluta	APP-I TWR SMC	1 (1) 1 (1) 1 (1)							
SCIE CONCEPCION/ Carriel Sur	APP-I TWR SMC	1 (1) 1 (1) 1 (1)							
SCDA IQUIQUE/Gral. Diego Aracena	APP-SR-I TWR SMC GP	1 (1) 1 (1) 1 (1) 1(1)-ER							
SCTZ PUERTO MONTT Tepual	ACC-U ACC-U GP ~~APP-SR-I~~	2 (1) 1 (1)-ER 1 (1)-ER ~~2 (1)~~	2 (06/08)	SAM-1 (4)	X (06/08)	X (06/08)	X (06/08)		
SCTE PUERTO MONTT/ ~~E~~l Tepual	TWR SMC ~~ATIS~~	1 (1) 1 (1) ~~1~~							
SCCZ PUNTA ARENAS	ACC-U GP-ER APP-SR-I	3 (2) 1 (2) 2 (1)	2 (06/08)	SAM-1 (3)	X (06/08)	X (06/08)	X (06/08)		
SCCI PUNTA ARENAS/ Pdte. C. Ibáñez del Campo	TWR SMC ~~ATIS~~	1 (1) 1 (1) ~~1~~							
SCEZ SANTIAGO	ACC-U GP APP-SR-I	4 (4)-ER 2 (2)-ER 4 (4)	2 (06/08)	SAM-1 (3)	X (06/08)	X (06/08)	X (06/08)		
SCEL SANTIAGO/ Arturo Merino Benitez	CLRD TWR SMC ATIS	1 (1) 2 (1) 2(1) 1 (1)	1 (06/08)						
SCTC TEMUCO/Manquehue	APP-L TWR SMC	1 (1) 1 (1) 1 (1)							
COLOMBIA									
SKEC BARRANQUILLA	ACC-U GP	2 (2) 1 (1)	2 (06/08)	CAR-A (2)	X (06/06)				
SKBQ BARRANQUILLA/ Ernesto Cortissoz	APP-SR-I TWR SMC	2 (2) 1 (1) 1 (1)							

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1	2	3	4	5	6	7	8	9	10
	ATIS	1							
	CLRD	1	1 (06/01)						
SKED BOGOTA	ACC-U	5 (5)	4 (06/08)	SAM-2 (2)	X (06/06)	X (06/06)			
	GP	1 (1)-ER							
SKCL CALI	ACC-SR-I	1 (1)							
	GP	1 (1)		SAM-1	X (06/06)				
SKCL CALI/Alfonso Bonilla Aragón	APP-SR-I	1 (1)							
	TWR	1 (1)							
	SMC	1 (1)							
	ATIS	1							
SKCG CARTAGENA/ Rafael Núñez	TWR	1 (1)							
SKCC CUCUTA/Camilo Daza	APP-I	1 (1)							
	TWR	1 (1)							
SLLT LETICIA/Alfredo Vásquez Cobo	APP-SR-I	1 (1)							
	TWR	1 (1)							
SKRG RIO NEGRO/ José María Córdova	APP-SR-I	1 (1)							
	TWR	1 (1)							
	SMC	1 (1)							
	ATIS	1 (1)							
SKSP SAN ANDRES I./ Sesquicentenario	APP-SR-I	1 (1)							
	APP-I	1 (1)							
	TWR	1 (1)							
	SMC	1							
SKBO SANTA FE DE BOGOTA/Eldorado	APP-SR-I	3 (3)							
	TWR	2 (2)							
	SMC	2 (2)							
	ATIS	1 (1)							
	CLRD	1 (1)	1 (06/01)						
COSTA RICA									
MROC ALAJUELA/ Juan Santamaria Intl.	APP-SR-I	2 (1)							
	TWR	1 (1)							
	SMC	1 (1)							
	D-ATIS	1 (1)							
	GP	1 (1)							
MRLB LIBERIA/Tomás Guardia Intl.	APP-I	1 (1)							
	TWR	1 (1)							
	SMC	1 (1)							
MRLM LIMON/Limón Intl.	AFIS	1 (1)							
MRPV PAVAS/Tobías Bolaños Intl.	TWR	1 (1)							
	SMC	1 (1)							
CUBA									
MUCM CAMAGUEY/ Ignacio Agramonte	APP-SR-L	1							
	TWR	1 (1)							

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1	2	3	4	5	6	7	8	9	10
MUCL CAYO LARGO DEL SUR/Vilo Acuña	APP-L TWR	1 (1) 1 (1)							
MUCA CIEGO DE AVILA/ Máximo Gómez	APP-L TWR	1 1 (1)							
MUHA HABANA	ACC-SR-U ACC-SR-I GP-U	5 (4)-ER 3 (1)-ER 2 (1)	2 (06/08)	CAR-A (6)	X (06/08)				
MUHA HABANA/José Martí	APP-SR-L APP-SR-I TWR SMC D-ATIS	1 1 (1) 1 (1) 1 (1) 1 (1)							2008
MUHG HOLGUIN/Frank País	APP-SR-L TWR	1 1(1)							
MUCU SANTIAGO DE CUBA/ Antonio Maceo	APP-SR-I TWR SMC	1 (1) 1 (1) 1							
MUVR VARADERO/Juan Gualberto Gomez	APP-SR-L TWR SMC D-ATIS	1 1 (1) 1 1							2008
DOMINICA									
TDPB MELVILLE HALL/ Dominica	TWR	1 (1)							
TDPR ROSEAU/Canefield	TWR	1 (1)							
DOMINICAN REPUBLIC									
MDBH BARAHONA/ Maria Montes Intl.	TWR	1 (1)							
MDCY EL CATEY/ El Catey Intl.	TWR APP SMC D-ATIS	2 1 1 1							
~~MDHE HERRERA/ Herrera Intl.~~	~~TWR~~	~~1 (1)~~							
MDEH EL HIGÜERO/ Dr. Joaquín Balaguer Intl.	TWR APP SMC	2 1 1							
MDLR LA ROMANA/ La Romana Intl.	APP-L TWR	1 (1) 1 (1)							
MDPP PUERTO PLATA/ Gregorio Luperon	APP-SR-I TWR SMC	1 (1) 1 (1) 1 (1)							
MDPC PUNTA CANA/Punta Cana Intl.	APP-L TWR	1 1 (1)							
MDST SANTIAGO/Cibao	APP-L	1							

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1	2	3	4	5	6	7	8	9	10
Santiago Intl.	TWR	1 (1)							
MDCS SANTO DOMINGO	ACC-U ACC-SR-U GP	4 1 (1) 1	1 (06/08)						
MDSD SANTO DOMINGO/ De las Américas Intl.	APP-SR-I TWR SMC D-ATIS CLRD	2 (1) 1 (1) 1 (1) 1 (1) 1							
ECUADOR									
SEGU GUAYAQUIL	ACC-U ACC-U GP	2 (2) 1-ER 1 (1)	~~1 (06/08)~~	SAM-1 (4)	~~X (06/06)~~	~~X (06/06)~~	~~X (06/06)~~		
SEGU GUAYAQUIL/ Simón Bolívar	APP-SR-I APP-I TWR SMC ATIS	1 (1) 2 (1) 1 (1) 1 (1) 1							
SELT LATACUNGA/Cotopaxi	APP-I TWR	1 (1) 1 (1)							
SEMT MANTA/Eloy Alfaro	APP-I TWR	1 (1) 1 (1)							
SEQU QUITO/Mcal. Sucre	APP-SR-I TWR SMC ATIS	1 (1) 1 (1) 1 (1) 1 (1)							
EL SALVADOR									
MSLP SAN SALVADOR/ El Salvador Intl.	APP-I APP-I APP-SR-I TWR SMC GP D-ATIS	1 1 1 (1) 1 (1) 1 (1) 1 (1) 1 (1)							
MSSS SAN SALVADOR/ Ilopango Intl.	APP-I TWR TWR SMC	1 (1) 1 (1) 1 (1) 1 (1)							
FRENCH ANTILLES (France)									
TFFF FORT-DE-FRANCE Le Lamentin, Martinique	APP-U APP-I TWR APP-SR-I D-ATIS SMC	1 1 1 (1) 1 (1) 1 (1) 1 (1)							
TFFR POINTE-A-PITRE/	APP-U	1							

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1	2	3	4	5	6	7	8	9	10
Le Raizet, Guadeloupe	APP-I TWR APP-SR-I D-ATIS SMC	2 1 (1) 1 (1) 1 (1) 1							
TFFJ SAINT-BARTHELEMY/ Saint-Barthelemy	AFIS	1							
TFFG SAINT MARTIN/ Grand Case, Guadeloupe	AFIS	1							
FRENCH GUIANA (France)									
SOOO CAYENNE	ACC-U GP	2 (1) 1		CAR-A (1) SAM-2 (1) SAT-2 (1)					
SOCA CAYENNE/ Rochambeau	APP-SR-I TWR SMC ATIS	1 (1) 1 (1) 1 1							
GRENADA									
TGPZ LAURISTON/ Carriacou	TWR	1							
TGPY SAINT GEORGES/ Point Salines	APP-L TWR SMC	1 (1) 1 (1) 1 (1)							
GUATEMALA									
MGFL FLORES/Flores	APP-L TWR	1 1							
MGGT GUATEMALA/ La Aurora	APP-SR-I TWR SMC D-ATIS GP	1 1 1 1 1							
MGPB PUERTO BARRIOS/ Puerto Barrios	TWR	1 (1)							
MGSJ SAN JOSE/San José	TWR	1 (1)							
GUYANA									
SYGC GEORGETOWN	ACC-U ACC-U GPS ACC-L	1(1) 1-ER 1 (1) 1	1 (06/08)	CAR-A SAM-2	X (06/08)				
SYCJ TIMEHRI/ Cheddi Jagan Intl.	APP-L TWR SMC	1 1 (1) 1 (1)							
HAITI									

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1	2	3	4	5	6	7	8	9	10
MTCH CAP HAITIEN/Intl.	APP-L TWR	1 1 (1)							
MTEG PORT-AU-PRINCE	ACC-SR-U GP	~~1~~ 2(1) 1	1 (06/08)						
MTPP PORT-AU-PRINCE/Intl.	APP-SR-I APP-I TWR SMC D-ATIS	1 1 (1) 1 (1) 1 1							
HONDURAS									
MHLC LA CEIBA/ Golosón Intl.	APP-L TWR SMC	1 1 (1) 1							
MHRO COXEN HOLE/Juan Manuel Gálvez Intl.	TWR SMC	1 (1) 1 (1)							
MHLM SAN PEDRO SULA/ La Mesa Intl.	APP-I TWR SMC GP D-ATIS	1 (1) 1 (1) 1 (1) 1 (1) 1 (1)							
MHTG TEGUCIGALPA (CENAMER)	ACC-SR-U GP	7 (4) 1	3 (06/08)	CAR-A (6) SAM-1 (2)	X (06/08)	X (06/08)	X (06/08)		
MHTG TEGUCIGALPA/ Toncontin	APP-I TWR SMC GP D-ATIS	1 (1) 1 (1) 1 (1) 1 (1) 1 (1)							
JAMAICA									
MKJK KINGSTON	ACC-SR-U ACC-U GP	1 5 (2) 1	2 (06/~~06~~8)		X (06/0~~6~~8)	X (06/0~~6~~8)	X (06/0~~6~~8)		
MKJP KINGSTON/Norman Manley Intl.	APP-SR-1 APP-I TWR SMC D-ATIS	1 1 (1) 1 1 (1) 1							
MKJS MONTEGO BAY/ Sangster Intl.	APP-SR-I APP-I TWR SMC D-ATIS	1 1 1 (1) 1 (1) 1							
MEXICO									
MMAA ACAPULCO/Gral. Juan Alvarez Intl.	APP-SR-I APP-SR-L D-ATIS SMC TWR GP	1 (1) 1 (1) 1 1 1 (1) 1							

Country and location Pays et emplacement País y localidad	Service or function Service ou fonction Servicio o función	VHF voice Voix VHF Voz VHF	VHF data Données VHF Datos VHF	HF voice Voix HF Voz HF	HF data Données HF Datos HF	Satellite voice Voix satellite Voz por satélite	Satellite data Données satellite Datos por satélite	Mode S Modo S	Remarks Remarques Observaciones
1	2	3	4	5	6	7	8	9	10
MMBT BAHIAS DE HUATULCO/ Bahías de Huatulco	TWR	1 (1)							
MMCP CAMPECHE/Ignacio Alberto Acuña Ongay Intl.	TWR	1 (1)							
MMUN CANCUN/Cancún Intl.	APP-L APP-I SMC TWR D-ATIS CLRD GP	1 (1) 1 (1) 1 1 (1) 1 1 1							
MMCM CHETUMAL/ Chetumal Intl.	TWR	1 (1)							
MMCU CHIHUAHUA/Gral. Roberto Fierro Villalobos Intl.	APP-I TWR D-ATIS GP	1 (1) 1 (1) 1 1							
MMMC CIUDAD ACUÑA/Intl.	AFIS	1 (1)							
MMCS CIUDAD JUAREZ/ Abraham González Intl.	APP-I TWR	1 1 (1)							
MMCZ COZUMELCozumel/ Intl.	TWR	1 (1)							
MMCL CULIACAN/Fidel Bachigualato	APP-I TWR GP	1 (1) 1 (1) 1							
MMDO DURANGO/Pte. Guadalupe Victoria, Intl.	TWR	1 (1)							
MMGL GUADALAJARA/ Don Miguel Hidalgo y Costilla Intl.	APP-SR-I APP-SR-L D-ATIS SMC TWR CLRD GP	1 (1) 1 (1) 1 (1) 1 (1) 1 (1) 1 1							
MMGM GUAYMAS/Gral. José María Yáñez Intl.	TWR	1 (1)							
MMHO HERMOSILLO/Gral. Ignacio Pesqueira Garcia Intl.	APP-I D-ATIS TWR SMC	1 (1) 1 (1) 1 (1) 1							
MMZH IXTAPA-ZIHUATANEJO/ Ixtapa-Zihuatanejo Intl.	APP-I TWR	1 (1) 1 (1)							
MMLP LA PAZ/Gral. Manuel Márquez de León Intl.	APP-I TWR	1 (1) 1 (1)							
MMLO LEON/Guanajuato	APP-L	1							

Country and location Pays et emplacement País y localidad	Service or function Service ou fonction Servicio o función	VHF voice Voix VHF Voz VHF	VHF data Données VHF Datos VHF	HF voice Voix HF Voz HF	HF data Données HF Datos HF	Satellite voice Voix satellite Voz por satélite	Satellite data Données satellite Datos por satélite	Mode S Modo S	Remarks Remarques Observaciones
1	2	3	4	5	6	7	8	9	10
	TWR	1 (1)							
MMLT LORETO/Loreto Intl.	TWR	1 (1)							
MMZO MANZANILLO/Playa de Oro Intl.	APP-L TWR	1 1 (1)							
MMMA MATAMOROS/Gral. Servando Canales	APP-L TWR	1 1 (1)							
MMMZ MAZATLAN/Gral. Rafael Buelna Intl.	ACC-SR-L ACC-SR-U APP-I SMC TWR D-ATIS GP	4 4 (5) 1 (1) 1 1 (1) 1 (1) 1	5 (06/08)		X (06/08)	X (06/08)	X (06/08)		
MM~~MO~~IDMERIDA/Lic. Manuel Crescencio Rejón Intl.	ACC-SR-L ACC-SR-U APP-I D-ATIS GP TWR	3 4 (4) 1 (1) 1 1 (1) 1 (1)	3 (06/08)	CAR-A (5)	X (06/08)	X (06/08)	X (06/08)		
MMML MEXICALI/Gral. Rodolfo Sánchez Taboada Intl.	APP-I TWR	1 1 (1)							
MMMX MEXICO/Lic. Benito Juárez Intl.	ACC-SR-L ACC-SR-U APP-SR-I APP-SR-L D-ATIS GP SMC TWR CLRD	5 5 (7) 1 (1) 1 (1) 1 (1) 1 (1) 1 (1) 1 (1) 1 (1)	3 (06/08)		X (06/08)	X (06/08)	X (06/08)		
MMAN MONTERREY/ Aeropuerto Del Norte Intl.	TWR	1 (1)							
MMMY MONTERREY/Gral. Mariano Escobedo Intl.	ACC-SR-L ACC-SR-U APP-SR-I APP-SR-L D-ATIS GP SMC TWR	2 2 (3) 1 (1) 1 (1) 1 (1) 1 1 (1) 1 (1)	3 (06/08)		X (06/08)	X (06/08)	X (06/08)		
MMMM MORELIA/ Gral. Francisco Mujica Intl.	APP-L TWR	1 1 (1)							
MMNG NOGALES/Nogales Intl.	AFIS	1							
MMNL NUEVO LAREDO/ Quetzalcoatl Intl.	APP-L TWR	1 1 (1)							

Country and location Pays et emplacement País y localidad	Service or function Service ou fonction Servicio o función	VHF voice Voix VHF Voz VHF	VHF data Données VHF Datos VHF	HF voice Voix HF Voz HF	HF data Données HF Datos HF	Satellite voice Voix satellite Voz por satélite	Satellite data Données satellite Datos por satélite	Mode S Modo S	Remarks Remarques Observaciones
1	2	3	4	5	6	7	8	9	10
MMPG PIEDRAS NEGRAS/Intl.	D-ATIS	1 (1)							
MMPR PUERTO VALLARTA/ Lic. Gustavo Díaz Ordaz Intl.	APP-SR-I APP-SR-L D-ATIS SMC TWR	1 (1) 1 (1) 1 1 1 (1)							
MMRX REYNOSA/Gral. Lucio Blanco Intl.	APP-L TWR	1 1 (1)							
MMSF SAN FELIPE/ San Felipe Intl.	AFIS	1 (1)							
MMSD SAN JOSE DEL CABO/San José del Cabo Intl.	APP-I TWR GP	1 1 (1) 1							
MMTM TAMPICO/Gral. Francisco Javier Mina Intl.	APP-I TWR GP	1 (1) 1 (1) 1							
MMTP TAPACHULA/ Tapachula Intl.	TWR	1 (1)							
MMTJ TIJUANA/ Gral. Abelardo L. Rodríguez Intl.	APP-SR-I APP-SR-L D-ATIS GP TWR SMC	1 (1) 1 (1) 1 (1) 1 (1) 1 (1) 1							
MMTO/TOLUCA/Lic. Adolfo Lopez Mateos	TWR GP	1 (1) 1							
MMTC TORREON/Torreón Intl.	APP-L TWR	1 (1) 1 (1)							
MMVR VERACRUZ/Gral. Heriberto Jara Intl.	APP-L TWR	1 (1) 1 (1)							
MMVA VILLAHERMOSA/ C.P.A. Carlos Rovirosa	APP-L TWR	1 1 (1)							
MMZC ZACATECAS/Gral. Leobardo Ruíz Intl.	APP-I TWR	1 1 (1)							
MONTSERRAT (United Kingdom)									
TRPM PLYMOUTH/ Blackburne, Montserrat I.	APP-L TWR	1 1							
NETHERLANDS ANTILLES (Netherlands)									
TNCF CURACAO	ACC-U GP	3 (2)-ER 1 (1)	2 (06/08)		X (06/08)	X (06/08)	X (06/08)		
TNCB KRALENDIJK/ Flamingo, Bonaire I.	APP-I TWR	1 1 (1)							
TNCE ORANJESTAD/ F.D. Rossevelt, St. Eustacius I.	TWR	1							

Country and location Pays et emplacement País y localidad	Service or function Service ou fonction Servicio o función	VHF voice Voix VHF Voz VHF	VHF data Données VHF Datos VHF	HF voice Voix HF Voz HF	HF data Données HF Datos HF	Satellite voice Voix satellite Voz por satélite	Satellite data Données satellite Datos por satélite	Mode S Modo S	Remarks Remarques Observaciones
1	2	3	4	5	6	7	8	9	10
TNCM PHILIPSBURG/Prinses Juliana, St. Maarten I.	APP-I TWR SMC	1 1 1							
TNCC WILLEMSTAD/Hato, Curacao I.	APP-I TWR SMC APP-SR-I D-ATIS	1 1 (1) 1 1 (1) 1							
NICARAGUA									
MNMG MANAGUA/Augusto César Sandino Intl.	APP-I TWR SMC GP D-ATIS	1 (1) 1 (1) 1 (1) 1 (1) 1							
MNPC PUERTO CABEZAS/ Puerto Cabezas	TWR	1							
PANAMA									
MPBO BOCAS DEL TORO/ Bocas del Toro	AFIS	1 (1)							
MMPCH CHANGUINOLA/ Cap. Manuel Niño	TWR	1 (1)							
MPDA DAVID/Enrique Malek	TWR SMC	1 (1) 1 (1)							
MPMG PANAMA/Marcos A. Gelabert	TWR SMC CLRD	1 (1) 1 (1) 1 (1)							
MPZL PANAMA	ACC-U ACC-SR-U APP-SR-I GP	2 (1) 1 (1) 3 (3) 1 (1)	1 (06/08)	CAR-A (3) SAM-1 (2)	X (06/08)	X (06/08)	X (06/08)		
MPTO PANAMA/Tocumen	TWR SMC ATIS-D CLRD	1 (1) 1 (1) 1 1							
PARAGUAY									
SGFA ASUNCION	ACC-U ACC-U GP	1 (1) 1 (1)-ER 1 (1)	1 (06/08)	SAM-1 (3) SAM-2 (3)	X (06/08)				
SGAS ASUNCION/ Silvio Pettirossi	APP-SR-I APP-I TWR SMC	1 (1) 2 (2) 1 (1) 1 (1)							
SGES CIUDAD DEL ESTE/ Guarani	APP-SR-I TWR	1 (1) 1 (1)							
PERU									
SPQU AREQUIPA/ Rodríguez Ballón Intl.	APP-SR-U TWR	1 (1) 1 (1)							

Country and location Pays et emplacement País y localidad	Service or function Service ou fonction Servicio o función	VHF voice Voix VHF Voz VHF	VHF data Données VHF Datos VHF	HF voice Voix HF Voz HF	HF data Données HF Datos HF	Satellite voice Voix satellite Voz por satélite	Satellite data Données satellite Datos por satélite	Mode S Modo S	Remarks Remarques Observaciones
1	2	3	4	5	6	7	8	9	10
SPHI CHICLAYO/ Cap. José Quiñones Gonzáles	APP-SR-I TWR	1 (1) 1 (1)							
SPZO CUZCO/Velazco Astete	APP-SR-U TWR ATIS	1 1 (1) 1 (1)							
SPQT IQUITOS/Cnel. FAP Francisco Secada Vignetta	APP-SR-I TWR	1 (1) 1 (1)							
SPIM LIMA	ACC-SR-U GP	3 (3)-ER 1 (1)	2 (06/06)	SAM-1 (2)	X (06/06)	X (06/06)	X (06/06)		
SPIM LIMA-CALLAO/Jorge Chávez Intl.	APP-SR-I APP-SR-U TWR SMC CLRD ATIS	1 (1) 2 1 (1) 1 (1) 1 (1) 1(1)	1 (06/01)						
SPSO PISCO/Pisco	APP-I TWR SMC	1 1 (1) 1 (1)							
SPTN TACNA/Cnel. FAP Carlos Ciriani Santa Rosa	APP-I TWR	1 1 (1)							
SPRU TRUJILLO/Cap. Carlos Martínez de Pinillos	APP-I TWR	1 (1) 1 (1)							
PUERTO RICO (United States)									
TJBQ AGUADILLA/Rafael Hernández Intl.	TWR	1 (1)							
TJFA FAJARDO/Diego Jiménez Torres	TWR	1 (1)							
TJMZ MAYAGUEZ/Mayaguez	SMC TWR	1 1							
TJPS PONCE/Mercedita	TWR SMC APP-L	1 1							
TJZS SAN JUAN	ACC-U GP-U	11	4 (06/08)	CAR-A (6) CAR-B (1) NAT-A (5)	X (06/08)	X (06/08)	X (06/08)		
TJSJ SAN JUAN, PUERTO RICO/Luis Muñóz Marin Intl.	D-ATIS TWR SMC APP-SR-I	1 (1) 2 (1) 1 (1) 2 (2)							
TJVQ VIEQUES/Antonio Rivera	TWR	1 (1)							
SAINT KITTS AND NEVIS									
TKPK BASSETERRE/Golden Rock, Saint Kitts I.	APP-L TWR	1 (1) 1 (1)							

Country and location Pays et emplacement País y localidad	Service or function Service ou fonction Servicio o función	VHF voice Voix VHF Voz VHF	VHF data Données VHF Datos VHF	HF voice Voix HF Voz HF	HF data Données HF Datos HF	Satellite voice Voix satellite Voz por satélite	Satellite data Données satellite Datos por satélite	Mode S Modo S	Remarks Remarques Observaciones
1	2	3	4	5	6	7	8	9	10
TKPN CHARLESTOWN/ Newcastle, Nevis I.	TWR	1							
SAINT LUCIA									
TLPC CASTRIES/Vigie	TWR SMC	1 (1) 1 (1)							
TLPL VIEUX-FORT/ Hewanorra Intl.	APP-L TWR SMC	1 (1) 1 (1) 1 (1)							
SAINT VINCENT AND THE GRENADINES									
TVSV BEQUIA/J. F. Mitchel	TWR	1 (1)							
TVSC CANOUAN/Canouan	TWR	1 (1)							
TVSV KINGSTOWNE/ E.T. Joshua	APP-L TWR	1 (1) 1 (1)							
TVSM MUSTIQUE/Mustique	TWR	1 (1)							
TVSU UNION ISLAND/ Union Island	TWR	1							
SENEGAL									
GOOO DAKAR	ACC-U	1 (1)-ER		SAT-1 SAT-2	X (06/08)	X (06/08)	X (06/08)		
SURINAME									
SMNI NEW NICKERIE/ Maj. Fernandes	TWR SMC	1 (1) 1							
SMPM PARAMARIBO	ACC-U GP	1 (1)-ER 1							
SMZO PARAMARIBO/ Zorg en Hoop	TWR SMC	1 (1) 1 (1)							
SMJP ZANDERY/Johan A. Pengel	APP-I TWR SMC	1 (1) 1 (1) 1 (1)							
TRINIDAD AND TOBAGO									
TTZP PIARCO	ACC-SR-U ACC-U GP	3 4 (2) 1 (1)	2 (06/08)	CAR-A (3) CAR-B (1) SAM-2 (2)	X (06/08)	X (06/08)	X (06/08)		
TTPP PORT OF SPAIN/ Piarco Intl., Trinidad I.	APP-I APP-SR-I TWR SMC ATIS	1 2 (1) 1 (1) 1 (1) 1 (1)							

Country and location Pays et emplacement País y localidad	Service or function Service ou fonction Servicio o función	VHF voice Voix VHF Voz VHF	VHF data Données VHF Datos VHF	HF voice Voix HF Voz HF	HF data Données HF Datos HF	Satellite voice Voix satellite Voz por satélite	Satellite data Données satellite Datos por satélite	Mode S Modo S	Remarks Remarques Observaciones
1	2	3	4	5	6	7	8	9	10
TTCP SCARBOROUGH/ Crown Point, Tobago I.	APP-I TWR SMC	1 (1) 1 (1) 1 (1)							
TURKS AND CAICOS ISLANDS (United Kingdom)									
MBGT GRAND TURK/ Grand Turk Intl.	APP-L TWR	1 1 (1)							
MBPV PROVIDENCIALES/ Intl.	APP-L TWR	1 (1) 1 (1)							
MBSC SOUTH CAICOS/Intl.	APP-L TWR	1 1 (1)							
UNITED STATES									
KZWY NEW YORK	GP-U	1-ER	1 (06/08)	CAR-A CAR-B	X (06/08)	X (06/08)	X (06/08)		
URUGUAY									
SUCA COLONIA/ Departamental de Colonia	TWR	1 (1')							
SULS MALDONADO C/C Carlos A. Curbelo Intl Laguna del Sauce	TWR SMC ATIS	1 (1) 1 1							
SUAA MONTEVIDEO/Angel S. Adami Intl.	TWR	1 (1)							
SUEO MONTEVIDEO	ACC-U	3 (2)	1 (06/08)	SAM-1 (3) SAM-2 (5) SAT-X*	X (06/08)	X (06/08)	X (06/08)		*Frequency to be designated *Fréquence à déterminer *Frecuencia por designar
SUMU MONTEVIDEO/ Carrasco Intl. Gral. Cesareo Berisso	APP-SR-I APP-I SMC TWR ATIS	1 (1) 1 (1) 1 (1) 1 (1) 1							
SURV RIVERA/Cerro Chapeau Intl.	TWR	1 (1)							
SUSO SALTO/Intl. Nueva Hesperides	TWR	1 (1)							
VENEZUELA									
SVBC BARCELONA/Gral. José Antonio Anzoátegui Intl.	APP-SR-I TWR SMC ATIS	2 (2) 1 (1) 1 (1) 1 (1)							

Country and location Pays et emplacement País y localidad	Service or function Service ou fonction Servicio o función	VHF voice Voix VHF Voz VHF	VHF data Données VHF Datos VHF	HF voice Voix HF Voz HF	HF data Données HF Datos HF	Satellite voice Voix satellite Voz por satélite	Satellite data Données satellite Datos por satélite	Mode S Modo S	Remarks Remarques Observaciones
1	2	3	4	5	6	7	8	9	10
SVZM MAIQUETIA	ACC-SR-U GP	5 (6) 1 (2)	3 (06/08)	CAR-A (4) SAM-2 (3)	X (06/08)	X (06/08)	X (06/08)		
SVMI CARACAS/Maiquetía, Simón Bolívar	APP-SR-L TWR SMC ATIS CLRD	2 (2) 2 (2) 2 (2) 1 (1) 1	~~1 (06/01)~~						
SVMC MARACAIBO/ La Chinita Intl.	APP-SR-I TWR SMC ATIS GP	2 (2) 1 (1) 1 (1) 1 (1) 1 (1)							
SVMG MARGARITA/Intl. Del Caribe, General Santiago Marino	APP-SR-I TWR SMC ATIS	1 (1) 1 (1) 1 (1) 1 (1)							
SVJC PARAGUANA/Josefa Camejo	APP TWR (1)								
SVSA SAN ANTONIO DEL TACHIRA/San Antonio del Tachira	APP TWR (1)								
SVVA VALENCIA/Zim Valencia	APP TWR	 1 (1)							
VIRGIN ISLANDS (United Kingdom)									
TUPJ ROADTOWN/ Beef Island	APP-L TWR	1 1 (1)							
TUPW VIRGIN GORDA/ Virgin Gorda	TWR	1							
VIRGIN ISLANDS (United States)									
TISX SAINT CROIX/Henry E. Rohlsen, St. Croix	APP-I TWR SMC	1 (1) 1 (1) 1 (1)							
TIST SAINT THOMAS/ Cyril E. King	APP-I TWR SMC D-ATIS	1 (1) 1 (1) 1 (1) 1 (1)							

APPENDIX B

SAM PLAN OF ACTIVITIES FOR AIR-GROUND DATA LINK PLANNING AND IMPLEMENTATION

1. Participate in seminars and workshops on air-ground data links.

2. Review and update the regional air-ground data link plan (FASID Table CNS 2A) to obtain the benefits of data communications, thus improving safety, efficiency, and capacity by reducing speech communications and gradually implementing automation processes to meet the operational requirements that have been coordinated and harmonised with the global ATM system.

3. Assess the capacity and the need to modernise control centres and the aircraft fleet operating in the FIR and in the respective airspace, in order to implement air-ground data links in keeping with operational requirements and ICAO SARPs and guidelines, including plans for the implementation of the aforementioned capacity.

4. Establish and participate in a trial and demonstration programme for air-ground data link systems and applications.

5. Study and assess arrangements made by other States/International organisations for the implementation of data links, establishing multinational cooperation mechanisms.

6. In keeping with the global roadmap, establish a CAR/SAM regional programme for the evolutionary implementation of air-ground data links, ensuring regional and inter-regional interoperability to meet the global ATM system requirements in a coordinated, harmonious, and seamless manner.

7. Conduct and monitor research studies on, and the development of, communication technology, and follow up on the ICAO SARPs and guidelines on the future evolution of data links and their services.

8. These activities are necessary in order to execute the implementation programme shown in **Appendix C.**

APPENDIX C

CAR/SAM REGIONAL PROGRAMME FOR THE IMPLEMENTATION OF AIR-GROUND DATA LINKS *		
TERM	**INFRASTRUCTURE IMPLEMENTATION GOALS**	**SERVICES**
Immediate term (2005–2009)	Implement data link services based on ACARS and FANS and begin using VDL-Mode 2 and HFDL in keeping with ICAO SARPs and guidelines.	Maximise the use of: - pre-departure dispatch; - oceanic dispatch; - D-ATIS; - other flight information and routine messages; and - automatic position reporting by aircraft.
Medium term (2009–2014)		- more complex safety-related information may be exchanged, including ATC dispatch.
Long term (after 2014)	Implement VDL data links, according to their future evolution and in keeping with the new ICAO SARPs and guidelines.	- use will include downlink of aircraft flight parameters for use by the ATM system; and - uplink of traffic data to improve cockpit situational awareness.

Note:

* *This regional programme is in keeping with the global roadmap for the implementation of air-ground data links.*

APPENDIX D

ACTION PLAN FOR THE IMPROVEMENT OF GROUND-AIR COMMUNICATIONS SYSTEMS

Activities	Beginning Date	Ending Date	Responsible
Data collection			
Remittance by ICAO of letter to SAM States and International Organizations (IATA) members of the Project requesting to nominate a person as focal point and indicating activities to be executed.	May 2008		RO
Nomination of a focal point for data collection. Data to be collected is: ▪ VHF Coverage – continental and oceanic area. ▪ HF Coverage – oceanic and continental area ▪ VHF and HF equipment use life ▪ VHF and HF equipment reposition plan. ▪ Table CNS 2 A of FASID update, with special attention to ground-air data communications ▪ Avionics capacities of national air fleets ▪ Current and planned air space capacity		June 2008	State
Delivery of collected data to States and International organizations		June 2008	States, Regional Office (RO)
Hiring of an expert	July 2008		RO
Beginning of expert's activities	August 2008	September 2008 (three weeks)	

Processing and analysis of collected information			Expert and RO
Draft of the improvement strategy for the short and medium term			Expert
Cost/benefit analysis			Expert and RO
Draft of implementation guidelines for the States			Expert
Revision of the strategy and implementation guidelines for the implementation of ground-air communications improvements		November 2008	SAM/IG/2
Training			States, RO
Seminar on Improvement of Ground-Air Communications Systems	April 2009	April 2009 (one week)	SAM/IG/3
Implementation of the ground-air communications improvements		March 2011	States
Follow up of the ground-air communications systems improvements implementation.	March 2009	March 2011	RO, States

APPENDIX E

Table CNS 1Ba – ATN ROUTER PLAN

EXPLANATION OF THE TABLE

Column

1 Administration – the name of the State, Territory or International Organization responsible for management of an ATN router and Location.

2 ATN Router Type to be implemented at the location shown in column 2:

BBIS – Backbone Boundary Intermediate System performing Inter Domain Routing Protocol (IDRP).
BIS – Boundary Intermediate System with IDRP.
IS – Intermediate system (router) without IDRP.

3 Type of Interconnection:

Inter – Regional.
Intra – Regional.
Sub – Regional.

4 Name of the location of the correspondent router connected with router/location shown in column 2.

5 Link Speed – Speed requirements of the interconnecting link.

6 Link Protocol – Protocol requirements for the interconnecting link.

7 The means of connecting the ATN routers of columns 2 and 5.

CAMSAT – Central American digital network.
E/CAR – Eastern Caribbean digital network.
MEVA – MEVA digital network.
REDDIG – South American digital network.
DIR – Leased direct circuit.

8 Target date of implementation of the ATN facilities and means listed in columns 2, 5 and 8.

TBD – To be determined.

9 Remarks.

Tabla CNS 1Ba – PLAN DE ENCAMINADORES ATN

EXPLICACIÓN DE LA TABLA

Columna

1 Administración – Nombre del Estado, Territorio u Organización Internacional responsable para la gerencia del encaminador ATN y Localidad.

2 Tipo de encaminador ATN:

BBIS – Sistema Intermedio Encaminador Principal que ejecuta el Protocolo de Encaminamiento Inter-Dominios (IDRP).
BIS – Sistema Intermedio Encaminador con IDRP.
IS – Sistema Intermedio (encaminador) sin IDRP.

3 Tipo de Interconexión:

Inter – Regional
Intra – Regional
Sub – Regional

4 Nombre de la localidad del encaminador correspondiente conectado con el encaminador/ localidad mostrado en la columna 2.

5 Velocidad del Enlace – Requerimientos de velocidad del enlace de interconexión.

6 Protocolo de Enlace – Requerimientos del Protocolo para el enlace de interconexión.

7 Medio de comunicación mediante el cual serán conectados los encaminadores especificados en las columnas 2 y 5.

CAMSAT – Red digital de Centro América.
E/CAR – Red digital del Caribe Oriental.
MEVA – Red digital MEVA.
REDDIG – Red digital de Suramérica.
DIR – Circuito directo arrendado.

8 Fecha meta implementación de las facilidades ATN y medios listados en las columnas 2, 3 y 8.

TBD- A ser determinado.

9 Observaciones.

TABLE/TABLA CNS 1Ba – ATN ROUTERS REGIONAL PLAN / PLAN REGIONAL DE ENCAMINADORES ATN

Administration and Location/ Administración y Localidad	Type of Router / Tipo de Encaminador	Type of Interconnection/ Tipo de interconexión	Connected Router- Encaminador Conectado	Link Speed- Velocidad del enlace	Link Protocol- Protocolo del Enlace	Via Vía	Target Date / Fecha Meta	Remarks Observaciones
1	2	3	4	5	6	7	8	9
Argentina /Buenos Aires	IP	Inter/Intra Regional	AFI(Johannesburgo), Bolivia (La Paz) , Chile (Santiago de Chile), Brasil(Brasilia), Paraguay (Asunción), Perú (Lima) y Uruguay (Montevideo)	2x 19200	IPv6	CAFSAT y REDDIG	2006	
Bolivia /La Paz	IP	Intra Regional	Argentina (Buenos Aires), Brasil (Brasilia)y Perú (Lima)	2x 19200	IPv6	REDDIG	2010	
Brasil /Manaus	IP	Intra Regional	Colombia (Bogotá),Guyana (Georgetown), Guyana Francesa (Cayena), Perú (Lima), Surinam(Paramaribo) y Venezuela (Caracas)	2x19200	IPv6	REDDIG	2009	
Brasil /Brasilia	IP	Inter/Intra Regional	AFI (Dakar),EUR(Madrid) NAM (Atlanta) via Bogotá, Argentina (Buenos Aires), Bolivia(La Paz), Paraguay(Asunción) y Uruguay (Montevideo)	2x19200	IPv6	CAFSATy REDDIG	2009	
Chile/Santiago	IP	Inter/Intra Regional	PAC(Christchurch, Brisbane), Argentina (Buenos Aires) y Perú (Lima)	2x19200	IPv6	Communic ation Service Provider y REDDIG	2008	
Colombia /Bogotá	IP	Inter/Intra Regional	NAM (Atlanta)*, Ecuador (Guayaquil), Brasil (Manaus) Perú (Lima), Venezuela (Caracas),Panama	2x19200	IPV6	*Interconexi ón MEVA II REDDIG y REDDIG	2008	
Ecuador/Guayaquil	IP	Intra Regional	Colombia (Bogotá) y Perú (Lima), Venezuela (Caracas)	2x19200	IPv6	REDDIG	2009	
Guyana	IP	Intra Regional	C-CAR (Piarco), Brasil (Manaos) , Surinam(Paramaribo) y Venezuela(Caracas)	2x19200	IPv6	REDDIG	2010	

Administration and Location/ Administración y Localidad	Type of Router / Tipo de Encaminador	Type of Interconnection/ Tipo de interconexión	Connected Router-Encaminador Conectado	Link Speed-Velocidad del enlace	Link Protocol-Protocolo del Enlace	Via Vía	Target Date / Fecha Meta	Remarks Observaciones
1	2	3	4	5	6	7	8	9
Guyana Francesa	IP	Intra Regional	Brasil (Manaus) y Venezuela (Caracas)	2x19200	IPv6	REDDIG	2010	
Panamá	IP	Inter/Intra Regional	NAM(Atlanta), Bogota Colombia	1x19200	IPv6	MEVA II Interconexión MEVA II REDDIG	2008	
Paraguay/Asunción	IP	Intra Regional	Argentina (Buenos Aires) Brasil (Brasilia)	2x19200	IPv6	REDDIG	2007	
Perú/Lima	IP	Inter/Intra Regional	NAM(Atlanta),,Argentina(BuenosAires),Bolivia (La Paz),Brasil (Manaos),Chile(Santiago),Colombia (Bogotá),Ecuador (Guayaquil y Venezuela (Caracas),	2x19200	IPv6	REDDIG	2008	
Suriname/Paramaribo	IP	Intra Regional	Brasil (Manaos), Guyana Francesa(Cayena) y Venezuela (Caracas)	2x19200	IPv6	REDDIG	2010	
Uruguay /Montevideo	IP	Intra Regional	Argentina(Buenos Aires), Brasil (Brasilia)	2x19200	IPv6	REDDIG	2010	
Venezuela/Caracas	IP	Inter/Intra Regional	CAM (San Juan), C-CAR(Piarco), EUR(Madrid),Brasil (Manaus), Colombia (Bogotá) y Suriname (Paramaribo), French Guiana (Cayenne), Guyana (Georgetown), Ecuador (Guayaquil), Perú (Lima)		IPv6	Interconexión MEVAII REDDIG	2008	

TABLA CNS-1Bb – PLAN DE APLICACIONES TIERRA-TIERRA ATN

EXPLICACIÓN DE LA TABLA

Columna

1 Administración – Nombre del Estado, Territorio u Organización Internacional responsable para la gerencia de una instalación de aplicación tierra-tierra ATN y Localidad de la instalación.

2 Tipo de Instalación:

AMHS – Sistema de tratamiento de mensajes ATS)
AIDC – Comunicaciones de datos entre instalaciones ATS).

3 Nombre de la Administración y Localidad correspondiente a la instalación de la aplicación ATN tierra-tierra.

4 Norma usada en la instalación indicada en las columnas 1 y 2.

5 Fecha de implementación de la instalación .

TBD – A ser determinado.

6 Observaciones.

TABLA CNS-1Bb – ATN EARTH-EARTH APPLICATIONS PLAN

EXPLANATION OF THE TABLE

Column

1 Administration – Name of the State, Territory or International Organization responsible for the Management o fan installation of an ATN Earth-Earth application and installation locality.

2 Type of Installation:

AMHS – System for the treatment of ATS messages
AIDC – Data Communications between ATS installations

3 Name of the Administration and Locality corresponding to the installation of the ATN Earth-Earth application.

4 Standard used in the installation indicated in columns 1 and 2.

5 Installation implementation date.

TBD – to be determined.

6 Remarks.

TABLE CNS 1BB – ATN GROUND-GROUND APPLICATIONS PLAN / TABLA CNS1 BB – PLAN DE APLICACIONES TIERRA-TIERRA ATN (SAM REGION / REGIÓN SAM)

ATN GROUND-GROUND APPLICATIONS PLAN / PLAN DE APLICACIONES TIERRA-TIERRA					
Administration and Location/ Administración y localidad	**Application Type/ Tipo de Aplicación**	**Conneted with Administration & Location of/ Conectada con Administración y Localidad de.**	**Used Standard / Norma usada**	**Implementation Date/ Fecha de Implementación**	**Remarks/ Observaciones**
1	2	3	4	5	6
Argentina, Buenos Aires	AMHS	Bolivia, Brasil, Chile, Paraguay Perú, Uruguay y AFI	IP o OSI sobre IP	2006	
	AIDC	Bolivia, Brasil, Chile, Paraguay Perú, Uruguay y AFI	IP o OSI sobre IP	TBD /Por determinar	
Bolivia , La Paz	AMHS	Argentina , Perú y Brasil	IP o OSI sobre IP	2010	
	AIDC	Argentina , Perú y Brasil	IP o OSI sobre IP	TBD /Por determinar	
Brasil, Brasilia	AMHS	Argentina, Bolivia Paraguay,Uruguay, NAM,EUR,AFI	IP o OSI sobre IP	2008	
	AIDC	Argentina, Bolivia Paraguay,Uruguay, NAM,EUR,AFI	IP o OSI sobre IP	TBD/ Por determinar	
Brasil ,Manaus	AMHS	Colombia, Guyana, Guyana Francesa, Perú, Surinam , y Venezuela.	IP o OSI sobre IP	2008	
	AIDC	Colombia, Guyana, Guyana Francesa, Perú, Surinam , y Venezuela	IP o OSI sobre IP	TBD/ Por determinar	
Chile, Santiago	AMHS	Argentina, Perú y PAC.	IP o OSI sobre IP	2008	
	AIDC	Argentina, Perú y PAC.	IP o OSI sobre IP	TBD/Por determinar	
Colombia , Bogotá	AMHS	Ecuador, Panamá, Perú y Venezuela.	IP o OSI sobre IP	2008	
	AIDC	Ecuador, Panamá, Perú y Venezuela.	IP o OSI sobre IP	TBD/Por determinar	
Ecuador,Quito	AMHS	Colombia, Perú y Venezuela	IP o OSI sobre IP	2009	
	AIDC	Colombia, Perú y Venezuela	IP o OSI sobre IP	TBD/Por determinar	
French Guyana ,Cayenne	AMHS	Brasil, Venezuela	IP o OSI sobre IP	2010	
	AIDC	Brasil, Venezuela	IP o OSI sobre IP	TBD/Por determinar	
Guyana,Georgetown	AMHS	Brasil, Trinidad Tobago, Suriname y Venezuela	IP o OSI sobre IP	2010	
	AIDC	Brasil, Trinidad Tobago, Suriname y Venezuela	IP o OSI sobre IP	TBD/Por determinar	
Panama, Ciudad de Panama	AMHS	NAM y Colombia	IP o OSI sobre IP	2008	

ATN GROUND-GROUND APPLICATIONS PLAN / PLAN DE APLICACIONES TIERRA-TIERRA					
Administration and Location/ Administración y localidad	**Application Type/ Tipo de Aplicación**	**Conneted with Administration & Location of/ Conectada con Administración y Localidad de.**	**Used Standard / Norma usada**	**Implementation Date/ Fecha de Implementación**	**Remarks/ Observaciones**
1	2	3	4	5	6
	AIDC	NAM y Colombia	IP o OSI sobre IP	TBD/Por determinar	
Paraguay,Asunción	AMHS	Argentina, Brasil	IP o OSI sobre IP	2007	
	AIDC	Argentina, Brasil	IP o OSI sobre IP	TBD/Por determinar	
Perú, Lima	AMHS	Argentina,Bolivia,Brasil,Chile Colombia,Ecuador,Venezuela y NAM	IP o OSI sobre IP	2008	
	AIDC	Argentina,Bolivia,Brasil,Chile Colombia,Ecuador,Venezuela y NAM	IP o OSI sobre IP	TBD/Por determinar	
Surinam, Paramaribo	AMHS	Brasil,French Guyana y Venezuela	IP o OSI sobre IP	2010	
	AIDC	Brasil,French Guyana y Venezuela	IP o OSI sobre IP	TBD/Por determinar	
Uruguay, Montevideo	AMHS	Argentina, Brasil	IP o OSI sobre IP	2010	
	AIDC	Argentina, Brasil	IP o OSI sobre IP	TBD/Por determinar	
Venezuela,Caracas	AMHS	Brasil, Colombia, Ecuador, Guyana, French Guyana, Perú, Suriname, NAM,CAR y EUR	IP o OSI sobre IP	2008	
	AIDC	Brasil, Colombia, Ecuador, Guyana, French Guyana, Perú, Suriname, NAM,CAR y EUR	IP o OSI sobre IP	TBD/Por determinar	

APPENDIX F

ACTION PLAN FOR IMPROVING GROUND-GROUND COMMUNICATION SYSTEMS

Activities	Start-up date	Completion date	Responsible party
Data collection			
ICAO letter to SAM project member States and International Organisations (IATA) for the designation of focal point and activities to be carried out.	May 2008		RO
			State
Delivery of collected data requested from States and International organisations		June 2008	States, Regional Office (RO)
Hiring of expert	July 2008		RO
Start-up of activities by expert	Aug 2008	Sep 2008-three weeks	
Processing and analysis of collected information			Expert and RO
Drafting of strategy for short- and medium-term improvements			Expert
Cost-benefit analysis			Expert and RO
Drafting of implementation guidelines for States			Expert
Revision of strategy and guidelines for improving ground-ground communications		Nov 2008	SAM IG/2
Training			States, RO
Seminar on improvements to ground-ground communication systems	Apr 2009	Apr 2009 (one week)	SAM IG/3
Implementation of ground-ground communication improvements		Dec 2012	States
AMHS		Dec 2010	States
AIDC		Dec 2012	States
VCSS systems		June 2011	States
Follow-up on the implementation of improvements to ground-air communication system	Mar 2009	Dec 2012	RO, States

APPENDIX/APENDICE G

Table CNS 4A - SURVEILLANCE SYSTEMS (Updated)
Tabla CNS 4A - SISTEMAS DE VIGILANCIA (Actualizada)

State(Territory)/Location Estado(Territorio)/Ubicación	ATS Unite Served Unidad ATS Servida	PSR			SSR				ADS		Remarks Observaciones
		Funtion Función	Coverage Cobertura (NM)	Status Impl. Estado	Funtion Función	Modes Modos (A,C& S)	Coverage Cobertura (NM)	Status Impl. Estado	Type Tipo	Status Impl. Estado	
1	3	4	5	6	7	8	9	10	11	12	13
ANGUILA (UK)								NP			
ANTIGUA & BARBUDA											
Airport (4 NM North)	V.C. Bird APP				T	A/C	180	I*			* MSSR
ARGENTINA											
Aeroparque Jorge Newbery	Ezeiza ACC Aeroparque APP	T	60	P	E	A/C	220	P*			* MSSR
Bahía Blanca, Airport	Ezeiza ACC Bahía Blanca APP	T	60	P	E	A/C	220	P*			* MSSR
Bolívar, Airport	Ezeiza ACC				E	A/C	220	P*			* MSSR
Colonia Catriel, Airport	Ezeiza ACC				E	A/C	220	P*			* MSSR
Córdoba, Airport	Córdoba ACC Ezeiza ACC Córdoba APP	T	60	I	E/T	A/C	180	I/P*			* MSSR
Ezeiza, Airport	Ezeiza ACC Buenos Aires APP	T	90	I	E	A/C	220	I*			* MSSR
Jujuy, Airport	Córdoba ACC				E	A/C	220	p*			* MSSR
La Rioja, Airport	Córdoba ACC				E	A/C	220	p*			* MSSR
Las Lomitas, Airport	Ezeiza ACC Córdoba ACC				E	A/C	220	p*			* MSSR
Mar de Plata, Airport	Ezeiza ACC Mar del Plata APP	T	60	I	E	A/C	220	I*			* MSSR
Mendoza, Airport	Mendoza ACC Mendoza APP	T	60	I	E	A/C	180	I*			* MSSR
Merlo (Buenos Aires)	Ezeiza ACC	T	220	P	E	A/C	220	P*			* MSSR
Paraná, Airport	Ezeiza ACC Córdoba ACC				E	A/C	220	I*			* MSSR
Posadas Airport	Ezeiza ACC				E	A/C	220	P*			* MSSR
Reconquista Airport	Ezeiza ACC Córdoba ACC				E	A/C	220	P*			* MSSR
Resistencia, Airport	Ezeiza ACC Córdoba APP Resistencia APP	T	60	P	E	A/C	220	P*			* MSSR
San Carlos de Bariloche, Airport	Ezeiza ACC Bariloche APP	T	60	P	E/T	A/C	220	P*			* MSSR
San Luis, Airport	Córdoba APP Ezeiza ACC				E	A/C	220	P*			* MSSR
Santa Rosa, Airport	Ezeiza ACC Ezeiza ACC				E	A/C	220	P*			* MSSR
Tartagal, Airport	Córdoba APP				E	A/C	220	P*			* MSSR
Tucumán, Airport	Córdoba APP Ezeiza ACC				E	A/C	220	P*			* MSSR

State(Territory)/Location Estado(Territorio)/Ubicación	ATS Unite Served Unidad ATS Servida	PSR			SSR				ADS		Remarks Observaciones
		Funtion Función	Coverage Cobertura (NM)	Status Impl. Estado	Funtion Función	Modes Modos (A,C& S)	Coverage Cobertura (NM)	Status Impl. Estado	Type Tipo	Status Impl. Estado	
1	3	4	5	6	7	8	9	10	11	12	13
ARUBA (Kingdom of the Netherlands)											
	Reina Beatrix APP	T	80	I	T	A/C	256	I*			*MSSR
BAHAMAS											
Nassau	Miami ACC Nassau APP	E/T		I	E/T	A/C		I			
BARBADOS											
Aiport	Adams APP				T	A/C	250	I*			*MSSR
BELIZE											
	Belize APP							NP			
BOLIVIA											
La Paz	La Paz ACC				E	A/C		I/P*			*It is recomended to widen widen coverage and replacem to MSSR/ Se
La Paz	La Paz APP	T		P*	T	A/C		I/P**			*Recommended/ Recomendado **Replacem ent recommended to MSSR / Recomendado reemplazo por MSSR
BRASIL											
Barra do Carcas	Brasilia ACC	E		I	E	A/C		I			
Belém	Belem ACC	E		I	E	A/C		I			
Belém	Belem APP	T		I	T	A/C		I			
Boa Vista	Manaus ACC	E		I	E	A/C		I			
Bom Jesus da Lapa	Recife ACC				E	A/C		P*			*MSSR <-2000
Brasilia (Gama)	Brasilia ACC	E		I	E	A/C		I			
Brasilia	Brasilia APP	T		I	T	A/C		I			
Cachimbo					E	A/C		P*			*MSSR
Campinas	Campinas APP	T		P	T	A/C		P*			*MSSR
Cangucu	Curitiba ACC	E		I	E	A/C		I			
Catanduvas	Curitiba ACC	E		I	E	A/C		I			
Chapada Dos Guimaraes	Brasilia ACC	E		I	E	A/C		I			
Confins	Belo Horizonte APP	T		I	T	A/C		I			
Conceicao do Araguia		E		P	E	A/C		P*			*MSSR
Cruzeiro do Sul		E		P	E	A/C		P*			*MSSR
Curitiba (Morro da Igreja)	Curitiba ACC	E		I	E	A/C		I			
Curitiba	Curitiba APP	T		I	T	A/C		I			
Dianopolis					E	A/C		P*			*MSSR
Eirunepe		E		P	E	A/C		P*			*MSSR
Fernando Noronha	Recife ACC				E	A/C		I			
Fortaleza	Recife ACC	E		I	E	A/C		I			
Fortaleza	Fotaleza APP	T		I	T	A/C		I			

State(Territory)/Location Estado(Territorio)/Ubicación	ATS Unite Served Unidad ATS Servida	PSR			SSR				ADS		Remarks Observaciones
		Funtion Función	Coverage Cobertura (NM)	Status Impl. Estado	Funtion Función	Modes Modos (A,C& S)	Coverage Cobertura (NM)	Status Impl. Estado	Type Tipo	Status Impl. Estado	
1	3	4	5	6	7	8	9	10	11	12	13
Foz do Iguazu	Foz do Iguacu APP	T		I	T	A/C		I			
Guajara - Mirim		E		P	E	A/C		P*			*MSSR
Guarulhos	Sao Paulo APP	T		I	T	A/C		I			
Imperatriz					E	A/C		P*			*MSSR
Jacarcacanga					E	A/C		P*			*MSSR
Jaraguari	Curitiba ACC	E		I	E	A/C		I			
Macapa		E		P	E	A/C		P*			*MSSR
Maceió	Recife ACC	E		I	E	A/C		I			
Manaus (E. Gomes)	Manaus ACC	E		I	E	A/C		I			
Manaus (E. Gomes)	Manaus APP	T		I	T	A/C		I			
Natal	Recife ACC	E		I	E	A/C		I			
Natal	Natal APP	T		I	T	A/C		I			
Petrolina	Recife ACC				E	A/C		P*			*MSSR <-1999
Pico do Couto	Brasilia ACC	E		I	E	A/C		I			
Porto Alegre	Porto Alegre APP	T		I	T	A/C		I			
Porto Espiridiao		E		P	E	A/C		P *			*MSSR
Porto Seguro	Recife ACC	E		P	E	A/C		P			*MSSR <-2000
Porto Velho		E		P	E	A/C		P *			*MSSR
Recife	Recife ACC	E		I	E	A/C		I			
Recife	Recife APP	T		I	T	A/C		I			
Río Branco		E		P	E	A/C		P *			*MSSR
Río de Janeiro (Galeao)	Río APP	T		I	T	A/C		I/P *			*MSSR
Salvador	Recife ACC	E		I	E	A/C		I			
Salvador	Salvador APP	T		I	T	A/C		I			
Sabtarém		E		P	E	A/C		P*			*MSSR
Santiago	Curitiba ACC	E		I	E	A/C		I			
Sao Felix do Aragunia					E	A/C		P*			*MSSR
S.Feliz do Xingu					E	A/C		P*			*MSSR
Sao Gabriel Cachoeira	Manaus ACC	E		I	E	A/C		I			
Sao Luis		E		P	E	A/C		P*			*MSSR
Sao Paulo	Sao Paulo APP	T		I	T	A/C		I			
Sao Roque	Brasilia ACC	E		I	E	A/C		I			
Sinop	Brasilia ACC	E		P	E	A/C		P*			*MSSR
Tabatinga	Manaus ACC	E		I	E	A/C		I			
Tanabi	Brasilia ACC	E		I	E	A/C		I			
Tefé		E		P	E	A/C		P			*MSSR
Tirios					E	A/C		P*			*MSSR
Tres Marias	Brasilia ACC	E		I	E	A/C		I			
Vilhena		E		P	E	A/C		P*			*MSSR
CHILE											
Antofagasta	Santiago ACC	T		I	E/T	A/C		I*			*MSSR
	Antofagasta APP										
Cerrillos	Santiago ACC				T	A/C		I*			*MSSR
Iquique	Santigo ACC	T		I	T	A/C		I			
	Iquique APP										
Los Angeles	Santiago APP				E	A/C		I*			*MSSR
Puerto Montt	Puerto Montt APP	T		I	T	A/C		I			
Punta Arena	Punta Arena ACC	E/T		I	E/T	A/C		I			

State(Territory)/Location Estado(Territorio)/Ubicación	ATS Unite Served Unidad ATS Servida	PSR			SSR				ADS		Remarks Observaciones
		Funtion Función	Coverage Cobertura (NM)	Status Impl. Estado	Funtion Función	Modes Modos (A,C& S)	Coverage Cobertura (NM)	Status Impl. Estado	Type Tipo	Status Impl. Estado	
1	3	4	5	6	7	8	9	10	11	12	13
	Punta Arena APP										
Santiago	Santiago ACC	T		I	T	A/C		I*			*MSSR
	Santiago APP										
Vallenar					E	A/C		I*			*MSSR
COLOMBIA											
Araraguara	Bogotá ACC				E/T	A/C	250	I*			*MSSR
	Villavicencio APP										
Bucaramanga	Barranquilla ACC				E/T	A/C	250	P			<2005
	Bogotá ACC										
	Bucaramanga APP										
	Cúcuta APP										
Cali	Bogotá ACC	T	80	P	T	A/C	250	I*			*MSSR
	Cali APP										
Carepa	Barranquilla ACC	E/T	80	I	E/T	A/C/S	250	I*			*MSSR, <2004
	Bogotá ACC										Used SAC-
	Rio Negro APP										ASTERIX Code
Carimagua	Bogotá ACC	E/T	200	I	E/T	A/C	200	I			
	Villavicencio APP										
Cerro Maco	Barranquilla ACC	E/T	165	I	E/T	A/C	250	I*			*MSSR
	Bogotá ACC										
	Barranquilla APP										
	Cartagena TWR										
	Rio Negro APP										
Cerro Verde	Barranquilla ACC	E/T	60	I	E	A/C	200	I*			*MSSR
	Bogotá ACC										
	Barranquilla APP										
	Cali APP										
	Pereira APP										
	Rio Negro APP										
El Dorado	Bogotá ACC	E/T	60	I	E/T	A/C	200	I*			*MSSR
	Bogotá APP										
	Villacencio APP										
Espinal	Bogotá ACC				E/T	A/C	250	P			<2005
	Bogotá APP										
Leticia	Bogotá ACC	E/T	200	I	E/T	A/C	250	I			*MSSR
	Leticia APP										<2004
	Villavicencio APP										
Leticia (MIL)	Villavicencio APP	T	240	P	T	A/C	240	P			
Marandúa	Bogotá ACC	E/T	240	I	E/T	A/C	240	I			
	Villavicencio APP										
Pereira	Bogotá ACC				E/T	A/C	250	P			<2005
	Bogotá APP										
	Cali APP										
	Pereira APP										
	Rio Negro APP										
Ríohacha	Barranquilla ACC	E	240	I	E	A/C	240	I			
S. J. Guaviare	Bogotá ACC	E/T	240	I	E/T	A/C	240	I			

State(Territory)/Location Estado(Territorio)/Ubicación	ATS Unite Served Unidad ATS Servida	PSR			SSR				ADS		Remarks Observaciones
		Funtion Función	Coverage Cobertura (NM)	Status Impl. Estado	Funtion Función	Modes Modos (A,C& S)	Coverage Cobertura (NM)	Status Impl. Estado	Type Tipo	Status Impl. Estado	
1	3	4	5	6	7	8	9	10	11	12	13
	Villavicencio APP										
San Andrés (MIL)	Barranquilla ACC	E/T	240	I	E/T	A/C	240	I			
	San Andrés APP										
San Andrés	Barranquilla ACC				E/T	A/C	250	I*			*MSSR, <2007
	San Andrés APP										
Santa Ana	Bogotá ACC	E/T	165	I	E/T	A/C	250	I*			*MSSR
	Cali ACC/APP										
	Pereira APP										
Tablazo	Bogotá ACC	E/T	80	P	E/T	A/C	250	I/P*			*MSSR, <2004
	Bogotá APP										
	Cali APP										
	Pereira APP										
	Rio Negro APP										
	Villavicencio APP										
Tubará (Barranquilla)	Barranquilla ACC	E/T	80	I	E/T	A/C	250	I*			*MSSR
	Barranquilla APP										
	San Andrés APP										
Villavicencio	Villavicencio APP	T	80	I	E	A/C	150	I			
COSTA RICA											
El Coco	El Coco APP	E/T		I	E/T	A/C	245	I*			*MSSR
CUBA											
Camagüey	Habana ACC				E/T	A/C	200	I/P*			*MSSR
	Camagüey APP										
Habana	Habana TMA	T		P	T	A/C	200	I/P*			*MSSR
	Habana APP										
Holguín	Habana ACC				E/T	A/C	200	I/P*			*MSSR
	Santiago de Cuba TMA										
	Holguín APP										
Menocal	Habana ACC				E/T	A/C	200	I*			*MSSR
	Habana TMA										
	Habana APP										
	Varadero APP										
San Julián	Habana ACC				E	A/C	200	I/P*			*MSSR
Sta. Clara	Habana ACC				E	A/C	200	I/P*			*MSSR
DOMINICA				NP				NP			
DOMINICAN REPUBLIC											
Barahona	Barahona APP	T	70	I							
Puerto Plata	Puerto Plata APP	T	70	I							
Punta Cana	Santo Domingo ACC	T	70	P	E/T	A/C	250	P*			*MSSR
	Punta Cana APP										
Santo Domingo	Santo Domingo ACC	E/T	70	I	E/T	A/C	250	I*			*MSSR
	Santo Domingo APP										

State(Territory)/Location Estado(Territorio)/Ubicación	ATS Unite Served Unidad ATS Servida	PSR			SSR				ADS		Remarks Observaciones
		Funtion Función	Coverage Cobertura (NM)	Status Impl. Estado	Funtion Función	Modes Modos (A,C& S)	Coverage Cobertura (NM)	Status Impl. Estado	Type Tipo	Status Impl. Estado	
1	3	4	5	6	7	8	9	10	11	12	13
ECUADOR											
Guayaquil	Guayaquil ACC	E/T			E	A/C	200	I*			
	Guayaquil APP										
Quito APP	Quito APP	T		I	T	A/C		I/P*			* 2000
EL SALVADOR											
El Salvador	El Salvador APP	T		I	T	A/C	200	I*			*MSSR
FRENCH ANTILLES											
Fort-de-France	Fort-de-France APP				T	A/C	250	I*			*MSSR
Point-à-Pitre	Point-à-Pitre APP				T	A/C	250	I*			*MSSR
GRENADA											
	Point Salines APP							N/P			
GUATEMALA											
C. Guatemala	La Aurora APP	T		I	T	A/C	250	I*			*MSSR
GUYANA											
	Georgetown ACC							N/P			
HAITI											
	Port-au-Prince ACC				E/T	A/C		P*			*MSSR
	Port-au-Prince APP				T	A/C		P*			*MSSR
HONDURAS											
San Pedro Sula	La Mesa APP	T		I	T	A/C	250	I*			*MSSR
JAMAICA											
Kingston	Kingston APP	T	60	I	E/T	A/C	250	I*			*MSSR
Montego Bay	Montego Bay APP	T	60	I	T	A/C	250	I*			*MSSR
Mount Denham	Kingston ACC	E	120	I	E	A/C	250	I*			*MSSR
MEXICO											
Acapulco	Acapulco APP	T		I	T	A/C	240	I*			*MSSR
Bajio Gto	México ACC				E/T	A/C, S	240	I*			*MSSR
	Bajio APP										
Cancún	Mérida ACC	E/T	60	I	E/T	A/C	240	I*			*MSSR
	Cancún APP										
Cerro Potosi	Monterrey ACC				E	A/C	240	I*			*MSSR
	México ACC										
Cerro Rusias	Mazatlán ACC				E	A/C	240	I*			*MSSR
	México ACC										
	Monterrey ACC										
Cerro Los Gallos	Mazatlán ACC				E	A/C	240	I*			*MSSR
	México ACC										
	Monterrey ACC										
Cerro Santa Eulalia	Monterrey ACC				E/T	A/C	240	I*			*MSSR
	Chihuaha APP										
Guadalajara	Guadalajara APP	T	80	I	T	A/C	240	I*			*MSSR

State(Territory)/Location Estado(Territorio)/Ubicación	ATS Unite Served Unidad ATS Servida	PSR			SSR				ADS		Remarks Observaciones
		Funtion Función	Coverage Cobertura (NM)	Status Impl. Estado	Funtion Función	Modes Modos (A,C& S)	Coverage Cobertura (NM)	Status Impl. Estado	Type Tipo	Status Impl. Estado	
1	3	4	5	6	7	8	9	10	11	12	13
Hermosillo	Mazatlán ACC				E/T	A/C	240	I*			*MSSR
	Hermosillo APP										
	Tijuana APP										
Los Mochis	Mazatlán ACC				E	A/C	240	I*			*MSSR
Mazatlán	Mazatlán ACC				E	A/C	240	I*			*MSSR
Mérida	Mérida ACC	E/T		I	E/T	A/C	240	I*			*MSSR
	Mérida APP										
Cerro Sordo	México ACC				E	A/C	240	I*			*MSSR
	Monterrey ACC										
Monterrey	Monterrey ACC	E/T	80	I	E/T	A/C	240	I*			*MSSR
	Monterrey APP										
Peñón	México APP				E	A/C	240	I*			*MSSR
Puerto Peñasco	Mazatlán ACC				E	A/C	240	I*			*MSSR
Puerto Vallarta	Puerto Vallarta APP				T	A/C	240	I*			*MSSR
San José del Cabo	Mazatlán ACC				E	A/C, S	240	I*			*MSSR
Tampico	México ACC				E	A/C, S	240	I*			*MSSR
	Mérida ACC										
	Monterrey ACC										
Tijuana	Tijuana APP				T	A/C	240	I*			*MSSR
Toluca	México ACC	E/T	80	I	E/T	A/C	240	I*			*MSSR
	Toluca APP										
Veracruz	México ACC				E	A/C	240	I*			*MSSR
	Mérida ACC										
Villahermosa	México ACC				E	A/C, S	240	I*			*MSSR
	Mérida ACC										
MONSERRAT (United Kingdowm)								N/P			
NETHERLANDS ANTILLES (Netherlands)											
Willemstad	Curaçao ACC	E/T	120	I	E/T	A/C	256	I*			*MSSR
	Curaçao APP										
Saint Maarten	Juliana APP	T	60	I	T	A/C	256	I*			*MSSR
NICARAGUA											
Managua	Managua APP	T		P	T	A/C	250	P*			*MSSR
Bluefields	Bluefields TWR				T	A/C	250	N/I			
PANAMA											
Panamá	Panamá ACC				E/T	A/C		I*			*MSSR
	Panamá APP										
PARAGUAY											
Asunción	Asunción ACC	T	60	I	E/T	A/C		I			Sistema PSR y SSR necesita remplazo
Ciudad del Este	Ciudad del Este APP	T	60	I	E/T	A/C		I			
PERU											
Arequipa	Arequipa APP	T		P				R			

State(Territory)/Location Estado(Territorio)/Ubicación	ATS Unite Served Unidad ATS Servida	PSR			SSR				ADS		Remarks Observaciones
		Funtion Función	Coverage Cobertura (NM)	Status Impl. Estado	Funtion Función	Modes Modos (A,C& S)	Coverage Cobertura (NM)	Status Impl. Estado	Type Tipo	Status Impl. Estado	
1	3	4	5	6	7	8	9	10	11	12	13
Cusco	Cusco APP	T		P				R			
Iquitos	Iquitos APP	T		P				R			
Lima	Lima ACC				E	A/C		I*			*MSSR, Se
	Lima APP	T		I	E	A/C		I*			recomienda ampliar la cobertura de la FIR
PUERTO RICO (United States)											
Pico del Este	San Juan ACC	E/T		I	E	A/C		I			
San Juan	San Juan APP				T	A/C		I			
SAINT KITTS AND NEVIS								NP			
SAINT LUCIA	Santa Lucia APP							NP*			* Radar data sharing with Martinica planned/ Proyecta compartir datos radar con Martinica.
SAINT VINVENT & THE GRENADINES	E.T.Joshua APP							NP			
SURINAME								NP			
TRINIDAD & TOBAGO											
Piarco (15 NM north)	Piarco ACC Piarco APP	E/T		I	E/T	A/C	230	I*			*MSSR
TURKS & CAICOS IS. (United Kingdom)											
Grand Turks	Miami ACC				E	A/C		I			
URUGUAY											
Carrasco	Montevideo ACC	E/T	80	I	E/T	A/C	180	I*			MSSR
	Carrasco APP										MSSR
Durazno	Montevideo ACC Carrasco APP				E/T	A/C	256	P			
VENEZUELA											
Barquisimeto	Baruisimeto APP	T	60	I	T	A/C	200	I			
Isla Margarita	Margarita APP	T	60	I	T	A/C	200	I			
Maiquetía	Maiquetía ACC	E/T	60	I	E/T	A/C	200	I			
	Maiquetía APP										
Maracaibo	Maracaibo APP	T	60	I	T	A/C	200	I*			*MSSR

State(Territory)/Location Estado(Territorio)/Ubicación	ATS Unite Served Unidad ATS Servida	PSR			SSR				ADS		Remarks Observaciones
		Funtion Función	Coverage Cobertura (NM)	Status Impl. Estado	Funtion Función	Modes Modos (A,C& S)	Coverage Cobertura (NM)	Status Impl. Estado	Type Tipo	Status Impl. Estado	
1	3	4	5	6	7	8	9	10	11	12	13
VIRGIN IS. (United Kingdom)								NP			
VIRGIN IS. (United States											
Saint Thomas	San Juan ACC San Juan APP	E/T		I	E/T	A/C		I			
COCESNA											
Cerro Santiago, Guatemala	CENAMER ACC				E	A/C	245	I*			*MSSR
Mata de Caña, Costa Rica	CENAMER ACC				E	A/C	245	I*			*MSSR
Puero Cabezas, Nicaragua	CENAMER ACC				E	A/C	245	I*			*MSSR
Roatán, Honduras	CENAMER ACC				E	A/C	245	I*			*MSSR
Tegucigalpa, Honduras	CENAMER ACC				E	A/C	245	I*			*MSSR

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The Surveillance Strategy for CAR/SAM Region

First Edition

Rev 1.0

INTERNATIONAL CIVIL AVIATION ORGANIZATION

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Table of Contents

1. Introduction 3

1.1 Aim of the surveillance strategy 3

1.2 Scope of the Surveillance Strategy 3

1.3 Structure of the Document 4

1.4 Intended Readers 4

1.5 Relationship with other documents 5

1.6 Acknowledgments 5

2. Surveillance Operational Scenario Evolution 6

2.1 En-Route and TMA Airspace 6

2.2 Aerodrome Operations 7

2.3 Aircraft Systems 7

2.4 Operational Drivers Timeframe 8

3. Surveillance Infrastructure Evolution 9

3.1 En-Route and TMA Airspace 9

3.2 Aerodrome Operations 10

3.3 Aircraft Systems 10

3.4 Surveillance Infrastructure Timeframe 11

4. Surveillance Related Issues 13

4.1 Required Regional Studies and Trials 13

4.2 Studies and Trials Timeframe 14

5. Annex A – Acronyms 15

6. Annex B – Definitions 16

7. Annex C – Surveillance Techniques 20

DRAFT

The Surveillance Strategy for CAR/SAM Region

1. Introduction

1.1 Aim of the surveillance strategy

The main objective of this strategy is to propose the surveillance systems that are suitable to be applied in short and medium terms within CAR/SAM Region and to define an evolutionary path that will promote safety, interoperability and cost effectiveness of the required infrastructure to meet the future ATM needs.

The surveillance strategy should be seen as a guidance document to all stakeholders, without any regulatory or mandatory requirements. Appropriate regulations should be published by Air Navigation Authorities when the use of new surveillance techniques is to be introduced in the States.

The envisaged goal of this strategy is a regional surveillance infrastructure that enables the interoperability of aircraft equipage throughout CAR/SAM Region in cost effective way.

1.2 Scope of the Surveillance Strategy

Implementation of surveillance systems should be based on a harmonized strategy for the CAR/SAM Regions that would take into account the operational requirements and relevant cost-benefit analyses. It should also be based on Action Plans to ensure that CAR/SAM States, Territories and International Organizations implement the necessary systems in accordance with consistent timescales.

Within the context of the GREPECAS/14, that was held in Costa Rica, in April 2007, the meeting took note of the new surveillance technologies that are arising and analyzed the Global Air Navigation Plan for CNS/ATM Systems (Doc. 9750) initiatives related to data link based surveillance and ADS-C and ADS-B implementation.

Even though the Surveillance Regional Plan was updated during the referred meeting, it was recognized that further analysis on that matter should take place by CNS Committee. The CNS Surveillance Task Force (CNS/SUR/TF) was then created and tasked, among other activities, to define an Air Surveillance Strategy for CAR/SAM Regions.

The surveillance technologies considered in this strategy to meet present and future ATM expectations are listed bellow and briefly explained in Attachment A:

- Primary Radar (PSR, SMR/ASDE);
- Secondary Surveillance Radar (SSR);
- Automatic Dependent Surveillance-Broadcast (ADS-B);
- Automatic Dependent Surveillance-Contract (ADS-C);
- Traffic Information Service – Broadcast (TIS-B); and
- Multilateration.

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In order to provide a global view of the surveillance strategy, the operational drivers, the required surveillance infrastructure and the regional studies and trials proposed in this document have been displayed in each chapter in a chronological presentation.

The dates illustrated in this document define when surveillance systems are expected to become regionally operational. Nevertheless, some of the surveillance systems described in this strategy will be used to solve local issues prior to the timescales in this document, and thereby will migrate from pioneer areas into bigger regional areas.

In other words, new surveillance technologies implemenataion policy for CAR/SAM Region should be first based on a voluntary implemenation in pocket areas, using certified existing equipage which is to be followed by an implementation in wider areas supported by the Implementing Rule related to the upgraded equipage.

1.3 Structure of the Document

This document is structured as follows:

- Section 1 (this section) presents the aim of the document, explains its scope and structure and describes the intended readers and relationship with other documents.
- Section 2 describes the Surveillance Operational Scenario Evolution, i.e. the envisaged operational drivers for the period between 2007 and 2020 in the Air Surveillance field, for En-Route and TMA Airspace, Aerodrome Operations and Aircraft Systems.
- Section 3 specifies the Surveillance Infrastructure Evolution required to cope with the foreseen environment for En-Route and TMA Airspaces, Aerodrome operations and Aircraft systems, during the above mentioned period.
- Section 4 specifies the regional studies and trials that are needed to be accomplished in a timely manner in order to gather sufficient knowledge about the operational use of the new surveillance technologies.
- Annex A provides the meaning of the Acronyms used in this document.
- Annex B provides the definitions of the different terms used in this document.
- Annex C describes the principles of known surveillance techniques.

1.4 Intended Readers

This strategy was developed to the following stakeholders group within CAR/SAM Region:

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- The departments of the National Supervisory Authorities of ECAC countries who are responsible for verifying ATM Surveillance Systems;
- The departments of the civil and military ANSP of CAR/SAM states who are responsible for procuring/designing, accepting, and maintaining ATM Surveillance Systems;
- The Airport Operators, who are responsible for procuring/designing, accepting, and maintaining Surveillance Systems at airports level; and
- The Airspace Users, who are the final client of the ATM Surveillance Systems chain.

1.5 Relationship with other documents

This surveillance strategy is derived from the Global Air Navigation Plan for CNS/ATM Systems (Doc. 9750), since technology is not an end in itself and should be based on clearly established operational requirements for ATM evolution.

Therefore, CAR/SAM States, Territories and International Organizations should, when implementing surveillance systems, the operational requirements of the mentioned Plan, specially the ones related to GPIs 09 and 17 (Situational Awareness and Implementation of data link applications).

In other words, surveillance strategy should be seen as a link between the Global Air Navigation Plan for CNS/ATM Systems (Doc. 9750) and the stakeholders' strategy for the air surveillance applications.

1.6 Acknowledgments

This surveillance strategy has been developed by the CNS Surveillance Task Force, according to its Reference Terms and Working Program.

This document should be reviewed and updated every two years.

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2. Surveillance Operational Scenario Evolution

2.1 En-Route and TMA Airspace

The surveillance operational scenario evolution for En-Route and TMA airspace is based on three fundamental principals for ground users in such airspace. These principals are dominant throughout the complete surveillance strategy and are:

- An independent surveillance system to track non-cooperative targets in TMA and En Route airspace where and when required;
- An independent surveillance system to track cooperative targets in TMA and en-route airspace; and
- Dependant cooperative surveillance.

For En-Route and TMA Airspace, security and safety will remain key requirements throughout the strategy period. Therefore, the need to provide detection of aircrafts that are not equipped with SSR transponders or ADS-B, as well as the ones experiencing an avionics failure, is permanent for TMA Airspace. Detection of non cooperative targets for En-Route Airspace will also remain for specific areas, according to homeland security requirements.

Before 2010, independent surveillance systems will be predominant in CAR/SAM Regions. Until then, target position will only be determined by the ground sensors (eg. PSR, SSR and mode S radars).

From 2010 onwards, the provision of ADDs to ground stations to support TMA and En Route operations is envisaged, following the increasing rate of SSR Mode S equipped aircraft (new and overhauled) that will be able to transmit ADS-B messages (ADS-B out).

The first set of new applications that are envisaged to be supported in CAR/SAM Region are the ground Surveillance (ADS-B out) in a non-radar environment (ADS-B-NRA), in a radar environment (ADS-B-RAD) and Airborne Derived Data (ADS-B-ADD). ADS-B-out is expected to reach initial operational capability status in 2010.

Another set of possible new applications is related to Airborne Surveillance (ADS-B-in, possibly supplemented by TIS-B) including: Airborne situational awareness (ATSA-AIRB), visual separation on approach (ATSA-VSA) and In-trail Procedure in oceanic airspace (ATSA-ITP). ADS-B-in for air traffic situational awareness is expected to be launched after 2015.

It is expected that an integration of airport and airspace surveillance will become more widespread from 2015 onwards. This requires an increased integration of surveillance information at the SDPD level, which will require updating to process and deliver the new information to surveillance users as the new systems become operational.

Until 2018, the ground service provider will remain responsible for the separation service and for maintaining separation. However, from 2018 onwards, there will be a number of ATM concepts which will drive the evolution of the surveillance environment, these are:

- Enhanced medium term planning with the tasks of the controllers operating in En-Route and TMA sectors becoming increasingly supported by more automation. The controller will make use of more ADD to provide a more accurate view of the situation and improvements in safety nets;

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- Surveillance derived information will be made available to support Airborne Traffic Situational Awareness;
- Flight data processing systems will be upgraded to provide full 4D trajectory prediction aligned with the capabilities of 4D FMS;
- The limited delegation of separation tasks to aircrews in low and medium density airspace. This will require additional avionics infrastructure and additional tools for the controller and aircrew; and
- Introduction of preferred routing will require flight information to be displayed in real time to the controller.

2.2 Aerodrome Operations

At selected airports, the aerodrome operations will be based on:

- The implementation of A-SMGCS level I (which may include ADS-B Package I, ADS-B-APT application) and A-SMGCS level II will be enabled by systems such as SMR and Multilateration, from 2007 onwards;
- From 2010, the use of ADDs to support aerodrome operations is envisaged; and
- Where airport operators foresee a benefit of A-SMGCS level III (which may include the ADS-B Package I, ATSA SURF application) and A-SMGCS IV from 2015 onwards. This may require an ADS-B and TIS-B infrastructure and an equipage of selected, appropriate airport vehicles with transponders.

2.3 Aircraft Systems

From an airborne perspective, the surveillance strategy is based on four steps, these are:

- Continuing the use of SSR or SSR Mode S systems for ground based surveillance radar or Multilateration systems. This means that no additional equipment is foreseen on the aircraft until 2010;
- The implementation of new ground Surveillance Applications (ADS-B out) from 2010 onwards which will require integration between the aircraft navigation system and mode S transponders, in order to transmit intent information to other aircraft and ground users. This is enabled by ADS-B using 1090 MHz Extended Squitter or other data-links;
- The implementation of ADS-B Package I ASAS situational awareness applications from 2015 onwards which will require an airborne SDPS and display system; and
- The implementation of ADS-B Package II ASAS separation applications from 2018 onwards. The enabling techniques are the same as ADS-B Package I, however there may be higher integrity requirements on the information presented to the aircrew which may result in an upgrade of the avionics.

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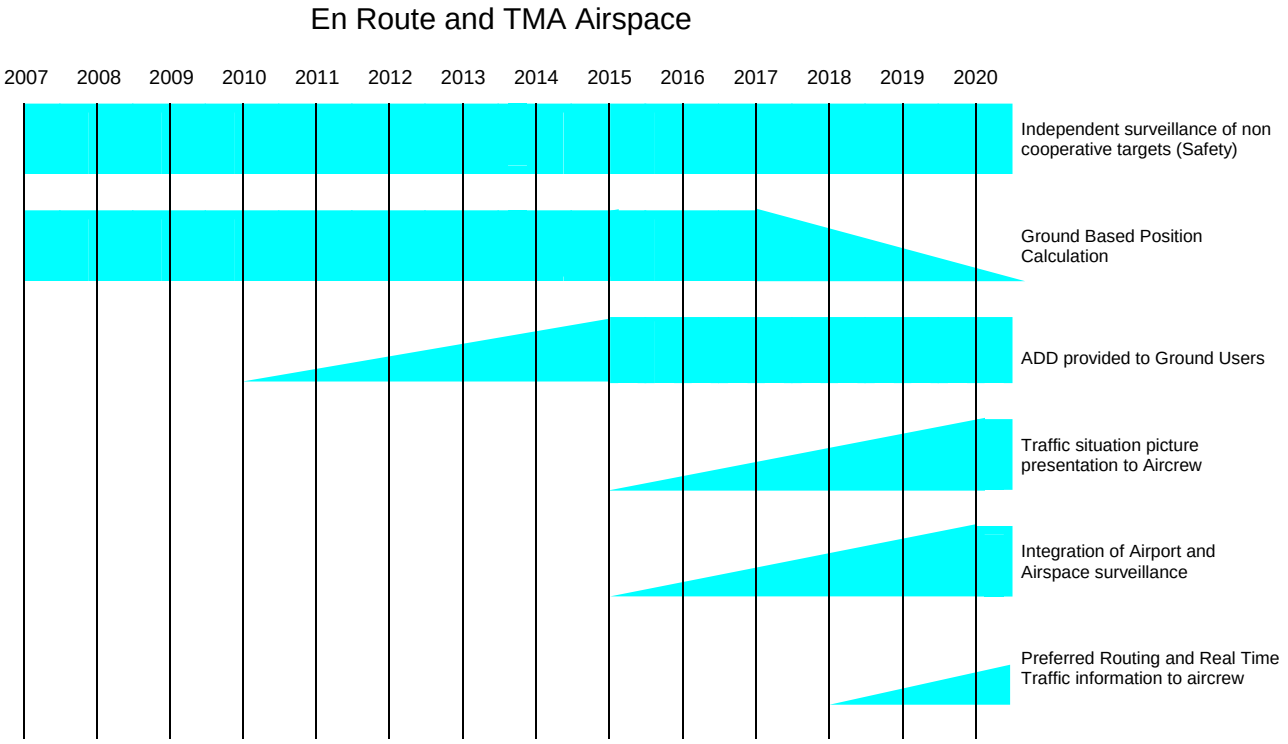
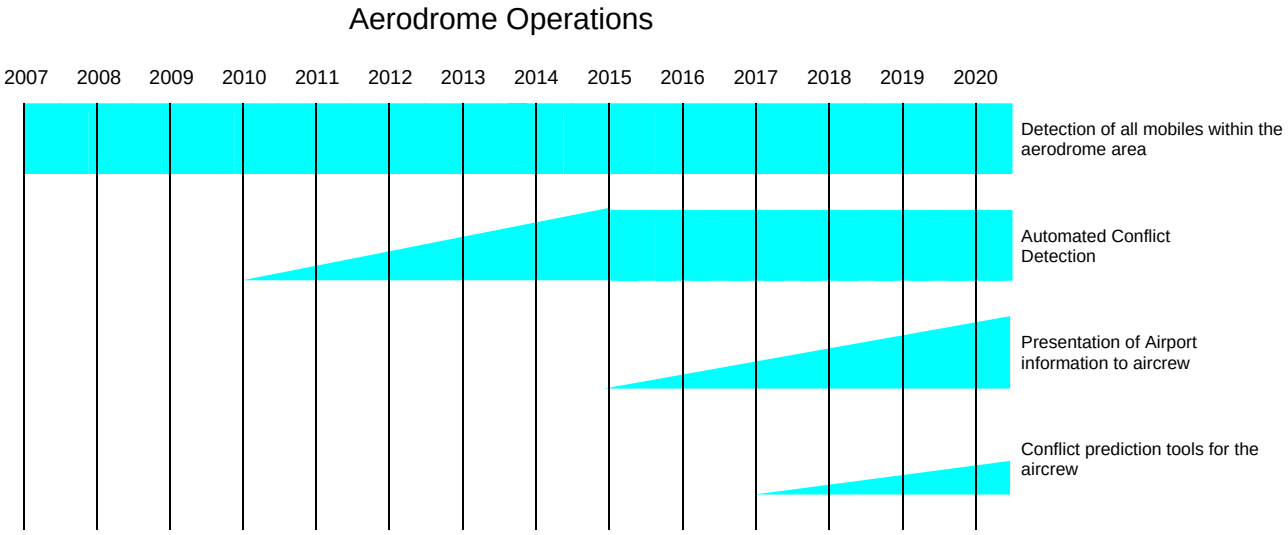
2.4 Operational Drivers Timeframe





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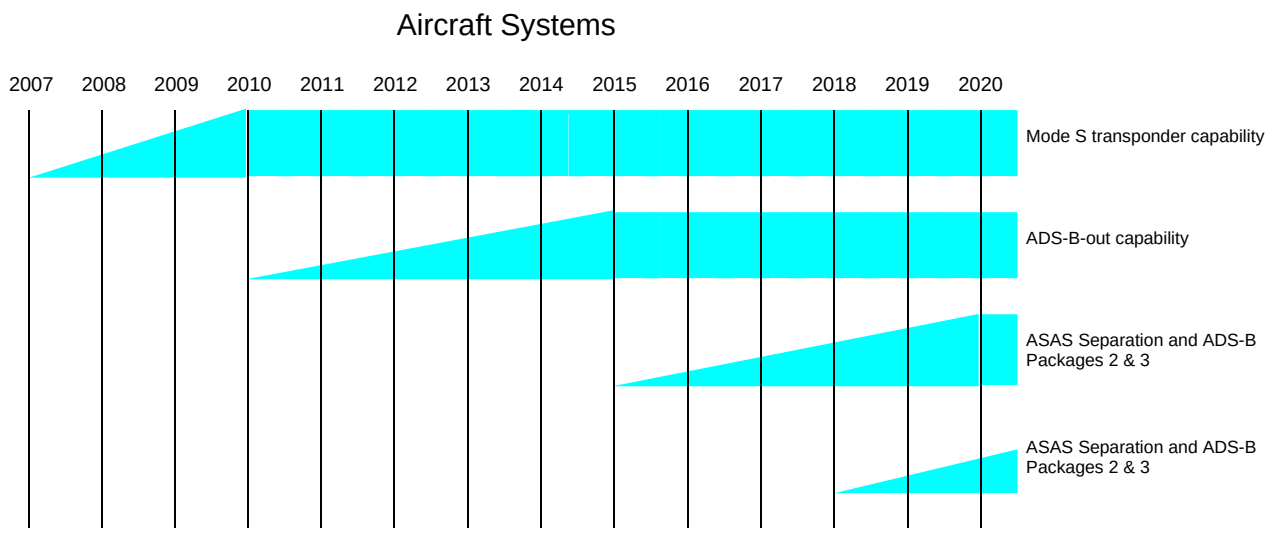

3. Surveillance Infrastructure Evolution

3.1 En-Route and TMA Airspace

Independent Surveillance, in the form of Primary Surveillance Radar will be widely used in CAR/SAM regions within Air Traffic Management for Approach and Terminal Maneuvering Area (TMA) surveillance throughout the whole strategy period. In some areas, Primary Surveillance Radar will still be used in En-Route surveillance, based on local requirements, especially for homeland security.

From 2007 to 2010, co-operative surveillance, in the form of SSR and SSR Mode S, will still be the main means of surveillance and will be extensively used for air traffic surveillance by civil agencies for TMA and En-Route services within coverage of (ground based) interrogator station(s);

SSR Mode S elementary surveillance will be implemented from 2010 onwards in high density TMAs in order to improve secondary radar performances. Since there will still exist legacy aircrafts that won't be able to reply on mode S, a mixed mode interrogation will be required up to 2015.

Ground implementation for ADS-B (based on ES Mode S receivers) will increase from 2010 onwards to fill en route and terminal areas not covered with radar and to strengthen surveillance in areas covered with SSR Modes A/C and S.

Depending on the percentage of ADS-B equipped aircrafts, wide area multilateration (WAM) implementation should be considered as a possible transition path to ADS-B environment in a shorter timeframe.

From 2010 onwards ADS-C surveillance will be operationally used in all oceanic and remote airspace associated with FANS capacities.

Surveillance Data Processing and Distribution systems based on radar server technology will have to be progressively upgraded, from 2010 on, in order to merge legacy radar data and information contained in the ADD and/or from Multilateration position calculations and promote data sharing between States using TCP/IP patterns.

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From 2012 on there will be an increasing implementation of “Mode S only” radars in high-traffic-density approach, en route, and terminal areas, and monopulse SSR, adaptable to Mode S, in medium-traffic en route and terminal areas.

It is predicted that by 2015 the majority of the SSR and SSR Mode S systems currently installed are at the end of their operational life. Therefore, SSR Mode A/C radars that have completed their life cycle by that time won’t be replaced anymore. ADS-B or multilateration systems will fully replace those decommissioned SSRs.

3.2 Aerodrome Operations

From 2007 up to 2010, the main technology for calculating the position of mobiles (both aircraft and vehicles) will be Surface Movement (primary) Radar and Multilateration, using Mode S SSR transponder replies and Mode S Squitter messages.

From 2010 onwards, A-SMGCS Level I/II will provide the benefits at the aerodrome and additional information may be required by the ground systems. The most effective means of achieving this would be via ADS-B, since aircraft will already be equipped and there will be a cost-effective upgrade path for the Multilateration ground stations, although there may be an impact on the avionics.

Although many Multilateration systems are configured with their own data fusion trackers as standard, a possible upgrade to existing SDPDs to support Aerodrome operations will be required from 2010 onwards.

The introduction of A-SMGCS Levels III/IV at selected aerodromes will require aircrew to be presented, from 2015 onwards, with an airport map and other mobiles for situational awareness and possible conflict prediction tools in the aircraft. Where airports foresee a benefit from these kinds of applications then a TIS-B service may be required to ensure a complete and consistent airport situation picture.

3.3 Aircraft Systems

In accordance with ICAO requirements, all aircraft flying within CAR/SAM controlled airspace are required to be equipped with a pressure altitude reporting device. It is not foreseen that there will be significant changes for aircraft systems prior to 2010 on that matter.

Until 2010 the implementation of ACAS II systems throughout commercial and general aviation will be completed, using Mode S transponder for elementary surveillance (ELS). From 2010 onwards, those transponders will have to be integrated to GNSS airborne systems so that they will operate in ADS-B environments (ADS-B out).

If aircraft are operating in airspace where the ADS-B Package I ground based surveillance applications are in use, then the avionics configuration will require changes to deliver the additional aircraft derived data required. Therefore, until 2015 Mode S transponders will have to be updated (enhanced surveillance – EHS).

From 2015 onwards, the move from ASAS spacing to ASAS separation and preferred routing may require a high integrity traffic situation picture, therefore the use of TIS-B will be required as well as the implementation of an airborne Surveillance Data Processing System (SDPS) to integrate ADS-B in and TIS-B for presentation of the air situation picture on a graphical display.

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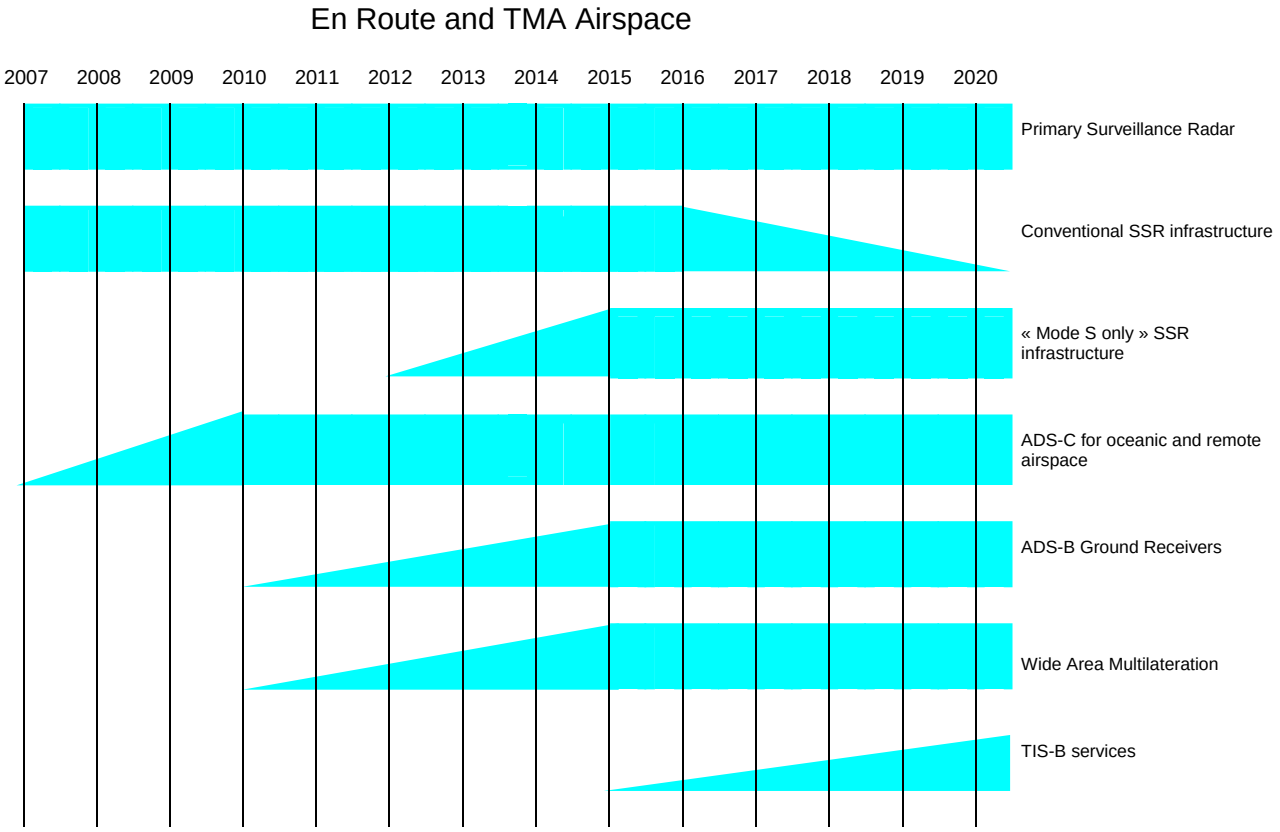
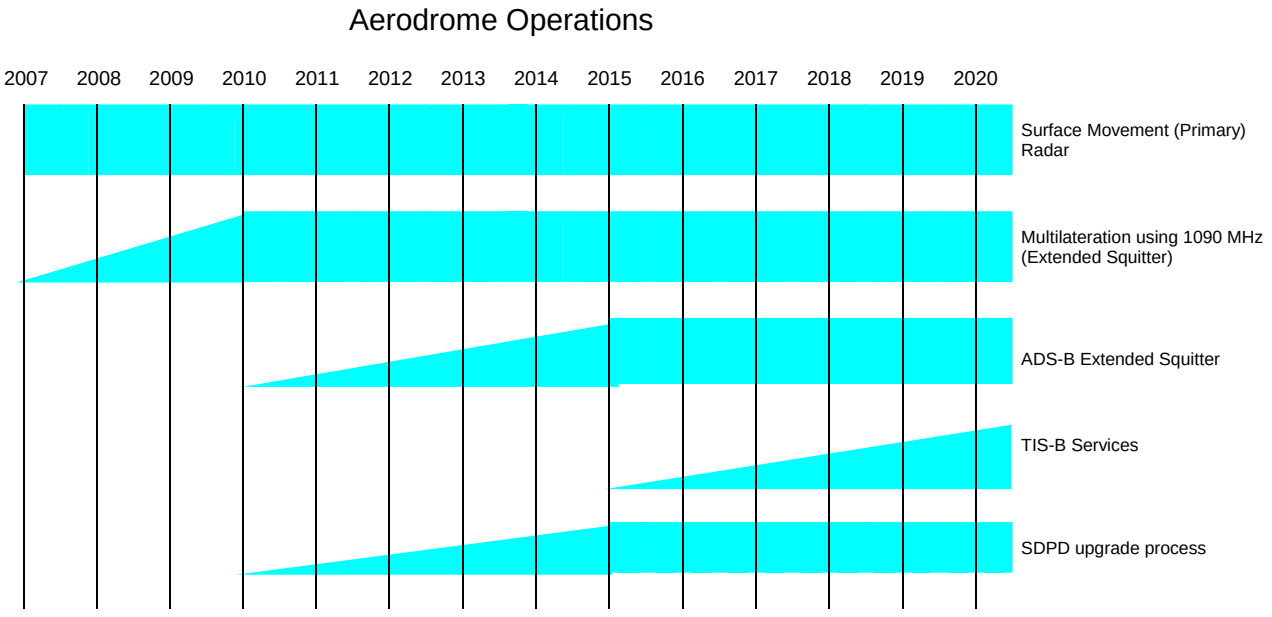
3.4 Surveillance Infrastructure Timeframe





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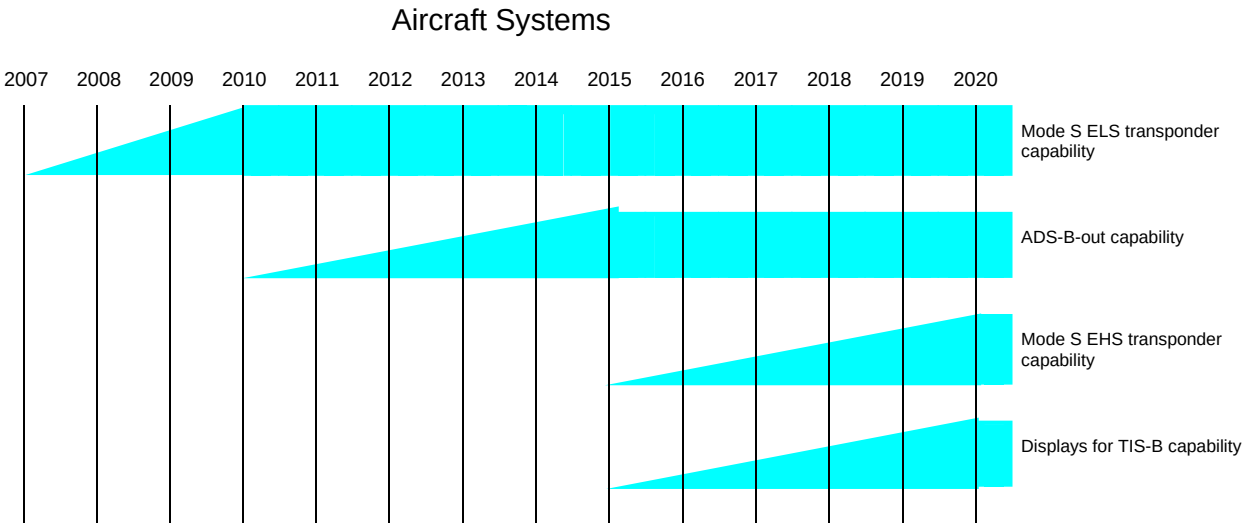
Aircraft Systems
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
Mode S ELS transponder capability
ADS-B-out capability
Mode S EHS transponder capability
Displays for TIS-B capability

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4. Surveillance Related Issues

4.1 Required Regional Studies and Trials

From 2007 onwards, there will be a continuous need to perform periodic assignment and monitoring of mode S 24-bits address by all Civil Aviation Authorities in CAR/SAM Region.

By the end of 2008 regional trials will have to be conducted in order to support the operational introduction of new techniques such as ADS-B and WAM. Such assessments would include Cost Benefit Analysis, safety assessments and detailing operational requirements.

In order to validate the timeframe forecasted by this surveillance strategy and assess the proportions of equipped aircrafts, until 2009, each State/Territory/International Organization should evaluate the:

- useful life of their radars and the potentiality for their replacement with ADS-B;
- locations of potential ADS-C or ADS-B ground station sites;
- capabilities of existing and planned ATC automation systems to support ADS-C or ADS-B applications;
- maximum density traffic nowadays and expected for the year 2020;
- number of equipped aircrafts operating in the concern airspace;
- number, name and type of equipped aircraft of the airlines that have equipped aircrafts for mode S, ADS-C and ADS-B;
- rate of faulty Mode S airborne equipment and its behavior; and
- categorization of the accuracy/integrity data available in the aircrafts.

The ADS-B deployment should be associated at early stages in coordination with the States/Territory/International Organizations responsible for the control of adjacent areas, and the correspondent ICAO Regional Office. Therefore, until 2009 a plan for data sharing should be established, aiming at a coordinated, harmonious and interoperable implementation of ADS-B.

It is also required to ensure that the regional surveillance standards and surveillance functional architecture are consistent with the Required Surveillance Performance (RSP), after the approval of RSP provisions (expected to be delivered by 2009).

As the increased dependence on ADS-B (1090 MHz Extended Squitter) is expected to grow, there is concern that the band will become saturated as more information is loaded onto the restricted band. Therefore it is required to study before 2010 whether the use of 1090MHz continues to support the surveillance requirements.

Until 2012, the capabilities of current Multi Sensor Trackers are to be assessed in light of the more stringent requirements need to support and process increasing amount of ADD.

It is required to identify, before 2015, the impact of the new procedures that are predicted to require ‘intent’ information from the aircraft. The precise definition of intent requires

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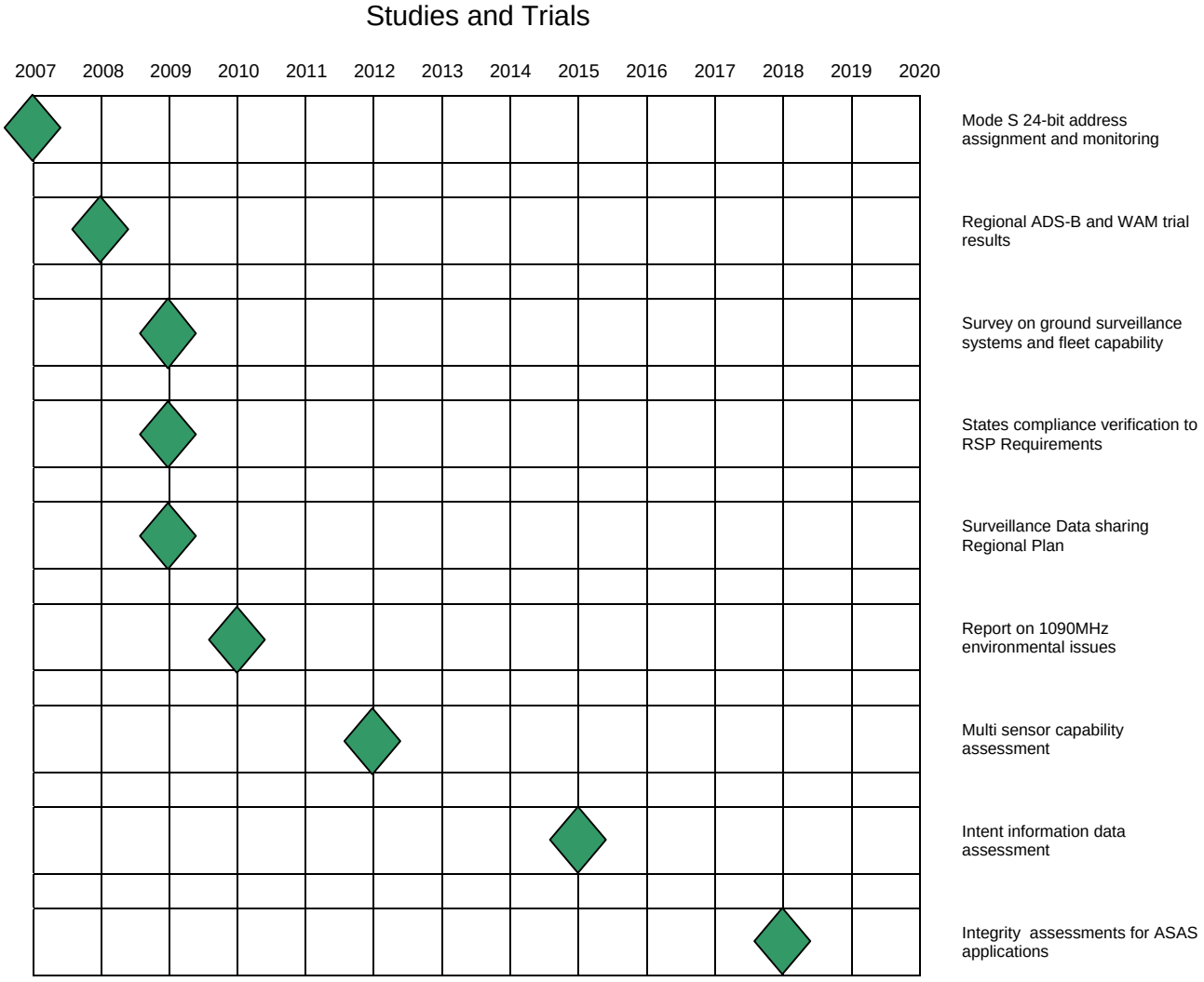
clarification to ensure avionics equipment and ground processing products can be developed in time to deliver the required information.

By 2018 it is required to identify whether the integrity requirements of the information presented to the aircrew while performing ADS-B Package I airborne surveillance applications may require the need for the uplink of traffic information to the aircraft to validate the integrity of the navigation data transmitted by ADS-B.

4.2 Studies and Trials Timeframe



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5. Annex A – Acronyms

ACAS Aircraft Collision Avoidance System

ADD Aircraft Derived Data

ADS Automatic Dependent Surveillance

ADS-B ADS-Broadcast

ADS-C ADS-Contract

ANC Air Navigation Council

ANSP Air Navigation Service Provider

APP Approach (Centre or Control)

ASAS Airborne Separation Assistance System

ASDE Airport Surveillance Detection Equipment

A-SMGCS Advanced Surface Movement and Guidance Control System

ATC Air Traffic Control

ATM Air Traffic Management

CDTI Cockpit Display of Traffic Information

CNS Communications Navigation and Surveillance

CPDLC Controller Pilot Data link Communications

FDPS Flight Data Processing System

FMS Flight Management System

GNSS Global Navigation Satellite System

GPS Global Positioning System

ICAO International Civil Aviation Organisation

M-SSR Mono-pulse Secondary Surveillance Radar

PSR Primary Surveillance Radar

RSP Required Surveillance Performance

SARPs Standards and Recommended Practices

SDPD Surveillance Data Processing and Distribution System

SMGCS Surface Movement Guidance and Control System

SSR Secondary Surveillance Radar

TCAS Traffic Collision Avoidance System

TIS-B Traffic Information Service - Broadcast

TMA Terminal Maneuver (Control) Area

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6. Annex B – Definitions

Surveillance is defined as the technique for the timely detection of targets and the determination of their position (and if required, the acquisition of supplementary information relating to targets) and the timely delivery of this information to users in support of the safe control and separation of targets within a defined area of interest.

Ground Based Surveillance is defined as 'ground based techniques for the timely detection of targets and the determination of their position (and if required, the acquisition of supplementary information relating to targets) and the timely delivery of this information to users in support of the safe control and separation of targets within a defined areas of interest'. The 'defined area of interest'' relates to the ability of the User to select which information is deemed necessary to ensure the safe implementation of the surveillance application within the physical airspace for which they are responsible.

Independent surveillance is a technique where the position of the aircraft is calculated by the ground and is not dependent on position data transmitted by the aircraft.

Dependent surveillance like ADS-B is based on the principle of the target informing the ground system and other targets of its own position. The target may also provide aircraft derived data. Dependent surveillance delivers Aircraft Derived Data (ADD). ADD may contain navigation position, identification and other data from the aircraft.

Cooperative surveillance is a technique that requires the mobile to equip with a dedicated surveillance systems which responds to transmissions from the ground system.

Non Cooperative surveillance is a technique where the position of the aircraft is calculated by the ground and is not dependent on position data transmitted by the aircraft or upon any deliberate interaction in the aircraft with active components e.g SSR transponders.

Basic surveillance delivers to the surveillance user:

- Aircraft position (latitude, longitude and altitude)
- Mode A

Elementary surveillance includes basic surveillance and also delivers to the surveillance user:

- Aircraft identity - Flight Identity or tail registration and 24 bit address,
- Flight Status,
- Aircraft pressure altitude in 100 ft or 25 ft units, if the aircraft is appropriately equipped.

Enhanced Surveillance delivers to the surveillance user a set of Aircraft Derived Data (ADD) to provide additional information to ground or air based ATM systems and safety nets. Enhanced surveillance may be delivered to ground system through Mode S SSR, ADS-B or Multilateration system (through active interrogations).

Aircraft Derived Data Different cooperative surveillance technologies extract different information from the aircraft. In its simplest form, the Mode A and Mode C information provided by the aircrafts SSR transponder can be classified as aircraft derived data or down

DRAFT

linked aircraft parameters. When implemented using SSR Mode S, the following current or short term Aircraft Parameters are automatically extracted from the aircraft:

- Air Speed (Indicated Air Speed and Mach Number)
- Ground Speed
- Magnetic Heading Roll Angle
- Selected Altitude Track Angle Rate (or, if not available, True Air Speed)
- True Track Angle Vertical Rate

The enhanced surveillance parameters delivered by ADS-B include the position and longer term intent parameters e.g. 4D trajectory, trajectory change points etc.

Surveillance users are:

- Oceanic ATM Centers
- En-Route ATM Centers
- TMA/Approach ATM Units
- Airports/Tower ATM & Ground Traffic Management Units
- Military Centers
- Airline Aircraft Operations Centre
- Enhanced Tactical Flow Management System
- Data processing systems, such as Flight Data Processing Systems
- ATM Tools, such as Short Term Conflict Alert
- The target
- Adjacent Surveillance Functions
- Non ATM functions (e.g. Search and Rescue).

Surveillance Data Processing and Distribution systems accept information from surveillance sensors, process the information to develop the 'best' estimate of the position of a target and supply this information to users. In addition the SDPD may receive ADD and distribute this to surveillance users attached to the position information.

A-SMGCS is an airport system which provides surveillance to a ground controller. It has four implementation levels that provide different levels of functionality:

Level I A-SMGCS provides:

- Position; the presentation to a controller of the location of an aircraft or vehicle;
- Identification; the presentation to the controller the identity (flight identification or call sign) of the aircraft or vehicle.

Level II A-SMGCS provides a conflict prediction function to alert the controller of:

- Potential collisions (between aircraft/vehicle or aircraft/aircraft) on the runway surface or protected areas
- Potential entry of aircraft or vehicles into restricted areas.

Level III A-SMGCS includes functions that are being defined by the Airports and Environments Business Division to share traffic situation awareness amongst pilots and drivers and the introduction of the automated routing function. The guidance function may be enhanced by:

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- Display of the airport map showing taxiways, runways, obstacles and the mobile position to aircrew and drivers;
- Providing dynamic map with updates of the runway status
- Triggering automatically the dynamic ground signs (stop bars, centerline lights, etc.) according to the route issued by the controller.

Level IV A-SMGCS corresponds to the improvement of the functions implemented at the level III. Of particular note to the surveillance strategy, the control function will be complemented by a conflict resolution function in the cockpit or vehicle.

ADS-B Package I is a set of Ground Based Surveillance, Airborne Traffic Situational Awareness and Airborne Spacing applications (reference 6). Note that since reference 6 was published, the application descriptions have been refined, although they remain largely in accordance with the referenced document. The text below summarizes the applications as of November 2005.

ADS-B Package I Ground Based Surveillance Applications are aimed at improving ATC surveillance on the ground for En-Route and TMA airspace and on the airport surface and at enhancing ATC tools through the provision of aircraft derived data enabled by ADS-B. These applications are:

- ADS-B-RAD ATC surveillance for TMA and En-Route airspace in areas that are already covered by radar systems
- ADS-B-NRA ATC surveillance in non-radar areas
- ADS-B-APT Airport surface surveillance
- ADS-B-ADD Aircraft derived data for ATC tools

ADS-B Package I Airborne Surveillance Applications are aimed at improving airborne (cockpit) surveillance in En-Route and TMA airspace as well as on the airport surface. These applications are:

- ATSA-SURF Enhanced traffic situational awareness on the airport surface
- ATSA-VSA Enhanced visual separation on approach
- ATSA-ITP In-trail procedure in oceanic airspace
- ATSA-AIRB Enhanced traffic situational awareness during flight operations

ADS-B Package I Airborne Spacing Applications are aimed at using airborne (cockpit) surveillance capabilities to carry out applications where the flight crew is able to maintain a time or distance from designated aircraft. These applications are:

- ASPA-S&M Enhanced sequencing and merging operations
- ASPA-C&P Enhanced crossing and passing operations

ASAS Applications are a set of operational procedures for controllers and flight crews that make use of the capabilities of Airborne Separation Assistance Systems to meet a clearly defined operational goal.

Airborne Spacing (ASPA) is an ASAS application category where the flight crew is able to maintain a time or distance from designated aircraft. The controller can use new spacing instructions to expedite and maintain an orderly and safe flow of traffic and is still responsible for providing separation in accordance with the applicable ATC separation

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minima. New procedures and responsibilities are expected with the introduction of Airborne Spacing applications.

Airborne Separation is an ASAS application category where the flight crew is able to provide separation from designated aircraft in accordance with the applicable airborne separation minima. In this application the controller can delegate separation relative to a designated aircraft to the flight crew through a new clearance however the controller is responsible for providing separation in accordance with the applicable ATC separation minima from other aircraft. New procedures and responsibilities are expected with the introduction of Airborne Separation applications.

Airborne Self Separation is an ASAS application where the flight crew is able to provide separation from all known aircraft in accordance with the applicable airborne separation minima. Airborne self separation is not considered within the timescales of this strategy.

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7. Annex C – Surveillance Techniques

Primary Radar (PSR, SMR/ASDE)

Primary Radar operates by radiating high levels of electromagnetic energy and detecting the presence and characteristics of echoes returned from reflected objects.

Target detection is totally based on the reception of reflected energy, it does not depend on any energy radiated from the target itself, i.e. no carriage of airborne equipment is required.

Secondary Surveillance Radar (SSR)

Secondary Surveillance Radar (SSR) operates by transmitting coded interrogations in order to receive coded information from all SSR transponder equipped aircraft, providing a two way "data link" on separate interrogation (1030 MHz) and reply (1090 MHz) frequencies.

Replies contain positive identification, as requested by the interrogation, either one of 4096 codes (Mode A) or aircraft pressure altitude reports (Mode C). The co-operative concept ensures stable received signal strength and considerably lower transmitted power levels than Primary Radar. SSR enables Basic Surveillance.

SSR Mode S is a development of SSR using the same interrogation and reply frequencies as the SSR but the selective interrogations contain a unique 24 bit address that ensures all transmissions are only decoded by one aircraft's Mode S Transponder having that 24 bit address.

A Mode S station also transmits conventional SSR formats in order to detect SSR only aircraft (Mode A/C) in order to be downward compatible with SSR.

The SSR Mode S transponder is also a fundamental part of the ACAS airborne installation and the ADS-Broadcast when using the 1090 MHz Extended Squitter transmission. SSR Mode S enables elementary and enhanced surveillance.

Automatic Dependent Surveillance-Broadcast (ADS-B)

Automatic Dependent Surveillance - Broadcast (ADS-B) is a surveillance technique that allows the transmission of aircraft derived parameters, such as position and identification, via a broadcast mode data link for use by any air and/or ground users.

Each ADS-B emitter periodically broadcasts its position and other data provided by the onboard aircraft avionics systems. Any user, either airborne or ground based, within range of the emitter may choose to receive and process the information. Three technology options are available, these are ADS-B 1090ES [which has been selected as the initial link for CAR/SAM Region], VDL Mode 4 (Very High Frequency Data Link) and UAT (Universal Access Time). ADS-B enables elementary and enhanced surveillance.

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Automatic Dependent Surveillance-Contract (ADS-C)

Automatic Dependent Surveillance - Contract (ADS-C) is a surveillance technique in which aircraft provide, via a data link, data such as position and identification, derived from the onboard aircraft avionics systems. A "contract" is established between the aircraft and the ground to transmit data at a particular event. An event could be time based, position based or as specified in the contract.

Currently ADS-C is usually implemented via SATCOM but any data link having the range capability would suffice. Whilst originally envisaged to be an ATN compliant data link, current implementations exploit a large part of the functionality through the FANS 1/equipment currently carried by many aircraft.

Traffic Information Service – Broadcast (TIS-B)

An air traffic situation picture derived by a ground based Surveillance Data Processing System may be broadcast from the ground to all aircraft within range and equipped with correct receivers. There are three roles of TIS-B, these are:

- TIS-B fundamental service: This ‘gap filler service broadcasts information about aircraft that cannot be adequately obtained directly by ADS-B and is used to enhance the availability of surveillance information to users that are not normally able to receive ADS-B transmissions from other aircraft. This service will normally exclude from transmission those aircraft broadcasting ADS-B messages
- ADS-B validation service: This optional service compares aircraft ADS-B state vector data with surveillance data from ground-based sensors and broadcasts validation data
- ADS-B rebroadcast service: The automatic rebroadcast of ADS-B messages received over one data link, translated directly onto other data links for the purpose of extending ADS-B connectivity to users of incompatible data links.

Multilateration

Multilateration is a surveillance technique where aircraft replies from other SSR or SSR Mode S interrogations or spontaneous squitter message from Mode S transponder are passively received by 3 or more ground receiver stations. Using time of arrival techniques the position and altitude of the target can be determined. In some Multilateration systems, active Mode S selective interrogations are used to extract data from the aircraft.

The surveillance strategy distinguishes three levels of functionality, which are:

- Basic operation in which Multilateration uses time of arrival of signals to determine the position of aircraft.
- Elementary operation, which includes basic operation and the addition of active integrations to extract aircraft identification information from the flight systems
- Enhanced operations, which includes basic operations and the addition of active interrogations to extract any information (including aircraft identification) from the aircraft systems.

APPENDIX I

ACTION PLAN TO IMPROVE SURVEILLANCE SYSTEMS

Activities	Start-up date	Completion date	Responsible party
Data collection			
ICAO letter to SAM project member States and International Organisations (IATA) to identify focal point and activities to be carried out.	May 2008		RO
Designation of focal point for data collection. Data to be collected are: ▪ Status of surveillance system and future implementation plans. ▪ Age of surveillance equipment. ▪ Review FASID Table CNS 4. ▪ Domestic fleet surveillance capacity. ▪ Current and future airspace capacity.	Jun 2008		State
Delivery of collected data requested from States and International Organisations		Jul 2008	States, Regional Office (RO)
Hiring of expert	Aug 2008		RO
Beginning of activities by the expert	Aug 2008	Sep 2008- (three weeks)	
Processing and analysis of collected data			Expert and RO
Drafting of strategy for short- and medium-term improvements			Expert
Cost-benefit analysis			Expert and RO
Development of implementation guidelines for States			Expert
Review strategy and guidelines for improving surveillance		Nov 2008	SAM IG/2
Training			States, RO
Seminar on surveillance systems	Jun 2009	(one week)	
Implementation of surveillance system improvements			States

Short term (Radar Mode S and WMLAT)		Late 2015	States
Medium term (ADS B)	Early 2015		States
Follow-up on the implementation of improvements to ground-air communication systems	2009		RO, States

APPENDIX J

Activities to be carried out by the expert within Project RLA/06/901 related to the implementation of communications and surveillance capacity improvement

Results	Activities	Responsible part of each activity
1.3 Implementation of communication and surveillance capacity improvements for en-route and terminal area operations – (GPIs 6, 7, 9, 17, 18, and 22)	1.3.1 Obtain and complete the information, learning about the current status in the participating States and organisations with respect to: a) Existing CNS facilities and equipment; b) Regional planning and documentation on existing CNS; c) Aeronautical message handling systems (AMHS); d) Very high frequency data link (VDL) and high-frequency data link (HFDL); e) ATS interfacility data communication (AIDC); f) Automatic dependent surveillance by contract (ADS/C); g) Automatic dependent surveillance by broadcast (ADS/B); h) Multilateration, etc.; i) Communication protocols used.	CNS, ATM, RO
	1.3.2 Analyse the operational scenarios of existing and planned ATS, in order to determine the operational requirements for improving communication and surveillance systems in the short and medium term, as well as other operational requirements to meet future ATM expectations, using, *inter alia*, the following tools: a) Aeronautical message handling system (AMHS), b) Very high frequency digital link (VDL), c) ATS interfacility data communication (AIDC), d) Automatic dependent surveillance by contract (ADS/C), e) Automatic dependent surveillance by broadcast (ADS/B), f) Multilateration, etc.	CNS, ATM, RO

Results	Activities	Responsible part of each activity
	1.3.3 Prepare a cost-benefit analysis of the various options available for communication and surveillance systems, comparing the existing structure with the improvement resulting from the implementation of the new systems, also taking into account the existence of two or more technologies to meet the same operational requirement (for example: multilateration or ADS/B).	CBA, CNS, ATM,RO
	1.3.6 Develop a strategy for the implementation of communication, navigation, and surveillance improvements in the CAR/SAM Regions, taking into account the information obtained in the preceding activities.	CNS, ATM, RO

APPENDIX K

PROPOSED TERMS OF REFERENCE AND WORK PROGRAMME FOR THE SAM REGION COMMUNICATIONS AND SURVEILLANCE CAPACITIES IMPROVEMENT FOR EN-ROUTE AND TERMINAL AREA IMPLEMENTATION WORKING GROUP (SAM/CNS/IG)

1. TERMS OF REFERENCE

Develop specific studies and guidance material for RNAV/RNP implementation of communications and surveillance system, to support improvement implementation in the SAM Region ATM System.

2. WORK PROGRAMME

a) Data collection on present situation of communications and surveillance systems.
b) Identify ATM requirements for communications and surveillance systems improvement.
c) Draft a strategy for the implementation of communications and surveillance improvements in the SAM Region.
d) Draft guidelines for the implementation of communications and surveillance systems improvement.
e) Develop an Action Plan Model for communications and surveillance capacities implementation for en-route and terminal area operations.
f) Follow-up of the implementation of the communications and surveillance capacities.

3. COMPOSITION

Argentina, Bolivia, Brazil, Chile, Ecuador, Peru, Uruguay, Venezuela and IATA.

4. RAPPORTEUR

Paulo Vila (Peru)

Agenda Item 4: Operational implementation of new ATM automated systems and integration of existing ones

Regional plan for the interconnection of automated systems

4.1 The Meeting noted that CAR/SAM air traffic control centres had had difficulties to implement the proper procedures for coordinating air traffic, a factor that had been identified as the main cause of air traffic accidents, which could be significantly reduced through the use of automated air traffic control systems for the automatic transfer of data, thus minimising manual procedures for the required ATC coordination.

4.2 The Meeting also noted that the interconnection of CAR/SAM air traffic control automated systems aims at the automated transmission of data on flight plans and surveillance of flights in transition from one FIR to an adjacent one, as a way of improving the air traffic control coordination process for flights between the air traffic control centres involved.

4.3 In order to carry out the regional interconnection of ATC automated system facilities, the Meeting was advised of a number of activities conducted under project RLA/98/003. These activities were carried out by a group of experts on automation systems under the coordination of the ICAO Regional Office in Lima. The following activities were carried out:

- Drafting of a questionnaire on automated systems installed in ATS units and their interfaces.

- Interconnection tests between the automated systems of the Manaos ACC (Amazónica FIR) in Brazil and the Maiquetía ACC (Maiquetía FIR) in Venezuela.

- States missions for the collection of data: Activity carried out in 2007 by a group of experts, with the support of DECEA and ICAO/Lima, with the purpose of assessing the status of automated air traffic control systems installed in the areas of CAR/SAM control centres. On-site visits were made to Peru, Ecuador, Venezuela, Colombia, Panama, COCESNA, Chile, Uruguay, Argentina, and Brazil.

- Drafting of the Interface Control Document (SICD): based on the information collected during the visits, the team prepared an interface document containing all related data, as well as a description of the interfaces the exist in many of the systems available in the CAR/SAM ACCs; therefore, they provided the subsidies for the adoption of the necessary measures to interconnect these systems.

- Drafting of the Interconnection Plan based on the consolidated information contained in the SICD, which took into account the particular characteristics of each State ACC.

Status of radar systems and radar data sharing

4.4 The Meeting noted that many CAR/SAM air navigation service providers (ANSPs) had their own fixed radar network and received a synthesis of the information received from sensors, which, supplemented with flight plan information, represented the basic input for air traffic control. In addition to this information, other information from adjacent ATC units could feed automated systems to provide a broader image of air traffic under their responsibility.

4.5 The transfer of responsibility for flight control between adjacent centres begins with the transmission of flight plan data through AFTN messages, and concludes with bilateral speech communications between air traffic controllers. This non-automated process has been identified as the main cause of several operational mishaps.

4.6 Missions to the States by ICAO experts for collecting data on ATC automated systems installed in the Region resulted in the drafting of an external interface document (SICD) describing the internal characteristics of ATC systems in the CAR/SAM Regions.

4.7 The SICD provides an overview of different systems installed in ATC facilities of the Region, which were developed and installed by various providers. Each of these systems has its own architecture and reflects a given level of technological development. Consequently, some systems are already prepared for the introduction of advanced technologies, such as ADS/CDPLC, while others have basic functions and characteristics.

4.8 State visits confirmed that the system most widely used in the Region was AIRCON 2000, provided by INDRA. A total of five air control centres operated with this system; however, there were different versions of the aforementioned systems, with different functions.

4.9 Radar coverage in the various FIRs was quite diverse, where some had total coverage in upper airspace levels, while others only provided very limited radar coverage.

4.10 Another aspect that could be identified was the big difference in terms of the extent to which some States relied on the solution offered by the provider. Some ANSPs relied completely on the provider for the implementation of even simple changes to the system, while others had a highly-trained and updated technical team, capable of making the necessary changes in configuration and specifying new functions to optimise the provision of air navigation services.

4.11 In the Region, only one effective case of radar data sharing had been implemented between Argentina and Uruguay, and some others were under study and in different stages of bilateral agreement. Nevertheless, automated coordination for transborder flights had not been implemented nor was being planned between air traffic control centres.

Status of OLDI/AIDC systems for the exchange of flight plan data

4.12 Regarding these systems, the Meeting took note that, despite the existing systems, most ATC centres had the basic feature that allowed for the coordination of flight plans through the OLDI protocol. This function was not being used yet, mainly due to difficulties facing local technicians to configure the system as necessary, as well as apparent differences in the implementation of the protocol by system providers. In one case, a tentative definition of flight plan coordination between two adjacent ACCs using OLDI failed, probably due to differences in protocol implementation by providers of the competition.

4.13 Some ATC systems used message coordination (CDN, LAM, ACP) as specified in Doc 4444-PANS/ATM for flight plan coordination between adjacent ACCs, this being the specific case of Brazil (where OLDI plans were used occasionally for the same purpose and to improve AIDC).

4.14 Venezuela also had the capability of coordinating PANS/ATM messages through ICAO Doc 4444, and although it had not been used operationally, this feature had been demonstrated during interconnection tests performed between the Amazónica FIR and the Maiquetía FIR under project RLA/98/003.

4.15 Only Chile used the OLDI protocol operationally for automated air traffic coordination between its ACC and domestic approach control centres.

4.16 The only AIDC system in the Region had been purchased by Argentina.

Regional interconnection levels between automated systems

4.17 The visits made to most ATC automated systems in the SAM Region and COCESNA as well as the data collected revealed different interconnection levels.

4.18 Interconnection levels were to be used as planning factors to define implementation strategies, since they characterised and categorised the status and availability of each ATC centre for such interconnection.

4.19 The existing regional interconnection level for radar data and flight information is shown in **Appendix A** to this agenda item. Interconnection levels go from the lowest, which represents a non-automatic functionality, to the highest, which represents automatic functionality. Based on the level of automated interconnection in each ACCs of the SAM Region and COCESNA, as shown in Appendix A, an interconnection level assignment table had been developed. This table showed the interconnection level implementation solutions that could be applied for each ACC and its adjacent ACC in a given State. This table is shown in **Appendix B** to this agenda item.

Preliminary plan for the implementation of the regional interconnection of ATC automated systems

4.20 In order to attain the interconnection implementation level, several solutions were identified, including bilateral connection (from centre to centre), multilateral interconnection, and an interim radar data sharing solution.

4.21 The bilateral interconnection is achieved when a common protocol is established for the exchange of radar data and flight plan information between two neighbouring States, with the necessary adjustments for the integration of this information in each system. The advantage of this modality is that short-term actions can be established using existing common technologies in each neighbouring State. This permits the use of existing know-how and resources to save money and means.

4.22 The multilateral interconnection should take into account the radar data network that facilitates broad surveillance data sharing. In this network, all the information (radar and future ADS-B) from different locations in the various States is received in the specific interface of each sensor, and is then converted to ASTERIX format and shared according to the geographical filter of interest to each State. The basic equipment is the RMCDE (radar message conversion and distribution equipment), which is normally used initially to support national modernisation programmes. Later on, the equipment offers the possibility of connecting to facilities in adjacent States for the exchange of surveillance data of common interest, and, in advanced stages, the same physical equipment permits the integration to a flexible and wide-range radar information network. This system, called RADNET, is currently installed in Europe.

4.23 The Brazilian administration proposed an interim solution for radar data sharing, which implied sharing radar data obtained from facilities located close to its borders with SAM States, using a product called SISTRASAG. This is not really an automation solution; it only provides a radar display to SAM States that share borders with Brazil.

4.24 Analysing the various automation solutions, it should be noted that bilateral solutions for sharing flight plan information and surveillance data might not be implemented on time and, under certain conditions, would not be the most appropriate solution for attaining the interconnection; nevertheless, it is the solution that the Region can implement in the short and medium term.

4.25 The multilateral solution for sharing flight plan information and surveillance data may be difficult to implement without coordination centralised in a project. The support required from system providers to configure systems or to implement minor changes or updates would be more effective if negotiated collectively rather than individually by air navigation service providers (ANSPs). The experience gained with multinational implementations, *e.g.* REDDIG, governed by the provisions of specific projects coordinated by the ICAO SAM Regional Office, has been positive; therefore, it is highly advisable that the interconnection of CAR/SAM ATC automated centres be done through a specific project, similar to the REDDIG project.

4.26 **Appendix C** to this agenda item contains a list of proposed activities for the regional interconnection of ATC automated systems. It should be noted that the mechanisms for the fulfilment of these activities should be carefully analysed in order to achieve a systematic interconnection of ATC centres.

4.27 Upon reviewing the activities of the regional automated system interconnection panel, the Meeting formulated the following conclusion:

Conclusion SAM/IG/1-7 Adoption of the Action Plan for the regional interconnection of automated systems

That, when carrying out the activities for the regional interconnection of systems, consideration be given to the action plan for the regional interconnection of automated systems contained in Appendix C to this agenda item.

Automation activities to be carried out in 2008

4.28 The Meeting noted that, under Objective No. 3, project RLA/06/901 set forth the tasks to be fulfilled for the operational implementation of new ATM automated systems and the integration of existing ones. For more reference, **Appendix D** to this agenda item contains the tasks to be performed in 2008.

4.29 The Meeting considered that, in addition to the activities carried out by the automation panel, activities 3.1.1, 3.1.2 of Objective 3 of project RLA/06/901 should be completed and a new activity should be included, involving the drafting of a model SAM Automation System Requirements Document, containing common basic functionalities, which could be used as a reference for the acquisition of new systems and the modification of existing ones.

4.30 In order to carry out the aforementioned activities, the Meeting considered that an expert on automation should be engaged for a period of 4 weeks, starting early August 2008.

4.31 The Meeting also felt that project member States that had automated systems should verify if there was a service contract with the automation system provider and if it included the configuration of radar data and flight plan exchange lines.

Terms of reference and work programme on ATM automation

4.32 The Working Group for the Implementation of ATM Automated Systems and the Integration of Existing Ones in the SAM Region (SAM/AUTO/IG) should establish a drafting group to prepare the work documentation for its meetings and review the material prepared by the experts hired by project RLA/06/901, and, with the support of the Secretariat, prepare the report on the ATM automation matters addressed at each SAM/IG meeting.

4.33 Furthermore, the Meeting felt that the task force should be made up by representatives of each State participating in project RLA/06/901, who would be tasked with coordinating and doing the work required in their respective States, and they would be the focal points for the SAM/AUTO/IG.

Likewise, the other States not yet participating in the project were invited to be part of the Implementation Group.

4.34 **Appendix E** to this agenda item contains the Terms of Reference and Work Programme of the Working Group for the Implementation of ATM Automated Systems and Integration of the Existing Ones in the SAM Region.

APPENDIX A

FLIGHT AND RADAR DATA PLAN INTERCONNECTION LEVEL

FLIGHT PLAN INTERCONNECTION LEVEL

Interconnection Level of Flight Plan Data	Communications Protocol	State/ATC Centre	Notes
1	AIDC	Argentina (Ezeiza, Córdoba)	Planned but not used system.
2	OLDI	Argentina, Chile, Colombia, Ecuador, Panamá, Uruguay and CENAMER	Planned but not used system, with the exception of Chile.
3	ICAO Doc 4444 Coordination	Brazil, Venezuela	Implemented in ACCs of Brazil for coordination between Air Traffic Control Domestic Centres.
4	ICAO Doc 4444 (Manual Messages)		

RADAR PLAN INTERCONNECTION LEVEL

Interconnection Level of Surveillance Data	Communications Protocol	Notes
1	ASTERIX Intercentre cat 62,63	Ecuador
2	ICD Intercentre Owner	Brazil, Venezuela
3	ASTERIX Radar ICD	
4	ICD Owner	Uruguay, Argentina
5	No shared information available	

APPENDIX B

Solutions for Interconnection Levels between Adjacent ACCs

Note
A – Current interconnection level
S – Possibility for Sharing Surveillance Radar Data using SISTRASAG
P – Possibility for Interconnection using current Air Traffic Control System.
P* - Possibility for Interconnection using Air Traffic Control System being presently installed.

STATE: ARGENTINA										
ACC	ACC ADJ	FLIGHT PLAN INTERCONNECTION LEVELS				SURVEILLANCE INTERCONNECTION LEVELS				
		1	2	3	4	1	2	3	4	5
CORDOBA INSTAL.	ASUNCIÓN				A					A
	LA PAZ				A					A
	EZEIZA	**P***	**P***		A	**P***		**P***		A
	MENDOZA				A					A
	RESISTENCIA				A					A
	SANTIAGO		P					**P***		
RESISTENCE (NON-AUTO)	ASUNCIÓN				A					A
	CORDOBA				A					A
	CURITIBA				A				S*	A
	MENDOZA				A					A
	MONTEVIDEO				A					A
EZEIZA	RIVADAVIA				A					A
	MENDOZA				A					A
	PUERTO MONTT				A					
	SANTIAGO		**P***		A			**P***		A
	CORDOBA	**P***	**P***		A	**P***		**P***		A
	RESISTENCIA				A					A
	JOHANNESBURG				A					A
	MONTEVIDEO		**P***		A	**P***			A	
MENDOZA (NON AUTO)	EZEIZA				A					A
	SANTIAGO				A					A
	CORDOBA				A					A
COMODORO RIVADAVIA (NON-AUTO)	EZEIZA				A					A
	SANTIAGO				A				S(Chile)	A
	PUERTO MONTT				A					
	PUNTA ARENAS				A					

STATE: BRASIL										
ACC	ACC ADJ	FLIGHT PLAN INTERCONNECTION LEVELS				SURVEILLANCE INTERCONNECTION LEVELS				
		1	2	3	4	1	2	3	4	5
AMAZONICO	BRASÍLIA			A				A		
	BOGOTÁ				A			**P**		A
	GEORGETOWN				A				**S**	A
	LA PAZ				A				**S**	A
	LIMA				A				**S**	A
	MAIQUETIA			**P**	A		**P**			A
	PARAMARIBO				A				**S**	A
	RECIFE			A				A		
	ROCHAMBEAU				A				**S**	A
	ATLANTICO				A					A
BRASÍLIA	AMAZONICO			A				A		
	CURITIBA			A				A		
	LA PAZ				A				**S**	A
	RECIFE			A				A		
	ATLANTICO				A					A
CURITIBA	ASUNCIÓN				A				**S**	A
	BRASÍLIA			A				A		
	LA PAZ				A				**S**	A
	MONTEVIDEO				A			**P**		A
	RESISTENCIA				A				**S**	A
	ATLANTICO				A					A
RECIFE	AMAZONICO			A				A		
	BRASÍLIA			A				A		
	ATLANTICO				A					A
ATLANTICO (NON-AUTO)	AMAZONICO				A					A
	BRASÍLIA				A					A
	CURITIBA				A					A
	DAKAR				A					A
	JOHANNESBURG				A					A
	LUANDA				A					A
	MONTEVIDEO				A					A
	RECIFE				A					A
	ROCHAMBEAU				A					A

STATE: BOLIVIA										
ACC	ACC ADJ	FLIGHT PLAN INTERCONNECTION LEVELS				SURVEILLANCE INTERCONNECTION LEVELS				
		1	2	3	4	1	2	3	4	5
LA PAZ (NON-AUTO)	AMAZONICO				A				**S**	A
	ASUNCIÓN				A					A
	BRASÍLIA				A				**S**	A
	CURITIBA				A				**S**	A
	CORDOBA				A					A
	LIMA				A					A
	SANTIAGO				A					A

STATE: CHILE										
ACC	ACC ADJ	FLIGHT PLAN INTERCONNECTION LEVELS				SURVEILLANCE INTERCONNECTION LEVELS				
		1	2	3	4	1	2	3	4	5
SANTIAGO	CORDOBA		**P**		A			**P**		A
	LIMA				A					A
	LA PAZ				A					A
	MENDOZA				A					A
	RIVADAVIA				A					A

STATE: COLOMBIA										
ACC	ACC ADJ	FLIGHT PLAN INTERCONNECTION LEVELS				SURVEILLANCE INTERCONNECTION LEVELS				
		1	2	3	4	1	2	3	4	5
BOGOTÁ	AMAZONICO				A			**P**	**S**	A
	GUAYAQUIL		**P**		A			**P**		A
	LIMA				A					A
	MAIQUETIA				A			**P**		A
	PANAMÁ		**P**		A			**P**		A
	BARRANQUILLA		**P**		A			**P**		A
BARRANQUILLA	MAIQUETIA				A			**P**		A
	PANAMÁ		**P**		A			**P**		A
	BOGOTÁ		**P**		A			**P**		A
	KINGSTON				A					A
	CURAZAO				A					A

STATE: ECUADOR										
ACC	ACC ADJ	FLIGHT PLAN INTERCONNECTION LEVELS				SURVEILLANCE INTERCONNECTION LEVELS				
		1	2	3	4	1	2	3	4	5
GUAYAQUIL	BOGOTA		**P**		A	**P**		**P**		A
	LIMA				A					A
	CENAMER				A					A

STATE: FRENCH GUYANA										
ACC	ACC ADJ	FLIGHT PLAN INTERCONNECTION LEVELS				SURVEILLANCE INTERCONNECTION LEVELS				
		1	2	3	4	1	2	3	4	5
ROCHAMBEAU	AMAZONICO				A				**S**	A
	PARAMARIBO				A					A
	PIARCO				A					A
	ATLANTICO				A					A

STATE: GUYANA										
ACC	ACC ADJ	FLIGHT PLAN INTERCONNECTION LEVELS				SURVEILLANCE INTERCONNECTION LEVELS				
		1	2	3	4	1	2	3	4	5
GEORGETOWN	AMAZONICO				A				**S**	A
	PIARCO				A					A
	MAIQUETIA				A					A
	PARAMARIBO				A					A

STATE: PANAMA										
ACC	ACC ADJ	FLIGHT PLAN INTERCONNECTION LEVELS				SURVEILLANCE INTERCONNECTION LEVELS				
		1		3	4	1	2	3	4	5
PANAMA	BOGOTA		**P**		A			**P**		A
	BARRANQUILLA		**P**		A			**P**		A
	CENAMER		**P**		A			**P**		A

STATE: PARAGUAY										
ACC	ACC ADJ	FLIGHT PLAN INTERCONNECTION LEVELS				SURVEILLANCE INTERCONNECTION LEVELS				
		1	2	3	4	1	2	3	4	5
ASUNCION (NON-AUTO)	CURITIBA				A				**S**	A
	LA PAZ				A					A
	RESISTÊNCIA				A					A

STATE: PERU										
ACC	ACC ADJ	FLIGHT PLAN INTERCONNECTION LEVELS				SURVEILLANCE INTERCONNECTION LEVELS				
		1	2	3	4	1	2	3	4	5
LIMA	AMAZONICO				A				**S**	A
	BOGOTÁ				A				**P**	A
	CHILE				A					A
	GUAYAQUIL				A					A
	LA PAZ				A					A

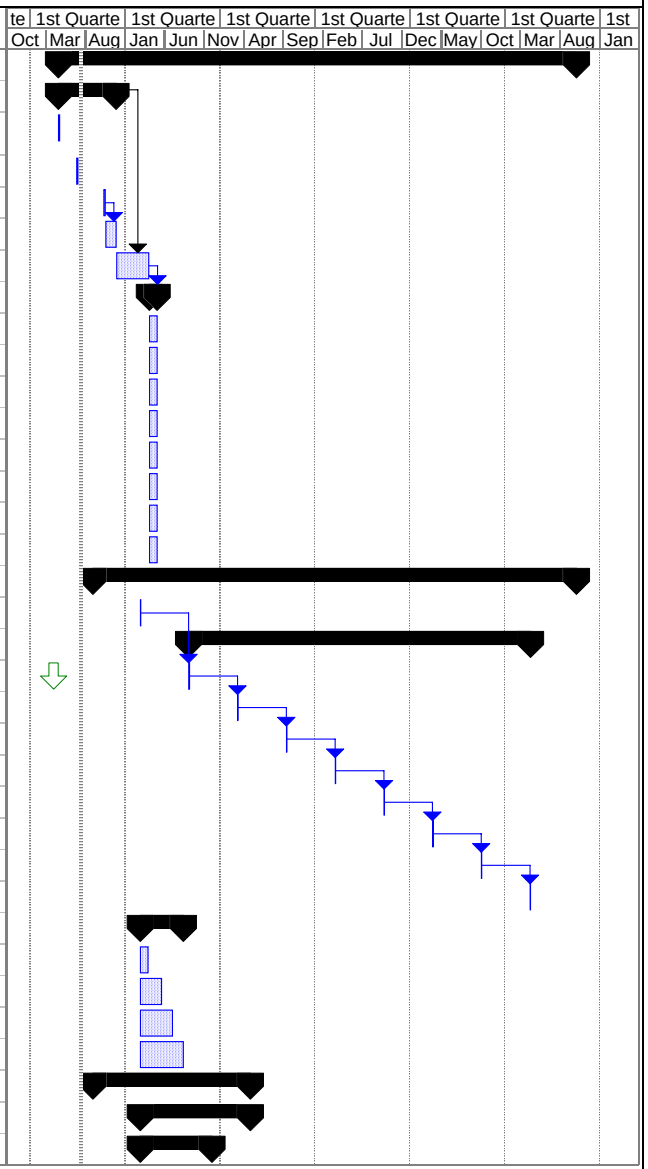
STATE: SURINAME										
ACC	ACC ADJ	FLIGHT PLAN INTERCONNECTION LEVELS				SURVEILLANCE INTERCONNECTION LEVELS				
		1	2	3	4	1	2	3	4	5
PARAMARIBO	AMAZONICO				A				**S**	A
	GEORGETOWN				A					A
	PIARCO				A					A
	ROCHAMBEAU				A					A

STATE: VENEZUELA										
ACC	ACC ADJ	FLIGHT PLAN INTERCONNECTION LEVELS				SURVEILLANCE INTERCONNECTION LEVELS				
		1	2	3	4	1	2	3	4	5
MAIQUETIA	AMAZONICO			**P**	A		**P**			A
	BOGOTA				A			**P**		A
	BARRANQUILLA				A			**P**		A
	PIARCO				A			**P**		A
	GEORGETOWN				A					A
	CURAZAO				A					A
	SAN JUAN				A					A

STATE: URUGUAY										
ACC	ACC ADJ	FLIGHT PLAN INTERCONNECTION LEVELS				SURVEILLANCE INTERCONNECTION LEVELS				
		1	2	3	4	1	2	3	4	5
MONTEVIDEO	CURITIBA				A			P	**S**	A
	EZEIZA		**P**		A	**P***		**P**	A	
	RESISTENCIA				A					A
	ATLANTICO				A					A
	JOHANNESBURG				A					A

INTERNATIONAL ORGANIZATION: COCESNA										
ACC	ACC ADJ	FLIGHT PLAN INTERCONNECTION LEVELS				SURVEILLANCE INTERCONNECTION LEVELS				
		1	2	3	4	1	2	3	4	5
CENAMER	GUAYAQUIL		P		A					A
	KINGSTON				A					A
	LA HABANA				A					A
	MERIDA				A					A
	PANAMA		**P**		A					A
	MEXICO				A					A

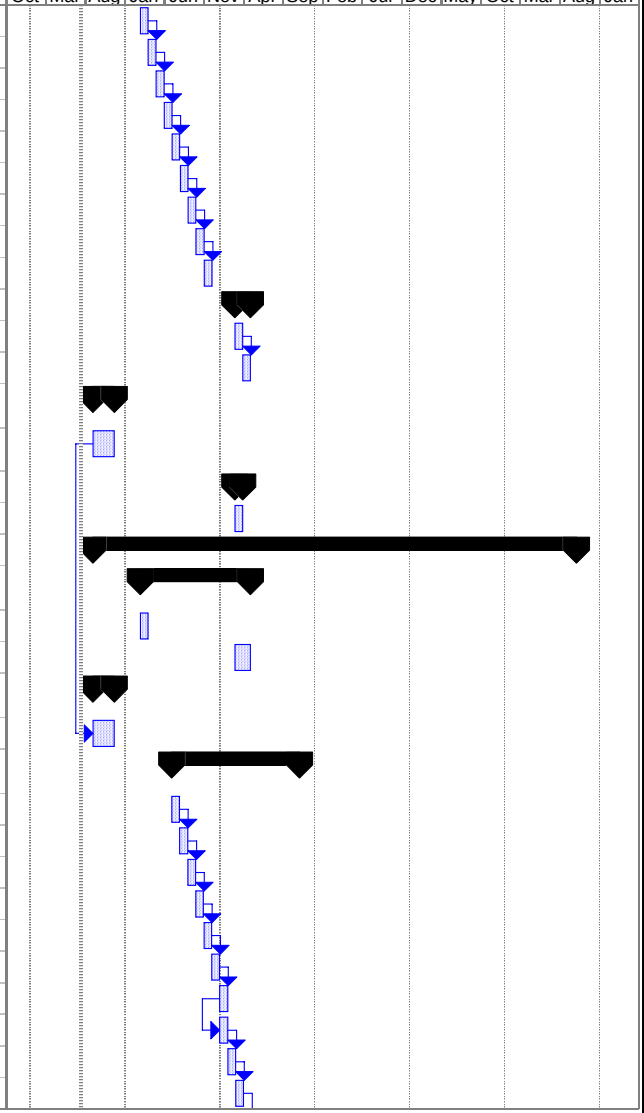
ID	Nome da tarefa	Duration	Start	Finish
1	**CAR/SAM Interconection Plan**	**1425 days**	**Mon 21/04/08**	**Fri 04/10/13**
2	**Plan Approval**	**160 days**	**Mon 21/04/08**	**Fri 28/11/08**
3	Plan Presentation in the 1ª GT CNS/ATM SAM-ATM/CNS/IG 1 Meeting	5 days	Mon 21/04/08	Fri 25/04/08
4	Plan Presentation ATM/CNS/SG/6	5 days	Mon 30/06/08	Fri 04/07/08
5	Plan presentation in the GREPECAS Meeting	5 days	Mon 13/10/08	Fri 17/10/08
6	CAR/SAM interconnection plan Approval	30 days	Mon 20/10/08	Fri 28/11/08
7	Project Managing Board Creation	90 days	Mon 01/12/08	Fri 03/04/09
8	**Project Organization**	**22 days**	**Mon 06/04/09**	**Tue 05/05/09**
9	Managing plan	22 days	Mon 06/04/09	Tue 05/05/09
10	Communication Plan	22 days	Mon 06/04/09	Tue 05/05/09
11	Human resources Plan	22 days	Mon 06/04/09	Tue 05/05/09
12	Cost Plan	22 days	Mon 06/04/09	Tue 05/05/09
13	Risk Assesment Plan	22 days	Mon 06/04/09	Tue 05/05/09
14	Escope Managing Plan	22 days	Mon 06/04/09	Tue 05/05/09
15	Quality plan	22 days	Mon 06/04/09	Tue 05/05/09
16	Procurement and Acquisition plan	22 days	Mon 06/04/09	Tue 05/05/09
17	**Plan execution**	**1330 days**	**Mon 01/09/08**	**Fri 04/10/13**
18	STARTUP MEETING	2 days	Mon 02/03/09	Tue 03/03/09
19	**Coordination Meetings**	**940 days**	**Fri 04/09/09**	**Thu 11/04/13**
20	1 Coordination Meeting	2 days	Fri 04/09/09	Mon 07/09/09
21	2 Coordination Meeting	2 days	Thu 11/03/10	Fri 12/03/10
22	3 Coordination Meeting	2 days	Wed 15/09/10	Thu 16/09/10
23	4 Coordination Meeting	2 days	Tue 22/03/11	Wed 23/03/11
24	5 Coordination Meeting	2 days	Mon 26/09/11	Tue 27/09/11
25	6 Coordination Meeting	2 days	Fri 30/03/12	Mon 02/04/12
26	7 Coordination Meeting	2 days	Thu 04/10/12	Fri 05/10/12
27	8 Coordination Meeting	2 days	Wed 10/04/13	Thu 11/04/13
28	**Institutional/Legal Documents Creation**	**120 days**	**Mon 02/03/09**	**Fri 14/08/09**
29	Responsability definition over Shared Resources	22 days	Mon 02/03/09	Tue 31/03/09
30	Operational Agreements Between States	60 days	Mon 02/03/09	Fri 22/05/09
31	Surveilance Area definition to be shared	90 days	Mon 02/03/09	Fri 03/07/09
32	Security Plan	120 days	Mon 02/03/09	Fri 14/08/09
33	**Flight Plan Interconection Implementation**	**434 days**	**Mon 01/09/08**	**Thu 29/04/10**
34	**Flight Plan interconnection using OLDI**	**304 days**	**Mon 02/03/09**	**Thu 29/04/10**
35	**First Phase**	**198 days**	**Mon 02/03/09**	**Wed 02/12/09**



Projeto: SAM1GNE19ApnC
Data: Fri 11/07/08

Tarefa | Etapa | Tarefas externas
Divisão | Resumo | Etapa externa
Andamento | Resumo do projeto | Prazo final

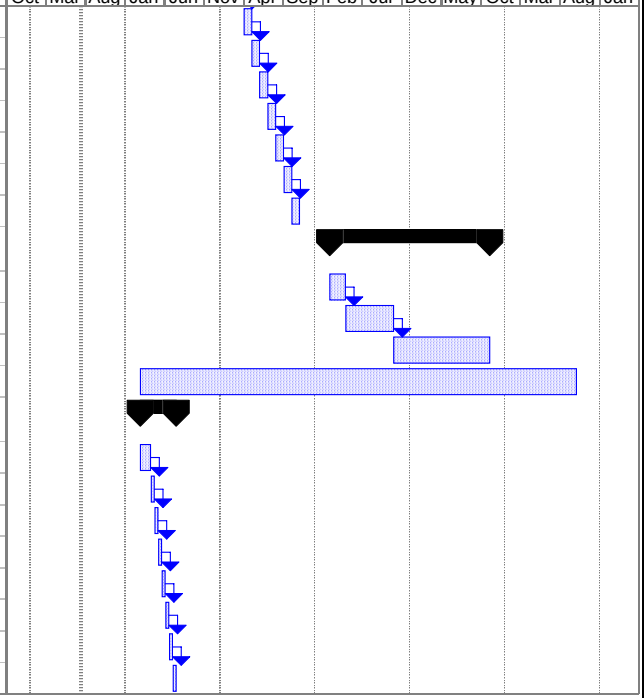
ID	Nome da tarefa	Duration	Start	Finish
36	EZEIZA-MONTEVIDEO	22 days	Mon 02/03/09	Tue 31/03/09
37	EZEIZA-CORDOBA	22 days	Wed 01/04/09	Thu 30/04/09
38	EZEIZA-SANTIAGO	22 days	Fri 01/05/09	Mon 01/06/09
39	BOGOTÁ-GUAYAQUIL	22 days	Tue 02/06/09	Wed 01/07/09
40	BOGOTÁ-PANAMÁ	22 days	Thu 02/07/09	Fri 31/07/09
41	BOGOTÁ-BARRANQUILHA	22 days	Mon 03/08/09	Tue 01/09/09
42	BARRANQUILHA-PANAMÁ	22 days	Wed 02/09/09	Thu 01/10/09
43	SANTIAGO-CORDOBA	22 days	Fri 02/10/09	Mon 02/11/09
44	PANAMÁ-CENAMER	22 days	Tue 03/11/09	Wed 02/12/09
45	**Second Phase (With Brazil)**	**44 days**	**Mon 01/03/10**	**Thu 29/04/10**
46	CURITIBA-URUGUAI	22 days	Mon 01/03/10	Tue 30/03/10
47	AMAZÔNICO-BOGOTÁ	22 days	Wed 31/03/10	Thu 29/04/10
48	**Flight Plan interconnection using Doc 4444 (CDN, LAM,ACP)**	**60 days**	**Mon 01/09/08**	**Fri 21/11/08**
49	MAIQUETIA - AMAZONICO Interconnection Comissioning	60 days	Mon 01/09/08	Fri 21/11/08
50	**Flight Plan interconnection using AIDC**	**22 days**	**Mon 01/03/10**	**Tue 30/03/10**
51	BRASIL-ARGENTINA	22 days	Mon 01/03/10	Tue 30/03/10
52	**Surveillance Data interconnection Implementation**	**1330 days**	**Mon 01/09/08**	**Fri 04/10/13**
53	**Surveillance Data interconnection Implementation using Intercenter ASTERIX 62/63**	**304 days**	**Mon 02/03/09**	**Thu 29/04/10**
54	EZEIZA-MONTEVIDEO	22 days	Mon 02/03/09	Tue 31/03/09
55	BRASIL- MONTEVIDEO	44 days	Mon 01/03/10	Thu 29/04/10
56	**Surveillance Data interconnection Implementation with Proprietary ICD**	**60 days**	**Mon 01/09/08**	**Fri 21/11/08**
57	AMAZONICO-MAIQUETIA	60 days	Mon 01/09/08	Fri 21/11/08
58	**Surveillance Data interconnection Implementation using ASTERIX Radar ICD**	**352 days**	**Wed 01/07/09**	**Thu 04/11/10**
59	EZEIZA-SANTIAGO	22 days	Wed 01/07/09	Thu 30/07/09
60	EZEIZA-CORDOBA	22 days	Fri 31/07/09	Mon 31/08/09
61	EZEIZA- MONTEVIDEO	22 days	Tue 01/09/09	Wed 30/09/09
62	AMAZÔNICO-BOGOTÁ	22 days	Thu 01/10/09	Fri 30/10/09
63	CURITIBA-MONTEVIDEO	22 days	Mon 02/11/09	Tue 01/12/09
64	SANTIAGO-CORDOBA	22 days	Wed 02/12/09	Thu 31/12/09
65	BOGOTÁ-GUAYAQUIL	22 days	Fri 01/01/10	Mon 01/02/10
66	BOGOTÁ-PANAMÁ	22 days	Fri 01/01/10	Mon 01/02/10
67	BOGOTÁ-BARRANQUILHA	22 days	Tue 02/02/10	Wed 03/03/10
68	BOGOTÁ-MAIQUETIA	22 days	Thu 04/03/10	Fri 02/04/10



Projeto: SAM1GNE19ApnC
Data: Fri 11/07/08

Tarefa | Etapa | Tarefas externas
Divisão | Resumo | Etapa externa
Andamento | Resumo do projeto | Prazo final

ID	Nome da tarefa	Duration	Start	Finish
69	BOGOTÁ-LIMA	22 days	Mon 05/04/10	Tue 04/05/10
70	PANAMÁ-CENAMER	22 days	Wed 05/05/10	Thu 03/06/10
71	CORDOBA-EZEIZA	22 days	Fri 04/06/10	Mon 05/07/10
72	MAIQUETIA-BARRANQUILHA	22 days	Tue 06/07/10	Wed 04/08/10
73	BARRANQUILHA-PANAMÁ	22 days	Thu 05/08/10	Fri 03/09/10
74	BARRANQUILLA-MAIQUETIA	22 days	Mon 06/09/10	Tue 05/10/10
75	MAIQUETIA-PIARCO	22 days	Wed 06/10/10	Thu 04/11/10
76	**Surveillance Data interconnection Implementation using RADNET for the CAR/SAM Region**	**440 days**	**Tue 01/03/11**	**Mon 05/11/12**
77	Specification	44 days	Tue 01/03/11	Fri 29/04/11
78	Acquisition	132 days	Mon 02/05/11	Tue 01/11/11
79	Installation	264 days	Wed 02/11/11	Mon 05/11/12
80	Telecommunication infrastructure Coordination	1200 days	Mon 02/03/09	Fri 04/10/13
81	**Surveillance Data interconnection Implementation using SISTRASAG**	**100 days**	**Mon 02/03/09**	**Fri 17/07/09**
82	BRASIL	30 days	Mon 02/03/09	Fri 10/04/09
83	LIMA	10 days	Mon 13/04/09	Fri 24/04/09
84	LA PAZ	10 days	Mon 27/04/09	Fri 08/05/09
85	ASSUNCION	10 days	Mon 11/05/09	Fri 22/05/09
86	GEORGETOWN	10 days	Mon 25/05/09	Fri 05/06/09
87	PARAMARIBO	10 days	Mon 08/06/09	Fri 19/06/09
88	ROCHAMBEAU	10 days	Mon 22/06/09	Fri 03/07/09
89	RESISTENCIA	10 days	Mon 06/07/09	Fri 17/07/09



Projeto: SAM1GNE19ApnC
Data: Fri 11/07/08

Tarefa | Etapa | Tarefas externas
Divisão | Resumo | Etapa externa
Andamento | Resumo do projeto | Prazo final

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APPENDIX D

Expert Activities within Project RLA/06/901 regarding the operational implementation of new ATM automated systems and integration of the existing ones

Results	Activities	Party responsible for each activity
3.1 Operational implementation of new automated ATM systems, and integration of the existing ones – (GPIs 6, 7, 9, 16, 17, and 18). ATM, CNS, AIS, MET, RO	3.1.1 Obtain and complete the information, learning about the current status in the participating States and organisations with respect to: a) Existing facilities and equipment, especially for adjacent airspaces; b) Existing regional planning and documentation; c) Existing interface control documents (ICDs); d) Implementation of new ATM automation tools (minimum safe altitude warning, conflict prediction, conflict alert, conflict resolution advisory, path conformity control, functional integration of ground and aircraft systems); e) Implementation of flight data processing systems (FDPS); f) Implementation of radar data processing (RDPS) and ADS ATS surveillance systems, and exchange of radar/ADS data, including mono-radar, multi-radar, and radar data sharing; g) Implementation of digital communication networks at State and regional level; h) Implementation of ATM applications, such as radar control handoff, automated hands-free system, AIDC, CPDLC, etc.; i) Implementation of AIS data banks; j) Processes to ensure quality and timely distribution of aeronautical information; k) Functional integration of ground and aircraft systems; l) Implementation of MET data banks; m) Availability of meteorological information in support of ATM systems, including ✓ D-ATIS, D-VOLMET and other information (volcanic ash, tropical cyclones, storms, clear air turbulence, icing, wind shear, etc.) using up-linked ADS messages;	ATM, CNS, AIS, MET, RO

	✓ MET information from down-linked ADS messages (upper wind fields, real-time wind profiles, etc.) n) Implementation of collaborative decision-making (CDM) aspects for other ATM requirements, in keeping with the global ATM operational concept.	
	3.1.2 Analyse the operational scenarios of current and planned ATS, with a view to determining the operational requirements for the short- and medium-term integration of existing automated systems and other operational requirements to meet future ATM expectations, as well as the identification of system requirements for non-automated ATS units.	ATM, CNS, RO

APPENDIX E

PROPOSED TERMS OF REFERENCE AND WORK PROGRAMME FOR SAM REGION IMPLEMENTATION WORKING GROUP ON ATM AUTOMATED SYSTEMS AND INTEGRATION OF EXISTING ATM AUTOMATED SYSTEMS (SAM/AUTO/IG)

1. TERMS OF REFERENCE

Develop specific studies and guidance material for ATM automated systems implementation to support SAM ATM System improvements implementation according to the ICAO Strategic Objectives and Global Plan Initiatives (GPI) on this matter (GPI 6, 7, 9, 17, 18, and 19).

2. WORK PROGRAMME

a) Identify ATM requirements and draft a strategy for the Integration/Implementation of Automated Systems in the SAM Region, taking into account GREPECAS guidelines (GREPECAS/12 Appendix K to the Report on Agenda Item 3).
b) Prepare and document an action plan that enables inter-operable implementation of new ATM automated systems, as well as the integration between those existing.
c) Draft guidance material and guidelines for the data exchange between ATM units, contemplating the communications support.
d) Follow-up of the implementation of the action plan that enables inter-operable implementation of new ATM automated systems, as well as the integration between those existing.

3. COMPOSITION

Guillermo Ricardo Cocchi (Argentina), Julio César de Souza Pereira and Antonio Marcos Costa Fonseca (Brazil), Vicente Navarrete, (Ecuador), José Pastoriza, (Uruguay), Rafael Sánchez Greiner (Venezuela).

4. RAPPORTEUR

Antonio Marcos Costa Fonseca, (Brazil)

Agenda Item 5: Other business

Approval of Amendment 1 to Doc PANS-ATM, 4444 by the Air Navigation Commission

5.1 At its first and second meetings, the 177th Session of the Air Navigation Commission approved the amendment to Doc PANS-ATM concerning flight plans. This amendment resulted from the work of the Flight Plan Study Group (FPLSG). The nature and scope of the proposal of amendment reflected the desire to update the model flight plan to meet the needs of aircraft with advanced capabilities and the evolutionary requirements of automated air traffic management (ATM) systems, taking into account their compatibility with existing systems, human factors, and aspects related to costs and the transition.

5.2 Regarding this last aspect, and for information purposes, **Appendix A** to this part of the report contains a copy of the approval of Amendment 1 to Doc PANS-ATM, 4444 by the Air Navigation Commission. The transition guide was being drafted by ICAO and should be ready by February 2009. In this regard, the Secretariat would present a working paper on this matter at the next SAM/IG meeting concerning an assessment of the impact that this amendment would have on the automated systems of the Region.

Implementation of the Guayana Terminal Control Area

5.3 Venezuela presented the meeting with information on the activities that were being carried out in Venezuela for the establishment of the Guayana Terminal Control Area, as part of the activities within the framework of the CNS/ATM implementation project.

5.4 This project for the modernisation of airports and air traffic services in Venezuela (MAGTA) was being implemented through a series of activities aimed at harmonising Venezuelan aeronautical services with regional requirements in this field.

First Seminar on the Introduction to Performance-Based Navigation (PBN) for the South American Region

5.6 Regarding the First Seminar on the Introduction to PBN for the SAM Region, held in Lima, Peru, on 17-20 June 2008, as part of an educational campaign aimed at providing guidance on the International Civil Aviation Organization (ICAO) performance-based navigation (PBN) concept, as contained in ICAO Doc 9613, Manual on Performance-Based Navigation, the Meeting deemed it advisable to recommend civil aviation administrations of the SAM Region to invite domestic air operators to participate in this important event.

Participation of operations and airworthiness experts

5.7 The Meeting deemed it advisable for OPS/AIR experts to participate in SAM/IG meetings, and thus requested the Secretariat to clearly state this requirement in the invitation letter and request the States to pay heed. To this end, OPS/AIR matters would be included in the agenda for the meeting.

SAMIG internal coordination mechanism

5.8 In order to harmonise the activities of the various SAM/IG implementation groups, the Meeting agreed to establish a SAM/IG Coordination Group made up as follows:

SAMIG Coordination Group

- Chairperson of the SAM Implementation Group, Mr. Rafael Sánchez Greiner (Venezuela)
- Rapporteur of the PBN Implementation Group (SAM/PBN/IG), Mr. Julio Pereira (Brazil)
- Rapporteur of the ATFM Implementation Group, Mr. Víctor Marcelo de Virgilio (Argentina)
- Rapporteur of the Group for the Implementation of improvements in communication, navigation, and surveillance capabilities for en-route and terminal area operations (SAM/CNS/IG), Mr. Paulo Vila (Peru)
- Rapporteur of the Group for the Implementation of ATM automated systems and Integration of the existing ones in the SAM Region (SAM/AUTO/IG), Mr. Antonio Marcos Costa Fonseca (Brazil)
- Coordinator, Mr. Roberto Arca.

CDM courses

5.9 Given the importance of the collaborative decision-making (CDM) concept, the Secretariat was requested to assess and report to the next SAM/IG meeting on the availability of CDM courses that could be offered to SAM States.

Automation seminar

5.10 The Meeting deemed it advisable to invite civil aviation administrations of the SAM Region to participate in the Automation Seminar to be held in Rio de Janeiro, Brazil, on 11-13 June 2008. The preliminary agenda of the seminar was provided to the participants.

Participation of CARSAMMA to analyse PBN aspects

5.11 The Meeting deemed it advisable for CARSAMMA delegates to participate at SAM/IG meetings in order to analyse aspects related to PBN implementation.

Appendix A to the Report on Agenda Item 5

ATTACHMENT A to State letter AN 13/2.5-07/35

NOTES ON THE PRESENTATION OF THE PROPOSED AMENDMENT

The text of the amendment is arranged to show deleted text with a line through it and new text highlighted with grey shading, as shown below:

1.	~~Text to be deleted is shown with a line through it~~	text to be deleted
2.	New text to be inserted is highlighted with grey shading	new text to be inserted
3.	~~Text to be deleted is shown with a line through it~~ followed by the replacement text which is highlighted with grey shading.	new text to replace existing text

PROPOSED AMENDMENT TO THE

PROCEDURES FOR AIR NAVIGATION SERVICES — AIR TRAFFIC MANAGEMENT (PANS-ATM, DOC 4444)

CHAPTER 4. GENERAL PROVISIONS FOR AIR TRAFFIC SERVICES

. . .

4.4 FLIGHT PLAN

4.4.1 Flight plan form

Note.— Procedures for the use of repetitive flight plans are contained in Chapter 16, Section 16.4.

. . .

4.4.1.3 Operators and air traffic services units should comply with:

a) the instructions for completion of the flight plan form and the repetitive flight plan listing form given in Appendix 2; and

b) any constraints identified in relevant Aeronautical Information Publications (AIPs).

Note 1.— Failure to adhere to the provisions of Appendix 2 or any constraint identified in relevant AIPs may result in data being rejected, processed incorrectly or lost.

Note 2.— The instructions for completing the flight plan form given in Appendix 2 may be conveniently printed on the inside cover of flight plan form pads, or posted in briefing rooms.

. . .

4.4.2 Submission of a flight plan

4.4.2.1 PRIOR TO DEPARTURE

4.4.2.1.1 Flight plans shall not be submitted more than 144 hours before the estimated off-block time of a flight.

4.4.2.1.~~1~~2 Except when other arrangements have been made for submission of repetitive flight plans, a flight plan submitted prior to departure should be submitted to the air traffic services reporting office at the departure aerodrome. If no such unit exists at the departure aerodrome, the flight plan should be submitted to the unit serving or designated to serve the departure aerodrome.

4.4.2.1.~~2~~3 In the event of a delay of 30 minutes in excess of the estimated off-block time for a controlled flight or a delay of one hour for an uncontrolled flight for which a flight plan has been submitted, the flight plan should be amended or a new flight plan submitted and the old flight plan cancelled, whichever is applicable.

CHAPTER 11. AIR TRAFFIC SERVICES MESSAGES

. . .

11.4 MESSAGE TYPES AND THEIR APPLICATION

. . .

11.4.2 Movement and control messages

. . .

11.4.2.2 FILED FLIGHT PLAN MESSAGES AND ASSOCIATED UPDATE MESSAGES

. . .

11.4.2.2.2 FILED FLIGHT PLAN (FPL) MESSAGES

Note.— Instructions for the transmission of an FPL message are contained in Appendix 2.

. . .

11.4.2.2.2.5 FPL messages shall ~~normally~~ be transmitted immediately after the filing of the flight plan. ~~However, i~~If a flight plan is filed more than 24 hours in advance of the estimated off-block time of the flight to which it refers, ~~that flight plan shall be held in abeyance until at most 24 hours before the flight begins so as to avoid the need for the insertion of a date group into that~~ the date of the flight departure shall be inserted in Item 18 of the flight plan. ~~In addition, if a flight plan is filed early and the provisions of 11.4.2.2.2.2 b) or e) or 11.4.2.2.2.3 apply, transmission of the FPL message may be withheld until one hour before the estimated off-block time, provided that this will permit each air traffic services unit concerned to receive the information at least 30 minutes before the time at which the aircraft is estimated to enter its area of responsibility.~~

. . .

11.4.2.2.4 MODIFICATION (CHG) MESSAGES

A CHG message shall be transmitted when any change is to be made to basic flight plan data contained in previously transmitted FPL or RPL data. The CHG message shall be sent to those recipients of basic flight plan data which are affected by the change. Relevant revised basic flight plan data shall be provided to such affected entities not previously having received this.

Note.— See 11.4.2.3.4 concerning notification of a change to coordination data contained in a previously transmitted current flight plan or estimate message.

. . .

APPENDIX 2. FLIGHT PLAN

. . .

2. Instructions for the completion of the flight plan form

. . .

2.2 Instructions for insertion of ATS data

Complete Items 7 to 18 as indicated hereunder.

Complete also Item 19 as indicated hereunder, when so required by the appropriate ATS authority or when otherwise deemed necessary.

Note 1.— Item numbers on the form are not consecutive, as they correspond to Field Type numbers in ATS messages.

Note 2.— Air traffic services data systems may impose communications or processing constraints on information in filed flight plans. Possible constraints may, for example, be limits with regard to item length, number of elements in the route item or total flight plan length. Significant constraints are documented in the relevant Aeronautical Information Publication.

ITEM 7: AIRCRAFT IDENTIFICATION (MAXIMUM 7 CHARACTERS)

INSERT one of the following aircraft identifications, not exceeding 7 characters:

a) the nationality or common mark and registration mark~~ing~~ of the aircraft (e.g. EIAKO, 4XBCD, N2567GA), when:

1) in radiotelephony the call sign to be used by the aircraft will consist of this identification alone (e.g. ~~OOTEK~~CGAJS), or preceded by the ICAO telephony designator for the aircraft operating agency (e.g. ~~SABENA OOTEK~~BLIZZARD CGAJS);

2) the aircraft is not equipped with radio;

OR b) the ICAO designator for the aircraft operating agency followed by the flight identification (e.g. KLM511, NGA213, JTR25) when in radiotelephony the call sign to be used by the aircraft will consist of the ICAO telephony designator for the operating agency followed by the flight identification (e.g. KLM511, NIGERIA 213, ~~HERBIE~~JESTER 25).

Note 1.— Standards for nationality, common and registration marks to be used are contained in Annex 7, Chapter 2.

Note 2.— Provisions for the use of radiotelephony call signs are contained in Annex 10, Volume II, Chapter 5. ICAO designators and telephony designators for aircraft operating agencies are contained in Doc 8585 — Designators for Aircraft Operating Agencies, Aeronautical Authorities and Services.

ITEM 8: FLIGHT RULES AND TYPE OF FLIGHT (ONE OR TWO CHARACTERS)

Flight rules

INSERT one of the following letters to denote the category of flight rules with which the pilot intends to comply:

I if it is intended that the entire flight will be operated under the IFR
V if it is intended that the entire flight will be operated under the VFR
Y if the flight initially will be operated under the IFR ~~first) and specify in Item 15 the point~~, followed by one or more subsequent changes of flight rules or
Z if the flight initially will be operated under the VFR ~~first)~~, followed by one or more subsequent changes of flight rules

Specify in Item 15 the point or points at which a change of flight rules is planned.

Type of flight

INSERT one of the following letters to denote the type of flight when so required by the appropriate ATS authority:

S if scheduled air service
N if non-scheduled air transport operation
G if general aviation
M if military
X if other than any of the defined categories above.

Specify status of a flight following the indicator STS in Item 18, if specific handling by ATS is required.

. . .

ITEM 10: EQUIPMENT AND CAPABILITIES

Capabilities comprise the following elements:

a) presence of relevant serviceable equipment on board the aircraft;

b) equipment and capabilities commensurate with flight crew qualifications; and

c) where applicable, authorization from the appropriate authority.

Radio communication, navigation and approach aid equipment and capabilities

INSERT one letter as follows:

N if no COM/NAV/approach aid equipment for the route to be flown is carried, or the equipment is unserviceable,

OR S if standard COM/NAV/approach aid equipment for the route to be flown is carried and serviceable (see Note 1),

AND/OR

INSERT one or more of the following letters to indicate the serviceable COM/NAV/approach aid equipment and capabilities available ~~and serviceable~~:

A	~~(Not allocated)~~GNSS Augmentation in addition to ABAS *(see Note 6)*	M	~~Omega~~CPDLC ATN capability *(see Note 3)*
~~B~~	~~(Not allocated)~~	O	VOR
C	LORAN C	~~P~~	~~(Not allocated)~~
D	DME	~~Q~~	~~(Not allocated)~~
E	~~(Not allocated)~~DME-DME with IRU	R	~~RNP type certification~~PBN capability *(see Note 5)*
F	ADF		
G	~~(~~GNSS~~)~~ ABAS without external augmentation	T	TACAN
H	HF RTF	U	UHF RTF
I	Inertial Navigation	V	VHF RTF
J	~~(Data Link)~~CPDLC FANS 1/A capability *(see Note 3)*	W	RVSM capability
	~~(see Note 3)~~	X	MNPS capability
K	~~(~~MLS~~)~~	~~Y~~	~~when prescribed by ATS~~
L	ILS	Z	Other equipment carried *(see Note 2).*

Any alphanumeric characters not indicated above are reserved.

Note 1.— If the letter S is used, s~~S~~tandard equipment is considered to be VHF RTF, ADF, VOR and ILS, unless another combination is prescribed by the appropriate ATS authority.

Note 2.— If the letter Z is used, specify in Item 18 the other equipment carried or other capabilities, preceded by COM/ ~~and/or~~, NAV/ and/or DAT, as appropriate.

Note 3.— If the letters J or M are~~is~~ used, specify in Item 18 the ~~equipment carried~~data link capabilities, preceded by DAT/ followed by one or more letters as appropriate.

Note 4.— Information on navigation capability is provided to ATC for clearance and routing purposes.

Note 5.— ~~Inclusion of~~If the letter R is used, the performance based navigation levels that can be met are specified in Item 18 following the indicator PBN/. Guidance material on the application of performance based navigation to a specific ~~indicates that an aircraft meets the RNP type prescribed for the~~ route segment~~(s)~~, route~~(s) and/~~or area ~~concerned~~ is contained in the Manual on Required Navigation Performance *(Doc 9613).*

Note 6.— If the letter A is used, the type of external GNSS augmentation is specified in Item 18 following the indicator NAV/.

Surveillance equipment and capabilities

INSERT N if no surveillance equipment for the route to be flown is carried, or the equipment is unserviceable,

OR

INSERT one or two of the following letters to describe the serviceable surveillance equipment ~~carried~~ and/or capabilities on board:

~~SSR equipment~~SSR Modes A and C

~~N Nil~~
A Transponder — Mode A (4 digits — 4 096 codes)
C Transponder — Mode A (4 digits — 4 096 codes) and Mode C

SSR Mode S

~~X Transponder — Mode S without both aircraft identification and pressure-altitude transmission~~
E Transponder — Mode S, including aircraft identification, pressure-altitude and extended squitter (ADS-B) capability
H Transponder — Mode S, including aircraft identification, pressure-altitude and enhanced surveillance capability
I Transponder — Mode S, including aircraft identification, but no pressure-altitude capability
L Transponder — Mode S, including aircraft identification, pressure-altitude, extended squitter (ADS-B) and enhanced surveillance capability
P Transponder — Mode S, including pressure-altitude, but no aircraft identification ~~transmission~~capability
~~I Transponder — Mode S, including aircraft identification transmission, but no pressure-altitude transmission~~
S Transponder — Mode S, including both pressure altitude and aircraft identification ~~transmission~~capability
X Transponder — Mode S with neither aircraft identification nor pressure-altitude capability

ADS-B

B ADS-B with dedicated 1090 MHz ADS-B capability only
U ADS-B capability using UAT
V ADS-B capability using VDL Mode 4

ADS-C

D ADS-C with FANS 1/A capabilities
G ADS-C with ATN capabilities

~~*ADS equipment*~~

~~D ADS capability~~

Alphanumeric characters not indicated above are reserved.

Note.— Additional surveillance applications are listed in Item 18 following the indicator SUR/.

ITEM 13: DEPARTURE AERODROME AND TIME (8 CHARACTERS)

INSERT the ICAO four-letter location indicator of the departure aerodrome as specified in Doc 7910, *Location Indicators*,

OR, if no location indicator has been assigned,

INSERT ZZZZ and *SPECIFY*, in Item 18, the name or location of the aerodrome preceded by DEP/ ,

OR, if the flight plan is received from an aircraft in flight,

INSERT AFIL, and *SPECIFY*, in Item 18, the ICAO four-letter location indicator of the location of the ATS unit from which supplementary flight plan data can be obtained, preceded by DEP/ .

THEN, WITHOUT A SPACE,

INSERT for a flight plan submitted before departure, the estimated off-block time (EOBT),

OR, for a flight plan received from an aircraft in flight, the actual or estimated time over the first point of the route to which the flight plan applies.

ITEM 15: ROUTE

INSERT the *first cruising speed* as in (a) and the *first cruising level* as in (b), without a space between them.

THEN, following the arrow, *INSERT* the route description as in (c).

(a) Cruising speed (maximum 5 characters)

INSERT the *True Air Speed* for the first or the whole cruising portion of the flight, in terms of:

Kilometres per hour, expressed as K followed by 4 figures (e.g. K0830), *or*

Knots, expressed as N followed by 4 figures (e.g. N0485), *or*

True Mach number, when so prescribed by the appropriate ATS authority, to the nearest hundredth of unit Mach, expressed as M followed by 3 figures (e.g. M082).

(b) Cruising level (maximum 5 characters)

INSERT the planned cruising level for the first or the whole portion of the route to be flown, in terms of:

Flight level, expressed as F followed by 3 figures (e.g. F085; F330), *or*

**Standard Metric Level in tens of metres,* expressed as S followed by 4 figures (e.g. S1130), *or*

Altitude in hundreds of feet, expressed as A followed by 3 figures (e.g. A045; A100), *or*

Altitude in tens of metres, expressed as M followed by 4 figures (e.g. M0840), *or*

for uncontrolled VFR flights, the letters VFR.

*When so prescribed by the appropriate ATS authorities.

(c) Route (including changes of speed, level and/or flight rules)

Flights along designated ATS routes

INSERT, if the departure aerodrome is located on or connected to the ATS route, the designator of the first ATS route,

OR, if the departure aerodrome is not on or connected to the ATS route, the letters DCT followed by the point of joining the first ATS route, followed by the designator of the ATS route.

THEN

INSERT each point at which either a change of speed and/or level is planned to commence, or a change of ATS route, and/or a change of flight rules is planned,

Note.— When a transition is planned between a lower and upper ATS route and the routes are oriented in the same direction, the point of transition need not be inserted.

FOLLOWED IN EACH CASE

by the designator of the next ATS route segment, even if the same as the previous one,

OR by DCT, if the flight to the next point will be outside a designated route, unless both points are defined by geographical coordinates.

Flights outside designated ATS routes

INSERT points normally not more than 30 minutes flying time or 370 km (200 NM) apart, including each point at which a change of speed or level, a change of track, or a change of flight rules is planned.

OR, when required by appropriate ATS authority(ies),

DEFINE the track of flights operating predominantly in an east-west direction between 70°N and 70°S by reference to significant points formed by the intersections of half or whole degrees of latitude with meridians spaced at intervals of 10 degrees of longitude. For flights operating in areas outside those latitudes the tracks shall be defined by significant points formed by the intersection of parallels of latitude with meridians normally spaced at 20 degrees of longitude. The distance between significant points shall, as far as possible, not exceed one hour's flight time. Additional significant points shall be established as deemed necessary.

For flights operating predominantly in a north-south direction, define tracks by reference to significant points formed by the intersection of whole degrees of longitude with specified parallels of latitude which are spaced at 5 degrees.

INSERT DCT between successive points unless both points are defined by geographical coordinates or by bearing and distance.

USE ONLY the conventions in (1) to (5) below and *SEPARATE* each sub-item by a space.

(1) ATS route (2 to 7 characters)

The coded designator assigned to the route or route segment including, where appropriate, the coded designator assigned to the standard departure or arrival route (e.g. BCN1, Bl, R14, UB10, KODAP2A).

Note.— Provisions for the application of route designators are contained in Annex 11, Appendix 1, ~~whilst guidance material on the application of an RNP type to a specific route segment(s), route(s) or area is contained in the~~ ~~Manual on Required Navigation Performance (RNP) *(Doc 9613)*~~.

(2) Significant point (2 to 11 characters)

The coded designator (2 to 5 characters) assigned to the point (e.g. LN, MAY, HADDY), *or,*
if no coded designator has been assigned, one of the following ways:

— *Degrees only* (7 characters):

2 figures describing latitude in degrees, followed by "N" (North) or "S" (South), followed by 3 figures describing longitude in degrees, followed by "E" (East) or "W" (West). Make up the correct number of figures, where necessary, by insertion of zeros, e.g. 46N078W.

— *Degrees and minutes* (11 characters):

4 figures describing latitude in degrees and tens and units of minutes followed by "N" (North) or "S" (South), followed by 5 figures describing longitude in degrees and tens and units of minutes, followed by "E" (East) or "W" (West). Make up the correct number of figures, where necessary, by insertion of zeros, e.g. 4620N07805W.

— *Bearing and distance from a ~~navigation aid~~significant point:*

The identification of the ~~navigation aid (normally a VOR)~~significant point, ~~in the form of 2 or 3 characters, THEN~~followed by the bearing from the ~~aid~~point in the form of 3 figures giving degrees magnetic, ~~THEN~~followed by the distance from the ~~aid~~point in the form of 3 figures expressing nautical miles. In areas of high latitude where it is determined by the appropriate authority that reference to degrees magnetic is impractical, degrees true may be used. Make up the correct number of figures, where necessary, by insertion of zeros — e.g. a point 180° magnetic at a distance of 40 nautical miles from VOR "DUB" should be expressed as DUB180040.

(3) | Change of speed or level (maximum 21 characters) |

The point at which a change of speed (5% TAS or 0.01 Mach or more) or a change of level is planned to commence, expressed exactly as in (2) above, followed by an *oblique stroke and both the cruising speed and the cruising level*, expressed exactly as in (a) and (b) above, without a space between them, *even when only one of these quantities will be changed*.

Examples: LN/N0284A045
MAY/N0305Fl80
HADDY/N0420F330
4602N07805W/N0500F350
46N078W/M082F330
DUB180040/N0350M0840

(4) | Change of flight rules (maximum 3 characters) |

The point at which the change of flight rules is planned, expressed exactly as in (2) or (3) above as appropriate, *followed by a space and one of the following*:

VFR if from IFR to VFR
IFR if from VFR to IFR

Examples: LN VFR
LN/N0284A050 IFR

(5) | Cruise climb (maximum 28 characters) |

The letter C followed by an *oblique stroke*; *THEN the point at which cruise climb is planned to start*, expressed exactly as in (2) above, *followed by an oblique stroke; THEN the speed to be maintained during cruise climb*, expressed exactly as in (a) above, followed by *the two levels defining the layer to be occupied during cruise climb*, each level expressed exactly as in (b) above, *or the level above which cruise climb is planned followed by the letters PLUS*, without a space between them.

Examples: C/48N050W/M082F290F350
C/48N050W/M082F290PLUS
C/52N050W/M220F580F620.

ITEM 16: DESTINATION AERODROME AND TOTAL ESTIMATED ELAPSED TIME, DESTINATION ALTERNATE AERODROME(S)

Destination aerodrome and total estimated elapsed time (8 characters)

INSERT the ICAO four-letter location indicator of the destination aerodrome ~~followed, without a space, by the total estimated elapsed time~~as specified in Doc 7910, *Location Indicators*,

OR , if no location indicator has been assigned,

INSERT ZZZZ ~~followed, without a space, by the total estimated elapsed time,~~ and *SPECIFY* in Item 18 the name or location of the aerodrome, preceded by DEST/ .

THEN WITHOUT A SPACE

INSERT the total estimated elapsed time.

Note.— For a flight plan received from an aircraft in flight, the total estimated elapsed time is the estimated time from the first point of the route to which the flight plan applies to the termination point of the flight plan.

Destination a~~A~~lternate aerodrome(s) ~~(4 characters)~~

INSERT the ICAO four-letter location indicator(s) of not more than two destination alternate aerodromes, as specified in Doc 7910, *Location Indicators*, separated by a space,

OR, if no location indicator has been assigned to the destination alternate aerodrome(s),

INSERT ZZZZ and *SPECIFY* in Item 18 the name or location of the destination alternate aerodrome(s), preceded by ALTN/ .

ITEM 18: OTHER INFORMATION

Note.— Use of indicators not included under this item may result in data being rejected, processed incorrectly or lost.

Hyphens or oblique strokes should only be used as prescribed below.

INSERT 0 (zero) if no other information,

OR, any other necessary information in the preferred sequence shown hereunder, in the form of the appropriate indicator selected from those defined hereunder or in the *Regional Supplementary Procedures* (Doc 7030, SUPPS) followed by an oblique stroke and the information to be recorded:

STS/ Reason for special handling by ATS, e.g. a search and rescue mission, as follows:

ALTRV: for a flight operated in accordance with an altitude reservation;
ATFMX: for a flight approved for exemption from ATFM measures by the appropriate ATS authority;
FFR: fire-fighting;
FLTCK: flight check for calibration of navaids;
HAZMAT: for a flight carrying hazardous material;
HEAD: a flight with Head of State status;
HOSP: for a medical flight declared by medical authorities;
HUM: for a flight operating on a humanitarian mission;
MARSA: for a flight for which a military entity assumes responsibility for separation of military aircraft;
MEDEVAC: for a life critical medical emergency evacuation;
NONRVSM: for a non-RVSM capable flight intending to operate in RVSM airspace;
SAR: for a flight engaged in a search and rescue mission; and
STATE: for a flight engaged in military, customs or police services.

Other reasons for special handling by ATS shall be denoted under the designator RMK/.

PBN/ Indication of RNAV and/or RNP capabilities. Include as many of the descriptors below, as apply to the flight, up to a maximum of 8 entries, i.e. a total of not more than 16 characters.

	RNAV SPECIFICATIONS
A1	RNP 10
B1	RNAV 5 all permitted sensors
B2	RNAV 5 GNSS
B3	RNAV 5 DME/DME
B4	RNAV 5 VOR/DME
B5	RNAV 5 INS or IRS
B6	RNAV 5 LORANC
C1	RNAV 2 all permitted sensors
C2	RNAV 2 GNSS
C3	RNAV 2 DME/DME
C4	RNAV 2 DME/DME/IRU
D1	RNAV 1 all permitted sensors
D2	RNAV 1 GNSS
D3	RNAV 1 DME/DME
D4	RNAV 1 DME/DME/IRU
	RNP SPECIFICATIONS
L1	RNP 4
O1	Basic RNP 1 all permitted sensors
O2	Basic RNP 1 GNSS
O3	Basic RNP 1 DME/DME
O4	Basic RNP 1 DME/DME/IRU

S1	RNP APCH
T1	RNP AR APCH with RF (special authorization required)
T2	RNP AR APCH without RF (special authorization required)

Combinations of alphanumeric characters not indicated above are reserved.

~~EET/ Significant points or FIR boundary designators and accumulated estimated elapsed times to such points or FIR boundaries, when so prescribed on the basis of regional air navigation agreements, or by the appropriate ATS authority.~~

~~Examples: EET/CAP0745 XYZ0830~~
~~EET/EINN0204~~

~~RIF/ The route details to the revised destination aerodrome, followed by the ICAO four-letter location indicator of the aerodrome. The revised route is subject to reclearance in flight.~~

~~Examples: RIF/DTA HEC KLAX~~
~~Examples: RIF/ESP G94 CLA YPPH~~
~~Examples: RIF/LEMD~~

~~REG/ The registration markings of the aircraft, if different from the aircraft identification in Item 7.~~

~~SEL/ SELCAL Code, if so prescribed by the appropriate ATS authority.~~

~~OPR/ Name of the operator, if not obvious from the aircraft identification in Item 7.~~

~~STS/ Reason for special handling by ATS, e.g. hospital aircraft, one engine inoperative, e.g. STS/HOSP, STS/ONE ENG INOP.~~

~~TYP/ Type(s) of aircraft, preceded if necessary by number(s) of aircraft, if ZZZZ is inserted in Item 9.~~

~~PER/ Aircraft performance data, if so prescribed by the appropriate ATS authority.~~

~~COM/ Significant data related to communication equipment as required by the appropriate ATS authority, e.g. COM/UHF only.~~

~~DAT/ Significant data related to data link capability, using one or more of the letters S, H, V and M, e.g. DAT/S for satellite data link, DAT/H for HF data link, DAT/V for VHF data link, DAT/M for SSR Mode S data link.~~

NAV/ Significant data related to navigation equipment, other than specified in PBN/, as required by the appropriate ATS authority. Indicate GNSS augmentation under this indicator, with a space between two or more methods of augmentation, e.g. NAV/GBAS SBAS.

COM/ For flights exempted from carriage requirement of a VHF transceiver with 8.33 kHz channel spacing but not RCP capable, insert COM/A.

For RCP capable flights, enter COM/ followed by the characters RCP and 3 numerics, which represent the RCP type to which the aircraft is capable of operating, e.g. COM/RCP120 followed by a space and in alphabetical order, as many of the descriptors below that apply to the flight.

A	Flight exempted from carriage requirement of a VHF transceiver with 8.33 kHz channel spacing
B	CPDLC message subset version number (110 pending finalization)
C	CPDLC message subset version number (112 pending finalization)

Example: COM/RCP120 AC

Alphanumeric characters not indicated above are reserved.

Note.— Guidance material on the application of an RCP type to a specific route segment, route or area is contained in the Manual on Required Communication Performance (RCP) *(Doc 9869).*

DAT/ Indicate CPDLC data link transmission medium and other applications using one or more of the letters listed below.

F	FIS using VHF data link
H	CPDLC using HF data link transmission capability
S	CPDLC using satellite data link capability
V	CPDLC using VHF data link capability

Example: DAT/FHSV

Alphanumeric characters not indicated above are reserved.

SUR/ Include surveillance applications or capabilities by listing as many of the descriptors below that apply to the flight, following SUR/ in alphabetical order.

A	TIS-B
B	ADS-B Air to Air Surveillance “ADS-B in”

DEP/ Name of departure aerodrome, if ZZZZ is inserted in Item 13, or the ~~ICAO four-letter location indicator of the location of the~~ ATS unit from which supplementary flight plan data can be obtained, if AFIL is inserted in Item 13. For aerodromes not listed in the relevant Aeronautical Information Publication, indicate location

EITHER in LAT/LONG, as follows:

With 4 figures describing latitude in degrees and tens and units of minutes followed by "N" (North) or "S" (South), followed by 5 figures describing longitude in degrees and tens and units of minutes, followed by "E" (East) or "W" (West). Make up the correct number of figures, where necessary, by insertion of zeros, e.g. 4620N07805W (11 characters).

OR bearing and distance from the nearest significant point, as follows:

The identification of the significant point followed by the bearing from the point in the form of 3 figures giving degrees magnetic, followed by the distance from the point in the form of 3 figures expressing nautical miles. In areas of high latitude where it is determined by the appropriate authority that reference to degrees magnetic is impractical, degrees true may be used. Make up the correct number of figures, where necessary, by insertion of zeros, e.g. a point of 180° magnetic at a distance of 40 nautical miles from VOR "DUB" should be expressed as DUB180040.

DEST/ Name of destination aerodrome, if ZZZZ is inserted in Item 16. For aerodromes not listed in the relevant Aeronautical Information Publication, indicate location in LAT/LONG or bearing and distance from the nearest significant point, as described under DEP/ above.

DOF/ The date of flight departure in a six figure format (YYMMDD, where YY equals the year, MM equals the month and DD equals the day).

REG/ The nationality or common mark and registration mark of the aircraft, if different from the aircraft identification in Item 7.

EET/ Significant points or FIR boundary designators and accumulated estimated elapsed times from take-off to such points or FIR boundaries, when so prescribed on the basis of regional air navigation agreements, or by the appropriate ATS authority.

Examples: EET/CAP0745 XYZ0830
EET/EINN0204

SEL/ SELCAL Code, for aircraft so equipped.

TYP/ Type(s) of aircraft, preceded if necessary by number(s) of aircraft and separated by one space, if ZZZZ is inserted in Item 9.

Example: TYP/2 F15 5 F5 3 B2

~~ALTN/ Name of destination alternate aerodrome(s), if ZZZZ is inserted in Item 16.~~

~~RALT/ Name of en-route alternate aerodrome(s).~~

CODE/ Aircraft address (expressed in the form of an alphanumerical code of six hexadecimal characters) when required by the appropriate ATS authority. Example: "F00001" is the lowest aircraft address contained in the specific block administered by ICAO.

DLE/ Enroute delay or holding, insert the significant point(s) on the route where a delay is planned to occur, followed by the length of delay using four figure time in hours and minutes (hhmm).

Example: DLE/MDG0030

OPR/ ICAO designator or name of the aircraft operating agency, if different from the aircraft identification in item 7.

ORGN/ The originator's 8 letter AFTN address or other appropriate contact details, in cases where the originator of the flight plan may not be readily identified, as required by the appropriate ATS authority.

Note.— In some areas, flight plan reception centres may insert the ORGN/ identifier and originator's AFTN address automatically.

PER/ Aircraft performance data, indicated by a single letter as specified in the *Procedures for Air Navigation Services — Aircraft Operations* (PANS-OPS, Doc 8168)*, Volume I — Flight Procedures*, if so prescribed by the appropriate ATS authority.

ALTN/ Name of destination alternate aerodrome(s), if ZZZZ is inserted in Item 16. For aerodromes not listed in the relevant Aeronautical Information Publication, indicate location in LAT/LONG or bearing and distance from the nearest significant point, as described in DEP/ above.

RALT/ ICAO four letter indicator(s) for en-route alternate(s), as specified in Doc 7910, *Location Indicators*, or name(s) of en-route alternate aerodrome(s), if no indicator is allocated. For aerodromes not listed in the relevant Aeronautical Information Publication, indicate location in LAT/LONG or bearing and distance from the nearest significant point, as described in DEP/ above.

TALT/ ICAO four letter indicator(s) for take-off alternate, as specified in Doc 7910, *Location Indicators*, or name of take-off alternate aerodrome, if no indicator is allocated. For aerodromes not listed in the relevant Aeronautical Information Publication, indicate location in LAT/LONG or bearing and distance from the nearest significant point, as described in DEP/ above.

RIF/ The route details to the revised destination aerodrome, following by the ICAO four-letter location indicator of the aerodrome. The revised route is subject to reclearance in flight.

Examples: RIF/DTA HEC KLAX
RIF/ESP G94 CLA YPPH

RMK/ Any other plain language remarks when required by the appropriate ATS authority or deemed necessary.

ITEM 19: SUPPLEMENTARY INFORMATION

. . .

4. Instructions for the transmission of a supplementary flight plan (SPL) message

Items to be transmitted

Transmit items as indicated hereunder, unless otherwise prescribed:

a) AFTN Priority Indicator, Addressee Indicators <<≡, Filing Time, Originator Indicator <<≡ and, if necessary, specific identification of addressees and/or originator;

b) commencing with <<≡ (SPL:

all symbols and data in the unshaded areas of boxes 7, 13, 16 and 18, except that the ')' at the end of box 18 is *not* to be transmitted, and then the symbols in the unshaded area of box 19 down to and including the)<<≡ of box 19,

additional alignment functions as necessary to prevent the inclusion of more than 69 characters in any line of Items 18 and 19. The alignment function is to be inserted only in lieu of a space, so as not to break up a group of data,

letter shifts and figure shifts (not pre-printed on the form) as necessary;

c) the AFTN Ending, as described below:

End-of-Text Signal

a) one LETTER SHIFT

b) two CARRIAGE RETURNS, one LINE FEED

Page-feed Sequence

Seven LINE FEEDS

End-of-Message Signal

Four of the letter N.

. . .

7. Instructions for the completion of the repetitive flight plan (RPL) listing form

. . .

7.4 Instructions for insertion of RPL data

. . .

ITEM G: SUPPLEMENTARY DATA AT

INSERT name and appropriate contact details of ~~contact~~entity where information normally provided under Item 19 of the FPL is kept readily available and can be supplied without delay.

. . .

APPENDIX 3. AIR TRAFFIC SERVICES MESSAGES

1. Message contents, formats and data conventions

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1.2 The standard types of field

. . .

The standard fields of data permitted in ATS messages are as shown in the following table. The numbers in column 1 correspond with those in the reference table on page A3-30.

Field type	*Data*
3	Message type, number and reference data
5	Description of emergency
7	Aircraft identification and SSR Mode and Code
8	Flight rules and type of flight
9	Number and type of aircraft and wake turbulence category
10	Equipment and capabilities
13	Departure aerodrome and time
14	Estimate data
15	Route
16	Destination aerodrome and total estimated elapsed time, destination alternate aerodrome(s)
17	Arrival aerodrome and time
18	Other information
19	Supplementary information
20	Alerting search and rescue information
21	Radio failure information
22	Amendment

. . .

1.6 Data conventions

. . .

1.6.3 *The expression of position or route*

The following alternative data conventions shall be used for the expression of position or route:

a) from 2 to 7 characters, being the coded designator assigned to an ATS route to be flown;

b) from 2 to 5 characters, being the coded designator assigned to an en-route point;

c) 4 numerics describing latitude in degrees and tens and units of minutes, followed by "N" (meaning "North") or "S" (South), followed by 5 numerics describing longitude in degrees and tens and units of minutes, followed by "E" (East) or "W" (West). The correct number of numerics is to be made up, where necessary, by the insertion of zeros, e.g. "4620N07805W";

d) 2 numerics describing latitude in degrees, followed by "N" (North) or "S" (South), followed by 3 numerics describing longitude in degrees, followed by "E" (East) or "W" (West). Again, the correct number of numerics is to be made up, where necessary, by the insertion of zeros, e.g. "46N078W";

e) 2 ~~or 3~~to 5 characters being the coded identification of a ~~navigation aid (normally a VOR)~~ significant point, followed by 3 decimal numerics giving the bearing from the point in degrees magnetic followed by 3 decimal numerics giving the distance from the point in nautical miles. The correct number of numerics is to be made up, where necessary, by the insertion of zeros, e.g. a point at 180° magnetic at a distance of 40 nautical miles from VOR "FOJ" would be expressed as "FOJ180040".

. . .

Field Type 8 — Flight rules and type of flight

Format:– [a] [b]*

SINGLE HYPHEN

(a) *Flight Rules*
1 LETTER as follows:
I if ~~IFR~~it is intended that the entire flight will be operated under the IFR
V if ~~VFR~~ it is intended that the entire flight will be operated under the VFR
Y if ~~IFR first~~the flight initially will be operated under the IFR, followed by one or more subsequent changes of flight rules
Z if ~~VFR first~~the flight initially will be operated under the VFR, followed by one or more subsequent changes of flight rules
Note.— If the letter Y or Z is used, the point or points at which a change of flight rules is planned is to be shown as indicated in Field Type 15.

* This field shall be terminated here unless indication of the type of flight is required by the appropriate ATS authority.

. . .

Field Type 10 — Equipment and Capabilities

Format:– [a] / [b]

SINGLE HYPHEN

(a) *Radio Communication, Navigation and Approach Aid Equipment and Capabilities*

1 LETTER as follows:

N no COM/NAV/approach aid equipment for the route to be flown is carried, or the equipment is unserviceable

OR

S Standard COM/NAV/approach aid equipment for the route to be flown is carried and serviceable (*See Note 1*)

AND/OR

ONE OR MORE OF THE FOLLOWING LETTERS to indicate the serviceable COM/NAV/approach aid equipment ~~serviceable~~and capabilities

A	~~(Not allocated)~~GNSS Augmentation in addition to ABAS *(see Note 6)*	M	~~Omega~~CPDLC ATN capability *(see Note 3)*
~~B~~	~~(Not allocated)~~	O	VOR
C	LORAN C	~~P~~	~~(Not allocated)~~
D	DME	~~Q~~	~~(Not allocated)~~
E	~~(Not allocated)~~DME-DME with IRU	R	~~RNP type certification~~PBN capability *(see Note 5)*
F	ADF	T	TACAN
G	~~(~~GNSS~~)~~ ABAS without external augmentation	U	UHF RTF
		V	VHF RTF
H	HF RTF	W	~~when~~RVSM capability
I	Inertial Navigation	X	MNPS capability
J	~~(Data link)~~CPDLC FANS 1/A capability *(see Note 3)*	~~Y~~	~~prescribed by ATS~~
K	~~(~~MLS~~)~~		
L	ILS		
		Z	Other equipment carried *(see Note 2)*

Note 1.— Standard equipment is considered to be VHF RTF, ADF, VOR and ILS, unless another combination is prescribed by the appropriate ATS authority.

Note 2.— If the letter Z is used, specify in Item 18, other ~~the~~ equipment carried or other capabilities~~is to be specified in Item 18~~, preceded by COM/, and/or NAV/, and/or DAT as appropriate.

Note 3.— If the letters J or M, are~~is~~ used, specify in Item 18 the ~~equipment carried~~data link capabilities, preceded by DAT/followed by one or more letters as appropriate.

Note 4.— Information on navigation capability is provided to ATC for clearance and routing purposes.

Note 5.— ~~Inclusion of~~If the letter R is used, the performance based navigation levels that can be met are specified in Item 18 following the indicator PBN/. Guidance material on the application of performance based navigation to a specific ~~indicates that an aircraft meets the RNP type prescribed for the~~ route segment~~(s)~~, route~~(s) and/~~or area ~~concerned~~ is contained in the Performance Based Navigation Manual *(Doc 9613).*

Note 6.— If the letter A is used, the type of external GNSS augmentation is specified in Item 18 following the indicator NAV/.

Note 7.— Guidance material on the application of an RCP type to a specific route segment, route or area is contained in the Manual on Required Communication Performance (RCP) *(Doc 9869).*

OBLIQUE STROKE

(b) *Surveillance Equipment and capabilities*

ONE OR TWO LETTERS to describe the serviceable surveillance equipment ~~carried~~and/or capabilities on board:

SSR ~~equipment~~Modes A and C

~~N Nil~~
A Transponder — Mode A (4 digits — 4 096 codes)
C Transponder — Mode A (4 digits — 4 096 codes) and Mode C

SSR Mode S

~~X Transponder — Mode S without both aircraft identification and pressure-altitude transmission~~
E Transponder — Mode S, including aircraft identification, pressure-altitude and extended squitter (ADS-B) capability
H Transponder — Mode S, including aircraft identification, pressure-altitude and enhanced surveillance capability
I Transponder — Mode S, including aircraft identification, but no pressure-altitude capability
L Transponder — Mode S, including aircraft identification, pressure-altitude, extended squitter (ADS-B) and enhanced surveillance capability
P Transponder — Mode S, including pressure-altitude, but no aircraft identification ~~transmission~~capability
~~I Transponder — Mode S, including aircraft identification transmission, but no pressure-altitude transmission~~

S Transponder — Mode S, including both pressure altitude and aircraft identification ~~transmission~~capability
X Transponder — Mode S with neither aircraft identification nor pressure-altitude capability

ADS-B

B ADS-B with dedicated 1090 MHz ADS-B capability only
U ADS-B capability using UAT

V ADS-B capability using VDL Mode 4

ADS-C

D ADS-C with FANS 1/A capabilities
G ADS-C with ATN capabilities

~~*ADS equipment*~~

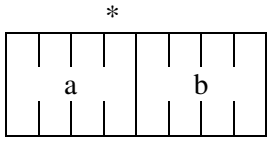
~~D ADS capability~~

Alphanumeric characters not indicated above are reserved.

Examples: –ZS/A
–SCHJ/CD
–SAFJ/SD

. . .

Field Type 13 — Departure aerodrome and time

Format:– 

SINGLE HYPHEN

(a) *Departure Aerodrome*

4 LETTERS, being

the ICAO four-letter location indicator allocated to the departure aerodrome as specified in Doc 7910, *Location Indicators*, or

ZZZZ if no ICAO location indicator has been allocated (*see Note 1*) or if the departure aerodrome is not known, or

AFIL if the flight plan has been filed in the air (*see Note 2*).

Note 1.— If ZZZZ is used, the name or location of the departure aerodrome is to be shown in the Other Information Field (see Field Type 18) if this Field Type is contained in the message.

Note 2.— If AFIL is used, the ATS unit from which supplementary flight data can be obtained is to be shown in the Other Information Field (Field Type 18).

* This field shall be terminated here in message types ~~CHG, CNL,~~ ARR, CPL, EST, CDN, ACP and RQS. It shall be terminated here in message type RQP if the estimated off-block time is not known.

(b) *Time*

4 NUMERICS giving

the estimated off-block time (EOBT) at the aerodrome in (a) in FPL, CHG, CNL and DLA messages transmitted before departure and in RQP message, if known, or

the actual time of departure from the aerodrome in (a) in ALR, DEP and SPL messages, or

the actual or estimated time of departure from the first point shown in the Route Field (see Field Type 15) in FPL messages derived from flight plans filed in the air, as shown by the letters AFIL in (a).

For correlation purposes EOBT may be included in a modification (CHG) message and/or cancellation (CNL) messge.

Examples: –EHAM0730
–AFIL1625

. . .

Field Type 14 — Estimate data

Format:– [a] / [b] [c]* [d] [e]

SINGLE HYPHEN

(a) *Boundary Point (see Note 1)*

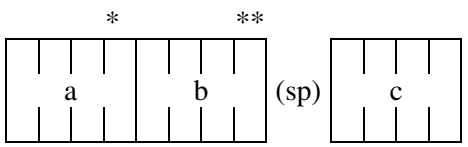
The BOUNDARY POINT expressed either by a designator consisting of 2 to 5 characters, in Geographical Coordinates, in Abbreviated Geographical Coordinates, or by bearing and distance from a ~~designated~~significant point ~~(e.g. a VOR)~~.

Note 1.— This point may be an agreed point located close to, rather than on, the FIR boundary.

Note 2.— See 1.6 for data conventions.

. . .

Field Type 16 — Destination aerodrome and total estimated elapsed time, destination alternate aerodrome(s)

Format:– 

See Note in margin on page A3-20.

SINGLE HYPHEN

(a) *Destination Aerodrome*

4 LETTERS, being

the ICAO four-letter location indicator allocated to the destination aerodrome as specified in Doc 7910, *Location Indicators*, or

ZZZZ if no ICAO location indicator has been allocated.

Note.— If ZZZZ is used, the name or location of the destination aerodrome is to be shown in the Other Information Field (see Field Type 18).

* This field is to be terminated here in all message types other than ALR, FPL and SPL.

• • •

SPACE

(c) *Destination Alternate Aerodrome(s)*
4 LETTERS, being

the ICAO four-letter location indicator allocated to an alternate aerodrome, as specified in Doc 7910, *Location Indicators* or

ZZZZ if no ICAO location indicator has been allocated.

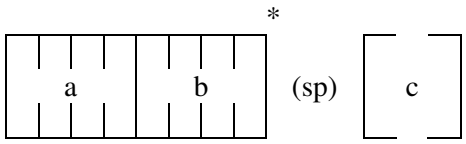
Note.— If ZZZZ is used, the name or location of the destination alternate aerodrome is to be shown in the Other Information Field (see Field Type 18).

.

Note.— One further element of (c) should be added, as necessary, preceded by a space

Examples: –EINN0630
–EHAM0645 EBBR
–EHAM0645 EBBR EDDL

Field Type 17 — Arrival aerodrome and time

Format:– 

SINGLE HYPHEN

(a) *Arrival Aerodrome* 4 LETTERS, being the ICAO four-letter location indicator allocated to the arrival aerodrome as specified in Doc 7910, *Location Indicators*, or ZZZZ if no ICAO location indicator has been allocated. *Note.— If ZZZZ is used, the name or location of the arrival aerodrome is to be shown in the Other Information Field (see Field Type 18).*

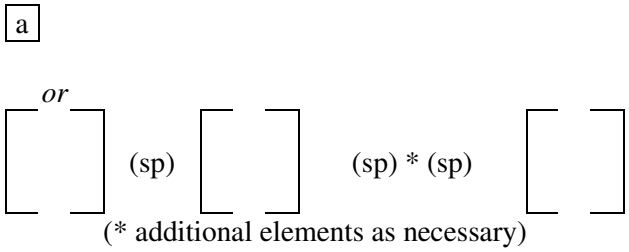
(b) *Time of Arrival* 4 NUMERICS, giving the actual time of arrival.

* This field is to be terminated here if an ICAO location indicator has been allocated to the arrival aerodrome.

Field Type 18 — Other information

Note.— Use of indicators not included under this item may result in data being rejected, processed incorrectly or lost.

Hyphens or oblique strokes should only be used as prescribed below.

Format:– 

(* additional elements as necessary)

SINGLE HYPHEN

(a) 0 (zero) if no other information,

OR,

Any other necessary information in the preferred sequence shown hereunder, in the form of the appropriate indicator selected from those defined hereunder or in the *Regional Supplementary Procedures* (Doc 7030, SUPPS) followed by an oblique stroke and the information to be recorded:

STS/ Reason for special handling by ATS, e.g. a search and rescue mission, as follows:

ALTRV: for a flight operated in accordance with an altitude reservation;
ATFMX: for a flight approved for exemption from ATFM measures by the appropriate ATS authority;
FFR: fire-fighting;
FLTCK: flight check for calibration of navaids;
HAZMAT: for a flight carrying hazardous material;
HEAD: a flight with Head of State status;
HOSP: for a medical flight declared by medical authorities;
HUM: for a flight operating on a humanitarian mission;
MARSA: for a flight for which a military entity assumes responsibility for separation of military aircraft;
MEDEVAC: for a life critical medical emergency evacuation;
NONRVSM: for a non-RVSM capable flight intending to operate in RVSM airspace;
SAR: for a flight engaged in a search and rescue mission; and
STATE: for a flight engaged in military, customs or police services.

Other reasons for special handling by ATS shall be denoted under the designator RMK/.

PBN/ Indication of RNAV and/or RNP capabilities. Include as many of the descriptors below, as apply to the flight, up to a maximum of 8 entries, i.e. a total of not more than 16 characters.

	RNAV SPECIFICATIONS
A1	RNP 10
B1	RNAV 5 all permitted sensors
B2	RNAV 5 GNSS
B3	RNAV 5 DME/DME
B4	RNAV 5 VOR/DME
B5	RNAV 5 INS or IRS
B6	RNAV 5 LORANC
C1	RNAV 2 all permitted sensors
C2	RNAV 2 GNSS
C3	RNAV 2 DME/DME
C4	RNAV 2 DME/DME/IRU
D1	RNAV 1 all permitted sensors
D2	RNAV 1 GNSS
D3	RNAV 1 DME/DME

D4	RNAV 1 DME/DME/IRU
	RNP SPECIFICATIONS
L1	RNP 4
O1	Basic RNP 1 all permitted sensors
O2	Basic RNP 1 GNSS
O3	Basic RNP 1 DME/DME
O4	Basic RNP 1 DME/DME/IRU
S1	RNP APCH
T1	RNP AR APCH with RF (special authorization required)
T2	RNP AR APCH without RF (special authorization required)

Combinations of alphanumeric characters not indicated above are reserved.

~~EET/ Significant points or FIR boundary designators and accumulated estimated elapsed times to such points or FIR boundaries, when so prescribed on the basis of regional air navigation agreements, or by the appropriate ATS authority.~~
~~Examples: EET/CAP0745 XYZ0830~~
~~EET/EINN0204~~

~~RIF/ The route details to the revised destination aerodrome, followed by the ICAO four-letter location indicator of the aerodrome. The revised route is subject to reclearance in flight.~~

~~Examples: RIF/DTA HEC KLAX~~
~~Examples: RIF/ESP G94 CLA YPPH~~
~~Examples: RIF/LEMD~~

~~REG/ The registration markings of the aircraft, if different from the aircraft identification in Item 7.~~

~~SEL/ SELCAL Code, if so prescribed by the appropriate ATS authority.~~

~~OPR/ Name of the operator, if not obvious from the aircraft identification in Item 7.~~

~~STS/ Reason for special handling by ATS, e.g. hospital aircraft, one engine inoperative, e.g. STS/HOSP, STS/ONE ENG INOP.~~

~~TYP/ Type(s) of aircraft, preceded if necessary by number(s) of aircraft, if ZZZZ is inserted in Item 9.~~

~~PER/ Aircraft performance data, if so prescribed by the appropriate ATS authority.~~

~~COM/ Significant data related to communication equipment as required by the appropriate ATS authority, e.g. COM/UHF only.~~

~~DAT/ Significant data related to data link capability, using one or more of the letters S, H, V and M, e.g. DAT/S for satellite data link, DAT/H for HF data link, DAT/V for VHF data link, DAT/M for SSR Mode S data link.~~

NAV/ Significant data related to navigation equipment, other than specified in PBN/, as required by the appropriate ATS authority. Indicate GNSS augmentation under this indicator, with a space between two or more methods of augmentation, e.g. NAV/GBAS SBAS.

COM/ For flights exempted from carriage requirement of a VHF transceiver with 8.33 kHz channel spacing but not RCP capable, insert COM/A.

For RCP capable flights, enter COM/ followed by the characters RCP and 3 numerics, which represent the RCP type to which the aircraft is capable of operating, e.g. COM/RCP120 followed by a space and in alphabetical order, as many of the descriptors below that apply to the flight.

A	Flight exempted from carriage requirement of a VHF transceiver with 8.33 kHz channel spacing
B	CPDLC message subset version number (110 pending finalization)
C	CPDLC message subset version number (112 pending finalization)

Example: –COM/RCP120 AC

Alphanumeric characters not indicated above are reserved.

DAT/ Indicate CPDLC data link transmission medium and other applications using one or more of the letters listed below.

F	FIS using VHF data link
H	CPDLC using HF data link transmission capability
S	CPDLC using satellite data link capability
V	CPDLC using VHF data link capability

Example: –DAT/FHSV

Alphanumeric characters not indicated above are reserved.

SUR/ Include surveillance applications or capabilities by listing as many of the descriptors below that apply to the flight, following SUR/ in alphabetical order.

A	TIS-B
B	ADS-B Air to Air Surveillance “ADS-B in”

DEP/ Name of departure aerodrome, if ZZZZ is inserted in Item 13, or the ~~ICAO four-letter location indicator of the location of the~~ ATS unit from which supplementary flight plan data can be

obtained, if AFIL is inserted in Item 13. For aerodromes not listed in the relevant Aeronautical Information Publication, indicate location

EITHER in LAT/LONG, as follows:

With 4 figures describing latitude in degrees and tens and units of minutes followed by "N" (North) or "S" (South), followed by 5 figures describing longitude in degrees and tens and units of minutes, followed by "E" (East) or "W" (West). Make up the correct number of figures, where necessary, by insertion of zeros, e.g. 4620N07805W (11 characters).

OR bearing and distance from the nearest significant point, as follows:

The identification of the significant point followed by the bearing from the point in the form of 3 figures giving degrees magnetic, followed by the distance from the point in the form of 3 figures expressing nautical miles. In areas of high latitude where it is determined by the appropriate authority that reference to degrees magnetic is impractical, degrees true may be used. Make up the correct number of figures, where necessary, by insertion of zeros, e.g. a point of 180° magnetic at a distance of 40 nautical miles from VOR "DUB" should be expressed as DUB180040.

DEST/ Name of destination aerodrome, if ZZZZ is inserted in Item 16. For aerodromes not listed in the relevant Aeronautical Information Publication, indicate location in LAT/LONG or bearing and distance from the nearest significant point, as described under DEP/ above.

DOF/ The date of flight departure in a six figure format (YYMMDD, where YY equals the year, MM equals the month and DD equals the day).

REG/ The nationality or common mark and registration mark of the aircraft, if different from the aircraft identification in Item 7.

EET/ Significant points or FIR boundary designators and accumulated estimated elapsed times from take-off to such points or FIR boundaries, when so prescribed on the basis of regional air navigation agreements, or by the appropriate ATS authority.

Examples:–EET/CAP0745 XYZ0830
–EET/EINN0204

SEL/ SELCAL Code, for aircraft so equipped.

TYP/ Type(s) of aircraft, preceded if necessary by number(s) of aircraft and separated by one space, if ZZZZ is inserted in Item 9.

Example: –TYP/2 F15 5 F5 3 B2

~~ALTN/ Name of destination alternate aerodrome(s), if ZZZZ is inserted in Item 16.~~

~~RALT/ Name of en-route alternate aerodrome(s).~~

CODE/ Aircraft address (expressed in the form of an alphanumerical code of six hexadecimal characters) when required by the appropriate ATS authority. Example: "F00001" is the lowest aircraft address contained in the specific block administered by ICAO.

DLE/ Enroute delay or holding, insert the significant point(s) on the route where a delay is planned to occur, followed by the length of delay using four figure time in hours and minutes (hhmm).

Example: –DLE/MDG0030

OPR/ ICAO designator or name of the aircraft operating agency, if different from the aircraft identification in item 7.

ORGN/ The originator's 8 letter AFTN address or other appropriate contact details, in cases where the originator of the flight plan may not be readily identified, as required by the appropriate ATS authority.

Note.— In some areas, flight plan reception centres may insert the ORGN/ identifier and originator's AFTN address automatically.

PER/ Aircraft performance data, indicated by a single letter as specified in the *Procedures for Air Navigation Services — Aircraft Operations* (PANS-OPS, Doc 8168)*, Volume I — Flight Procedures*, if so prescribed by the appropriate ATS authority.

ALTN/ Name of destination alternate aerodrome(s), if ZZZZ is inserted in Item 16. For aerodromes not listed in the relevant Aeronautical Information Publication, indicate location in LAT/LONG or bearing and distance from the nearest significant point, as described in DEP/ above.

RALT/ ICAO four letter indicator(s) for en-route alternate(s), as specified in Doc 7910, *Location Indicators*, or name(s) of en-route alternate aerodrome(s), if no indicator is allocated. For aerodromes not listed in the relevant Aeronautical Information Publication, indicate location in LAT/LONG or bearing and distance from the nearest significant point, as described in DEP/ above.

TALT/ ICAO four letter indicator(s) for take-off alternate, as specified in Doc 7910, *Location Indicators*, or name of take-off alternate aerodrome, if no indicator is allocated. For aerodromes not listed in the relevant Aeronautical Information Publication, indicate location in LAT/LONG or bearing and distance from the nearest significant point, as described in DEP/ above.

RIF/ The route details to the revised destination aerodrome, following by the ICAO four-letter location indicator of the aerodrome. The revised route is subject to reclearance in flight.

Examples:–RIF/DTA HEC KLAX
–RIF/ESP G94 CLA YPPH

RMK/ Any other plain language remarks when required by the appropriate ATS authority or deemed necessary.

Examples:–0
–STS/MEDEVAC
–DAT/S
–EET/15W0315 20W0337 30W0420 40W0502

. . .

RULES FOR THE COMPOSITION OF ATS MESSAGES
(See Sections 1.3 to 1.8 of this Appendix)

. . .

The expression of position or route

The following alternative data conventions shall be used for the expression of position or route:

. . .

(e) 2 ~~or 3~~to 5 characters being the coded identification of a ~~navigation aid (normally a VOR)~~ significant point, followed by 3 decimal numerics giving the bearing from the point in degrees magnetic followed by 3 decimal numerics giving the distance from the point in nautical miles. The correct number of numerics is to be made up, where necessary, by insertion of zeros, e.g. a point at 180° magnetic at a distance of 40 nautical miles from VOR "FOJ" would be expressed as "FOJ180040".

. . .

2. Examples of ATS messages

. . .

2.2 Emergency messages

2.2.1 *Alerting (ALR) message*

2.2.1.1 *Composition*

. . .

–	9 Type of aircraft and wake turbulence category	–	10 Equipment and capabilities

. . .

16 Destination aerodrome and total estimated elapsed time, destination alternate aerodrome(s)

. . .

2.2.1.2 *Example*

The following is an example of an alerting message relating to an uncertainty phase, sent by Athens Approach Control to Belgrade Centre and other ATS units, in respect of a flight from Athens to Munich.

(ALR-INCERFA/LGGGZAZX/OVERDUE
–FOX236/A3600-IM
–C141/H-S/CD
–LGAT1020

–N0430F220 B9 3910N02230W/N0415F240 B9 IVA/N0415F180 B9
–EDDM0227 EDDF
–REG/A43213 EET/LYBE0020 EDMI0133 ~~REG/A43213~~ OPR/USAF RMK/NO POSITION REPORT SINCE DEP PLUS 2 MINUTES
–E/0720 P/12 R/UV J/LF D/02 014 C ORANGE A/SILVER C/SIGGAH
–USAF LGGGZAZX 1022 126.7 GN 1022 PILOT REPORT OVER NDB ATS UNITS ATHENS FIR ALERTED NIL)

2.2.1.2.1 *Meaning*

Alerting message — uncertainty phase declared by Athens due no position reports and no radio contact since two minutes after departure — aircraft identification FOX236 — IFR, military flight — Starlifter, heavy wake turbulence category, equipped with standard communications, navigation and approach aid equipment for the route, SSR transponder with Modes A (4 096 code capability) and C — ADS capability — last assigned Code 3624 — departed Athens 1020 UTC — cruising speed for first portion of route 430 knots, first requested cruising level FL 220 — proceeding on airway Blue 9 to 3910N2230W where TAS would be changed to 415 knots — proceeding on airway Blue 9 to Ivanic Grad VOR where FL 180 would be requested, maintaining TAS of 415 knots — proceeding on airway Blue 9 to Munich, total estimated elapsed time 2 hours and 27 minutes — destination alternate is Frankfurt — aircraft registration A43213 — accumulated estimated elapsed times at the Belgrade and Munich FIR boundaries 20 minutes and 1 hour and 33 minutes respectively — ~~aircraft registration A43213~~ — the aircraft is operated by the USAF — no position report has been received since 2 minutes after departure — endurance 7 hours and 20 minutes after take-off — 12 persons on board — portable radio equipment working on VHF 121.5 MHz and UHF 243 MHz is carried — life jackets fitted with lights and fluorescein are carried — 2 dinghies with orange covers are carried, have a total capacity for 14 persons — aircraft colour is silver — pilot's name is SIGGAH — operator is USAF — Athens approach control was the last unit to make contact at 1022 UTC on 126.7 MHz when pilot reported over GN runway locator beacon — Athens approach control have alerted all ATS units within Athens FIR — no other pertinent information.

. . .

2.3 Filed flight plan and associated update messages

2.3.1 *Filed flight plan (FPL) message*

2.3.1.1 *Composition*

(	3 Message type, number and reference data	–	7 Aircraft identification and SSR Mode and Code	–	8 Flight rules and type of flight	
–	9 Type of aircraft and wake turbulence category	–	10 Equipment and capabilities			
–	13 Departure aerodrome and time					
–	15 Route (using more than one line if necessary)					

– 16
Destination aerodrome and total estimated elapsed time, destination alternate aerodrome(s)

– 18
Other information (using more than one line if necessary)
)

2.3.1.2 *Example*

The following is an example of a filed flight plan message sent by London Airport to Shannon, Shanwick and Gander Centres. The message may also be sent to the London Centre or the data may be passed to that centre by voice.

(FPL-~~TPR~~ACA101-IS
–~~B707M~~B773/H-CHO~~P~~V/CD
–EGLL1400
–N0450F310 G1 UG1 STU285036/M082F310 UG1 52N015W
52N020W 52N030W 50N040W 49N050W
–CYQX0455 CYYR
–EET/EINN0026 EGGX0111 20W0136 CYQX0228 40W0330 50W0415 SEL/FJEL)

2.3.1.2.1 *Meaning*

Filed flight plan message — aircraft identification ~~TPR~~ACA101 — IFR, scheduled flight — a Boeing ~~707, medium~~777-300, heavy wake turbulence category equipped with Loran C, HF RTF, VOR, ~~Doppler,~~ VHF RTF and SSR transponder with Modes A (4 096 code capability) and C — ADS capability — departure aerodrome is London, estimated off-block time 1400 UTC — cruising speed and requested flight level for the first portion of the route are 450 knots and FL 310 — the flight will proceed on Airways Green 1 and Upper Green 1 to a point bearing 285 degrees magnetic and 36 NM from the Strumble VOR. From this point the flight will fly at a constant Mach number of .82, proceeding on Upper Green 1 to 52N15W; then to 52N20W; to 52N30W; to 50N40W; to 49N50W; to destination Gander, total estimated elapsed time 4 hours and 55 minutes — destination alternate is Goose Bay — captain has notified accumulated estimated elapsed times at significant points along the route, they are at the Shannon FIR boundary 26 minutes, at the Shanwick Oceanic FIR boundary 1 hour and 11 minutes, at 20W 1 hour and 36 minutes, at the Gander Oceanic FIR boundary 2 hours and 28 minutes, at 40W 3 hours and 30 minutes and at 50W 4 hours and 15 minutes — SELCAL code is FJEL.

2.3.2 *Modification (CHG) message*

2.3.2.1 *Composition*

(3
Message type, number and reference data – 7
Aircraft identification and SSR Mode and Code – 13
Departure aerodrome and time

– 16
Destination aerodrome and total estimated elapsed time, destination alternate aerodrome(s)

– 22 Amendment - - - - 22 Amendment etc. (using more than one) line if necessary)

2.3.2.2 *Example*

The following is an example of a modification message sent by Amsterdam Centre to Frankfurt Centre correcting information previously sent to Frankfurt in a filed flight plan message. It is assumed that both centres are computer-equipped.

(CHGA/F016A/F014-GABWE/A2173-EHAM-EDDF-8/I-16/EDDN)

. . .

2.3.3 *Flight plan cancellation (CNL) message*

2.3.3.1 *Composition*

(3 Message type, number and reference data – 7 Aircraft identification and SSR Mode and Code – 13 Departure aerodrome and time

– 16 Destination aerodrome and total estimated elapsed time, destination alternate aerodrome(s))

. . .

2.3.4 *Delay (DLA) message*

2.3.4.1 *Composition*

(3 Message type, number and reference data – 7 Aircraft identification and SSR Mode and Code – 13 Departure aerodrome and time

– 16 Destination aerodrome and total estimated elapsed time, destination alternate aerodrome(s))

. . .

2.3.5 *Departure (DEP) message*

2.3.5.1 *Composition*

(3 Message type, number and reference data – 7 Aircraft identification and SSR Mode and Code – 13 Departure aerodrome and time

– | 16
Destination aerodrome and total estimated elapsed time, destination alternate aerodrome(s) |)

. . .

2.3.4 *Delay (DLA) message*

2.3.4.1 *Composition*

(| 3
Message type, number and reference data | – | 7
Aircraft identification and SSR Mode and Code | – | 13
Departure aerodrome and time |

– | 16
Destination aerodrome and total estimated elapsed time, destination alternate aerodrome(s) |)

. . .

2.3.5 *Departure (DEP) message*

2.3.5.1 *Composition*

(| 3
Message type, number and reference data | – | 7
Aircraft identification and SSR Mode and Code | – | 13
Departure aerodrome and time |

– | 16
Destination aerodrome and total estimated elapsed time, destination alternate aerodrome(s) |)

. . .

2.3.6 *Arrival (ARR) message*

2.3.6.1 *Composition*

(| 3
Message type, number and reference data | – | 7
Aircraft identification and SSR Mode and Code | – | 13
Departure aerodrome and time |

– | 17
Arrival aerodrome and time |)

2.3.6.2 *Example 1*

The following is an example of an arrival message sent from the arrival aerodrome (= destination) to the departure aerodrome.

(ARR-CSA406-LHBP-LKPR0913)

2.3.6.2.1 *Meaning*

Arrival message — aircraft identification CSA406 — departed from Budapest/Ferihegy — landed at Prague/Ruzyne Airport at 0913 UTC.

2.3.6.3 *Example 2*

The following is an example of an arrival message sent for an aircraft which has landed at an aerodrome for which no ICAO location indicator has been allocated. The SSR Code would not be meaningful.

(ARR-~~HELI13~~HHE13-EHAM-1030 DEN HELDER)

2.3.6.3.1 *Meaning*

Arrival message aircraft identification ~~HELI13~~HHE13 — departed from Amsterdam — landed at Den Helder heliport at 1030 UTC.

2.4 Coordination messages

2.4.1 *Current flight plan (CPL) message*

2.4.1.1 *Composition*

(	3 Message type, number and reference data	–	7 Aircraft identification and SSR Mode and Code	–	8 Flight rules and type of flight	
–	9 Type of aircraft and wake turbulence category	–	10 Equipment and capabilities			
–	13 Departure aerodrome and time	–	14 Estimate data			
–	15 Route (using more than one line if necessary)					
–	16 Destination aerodrome and total estimated elapsed time, destination alternate aerodrome(s)					
–	18 Other information (using more than one line if necessary)					)

2.4.1.2 *Example 1*

The following is an example of a current flight plan message sent from Boston Centre to New York Centre on a flight which is en route from Boston to La Guardia Airport.

(CPL-UAL621/A5120-IS
–~~DC9~~A320/M-S/CD
–KBOS-HFD/1341A220A200A
–N0420A220 V3 AGL V445
–KLGA
–0)

2.4.1.3 *Example 2*

The following is an example of the same current flight plan message, but in this case the message is exchanged between ATC computers.

(CPLBOS/LGA052-UAL621/A5120-IS
–~~DC9~~A320/M-S/CD
–KBOS-HFD/1341A220A200A
–N0420A220 V3 AGL V445
–KLGA
–0)

Note.— The messages in Examples 1 and 2 are identical except that the Message Number of Example 2 does not appear in Example 1.

2.4.1.4 *Meaning*

Current flight plan message [with sending unit identity (BOS) and receiving unit identity (LGA), followed by the serial number of this message (052)] — aircraft identification UAL621, last assigned SSR Code 5120 in Mode A — IFR, scheduled flight — one~~–DC9~~A320, medium wake turbulence category, equipped with standard communications, navigation and approach aid equipment for the route and SSR transponder with Modes A (4 096 code capability) and C — ADS capability — departed Boston — the flight is estimated to cross the Boston/New York "boundary" at point HFD at 1341 UTC, cleared by the Boston Centre at altitude 22 000 feet but to be at or above altitude 20 000 feet at HFD — TAS is 420 knots, requested cruising level is altitude 22 000 feet — the flight will proceed on airway V3 to reporting point AGL thence on airway V445 — destination is La Guardia Airport — no other information.

2.4.2 *Estimate (EST) message*

2.4.2.1 *Composition*

(	3 Message type, number and reference data	–	7 Aircraft identification and SSR Mode and Code	–	13 Departure aerodrome and time	
–	14 Estimate data	–	16 Destination aerodrome and total estimated elapsed time, destination alternate aerodrome(s)			)

. . .

2.4.3 *Coordination (CDN) message*

2.4.3.1 *Composition*

(3 Message type, number and reference data – 7 Aircraft identification and SSR Mode and Code – 13 Departure aerodrome and time

– 16 Destination aerodrome and total estimated elapsed time, destination alternate aerodrome(s)

– 22 Amendment - - - - 22 Amendment etc. (using more than one) line if necessary)

. . .

2.4.4 *Acceptance (ACP) message*

2.4.4.1 *Composition*

(3 Message type, number and reference data – 7 Aircraft identification and SSR Mode and Code – 13 Departure aerodrome and time

– 16 Destination aerodrome and total estimated elapsed time, destination alternate aerodrome(s))

. . .

2.5 Supplementary messages

2.5.1 *Request flight plan (RQP) message*

2.5.1.1 *Composition*

(3 Message type, number and reference data – 7 Aircraft identification and SSR Mode and Code

– 13 Departure aerodrome and time – 16 Destination aerodrome and total estimated elapsed time, destination alternate aerodrome(s))

. . .

2.5.2 *Request supplementary flight plan (RQS) message*

2.5.2.1 *Composition*

(3 Message type, number and reference data – 7 Aircraft identification and SSR Mode and Code – 13 Departure aerodrome and time

– 16 Destination aerodrome and total estimated elapsed time, destination alternate aerodrome(s))

. . .

2.5.3 *Supplementary flight plan (SPL) message*

2.5.3.1 *Composition*

(3 Message type, number and reference data – 7 Aircraft identification and SSR Mode and Code – 13 Departure aerodrome and time

– 16 Destination aerodrome and total estimated elapsed time, destination alternate aerodrome(s)

. . .

— — — — — — — —

ATTACHMENT B to State letter AN 13/2.5-07/35

RESPONSE FORM TO BE COMPLETED AND RETURNED TO ICAO TOGETHER WITH ANY COMMENTS YOU MAY HAVE ON THE PROPOSED AMENDMENTS

To: The Secretary General
International Civil Aviation Organization
999 University Street
Montreal, Quebec
Canada, H3C 5H7

(State) _____

Please make a checkmark (√) against one option for each amendment. If you choose options "agreement with comments" or "disagreement with comments", **please provide your comments on separate sheets**.

	Agreement without comments	*Agreement with comments**	*Disagreement without comments*	*Disagreement with comments*	*No position*
Amendment to the *Procedures for Air Navigation Services — Air Traffic Management* (**PANS-ATM**, Doc 4444) (Attachment H refers)					

*"Agreement with comments" indicates that your State or organization agrees with the intent and overall thrust of the amendment proposal; the comments themselves may include, as necessary, your reservations concerning certain parts of the proposal and/or offer an alternative proposal in this regard.

Signature_____ Date_____

— END —