INTERNATIONAL CIVIL AVIATION ORGANIZATION

CAR/SAM REGIONAL PLANNING AND IMPLEMENTATION GROUP

(GREPECAS)

SIXTH MEETING OF THE AIR TRAFFIC MANAGEMENT / COMMUNICATIONS, NAVIGATION AND SURVEILLANCE SUBGROUP

(ATM/CNS/SG/6)

FINAL REPORT

Boca Chica, Dominican Republic
30 June to 4 July 2008

Prepared by the GREPECAS
ATM/CNS Subgroup Secretariat

July 2008

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FIRST PART

Report on Agenda Item 1
Examination of ATM and CNS matters revised by the Air Navigation Commission discussed during the GREPECAS/14 Meeting *1-1*

Report on Agenda Item 2
Based on the ACG/7 meeting results, review of proposals for the GREPECAS/15 concerning the future treatment of ATM and CNS matters *2-1*

SECOND PART

Report on Agenda Item 3
Review of the ATM/COMM/6 Meeting Report *3-1*

Report on Agenda Item 4
Review of the CNS/COMM/6 Meeting Report *4-1*

Report on Agenda Item 5
Formulation of proposals regarding the future treatment of ATM and CNS matters by the GREPECAS mechanism *5-1*

Report on Agenda Item 6
Other matters *6-1*

History of the Meeting

ii.1 Place and Duration of the Meeting

The Sixth Meeting of the ATM/CNS Subgroup (ATM/CNS/SG/6) of GREPECAS was held at the Hotel Hamaca, in Boca Chica, Dominican Republic. The Meeting commenced on 30 June and ended on 4 July 2008. The Reports of the ATM/COMM/6 and CNS/COMM/6 Meetings were reviewed and approved by the ATM/CNS Subgroup on 4 July 2008.

ii.2 Opening Ceremony and other matters

Ms. Loretta Martin, Regional Director of the ICAO NACC Regional Office welcomed the participants to this Meeting and highlighted the importance of the work of this Subgroup. Afterwards, Mr. José Tomás Pérez Director of Civil Aviation of the Instituto Dominicano de Aviación Civil (IDAC), Dominican Republic, welcomed the Subgroup to the Dominican Republic and officially opened the Meeting.

ii.3 Organization, Officers and Secretariat

The Meeting was chaired by Mr. Claudio Arellano from Mexico, Chairman of the ATM/CNS Subgroup. Mr. Carlos Stehli, Acting Regional Deputy Director of the ICAO SAM Regional Office and Secretary of the GREPECAS ATM/CNS Subgroup acted as Secretary of the Meeting, Mr. Víctor Hernández, Acting Deputy Regional Director, ICAO NACC Regional Office, acted as Secretary of the ATM Committee and was assisted by Mr. Jorge Fernández, Regional Officer, ATM/SAR, ICAO SAM Regional Office and Mr. Vincent Galotti, Chief of ATM at ICAO Headquarters, Montreal. Mr. Onofrio Smarrelli, Regional Officer CNS, ICAO SAM Regional Office, Secretary of the CNS Committee, was assisted by Mr. Julio Siu, Regional Officer CNS, ICAO NACC Regional Office.

ii.4 Working Languages

The working languages of the Meeting were English and Spanish. The documentation and the Report of the Meeting were issued in both languages.

ii.5 Agenda

The following agenda was adopted:

FIRST PART

Agenda Item 1: Examination of the ATM and CNS matters revised by the Air Navigation Commission discussed during the GREPECAS/14 Meeting.

Agenda Item 2: Based on the ACG/7 meeting results, review of proposals for the GREPECAS/15 concerning the future treatment of ATM and CNS matters.

SECOND PART

Agenda Item 3: Review of the ATM/COMM/6 Meeting Report

Agenda Item 4: Review of the CNS/COMM/6 Meeting Report

Agenda Item 5: Formulation of proposals regarding the future treatment of ATM and CNS matters by the GREPECAS mechanism

Agenda Item 6: Other matters

ii.6 Schedule and Working Methods

The Meeting held its sessions as a working group of the whole on Monday 30 June 2008, on Wednesday 2 and on Friday 4 July 2008 from 0900 to 1130 and from 0900 to 1600 hours, respectively, with appropriate breaks. The ATM and CNS Committees held their sessions from 13 to 16 November 2006, from 11:30 to 16:00 the first day and from 09:00 to 16:00 hours thereafter, with appropriate breaks. The Meeting created two Ad hoc Groups.

ii.7 Attendance

The Meeting was attended by 69 participants from 15 member States and 6 International Organizations Members of the ATM/CNS Subgroup, as well as one member State located outside the CAR/SAM Regions.

ii.8 Conclusions and Decisions

The ATM/CNS Subgroup records its activities in the form of Draft Conclusions, Draft Decisions, and Decisions, as follows:

Draft Conclusions: *Conclusions that require approval by GREPECAS prior to their implementation.*

Draft Decisions: *Decisions that require approval by GREPECAS prior to their implementation*

Decisions: *Decisions that deal with matters of concern to the ATM/CNS Subgroup and its Committees.*

ii.9 List of Draft Conclusions

ii.10 List of Draft Decisions

ii.11 List of Decisions

To be included in the Final Report

LIST OF PARTICIPANTS

Argentina

Guillermo Cocchi*
Walter Daniel Silva*
Alfredo Fabián Iacono#
Gustavo Adolfo Chiri#

Barbados

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Cedric H. Murrell*

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Carlos Ramón Alcántara*
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IFALPA

Miguel Marín*

IFATCA

Alex Figuereo*
Rodrigo Bruce Magallón*

SITA

Adriana Mattos#

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* *ATM Committee*
\# *CNS Committee*

ATM/CNS Subgroup

Working Papers

Number	Agenda Item	Title	Date	Presented by
WP/01	---	Draft Agenda, Working Methods, Schedule and Work Plan	21/04/08	Secretariat
WP/02 **Rev. 2**	1	Examination of Large Height Deviation Reports Received by the Caribbean and South American Monitoring Agency (CARSAMMA) in Connection with the Implementation of the Reduced Vertical Separation Minimum (RVSM) in the CAR/SAM Regions	03/07/08	CARSAMMA
WP/03	1	Measures Recommended by the Scrutiny Working Group (GTE) to Achieve Safety Objectives Approved By GREPECAS	13/06/08	Rapporteur GT/GTE
WP/04	2.1	Report of the First Meeting of the Performance-Based Navigation Task Force (PBN/TF/1)	12/06/08	Rapporteur PBN/TF
WP/05	2.1	Report of the Second Meeting of the Performance-Based Navigation Task Force (PBN/TF/2)	28/06/08	Rapporteur PBN/TF
WP/06 **Rev.**	2.2	Report of the Meeting of the ATFM/TF	13/06/08	Rapporteur ATFM/TF
WP/07	2.3	Activities in the CAR/NAM Regions for the Implementation of ATM Automation	10/06/08	Secretariat
WP/08	4.2	Analysis of ICAO and GREPECAS Guidance on Global, Inter and Intra-Regional Air Navigation Activities	01/06/08	Secretariat
WP/09	3	***Deficiencies In the ATM and SAR Fields in the CAR and SAM Regions***	19/05/08	Secretariat
WP/10	3	Outstanding GREPECAS Conclusions/Decisions in the ATM and SAR Fields	23/05/08	Secretariat
WP/11	4.1	Terms of Reference and Work Programme of the ATM Committee	09/06/08	Secretariat
WP/12	4.2	ICAO State Letter: Amendments to the ICAO Flight Plan	09/06/08	Secretariat
WP/13	1	Safety Assessment of the CAR/SAM Regions after Three Years of RVSM Application	26/06/08	CARSAMMA
WP/14	4.2	Follow-Up on the Implementation Strategies and Activities Related to the ATM Performance Objectives Approved by GREPECAS	02/06/08	Secretariat
WP/15	2.1	Strategic Lateral Offset Procedure (SLOP) - Proposed Implementation in the CAR/SAM Regions	01/06/08	IFALPA

Information Papers

Number	Agenda Item	Title	Date	Presented by
IP/01 Rev. 2	--	List of working papers and information papers	03/07/08	Secretariat
IP/02	3	Contingency Plans Catalogue	05/06/08	Secretariat
IP/03	2.2	Core Information for the Implementation of RNP10 in the WATRS Airspace	09/06/08	Secretariat
NI/04	2.1	Resultados de la Primera Reunión del Grupo de Implantación PBN en la Región SAM (SAM/PBN/IG) (***Available only in Spanish)***	12/06/08	Brazil

ATM COMMITTEE

Working Papers

Number	Agenda Item	Title	Date	Presented by
WP/01	---	Draft Agenda, Working Methods, Schedule and Work Plan	21/04/08	Secretariat
WP/02 Rev. 2	1	Examination of Large Height Deviation Reports Received by the Caribbean and South American Monitoring Agency (CARSAMMA) in Connection with the Implementation of the Reduced Vertical Separation Minimum (RVSM) in the CAR/SAM Regions	03/07/08	CARSAMMA
WP/03	1	Measures Recommended by the Scrutiny Working Group (GTE) to Achieve Safety Objectives Approved By GREPECAS	13/06/08	Rapporteur GT/GTE
WP/04	2.1	Report of the First Meeting of the Performance-Based Navigation Task Force (PBN/TF/1)	12/06/08	Rapporteur PBN/TF
WP/05	2.1	Report of the Second Meeting of the Performance-Based Navigation Task Force (PBN/TF/2)	28/06/08	Rapporteur PBN/TF
WP/06 Rev.	2.2	Report of the Meeting of the ATFM/TF	13/06/08	Rapporteur ATFM/TF
WP/07	2.3	Activities in the CAR/NAM Regions for the Implementation of ATM Automation	10/06/08	Secretariat
WP/08	4.2	Analysis of ICAO and GREPECAS Guidance on Global, Inter and Intra-Regional Air Navigation Activities	01/06/08	Secretariat
WP/09	3	Deficiencies In the ATM and SAR Fields in the CAR and SAM Regions	19/05/08	Secretariat
WP/10	3	Outstanding GREPECAS Conclusions/Decisions in the ATM and SAR Fields	23/05/08	Secretariat
WP/11	4.1	Terms of Reference and Work Programme of the ATM Committee	09/06/08	Secretariat

Number	Agenda Item	Title	Date	Presented by
WP/12	4.2	ICAO State Letter: Amendments to the ICAO Flight Plan	09/06/08	Secretariat
WP/13	1	Safety Assessment of the CAR/SAM Regions after Three Years of RVSM Application	26/06/08	CARSAMMA
WP/14	4.2	Follow-Up on the Implementation Strategies and Activities Related to the ATM Performance Objectives Approved by GREPECAS	02/06/08	Secretariat
WP/15	2.1	Strategic Lateral Offset Procedure (SLOP) - Proposed Implementation in the CAR/SAM Regions	01/06/08	IFALPA

Information Papers

Number	Agenda Item	Title	Date	Presented by
IP/01 **Rev. 2**	--	List of working papers and information papers	03/07/08	Secretariat
IP/02	3	Contingency Plans Catalogue	05/06/08	Secretariat
IP/03	2.2	Core Information for the Implementation of RNP10 in the WATRS Airspace	09/06/08	Secretariat
NI/04	2.1	Resultados de la Primera Reunión del Grupo de Implantación PBN en la Región SAM (SAM/PBN/IG) (***Available only in Spanish)***	12/06/08	Brazil

CNS COMMITTEE

Working Papers

Number	Agenda Item	Title	Date	Presented by
WP/01	--	Draft Agenda, Explanatory Notes, Modality, Working Methods, Organization and Schedule of the CNS/COMM/6 Meeting	13/05/08	Secretariat
WP/02	1.1	Follow up to the MEVA II- REDDIG interconnection activities	13/05/08	Secretariat
WP/03	1.2	Revision of the air-ground data link plan	26/05/08	Secretariat
WP/04	1.3	Regional ATN plan and its applications	31/05/08	Secretariat
WP/05	1.5	Follow up on activities for the migration to a new OPMET format	21/05/08	Secretariat
WP/06	2.1	Proposal of amendment to the Regional Air Navigation Pan – Tble CNS/3 of FASID	13/05/08	Secretariat

Number	Agenda Item	Title	Date	Presented by
WP/07	2.2	Report of the Third meeting of the GNSS Task Force	05/06/08	Rapporteur of GNSS Task Force
WP/08	2.3	Deactivation of NDB stations	20/05/08	Secretariat
WP/09	3.1 and 3.2	Work accomplished by the Surveillance Task Force	13/05/08	Rapporteur Surveillance Task Force
WP/10	1.3	Work accomplished by the ATN Task Force	27/06/08	Rapporteur of ATN Task Force
WP/11	3.3	Interconnection of automated systems in the CAR/SAM Regions	21/05/08	Secretariat
WP/12	3.4	Guidelines and considerations for a normalized registry of aircrafts with Mode S transponder	13/05/08	Secretariat
WP/13	4.1	Review of CNS deficiencies in the CAR/SAM Regions	16/05/08	Secretariat
WP/14	4.2	Analysis of the status of GREPECAS conclusions	26/05/08	Secretariat
WP/15	4.3	Results of the ITU World Radio Communication Conference WRC 2007 and initial ICAO position for the WRC 2011.	31/05/08	Secretariat
WP/16	5	Terms of reference and work programme of the CNS committee.	16/06/08	Secretariat
WP/17	2.2	Status of the studies and works realized by the RLA/03/902 project.	04/06/08	SACCSA Members Project
WP/18	3.3	Activities in the CAR/NAM Regions for the implementation of the ATM Automation	23/06/08	Secretariat
WP/19	3.2	ICAO APANPIRG ADS-B service performance parameters.	17/06/08	SITA
WP/20	2.2	Own SBAS system	20/06/08	Brazil

Information Papers

Number	Agenda Item	Title	Date	Presented by
IP/01	--	List of Working and Information Papers	27/06/08	Secretariat
NI/02	1.2, 1.3 y 2.2	Enmienda 83 al anexo 10 – Telecomunicaciones aeronáuticas	20/05/08	Secretariat
IP/03	6	ICAO framework for transition to an Electronic Air Navigation Plan (eANP)	20/05/08	Secretariat
IP/04	3	References on surveillance SARPS , planning and works of ASP panel	09/06/08	Secretariat
IP/05	1.2 and 3	Progress on global data link harmonization strategy	23/06/08	Secretariat
IP/06	2.2	Follow up on the planning/implementation activities of the SBAS and GBAS augmentation systems in the CAR/SAM Regions	27/06/08	United States
IP/07	1.2 and 3.2	Satellite Data Communications Performance in Oceanic and Remote Regions and the work of the FANS Satcom Improvement Team (FANS SIT)	27/06/08	United States
IP/08	3.2	Automatic Dependent Surveillance – Broadcast (ADS-B)	27/06/08	United States
IP/01	1.3	The Federal Aviation Administration Air Traffic Service Message Handling System (AMHS) Planning	27/06/08	United States

Agenda Item 1: **Examination of the ATM and CNS matters revised by the Air Navigation Commission discussed during the GREPECAS/14 Meeting.**

1.1 The Meeting noted that in the framework of the new revision method of the PIRGs reports, the Air Navigation Commission (ANC) reviewed the Report of GREPECAS/14 Meeting and did not find specific subjects requiring further action by the Council, and therefore its report was not subject to consideration by the latter.

1.2 The Meeting was informed that among the 64 Conclusions/Decisions formulated by GREPECAS/14 Meeting, 22 were selected by the ANC, whether due to its importance or because they require a specific action by ICAO. Note was taken of the Action Plan developed by the ANC, which is presented as the **Appendix** to this part of the report. In said Plan, the responsibilities, expected results and specific foreseen notification/conclusion dates for each Conclusion/Decision selected by GREPECAS/14 are defined. It was noted that the ANC related each Conclusion/Decision with ICAO Strategic Objectives. It was also informed that, concerning ICAO Secretariat, the Commission requested the Secretary General to adopt specific actions regarding Conclusions, in accordance with ICAO approved Business Plan. In this regard, it was informed that the corresponding Regional Offices (NACC and SAM) are adopting measures to include follow-up tasks in their work plans, and it is expected that States/Territories/International Organizations take the necessary measures to address the Action Plan developed by the ANC.

1.3 The Meeting also took note of the specific matters indicated hereunder, which were mentioned by the ANC concerning air traffic management:

a) *Large height deviations*: The ANC noted with concern that practically all ICAO Regions were experiencing large height deviations in the implementation of the reduced vertical separation minimum (RVSM). In this respect, it provided full support to GREPECAS initiative (Conclusion 14/45) concerning the provision of necessary training to States and requested ICAO to extend the offering of holding similar training seminars to other Regions. Also, it observed that the Separation and Airspace Safety Panel (SASP) was developing displacement procedures to be used beyond the oceanic and remote areas where they are currently authorized. These procedures reduce the collision probability in vertical superposition situations caused by large height deviations.

b) *Safety Assessment in terminal areas*: In support to GREPECAS proposal regarding the development of a common methodology for safety assessments in terminal areas, the ANC backed-up Conclusion 14/47 and requested the Secretary General to implement this task as part of the SASP work programme, which was already under consideration.

c) *Catalogue of ATS Contingency Plans*: Acknowledging that GREPECAS approach in Conclusion 14/50 is in line with Strategic Objective E: Continuity – *Maintain the continuity of aviation operations*, the ANC congratulated GREPECAS for the development of a contingency plan regional catalogue sample for air traffic services (ATS) and encouraged CAR and SAM Regions States to provide information to be included in this new catalogue.

d) CAR and SAM Regions ATM Performance Objectives: The WG/RPL congratulated GREPECAS on its initiative to develop the Performance Regional Framework (Conclusion 14/51) and requested the Secretariat to continue providing guidance to the Regions on the formulation of performance regional objectives in line with the Global Air Navigation Plan.

1.4 With regard to RVSM, the Meeting was informed that:

i) recently a proposed amendment to Annex 6 – *Aircraft Operations* for aircraft monitoring was recently reviewed by States and had successfully passed through the Air Navigation Commission which would require that two aircraft from each type group of an aircraft operator would have to monitored every two years or for individual aircraft, after 1000 flight hours, whichever is earlier. The meeting noted that the new requirements would be applicable as of November 2009; and

ii) with respect to the failure of many regions to meet the TLS of $5x\ 10^{-9}$ where RVSM was implemented, the Air Navigation Commission understood that this was not directly related to RVSM as most of the LHDs were due to operational errors. However, there was concern with respect to these operational errors and agreement within the Air Navigation Commission that these had to be aggressively addressed on a continuing basis through all means. The Secretariat acknowledged that it was well known that the CAR/SAM Regions had a very thorough reporting process and that most States participated with useful and adequate information. Chief/ATM from ICAO Headquarters urged the Meeting to continue to report and congratulated States for the recommendations and work aimed at addressing LHDs through a variety of means.

1.5 Likewise, Chief/ATM from ICAO Headquarters made a presentation on the latest work of ICAO Headquarters toward implementation of a global and seamless ATM system. The presentation described what is meant by the term: Global ATM which it was stressed, focused on meeting the expectations of the aviation community and, in particular, at this critical point, the aircraft operators. The need to adopt wider planning perspectives and to work toward implementation of ATM improvements over large geographical areas was also stressed. Information was provided on the work of the NextGen programme of the United States and the European SESAR programme. The meeting was informed that both of these programmes were striving to work with ICAO toward a common global ATM system under using the Global ATM Operational Concept and the Global Air Navigation Plan. In this context, the meeting noted that a symposium would be held in Montreal on 8, 9 and 10 September 2008 aimed at identifying the needs of NextGen and SESAR while at the same time ensuring that the needs of those States that were not part of these two programmes, would be considered during the Standards development process. Chief/ATM stressed that one objective of the symposium would be to ensure that benefits from these two programmes would flow to all ICAO regions.

APPENDIX A

GREPECAS/14 MEETING
Conclusions/Decisions — Action to be taken by the Air Navigation Commission

Conc/Dec and Strategic Objective(s)	Title of Conclusion/ Decision	Text of Conclusion/Decision	Proposed Follow-up	Responsibility	Deliverable	Action by ANC	Reporting/ Completion Date
C 14/44 **D**	**ESTABLISHMENT OF AN ACTION PLAN FOR THE INTERFACE OF ATM AUTOMATED SYSTEMS**	That CAR/SAM States/Territories/Intl Organizations, formulate an action plan to interface ATM automated systems, which includes: a) the assignment of an expert as point of contact to carry out regional coordination work for the interface of ATM automated systems; b) the analysis of the current service level provided by ATS automated systems, as well as requirements to satisfy future operational applications of the ATM community using the Table of ATS Operational Requirements for Automated Systems, included in Appendix 4B to this part of the Report; and c) document the action plan and share best practices and experiences with other States/Territories/Intl Organizations, as required.	Designate points of contact The analysis of the current service level Develop action plan	States/ Territories/ intl orgs States/ Territories/ intl orgs States/ Territories/ intl orgs	Action Plan for the interface of ATM automated systems	Noted.	Dec. 2008

Conc/Dec and Strategic Objective(s)	Title of Conclusion/ Decision	Text of Conclusion/Decision	Proposed Follow-up	Responsibility	Deliverable	Action by ANC	Reporting/ Completion Date
C 14/45 **D**	**TRAINING ON THE ANALYSIS OF LARGE HEIGHT DEVIATIONS (LHD)**	That, taking into account the need to have qualified experts available to assist in the activities of the GTE, the CAR and SAM States/Territories/Intl Organizations: a) support training on analysis of Large Height Deviations as part of regional activities; b) send technical experts to the training sessions envisaging those experts becoming regular participants of the GTE; and c) that ICAO take the necessary actions to coordinate GTE training sessions in each Region.	Support training Send technical experts to training sessions Coordinate training sessions	States/ Territories/ intl orgs States/ Territories/ intl orgs ICAO NACC and SAM Regional Offices	Experts trained Training sessions State letter	a) Noted. b) Noted. c) Called upon the Secretariat to extend the offer of similar training seminars to all the remaining Regions.	Nov. 2008 Nov. 2008 2009
C 14/46 **D**	**CAR/SAM ROADMAP FOR PBN**	That States/Territories and Intl Organizations adopt and apply the CAR/SAM Roadmap for PBN as shown in Appendix XX to this part of the report.	Apply the Road Map for PBN	States/Territories/ intl orgs	Harmonized implementation of PBN	Noted.	Short term 2010 Medium term 2011/2015

Conc/Dec and Strategic Objective(s)	Title of Conclusion/ Decision	Text of Conclusion/Decision	Proposed Follow-up	Responsibility	Deliverable	Action by ANC	Reporting/ Completion Date
C 14/47 **D**	**SAFETY ASSESSMENT SEMINARS AND METHODOLOGY**	That ICAO: a) promote seminars related to safety assessments, aiming at the preparation of personnel to work in the future PBN implementation; b) encourage safety airspace and separation panel (SASP) to develop a common methodology for safety assessment in terminal areas.	Coordinate safety assessment activities Develop a common methodology for safety assessment in TMA	ICAO NACC and /SAM Regional Offices ICAO HQ	Safety assessment seminars Common methodology for safety evaluations in TMA	a) Noted. b) Called upon the Secretariat to undertake this task through SASP.	2008 2010
C 14/49 **C, D**	**ADOPTION OF THE CAR AND SAM ATFM CONCEPT OF OPERATIONS (ATFM CAR/SAM CONOPS)**	That the CAR and SAM States/Territories and Intl Organizations: a) adopt the CAR and SAM ATFM Concept of Operations (ATFM CONOPS) shown in Appendix X to this part of the report; and b) establish a work program to enable the implementation of the ATFM CONOPS.	To adopt CAR/SAM ATFM CONOPS To establish a work programme for ATFM implementation	States/ Territories/ intl orgs States/ Territories/ intl orgs	CAR/SAM CONOPS	Noted.	Dec. 2008

Conc/Dec and Strategic Objective(s)	Title of Conclusion/ Decision	Text of Conclusion/Decision	Proposed Follow-up	Responsibility	Deliverable	Action by ANC	Reporting/ Completion Date
C 14/50 **D, E**	**CATALOGUE OF CAR/SAM ATS CONTINGENCY PLANS**	That: a) the model Catalogue of CAR/SAM ATS contingency plans, shown in Appendix Y to this part of the report, is adopted; and b) CAR/SAM States/Territories/International Organization send the updated information to ICAO, before 1st July 2007, for its inclusion in said document.	Adoption of Model Catalogue To send information to NACC and SAM Regional Offices	GREPECAS States/ Territories/ intl orgs	Model adopted ATS contingency plan Catalogue completed	Noted, and appreciated the efforts of GREPECAS.	Adopted by GREPECAS in April 2007 Nov. 2008
C 14/51 **D**	**RE-ORGANIZATION OF THE WORK PROGRAMMES TO SUPPORT THE ATM PERFORMANCE OBJECTIVES FOR THE CAR AND SAM REGIONS**	That, to support the evolution from a system-based towards a performance-based approach for the planning and implementation of air navigation infrastructure: a) CAR/SAM States, Territories and International Organizations take the necessary actions to develop and implement national ATM work programmes in accordance with the performance objectives; and b) ICAO continue the coordination to re-organize the CAR/SAM ATM Work Programmes in accordance with the new Global Plan Initiatives (GPI) and to support ICAO Strategic Objectives.	Develop and implement an ATM work programme oriented to performance objectives Reorganize the ATM programme according with the GPIs and ICAO Strategic Objectives	States/ Territories/ intl orgs ICAO NACC and SAM Regional Offices	Harmonized ATM performance objectives implemented ATM work programme aligned with performance objectives and ICAO Strategic Objectives	Noted and requested the Secretariat to continue providing requisite guidance to the Regions for the formulation regional performance objectives.	Dec. 2009 Oct. 2008

Conc/Dec and Strategic Objective(s)	Title of Conclusion/ Decision	Text of Conclusion/Decision	Proposed Follow-up	Responsibility	Deliverable	Action by ANC	Reporting/ Completion Date
C 14/52 **D**	**REVIEW FOR THE ADOPTION OF THE MEMORANDUM OF UNDERSTANDING AND IMPLEMENTATION OF THE ACTION PLAN FOR THE MEVA II / REDDIG INTERCONNECTION**	That in order to implement the interconnection of the VSAT MEVA II and the organization of the REDDIG networks, the Member States/Territories/International Organizations of these networks: a) study and review the feasibility to adopt the Memorandum of Understanding (MoU); and b) approve and implement the tasks related to the Action Plan presented in Appendix B to this part of the report.	Review and adopt the MoU Implement the Action Plan	States and intl orgs States and intl orgs	Signed MoU Implementation of interconnection	Noted.	March 2008 March 2008
D 14/55 **D**	**APV I CAPABILITY AS A MINIMUM PERFORMANCE REQUIREMENT FOR THE CAR/SAM REGIONAL SBAS IMPLEMENTATION**	That in order to coordinate the initiatives and projects for the SBAS solutions proposed for the CAR/SAM Regions, the CNS Committee must keep in mind that they be capable of achieving at least APV I capability.	Development of SBAS solution	CNS Committee of GREPECAS	SBAS solution	Noted.	Aug. 2008

Conc/Dec and Strategic Objective(s)	Title of Conclusion/ Decision	Text of Conclusion/Decision	Proposed Follow-up	Responsibility	Deliverable	Action by ANC	Reporting/ Completion Date
C 14/56 **D**	**PROGRESSIVE DEACTIVATION OF NDB STATIONS**	That in order to develop progressive deactivation of NDB Stations without affecting safety, States, Territories, International Organizations and airspace users: a) analyse the service provided by each NDB station, its function, procedural existence with other aids such as VOR/DME, GNSS-RNAV, as well as the aircraft capacity/development that operate in serviced airspace; b) based on the analysis described in item a) above and in the Table format included in the Appendix AF to this part of the Report, develop a plan for the progressive deactivation of NDB stations; and c) inform the corresponding ICAO NACC or SAM Regional Office regarding their respective plan for the progressive deactivation of NDB stations before 30 November 2007.	Analyse the service provided by each NDB station and develop a plan for the progressive deactivation of NDB stations	States and intl orgs	A plan for progressive deactivation of NDB stations	Noted.	July 2008

Conc/Dec and Strategic Objective(s)	Title of Conclusion/ Decision	Text of Conclusion/Decision	Proposed Follow-up	Responsibility	Deliverable	Action by ANC	Reporting/ Completion Date
D 14/57	**DEVELOPMENT OF A REGIONAL PLAN FOR THE PROGRESSIVE DEACTIVATION OF NDB STATIONS**	That the CNS Committee: a) prepare a regional plan for the progressive deactivation of NDB stations, taking into account the responses received from States, Territories, International Organizations and airspace users, Conclusion 14/X and the Table presented in the Appendix AF to this part of the Report; and b) based on the results of item a) above, propose the corresponding amendments to Table CNS 3 of the FASID.	Prepare a regional plan for the progressive deactivation of NDB stations Proposed amendment	CNS Committee of GREPECAS	NDB stations regional deactivation plan Proposal of amendment	Noted.	Aug. 2008 Dec. 2008

*** Note:** ICAO has established the following Strategic Objectives for the period 2005-2010:

A: Safety - *Enhance global civil aviation safety*;

B: Security - *Enhance global civil aviation security*

C: Environmental Protection - *Minimize the adverse effect of global civil aviation on the environment*

D: Efficiency - *Enhance the efficiency of aviation operations*

E: Continuity - *Maintain the continuity of aviation operations*

F: Rule of Law - S*trengthen law governing international civil aviation*

Agenda Item 2: **Based on the ACG/7 meeting results, review of proposals for the GREPECAS/15 concerning the future treatment of ATM and CNS matters.**

2.1 The Meeting considered four working papers presented under this Agenda Item to analyse the implications of ACG Draft Conclusion 7/03 formulated by the ACG/7 Meeting, with regard to restructuring the ATM/CNS Subgroup. In this regard, it noted that said Draft Conclusion was not approved by the ACG fast track mechanism and therefore, GREPECAS/15 Meeting to be held in October 2008 shall consider said Draft Conclusion before starting up restructuring the ATM/CNS Subgroup as requested by the aforementioned ACG/7 Conclusion.

2.2 The Meeting concurred with the comments of the ACG/7 Meeting with regard to problems concerning the functioning of the current ATM/CNS Subgroup and ATM and CNS Committees structure. It also agreed that the Subgroup should be reconfigured as a whole, but that to disband it and create two new Subgroups from the ATM and CNS Committees, as proposed by the ACG/7 meeting, would mean a backward movement in the CAR/SAM planning process, and that it would have severe adverse effects on the close coordination between the ATM and CNS areas, which is so necessary for planning important tasks in the CNS/ATM fields in line with the operational initiatives of the Global Air Navigation Plan.

2.3 In this regard, note was taken that among the 23 initiatives of the Global Plan, at least 14 require close CNS/ATM coordination and that GREPECAS is the only PIRG that has considered dealing this issue in a coordinated manner, which should be considered as a global planning model.

2.4 The Meeting agreed that restructuring the Subgroup should consider establishing a genuine Subgroup, completely in line and within the GREPECAS Procedural Handbook framework, concerning its activation and operation, and reporting of results to GREPECAS. This matter was not envisaged in the current mechanism of the ATM/CNS Subgroup. Likewise, it also agreed that, in order to ensure a suitable efficiency and coordination between the ATM and CNS fields, adequate Terms of Reference should be established, from which specific and important task may be inferred that should be developed in the short and medium terms in order to enhance ATM and that, as necessary, clearly identify the need for coordination with other fields within the ATM operational concept approach such as the AGA, AIM and MET fields. For these tasks, the deliverables should be identified in specific times. It was pointed out that the new Subgroup might create, as necessary, Task Forces to assist it when developing its tasks.

2.5 The acceptance of the foregoing approach mentioned above was unanimous by the Meeting, and it therefore decided to develop for the forthcoming GREPECAS/15 Meeting a specific proposal for restructuring the ATM/CNS Subgroup, for which an Ad hoc group was established composed by members of Argentina, Brazil, Chile, Colombia, Cuba, United States, Mexico, Panama, Dominican Republic, Trinidad and Tobago, chaired by the Chairperson of the ATM/CNS Subgroup. The results of the work of the Ad hoc group and of the analysis of the ATM/CNS Subgroup restructuring proposal is reported under Agenda Item 5.

Agenda Item 3: Review of the ATM/COMM/6 Meeting Report

Refer to Attachment 1 to this Report

Agenda Item 4: Review of the CNS/COMM/6 Meeting Report

Refer to Attachment 2 to this Report

Agenda Item 5: Formulation of proposals regarding the future treatment of ATM and CNS matters by the GREPECAS mechanism

5.1 The Meeting analyzed the work carried out by the Ad hoc Group mentioned under Agenda Item 2 on restructuring the ATM/CNS Subgroup. In developing the terms of reference for the new Subgroup, the Meeting recognized that it was critical to align the work of the CNS/ATM Subgroup with activities taking place at the global level and, specifically, the Global ATM Operational Concept and Global Air Navigation Plan. In meeting this objective, it was agreed that the terms of reference should consider performance objectives, development of detailed tasks, establishment of deliverables with deadlines and monitoring implementation. It was also recognized that, on a global basis, the work of all air navigation fields was being merged and that work had to be addressed in a holistic and strategic way. It therefore agreed to develop terms of reference with no division between CNS and ATM work, in line with the instructions of the Subgroup, and noted that accomplishing the work associated with the performance objectives would require both CNS and ATM work efforts. In the same way, it was recalled that the current use of the term "ATM", refers to all elements of the air navigation system, given due consideration to facilitate and harmonize the inter-regional implementation process. In this regard, the Meeting had an extensive exchange of views between the CNS and ATM experts and, with due explanations provided by the Secretariat, it was concurred that, considering the ATM operational concept, the global ATM implementation had to be faced as a system requiring the support of all the fields that traditionally are considered in the air navigation system.

5.2 The Meeting established, considering the existing work programmes of the ATM/CNS Subgroup and of the ATM and CNS Committees, the main CNS/ATM tasks to be carried out under the project development concept, by the new Subgroup, taking into account the performance objectives already established by GREPECAS and recognizing the need for establishing others if applicable in order to obtain in the short and medium terms, regional enhancements that may be required by the ATM community. The Meeting also recognized that the supervision of the Air Navigation Plan and the identification and reporting of deficiencies in the CNS/ATM/SAR fields were important tasks, and that if they were developed in specific time periods, they would allow the establishment of greater efficiency when performing these tasks, in view of the fact that the new Subgroup would have as deliverables, with well-established dates, the required amendments to the ANP and reporting of new deficiencies that might be identified, which would result in a better updating process of the ANP and a more effective handling of the deficiencies by the Subgroup.

5.3 Likewise, the Meeting recognized that the scope of the work developed by the ATM/CNS Subgroup and the ATM and CNS Committees should be made available to the new Subgroup for the development of its identified tasks, therefore, it was necessary that the Chairperson and Secretaries of the ATM/CNS Subgroup in coordination with the Chairpersons and Secretaries of the Committees, duly document this issue to be presented to the GREPECAS/15 Meeting.

5.4 The Meeting also recognized that this meant a great step regarding a new approach in regional CNS/ATM planning and concerning the establishment of a new management scheme, in which the role of the new Subgroup was essential with regard to deliverables of GREPECAS and its work programme. In this respect, the Meeting observed that, in order to start the mechanism of the new Subgroup, at least two meetings would be required before the GREPECAS/16 Meeting, one to develop the required work programmes and identify the necessary Task Forces, and another to supervise and adjust the operation of the work scheme established by its first meeting. With regard to this matter, it was observed that it was necessary to duly consider the number of meetings within the GREPECAS mechanism, in view of the financial impact on Civil Aviation Authorities.

5.5 Regarding the membership, it was agreed that it should be composed of the same States/Territories/International Organizations that form the ATM/CNS Subgroup and its Committees, and that ICAO should define the Secretariat structure that can provide the best assistance to the work of the new Subgroup.

5.6 As a result of the deliberations on this issue, the Meeting developed the Terms of Reference (TORs) and the main tasks for the new CNS/ATM Subgroup that are attached in the **Appendix** to this part of the Report, and developed the following Draft Decision for the consideration of GREPECAS/15 Meeting:

DRAFT
DECISION ATM/CNS/6/1 NEW CNS/ATM SUBGROUP

That, in line with GREPECAS efforts to improve the handling of ATM and CNS matters and the necessary coordination between these areas to ensure a performance-based approach to planning of a global ATM system, a re-engineering of the ATM/CNS Subgroup is carried out within the GREPECAS mechanism, establishing the new CNS/ATM Subgroup with the Terms of Reference presented in Appendix … to this part of the Report.

5.7 The Secretary of the ATM/CNS Subgroup thoroughly document this issue for the GREPECAS/15 Meeting, presenting information on the matters that the new Subgroup shall consider of the work already done by the ATM/CNS Subgroup and its Committees.

APPENDIX A

TERMS OF REFERENCE OF THE CNS/ATM SUBGROUP

1. Terms of Reference (TOR)

1. To plan a performance based transition to the ATM system envisaged in the Global ATM Operational Concept, considering the regional performance objectives, supported by the Global Air Navigation Plan Initiatives (GPIs);

2. Carry out CNS/ATM CAR/SAM planning activities to facilitate and harmonize the inter-regional implementation process to obtain in the near and medium terms, clear benefits for the ATM community; and

3. In meeting these TOR, the Subgroup should perform the following tasks:

   a) monitor the CNS/ATM aspects of the CAR/SAM Air Navigation Plan and propose corresponding amendments to keep it up-to-date;

   b) identify and report CNS/ATM air navigation deficiencies based on the Council approved methodology and GREPECAS complemented procedures; and

   c) considering the existing performance objectives (new objectives to be developed as necessary), develop detailed tasks, identify deliverables with deadlines and monitor implementation of the following:

- Performance based navigation
- Air Traffic Flow Management
- Civil/Military coordination
- Automation
- Situational awareness (surveillance)
- RVSM
- Communication infrastructure for ground to ground and ground to air
- Transition to the new ICAO Model Flight Plan

Note: Identified performance objectives are attached. A new document will be developed containing all performance objectives to be reviewed at each meeting.

ATM PERFORMANCE OBJECTIVES FOR THE CAR AND SAM REGIONS

OPTIMIZE THE ATS ROUTE STRUCTURE EN-ROUTE AIRSPACE			
Benefits			
Environment **Efficiency**	• ***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.***		
Strategy			
TASK	**DESCRIPTION**	**START-END**	**STATUS**
AOM	***En-route airspace***		
	Develop regional action plan	2007-2009	
	Develop Airspace Concept based in CAR /SAM PBN Roadmap, in order 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		
	Develop performance measurement plan		
	Formulate safety plan		
	Establish collaborative decision making (CDM) process		
	Publish national regulations for aircraft and operators approval using PBN manual as guidance material		
	Identify training needs and develop corresponding guidelines		
	Formulate system performance monitoring plan • • • • ***monitor implementation progress in accordance with CAR/SAM PBN implementation roadmap and State implementation plan*** • • •		
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.		

OPTIMIZE THE ATS ROUTE STRUCTURE IN TERMINAL AIRSPACE			
Benefits			
Environment Efficiency	• ***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.***		
Strategy			
TASK	**DESCRIPTION**	**START-END**	**STATUS**
AOM	***In terminal airspace***		
	Develop State PBN implementation plan		
	Develop Airspace Concept based in CAR /SAM PBN Roadmap, in order to design and implement 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 Basic-RNP12 ***Develop performance measurement plan*** ***Formulate safety plan*** ***Establish collaborative decision making (CDM) process*** ***Publish national regulations for aircraft and operators approval using PBN manual as guidance material*** ***Identify training needs and develop corresponding guidelines*** ***Formulate system performance monitoring plan*** • ***develop a regional strategy and work programme for implementation; and*** • ***monitor implementation progress in accordance with CAR/SAM PBN implementation roadmap and State implementation plan***		
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.		

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	• ***Develop State PBN implementation plan*** ***Develop Airspace Concept based in CAR /SAM PBN Roadmap, in order to design and implement RNP APCH with Baro-VNAV in accordance with assembly resolution A36-23, and RNP AR APCH where beneficial*** ***Develop performance measurement plan*** ***Formulate safety plan*** ***Establish collaborative decision making (CDM) process*** ***Publish national regulations for aircraft and operators approval using PBN manual as guidance material*** ***Identify training needs and develop corresponding guidelines*** ***Formulate system performance monitoring plan*** • ***monitor implementation progress in accordance with CAR/SAM PBN implementation roadmap and State implementation plan***		
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.		

ENHANCE CIVIL/MILITARY COORDINATION AND CO-OPERATION			
Benefits			
Efficiency	• increase airspace capacity;		
Continuity	• allow a more efficient ATS route structure • ensure safe and efficient action in the event of unlawful interference; • make available military restricted airspace more hours of the day so that aircraft can fly on their preferred trajectories; and • improve search and rescue services.		
Strategy (2008-2012)			
TASK	**DESCRIPTION**	**START-END**	**STATUS**
AOM	• develop guidance material on civil/military coordination and co-operation to be used by States/Territories to develop national policies, procedures and rules; • establish civil/military coordination bodies; • arrange for permanent liaison and close cooperation between civil ATS units and appropriate air defense units; • conduct a regional review of special use airspace; • develop a regional strategy and work programme for implementation of flexible use of airspace in a phased approach beginning with more dynamic sharing of restricted airspace while working towards full integration of civil and military aviation activities by 2012; and • monitor implementation progress		
References	GPI/1: flexible use of airspace.		

ALIGN UPPER AIRSPACE CLASSIFICATION			
Benefits			
Efficiency **Continuity**	• better utilization of data link communication; • optimize use of flight plan data processing systems; • enhance airspace management coordination, message exchange capabilities and utilization of flexible and dynamic airspace management techniques; • harmonization of interregional coordination processes; • improvement of airspace interoperability and seamlessness; and • ensure the provision of positive air traffic control services to all aircraft operations.		
Strategy ***(Target: 2008)***			
TASK	**DESCRIPTION**	**START-END**	**STATUS**

AOM	• Develop a regional implementation strategy and work programme for the implementation of ICAO Annex 11 airspace Class A above FL 195.
	• identify key stakeholders, ATCOs, pilots, and relevant international organisations for coordination and cooperation on changes for new airspace organization, using a CDM process;
	• develop new national airspace organization in accordance with ICAO provisions, as needed;
	• Coordinate changes for regional and national documents;
	  • Doc 8733, CAR/SAM ANP;
	  • AIP; and,
	  • ATS letters of agreement
	• Carry out improvements in ground systems to support new airspace organization configurations, as necessary;
	• Publish national regulatory material for implementation of new rules and procedures to reflect airspace organizational changes;
	• Train ATCOs and pilots in new procedures, including all civil and military airspace users, as required;
	• monitor implementation progress.		

References	GPI/4: align upper airspace classification.		

IMPROVE DEMAND AND CAPACITY BALANCING			
Benefits			
Environment	• reduction in weather- and traffic-induced holding, leading to reduced fuel consumption and emissions;		
Efficiency	• improved and smoother traffic flows; • improved predictability; • improved management of excess demand of service in ATC sectors and aerodromes; • improved operational efficiency; • enhanced airport capacity; • enhanced airspace capacity; and		
Safety	• improved safety management.		
Strategy ***Near term (2008)***			
TASK	**DESCRIPTION**	**START-END**	**STATUS**
ATFM (DCB)	• identify key stakeholders (ATC service providers and users, military authorities, airport authorities, aircraft operators and relevant international organisations) for purposes of coordination and cooperation, using a CDM process; • identify and analyse traffic flow problems and develop methods for improving efficiencies on gradual basis, as needed, through enhancements in current: o airspace organization and management (AOM) and airway structure (unidirectional routes), o communication, navigation and surveillance systems, o aerodrome capacity, o ATS capacity, and o ATS letters of agreement; • define common elements of situational awareness between FMUs; o common traffic displays, o common weather displays (Internet), o communications (teleconferences, web), and o daily teleconference/messages methodology advisories; • develop methods to establish demand/capacity forecasting; • develop a regional strategy and work programme for harmonized implementation of ATFM service; and,		

Medium term (2010)			
	• develop a regional strategy for the implementation of flexible use of airspace (FUA); o assess use of airspace management processes; o improve current national airspace management to adjust dynamic changes in traffic flows in tactical stage; o introduce improvements in ground ATS systems and associated procedures for the extension of FUA with dynamic airspace management processes; o implement dynamic ATC sectorization in order to provide the best balance between demand and capacity to respond in real-time to changing situations in traffic flows, and to accommodate in short-term the preferred routes of users; • define common electronic information and minimum databases required for decision support and alerting systems for interoperable situational awareness between Centralized ATFM units; • develop regional procedures for efficient and optimum use of aerodrome and runway capacity; • develop a regional ATFM procedural manual to manage demand/capacity balancing; • develop a regional strategy and framework for the implementation of Centralized ATFM unit; • develop operational agreements between Centralized ATFM units for interregional demand/capacity balancing; and, • monitor implementation progress.		
References	GPI/1: flexible use of airspace; GPI/6: air traffic flow management; GPI/7: dynamic and flexible ATS route management; GPI/9: Situational awareness; GPI/13: aerodrome design and management; GPI/14: runway operations; and GPI/16: decision support and alerting systems.		

IMPROVE ATM SITUATIONAL AWARENESS			
Benefits			
Efficiency	• enhanced traffic surveillance; • enhanced collaboration between flight crew and the ATM system; • improved collaborative decision-making through sharing electronic aeronautical data information; • reduction of workload for both pilots and controllers; • improved operational efficiency; • enhanced airspace capacity; • improved implementation on a cost-effective basis;		
Safety	• improved available electronic terrain and obstacle data in the cockpit; • reduction of the number of controlled flight into terrain related accidents; and • improved safety management.		
Strategy ***Near term (2010)***			
TASK	**DESCRIPTION**	**START-END**	**STATUS**
ATS (ATM SDM)	• **identify parties concerned** • identify the automation level required according to the ATM service provided in airspace and international aerodromes, assessing o operational architecture design, o characteristics and attributes for interoperability, o data bases and software, and o technical requirements; • improve ATS interfacility communication • implement flight plan data processing system and electronic transmission tools • implement radar data sharing programs where benefits can be obtained • develop situational awareness training programmes for pilots and controllers • implement ATM surveillance systems for situational traffic information and associated procedures • implement ATS automated message exchanges, as required o FPL, CPL, CNL, DLA, etc. • implement automated radar handovers, where able; • implement ground and air electronic warnings, as needed o Conflict prediction o Terrain proximity o MSAW o DAIW o Surveillance system for surface movement • implement data link surveillance technologies and applications: ADS, CPDLC, AIDC, as required		

Medium term (2015)			
	• implement additional/advanced automation support tools to increase sharing of aeronautical information o ETMS or similar o MET information o AIS/NOTAM dissemination o Surveillance tools to identify airspace sector constraints o A-SMGC in specific aerodromes, as required • implement teleconferences with ATM stakeholders • monitor implementation progress		
References	GPI/1: flexible use of airspace; GPI/6: air traffic flow management; and GPI/7: dynamic and flexible ATS route management; GPI/9: Situational awareness; GPI/13: aerodrome design and management; GPI/14: runway operations; and GPI/16: decision support and alerting systems; GPI/17: implementation of data link applications; GPI/18: aeronautical Information; GPI/19: meteorological systems.		

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Agenda Item 6: Other matters

6.1 The Meeting, considering the proposal on the new CNS/ATM Subgroup contained under Agenda Item 5 of this Report, did not review the Terms of Reference nor the Work Programme of the ATM/CNS Subgroup; nevertheless, the tasks of the Automation Task Force in correspondence with task ATM/CNS/5 of its work programme were examined. Concerning this item, and with the support of the work carried out by an Ad hoc Group, concerning the tasks of the Automation Task Force, the Meeting concurred with the following;

a) In reference with Task No. 1, it was related to the Interface Control Document (ICD) recommended by GREPECAS (Conc. 14/43), indicated that this guidance document should be considered as a "dynamic" document and should be improved/updated as necessary. In this sense, the Task Force shall continue considering this item or else it should be transferred to the work programme of the new CNS/ATM Subgroup.

b) In relation with Task No. 2, which refers to the Regional Automation Strategy (Conc. 12/31 of GREPECAS), presenting criterion for the development of ATM automation in the short, medium or long term. It is intended that through this document the States/Territories/International organizations prepare an Action Plan considering bilateral/multilateral arrangements and the recommended use of ICD. In this sense, the Meeting noted that after the recommendation made by GREPECAS/12 related to the mentioned Strategy, the States are preparing Action Plans in accordance with Conclusion 12/31. To this respect, the technical cooperation project RLA/98/003 worked on this issue mainly covering States of the SAM Region and COCESNA. Likewise, through the activities carried out by the NACC/WG, the CAR Region States have reached an agreement on the Action plan format and different activities in relation with the Flight Plan/Radar data exchange are being developed.

c) Related with Task No. 3, concerning the work of Regional Project RLA/98/003, it was noted that the Project, considering the Regional Strategy and the Regional ICD, has developed a very interesting work regarding an ACC Interconnection Plan with automated ATC equipment and the corresponding system control interface document (SCID), in order to establish data exchange of Radar/Flight Plans, as well as AIDC communications in accordance with the Regional Strategy Phases II and III. In line with GREPECAS Conclusion 14/44, the Project developed the corresponding Action Plan. In regard to this item, the Meeting considered that the documentation developed by Project RLA/98/003 should be considered by the Automation Task Force or otherwise by the mechanism automation on issues established by the new CNS/ATM Subgroup. In view that technical cooperation of Project RLA/98/003 has finalized this task, it was also considered as completed.

d) Related to Task No. 4, concerning the development of guidelines on ATM automation functions, it was noted that the formulation of this task is very general and it should be re-formulated according to the needs aim at presenting a more precise objective. In this sense, it should be noted that the ATM systems have automated functions locally defined by air navigation service providers (ANSP) and additionally to these local functions, these ATM systems have the inter-operability capacity with embedded standard applications in other ATM systems located in other States/FIR. Applications such as Radar/Flights Plans and AIDC communications data exchange are currently available to be implemented and be able to inter-operate between ATM automated

systems, and that cooperation/international coordination requires to define interfaces and other technical-operational requirements with the purpose to implement the respective interconnections between systems. The Meeting agreed that the Task Force Group of the mechanism to be established within the new CNS/ATM Subgroup should work in these issues for planning and implementation of these functions serving Phases II and II the Regional Strategy.

6.2 The Meeting examined a proposal for the use of the current Flight Plan for the interchange of the flight plan data updates. A member indicated that for this purpose his State uses the CPL and with good results. The Meeting, when interchanging opinions on this issue, agreed that if this possibility was contained in the Regional ICD it would necessary that the States analyze this issue in detail in order to consider the establishment of a regional agreement.

6.3 The Meeting discussed issues related with the transition towards a new ICAO Flight Plan model. Concerning this, it was noted that a related activity within the tasks of the possible new CNS/ATM Subgroup. Likewise, it was noted that in relation with this issue, ICAO Secretary General, through State Letter AN 13/2.1-08/50 informed the States that the Air Navigation Commission approved Amendment No. 1 to the 15th Edition of PANS-ATM (Doc 4444) becoming effective as at 15 November 2012, inviting the States to implement the provisions established in the mentioned amendment in respect to the new Flight Plan model, which text is included in **Appendix** to this part of the Report, and it also can be downloaded at the Webpage: www.icao.int/icaonet.

6.4 The Secretariat advised the Meeting that the ANC's ATM Requirements and Performance Panel (ATMRPP) is preparing implementation guidelines to assist a globally streamlined implementation of the new flight planning provisions; these guidelines will become available in due course. The Meeting agreed that there will be many actions necessary to ensure a streamlined regional implementation, including the development of a regional transition strategy. In this regard, the meeting initially identified the following actions:

- AIDC guidelines and other regional documents will need to be updated,
- Contingency arrangements for States that cannot comply by the due date,
- How to handle staged implementations by States and/or airspace users,
- Management of Repetitive Flight Plans, and
- Implications for electronic presentations including electronic flight progress strips.

6.5 In light of the situation, the Meeting agreed to the following draft Conclusion for GREPECAS/15 consideration:

DRAFT
CONCLUSION ATM/CNS/6/2 IMPLEMENTATION OF THE NEW ICAO FLIGHT PLAN MODEL

Considering that States should take measures to implement the new ICAO Flight Plan Model, Amendment No. 1 to the 15th Edition of the PANS-ATM (Doc 4444), and, in order to establish a regional strategy to facilitate the global implementation of this amendment, that:

a) based on the guidance material that will be prepared by ICAO, CAR/SAM States take the necessary measures to prepare for the transition to the new Flight Plan model; and

b) the Subgroup establish a contributory body to prepare a Regional Strategy for the transition to the new Flight Plan model in the CAR/SAM Regions and the provisions associated with ATS messages.

6.6 Finally, the Subgroup examined GREPECAS Conclusions 14/43 and 14/44 and took note that they were addressed to States, and, as indicated during the analysis of this Agenda Item, they were implementing the recommendations contained in these Conclusions. Furthermore, it was informed that the NACC and SAM Regional Offices were following-up on the implementation of said Conclusions. In this regard, the Meeting agreed that from the point of view of the GREPECAS mechanism these Conclusions could be considered as implemented.

INTERNATIONAL CIVIL AVIATION ORGANIZATION

CAR/SAM REGIONAL PLANNING AND IMPLEMENTATION GROUP

(GREPECAS)

ATTACHMENT 1

TO THE REPORT OF THE SIXTH MEETING OF THE ATM/CNS SUBGROUP OF GREPECAS

REPORT OF THE SIXTH MEETING OF THE ATM COMMITTEE OF THE ATM/CNS SUBGROUP OF GREPECAS (ATM/COMM/6)

(Boca Chica, Dominican Republic, 30 June to 4 July 2008)

Prepared by the GREPECAS
ATM/CNS Subgroup Secretariat

July 2008

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of ICAO concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

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4.2 Review the Future Work Plan of the ATM Committee

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HISTORY OF THE MEETING

History of the Meeting

ii.1 Place and Duration of the Meeting

The Sixth Meeting of the ATM Committee of the GREPECAS ATM/CNS Subgroup (ATM/CNS/SG/6) was held at Boca Chica, Dominican Republic. The Meeting commenced on 30 June 2008 and ended on 3 July 2008.

ii.2 Organization, Officers and Secretariat

The Meeting was chaired by Mr. Fidel Ara (Cuba), Vice-chairman of the Committee. Mr. Víctor Hernández, Acting Deputy Regional Director of the ICAO NACC Regional Office and Secretary of the Subgroup and was assisted by Mrs. Jorge Fernández, Regional Officer ATM/SAR of the ICAO SAM Office and Mr. Vincent Galotti, Chief of ATM at ICAO Headquarters, Montreal. The Meeting met in plenary sessions, and in Ad hoc Groups when necessary.

ii.3 Working Languages

The working languages of the Meeting were English and Spanish. The documentation and the Report of the Meeting were issued in both languages.

ii.4 Agenda

The following Agenda was adopted:

Agenda Item 1: Safety Assessment Post RVSM Implementation

Agenda Item 2: Report of the ATM Committee Task Forces

- 2.1 Performance-Based Navigation (PBN)
- 2.2 Air Traffic Flow Management (ATFM)
- 2.3 ATM Automation

Agenda Item 3: Review of Deficiencies and Pending Conclusions/Decisions of the GREPECAS Mechanism in the ATM and SAR Fields

Agenda Item 4: Issues Related to the Organization of Future Work of GREPECAS ATM Matters

- 4.1 Review the Terms of Reference and Work Programme of the ATM Committee and its Task Forces
- 4.2 Review the Future Work Plan of the ATM Committee

Agenda Item 5: Other Business

ii.5 **Schedule and Working Methods**

The Meeting held its sessions as a working group of the whole beginning on Monday 31 June 2008 from 1130 to 1600 to 3 July 2008, from 0900 to 1530 hours, with appropriate breaks. Two Ad-hoc groups were formed: ATM Automation and Analysis of the CAR/SAM Transition Plan towards the ATM System.

ii.6 **Conclusions and Decisions**

The ATM/CNS Subgroup records its activities in the form of Draft Conclusions, Draft Decisions, and Decisions, as follows:

Draft Conclusions: *Conclusions that require approval by GREPECAS prior to their implementation.*

Draft Decisions: *Decisions that require approval by GREPECAS prior to their implementation*

Decisions: *Decisions that deal with matters of concern to the ATM/CNS Subgroup and its Committees.*

The first two above are submitted to the ATM/CNS Subgroup for further submission to GREPECAS and the last for the information of the Subgroup with respect to its internal activities.

List of Draft Conclusions

NUMBER	TITLE	PAGE
ATM/6/1	MEASURES TO REDUCE OPERATIONAL ERRORS IN THE ATC COORDINATION LOOP BETWEEN ADJACENT ACCS	1-4
ATM/6/2	REVIEW OF THE METHODOLOGY USED FOR SAFETY ASSESSMENT	1-4
ATM/6/3	NATIONAL PBN IMPLEMENTATION PLANS	2-6
ATM/6/4	ADOPTION OF STRATEGIC LATERAL OFFSET PROCEDURES (SLOP)	2-10

List of Documentation
WORKING PAPERS

Number	Agenda Item	Title	Date	Presented by
WP/01	---	Draft Agenda, Working Methods, Schedule and Work Plan	21/04/08	Secretariat
WP/02 **Rev. 2**	1	Examination of Large Height Deviation Reports Received by the Caribbean and South American Monitoring Agency (CARSAMMA) in Connection with the Implementation of the Reduced Vertical Separation Minimum (RVSM) in the CAR/SAM Regions	03/07/08	CARSAMMA
WP/03	1	Measures Recommended by the Scrutiny Working Group (GTE) to Achieve Safety Objectives Approved By GREPECAS	13/06/08	Rapporteur GT/GTE
WP/04	2.1	Report of the First Meeting of the Performance-Based Navigation Task Force (PBN/TF/1)	12/06/08	Rapporteur PBN/TF
WP/05	2.1	Report of the Second Meeting of the Performance-Based Navigation Task Force (PBN/TF/2)	28/06/08	Rapporteur PBN/TF
WP/06 **Rev.**	2.2	Report of the Meeting of the ATFM/TF	13/06/08	Rapporteur ATFM/TF
WP/07	2.3	Activities in the CAR/NAM Regions for the Implementation of ATM Automation	10/06/08	Secretariat
WP/08	4.2	Analysis of ICAO and GREPECAS Guidance on Global, Inter and Intra-Regional Air Navigation Activities	01/06/08	Secretariat
WP/09	3	***Deficiencies In the ATM and SAR Fields in the CAR and SAM Regions***	19/05/08	Secretariat
WP/10	3	Outstanding GREPECAS Conclusions/Decisions in the ATM and SAR Fields	23/05/08	Secretariat
WP/11	4.1	Terms of Reference and Work Programme of the ATM Committee	09/06/08	Secretariat
WP/12	4.2	ICAO State Letter: Amendments to the ICAO Flight Plan	09/06/08	Secretariat
WP/13	1	Safety Assessment of the CAR/SAM Regions after Three Years of RVSM Application	26/06/08	CARSAMMA
WP/14	4.2	Follow-Up on the Implementation Strategies and Activities Related to the ATM Performance Objectives Approved by GREPECAS	02/06/08	Secretariat
WP/15	2.1	Strategic Lateral Offset Procedure (SLOP) - Proposed Implementation in the CAR/SAM Regions	01/06/08	IFALPA

INFORMATION PAPERS

Number	Agenda Item	Title	Date	Presented by
IP/01 **Rev. 2**	--	List of working papers and information papers	03/07/08	Secretariat
IP/02	3	Contingency Plans Catalogue	05/06/08	Secretariat
IP/03	2.2	Core Information for the Implementation of RNP10 in the WATRS Airspace	09/06/08	Secretariat
NI/04	2.1	Resultados de la Primera Reunión del Grupo de Implantación PBN en la Región SAM (SAM/PBN/IG) (***Available only in Spanish)***	12/06/08	Brazil

Agenda Item 1: Safety Assessment Post RVSM Implementation

Safety assessment of the CAR/SAM Regions after three years of RVSM application

1.1 The Meeting noted the results of a safety assessment during the post-implementation phase of the Reduced Vertical Separation Minimum of 300 m (1000 ft) in the airspace of the CAR/SAM Regions presented by the CAR/SAM Regional Monitoring Agency (CARSAMMA).

1.2 In accordance with Doc 9574- *Manual on implementation of a 300 m (1 000 ft) vertical separation minimum between FL 290 and FL 410 inclusive*, the assessment should be carried out to ensure that the operations in the RVSM airspace do not originate an increase in the collision risk, such that the total vertical risk does not exceed the safety objectives established for the CAR/SAM Regions.

1.3 The procedure used is based on the experiences obtained from the RVSM implementation in the North Atlantic and European airspaces and in the CAR/SAM regions airspace (References 1 to 7). The complete document of the CAR/SAM airspace assessment is included in **Appendix A** to this part of the report. The following is a summary of this document.

On Traffic Movement Data Collection

1.4 The sample used to estimate the passing frequency and the dynamic and physical parameters of the typical aircraft for the collision risk assessment was collected in the period from 14 to 27 January 2008 as in previous occasions, much of the data received from some States could not be used to advantage by different reasons, such as: errors in entrance and exit time (e.g., exit time occurring simultaneously to or before the entrance time), lack of information for identifying and locating routes and waypoint position reporting points, etc.

Technical risk assessment

1.5 The goal is of technical risk verification is to demonstrate that the TLS of 2.5×10^{-9} fatal accidents per aircraft flying hour is satisfied according to a significant level of confidence**.** The technical risk that represents the CAR/SAM region was evaluated considering the movements in three different adjacent ACC from the CAR region and four from the SAM region, as was done in the precedent safety analysis. The Havana, COCESNA, Panama, Curitiba, Brasilia, Recife and Amazonian ACC were used at that time.

1.6 The following table presents the Technical Collision Risk for the operational phases in 2006 (FM-1), in 2007 (FM-II) and in 2008 (FM-III) of the CAR/SAM Regions. The assessment of collision risk in the period from 2008 to 2017 was estimated for an annual traffic growing rate of 8 %. Note was taken that, until 2017, the technical risk will be below the limit of 2.5×10^{-9}.

	CAR	SAM	CAR/SAM
FM-I	0.140×10^{-9}	0.036×10^{-9}	0.076×10^{-9}
FM-II	0.152×10^{-9}	0.043×10^{-9}	0.087×10^{-9}
FM-III	0.151×10^{-9}	0.041×10^{-9}	0.093×10^{-9}

Technical Collision Risk

Vertical Risk Assessment due to Errors Associated with all causes

1.7 This section will provide an estimate of the risk associated with all causes connected to RVSM use. The technical and operational risk values are combined to estimate the total risk for the

1.8 As can be seen in the following Table, the total risk for the CAR/SAM region is greater than the TLS agreed for the Regions of 5×10^{-9}.

1.9 It is important to note that the total risk was strongly influenced by the LHD, most of them due to errors in ACC-unit-to-ACC-unit transfer messages and negative transfer received from transitioning ATC unit.

Risk	AIRSPACE									*TLS*
	CARIBBEAN			SOUTH AMERICA			CAR/SAM REGIONS			
	MP-I	MP-II	MP-III	MP-I	MP-II	MP-III	MP-I	MP-II	MP-III	
N_{az}^{Tec}	1.4×10^{-10}	1.5×10^{-10}	1.5×10^{-10}	3.6×10^{-11}	4.3×10^{-11}	4.1×10^{-11}	7.6×10^{-11}	8.7×10^{-11}	9.3×10^{-11}	5×10^{-9}
N_{az}^{ACAS}	1.3×10^{-10}	4.4×10^{-11}	1.1×10^{-10}	3.4×10^{-11}	1.2×10^{-11}	3.0×10^{-11}	7.1×10^{-11}	2.5×10^{-11}	7.0×10^{-11}	
N_{az}^{wl}	2.6×10^{-9}	5.7×10^{-9}	5.8×10^{-9}	8.2×10^{-9}	27.0×10^{-9}	26.9×10^{-9}	6.1×10^{-9}	2.2×10^{-8}	20.3×10^{-9}	
N_{az}^{cl}	3.9×10^{-10}	3.2×10^{-9}	6.2×10^{-9}	8.8×10^{-10}	1.8×10^{-10}	7.9×10^{-9}	6.7×10^{-10}	9.8×10^{-10}	8.4×10^{-9}	
N_{az}^{Total}	3.3×10^{-9}	9.1×10^{-9}	12.3×10^{-9}	9.0×10^{-9}	27.0×10^{-9}	34.9×10^{-9}	6.9×10^{-9}	23.0×10^{-9}	28.9×10^{-9}	

Collision Risks for the CAR/SAM Regions

1.10 These errors are not caused by the RVSM operation, but by common procedures such as aircraft transfers from one ATC Unit to another (type M errors) and to errors caused by the absence of coordination by the transferring ATC units (type N errors).

Risk Assessment for RVSM Operational in the CAR/SAM Regions not considering M and N errors

1.11 The Meeting noted that errors of type M and N do not directly influence the application of RVSM, that is, that these kinds of errors, when they occur, may cause LHD events regardless of the vertical separation applied.

1.12 Bearing in mind the above, this assessment is equivalent to adopting corrective actions resulting from the introduction of an efficient programme by the States and International Organizations aimed at eliminating the foregoing errors, as was recommended by GREPECAS. The following table shows the risk values really affecting the application of RVSM, this is, without M and N type errors.

Risk	CARIBBEAN	SOUTH AMERICA	CAR/SAM REGIONS	*TLS*
N_{az}^{Tec}	1.5×10^{-10}	4.0×10-11	9.3×10^{-11}	5.0×10^{-9}
N_{az}^{ACAS}	1.1×10^{-10}	3.0×10^{-11}	7.0×10^{-11}	
N_{az}^{wl}	1.3×10^{-9}	1.3×10^{-9}	1.4×10^{-9}	
N_{az}^{cl}	1.9×10^{-10}	5.8×10^{-10}	5.3×10^{-10}	
N_{az}^{Total}	1.7×10^{-9}	1.9×10^{-9}	2.1×10^{-9}	

Collision Risks for the CAR/SAM regions

Results and Conclusions

1.13 The technical risk estimated three years post implementation of the RVSM is 0.093×10^{-9}. This estimate satisfies the agreed TLS value of no more than 2.5 x 10^{-9} fatal accidents per flight hour due to the loss of a vertical separation standard of 1000 ft established correctly.

1.14 The evaluation of the technical risk for the CAR/SAM regions due to the air traffic growth was carried out due to annual growth rates of 8% a year until 2017. The forecast shows that the technical risk will be below the TLS of 2.5×10^{-9} until 2017.

1.15 However, the total vertical collision risk due to a combination of technical height-keeping errors and operational errors, evaluated in number of fatal accidents per flight hour, is above the acceptable maximum level. For the CAR region it is equal to 12.3 x 10^{-9} for the SAM region 34.9 x 10^{-9} and for the CAR/SAM regions 28.9 x 10^{-9}. In order to reduce the risks, corrective actions are necessary to reduce errors of types M and N.

1.16 The LHD collected from the CAR/SAM regions in the period from January to December 2007 are related to 197 errors in transition messages between Air Traffic Control (ATC) units (type M), and 63 errors negative transfer received from transitioning ATC unit (type N).

1.17 The States of the CAR/SAM regions should be aware that each Large Height Deviation (LHD) corresponds to a warning of risk. As a consequence, remedial actions should be implemented independently of the results of the risk evaluation. Therefore, remedial actions must be taken to eliminate all errors, mainly “M” and “N” errors.

1.18 The Meeting agreed that it is necessary to supersede GREPECAS Conclusion 13/61 - *Measures to reduce operational errors in the ATC coordination loop between adjacent ACCs* in order to update it keeping the ATC coordination loop between adjacent ATSs Prevention Programme related to said Conclusion and the additional measures associated to that prevention programme.

1.19 Between other additional measures GREPECAS encouraged States and International Organizations to implement a safety management system and as far as possible, as a technological defense, to gradually implement ATS interchange data communications (AIDC). Therefore, the Meeting decided to formulate the following.

DRAFT
CONCLUSION ATM/6/1 MEASURES TO REDUCE OPERATIONAL ERRORS IN THE ATC COORDINATION LOOP BETWEEN ADJACENT ACCS

That, taking into account the impact of operational errors in the ATC coordination loop between adjacent ACCs on air operations safety:

a) CAR/SAM States/Territories/International Organizations apply on an urgent basis, among other measures, the error in the coordination loop among adjacent ACCs described in **Appendix B** to this part of the Report, in order to reduce LHD caused by errors in traffic coordination messages between ATC units, to an acceptable level of safety;

b) CAR/SAM States/Territories/International Organizations gradually implement the interface for data exchange among ATC units; and

c) ICAO coordinate, provide assistance, and make a follow-up on the implementation of these corrective measures.

1.20 Likewise, the Meeting was of the opinion that if errors are not caused by RVSM operation but by common procedures of transferring aircrafts from one ATC unit to the other (M-type errors) and by errors due to absence of coordination by the transferring ATC Unit (N-type errors), it would be suitable that the SASP analyze the used methodology for safety assessment, and therefore it formulated the following draft conclusion:

DRAFT
CONCLUSION ATM/6/2 REVIEW OF THE METHODOLOGY USED FOR SAFETY ASSESSMENT

That ICAO review the methodology used for the assessment after the RVSM implementation safety considering the fact that errors type M and N identified and used to perform this assessment may be independent of RVSM implementation.

Additional Actions to be adopted

1.21 All the recommendations made in the assessment presented before, which are transcribed below for ease of reference, remain valid: These recommendations have the objective of helping the efforts to carry out the next tasks associated with collision risk evaluation.

a) Data on the Traffic Flow

1.22 Approximately 40% of the received data could not be treated due to different reasons: from lack of understanding on how the data should be transcribed to the spreadsheets to inconsistency of presented data. It is advisable that, before the collection of data, States pay attention to the guidelines developed for this procedure and approved by the GREPECAS.

b) Data on Technical Vertical Deviation

1.23 A planning effort should be made to define the best methodology of data collection on technical vertical deviation. Additionally, a work program should be elaborated to show that the Altimetry System Error (ASE) for RVSM-approved aircraft remains steady. This task could be carried out along with the implementation of a monitoring program of the aircraft altimetry system performance. Such program will have to foresee the monitoring of the mentioned system of altimetry at least each two years or after 1000 flight hours per aircraft (whichever occurs last).

c) Altimetry System Monitoring

1.24 The CAR/SAM regions will have to establish a program for implantation of monitoring units for the verification of aircraft altimetry system. This program will have to be composed of a system of independent monitoring units (AGHME) installed in positions strategically located in the areas of higher traffic flow density. The objective is to monitor the largest possible number of aircraft for verification of the stability of the altimetry system error (ASE) and to check if the technical risk remains compatible with the agreed TLS of 2.5×10^{-9}.

d) Data on Vertical Deviations due to Operational Errors

1.25 Information on these types of events is obtained through ATC or pilot's reports. Important data on these deviations, like number of crossed flight levels and time spent at non-authorized flight level, are rarely informed. As these deviations are consequences of errors or contingency actions, States should develop a work plan to obtain these data with a high level of confidence and share them with CARSAMMA.

e) Events due to ACAS (TCAS)

1.26 Monitoring ACAS/TCAS events shall be effective with regard to confirming the operational performance as a consequence of said events.

1.27 The Meeting noted that the LHD report contains details of events resulting in altitude deviations of 300 ft or more, occurring within the RVSM airspace. Events caused by turbulence or other weather related causes, responses to ACAS/TCAS advisories, deviations due to contingency events, and operational errors are included on the LHD report.

1.28 **Appendix C** to this part of the report includes all LHD received by CARSAMMA by Month-Year for the CAR/SAM airspace (Table 1), the summary of the Total Number of LHD Reports by Month and Cause of Deviation code within CAR/SAM airspace (Table 2), the evolution of LHD reports since the verification phase until Phase III of RVSM post-implementation (Table 3) and the LHD reports received by CARSAMMA, during 2007, divided into semesters, and the LHD reports informed by the FIR of the CAR/SAM Regions (Tables 4A and 4B).

1.29 It is important to say that the identification of the error as well as filling in the LHD form show the State's commitment with safety, as reflected in Tables 4A and 4B.

1.30 The LHD reports received by CARSAMMA, from January to August 2007, were validated during the Fourth Meeting of the Scrutiny Work Group, which took place in Merida, Mexico. The ones received between September and December 2007 were validated during the Fifth Meeting of the Scrutiny Work Group, which took place in Lima, Peru.

1.31 The Scrutiny Work Group Meetings were very important since for the first time the LHD reports were evaluated and validated by experts that had the purpose of identifying the tendencies of the errors and indicating points of conflict between the boundary of the Flight Information Regions of the Caribbean and South American States.

1.32 From January until December 2007, the most frequent causes of the LHD reports were due to "error in ATC-unit to ATC-unit transition message" (Code: M) and "negative transfer received from transitioning ATC-unit" (Code: N), evidencing the tendencies that are becoming worse period after period of the Operational Safety Assessment of the CAR/SAM Regions.

1.33 The event points identified by the higher frequency of LHD reports were : LIXAS, UGUPI, BOKON, GELIS, KONRI, NANIK, SORTA, 11N036W, BUXOS, DAKMO, ENSOL, MOXAS, SISEL, PULTU, TERAS, VSJ, ALCOT, KARAZ, AGUJA, ARNEL, UKLOS, 05N041W, ARORO, BOGAL, DAGUD, ESDIN, ESIPO, IREMI, JOBER, KAKOL, MIBAS, NOREX, PADOX, PAKON and VAKUD, being necessary that the States make immediate arrangements in order to eliminate the tendencies of the occurred LHD.

1.34 After a detailed analysis, CARSAMMA realized that the errors had possibly been caused by the deficient communication-radio between the ATC Units and the aircraft due to the non-compliance with operational agreements between the adjacent Flight Information Regions (FIR), as well as, the ATCO's lack of compliance of the operational agreements previously signed between the States.

1.35 In order to obtain a better control of the frequency of LHD events by aircraft, it is indispensable to add the information of aircraft registration number in the Field 04 ("Call Sign"), included in Appendix C to this part of the report.

1.36 Controllers must be trained to avoid the errors in ATC-unit to ATC-unit transition message in order to reduce the time spent in wrong flight levels and the number of flight levels passed without any clearance.

Measures Recommended by the Scrutiny Working Group (GTE) to Achieve Safety Objectives Approved by GREPECAS

1.37 In view that the RMA determines if the estimated risk of collision, calculated in accordance with ICAO collision risk methodology, is less than the agreed TLS, the Meeting recalled that a critical component of RVSM safety assessment is the system performance monitoring requirement, and the analysis of large height deviations. To this end, GREPECAS deemed pertinent to create the CAR/SAM Scrutiny Group.

1.38 The initial result of the Group's effort is to examine reports of large height deviations and produce an estimate of time spent at a flight level other than cleared. This estimate is used as a primary input used in the preparation of an estimate of the operational risk for the implementation of Reduced Vertical Separation Minimum. The Group examined both technical risk (affected by reliability and accuracy of the avionics within the aircraft) and operational risk (affected by the human element) in the development of the safety assessment.

1.39 The Group made recommendations for reducing or mitigating the effect of negative trends as a part of the RVSM implementation and ensure that operational errors are kept to a minimum. This information is used to assure that the airspace being examined continues to satisfy the requirements of the target level of safety, which is necessary to support continued RVSM operations. New procedures or other mitigation strategies to reduce occurrences of large height deviations may evolve out of this process.

1.40 The Fourth Training Seminar/Meeting was held in Merida, Mexico, September 25-27, 2007. The Fifth Training Seminar/Meeting of the CAR/SAM Grupo de Trabajo De Escrutinio (GTE) was hosted by the ICAO Lima office. This Training Seminar/Meeting is Session 2 of 2. The following contains a summary of the Group's analysis.

1.41 The Group reviewed GTE methodology and objectives, why is it necessary to evaluate and analyze large height deviations and how LHDs impact in the technical and operational risk assessment with regard to RVSM. The meeting also noted the ICAO collision risk model and the parameters contained in the model.

1.42 The Meeting noted that CARSAMMA is the focal point to obtain the necessary information in order to carry out safety assessments. It had the assignment to monitor aircraft performance, as well as to evaluate large-height deviations occurrences.

1.43 Note was taken that CARSAMMA has developed a significant training activity to ATCOs from the Brazilian Control Centers and has continued with air traffic movement data collection in 2008, which was submitted to the Agency. Based on the experience obtained, it developed an auto-run file which shall serve to train ATCOs in the CAR/SAM Regions, in filling the LHD report forms. A basic course of risk assessment between cruising levels aircraft is also being prepared, and shall be offered to CAR/SAM States and International Organizations.

1.44 CARSAMMA participated at a Special RMA meeting at a worldwide level, where among other matters, the lack of standardization of procedures established with States was analyzed, and how to monitor the operators requirements. It will have objectives to harmonize the parameters used b the different RMAs to develop risk assessments and also to review RMA manual.

1.45 Colombia presented different scenarios that were analyzed by the meeting for the purpose of defining LHD criteria that would facilitate the work of the Scrutiny Group. The established criteria will assist the GTE in determining whether a reported height event qualifies as an LHD. The results of the analysis carried out by the meeting and the conclusions adopted for each scenario are included in **Appendix D**. After the analysis was carried out, the Meeting considered that the scenarios should be evaluated in future meetings.

1.46 The GTE examined all occurrences of large height deviations of 90m (300ft) or greater reported to CARSAMMA during the period of January 2007 to December 2007. A total of 205 reports were evaluated. The details of each report are included in **Appendix E** to this part of the report.

1.47 The Group assigned an estimate of flight time spent at incorrect flight level, deviation magnitude, number of levels crossed and an event category to each event. These values are the primary contributors to the estimate of operational risk for operations in Reduced Vertical Separation Minimum (RVSM) airspace.

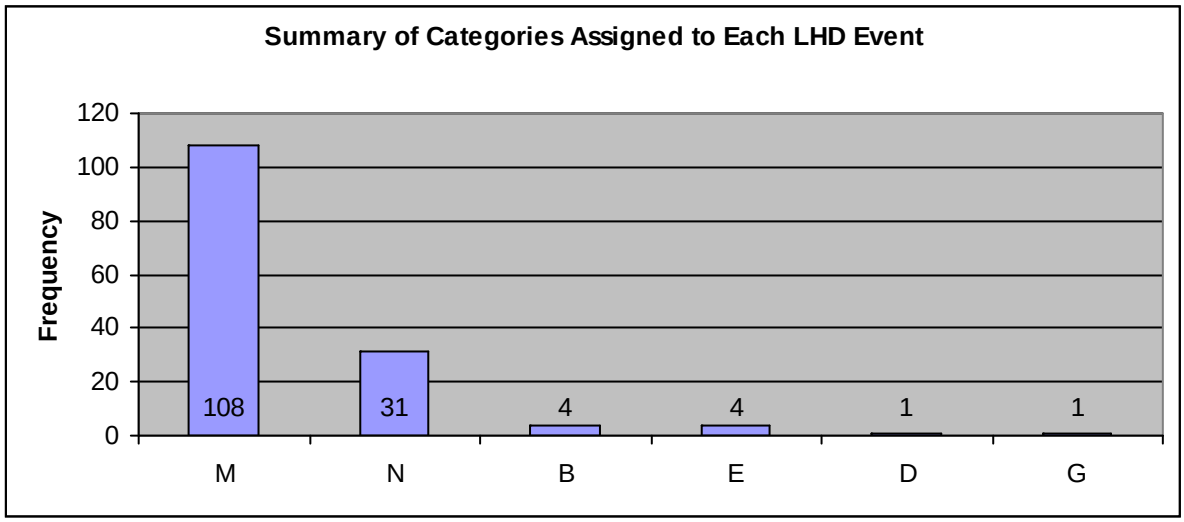
1.48 An initial analysis revealed that the LHD Reporting Form has been used for purposes other than reporting an LHD event. It was noted that, although the reports did not pertain to the current GTE analysis, the reports will be reviewed and evaluated by CARSAMMA. Additionally, it was recommend that ATS administrations take the necessary actions, so that personnel in charge of collecting recording such information would receive training to facilitate the identification and filling of the LHD event form.

1.49 With regard to some reports received used to report other incidents different to those related with LHD, CARSAMMA consulted with the authorities regarding all LHD reports submitted during the period January-December 2007 and to review if times shown in the same are accurate.

1.50 Previous analyses revealed that a significant number LHD events categorized as Code “M” and Code “N” were associated with other adjacent Region FIR. A total of 19 observed events correspond to approximately 13% of the reported LHDs. The Meeting agreed that these reports required further investigation. The analysis identified nine reports categorized as Code “M” and Code “N” that were associated with Dakar represented approximately 6% of qualifying LHDs

1.51 The following chart provides a summary of the number of categories assigned to each event. M and N continue to be the top two categories which account for approximately 93% of the reported LHDs. A table of event categories, included in **Appendix F,** emphasizes that errors are not caused by RVSM operation, common procedures in aircraft transference from one ATC unit to another is the largest contributor.

1.52 For this reason, GREPECAS encouraged States and International Organizations to implement a safety management system and, as technology permits, to gradually implement ATS Inter-facility data communication (AIDC).



1.53 With respect to coordination errors, the meeting recalled that many letters of operational agreement (LOAs) between ACCs contain a procedure for the transference of ground/air communications, which establishes that such transference of communications of an aircraft shall be transferred FIVE (5) minutes before the estimated hour in which the aircraft shall reach the transference point for each ATS route.

1.54 In view of the above, and as a prevention method to minimize the impact that the lack of an effective coordination of aircraft transference might have in safety, the meeting agreed that States should take the corresponding actions, so that ACCs apply the communications procedure aforementioned. In cases where current LOAs do not contemplate these 5 minutes for the communications transference, the meeting deemed pertinent that ACCs involved, if applicable, review and incorporate such procedure.

1.55 The Meeting noted that the CARSAMMA and the Scrutiny Group (GTE) have scheduled a new series of courses/meetings in order to improve the States participation in LHD analysis, which is foreseen to result in the enhancement of safety levels in the CAR/SAM Regions.

APPENDIX A

SAFETY ASSESSMENT OF THE CAR/SAM REGIONS AFTER THREE YEARS OF RVSM APPLICATION

1. Introduction

1.1 This report shows the results of a safety assessment relevant to the operational phase of implementation of the Reduced Vertical Separation Minimum of 300 m (1000 ft) in the airspace of the Caribbean and South American regions (CAR/SAM). This phase corresponds to the continuation of implementation strategy of the Manual on Implementation of a 300 m (1000 ft) Vertical Separation Minimum between FL 290 and FL 410 inclusive, ICAO, Montreal, Doc 9574, 1st edition 1992, 2nd edition 2000.

1.2 According to Doc 9574 the assessment should be carried out to ensure that the operations in the RVSM airspace do not induce an increase in the collision risk, such that the total vertical risk does not exceed the safety objectives established.\

1.3 The methodological procedures used are based on the experiences obtained from the RVSM implementation in the North Atlantic and European airspaces and in the CAR/SAM regions airspace (References 1 to 7).

2.0 Context.

2.1 **On Airspace** – the CAR/SAM regions airspace is constituted by 38 Flight Information Regions (FIR) located in the following States: Antigua and Barbuda, Netherlands Antilles, Argentina, Barbados, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, El Salvador, Ecuador, United States, Grenada, Guadeloupe, Guatemala, Guyana, French Guyana, Haiti, Honduras, Jamaica, Martinique, Nicaragua, Panama, Paraguay, Peru, Dominican Republic, St. Barthelemy, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Trinidad and Tobago, Uruguay and Venezuela.

2.2 **On Traffic Movement Data Collection –** the sample used to estimate the passing frequency and the dynamic and physical parameters of the typical aircraft for the collision risk assessment was collected in the period from 14 to 27 January 2008, as determined in the AP/ATM/9/13 conclusion, thirteenth meeting, held in Colombia, Bogota, in the period between 09 and 13 July 2008. From among the data received from the 38 FIR of the CAR/SAM regions, the data received from three adjacent control centers (ACC), Havana, COCESNA and Panama from Caribbean region, and four adjacent ACC, Curitiba, Brasilia, Recife and Amazonian from South American region, were treated. The sample consisted, in terms of flight hours, of a total of 26, 924 hours received from all ACC, 8,575 hours (~32%) received from the CAR region and 18,349 hours (~68%) from the SAM region. And as in previous occasions, much of the data received from some States could not be used to advantage by different reasons, such as errors in entrance and exit time (e. g. exit time occurring simultaneously to or before the entrance time), lack of information for identifying and locating routes and waypoint position reporting points, etc.

2.3 **Aircraft Population –** in accordance with the orientation guidance to RVSM implementation it is necessary that 100% of the RVSM approved aircraft population meet the RVSM requirements.

2.4 **Data On Vertical Deviations –** in the absence of appropriate ways of providing aircraft height-keeping monitoring, the statistically representative vertical deviations of less than 300 ft from the North Atlantic region (sent by the CMA agency) were used. The atypical large height vertical deviations *AAD*, collected from the CAR/SAM regions, were added to the typical vertical deviations from NAT for a new fitting of the *AAD* probability distribution function. The statistical data (mean and standard deviation) of the ASE distribution functions for each group of aircraft types were obtained from the European RVSM monitoring program and are contained in Reference 4.

3.0 Demonstration of the Technical Feasibility of RVSM Application in the CAR/SAM Regions.

3.1 Conditions that Quantify the Global System Performance Specification.

3.2 Passing Frequency – the passing frequency was determined individually for each route segment, each airway, each ACC, for the three adjacent ACC of the Caribbean region and for the four adjacent ACC of the South American region, and for the whole airspace of the CAR/SAM regions represented by all the considered ACC. In the Caribbean region, the peak of the passing frequency occurred in the route segment between waypoints UCA and URSUS of the route UA301, which belong to FIR Havana, for aircraft flying in opposite directions. In South America, the passing frequency peak occurred in the FIR Recife in the route segment between waypoints CONDE and SVD of the UW58 airway. The passing frequencies for the CAR/SAM regions are shown in Table 5.

3.3 The estimate for the vertical occupancy on crossing routes was derived from the traffic samples received from the main 7 CAR/SAM FIR in terms of traffic density. The vertical occupancy is estimated to be 0.5488.

3.4 Aircraft Size

3.4.1 The aircraft length, wingspan and height shown in Table 1 were used in the estimation of risk for the CAR/SAM RVSM safety assessment. These numerical values were estimated from the traffic sample.

Aircraft	**λ_z Height (NM)**	**λ_x Length (NM)**	**λ_y Wingspan (NM)**
Average Aircraft	0.0078381	0.0233009	0.0209562

Table 1 - Aircraft Size Used in the CAR/SAM RVSM Safety Assessment

3.4.2 Estimation of the risk for proximate aircraft pairs at adjacent flight levels on crossing routes requires the diameter of the disk representing the shape of an aircraft in the horizontal plane, $\lambda_{h.}$ This value has been taken as 0.0233009 NM for average aircraft in the CAR/SAM airspace.

3.5 **Relative Aircraft Speeds.**

3.5.1 Table 2 presents the numerical values and sources for estimation of relative aircraft speeds used in the CAR/SAM safety assessment. The numerical values of average relative along-track speed and average absolute aircraft ground speed are those obtained from the analysis of the traffic sample. CARSAMMA used the numerical value of relative cross-track speed already used in the safety assessment of other regions, i.e. 20 knots.

3.5.2 The numerical value for the relative horizontal-plane speed of a pair of aircraft on crossing routes in horizontal overlap was determined from the angle of route intersections in a route system analysed assuming that the speed of an individual aircraft is 450.11 knots.

3.5.3 The numerical value of 1.5 knots for relative vertical speed shown in Table 2 is that used in both the NAT and Pacific RVSM safety assessments.

Parameter Symbol	Parameter Definition	Parameter Value	Source for Value
$\overline{\lvert\Delta V\rvert}$	Average absolute value of the relative along-track speed between aircraft on same direction routes	18.25 knots	Estimated from CAR/SAM sample
$\overline{\lvert V\rvert}$	Average absolute value of the aircraft ground speed	450.11 knots	Estimated from CAR/SAM sample
$\overline{\lvert\dot{y}\rvert}$	Average absolute value of the relative cross track speed for an aircraft pair nominally on the same track	20 knots	Value used in NAT RVSM safety assessment
$\overline{\lvert h(\dot{\theta})\rvert}$	Average absolute value of the relative horizontal speed during overlap for aircraft pairs on routes with crossing angle varying from 5 to 175 degrees	Depends on the angle of intersection	Corresponds to an average aircraft speed of 448.50 knots
$\overline{\lvert\dot{z}\rvert}$	Average absolute value of the relative vertical speed of an aircraft pair that have lost all vertical separation	1.5 knots (all traffic flows)	Value used in NAT and Pacific RVSM safety assessments

Table 2 - Relative Aircraft Speeds Used in the CAR/SAM RVSM Safety Assessment

3.6 **Probability of Lateral Overlap** – CARSAMMA used 0.3 NM as a standard deviation of lateral heading to estimate the numerical value of P_y *(0)*. The result of this estimation is a value of 0.0494.

3.7 **Probability of Vertical Overlap Attributable to Technical Height-Keeping Performance** - As noted previously, technical risk is considered to arise from the effects of turbulence, loss of height-keeping as well as from aircraft altimetry and altitude-keeping system performance errors. Hence, the estimation of the probability of vertical overlap must take into account the contributions of vertical errors arising from all of these sources.

3.7.1 CARSAMMA has compared the results of monitoring aircraft height-keeping performance in the NAT and CAR/SAM regions and has found them to be similar. As a result, and considering the amount of data available, CARSAMMA has used the estimates of ASE from the NAT region in the technical operational safety assessment.

3.7.2 The Task Force has consistently called on ATS providers, airspace users and others to forward monthly reports of all sorts of LHD to CARSAMMA. While not all ATS units have provided these monthly reports, those received by CARSAMMA from January through December 2007 have highlighted just a few significant instances of LHD attributable to turbulence. Because of the important effect of this parameter on vertical collision risk, CARSAMMA has taken a cautious approach to specify its numerical value. The approach considered the LHD from the NAT region added to the LHD from the 7 CAR/SAM FIR, which resulted in the values shown in Table 3.

$P_Z(1000)$	$P_Z(0)$	$P_y(0)$
5.091×10^{-9}	0.4852	0.0496

Table 3 - Results for the Vertical and Lateral Overlap Probability

3.8 **Verification of the Global Height Keeping Performance Specification –**Tables 4.1 to 4.3 show that all *TVE* proportions are met simultaneously, verifying that the Global Height Keeping Performance Specification is in agreement, taking into account the conditions in which the data on deviations have been obtained from the NAT airspace and from the CAR/SAM regions.

Phases / Proportion	VF	OIP	MP-I	MP-II	MP-III	Threshold
Prob{|TVE| ≥ 300}	8.55×10^{-5}	6.04×10^{-5}	1.04×10^{-5}	9.43×10^{-5}	9.45×10^{-5}	2.0×10^{-3}
Prob{|TVE| ≥ 500}	2.27×10^{-6}	1.48×10^{-6}	3.02×10^{-6}	2.76×10^{-6}	2.77×10^{-6}	3.7×10^{-6}
Prob{|TVE| ≥ 650}	2.13×10^{-7}	1.46×10^{-7}	2.84×10^{-7}	2.61×10^{-7}	2.62×10^{-7}	4.7×10^{-7}
Prob{950 ≤ |TVE| ≥ 1050}	2.19×10^{-9}	1.67×10^{-9}	2.55×10^{-9}	2.41×10^{-9}	2.42×10^{-9}	5.3×10^{-8}

Table 4.1 – Proportions of Height Keeping Errors (CAR Region)

Phases / Proportion	VF	IOP	MP-I	MP-II	MP-III	Threshold
Prob{|TVE| ≥ 300}	7.12×10^{-5}	4.69×10^{-5}	5.21×10^{-5}	3.81×10^{-5}	3.81×10^{-5}	2.0×10^{-3}
Prob{|TVE| ≥ 500}	1.34×10^{-6}	8.69×10^{-6}	7.29×10^{-6}	6.15×10^{-7}	6.16×10^{-7}	3.7×10^{-6}
Prob{|TVE| ≥ 650}	9.81×10^{-7}	7.89×10^{-7}	5.91×10^{-7}	5.89×10^{-8}	5.90×10^{-8}	4.7×10^{-7}
Prob{950 ≤ |TVE| ≥ 1050}	7.53×10^{-9}	8.79×10^{-9}	6.49×10^{-9}	8.34×10^{-10}	8.36×10^{-10}	5.3×10^{-8}

Table 4.2 – Proportions of Height Keeping Errors (SAM Region)

Phases / Proportion	VF	OIP	MP-I	MP-II	MP-III	Threshold
Prob{|TVE| ≥ 300}	7.86×10^{-5}	5.05×10^{-5}	6.95×10^{-5}	6.051×10^{-5}	6.060×10^{-5}	2.0×10^{-3}
Prob{|TVE| ≥ 500}	1.72×10^{-6}	1.05×10^{-6}	1.49×10^{-6}	1.470×10^{-6}	1.472×10^{-6}	3.7×10^{-6}
Prob{|TVE| ≥ 650}	1.43×10^{-7}	9.86×10^{-7}	1.34×10^{-7}	1.395×10^{-7}	1.398×10^{-7}	4.7×10^{-7}
Prob{950 ≤ |TVE| ≥ 1050}	1.31×10^{-9}	1.11×10^{-9}	1.28×10^{-9}	1.462×10^{-9}	1.466×10^{-9}	5.3×10^{-8}

Table 4.3 – Proportions of Height Keeping Errors (CAR/SAM Regions)

3.9 **Identification of the causes of Height Keeping Errors Inconsistency –** the causes of deviations correspond to atmospheric turbulence and other possible flight technical errors as autopilot or even to operational conditions of air traffic control not identified in the incident reports.

3.10 **Verification of Technical TLS (Technical Risk) -** The goal is to demonstrate that the TLS of 2.5×10^{-9} fatal accidents per aircraft flying hour is satisfied according to a significant level of confidence**.** The technical risk that represents the CAR/SAM region was evaluated considering the movements of three different adjacent ACC from the CAR region and four from the SAM region, as was done in the precedent safety analysis. The Havana, COCESNA, Panama, Curitiba, Brasilia, Recife and Amazonian ACC were used at that time. In Table 5 below, the parameters of the Technical Collision Risk Model for the operational phases in 2006 (MP-I), 2007 (MP-II) and 2008 (MP-III) are shown for comparison.

3.11 The collision risk was assessed separately for the CAR and SAM regions and for the total CAR/SAM airspace, as shown in Table 6 below.

3.12 **Effect of the Growing Traffic -** the evolution of collision risk in the period from 2008 to 2017 was estimated for an annual traffic growing rate of 8 % that directly affects the passing frequency numerical value. The forecasts are shown in Figs. 1, 2 and 3, below**.** Note that, until 2017, the technical risk will be below the limit of 2.5×10^{-9}. In the figures below, a similar projection is presented for the Verification Phase (VP), Initial Operation Phase (IOP) and Operational Phases (MP-I, MP-II and MP-III) scheduled for years 2004, 2005, 2006, 2007 and 2008, respectively.

PARAMETERS	AIRSPACE								
	CARIBBEAN			SOUTH AMERICA			CAR/SAM REGIONS		
	FM-I	FM-II	FM-III	FM-I	FM-II	FM-III	FM-I	FM-II	FM-III
$P_y(0)$	0.0464	0.0493	0.0500	0.0446	0.0512	0.0492	0.0447	0.0504	0.0494
$P_z(0)$	0.4095	0.4494	0.4508	0.3748	0.4487	0.4338	0.3862	0.4485	0.4852
$P_z(1000)$	8.18×10^{-9}	9.94×10^{-9}	8.06×10^{-9}	1.78×10^{-9}	3.15×10^{-9}	2.463×10^{-9}	3.75×10^{-9}	5.82×10^{-9}	5.091×10^{-9}
λ_x (NM)	0.0224519	0.023812	0.02418663	0.0206317	0.02387	0.0229706	0.021244	0.0238494	0.02330088
λ_y (NM)	0.0196701	0.020920	0.02120884	0.0186196	0.02171	0.0208620	0.01897	0.0213892	0.02095623
λ_z (NM)	0.0067274	0.0071437	0.007224062	0.0062421	0.00722	0.0070315	0.006403	0.0071865	0.0078381
λ_h (NM)	0.0224519	0.023812	0.02418663	0.0206317	0.02387	0.0229706	0.021236	0.0238494	0.0235078
$\overline{\lvert V \rvert}$ (NM/h)	470.65	464.70	467.68	442.30	437.59	446.93	451.72	448.50	450.11
$\overline{\lvert \Delta V \rvert}$ (NM/h)	20	20	20	18.42	18.04	19.21	18.44	18.05	18.25
$\overline{\lvert \dot{y} \rvert}$ (NM/h)	20	20	20	20	20	20	20	20	20
$\overline{\lvert \dot{z} \rvert}$ (NM/h)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
$N_x(op)$	0.3361	0.2731	0.3351	0.2397	0.1772	0.2293	0.2873	0.2287	0.2838
$N(same)$	0.0	0.0	0.001	0.0139	0.0043	0.01001	0.0139	0.0043	0.01001
$E_z(cros)$	0.3743	0.3240	0.3492	0.9053	0.4637	0.6845	0.7003	0.3973	0.5488
$S_x(NM)$	80	80	80	80	80	80	80	80	80

Table 5 - Summary of the Technical Vertical Collision Risk Parameters

	CAR	SAM	CAR/SAM
FM-I	0.140×10^{-9}	0.036×10^{-9}	0.076×10^{-9}
FM-II	0.152×10^{-9}	0.043×10^{-9}	0.087×10^{-9}
FM-III	0.151×10^{-9}	0.041×10^{-9}	0.093×10^{-9}

Tabla 6. Technical Collision Risk

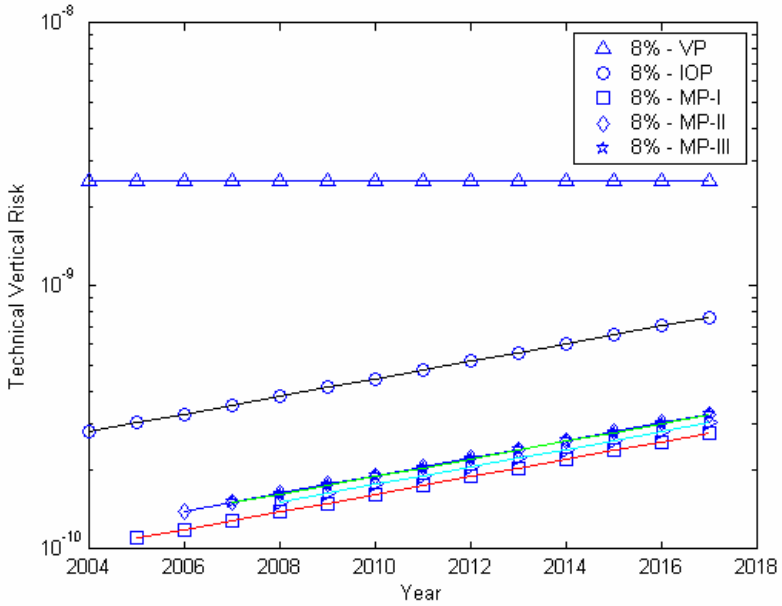


Fig 1 - Technical Collision Risk Forecast for the Caribbean Region

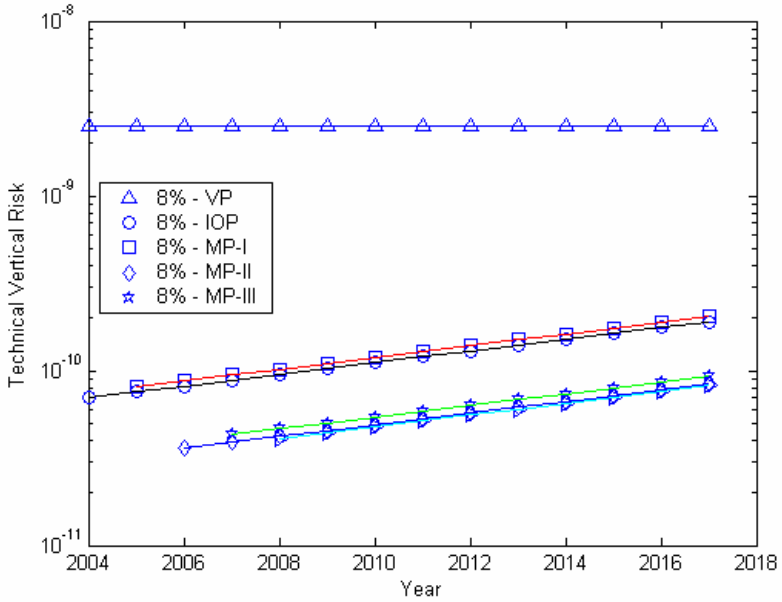


Fig 2 - Technical Collision Risk Forecast for the SAM Region.

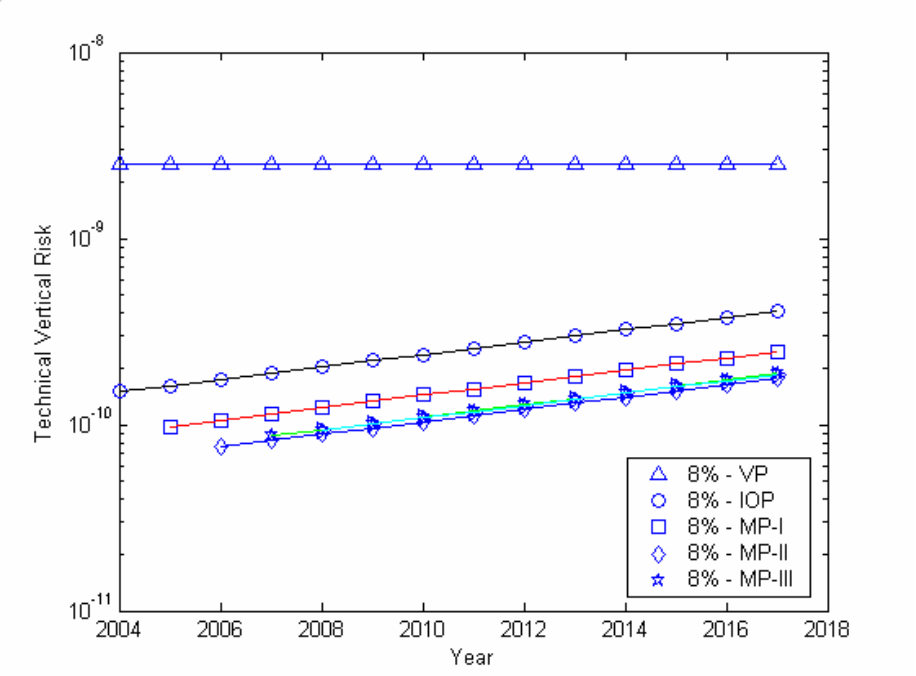


Fig 3. Technical Collision Risk Forecast for the CAR/SAM Regions.

4.0 **Operational Risk** - the CRM for operational risk was developed in connection with the CAR/SAM RVSM implementation. As such, it reflects certain operational characteristics of the CAR/SAM airspace that are not common to other airspaces.

4.1 The LHD identified through the reports received by CARSAMMA may be due to operational procedures, adverse meteorological conditions or emergency procedures caused by equipment failures or loss of pressurization and can be divided into four main types of group:

a) ATC-pilot loop errors and incorrect clearances;
b) aircraft contingency events;
c) deviations due to meteorological effects; and
d) deviations due to ACAS (TCAS).

4.2 The definition of errors according to the causes was based on the classification approved by the SWG at AP/ATM/11 (REF. 5) and is presented on the paper related to LHD at that meeting. Tables 9 and 10 below show the large deviations (equal to or larger than 1000ft) for the region analyzed, considered operational and received by CARSAMMA, the types and causes of which are described in the Table 9. In Tables 7 and 8, the last two columns refer to the numbers of crossed flight levels, n^{cl}, in the same (s) and opposite (op) direction of flow.

EVENT DATE	FLIGH IDENT	ACFT TYPE	POSITION	CLRD FL	EVENT FL	HT LHD	DURA TION	DUR GTE	CODE	COD GTE	FIR	SOURCE	Time (S)	Time (Op)	n (S)	n (Op)
12/01/07	CMP489	B737	DAGUD	390	410	2000	90		M	M	PANAMA/OCEANIC	PILOT	90		1	1
17/01/07	AMX017	B762	DAKMO	360	380	2000	90		M	M	PANAMA/OCEANIC	PILOT / MODE C	90		1	1
19/01/07	ALV512	A315	VKA	300	320	2000	90		M	M	SANTO DOMINGO	PILOT / MODE C	90		1	1
20/01/07	RPB7532	MD80	ALPON	390	370	-2000	90		M	M	PANAMA/OCEANIC	PILOT	90		1	1
20/01/07	CMP403	B737	AGUJA	400	400	0	0	90	N	N	PANAMA/OCEANIC	MODE C	90			
23/01/07	SAM8478	MD83	DAKMO	320	340	2000	90		M	M	PANAMA/OCEANIC	PILOT / MODE C	90		1	1
23/01/07	CMP488	B738	8NM SUR BUXOS	380	380	0	0	90	N	N	PANAMA/OCEANIC	PILOT	90			
25/01/07	VEC316	B722	BOGAL	390	370	-2000	90		M	M	PANAMA/OCEANIC	PILOT / MODE C	90		1	1
26/01/07	AAL996	B763	ARORO	340	360	2000	90		M	M	PANAMA	MODE C	90		1	1
27/01/07	AAL2133	B738	SELEK	330	370	4000	90		M	M	HAVANA	MODE C	90		2	2
27/01/07	DAL144	B763	ETBOD	320	360	4000	30		M	M	PORT AU PRINCE	PILOT	30		2	2
31/01/07	AVA9776	MD83	DAKMO	360	340	-2000	90		M	M	PANAMA	MODE C	90		1	1
31/01/07	CMP302	B737	DAKMO	340	380	4000	90		M	M	PANAMA	MODE C	90		2	2
04/02/07	ARG1365	B735	GELIS	350	330	-2000	90		M	M	PANAMA CEANIC	PILOT / MODE C	90		1	1
06/02/07	CMP416	E190	BOGAL	300	300	0	90		N	N	PANAMA/OCEANIC	PILOT / MODE C	90			
09/02/07	TPA410	B762	ILTUR	360	380	2000	90		M	M	PANAMA/OCEANIC	PILOT	90		1	1
12/02/07	CMP824	E190	BITIX	380	340	-4000	90		M	M	PANAMA/OCEANIC	PILOT	90		2	2

Table 7 - Operational LHD (Equal to or Larger than 1000ft) Received by CARSAMMA from the CAR Region

EVENT DATE	FLIGH IDENT	ACFT TYPE	POSITION	CLRD FL	EVENT FL	HT LHD	DURA TION	DUR GTE	CODE	COD GTE	FIR	SOURCE	Time (S)	Time (Op)	n (S)	n (Op)
20/02/07	COA745	B738	(182354N 0883854W)	350	370	2000	90		M	M	CENTRAL AMERICAN	MODE C	90		1	1
21/02/07	DAL516	B752	VESKA	340	350	1000	90		M	M	SANTO DOMINGO	PILOT / MODE C		90		1
25/02/07	AAL932	B752	TOKUT	360	340	-2000	90		M	M	PANAMA	PILOT / MODE C	90		1	1
15/03/07	DAL274	B764	BUXOS	300	320	2000	90		M	M	PANAMA	PILOT / MODE C	90		1	1
15/03/07	CMP716	E190	ESEDA	340	340	0	90		M	N	PANAMA	MODE C	90			
19/03/07	TSC174	A310	DUXUN	350	370	2000	90		M	M	PANAMA	PILOT	90		1	1
20/03/07	RPB7512	MD83	KAKOL	320	340	2000	90		M	M	PANAMA	PILOT / MODE C	90		1	1
25/03/07	CMP437	B737	ARNAL	370	330	-4000	90		M	M	PANAMA	PILOT	90		2	2
27/03/07	DAL146	B764	BUXOS	300	320	2000	90		M	M	PANAMA	MODE C	90		1	1
05/04/07	AAL930	B752	DIBOK	360	360	0	15		N	N	KINGSTON	PILOT	15			
08/04/07	LNE539	B763	DAGUD	350	370	2000	90		M	M	PANAMA	PILOT	90		1	1
18/04/07	CMP266	B737	AGUJA	380	400	2000	90		M	M	PANAMA	MODE C	90		1	1
01/05/07	RCH633	K35R	PAPIN	360	360	0	0	90	N	N	PANAMA	PILOT	90			
04/05/07	AAL952	A306	BUXOS	320	340	2000	90		M	M	PANAMA	PILOT / MODE C	90		1	1
09/05/07	COA654	B752	TILSO	360	380	2000	90		M	M	PANAMA	PILOT	90		1	1

Table 7 - Operational LHD (Equal to or Larger than 1000ft) Received by CARSAMMA from the CAR Region (Continuation)

EVENT DATE	FLIGH IDENT	ACFT TYPE	POSITION	CLRD FL	EVENT FL	HT LHD	DURA TION	DUR GTE	CODE	COD GTE	FIR	SOURCE	Time (S)	Time (Op)	n (S)	n (Op)
09/05/07	CMP300	E190	UKLOS	340	380	4000	90		M	M	PANAMA	MODE C	90		2	2
10/05/07	COA882	B737	ARORO	340	380	4000	90		M	M	PANAMA	PILOT / MODE C	90		2	2
14/05/07	DAL742		2008N 07820W	320	300	-1000	60		M	I	KINGSTON	PILOT / MODE C		60		1
16/05/07	VPBON			360	380	2000	90		M	M	SANTO DOMINGO	PILOT / MODE C	90		1	1
30/05/07	RPB7540	MD81	KAKOL	320	340	2000	90		M	M	PANAMA	PILOT / MODE C	90		1	1
26/06/07	UPS383	B752	UKLOS	360	380	2000	90		M	M	PANAMA	MODE C	90		1	1
27/06/07	CMP874	E190	BOGAL	340	300	-4000	90		M	M	PANAMA	MODE C	90		2	2
27/06/07	MXA381	A319	ISEBA	350	370	2000	90		M	M	PANAMA	MODE C	90		1	1
29/06/07	AVA060	MD83	DAKMO	340	340		90		N	N	PANAMA		90			
01/07/07	LRC661	A320	PAPIN	370	350	-2000	90		M	M	PANAMA	PILOT	90		1	1
01/07/07	CCCWK	G150	AGUJA	360	400	4000	90		M	M	PANAMA	MODE C	90		2	2
10/07/07	ALV502	A315		340	300	-4000	90		M	M	SANTO DOMINGO	PILOT	90		2	2

Table 7 - Operational LHD (Equal to or Larger than 1000ft) Received by CARSAMMA from the CAR Region (Continuation)

EVENT DATE	FLIGH IDENT	ACFT TYPE	POSITION	CLRD FL	EVENT FL	HT LHD	DURA TION	DUR GTE	CODE	COD GTE	FIR	SOURCE	Time (S)	Time (Op)	n (S)	n (Op)
18/07/07	AVA060	MD80	DAKMO	320	340	2000	90		M	M	PANAMA	MODE C	90		1	1
18/07/07	N270KA	H25B	BUFEO	350	330	-2000	90		M	M	PANAMA	PILOT	90		1	1
31/07/07	LNE539	B763	DAGUD	350	370	2000	90		M	M	PANAMA	PILOT	90		1	1
17/08/07	XAFLY	LJ60	ILTUR	400	430	1000	90		M	M	PANAMA	MODE C		90		1
22/08/07	RPB7372	MD83	AGUJA	360	360	0	90		N	N	PANAMA	MODE C	90			
05/09/07	RPB7540	MD81	KAKOL	320	340	2000	90		M	M	PANAMA	PILOT / MODE C	90		1	1
06/09/07	LCO1100	B763	UKLOS	320	340	2000	90		M	M	PANAMA	PILOT / MODE C	90		1	1
07/09/07	UPS382	B752	ARNAL	370	370	0	90		N	N	PANAMA	PILOT	90			
13/09/07	UPS383	B752	UKLOS	320	340	2000	90		M	M	PANAMA	PILOT / MODE C	90		1	1
27/09/07	N800EL	H25B	BUFEO	410	410	0	90		N	N	PANAMA					

Table 7 - Operational LHD (Equal to or Larger than 1000ft) Received by CARSAMMA from the CAR Region (Continuation)

EVENT DATE	FLIGH IDENT	ACFT TYPE	POSITION	CLRD FL	EVENT FL	HT LHD	DURA TION	DUR GTE	CODE	COD GTE	FIR	SOURCE	Time (S)	Time (Op)	n (S)	n (Op)
03/10/07	COA882	B737	ARORO	360	380	2000	90		M	M	PANAMA	MODE C	90		1	1
03/10/07	MXA374	A320	15NM south of KASOR (1500n 07940W)	360	360	0	90		D / N	D / N	KINGSTON	MODE C	90			
10/10/07	CMP418	B737	1444N 07747W	380	390	1000	90		M	B	KINGSTON	MODE C		90		1
23/10/07	AAL912	B752	BUXOS	360	360	0	90		N	N	PANAMA	MODE C	90			
23/11/07	COA 654	B752	TILSO	360	380	2000	90		M	M	PANAMA	MODE C	90		1	1
24/11/07	LAN584	B763	BUXOS	340	340	0	90		N	N	PANAMA	MODE C	90			
20/12/07	VEC202	B722	PYGBY	320	340	2000	30		M	M	PORT AU PRINCE	PILOT	30		1	1
25/12/07	AAL939	B738	JOSES	310	390	8000	30		M	M	PORT AU PRINCE	PILOT	30		4	4
											TOTAL Time (s)		4875			
											TOTAL Time (op)			330		
												TOTAL n(s)			58	
												TOTAL n(op)				62

Table 7 - Operational LHD (Equal to or Larger than 1000ft) Received by CARSAMMA from the CAR Region (Continuation)

VENT DATE	FLIGH IDENT	ACFT TYPE	POSITION	CL R FL	EVENT FL	HT LHD	DURA TION	DUR GTE	CODE	COD GTE	FIR	SOURCE	Ti me (S)	Time (Op)	n (S)	n (Op)
05/01/07	LAN704	A343	00N 042W	330	350	2000	90		M	M	ATLANTICO	PILOT	90		1	1
13/01/07	DAL145	B763	ILKIT	350	350	0	0	90	N	N	MAIQUETIA	PILOT / MODE C	90			
13/01/07	AAL2943	B763	ESIPO	310	310	0	0	90	N	N	MAIQUETIA	PILOT / MODE C	90			
15/01/07	AAL945	B752	IREMI	350	370	2000	120		M	M	LIMA	PILOT	120		1	1
18/01/07	PUA402	B763	ALBAL	290	390	10000	90		M	M	SANTIAGO	PILOT	90		5	5
20/01/07	ARG1364	B735	MIBAS	340	360	2000	10		M	M	SANTIAGO	PILOT / MODE C	10		1	1
24/01/07	SAA205	A346	24S 010W	310	350	4000	90		M	M	ATLANTICO	PILOT	90		2	2
25/01/07	IBE6833	A346	05N 041W	340	360	2000	90		M	M	ATLANTICO	PILOT	90		1	1
27/01/07	AAL2155	B738	ALCOT	370	390	2000	90		M	M	MAIQUETIA	PILOT / MODE C	90		1	1
01/02/07	TPU135	A319	PLG	340	360	2000	360		M	M	LIMA	PILOT	360		1	1
02/02/07	LPE426	B763	KONRI	360	380	2000	90		M	M	COMOD/RIVA D	PILOT	90		1	1
06/02/07	IBE6833	A346	13N 06037W	320	300	-2000	15		M	M	ROCHAMBEAU	PILOT / MODE C	15		1	1
06/02/07	TUS8411	B763	ILKIT	310	310	0	0	90	N	N	MAIQUETIA	PILOT / MODE C	90			
06/02/07	CUB312	IL62	VSJ	350	350	0	0	90	N	N	MAIQUETIA	PIL/MDC	90			
06/02/07	DAL145	B763	ILKIT	350	350	0	0	90	N	N	MAIQUETIA	PIL/MDC	90			
06/02/07	XBKBE	GLF2	ORTIZ	350	350	0	0	90	N	N	MAIQUETIA	PIL/MDC	90			
06/02/07	CIU308	DC10	GERNI/SKBO	380	370	-1000	90		C	C	ASUNCION	PILOT		90		1
07/02/07	ARG1301	A340	KJFK / SAEZ	400	410	1000	90		D	D	ASUNCION	PILOT		90		1
07/02/07	IBE6847	A346	05N 041W	360	360	0	15		M	M	ROCHAMBEAU	PILOT	15			
08/02/07	CWC463	DC10	VSJ	330	330	0	5		N	N	MAIQUETIA	PIL/ MDC	5			

Table 8 - Operational LHD (Equal to or Larger than 1000ft) Received by CARSAMMA from the SAM Region

EVENT DATE	FLIGH IDENT	ACFT TYPE	POSITION	CLRD FL	EVENT FL	HT LHD	DURA TION	DUR GTE	CODE	COD GTE	FIR	SOURCE	Time (S)	Time (Op)	n (S)	n (Op)
08/02/07	CUB7310	B733	ALCOT	330	330	0	0	90	N	N	MAIQUETIA	PILOT / MODE C	90			
08/02/07	TAP165	A310	NANIK	340	360	2000	90		M	M	ATLANTICO	PILOT	90		1	1
10/02/07	CUB312	IL62	ALCOT	370	370	0	0	90	N	N	MAIQUETIA	PILOT / MODE C	90			
12/02/07	LPE565	A319	ILMUX	340	360	2000	180		M	M	LIMA	PILOT	180		1	1
13/02/07	LPE639	A319	ARI	350	330	-2000	90		M	M	ANTOFAGASTA	PILOT	90		1	1
14/02/07	TAM8084	A332	JOBER	350	370	2000	90		M	M	ATLANTICO	PILOT	90		1	1
16/02/07	TAM8075	A320	ESIPO	330	350	2000	240		M	M	MAIQUETIA	PILOT / MODE C	240		1	1
16/02/07	ACA091	B763	ISANI	320	340	2000	90		M	M	MAIQUETIA	PILOT / MODE C	90		1	1
16/02/07	N118MT	CL60	KONRI	370	330	-4000	90		M	M	ANTOFAGASTA	PILOT	90		2	2
17/02/07	LAN601	B763	AMERO	350	370	2000	30		M	M	LIMA	PILOT	30		1	1
25/02/07	COA30	B762	KOXAM	320	340	2000	20		M	M	GEORGETOWN	PILOT	20		1	1
25/02/07	BBR1323	B763	KONRI	360	330	-3000	90		H / M	H / M	ANTOFAGASTA	PILOT / MODE C		90	1	2
04/03/07	SNTRY82	C141	LIXAS	310	310	0	30		N	N	GUAYAQUIL	PIL/MDC	30			
09/03/07	AFR406	B772	1140N 03642W	340	360	2000	15		N	N	ROCHAMBEAU	PILOT	15		1	1
14/03/07	TAP179	A343	NANIK	360	380	2000	90		M	M	ATLANTICO	PIL/MDC	90		1	1
15/03/07	AER7480		SUR	300	340	4000	90		D	D / N	BOGOTA	PILOT	90		2	2
16/03/07	AAL956	B772	PAKON				90		N	N	MAIQUETIA	PILOT	90			
16/03/07	TPA733	B767	VSJ	370	390	2000	90		M	M	MAIQUETIA	PILOT	90		1	1
16/03/07	BBR1323	B752	KIKAS	350	370	2000	90		M	M	MAIQUETIA	PILOT	90		1	1
20/03/07	LPE627	B767	LIXAS	370	370	0	30		N	N	GUAYAQUIL	PIL/MDC	30			

Table 8 - Operational LHD (Equal to or Larger than 1000ft) Received by CARSAMMA from the SAM Region (Continuation)

EVENT DATE	FLIGH IDENT	ACFT TYPE	POSITION	CLRD FL	EVENT FL	HT LHD	DURA TION	DUR GTE	CODE	COD GTE	FIR	SOURCE	Time (S)	Time (Op)	n (S)	n (Op)
21/03/07	VLO7443	MD11	POS - DEKON	320	340	2000	90		M	M	ATLANTICO	PILOT / MODE C	90		1	1
24/03/07	LAN584	B763	SORTA	320	300	-2000	30		M	M	LIMA	PILOT	30		1	1
29/03/07	DAL147	B764	SORTA	330	350	2000	30		M	M	LIMA	PILOT	30		1	1
02/04/07	VRG8942	B767	VAGAN	360	380	2000	1200		M	M	MAIQUETIA	PILOT	1200		1	1
02/04/07	ARG1380	A310	VAGAN	380	380	0	900		N	N	MAIQUETIA	PILOT	900			
05/04/07	TPU034	A320	ELAKO	340	360	2000	180		M	M	LIMA	PILOT	180		1	1
08/04/07	LCO11040	B763	GELIS	300	310	1000	30		B	B	LA PAZ	PILOT		30		1
09/04/07	MPD525	A343	13N 030W	360	360	0	15		M	N	ROCHAMBEAU	PILOT	15			
11/04/07	VDA4556	IL76	INCAS	380	300	-8000	90		M	M	ANTOFAGASTA	PILOT / MODE C	90		4	4
11/04/07	IBE6843	A340	1330N 03730W	340	340	0	15		M	N	ROCHAMBEAU	PILOT	15			
11/04/07	LAN705	A343	10N 036W	320	340	2000	15		M	M	ROCHAMBEAU	PILOT	15		1	1
11/04/07	TAM8099	A342	NANIK	380	400	2000	90		M	M	ATLANTICO	PILOT	90		1	1
11/04/07	IBE6865	A343	1330N 03730W	340	340	0	15		M	N	ROCHAMBEAU	PILOT	15			
11/04/07	AVA025	B762	PULTU	360	380	2000	90		M	M	GUAYAQUIL	PILOT / MODE C	90		1	1
11/04/07	MXA1695	B763	LIXAS	390	390	0	90		N	N	GUAYAQUIL	PILOT / MODE C	90			
11/04/07	AVA025	B763	TERAS	360	380	2000	30		M	M	ASUNCION	PILOT	30		1	1
15/04/07	CMP437	B737	VAKUD	370	390	2000	60		M	M	LIMA	PILOT	60		1	1
19/04/07	CIU329	DC10	ENSOL	410	410	0	90		M	M	GUAYAQUIL	PIL/MDC	90		0	0
21/04/07	N5VS	GLF5	VSJ	450	450	0	90		M	M	MAIQUETIA	PILOT	90			
22/04/07	ARG1364	B735	MIBAS	340	300	-4000	90		M	M	SANTIAGO	PIL/MDC	90		2	2
23/04/07	TPU035	A320	ILMUX	340	360	2000	90		M	M	LIMA	PILOT	90		1	1

Table 8 - Operational LHD (Equal to or Larger than 1000ft) Received by CARSAMMA from the SAM Region (Continuation)

EVENT DATE	FLIGH IDENT	ACFT TYPE	POSITION	CLRD FL	EVENT FL	HT LHD	DURA TION	DUR GTE	CODE	COD GTE	FIR	SOURCE	Time (S)	Time (Op)	n (S)	n (Op)
26/04/07	COA590	B763	ARNEL	370	390	2000	30		M	M	LIMA	PILOT	30		1	1
26/04/07	LAP707	F100	UMKAL	280	300	1000	90		M	M	SANTIAGO	PILOT / MODE C		90		1
03/05/07	GLG600	B732	BOKAN	350	350	0	90		N	N	GUAYAQUIL	PILOT / MODE C	90			
06/05/07	LAN622	B763	ESDIN	320	320	0	90		M	M	ANTOFAGASTA	PILOT	90			
09/05/07	VEC201	B727	20 NM ANTES DE VSJ	310	330	2000	90		M	M	MAIQUETIA	PILOT / MODE C	90		1	1
11/05/07	DAL061	B767	ILKIT	330	350	2000	90		M	M	MAIQUETIA	PILOT / MODE C	90		1	1
11/05/07	SAM113	F100	BOKAN	320	340	2000	90		M	M	GUAYAQUIL	PILOT / MODE C	90		1	1
14/05/07	LAN501	B763	UGUPI	330	350	2000	90		M	M	GUAYAQUIL	PILOT / MODE C	90		1	1
15/05/07	IBE6652	A346	DIMAS	350	370	2000	15		M	M	ROCHAMBEAU	PILOT			1	1
17/05/07	IBE6843	A346	05N 041W	340	370	3000	15		N	N	ROCHAMBEAU	PILOT		15	1	2
17/05/07	MPD975	A332	IRELA	360	0	0	15		N	N	ROCHAMBEAU	PILOT	15			
17/05/07	MPD525	A343	10N 036W	340	340	0	15		M	N	ROCHAMBEAU	PILOT	15			
17/05/07	MXA1695	B763	LIXAS	390	390	0	90		N	N	GUAYAQUIL	PIL/MDC	90			
17/05/07	VEC201	B727	ALCOT	330	330	0	0	90	N	N	MAIQUETIA	PIL/MDC	90			
20/05/07	DAL335	B764	UGUPI	330	330	0	90		N	N	GUAYAQUIL	PIL/MDC	90			
21/05/07	DLH502	B744	1130N 036W	360	360	0	15		N	N	ROCHAMBEAU	PILOT	15			
25/05/07	LNE7604	B763	ENSOL	360	340	-2000	90		M	M	GUAYAQUIL	PILOT / MODE C	90			
26/05/07	AAL1089	B738	VODIN	350	370	2000	90		M	M	MAIQUETIA	PIL/MDC	90		1	1
29/05/07	KLM753	MD11	TERAS	400	400	0	90		M	N	GUAYAQUIL	PIL/MDC	90			

Table 8 - Operational LHD (Equal to or Larger than 1000ft) Received by CARSAMMA from the SAM Region (Continuation)

EVENT DATE	FLIGH IDENT	ACFT TYPE	POSITION	CLRD FL	EVENT FL	HT LHD	DURA TION	DUR GTE	CODE	COD GTE	FIR	SOURCE	Time (S)	Time (Op)	n (S)	n (Op)
30/05/07	TAM9537	MD11	DEKON	380	400	2000	90		M	M	ATLANTICO	PILOT / MODE C	90		1	1
30/05/07	LAN621	B763	ESDIN	350	370	2000	90		M	M	ANTOFAGASTA	PILOT	90		1	1
31/05/07	LPE769	B763	LOPES	350	370	2000	90		M	M	ANTOFAGASTA	PILOT	90		1	1
08/06/07	IBE6831	A343	1140N 03642W	340	360	2000	15		N	I / M	ROCHAMBEAU	PILOT	15		1	1
08/06/07	LAN705	A343	1140N 03642W	340	340	0	15		N	N	ROCHAMBEAU	PILOT	15			
12/06/07	AMX010	B762	ESDIN	330	390	6000	420		M	M	LIMA	PILOT	420		3	3
13/06/07	AMX010	B762	KARAZ	390	330	-6000	90		B / M	M	GUAYAQUIL	PIL/MDC	90		3	3
13/06/07	LAU355	B722	BOKAN	320	360	4000	90		M	M	GUAYAQUIL	PIL/MDC	90		2	2
16/06/07	AFR442	B744	TASIL	340	360	2000	2560		M	M	ATLANTICO	PILOT	2560		1	1
17/06/07	CMP829	B737	ENSOL	390	410	2000	90		M	M	GUAYAQUIL	PIL/MDC	90		1	1
18/06/07	CMP307	B737	UGUPI	370	390	2000	90		M	M	GUAYAQUIL	PILOT / MODE C	90		1	1
19/06/07	TPU025	A320	GELIS	330	330	0	0	90	N	N	ANTOFAGASTA	PILOT	90			
20/06/07	LNE517	B763	ENSOL	350	370	2000	90		M	M	GUAYAQUIL	PIL/MDC	90		1	1
24/06/07	LRC651	A320	LIXAS	330	350	2000	90		M	M	GUAYAQUIL	PIL/MDC	90		1	1
25/06/07	AFR6810	B744	DIKEB	340	360	2000	960		M	M	ATLANTICO	PILOT	960		1	1
03/07/07	MXA1694	B763	KONRI	360	340	-2000	30		M	M	ANTOFAGASTA	PIL/MDC	30		1	1
04/07/07	LPE581	A319	VAKUD	350	350	0	30	90	M	M	GUAYAQUIL	PIL/MDC	90			
04/07/07	LPE581	B767	VAKUD	390	350	-4000	30		M	M	LIMA	PILOT	30		2	2
07/07/07	AAL931	B752	ENSOL	370	370	0	90		N	N	GUAYAQUIL	PIL/MDC	90			
13/07/07	LAN503	B763	SORTA	350	370	2000	30		M	M	LIMA	PILOT	30		1	1
13/07/07	LAN503	B763	SORTA	350	370	2000	90		M	M	ANTOFAGASTA	PILOT	90		1	1

Table 8 - Operational LHD (Equal to or Larger than 1000ft) Received by CARSAMMA from the SAM Region (Continuation)

EVENT DATE	FLIGH IDENT	ACFT TYPE	POSITION	CLRD FL	EVENT FL	HT LHD	DURA TION	DUR GTE	CODE	COD GTE	FIR	SOURCE	Time (S)	Time (Op)	n (S)	n (Op)
13/07/07	MXA1691	B763	GELIS	350	370	2000	30		M	M	ANTOFAGASTA	PILOT	30		1	1
14/07/07	LAN501	B763	SORTA	330	350	2000	90		M	M	ANTOFAGASTA	PILOT	90		1	1
16/07/07	AVA075	B762	PULTU	360	360	0	90		N	N	GUAYAQUIL	PILOT / MODE C	90			
16/07/07	COA810	B738	LIXAS	370	370	0	90		N	N	GUAYAQUIL	PILOT / MODE C	90			
16/07/07	ARG1384	A310	GEKAL	300	320	2000	10		M	M	ANTOFAGASTA	PIL/MDC	10		1	1
21/07/07	MPD525	A343	0843N 03527W	340	340	0	15		M	N	ROCHAMBEAU	PILOT	15			
21/07/07	CMP750	B737	SORTA	360	380	2000	30		M	M	LIMA	PILOT	30		1	1
21/07/07	CMP750	B738	SORTA	360	380	2000	90		M	M	ANTOFAGASTA	PILOT	90		1	1
22/07/07	DAL199	B752	ENSOL	330	370	4000	90		M	M	GUAYAQUIL	PIL/MDC	90		2	2
22/07/07	ACA092	B763	SISEL	330	350	2000	90		M	M	GUAYAQUIL	PIL/MDC	90		1	1
22/07/07	LAN573	B763	PULTU	340	360	2000	90		M	M	GUAYAQUIL	PIL/MDC	90		1	1
22/07/07	LAN573	B767	TERAS	340	360	2000	30		M	M	LIMA	PILOT	30		1	1
22/07/07	CMP750	B737	SORTA	360	380	2000	30		M	M	LIMA	PILOT	30		1	1
22/07/07	CWC463	DC10	BOKAN	360	300	-6000	90		M	M	GUAYAQUIL	PIL/MDC	90		3	3
23/07/07	GLG603	B732	BOKAN	340	320	-2000	90		M	M	GUAYAQUIL	PIL/MDC	90		1	1
27/07/07	COA653	B752	VAMOS	350	370	2000	90		M	M	GUAYAQUIL	PIL/MDC	90		1	1
27/07/07	TPU029	A319	MIRLO	360	380	2000	90		M	M	GUAYAQUIL	PIL/MDC	90		1	1
28/07/07	CMP489	B732	UGUPI	390	390	0	90		N	N	GUAYAQUIL	PIL/MDC	90			
03/08/07	TAM3282	A319	CARDO	350	370	2000	90		M	M	RECIFE	MODE C	90		1	1
05/08/07	AAL2111	A306	UGUPI	290	310	2000	90		M	M	GUAYAQUIL	PIL/MDC	90		1	1
07/08/07	IBE6842	A346	MAGNO	370	350	-2000	120		M	M	ATLANTICO	PILOT	120		1	1

Table 8 - Operational LHD (Equal to or Larger than 1000ft) Received by CARSAMMA from the SAM Region (Continuation)

EVENT DATE	FLIGH IDENT	ACFT TYPE	POSITION	CLRD FL	EVENT FL	HT LHD	DURA TION	DUR GTE	CODE	COD GTE	FIR	SOURCE	Time (S)	Time (Op)	n (S)	n (Op)
08/08/07	SAM112	F100	BOKAN	320	340	2000	60		M	M	GUAYAQUIL	PILOT / MODE C	60		1	1
11/08/07	AVA069	MD83	BOKAN	320	340	2000	180		M	M	GUAYAQUIL	PIL/MODE C C	180		1	1
12/08/07	AFR406	B772	1140N 03642W	340	340	0	15		M	M	ROCHAMBEAU	PILOT	15			
12/08/07	COA810	B738	LIXAS	350	370	2000	180		M	M	GUAYAQUIL	PIL/MODE C	180		1	1
14/08/07	ARG1364	A310	GEKAL	320	330	1000	30		B	B	ANTOFAGASTA	PIL/MODE C		30		1
15/08/07	LPE707	B763	KENOX	340	340	0	15		N	N	ROCHAMBEAU	SBAO ACC	15			
16/08/07	AMX011	B763	KARAZ	380	340	-4000	180		M	M	GUAYAQUIL	PILOT / MODE C	180		1	1
17/08/07	LPE511	B763	UGUPI	330	350	2000	120		M	M	GUAYAQUIL	PIL/MODE C	120		1	1
17/08/07	KRE2185	B722	ALCOT	320	320	0	90		N	N	MAIQUETIA	MODE C	90			
17/08/07	HCCEZ	E190	NOREX	360	360	0	90		M	M	MAIQUETIA	MODE C	90			
17/08/07	AVA091	MD83	NOREX	320	320	0	90		M	M	MAIQUETIA	MODE C	90			
20/08/07	AMX019	B737	ARNEL	340	360	2000	60		M	M	GUAYAQUIL	PIL/MDC	90		1	1
20/08/07	VPBOZ	F900	NANIK	400	430	1000	300		M	M	ATLANTICO	PILOT		90		1
21/08/07	IBE6845	A346	NANIK	360	380	2000	60		M	M	ATLANTICO	PILOT	60		1	1
22/08/07	LPE429	B763	GELIS	370	390	2000	30		M	M	LIMA		30		1	1
23/08/07	LPE582	A319	TERAS	350	370	2000	120		M	M	GUAYAQUIL	PIL/MDC	120		1	1
28/08/07	ARG1136	B744	POS - FOZ	330	310	-2000	90		P	P	ASUNCION	PILOT	90		1	1
30/08/07	DLH502	B744	1100N 03630W	340	340	0	15		M	M	ROCHAMBEAU	PILOT	15			
30/08/07	LAN705	A343	0912N 03540W	340	340	0	15		N	N	ROCHAMBEAU	PILOT	15			
30/08/07	CMP273	E190	SISEL	350	370	2000	60		M	M	GUAYAQUIL	PIL/MDC	60		1	1

Table 8. Operational LHD (Equal to or Larger than 1000ft) Received by CARSAMMA from the SAM Region (Continuation)

EVENT DATE	FLIGH IDENT	ACFT TYPE	POSITION	CLRD FL	EVENT FL	HT LHD	DURATION	DUR GTE	CODE	COD GTE	FIR	SOURCE	Time (S)	Time (Op)	n (S)	n (Op)
01/09/07	ARG1134	B744	NEURA	330	350	2000	80		M	M	ATLANTICO	PILOT	80		1	1
01/09/07	LNE1447	A320	GELIS	330	350	2000	30		M	M	ANTOFAGASTA	PILOT / MODE C	30		1	1
03/09/07	TAP156	A332	INTOL	370	390	2000	240	90	M	M	ATLANTICO	PILOT	90		1	1
14/09/07	MXA1692	B763	KONRI	360	340	-2000	30		M	M	ANTOFAGASTA	PILOT / MODE C	30		1	1
15/09/07	BW491	B738	EGEMA	410	390	-2000	600	90	M	M	GEORGETOWN	PILOT	90		1	1
16/09/07	TPA601	B763	PUERTO LEGIZANO	380	360	-2000	48		M	M	LIMA	PILOT	48		1	1
22/09/07	DLH504	A343	REGIS	310	350	4000	90		M	B	ATLANTICO	PILOT	90		2	2
28/09/07	FDX44	MD11	ILKUT RUTA RNAV	310	330	2000	90		M	M	MAIQUETIA	PILOT / MODE C	90		1	1
28/09/07	LAU335	B721	NOREX			0	90		N	N	MAIQUETIA	PILOT	90			
29/09/07	CMP273	E190	SISEL	350	390	4000	2580	90	M	M	GUAYAQUIL		90		2	2
01/10/07	CMP279	B738	PLG	330	350	2000	30		M	M	LIMA	PILOT	30		1	1
02/10/07	TPU023	A320	GELIS	350	330	-2000	30		M	M	ANTOFAGASTA	MODE C	30		1	1
02/10/07	MAA6871	B763	URIBI	310	330	2000	180		M	M	MAIQUETIA	PILOT	180		1	1
02/10/07	LCO1731	B767	ESIPO	350	310	-4000	720		M	M	MAIQUETIA	PILOT	720		2	2
06/10/07	LAN621	B763	KARAZ	330	350	2000	30		M	M	LIMA	PILOT	30		1	1
09/10/07	COA653	B752	MOXAS	390	410	2000	1200	90	M	M	GUAYAQUIL	PILOT / MODE C	90		1	1
11/10/07	MPD525	A343	0752N 03505W	320	320	0	15	180	M	N	ROCHAMBEAU	SBAO ACC	180			
12/10/07	LAN531	B763	UGUPI	350	350	0	600		N	N	GUAYAQUIL	PIL/MDC	600		1	1
13/10/07	AAL2111	B763	SISEL	350	370	2000	300		M	M	GUAYAQUIL	PILOT / MODE C	300		1	1
14/10/07	AAL917	A306	UGUPI	270	310	2000	90		M	M	GUAYAQUIL	PILOT / MODE C	90		1	1

Table 8 - Operational LHD (Equal to or Larger than 1000ft) Received by CARSAMMA from the SAM Region (Continuation)

EVENT DATE	FLIGH IDENT	ACFT TYPE	POSITION	CLRD FL	EVENT FL	HT LHD	DURATION	DUR GTE	CODE	COD GTE	FIR	SOURCE	Time (S)	Time (Op)	n (S)	n (Op)
15/10/07	FDX55	A310	15 NM NORTE FROM VOR/DME VSJ	330	350	2000	240		M	M	MAIQUETIA	MODE C	240		1	1
20/10/07	LRC631	A320	AKNIL	350	370	2000	90		M	M	MAIQUETIA	PILOT	90		1	1
26/10/07	UAL842	B763	LOGON	340	340	0	90		N	N	MAIQUETIA	PILOT	90			
26/10/07	GTI074	B744	IREMI	400	400	0	90		N	N	ANTOFAGASTA	MODE C	90			
27/10/07	UPS382	B752	ENSOL	370	390	2000	300	90	M	M	GUAYAQUIL	PIL/MDC	90		1	1
27/10/07	AFR443	B744	INTOL	310	330	2000	240	90	M	M	ATLANTICO	PILOT	90		1	1
28/10/07	LAN570	B763	ARI	320	340	2000	30		M	M	ANTOFAGASTA		30		1	1
30/10/07	LAN603	B767	KARAZ	330	350	2000	30		M	M	LIMA	PILOT	30		1	1
11/11/07	LXP338	B732	50NM NORTH FROM VTN VOR	320	340	2000	30		B	B	SANTIAGO	MODE C	30		1	1
16/11/07	AMX010	B762	OSELO	330	370	4000	90		M	M	GUAYAQUIL	PIL/MDC	90		2	2
16/11/07	LNE443	B763	GELIS	330	350	2000	30		M	M	ANTOFAGASTA	PIL/MDC	30		1	1
17/11/07	MPH061	MD11	PULTU	320	340	2000	90		M	M	GUAYAQUIL	PILOT / MODE C	90		1	1
18/11/07	LAN621	B767	ARNEL	330	350	2000	30		M	M	LIMA	PILOT	30		1	1
18/11/07	AAL957	B767	VAKUD	350	330	-2000	30		M	M	LIMA	PILOT	30		1	1
19/11/07	ARG1364	B735	MIBAS	300	320	2000	10		B	B	SANTIAGO	MODE C	10		1	1
20/11/07	TPU033	A320	LIXAS	350	350	0	90		N	N	GUAYAQUIL	PIL/MDC	90			
24/11/07	MPD924	A332	BOKAN	350	350	0	90		N	N	GUAYAQUIL	PIL/MDC	90			
24/11/07	CMP436	E190	PADOX	340	360	2000	90		M	M	GUAYAQUIL	PIL/MDC	90		1	1
24/11/07	TPU053	A320	LIXAS	350	350	0	90		M	M	GUAYAQUIL	PILOT / MODE C	90			

Table 8 - Operational LHD (Equal to or Larger than 1000ft) Received by CARSAMMA from the SAM Region (Continuation)

EVENT DATE	FLIGH IDENT	ACFT TYPE	POSITION	CLRD FL	EVENT FL	HT LHD	DURA TION	DUR GTE	CODE	COD GTE	FIR	SOURCE	Time (S)	Time (Op)	n (S)	n (Op)
29/11/07	VLO7441	DC10	JOBER	350	350	0	3600		M	M	ATLANTICO	MODE C	3600			
30/11/07	LPE707	B763	BISUK at FIR boundary	320	340	2000	15		M	M	ROCHAMBEAU					
30/11/07	IBE6651	A346	1018N 04706W at FIR boundary	340	360	2000	15		M	M	ROCHAMBEAU	PILOT	15		1	1
01/12/07	MXA1692	B763	ARNEL	340	360	2000	30		M	M	GUAYAQUIL	PILOT / MODE C	30		1	1
03/12/07	ARG1141	A342	TASIL	340	360	2000	180		M	M	ATLANTICO	PILOT	180		1	1
03/12/07	TAP176	A332	MAGNO	370	390	2000	120		M	M	ATLANTICO	PILOT	120		1	1
05/12/07	SAM181	F100	BOKAN	320	340	2000	20		M	M	GUAYAQUIL	PILOT / MODE C	20		1	1
09/12/07	AAL945	B763	LIXAS	310	330	2000	20		M	M	GUAYAQUIL	PILOT / MODE C	20		1	1
10/12/07	SOO575	B742	SORTA	330	310	-2000	90		M	M	ANTOFAGASTA	PILOT / MODE C	90		1	1
12/12/07	PROPP	H25A	OTONI	400	400	0	15		N	N	ROCHAMBEAU	PILOT	15			
14/12/07	MXA1692	B763	KONRI	320	340	2000	30		M	N	ANTOFAGASTA	PILOT / MODE C	30		1	1
15/12/07	N270KA	HS54	SISEL	350	350	0	30		N	N	GUAYAQUIL	PILOT / MODE C	30			
16/12/07	CMP435	B737	UGUPI	370	390	2000	20		M	M	GUAYAQUIL	PILOT / MODE C	20		1	1
17/12/07	TPU041	A321	LIXAS	330	330	0	20		N	N	GUAYAQUIL	PILOT / MODE C	20			
18/12/07	AFR459	A342	EPODE	350	370	2000	1320		M	M	ATLANTICO	PILOT	1320		1	1
18/12/07	DMJ1005	B737	NANIK	330	320	-1000	3600	90	M	M	ATLANTICO	PILOT		90		1

Table 8 - Operational LHD (Equal to or Larger than 1000ft) Received by CARSAMMA from the SAM Region (Continuation)

EVENT DATE	FLIGH IDENT	ACFT TYPE	POSITION	CLRD FL	EVENT FL	HT LHD	DURATION	DUR GTE	CODE	COD GTE	FIR	SOURCE	Time (S)	Time (Op)	n (S)	n (Op)
19/12/07	LNE1448	A320	PADOX	320	340	2000	15		M	M	GUAYAQUIL	PILOT / MODE C	15		1	1
19/12/07	MAA6323	B763	MOXAS	350	330	-2000	15		M	M	GUAYAQUIL	PILOT / MODE C	15		1	1
20/12/07	LAN531	B763	UGUPI	330	330	0	10		N	N	GUAYAQUIL	PILOT / MODE C	10			
20/12/07	KLM753	MD11	PULTU	340	360	2000	30		M	M	GUAYAQUIL	PILOT / MODE C	30		1	1
21/12/07	IBE6821	A343	NANIK	340	350	1000	1970	90	M	M	ATLANTICO	PILOT		90		1
23/12/07	TAM8080	A332	KOXAM	360	380	2000	90		M	M	GEORGETOWN	PILOT	90		1	1
23/12/07	TAP177	A332	NANIK	360	360	0	90		M	M	ATLANTICO	PILOT	90			
24/12/07	MPH664	B763	08N 054W	370	370	0	15		M	N	ROCHAMBEAU	PILOT	15			
25/12/07	PTU024	A320	KONRI	320	340	2000	30		M	M	ANTOFAGASTA	PILOT / MODE C	30		1	1
26/12/07	CMP273	E190	SISEL	350	330	-2000	15		M	M	GUAYAQUIL	PILOT / MODE C	15		1	1
27/12/07	LAN531	B763	IREMI	370	370	0	90		N	N	ANTOFAGASTA	PILOT	90			
27/12/07	AVA075	B762	PULTU	360	400	4000	20		M	M	GUAYAQUIL	PILOT / MODE C	20		2	2
27/12/07	LNE1447	A320	KONRI	340	360	2000	30		M	M	ANTOFAGASTA	PILOT / MODE C	30		1	1
											TOTAL Time (s)		26298			
											TOTAL Time (op)			705		
												TOTAL n(s)			166	
												TOTAL n(op)				176

Table 8 - Operational LHD (Equal to or Larger than 1000ft) Received by CARSAMMA from the SAM Region (Continuation)

Error Type	**LHD CAUSE**
A	Failure to climb/descend as cleared
B	Climb/descent without ATC clearance
C	Entry into airspace at an incorrect flight level
D	Deviation due to turbulence or other weather related cause
E	Deviation due to equipment failure
F	Deviation due to collision avoidance system (ACAS/TCAS) advisory
H	Aircraft not approved for operation in RVSM restricted airspace
I	ATC system loop error; (e.g. pilot misunderstands clearance message or ATC issues incorrect clearance)
M	Error in ATC-unit-to-ATC-unit transition message
N	Negative transfer received from transitioning ATC-unit
O	Others
P	Unknown

Table 9 - Classification of the Received LHD

4.3 Classification of errors for risk evaluation

4.3.1 The causes of the group errors were classified and they contribute to two different events:

- *Aircraft levelling at the wrong flight level*;

According to Tables 7 and 8, 272 aircraft levelled at wrong flight levels for 32208 seconds, with an average time of 0.0328922 hours spent in the wrong flight level and nine of them in the opposite direction of the flow.

- *Aircraft climbing/descending through one or more flight levels*.

According to Tables 7 and 8, 462 crossings of flight levels occurred without ATC clearance, 176 of them in the opposite direction of the flow.

4.3.1 All the deviations due to non-severe meteorological effects (larger than or equal to 300ft and lesser than 1000ft) were considered in the AAD distribution.

4.3.2 With respect to the deviations due to ACAS (TCAS), a distribution function formed by the typical and atypical behavior of the deviations was constructed, using a model of double-double exponential form. In this case, the data of the typical behavior were from the NAT region.

4.3.3 The density function $f_{ACAS}^{AAD}(a)$ so obtained was then convoluted with the density function $f^{ASE}(a)$, to generate a $f_{ACAS}^{TVE}(z)$ density function and, finally, to produce an estimate for the vertical overlap probability due to ACAS (TCAS), $P_z(S_z)_{ACAS}$.

4.4 Determination of the appropriate parameter values for each group of classified errors

4.4.1 The calculations were done separately for each region (CAR and SAM) and for the whole CAR/SAM airspace. For both airspaces, the same data (Table 10) of aircraft levelling at wrong flight level n^{wl}, number of flight levels crossed without clearance n^{cl} and average time spent in wrong flight level $\bar{t}_{wl}$ were used. The climb/descent rate $\overline{|\dot{z}_c|}$ was assumed to be 10 kt.

4.4.2 In Table 11 below, the group error parameters are shown, classified according to their application to the CAR/SAM regions. In this table, $P_z^{wl}(1000)$ is the vertical overlap probability due to an aircraft levelling at a wrong flight level and $P_z^{cl}(1000)$ is the vertical overlap probability due to an aircraft that crosses one or more flight levels without ATC clearance. The parameters α^{wl} and α^{cl} refer to the error rates for aircraft levelling at a wrong flight level and aircraft crossing a flight level without ATC clearance, respectively. The product $\alpha^{wl} \times \bar{t}^{wl}$ is the proportion of flying time spent in a wrong flight level.

AIRSPACE									
PARAMETERS	CARIBBEAN			SOUTH AMERICA			CAR/SAM REGIONS		
	MP-I	MP-II	MP-III	MP-I	MP-II	MP-III	MP-I	MP-II	MP-III
n^{wl}	*26*	*61*	62	*17*	*52*	210	*43*	*113*	272
n^{wl}_{same}	*24*	*56*	58	*17*	*46*	200	*41*	*102*	258
n^{wl}_{op}	*2*	*5*	4	*0*	*7*	10	*2*	*12*	14
n^{cl}_{same}	*2*	*9*	58	*5*	*0*	166	*7*	*9*	224
n^{cl}_{op}	*4*	*33*	62	*9*	*6*	176	*13*	*39*	238
n^{cl}	*6*	*42*	120	*14*	*6*	342	*20*	*48*	462
$\bar{t}^{ne}_{t}$	0.01811 *h*	0.02010 *h*	0.02332 h	0.04118 h	0.08994 *h*	0.035718 h	0.02723 h	0.05257 *h*	0.03289 h
$\bar{t}^{wl}_{same}$	*0.01719 h*	*0.02041 h*	0.02335 h	*0.04118 h*	0.05851 *h*	0.036525 h	*0.02713 h*	0.03760 *h*	0.03356 h
t^{wl}_{op}	*0.02917 h*	*0.01667 h*	0.02292 h	*0.0*	0.29643 *h*	0.019583 h	*0.02917 h*	0.17986 *h*	0.02054 h
t^{wl}_{same}	*24.75 min*	68.58 *min*	8.25 min	*42.0 min*	161.50 *min*	438.3 min	66.75 min	230.08 *min*	519.55
t^{wl}_{op}	*3.50 min*	5.00 *min*	5.50 min	*0.0 min*	124.50 *min*	11.75 min	3.50 min	129.50 *min*	17.25
t^{wl}_{t}	*28.25 min*	73.58 *min*	86.75 min	*42.0 min*	286.0 *min*	450.05 min	70.25 min	359.58 *min*	536.80
$\overline{\lvert\dot{z}_c\rvert}$	*10 kt*	*10kt*	10 kt	*10 kt*	*10 kt*	10 kt	*10 kt*	*10 kt*	*10 kt*

Table 10 - Operational Errors Data

4.5 **Vertical Risk Assessment due to Operational Errors**

4.5.1 This section will provide an estimate of the risk associated with all causes connected to RVSM use. The technical and operational risk values are combined to estimate the total risk for the system attributable to all causes.

4.5.2 The vertical collision risk was calculated using the Reich Collision Risk Model associated to each group of LHD. Table 12 shows the numerical values of the following components of the risk:

- N_{az}^{tec}, the technical vertical risk;
- N_{az}^{wl}, the vertical risk due to aircraft levelling at a wrong flight level;
- N_{az}^{cl}, the vertical risk due to an aircraft crossing a flight level without ATC clearance;
- N_{az}^{ACAS}, the vertical risk due to ACAS (TCAS) advisories; and
- N_{az}, the vertical collision risk due to all causes or the total risk.

4.5.3 As can be seen in Table 12, the total risk for the CAR/SAM region is greater than the agreed TLS.

4.5.4 It is important to note that the total risk was strongly influenced by the LHD, most of them due to errors in ATC-unit-to-ATC-unit transition messages and negative transfer received from transitioning ATC-unit.

PARAMETER	CARIBBEAN			SOUTH AMERICA			CAR/SAM REGIONS		
	FM-I	FM-II	FM-III	FM-I	FM-II	FM-III	FM-I	FM-II	FM-III
T (hours)	249,264.0	227,736.0	290,607.0	309,264.0	642,528.0	623,170.0	558,528.0	870,264.0	913,777.0
α^{wl}	$1{,}043\times10^{-4}$	2.679×10^{-4}	2.133×10^{-4}	5.497×10^{-5}	8.248×10^{-5}	3.370×10^{-4}	7.699×10^{-5}	1.310×10^{-4}	2.977×10^{-4}
α_{mismo}^{wl}	9.628×10^{-5}	2.459×10^{-4}	1.996×10^{-4}	5.497×10^{-5}	7.159×10^{-5}	3.209×10^{-4}	7.341×10^{-5}	1.172×10^{-4}	2.823×10^{-4}
α_{op}^{wl}	8.024×10^{-6}	2.195×10^{-5}	1.376×10^{-5}	0.0	1.089×10^{-5}	1.605×10^{-5}	3.581×10^{-6}	1.379×10^{-5}	1.532×10^{-5}
α^{cl}	2.407×10^{-5}	1.844×10^{-4}	4.129×10^{-4}	4.527×10^{-5}	9.337×10^{-6}	5.488×10^{-4}	3.581×10^{-5}	5.516×10^{-5}	5.056×10^{-4}
α_{same}^{cl}	8.024×10^{-6}	3.952×10^{-5}	1.996×10^{-4}	1.617×10^{-5}	*0.0*	2.664×10^{-4}	1.253×10^{-5}	1.034×10^{-5}	2.451×10^{-4}
α_{op}^{cl}	1.605×10^{-5}	1.449×10^{-4}	2.133×10^{-4}	2.910×10^{-5}	9.337×10^{-6}	2.824×10^{-4}	2.328×10^{-5}	4.481×10^{-5}	2.605×10^{-4}
Q_{same}	7.171×10^{-8}	8.963×10^{-8}	8.034×10^{-8}	1.331×10^{-7}	9.106×10^{-8}	5.861×10^{-8}	4.858×10^{-8}	4.320×10^{-8}	3.673×10^{-8}
Q_{op}	1.170×10^{-7}	7.318×10^{-8}	7.886×10^{-8}	0.0	4.613×10^{-7}	3.142×10^{-8}	5.222×10^{-8}	2.067×10^{-7}	2.247×10^{-8}
$Q = \alpha^{wl} \times \bar{t}^{wl}$	1.889×10^{-6}	5.385×10^{-6}	4.975×10^{-6}	2.263×10^{-6}	7.418×10^{-6}	1.204×10^{-5}	2.096×10^{-6}	6.886×10^{-6}	9.791×10^{-6}
$P_z(0)$	0.4095	0.4494	0.4508	0.3748	0.4487	0.4338	0.3862	0.4485	0.4852
$P_z^{wl}(1000)$	7.736×10^{-7}	2.420×10^{-6}	2.243×10^{-6}	8.484×10^{-7}	3.328×10^{-6}	5.221×10^{-6}	8.097×10^{-7}	3.088×10^{-6}	4.750×10^{-6}
$P_z^{wl}(1000)_{same}$	7.141×10^{-7}	2.255×10^{-6}	2.100×10^{-6}	8.484×10^{-7}	1.879×10^{-6}	5.085×10^{-6}	7.720×10^{-7}	3.089×10^{-6}	4.598×10^{-6}
$P_z^{wl}(1000)_{op}$	5.951×10^{-8}	1.644×10^{-7}	1.421×10^{-7}	0.0	1.449×10^{-6}	1.363×10^{-7}	3.766×10^{-8}	1.112×10^{-6}	1.527×10^{-7}
$P_z^{cl}(1000)$	3.239×10^{-8}	2.635×10^{-7}	5.966×10^{-7}	5.651×10^{-8}	1.347×10^{-8}	7.718×10^{-7}	4.586×10^{-8}	7.928×10^{-8}	7.926×10^{-7}
$P_z^{cl}(1000)_{same}$	1.080×10^{-8}	5.646×10^{-8}	2.884×10^{-7}	2.018×10^{-8}	0.0	3.746×10^{-7}	1.605×10^{-8}	1.486×10^{-8}	3.843×10^{-7}
$P_z^{cl}(1000)_{op}$	2.159×10^{-8}	2.070×10^{-7}	3.082×10^{-7}	3.633×10^{-8}	1.347×10^{-8}	3.972×10^{-7}	2.981×10^{-8}	6.441×10^{-8}	4.083×10^{-7}
$P_z^{ACAS}(1000)$	7.511×10^{-9}	2.895×10^{-9}	6.026×10^{-9}	1.668×10^{-9}	9.132×10^{-10}	1.841×10^{-9}	3.515×10^{-9}	1.692×10^{-9}	3.804×10^{-9}

Table 11 - Parameters of the Classified Operational Error Groups

Risk	AIRSPACE									*TLS*
	CARIBBEAN			SOUTH AMERICA			CAR/SAM REGIONS			
	MP-I	MP-II	MP-III	MP-I	MP-II	MP-III	MP-I	MP-II	MP-III	
N_{az}^{Tec}	1.4×10^{-10}	1.5×10^{-10}	1.5×10^{-10}	3.6×10^{-11}	4.3×10^{-11}	4.1×10^{-11}	7.6×10^{-11}	8.7×10^{-11}	9.3×10^{-11}	5.0×10^{-9}
N_{az}^{ACAS}	1.3×10^{-10}	4.4×10^{-11}	1.1×10^{-10}	3.4×10^{-11}	1.2×10^{-11}	3.0×10^{-11}	7.1×10^{-11}	2.5×10^{-11}	7.0×10^{-11}	
N_{az}^{wl}	2.6×10^{-9}	5.7×10^{-9}	5.8×10^{-9}	8.2×10^{-9}	27.0×10^{-9}	26.9×10^{-9}	6.1×10^{-9}	2.2×10^{-8}	20.3×10^{-9}	
N_{az}^{cl}	3.9×10^{-10}	3.2×10^{-9}	6.2×10^{-9}	8.8×10^{-10}	1.8×10^{-10}	7.9×10^{-9}	6.7×10^{-10}	9.8×10^{-10}	8.4×10^{-9}	
N_{az}^{Total}	3.3×10^{-9}	9.1×10^{-9}	12.3×10^{-9}	9.0×10^{-9}	27.0×10^{-9}	34.9×10^{-9}	6.9×10^{-9}	23.0×10^{-9}	28.9×10^{-9}	

Table 12 - Collision Risks for the CAR/SAM Regions

4.5.5 These types of errors are not caused by the RVSM operation.

4.5.6 Considering the above remarks, it can be concluded that is necessary to continue to monitor the LHD to keep them inside acceptable limits.

4.6 Determination of the limit of time that the aircraft can spend at a wrong flight level when flying in the same direction as another aircraft at the same flight level

4.6.1 The proportion of time the aircraft spends at a wrong flight level is defined by the product of the error rate for the aircraft levelling at a wrong flight level, α^{wl}, and the average time spent at the wrong flight level, $\bar{t}^{wl}$, that is, $\alpha^{wl} \times \bar{t}^{wl}$.

4.6.2 Fixing the TLS as the limit for the total risk and using the values of technical risk and the risk due to ACAS (TCAS) advisories calculated on the basis of the data collected, the maximum proportion of time that an aircraft can spend in a wrong flight level, the error rates and the respective maximum tolerances are estimated and shown in Table 13 below for a climb/descent rate of 10 kt. Note that the above error rates refer to errors due to aircraft flying at a wrong level and errors due to aircraft crossing levels without ATC clearance.

Parameters	CAR	SAM	CAR/SAM
Total flying time per year (hr)	290,607	623,170	913,777
$(\alpha^{wl} \times \bar{t}^{wl})_{\max}$	5.597×10^{-7}	6.883×10^{-7}	5.455×10^{-7}
$\alpha^{wl}_{\max}$	2.400×10^{-5}	1.927×10^{-5}	1.658×10^{-5}
$\alpha^{cl}_{\max}$	1.683×10^{-4}	1.981×10^{-4}	5.455×10^{-7}
$t^{wl}_{\max}(s/year)$	585.55	1.544.20	1794.42
$n^{cl}_{\max}(per/year)$	49	123	145

Table 13 Proportion of Time, Error Rates and Maximum Tolerances for Flight Level Crossings Without ATC Clearance and Time Spent at Wrong Flight Levels per Year.

4.7 Remedial Actions.

4.7.1 Assuming no flight level crossing without ATC clearance, it can be concluded from Table 13 that about 1,794 seconds per year of aircraft levelling at the wrong level can be tolerated. On the other hand, assuming no aircraft levelling at a wrong flight level, 145 flight-level crossings without ATC clearance with a rate of climb/descent of 10 kt can be tolerated without exceeding the agreed TLS.

4.7.2 So, to reduce the risk, the time spent at wrong flight levels and the number of flight levels crossed without ATC clearance must be reduced. Remedial actions must be taken in order to reduce the causes of transition messages between ATC units and negative transfer received from transitioning ATC-unit.

4.8 Risk Assessment for RVSM Operational in the CAR/SAM Regions.

4.8.1 This section provides a risk assessment associated with all causes involving the use of RVSM. CARSAMMA has decided to consider that errors of type M and N do not influence in the application of the RVSM, that is, that these kinds of errors, when they occur, will lead to LHDs regardless the value of the RVSM applied. Therefore, in Tables 14 and 15 only the errors that are directly related to the application of RVSM are presented.

4.8.2 The calculations have demonstrated that, for this assessment, the consideration above is equivalent to taking corrective actions resulting from the introduction of an efficient program of corrective measures to eliminate the errors in ATC-unit-to-ATC-unit transition message (type M) and in negative transfer received from transitioning ATC-unit (type N).

EVENT DATE	FLIGH IDENT	ACFT TYPE	POSITION	CLRD FL	EVENT FL	HT LHD	DURA TION	DUR GTE	CODE	COD GTE	FIR	SOURCE	Time (S)	Time (Op)	n (S)	n (Op)
14/05/07	DAL742		2008N 07820W	320	300	-1000	60		M	I	KINGSTON	PILOT / MODE C		60		1
03/10/07	MXA374	A320	15NM south of KASOR (1500n 07940W)	360	360	0	90		D / N	D / N	KINGSTON	MODE C	90			
10/10/07	CMP418	B737	1444N 07747W	380	390	1000	90		M	B	KINGSTON	MODE C		90		1

TOTAL Time (s)		**90**			
TOTAL Time (op)			**150**		
	TOTAL n(s)			**0**	
	TOTAL n(op)				**2**

Table 14 - Large Operational Errors in the CAR Region, Without Errors of the Types M and N

EVENT DATE	FLIGH IDENT	ACFT TYPE	POSITION	CLRD FL	EVENT FL	HT LHD	DURATION	DUR GTE	CODE	COD GTE	FIR	SOURCE	Time (S)	Time (Op)	n (S)	n (Op)
06/02/07	CIU308	DC10	GERNI / SKBO	380	370	-1000	90		C	C	ASUNCION	PILOT		90		1
07/02/07	ARG1301	A340	KJFK / SAEZ	400	410	1000	90		D	D	ASUNCION	PILOT		90		1
25/02/07	BBR1323	B763	KONRI	360	330	-3000	90		H / M	H /M	ANTOFAGASTA	PILOT / MODE C		90	1	2
15/03/07	AER7480		SUR	300	340	4000	90		D	D / N	BOGOTA	PILOT	90		2	2
08/04/07	LCO11040	B763	GELIS	300	310	1000	30		B	B	LA PAZ	PILOT		30		1
08/06/07	IBE6831	A343	1140N 03642W	340	360	2000	15		N	I / M	ROCHAMBEAU	PILOT	15		1	1
14/08/07	ARG1364	A310	GEKAL	320	330	1000	30		B	B	ANTOFAGASTA	PILOT / MODE C		30		1
28/08/07	ARG1136	B744	POS - FOZ	330	310	-2000	90		P	P	ASUNCION	PILOT	90		1	1
22/09/07	DLH504	A343	REGIS	310	350	4000	90		M	B	ATLANTICO	PILOT	90		2	2
11/11/07	LXP338	B732	50NM NORTH FROM VTN VOR	320	340	2000	30		B	B	SANTIAGO	MODE C	30		1	1
19/11/07	ARG1364	B735	MIBAS	300	320	2000	10		B	B	SANTIAGO	MODE C	10		1	1
											TOTAL Time (s)		**325**			
											TOTAL Time (op)			**330**		
												TOTAL n(s)			**9**	
												TOTAL n(op)				**14**

Table 15 Large Operational Errors in the SAM Region, Without Errors of the Types M and N

4.8.3 **Results** – Table 16 below presents the numerical values of the risks due to errors that are directly related to the application of the RVSM, that is, without including errors of the types M and N.

Risk	CARIBBEAN	SOUTH AMERICA	CAR/SAM REGIONS	*TLS*
N_{az}^{Tec}	1.5×10^{-10}	4.0×10-11	9.3×10^{-11}	5.0×10^{-9}
N_{az}^{ACAS}	1.1×10^{-10}	3.0×10^{-11}	7.0×10^{-11}	
N_{az}^{wl}	1.3×10^{-9}	1.3×10^{-9}	1.4×10^{-9}	
N_{az}^{cl}	1.9×10^{-10}	5.8×10^{-10}	5.3×10^{-10}	
N_{az}^{Total}	1.7×10^{-9}	1.9×10^{-9}	2.1×10^{-9}	

Table 16 - Collision Risks for the CAR/SAM regions

5 **Conclusions**

5.1 This paper provides estimates of the technical, operational, and total risks for the RVSM operation in the CAR/SAM airspace, and also for all kinds of errors present in the reports.

5.2 The number of hours flown that is considered for the risk analysis of the CAR/SAM regions corresponds to the total of flight hours for the ACC Havana, COCESNA and Panama of the Caribbean region, together with the ACC Curitiba, Brasilia, Recife and Amazonian of the South American region. In short, the SAM region contributes with 68% of the total flight hours and the CAR region with 32%.

5.3 With respect to data on traffic movement, vertical deviations (*ASE* and *AAD*) and lateral deviations, the same conclusions and recommendations in the report of the latest assessment (AP/ATM/13) remain valid.

5.4 All the proportions of the TVE are satisfied simultaneously, demonstrating that the global height-keeping performance specification is in agreement with the values published in ICAO Doc 9574.

5.5 The technical vertical collision risk for the Caribbean region, South American region and for all airspace of the CAR/SAM regions was evaluated separately. All regions show numerical values of the technical risk below the TLS, under the same assumptions used in the report presented in the AP/ATM/13 meeting.

5.6 As can be seen from the values presented above (Table 6), the technical risk estimated three years post implementation of the RVSM is 0.093×10^{-9}. This estimate satisfies the agreed TLS value of no more than 2.5 x 10^{-9} fatal accidents per flight hour due to the loss of a vertical separation standard of 1000 ft established correctly.

5.7 The evaluation of the technical risk for the CAR/SAM regions due to the air traffic growth was carried out for annual growth rates of 8% a year until 2017. The forecast shows that the technical risk will be below the TLS of 2.5×10^{-9} until 2017.

5.8 However, the total vertical collision risk due to a combination of technical height-keeping errors and operational errors, evaluated in number of fatal accidents per flight hour, is above the tolerable maximum limit. For the CAR region it is equal to 12.3×10^{-9}, for the SAM region 34.9×10^{-9}, and for the CAR/SAM regions about 28.9×10^{-9}. In order to reduce these values, corrective actions are necessary. The suggested action is to reduce errors of types M and N.

5.9 The main operational errors (LHD) collected from the CAR/SAM regions in the period from January to December 2007 are related to transition messages between Air Traffic Control (ATC) units (197 errors of type M), negative transfer received from transitioning ATC unit (63 errors of type N). The other errors can be seen in the Table 17.

5.10 The States of the CAR/SAM regions should be aware that each Large Height Deviation (LHD) error corresponds to a warning of risk. As a consequence, remedial actions should be applied independently of whoever holds the responsibilities and independently of the results of the risk evaluation. Therefore, additional remedial actions must be taken to eliminate errors of the following types:

- A - Failure to climb/descend as cleared;
- B - Climb/descent without ATC clearance;
- C - Entry into airspace at an incorrect flight level;
- D - Deviation due to turbulence or other weather related cause;
- E - Deviation due to equipment failure;
- F - Deviation due to collision avoidance system (ACAS/TCAS) advisory;
- H - Aircraft not approved for operation in RVSM restricted airspace;
- I - ATC system loop error; (e.g. pilot misunderstands clearance message or ATC issues incorrect clearance);

5.11 The evolution of large errors presented in Table 17 corroborates the conclusions on the collision risk possibilities. Therefore, strong efforts are needed to motivate the States to apply additional safety corrective actions.

LHD Type	VF*2004	IOP 2005	MP-I 2006	MP-II 2007	MP-III 2008
A	2	2	2	-	1
B	3	6	-	1	8
C					1
D					6
E					2
F	-	-	1	-	2
H	-	-	1	-	1
I	-		6	31	2
M	16	4	56	76	197
N	-	-	-	1	63
O	-	-	-	1	-
P	-	-	3	3	1
TOTAL	21	12	68	113	284

* VP – Verification Phase (2004); IOP – Initial Operational Phase (2005);
MP-I – Monitoring Phase-I (2006); MP-II – Monitoring Phase-II (2007); MP-III – Monitoring Phase-III

Table 17 - Evolution of Large Height Deviations (LHD)

6.0 **Special Recommendation**

6.1 To comply with the resolution of the Fifth Meeting/Workshop of the Scrutiny Group GTE/5, which is transcribed below:

6.2 Taking into consideration that the Scrutiny Group (SG) in analyzing the LHD, verified that errors are not caused by RVSM operation but for common procedures in aircraft transference from an ATC unit to another one. For this reason, new corrective actions at short and mid term were proposed, therefore, GREPECAS/13 considered that these measures are additional to those contained in Conclusion 13/61.

6.3 In addition to the short-term actions, to find a solution to the identified LHD cause, GREPECAS encouraged States and International Organizations to implement a safety management system and as far as possible, as a technological defense, to gradually implement data communications between ATS (AIDC).

6.4 *On the other hand, GREPECAS/14 considered that in order to significantly reduce the occurrence of this type of errors, CAR/SAM States and International Organizations should, as an urgent matter, commit to adopt the measures referred in Conclusion GREPECAS 13/61"Measures to reduce operational errors in the ATC coordination loop between adjacent ACC", and particularly the error prevention programme in ATC coordination cycle between adjacent ATS units, associated to the referred conclusion and additional measures previously described (See Appendix B to this part of the report).*

7.0 Additional Recommendations

7.1 All the recommendations made in the assessment of 2007, which are transcribed below, remain valid:

7.2 The recommendations described in this section have the objective of helping in the efforts that will be required by the next tasks associated with the collision risk evaluation after the RVSM implementation in the CAR/SAM regions.

7.3 **Data on the Traffic Flow** – approximately 40% of the received data could not be treated due to different reasons: from lack of understanding on how the data should be transcribed to the spreadsheets to inconsistency of data. It is advisable that, before the collection of data, States pay attention to the guidelines developed for this procedure and approved by the RVSM TF.

7.4 **Data on Technical Vertical Deviation** – a planning effort should be made to define the best methodology of data collection on technical vertical deviation. Additionally, a work program should be elaborated to show that the Altimetry System Error (ASE) for RVSM-approved aircraft remains steady. This task could be carried out along with the implementation of a monitoring program of the aircraft altimetry system performance. Such program will have to foresee the monitoring of the mentioned system of altimetry at least each two years or after 1000 flight hours per aircraft (whichever occurs later).

7.5 **On Altimetry System Monitoring** - the CAR/SAM regions will have to establish a program for implantation of monitoring units for the verification of aircraft altimetry system. This program will have to be composed of a system of independent monitoring units (AGHME) installed in positions strategically located in the areas of higher traffic flow density. The objective is to monitor the largest possible number of aircraft for verification of the stability of the altimetry system error (ASE) and to check if the technical risk remains compatible with the agreed TLS of 2.5E-9.

7.6 **Data on Vertical Deviations due to Operational Errors** - Information on these types of events is obtained through ATC or pilot's reports. Unfortunately important data on these deviations, like number of crossed flight levels and time spent at non-authorized flight level, are rarely informed. As these deviations are consequences of errors or contingency actions, States should develop a work plan to obtain these data with a high level of confidence and share them with CARSAMMA.

7.7 States/International Organizations and airlines should continue to apply their best efforts toward obtaining and informing to CARSAMMA of LHD events.

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APPENDIX B

ERROR PREVENTION PROGRAMME IN THE COMMUNICATIONS BETWEEN ADJACENT ACCs

There are many initiatives that can be pursued to prevent operational errors from occurring. However, there are five primary areas, which can directly contribute to its prevention: **communications, phraseology, supervision, teamwork, and ATC proficiency**. In an effort to accomplish the goal of reducing communication errors between adjacent Area Control Centres and thus reduce or minimize the occurrence of large-height deviations, the following objectives should be included in the prevention programme:

The ATS authority shall:

a) identify individual, procedural, and/or equipment deficiencies used in air traffic services;

b) promptly correct individual, procedural, and/or equipment deficiencies which affect coordinations with adjacent and ATS units. This can be achieved through:
   - guidance on procedures to be followed;
   - implementation of read-back/hear-back programmes;
   - training in the filling of LHD forms;
   - increase and/or closer monitoring of ATCOs performance;
   - immediate coordination programme after a re-authorization or change in flight level;
   - changes in procedures and/or corrections/amendments of equipment.

c) communicate performance expectations to ATS supervisors and controllers;

d) ensure the ATS unit maintains a summary of and have information letters on operational errors, causal factors and trends, and incorporate them into training;

e) monitor and evaluate voice recordings (all ATS operational personnel);

f) take initiatives to improve communications among all ATS personnel to create an atmosphere conducive to sharing information;

g) exercise strict monitoring in ATC units;

h) ATS supervisors should:
   - communicate performance expectations to controllers, stressing the importance of operational control position discipline, awareness, teamwork, the use of proper phraseology, proper coordination procedures, control position relief briefings and utilization of a position relief checklist;
   - take prompt follow-up actions when controller performance does not meet with expectations;

- inform on individual and team accountability, and the consequences for not meeting expectations;
- provide efficient and consistent oversight of the ATS unit operation, and use effective resource management to ensure proper and timely assignment of personnel to promote the safe, orderly, and expeditious handling of air traffic;
- ensure that distractions and noise levels in the ATS unit are kept at a minimum;
- require all personnel to maintain a high degree of professionalism, teamwork, control position discipline, and awareness at all times in the ATS unit environment; and require that each controller knows, applies, and adheres to the appropriate requirements in the performance of his/her operational duties and responsibilities;
- promote an open flow of communications with all ATS personnel, allowing them to provide input to programme;
- place emphasis on hear-back/read-back errors during team meetings.

i) ATC personnel should:

- apply read-back/hear-back procedures when carrying out ATC coordinations;
- keep ATS supervisors advised of traffic problems and equipment limitations;
- make suggestions for ATS unit improvements and/or prevention of operational errors;
- maintain situational awareness;
- extend the extra effort to assist busier control position(s);
- continuously review their own operating techniques and ATS unit procedures to effect the highest quality of performance;
- promptly report all ATS incidents to the operational supervisor or other appropriate ATS authority for proper follow-up investigation;
- utilize memory aids.

VOICE RECORDING EVALUATIONS

Voice recording reviews should be conducted to ensure proper phraseology, good operating practices, and adherence to the standards set forth in ICAO provisions, and national/local directives and practices. Voice recording reviews should be conducted as follows:

a) the ATS unit should ensure that voice recording reviews are conducted at least semi-annually on all ATS operational personnel;

b) the ATS supervisor should review the voice recording, document comments and develop an action plan for documenting performance deficiencies; and

c) the ATS supervisor and the controller should review and discuss the voice recording.

Actions suggested as short term solution

a) That States, authorities and International Organizations continue their excellent compliance with the LHD requirements to report CARSAMMA on a monthly basis, and

b) That States, authorities and International Organizations distribute a copy of category "M", Error messages in ATC unit to ATC unit in transference messages and category "N", messages ("No ATC unit transference message was received"), received from transitioning ATC-unit LHD reports only to the adjacent ACC involved in addition to CARSAMMA.

c) When a trend is identified from shared reports, the States, Territories, and International Organizations shall share information and shall meet on a bilateral basis to develop a solution to the cause of the identified LHD.

d) Since some ACCs adjoin international oceanic airspace, ICAO NACC and SAM Regional Offices are requested to advise the corresponding adjacent ICAO regional Offices (EUR/NAT, WACAF) that said LHD report will be forthcoming from the adjacent ACC and urge positive interaction with reporting CAR/SAM unit.

Supported suggested actions as a medium term solution:

a) In an effort to eliminate the largest contributing LHD error category "M", the solution is to implement a quality management programme based upon safety management concepts outlined in Annex 11 amendment 44.

b) The "*Progressive implementation of ATS interfacility data communications (AIDC)*" will enhance the safety of the airspace and would reduce category "M" error. However, it is a medium term project incurring a large expense and hereby encourages that the CAR/SAM Regions States begin arrangements to submit to the World Bank an application for sufficient monies to enhance such implementation systems. The Meeting recalled that the AIDC is seen within the Automation Task Force Program and therefore is not required another action at this point

APPENDIX C

EXAMINATION OF LARGE HEIGHT DEVIATION REPORTS RECEIVED BY THE CARIBBEAN AND SOUTH AMERICAN MONITORING AGENCY (CARSAMMA) IN CONNECTION WITH THE IMPLEMENTATION OF THE REDUCED VERTICAL SEPARATION MINIMUM (RVSM) IN THE CAR/SAM REGIONS

EVENT DATE	FLIGH IDENT	ACFT TYPE	POSITION	CLRD FL	EVENT FL	HT LHD	COD GTE	FIR	SOURCE	Time (S)	T(Op)	n (S)	n (Op)
05/01/07	LAN704	A343	00N 042W	330	350	2000	M	ATLANTICO	PILOTO	90		1	1
12/01/07	CMP489	B737	DAGUD	390	410	2000	M	PANAMA	PILOTO	90		1	1
13/01/07	DAL145	B763	ILKIT	350	350	0	N	MAIQUETIA	PILOTO / MODO C	90			
13/01/07	AAL2943	B763	ESIPO	310	310	0	N	MAIQUETIA	PILOTO / MODO C	90			
15/01/07	AAL945	B752	IREMI	350	370	2000	M	LIMA	PILOTO	120		1	1
17/01/07	AMX017	B762	DAKMO	360	380	2000	M	PANAMA	PILOTO / MODO C	90		1	1
18/01/07	PUA402	B763	ALBAL	290	390	10000	M	SANTIAGO	PILOTO	90		5	5
19/01/07	ALV512	A315	VKA	300	320	2000	M	SANTO DOMINGO	PILOTO / MODO C	90		1	1
20/01/07	ARG1364	B735	MIBAS	340	360	2000	M	SANTIAGO	PILOTO / MODO C	10		1	1
20/01/07	RPB7532	MD80	ALPON	390	370	-2000	M	PANAMA	PILOTO	90		1	1
20/01/07	CMP403	B737	AGUJA	400	400	0	N	PANAMA	MODO C	90			
23/01/07	SAM8478	MD83	DAKMO	320	340	2000	M	PANAMA	PILOTO / MODO C	90		1	1
23/01/07	CMP488	B738	8NM SUR BUXOS	380	380	0	N	PANAMA	PILOTO	90			
24/01/07	SAA205	A346	24S 010W	310	350	4000	M	ATLANTICO	PILOTO	90		2	2
25/01/07	VEC316	B722	BOGAL	390	370	-2000	M	PANAMA	PILOTO / MODO C	90		1	1
25/01/07	IBE6833	A346	05N 041W	340	360	2000	M	ATLANTICO	PILOTO	90		1	1
26/01/07	AAL996	B763	ARORO	340	360	2000	M	PANAMA	MODO C	90		1	1
27/01/07	AAL2155	B738	ALCOT	370	390	2000	M	MAIQUETIA	PILOTO / MODO C	90		1	1
27/01/07	AAL2133	B738	SELEK	330	370	4000	M	HAVANA	MODO C	90		2	2
27/01/07	DAL144	B763	ETBOD	320	360	4000	M	PORT AU PRINCE	PILOT	30		2	2
31/01/07	AVA9776	MD83	DAKMO	360	340	-2000	M	PANAMA	MODO C	90		1	1
31/01/07	CMP302	B737	DAKMO	340	380	4000	M	PANAMA	MODO C	90		2	2
01/02/07	TPU135	A319	PLG	340	360	2000	M	LIMA	PILOTO	360		1	1
02/02/07	LPE426	B763	KONRI	360	380	2000	M	COMODORO RIVADAVIA	PILOTO	90		1	1
04/02/07	ARG1365	B735	GELIS	350	330	-2000	M	PANAMA	PILOTO / MODO C	90		1	1
06/02/07	IBE6833	A346	13N 06037W	320	300	-2000	M	ROCHAMBEAU	PILOT / MODO C	15		1	1
06/02/07	TUS8411	B763	ILKIT	310	310	0	N	MAIQUETIA	PILOTO / MODO C	90			
06/02/07	CUB312	IL62	VSJ	350	350	0	N	MAIQUETIA	PILOTO / MODO C	90			
06/02/07	DAL145	B763	ILKIT	350	350	0	N	MAIQUETIA	PILOTO / MODO C	90			
06/02/07	CMP416	E190	BOGAL	300	300	0	N	PANAMA	PILOTO / MODO C	90			
06/02/07	XBKBE	GLF2	ORTIZ	350	350	0	N	MAIQUETIA	PILOTO / MODO C	90			
06/02/07	CIU308	DC10	GERNI / SKBO	380	370	-1000	C	ASUNCION	PILOTO		90		1
07/02/07	ARG1301	A340	KJFK / SAEZ	400	410	1000	D	ASUNCION	PILOTO		90		1
07/02/07	IBE6847	A346	05N 041W	360	360	0	M	ROCHAMBEAU	PILOTO	15			
08/02/07	CWC463	DC10	VSJ	330	330	0	N	MAIQUETIA	PILOTO / MODO C	5			
08/02/07	CUB7310	B733	ALCOT	330	330	0	N	MAIQUETIA	PILOTO / MODO C	90			
08/02/07	TAP165	A310	NANIK	340	360	2000	M	ATLANTICO	PILOTO	90		1	1
09/02/07	TPA410	B762	ILTUR	360	380	2000	M	PANAMA	PILOTO	90		1	1
10/02/07	CUB312	IL62	ALCOT	370	370	0	N	MAIQUETIA	PILOTO / MODO C	90			
12/02/07	LPE565	A319	ILMUX	340	360	2000	M	LIMA	PILOTO	180		1	1
12/02/07	CMP824	E190	BITIX	380	340	-4000	M	PANAMA	PILOTO	90		2	2
13/02/07	LPE639	A319	ARI	350	330	-2000	M	ANTOFAGASTA	PILOTO	90		1	1
14/02/07	TAM8084	A332	JOBER	350	370	2000	M	ATLANTICO	PILOTO	90		1	1

EVENT DATE	FLIGH IDENT	ACFT TYPE	POSITION	CLRD FL	EVENT FL	HT LHD	COD GTE	FIR	SOURCE	Time (S)	Time (Op)	n (S)	n (Op)

EVENT DATE	FLIGH IDENT	ACFT TYPE	POSITION	CLRD FL	EVENT FL	HT LHD	COD GTE	FIR	SOURCE	Time (S)	Time (Op)	n (S)	n (Op)
16/02/07	TAM8075	A320	ESIPO	330	350	2000	M	MAIQUETIA	PILOT / MODE C	240	-	1	1
16/02/07	ACA091	B763	ISANI	320	340	2000	M	MAIQUETIA	PILOT / MODE C	90	-	1	1
16/02/07	N118MT	CL60	KONRI	370	330	-4000	M	ANTOFAGASTA	PILOT	90	-	2	2
17/02/07	LAN601	B763	AMERO	350	370	2000	M	LIMA	PILOT	30	-	1	1
20/02/07	COA745	B738	PENSO ENTRE MID/VOR Y BZE/VOR (182354N 0883854W)	350	370	2000	M	CENTRAL AMERICAN	MODO C	90	-	1	1
21/02/07	DAL516	B752	VESKA	340	350	1000	M	SANTO DOMINGO	PILOT / MODE C		90	-	1
25/02/07	COA30	B762	KOXAM	320	340	2000	M	GEORGETOWN	PILOT	20	-	1	1
25/02/07	AAL932	B752	TOKUT	360	340	-2000	M	PANAMA	PILOT / MODE C	90	-	1	1
25/02/07	BBR1323	B763	KONRI	360	330	-3000	H / M	ANTOFAGASTA	PILOT / MODE C	90	1	-	2
04/03/07	SNTRY82	C141	LIXAS	310	310	0	N	GUAYAQUIL	PILOT / MODE C	30	-	-	-
09/03/07	AFR406	B772	1140N 03642W	340	360	2000	N	ROCHAMBEAU	PILOT	15	-	1	1
09/03/07	PTWJS	BE40M	OPABA - ADOLF	400	406	600	B / D	RECIFE	MODO C		90		
14/03/07	TAP179	A343	NANIK	360	380	2000	M	ATLANTICO	PILOT / MODE C	90	-	1	1
15/03/07	DAL274	B764	BUXOS	300	320	2000	M	PANAMA	PILOT / MODE C	90	-	1	1
15/03/07	CMP716	E190	ESEDA	340	340	0	N	PANAMA	MODO C	90	-		
15/03/07	AER7480		SUR	300	340	4000	D / N	BOGOTA	PILOT	90	-	2	2
16/03/07	AAL956	B772	PAKON				N	MAIQUETIA	PILOT	90	-		
16/03/07	TPA733	B767	VSJ	370	390	2000	M	MAIQUETIA	PILOT	90	-	1	1
16/03/07	BBR1323	B752	KIKAS	350	370	2000	M	MAIQUETIA	PILOT	90	-	1	1
19/03/07	TSC174	A310	DUXUN	350	370	2000	M	PANAMA	PILOT	90	-	1	1
20/03/07	LPE627	B767	LIXAS	370	370	0	N	GUAYAQUIL	PILOT / MODE C	30	-	-	-
20/03/07	RPB7512	MD83	KAKOL	320	340	2000	M	PANAMA	PILOT / MODE C	90	-	1	1
21/03/07	VLO7443	MD11	POS - DEKON	320	340	2000	M	ATLANTICO	PILOT / MODE C	90	-	1	1
24/03/07	LAN584	B763	SORTA	320	300	-2000	M	LIMA	PILOT	30	-	1	1
25/03/07	CMP437	B737	ARNAL	370	330	-4000	M	PANAMA OCEANIC	PILOT	90	-	2	2
27/03/07	DAL146	B764	BUXOS	300	320	2000	M	PANAMA	MODE C	90	-	1	1
29/03/07	DAL147	B764	SORTA	330	350	2000	M	LIMA	PILOT	30	-	1	1
02/04/07	VRG8942	B767	VAGAN	360	380	2000	M	MAIQUETIA	PILOT	1200	-	1	1
02/04/07	ARG1380	A310	VAGAN	380	380	0	N	MAIQUETIA	PILOT	900	-		
05/04/07	TPU034	A320	ELAKO	340	360	2000	M	LIMA	PILOT	180	-	1	1
05/04/07	AAL930	B752	DIBOK	360	360	0	N	KINGSTON	PILOT	15	-	-	-
08/04/07	LCO11040	B763	GELIS	300	310	1000	B	LA PAZ	PILOT		30		1
08/04/07	LNE539	B763	DAGUD	350	370	2000	M	PANAMA	PILOT	90	-	1	1
09/04/07	MPD525	A343	13N 030W	360	360	0	N	ROCHAMBEAU	PILOT	15	-	-	-
11/04/07	VDA4556	IL76	INCAS	380	300	-8000	M	ANTOFAGASTA	PILOT / MODE C	90	-	4	4
11/04/07	IBE6843	A340	1330N 03730W	340	340	0	N	ROCHAMBEAU	PILOT	15	-	-	-
11/04/07	LAN705	A343	10N 036W	320	340	2000	M	ROCHAMBEAU	PILOT	15	-	1	1
11/04/07	TAM8099	A342	NANIK	380	400	2000	M	ATLANTICO	PILOT	90	-	1	1
11/04/07	IBE6865	A343	1330N 03730W	340	340	0	N	ROCHAMBEAU	PILOT	15	-		
11/04/07	AVA025	B762	PULTU	360	380	2000	M	GUAYAQUIL	PILOT / MODE C	90	-	1	1
11/04/07	MXA1695	B763	LIXAS	390	390	0	N	GUAYAQUIL	PILOT / MODE C	90	-	-	-
11/04/07	AVA025	B763	TERAS	360	380	2000	M	ASUNCION	PILOT	30	-	1	1
15/04/07	CMP437	B737	VAKUD	370	390	2000	M	LIMA	PILOT	60	-	1	1
15/04/07	IBE6805	A343	RDL242, 125NM SVD	360	364	400	B / D	RECIFE	MODE C	90	-		
18/04/07	CMP266	B737	AGUJA	380	400	2000	M	PANAMA	MODE C	90	-	1	1
19/04/07	CIU329	DC10	ENSOL	410	410	0	M	GUAYAQUIL	PILOT / MODE C	90	-	0	0
21/04/07	N5VS	GLF5	VSJ	450	450	0	M	MAIQUETIA	PILOT	90	-	-	-
22/04/07	ARG1364	B735	MIBAS	340	300	-4000	M	SANTIAGO	PILOT / MODE C	90	-	2	2

EVENT DATE	FLIGH IDENT	ACFT TYPE	POSITION	CLRD FL	EVENT FL	HT LHD	COD GTE	FIR	SOURCE	Time (S)	Time (Op)	n (S)	n (Op)
23/04/07	TPU035	A320	ILMUX	340	360	2000	M	LIMA	PILOT	90	-	1	1
26/04/07	COA590	B763	ARNEL	370	390	2000	M	LIMA	PILOT	30	-	1	1
26/04/07	LAP707	F100	UMKAL	280	300	1000	M	SANTIAGO	PILOT / MODE C	-	90	-	1
01/05/07	RCH633	K35R	PAPIN	360	360	0	N	PANAMA OCEANIC	PILOTO	90	-	-	-
03/05/07	GLG600	B732	BOKAN	350	350	0	N	GUAYAQUIL	PILOT / MODE C	90	-	-	-
04/05/07	AAL952	A306	BUXOS	320	340	2000	M	PANAMA OCEANIC	PILOT / MODE C	90	-	1	1
06/05/07	LAN622	B763	ESDIN	320	320	0	M	ANTOFAGASTA	PILOT	90	-		
09/05/07	COA654	B752	TILSO	360	380	2000	M	PANAMA OCEANIC	PILOT	90	-	1	1
09/05/07	CMP300	E190	UKLOS	340	380	4000	M	PANAMA OCEANIC	MODE C	90	-	2	2
09/05/07	VEC201	B727	20 NM ANTES DE VSJ	310	330	2000	M	MAIQUETIA	PILOT / MODE C	90	-	1	1
10/05/07	COA882	B737	ARORO	340	380	4000	M	PANAMA OCEANIC	PILOT / MODE C	90	-	2	2
11/05/07	DAL061	B767	ILKIT	330	350	2000	M	MAIQUETIA	PILOT / MODE C	90	-	1	1
11/05/07	SAM113	F100	BOKAN	320	340	2000	M	GUAYAQUIL	PILOT / MODE C	90	-	1	1
14/05/07	LAN501	B763	UGUPI	330	350	2000	M	GUAYAQUIL	PILOT / MODE C	90	-	1	1
14/05/07	AAL915	A306	2008N 07820W	310	313	300	F	KINGSTON	PILOT / MODE C	-	30	-	1
14/05/07	DAL742		2008N 07820W	320	300	-1000	I	KINGSTON	PILOT / MODE C	-	60	-	1
15/05/07	IBE6652	A346	DIMAS	350	370	2000	M	ROCHAMBEAU	PILOTO		-	1	1
16/05/07	VPBON			360	380	2000	M	SANTO DOMINGO	PILOT / MODE C	90	-	1	1
17/05/07	IBE6843	A346	05N 041W	340	370	3000	N	ROCHAMBEAU	PILOT		15	1	2
17/05/07	MPD975	A332	IRELA	360	0	0	N	ROCHAMBEAU	PILOT	15	-	-	-
17/05/07	MPD525	A343	10N 036W	340	340	0	N	ROCHAMBEAU	PILOT	15	-	-	-
17/05/07	MXA1695	B763	LIXAS	390	390	0	N	GUAYAQUIL	PILOT / MODE C	90	-	-	-
17/05/07	VEC201	B727	ALCOT	330	330	0	N	MAIQUETIA	PILOT / MODE C	90	-	-	-
20/05/07	DAL335	B764	UGUPI	330	330	0	N	GUAYAQUIL	PILOT / MODE C	90	-	-	-
21/05/07	DLH502	B744	1130N 036W	360	360	0	N	ROCHAMBEAU	PILOT	15	-	-	-
24/05/07	SOO112	B742	1548N 07706W	360	360	500	F	KINGSTON	PILOT / MODE C	-	15	-	-
25/05/07	LNE7604	B763	ENSOL	360	340	-2000	M	GUAYAQUIL	PILOT / MODE C	90	-	-	-
26/05/07	AAL1089	B738	VODIN	350	370	2000	M	MAIQUETIA	PILOT / MODE C	90	-	1	1
29/05/07	KLM753	MD11	TERAS	400	400	0	N	GUAYAQUIL	PILOT / MODE C	90	-	-	-
30/05/07	TAM9537	MD11	DEKON	380	400	2000	M	ATLANTICO	PILOT / MODE C	90	-	1	1
30/05/07	LAN621	B763	ESDIN	350	370	2000	M	ANTOFAGASTA	PILOT	90	-	1	1
30/05/07	RPB7540	MD81	KAKOL	320	340	2000	M	PANAMA OCEANIC	PILOT / MODE C	90	-	1	1
31/05/07	LPE769	B763	LOPES	350	370	2000	M	ANTOFAGASTA	PILOTO	90	-	1	1
08/06/07	IBE6831	A343	1140N 03642W	340	360	2000	I / M	ROCHAMBEAU	PILOT	15	-	1	1
08/06/07	LAN705	A343	1140N 03642W	340	340	0	N	ROCHAMBEAU	PILOT	15	-		
12/06/07	AMX010	B762	ESDIN	330	390	6000	M	LIMA	PILOT	420	-	3	3
13/06/07	AMX010	B762	KARAZ	390	330	-6000	M	GUAYAQUIL	PILOT / MODE C	90	-	3	3
13/06/07	LAU355	B722	BOKAN	320	360	4000	M	GUAYAQUIL	PILOT / MODE C	90	-	2	2
16/06/07	AFR442	B744	TASIL	340	360	2000	M	ATLANTICO	PILOT	2560	-	1	1
17/06/07	CMP829	B737	ENSOL	390	410	2000	M	GUAYAQUIL	PILOT / MODE C	90	-	1	1
18/06/07	CMP307	B737	UGUPI	370	390	2000	M	GUAYAQUIL	PILOT / MODE C	90	-	1	1
19/06/07	TPU025	A320	GELIS	330	330	0	N	ANTOFAGASTA	PILOT	90	-		
20/06/07	LNE517	B763	ENSOL	350	370	2000	M	GUAYAQUIL	PILOT / MODE C	90	-	1	1
24/06/07	LRC651	A320	LIXAS	330	350	2000	M	GUAYAQUIL	PILOT / MODE C	90	-	1	1

EVENT DATE	FLIGH IDENT	ACFT TYPE	POSITION	CLRD FL	EVENT FL	HT LHD	COD GTE	FIR	SOURCE	Time (S)	Time (Op)	n (S)	n (Op)
25/06/07	AFR6810	B744	DIKEB	340	360	2000	M	ATLANTICO	PILOTO	960	-	1	1
26/06/07	UPS383	B752	UKLOS	360	380	2000	M	PANAMA	MODE C	90	-	1	1
27/06/07	CMP874	E190	BOGAL	340	300	-4000	M	PANAMA	MODE C	90	-	2	2
27/06/07	MXA381	A319	ISEBA	350	370	2000	M	PANAMA	MODE C	90	-	1	1
29/06/07	AVA060	MD83	DAKMO	340	340		N	PANAMA		90	-	-	-
01/07/07	LRC661	A320	PAPIN	370	350	-2000	M	PANAMA	PILOT	90	-	1	1
01/07/07	CCCWK	G150	AGUJA	360	400	4000	M	PANAMA	MODE C	90	-	2	2
03/07/07	MXA1694	B763	KONRI	360	340	-2000	M	ANTOFAGASTA	PILOT / MODE C	30	-	1	1
04/07/07	LPE581	A319	VAKUD	350	350	0	M	GUAYAQUIL	PILOT / MODE C	90	-	-	-
04/07/07	LPE581	B767	VAKUD	390	350	-4000	M	LIMA	PILOT	30	-	2	2
07/07/07	AAL931	B752	ENSOL	370	370	0	N	GUAYAQUIL	PILOT / MODE C	90	-	-	-
10/07/07	ALV502	A315		340	300	-4000	M	SANTO DOMINGO	PILOT	90		2	2
12/07/07	N245MU	C510	20NM AL SUR DEL PUNTO DE NOTIFICACION MAVAL. AERONAVE DESVIADA AL SW DE LA RUTA UG765 ENTRE CTM VBOR Y RAB VOR.	360	357	-300	A	CENTRAL AMERICAN	PILOT / MODE C	90	-	-	-
13/07/07	LAN503	B763	SORTA	350	370	2000	M	LIMA	PILOT	30	-	1	1
13/07/07	LAN503	B763	SORTA	350	370	2000	M	ANTOFAGASTA	PILOT	90	-	1	1
13/07/07	MXA1691	B763	GELIS	350	370	2000	M	ANTOFAGASTA	PILOT	30	-	1	1
14/07/07	LAN501	B763	SORTA	330	350	2000	M	ANTOFAGASTA	PILOT	90	-	1	1
16/07/07	AVA075	B762	PULTU	360	360	0	N	GUAYAQUIL	PILOT / MODE C	90	-	-	-
16/07/07	COA810	B738	LIXAS	370	370	0	N	GUAYAQUIL	PILOT / MODE C	90	-	-	-
16/07/07	ARG1384	A310	GEKAL	300	320	2000	M	ANTOFAGASTA	PILOT / MODE C	10	-	1	1
18/07/07	AVA060	MD80	DAKMO	320	340	2000	M	PANAMA	MODE C	90	-	1	1
18/07/07	N270KA	H25B	BUFEO	350	330	-2000	M	PANAMA	PILOT	90	-	1	1
21/07/07	MPD525	A343	0843N 03527W	340	340	0	N	ROCHAMBEAU	PILOT	15	-	-	-
21/07/07	CMP750	B737	SORTA	360	380	2000	M	LIMA	PILOT	30	-	1	1
21/07/07	CMP750	B738	SORTA	360	380	2000	M	ANTOFAGASTA	PILOT	90	-	1	1
22/07/07	DAL199	B752	ENSOL	330	370	4000	M	GUAYAQUIL	PILOT / MODE C	90	-	2	2
22/07/07	ACA092	B763	SISEL	330	350	2000	M	GUAYAQUIL	PILOT / MODE C	90	-	1	1
22/07/07	CMP231	B737	1525N 08040W	410	406	-400	D	KINGSTON	PILOT		90		
22/07/07	LAN573	B763	PULTU	340	360	2000	M	GUAYAQUIL	PILOT / MODE C	90	-	1	1
22/07/07	LAN573	B767	TERAS	340	360	2000	M	LIMA	PILOT	30	-	1	1
22/07/07	CMP750	B737	SORTA	360	380	2000	M	LIMA	PILOT	30	-	1	1
22/07/07	CWC463	DC10	BOKAN	360	300	-6000	M	GUAYAQUIL	PILOT / MODE C	90	-	3	3
23/07/07	GLG603	B732	BOKAN	340	320	-2000	M	GUAYAQUIL	PILOT / MODE C	90	-	1	1
27/07/07	COA653	B752	VAMOS	350	370	2000	M	GUAYAQUIL	PILOT / MODE C	90	-	1	1
27/07/07	TPU029	A319	MIRLO	360	380	2000	M	GUAYAQUIL	PILOT / MODE C	90	-	1	1
28/07/07	CMP489	B732	UGUPI	390	390	0	N	GUAYAQUIL	PILOT / MODE C	90	-	-	-
31/07/07	LNE539	B763	DAGUD	350	370	2000	M	PANAMA	PILOT	90	-	1	1
03/08/07	TAM3282	A319	CARDO	350	370	2000	M	RECIFE	MODE C	90	-	1	1
05/08/07	AAL2111	A306	UGUPI	290	310	2000	M	GUAYAQUIL	PILOT / MODE C	90	-	1	1
07/08/07	IBE6842	A346	MAGNO	370	350	-2000	M	ATLANTICO	PILOT	120	-	1	1
08/08/07	SAM112	F100	BOKAN	320	340	2000	M	GUAYAQUIL	PILOT / MODE C	60	-	1	1

EVENT DATE	FLIGH IDENT	ACFT TYPE	POSITION	CLRD FL	EVENT FL	HT LHD	COD GTE	FIR	SOURCE	Time (S)	Time (Op)	n (S)	n (Op)
11/08/07	AVA069	MD83	BOKAN	320	340	2000	M	GUAYAQUIL	PILOT / MODE C	180	-	1	1
12/08/07	AFR406	B772	1140N 03642W	340	340	0	M	ROCHAMBEAU	PILOT	15	-	-	-
12/08/07	COA810	B738	LIXAS	350	370	2000	M	GUAYAQUIL	PILOT / MODE C	180	-	1	1
14/08/07	ARG1364	A310	GEKAL	320	330	1000	B	ANTOFAGASTA	PILOT / MODE C	-	30	-	1
15/08/07	LPE707	B763	KENOX	340	340	0	N	ROCHAMBEAU	SBAO ACC	15	-	-	-
16/08/07	AMX011	B763	KARAZ	380	340	-4000	M	GUAYAQUIL	PILOT / MODE C	180	-	1	1
17/08/07	LPE511	B763	UGUPI	330	350	2000	M	GUAYAQUIL	PILOT / MODE C	120	-	1	1
17/08/07	XAFLY	LJ60	ILTUR	400	430	1000	M	PANAMA	MODE C	-	90	-	1
17/08/07	KRE2185	B722	ALCOT	320	320	0	N	MAIQUETIA	MODE C	90	-	-	-
17/08/07	HCCEZ	E190	NOREX	360	360	0	M	MAIQUETIA	MODE C	90	-	-	-
17/08/07	AVA091	MD83	NOREX	320	320	0	M	MAIQUETIA	MODE C	90	-	-	-
20/08/07	AMX019	B737	ARNEL	340	360	2000	M	GUAYAQUIL	PILOT / MODE C	90	-	1	1
20/08/07	VPBOZ	F900	NANIK	400	430	1000	M	ATLANTICO	PILOT	-	90	-	1
21/08/07	IBE6845	A346	NANIK	360	380	2000	M	ATLANTICO	PILOT	60	-	1	1
22/08/07	RPB7372	MD83	AGUJA	360	360	0	N	PANAMA	MODE C	90	-	-	-
22/08/07	LPE429	B763	GELIS	370	390	2000	M	LIMA		30	-	1	1
23/08/07	LPE582	A319	TERAS	350	370	2000	M	GUAYAQUIL	PILOT / MODE C	120	-	1	1
28/08/07	ARG1136	B744	POS - FOZ	330	310	-2000	P	ASUNCION	PILOT	90	-	1	1
30/08/07	DLH502	B744	1100N 03630W	340	340	0	M	ROCHAMBEAU	PILOT	15	-	-	-
30/08/07	LAN705	A343	0912N 03540W	340	340	0	N	ROCHAMBEAU	PILOT	15			
30/08/07	CMP273	E190	SISEL	350	370	2000	M	GUAYAQUIL	PILOT / MODE C	60	-	1	1
01/09/07	ARG1134	B744	NEURA	330	350	2000	M	ATLANTICO	PILOT	80	-	1	1
01/09/07	LNE1447	A320	GELIS	330	350	2000	M	ANTOFAGASTA	PILOT / MODE C	30	-	1	1
03/09/07	TAP156	A332	INTOL	370	390	2000	M	ATLANTICO	PILOT	90	-	1	1
05/09/07	RPB7540	MD81	KAKOL	320	340	2000	M	PANAMA	PILOT / MODE C	90	-	1	1
06/09/07	LCO1100	B763	UKLOS	320	340	2000	M	PANAMA	PILOT / MODE C	90	-	1	1
07/09/07	UPS382	B752	ARNAL	370	370	0	N	PANAMA	PILOT	90	-	-	-
11/09/07	FAB2123	H25A	274527S 0492151W	290	294	400	E	CURITIBA	MODE C	110	-	-	-
13/09/07	UPS383	B752	UKLOS	320	340	2000	M	PANAMA	PILOT / MODE C	90	-	1	1
14/09/07	MXA1692	B763	KONRI	360	340	-2000	M	ANTOFAGASTA	PILOT / MODE C	30	-	1	1
15/09/07	BW491	B738	EGEMA	410	390	-2000	M	GEORGETOWN	PILOT	90	-	1	1
16/09/07	TPA601	B763	PUERTO LEGIZANO	380	360	-2000	M	LIMA	PILOT	48	-	1	1
22/09/07	DLH504	A343	REGIS	310	350	4000	B	ATLANTICO	PILOT	90	-	2	2
27/09/07	N800EL	H25B	BUFEO	410	410	0	N	PANAMA	PILOT / MODE C	-	-	-	-
28/09/07	FDX44	MD11	ILKUT RUTA RNAV	310	330	2000	M	MAIQUETIA	PILOT / MODE C	90	-	1	1
28/09/07	LAU335	B721	NOREX			0	N	MAIQUETIA	PILOT	90	-	-	-
29/09/07	CMP273	E190	SISEL	350	390	4000	M	GUAYAQUIL		90	-	2	2
30/09/07	MXA380	A319	104920N 0845554W - 20 NM SE DE ULAPO (UA502)	360	360	400	E	CENTRAL AMERICAN	PILOT / MODE C	0	-	-	-
01/10/07	CMP279	B738	PLG	330	350	2000	M	LIMA	PILOT	30	-	1	1
02/10/07	TPU023	A320	GELIS	350	330	-2000	M	ANTOFAGASTA	MODE C	30	-	1	1
02/10/07	MAA6871	B763	URIBI	310	330	2000	M	MAIQUETIA	PILOT	180	-	1	1
02/10/07	LCO1731	B767	ESIPO	350	310	-4000	M	MAIQUETIA	PILOT	720	-	2	2
03/10/07	COA882	B737	ARORO	360	380	2000	M	PANAMA	MODE C	90	-	1	1
03/10/07	MXA374	A320	15NM south of KASOR (1500n 07940W)	360	360	0	D / N	KINGSTON	MODE C	90	-	-	-
06/10/07	LAN621	B763	KARAZ	330	350	2000	M	LIMA	PILOT	30	-	1	1
09/10/07	COA653	B752	MOXAS	390	410	2000	M	GUAYAQUIL	PILOT / MODE C	90	-	1	1
10/10/07	CMP418	B737	1444N 07747W	380	390	1000	B	KINGSTON	MODE C		90	-	1
11/10/07	MPD525	A343	0752N 03505W	320	320	0	N	ROCHAMBEAU	SBAO ACC	180	-	-	-

EVENT DATE	FLIGH IDENT	ACFT TYPE	POSITION	CLRD FL	EVENT FL	HT LHD	COD GTE	FIR	SOURCE	Time (S)	Time (Op)	n (S)	n (Op)
12/10/07	LAN531	B763	UGUPI	350	350	0	N	GUAYAQUIL	PILOT / MODE C	600	-	1	1
13/10/07	AAL2111	B763	SISEL	350	370	2000	M	GUAYAQUIL	PILOT / MODE C	300	-	1	1
14/10/07	AAL917	A306	UGUPI	270	310	2000	M	GUAYAQUIL	PILOT / MODE C	90	-	1	1
15/10/07	FDX55	A310	15 NM NORTE DEL VOR/DME VSJ	330	350	2000	M	MAIQUETIA	MODE C	240	-	1	1
20/10/07	LRC631	A320	AKNIL	350	370	2000	M	MAIQUETIA	PILOT	90	-	1	1
23/10/07	AAL912	B752	BUXOS	360	360	0	N	PANAMA	MODE C	90	-	-	-
26/10/07	UAL842	B763	LOGON	340	340	0	N	MAIQUETIA	PILOT	90	-	-	-
26/10/07	GTI074	B744	IREMI	400	400	0	N	ANTOFAGASTA	MODE C	90	-		
27/10/07	UPS382	B752	ENSOL	370	390	2000	M	GUAYAQUIL	PILOT / MODE C	90	-	1	1
27/10/07	AFR443	B744	INTOL	310	330	2000	M	ATLANTICO	PILOTO	90	-	1	1
28/10/07	LAN570	B763	ARI	320	340	2000	M	ANTOFAGASTA		30	-	1	1
30/10/07	LAN603	B767	KARAZ	330	350	2000	M	LIMA	PILOTO	30	-	1	1
11/11/07	LXP338	B732	50NM NORTH FROM VTN VOR	320	340	2000	B	SANTIAGO	MODE C	30	-	1	1
16/11/07	AMX010	B762	OSELO	330	370	4000	M	GUAYAQUIL	PILOT / MODE C	90	-	2	2
16/11/07	LNE443	B763	GELIS	330	350	2000	M	ANTOFAGASTA	PILOT / MODE C	30	-	1	1
17/11/07	MPH061	MD11	PULTU	320	340	2000	M	GUAYAQUIL	PILOT / MODE C	90	-	1	1
18/11/07	LAN621	B767	ARNEL	330	350	2000	M	LIMA	PILOT	30	-	1	1
18/11/07	AAL957	B767	VAKUD	350	330	-2000	M	LIMA	PILOT	30	-	1	1
19/11/07	ARG1364	B735	MIBAS	300	320	2000	B	SANTIAGO	MODE C	10	-	1	1
20/11/07	TPU033	A320	LIXAS	350	350	0	N	GUAYAQUIL	PILOT / MODE C	90	-	-	-
23/11/07	COA 654	B752	TILSO	360	380	2000	M	PANAMA	MODE C	90	-	1	1
24/11/07	MPD924	A332	BOKAN	350	350	0	N	GUAYAQUIL	PILOT / MODE C	90	-	-	-
24/11/07	LAN584	B763	BUXOS	340	340	0	N	PANAMA	MODE C	90	-	-	-
24/11/07	CMP436	E190	PADOX	340	360	2000	M	GUAYAQUIL	PILOT / MODE C	90	-	1	1
24/11/07	TPU053	A320	LIXAS	350	350	0	M	GUAYAQUIL	PILOT / MODE C	90	-	-	-
29/11/07	VLO7441	DC10	JOBER	350	350	0	M	ATLANTICO	MODE C	3600	-	-	-
30/11/07	LPE707	B763	BISUK at FIR boundary	320	340	2000	M	ROCHAMBEAU			-	-	-
30/11/07	IBE6651	A346	1018N 04706W at FIR boundary	340	360	2000	M	ROCHAMBEAU	PILOT	15	-	1	1
01/12/07	MXA1692	B763	ARNEL	340	360	2000	M	GUAYAQUIL	PILOT / MODE C	30	-	1	1
03/12/07	ARG1141	A342	TASIL	340	360	2000	M	ATLANTICO	PILOT	180	-	1	1
03/12/07	TAP176	A332	MAGNO	370	390	2000	M	ATLANTICO	PILOT	120	-	1	1
05/12/07	SAM181	F100	BOKAN	320	340	2000	M	GUAYAQUIL	PILOT / MODE C	20	-	1	1
09/12/07	AAL945	B763	LIXAS	310	330	2000	M	GUAYAQUIL	PILOT / MODE C	20	-	1	1
10/12/07	SOO575	B742	SORTA	330	310	-2000	M	ANTOFAGASTA	PILOT / MODE C	90	-	1	1
12/12/07	PROPP	H25A	OTONI	400	400	0	N	ROCHAMBEAU	PILOT	15	-	-	-
14/12/07	MXA1692	B763	KONRI	320	340	2000	N	ANTOFAGASTA	PILOT / MODE C	30	-	1	1
15/12/07	N270KA	HS54	SISEL	350	350	0	N	GUAYAQUIL	PILOT / MODE C	30	-	-	-
16/12/07	CMP435	B737	UGUPI	370	390	2000	M	GUAYAQUIL	PILOT / MODE C	20	-	1	1
17/12/07	TPU041	A321	LIXAS	330	330	0	N	GUAYAQUIL	PILOT / MODE C	20	-	-	-
18/12/07	AFR459	A342	EPODE	350	370	2000	M	ATLANTICO	PILOT	1320	-	1	1
18/12/07	DMJ1005	B737	NANIK	330	320	-1000	M	ATLANTICO	PILOT		90		1
19/12/07	LNE1448	A320	PADOX	320	340	2000	M	GUAYAQUIL	PILOT / MODE C	15	-	1	1
19/12/07	MAA6323	B763	MOXAS	350	330	-2000	M	GUAYAQUIL	PILOT / MODE C	15	-	1	1
20/12/07	LAN531	B763	UGUPI	330	330	0	N	GUAYAQUIL	PILOT / MODE C	10	-	-	-

EVENT DATE	FLIGH IDENT	ACFT TYPE	POSITION	CLRD FL	EVENT FL	HT LHD	COD GTE	FIR	SOURCE	Time (S)	Time (Op)	n (S)	n (Op)
20/12/07	KLM753	MD11	PULTU	340	360	2000	M	GUAYAQUIL	PILOT / MODE C	30	-	1	1
20/12/07	VEC202	B722	PYGBY	320	340	2000	M	PORT AU PRINCE	PILOT	30	-	1	1
21/12/07	IBE6821	A343	NANIK	340	350	1000	M	ATLANTICO	PILOT		90	-	1
23/12/07	TAM8080	A332	KOXAM	360	380	2000	M	GEORGETOWN	PILOT	90	-	1	1
23/12/07	TAP177	A332	NANIK	360	360	0	M	ATLANTICO	PILOT	90	-	-	-
24/12/07	MPH664	B763	08N 054W	370	370	0	N	ROCHAMBEAU	PILOT	15	-	-	-
25/12/07	AAL939	B738	JOSES	310	390	8000	M	PORT AU PRINCE	PILOT	30	-	4	4
25/12/07	PTU024	A320	KONRI	320	340	2000	M	ANTOFAGASTA	PILOT / MODE C	30	-	1	1
26/12/07	CMP273	E190	SISEL	350	330	-2000	M	GUAYAQUIL	PILOT / MODE C	15	-	1	1
27/12/07	LAN531	B763	IREMI	370	370	0	N	ANTOFAGASTA	PILOT	90	-		
27/12/07	AVA075	B762	PULTU	360	400	4000	M	GUAYAQUIL	PILOT / MODE C	20	-	2	2
27/12/07	LNE1447	A320	KONRI	340	360	2000	M	ANTOFAGASTA	PILOT / MODE C	30	-	1	1

TOTAL Time (s)		31463	-	-	-
TOTAL Time (op)		-	1260	-	-
	TOTAL n(s)	-	-	224	
	TOTAL n(op)	-	-	-	239

Table 1 - Reports of LHD of 300 ft or more received by CARSAMMA by Month-Year for the CAR/SAM airspace

Month – Year	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	TOTAL
Jan													18	4			**22**
Feb			1	1				1					20	8			**31**
Mar		1		2									11	5			**19**
Apr		2		1									16	6			**25**
May						2			1				17	10			**30**
Jun									1				13	3			**17**
Jul	1			1									25	5			**32**
Aug		1											19	4		1	**25**
Sep		1			2								11	3			**17**
Oct		1		1									15	5			**22**
Nov		2											11	3			**16**
Dec													21	7			**28**
TOTAL	**1**	**8**	**1**	**6**	**2**	**2**	**0**	**1**	**2**	**0**	**0**	**0**	**197**	**63**	**0**	**1**	**284**

Table 2 - Sumary of the Total Number of LHD Reports by Month and Cause of Deviation within CAR/SAM airspace.

Table 3 demonstrates the evolution of LHD reports since the verification phase until the Phase III of the RVSM post-implementation in the CAR/SAM Regions.

YEARS	PHASES	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	TOTAL
2004	**VP**	2	3											16				**21**
2005	**IOP**	2	6											4				**12**
2006	**MP-I**	2					1			6				56			3	**68**
2007	**MP-II**		1							31				76	2	1	2	**113**
2008	**MP-III**	1	7	1	5	2	2		1	3				198	63		1	**284**

Table 4 – Evolution of the LHD reports.

Tables 4A and 4B presents the LHD reports received by CARSAMMA, during 2007, divided into semesters.

FIRST SEMESTER							
States	**FIR**	January	**February**	**March**	**April**	**May**	**June**
Dutch Antilles	Curacao - **TNCF**	-	-	-	-	-	-
Argentina	Cordoba - **SACU**	15/11 - NIL	15/11 - NIL	15/11 - NIL	09/05 - NIL	05/06 - NIL	15/11 - NIL
	Ezeiza - **SAEU**	15/11 - NIL	15/11 - NIL	15/11 - NIL	09/05 - NIL	05/06 - NIL	15/11 - NIL
	Mendoza - **SAMV**	15/11 - NIL	15/11 - NIL	15/11 - NIL	09/05 - NIL	05/06 - NIL	15/11 - NIL
	Resistencia - **SARU**	15/11 - NIL	15/11 - NIL	15/11 - NIL	09/05 - NIL	05/06 - NIL	15/11 - NIL
	C. Rivadavia - **SAVU**	15/11 - NIL	15/11 - NIL	15/11 - NIL	09/05 - NIL	05/06 - NIL	15/11 - NIL
Bolivia	La Paz - **SLLF**	29/11 - NIL	29/11 - NIL	29/11 - NIL	29/11 - NIL	29/11 - NIL	29/11 - NIL
Brazil	Atlantico - **SBAO**	01/02 - 03	04/03 - 02	04/04 - 02	01/05 - 01	02/06 - 01	25/10 - 02
	Amazonica - **SBAZ**	25/02 - NIL	16/11 - NIL	16/11 - NIL	16/11 - NIL	16/11 - NIL	16/11 - NIL
	Brasilia - **SBBS**	31/01 - NIL	31/01 - NIL	31/01 - NIL	31/01 - NIL	31/01 - NIL	31/01 - NIL
	Curitiba - **SBCW**	27/03 - NIL	27/03 - NIL	08/04 - NIL	21/05 - NIL	16/07 - NIL	16/07 - NIL
	Recife - **SBRE**	08/02 - NIL	02/03 - 01	09/04 - 01	21/05 - 01	19/06 - NIL	16/08 - NIL
Chile	Punta Arena - **SCCZ**	22/01 - NIL	18/03 - NIL	01/04 - NIL	03/05 - NIL	01/06 - NIL	09/07 - NIL
	Santiago - **SCEZ**	22/01 - 02	18/03 - NIL	04/04 - NIL	07/05 - 02	05/06 - NIL	09/07 - NIL
	Antofagasta - **SCFZ**	22/01 - NIL	18/03 - 05	04/04 - NIL	07/05 - 01	05/06 - 03	09/07 - 01
	Islã de Pascua - **SCIZ**	22/01 - NIL	18/03 - NIL	04/04 - NIL	07/05 - NIL	05/06 - NIL	09/07 - NIL
	Puerto Montt - **SCTZ**	11/02 - NIL	18/03 - NIL	09/01 - NIL	03/05 -NIL	05/06 - NIL	09/07 - NIL
COCESNA	Central American - **MHTG**	08/02 - 01	13/03 - 01	12/04 - NIL	28/05 - NIL	15/06 - NIL	12/07 - 01
Colombia	Barranquilla – **SKEC**	09/01 - NIL	09/01 - NIL	09/01 - NIL	09/01 - NIL	09/01 - NIL	09/01 - NIL
	Bogota – **SKED**	-	-	09/01 - 01	-	-	-
Cuba	Havana - **MUFH**	11/02 - 01	11/03 - NIL	10/04 - NIL	04/05 - NIL	28/11 - NIL	06/07 - NIL
Ecuador	Guayaquil - **SEGU**	25/02 - NIL	22/11 - NIL	22/11 - 02	22/11 - 04	22/11 - 15	22/11 - 07
Guyana	Georgetown- **SYGC**	08/03 - NIL	07/03 - 01	-	-	-	-
French Guiana	Rochambeau - **SOOO**	12/02 - NIL	12/03 - 02	19/07 - NIL	19/07 - 04	16/07 - 05	19/07 - 03
Haiti	Port Au Prince - **MTEG**	12/02 - 01	04/06 - NIL	04/06 - NIL	06/06 - NIL	06/06 - NIL	02/08 - NIL
Jamaica	Kingston - **MKJK**	13/08 - NIL	13/08 - NIL	13/08 - NIL	13/08 - 02	11/06 - 02	13/08 - NIL
Panama	Panama - **MPZL**	25/02 - 12	21/11 - 04	25/04 - 06	18/09 - 02	05/06 - 06	18/09 - 04
Paraguay	Asuncion - **SGFA**	11/02 - NIL	08/03 - 12	12/04 - 10	11/05 - 14	11/06 - 04	10/07 - 11
Peru	Lima - **SPIM**	22/02 - 01	12/03 - 03	24/04 - 02	11/05 - 06	14/01 - NIL	12/07 - 01
Dominican Republic	Santo Domingo - **MDCS**	08/02 - 01	12/03 - 01	08/04 - NIL	30/04 - NIL	06/06 - 01	10/07 - NIL
Suriname	Paramaribo - **SMPM**	27/03 - NIL	27/03 - NIL	27/03 - NIL	23/05 - NIL	23/05 - NIL	20/11 - NIL
Trinidad & Tobago	Piarco - **TTZP**	-	-	-	-	-	-
Uruguay	Montevideo - **SUEO**	04/09 - NIL	04/09 - NIL	04/09 - NIL	09/05 - NIL	04/09 - NIL	04/09 - NIL
Venezuela	Maiquetia - **SVZM**	14/01 - 02; 21/01 - 08; 13/02 - 01	13/02 - 12	21/01 - 05	29/01 - 03	03/07 - 04	03/07 - NIL

Table 4A- Large Height Deviations Reports Received by CARSAMMA

SECOND SEMESTER							
States	**FIR**	**January**	**February**	**March**	**April**	**May**	**June**
Dutch Antilles	Curacao - **TNCF**	-	-	-	-	-	-
Argentina	Cordoba - **SACU**	07/08 - NIL	07/09 - NIL	05/10 - NIL	06/11 - NIL	05/12 - NIL	04/01 - NIL
	Ezeiza - **SAEU**	07/08 - NIL	07/09 - NIL	05/10 - NIL	06/11 - NIL	05/12 -NIL	04/01 - NIL
	Mendoza - **SAMV**	07/08 - NIL	07/09 - NIL	05/10 - NIL	06/11 - NIL	05/12 -NIL	04/01 - NIL
	Resistencia - **SARU**	07/08 - NIL	07/09 - NIL	05/10 - NIL	06/11 - NIL	05/12 -NIL	04/01 - NIL
	Comodoro Rivadavia - **SAVU**	07/08 - NIL	07/09 - NIL	05/10 - NIL	06/11 - NIL	05/12 - NIL	04/01 - NIL
Bolivia	La Paz - **SLLF**	29/11 - NIL	29/11 - NIL	29/11 - NIL	29/11- NIL	27/12 - NIL	04/01 - NIL
Brazil	Atlantico - **SBAO**	07/08 - 01	01/09 - 03	10/10 - 03	05/11 - 01	05/12 - 01	08/01 - 06
	Amazonica - **SBAZ**	16/11 - NIL	16/11 - NIL	16/11 - NIL	16/11 - NIL	03/12 - NIL	16/01 - NIL
	Brasilia - **SBBS**	31/01 - NIL	31/01 - NIL	31/01 - NIL	31/01 - NIL	31/01 - NIL	31/01 - NIL
	Curitiba - **SBCW**	17/09 - NIL	17/09 - NIL	17/09 - 01	15/11 - NIL	03/12 - NIL	07/01 - NIL
	Recife - **SBRE**	16/08 - NIL	17/09 - 01	17/11 - NIL	17/11 - NIL	05/12 - 01	25/01 - NIL
Chile	Punta Arena - **SCCZ**	06/08 - NIL	09/01 - NIL	04/10 - NIL	05/11 - NIL	09/01 - NIL	09/01 - NIL
	Santiago - **SCEZ**	03/08 - NIL	04/09 - NIL	05/10 - NIL	07/11 - NIL	26/12 - 02	03/01 - NIL
	Antofagasta - **SCFZ**	03/08 - 06	04/09 - 02	05/10 - 02	07/11 - 03	26/12 - 01	03/01 - 05
	Isla de Pascua - **SCIZ**	03/08 - NIL	04/09 - NIL	05/10 - NIL	07/11 - NIL	26/12 - NIL	03/01 - NIL
	Puerto Montt - **SCTZ**	03/08 - NIL	14/09 - NIL	05/10 - NIL	27/11 - NIL	09/01 - NIL	02/01 - NIL
COCESNA	Central American - **MHTG**	15/08 - NIL	13/09 - NIL	05/10 - 01	13/11 - NIL	08/01 - NIL	08/01 - NIL
Colombia	Barranquilla – **SKEC**	09/01 - NIL	05/12 -NIL	05/12 - NIL	05/12 - NIL	05/12 - NIL	09/01 - NIL
	Bogota – **SKED**	-	-	-	-	-	-
Cuba	Havana - **MUFH**	09/08 - NIL	28/11 -NIL	28/11 - NIL	28/11 - NIL	07/12 - NIL	11/01 - NIL
Ecuador	Guayaquil - **SEGU**	26/11 - 19	26/11 - 09	22/11 - 03	22/11 - 09	07/12 - NIL	09/01 - 12
Guyana	Georgetown- **SYGC**	-	12/09 - NIL	04/10 - 01	-	-	11/01 - 01
French Guiana	Rochambeau - **SOOO**	07/08 - 01	04/10 - 04	04/10 - NIL	08/11 - 03	06/12 - 02	03/01 - 02
Haiti	Port Au Prince - **MTEG**	02/08 - NIL	11/10 - NIL	09/10 - NIL	07/12 - NIL	07/12 - NIL	10/01 - 02
Jamaica	Kingston - **MKJK**	13/08 - 01	26/11 - NIL	26/11 - NIL	26/11 - 02	-	-
Panama	Panama - **MPZL**	18/09 - 06	18/09 - 02	21/11 - 05	10/12 - 02	10/12 - 02	
Paraguay	Asuncion - **SGFA**	14/08 -13	11/09 - 07	09/10 - 10	22/11 - 05	11/12 - 08	09/01 - 06
Peru	Lima - **SPIM**	03/08 - 05; 22/08 - 02	12/09 - 01	19/10 - 01	22/11 - 03	19/12 - 02	14/01 - 01
Dominican Republic	Santo Domingo - **MDCS**	14/08 - 01	10/09 -NIL	15/10 - NIL	22/11 - NIL	09/01 - NIL	09/01 - NIL
Suriname	Paramaribo - **SMPM**	20/11 - NIL	20/11 - NIL	20/11 - NIL	20/11 - NIL	20/11 - NIL	14/01 - NIL
Trinidad & Tobago	Piarco - **TTZP**	-	-	-	-	-	-
Uruguay	Montevideo - **SUEO**	04/09 - NIL	04/09 - NIL	02/10 - NIL	06/11 - NIL	07/01 - NIL	04/01 - NIL
Venezuela	Maiquetia - **SVZM**	-	13/10 - 03	21/01 - 03	28/01 - 05	28/01 - 01	-

Table 4B - Large Height Deviations Reports Received by CARSAMMA

REPORT OF LARGE ALTITUDE DEVIATION FOR AIRCRAFT CLEARED AT OR ABOVE FL290

Report to the Caribbean and South American Monitoring Agency (CARSAMMA) of an altitude deviation of 300ft or more, including:

1) those due to ACAS/TCAS
2) turbulence and contingency events and
3) operational errors resulting in operation at flight levels other than cleared by ATC or coordinated
by ATC units.

Name of FIR: _____

Please complete Section I or II as appropriate

SECTION I:

There were no reports of large altitude deviation for the month of _____

SECTION II:

There was/were _____ report(s) of an altitude deviation of 300 ft or more for aircraft cleared at or above FL290. Details of the altitude deviation are attached (Form A).

(Please use a separate form for each report of altitude deviation).

SECTION III:

When complete please forward the report(s) to:

Air Navigation Management Center (CGNA)
Caribbean and South American Monitoring Agency (CARSAMMA)
Av. General Justo, 160
Rio de Janeiro, RJ
Cep: 20.021-130
Brazil
Phone: (55-21) 2101-6358
Fax: (55-21)2101-6490
E-mail: carsamma@cgna.gov.br

CARSAMMA
Caribbean and South American Monitoring Agency

The information contained in this form is confidential and will be used for statistical safety analysis purposes only.

CMA 4
ALTITUDE DEVIATION FORM

Report to the CARSAMMA of an altitude deviation of 300ft or more, including those due to TCAS, Turbulence and Contingency Events

1. Today's date:	2. Reporting Unit:		
DEVIATION DETAILS			
3. Operator Name:	4. Call Sign: Registration Number:	5. Aircraft Type:	6. Mode C Displayed: ❑ Yes Which FL: ❑ No
7. Date of Occurrence:	8. Time UTC:	9. Occurrence Position (lat/long or Fix):	
10. Cleared Route of Flight:			
11. Cleared Flight Level:	12. Estimated Duration at Incorrect Flight Level (seconds):		13. Observed Deviation (+/- ft):
14. Other Traffic Involved:			
15. Cause of Deviation (*brief title*): (Examples: ATC Loop Error, Turbulence, Weather, Equipment Failure)			
AFTER DEVIATION IS RESTORED			
16. Observed/Reported Final Flight Level*: *Please indicate the source of information – ❑ Pilot ❑ Mode C	Mark the appropriate box 17. Is the FL above the cleared level: ❑ 18. Is the FL below the cleared level: ❑	19. Did this FL comply with the ICAO Annex 2 Tables of Cruising Levels? ❑ Yes ❑ No	

NARRATIVE
20. Detailed Description of Deviation (*Please give your assessment of the actual track flown by the aircraft and the cause of the deviation.*)

CREW COMMENTS (IF ANY)

When complete please forward the report(s) to:

Air Navigation Management Center (CGNA)
Caribbean and South American Monitoring Agency (CARSAMMA)
Av. General Justo, 160
Rio de Janeiro, RJ
Cep: 20.021-130 Brazil
Phone: (55-21) 2101-6358 Fax: (55-21) 2101-6490
E-Mail: carsamma@cgna.gov.br

TO BE USED FOR SAFETY ANALYSIS ONLY

SPECIFICATION OF THE FIELDS
ALTITUDE DEVIATION FORM – CMA F4

(1) - Today's date (mandatory)
(2) - Reporting unit-FIR (mandatory)
(3) - Operator Name (mandatory)
(4) - Call Sign and Registration Number (mandatory)
(5) - Aircraft Type (mandatory)
(6) - Mode C Displayed (YES or NO) /Which FL? (mandatory)
(7) - Date of Occurrence (mandatory)
(8) - Time UTC (mandatory)
(9) - Occurrence Position (lat/long or fix) (mandatory)
(10) - Cleared Route of Flight (mandatory)
(11) - Cleared Flight Level (mandatory)
(12) - Estimated Duration at Incorrect Flight Level (seconds) (mandatory)
(13) - Observed Deviation (+/- ft) (mandatory)
(14) - Other Traffic Involved (mandatory)
(15) - Cause of Deviation (brief title) (mandatory)
(16) - Observed/reported Final Flight Level / MODE C or PILOT? (mandatory)
(17) - Is the FL above the cleared level?
(18) - Is the FL below the cleared level?
(19) - Did this FL comply with the ICAO Annex 2 Tables of Cruising Levels? (Y/N)
(20) - Detailed Description of Deviation (mandatory)
(21) - Crew Comments (if any)

- - - - - - - - -

APPENDIX D

ANALYSIS OF THE LARGE HEIGHT DEVIATIONS (LHD)
(PRESENTED BY COLOMBIA)

No LHD

1.- RADAR COVERAGE IN THE ADJACENT AREA

When the receiving FIR has radar coverage in the airspace of the transferring FIR and observes that the aircraft has a flight level different to the one previously coordinated, which was not reviewed, we do not consider there is a LHD, because the FIR was only made aware of it before it entered its airspace. We must take into consideration that there is a risk in safety, but we must investigate it as a coordination incident and not as an LHD.
Conclusion: The meeting "agreed" that in this scenario it is not an LHD.

2.- WITHOUT A RADAR COVERAGE IN THE ADJACENT AREA

When the receiving FIR has contact with the aircraft before it enters its airspace, and it is made aware of the aircraft´s change of flight level with respect to a level previously coordinated, we do not consider there is a LHD, because the FIR is made aware of this before it enters its airspace. We do have to bear in mind that there is a risk in safety, but an investigation must be conducted as a coordination incident and not as a LHD.

Conclusion: Taking into consideration objections expressed by most of the participants, no agreement was reached in this scenario. For this reason, it was considered that further analysis is required by the Working Group.

3.- LATERAL DEVIATION

When an aircraft reports a laterally deviated position of the original point of transfer, either through another route or because of a deviation requested by the crew for operational convenience, we do not consider there is a LHD given that the initial philosophy of the reports of large height deviations exclusively corresponds to vertical deviations and not to lateral ones. In this case, we must investigate this situation as a coordination incident between adjacent ACC.

Conclusion: Taking into consideration objections expressed by most of the participants, no agreement was reached in this scenario. For this reason, it was considered that further analysis is required by the Working Group.

4.- TRANSFER TIME ERROR

When an aircraft reports a longitudinal deviated position in time due to coordination error or to lack of review of the transfer time, this is not considered an LHD. In light of the initial philosophy of large height deviations reports, this would only cover vertical deviations and not to horizontal ones. In this case, we must investigate this situation as a coordination incident between adjacent ACC.

Conclusion: The meeting “agreed” that in this scenario it is not an LHD.

5.- LATERAL DEVIATION WITH RADAR COVERAGE IN THE ADJACENT AREA

When an aircraft flies into an airspace that was not included in its route due to an operational deviation, this is not considered an LHD. Since this is an operation error 3C-2 Appendix C to the Report on Agenda Item 3 GTE/5 made by the ACC that is aware of the deviation and that failed to report it to the affected ACC, this event should be considered a coordination incident between adjacent FIRs.

Conclusion: The meeting “agreed” that in this scenario it is not an LHD.

LHD

6. WITHOUT RADAR COVERAGE

When an aircraft flies into a receiving FIR and reports a flight level different from the one previously coordinated, this is considered an LHD. We must take into account the time when the aircraft passes the FIR border and the corresponding ACC becomes aware of the traffic and takes an action regarding the deviation whether this action means leaving the aircraft at the level it is reporting or move the aircraft to a level at which it does not conflict with the FIR’s traffic plan.

Conclusion: The meeting “agreed” that in this scenario it is not an LHD.

7. WITH RADAR COVERAGE BEFORE THE FIR BORDER

If communications failed, an aircraft is transferred to a certain flight level and then it goes into the accepting ACC’s radar coverage at a different flight level, this is considered an LHD. We must take into account the time when the aircraft passes the transfer point border and the corresponding ACC becomes aware of the traffic and takes an action regarding the deviation and its traffic plan.

Conclusion: The meeting “agreed” that in this scenario it is not an LHD.

8. LATERAL DEVIATION WITHOUT RADAR COVERAGE IN THE ADJACENT LEVEL

When an aircraft flies into an airspace that was not included in its route due to an operational deviation, and there is no news of the deviation until the aircraft is already in the affected airspace, this is considered an LHD. Besides being an operational error made by the ACC that is aware of the deviation and that failed to coordinate with the affected ACC, this event directly impacts on the corresponding FIR as a traffic in an airspace putting at risk the RVSM airspace. This event should be considered a coordination incident between adjacent FIRs.

Conclusion: Taking into consideration the objections expressed by some participants, no agreement was reached in this scenario.

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APPENDIX E

EVENT DATE	ACFT TYPE	EVENT FL	HT LHD	DURATION	CODE	FIR
1/12/2007	B737	410	2000	90	M	PANAMA OCEANIC
1/18/2007	B763	390	10000	90	M	SANTIAGO
1/20/2007	B735	360	2000	10	M	SANTIAGO
2/6/2007	E190	300	0	90	N	PANAMA OCEANIC
2/8/2007	F900	370		0		ASUNCION
2/9/2007	B762	380	2000	90	M	PANAMA OCEANIC
2/12/2007	E190	340	-4000	90	M	PANAMA OCEANIC
2/19/2007	A346	360	0	0		ASUNCION
2/20/2007	A340	370	0	0		ASUNCION
2/25/2007	B752	340	-2000	90	M	PANAMA OCEANIC
3/4/2007	C141	310	0	30	N	GUAYAQUIL
3/7/2007	B763	360	0	0		ASUNCION
3/16/2007	B772			90	N	MAIQUETIA
3/16/2007	B772				M	MAIQUETIA
3/16/2007	B763				M	MAIQUETIA
3/16/2007	B767	390	2000	90	M	MAIQUETIA
3/16/2007	B752	370	2000	90	M	MAIQUETIA
3/17/2007	A343	310	0	0		ASUNCION
3/20/2007	B767	370	0	30	N	GUAYAQUIL
3/21/2007	B762	390				ASUNCION
3/27/2007		390				ASUNCION
4/4/2007	A313	330		0		ASUNCION
4/7/2007	B772	410		0		ASUNCION
4/11/2007	B762	380	2000	90	M	GUAYAQUIL
4/11/2007	B763	390	0	90	N	GUAYAQUIL
4/12/2007	B763	390		0		ASUNCION
4/12/2007	F2TH	410		0		ASUNCION
4/15/2007	B737	390	0	0	M	GUAYAQUIL
4/19/2007	DC10	410	0	90	M	GUAYAQUIL
4/22/2007	B737	360				ASUNCION
4/22/2007	A343	290				ASUNCION
5/3/2007	B732	350	0	90	N	GUAYAQUIL
5/5/2007	B738	390	0	0		GUAYAQUIL
5/7/2007	B763	350	0	0	M	GUAYAQUIL
5/10/2007	B763	400	0	0	M	GUAYAQUIL
5/11/2007	F100	340	2000	90	M	GUAYAQUIL
5/14/2007	B763	350	2000	90	M	GUAYAQUIL
5/16/2007	C5	370	0	0	M	GUAYAQUIL
5/17/2007	B763	390	0	90	N	GUAYAQUIL
5/19/2007	C5	300	0	0	M	GUAYAQUIL
5/20/2007	B764	330	0	90	N	GUAYAQUIL
5/22/2007	C650	410	0	0	M	GUAYAQUIL
5/25/2007	B763	340	-2000	90	M	GUAYAQUIL
5/29/2007	MD11	400	0	90	N	GUAYAQUIL
5/29/2007	B737	360				ASUNCION
6/13/2007	B762	330	-6000	90	M	GUAYAQUIL

EVENT DATE	ACFT TYPE	EVENT FL	HT LHD	DURATION	CODE	FIR
6/13/2007	B722	360	4000	90	M	GUAYAQUIL
6/16/2007	B744	360	2000	2560	M	ATLANTICO
6/17/2007	B737	410	2000	90	M	GUAYAQUIL
6/18/2007	B737	390	2000	90	M	GUAYAQUIL
6/20/2007	B763	370	2000	90	M	GUAYAQUIL
6/24/2007	A320	350	2000	90	M	GUAYAQUIL
6/25/2007	B744	360	2000	960	M	ATLANTICO
6/26/2007	B763	390	0	0	M	GUAYAQUIL
6/29/2007	B762	370				ASUNCION
7/4/2007	A319	350	0	90	M	GUAYAQUIL
7/5/2007	DC10	320	0	0	M	GUAYAQUIL
7/7/2007	B763	340	0	0	M	GUAYAQUIL
7/7/2007	B752	370	0	90	N	GUAYAQUIL
7/8/2007	B763	370	0	0	M	GUAYAQUIL
7/9/2007	B732	350		0		ASUNCION
7/10/2007	A320	350	0	0	M	GUAYAQUIL
7/11/2007	A320	330	0	0	M	GUAYAQUIL
7/12/2007	B767	320		0		ASUNCION
7/16/2007	B762	360	0	90	N	GUAYAQUIL
7/16/2007	B738	370	0	90	N	GUAYAQUIL
7/19/2007	H25B	380		0		ASUNCION
7/21/2007	LJ35	370				ASUNCION
7/22/2007	B752	370	4000	90	M	GUAYAQUIL
7/22/2007	B763	350	2000	90	M	GUAYAQUIL
7/22/2007	B763	360	2000	90	M	GUAYAQUIL
7/22/2007	DC10	300	6000	90	M	GUAYAQUIL
7/23/2007	B732	320	2000	90	M	GUAYAQUIL
7/27/2007	B752	370	2000	90	M	GUAYAQUIL
7/27/2007	A319	380	2000	90	M	GUAYAQUIL
7/27/2007	A320	330	0	0	M	GUAYAQUIL
7/28/2007	B732	390	0	90	N	GUAYAQUIL
7/30/2007	B732	340	0	0	M	GUAYAQUIL
8/5/2007	A306	310	2000	90	M	GUAYAQUIL
8/8/2007	F100	340	2000	60	M	GUAYAQUIL
8/11/2007	MD83	340	2000	180	M	GUAYAQUIL
8/12/2007	B738	370	2000	180	M	GUAYAQUIL
8/16/2007	B763	340	-4000	180	M	GUAYAQUIL
8/17/2007	B763	350	2000	120	M	GUAYAQUIL
8/20/2007	B737	360	2000	60	M	GUAYAQUIL
8/23/2007	A319	370	2000	120	M	GUAYAQUIL
8/30/2007	E190	370	2000	60	M	GUAYAQUIL
9/1/2007	B744	350	2000	80	M	ATLANTICO
9/1/2007	A320	350	2000	30	M	ANTOFAGASTA
9/3/2007	A332	390	2000	90	M	ATLANTICO
9/5/2007	MD81	340	2000	90	M	PANAMA OCEANIC
9/6/2007	B763	340	2000	90	M	PANAMA OCEANIC
9/7/2007	B752	370	0	90	N	PANAMA OCEANIC
12/18/2007	A342	370	2000	1320	M	ATLANTICO

EVENT DATE	ACFT TYPE	EVENT FL	HT LHD	DURATION	CODE	FIR
12/18/2007	B737	320	-1000	90	M	ATLANTICO
12/19/2007	A320	340	2000	15	M	GUAYAQUIL
12/19/2007	B763	330	-2000	15	M	GUAYAQUIL
12/20/2007	B763	330		10	N	GUAYAQUIL
12/20/2007	MD11	360	2000	30	M	GUAYAQUIL
12/20/2007	B722	340	2000	30	M	PORT AU PRINCE
12/21/2007	B763	380				ASUNCION
12/21/2007	A343	350	1000	90	M	ATLANTICO
12/23/2007	A332	380	2000	90	M	GEORGETOWN
12/23/2007	A332	360		90	M	ATLANTICO
9/11/2007	H25A	294	400	110	E	CURITIBA
9/11/2007	B752	390				ASUNCION
9/11/2007	A310	330	0	0		ASUNCION
9/11/2007	F100	330	0			ASUNCION
9/12/2007	A346	380		0		ASUNCION
9/13/2007	A343	380		0		ASUNCION
9/13/2007	B763	390				ASUNCION
9/13/2007	B752	340	2000	90	M	PANAMA OCEANIC
9/14/2007	B763	340	-2000	30	M	ANTOFAGASTA
9/15/2007	B738	390	-2000	90	M	GEORGETOWN
9/16/2007	B763	340				ASUNCION
9/16/2007	B763	360	-2000	48	M	LIMA
9/22/2007	B763	330		0		ASUNCION
9/22/2007	A343	350	4000	90	B	ATLANTICO
9/27/2007	B763	310				ASUNCION
9/27/2007	H25B	410	0	90	N	PANAMA OCEANIC
9/28/2007	B732	370	0	0	M	MAIQUETIA
9/28/2007	B772	360				ASUNCION
9/28/2007	MD11	330	2000	60	M	MAIQUETIA
9/28/2007	B721			90	N	MAIQUETIA
9/29/2007	E190	390	4000	90	M	GUAYAQUIL
9/29/2007	B737	380	0	0		GUAYAQUIL
9/29/2007	A320	370	0	0		GUAYAQUIL CENTRAL
9/30/2007	A319	364	400	0	E	AMERICAN
10/1/2007	B738	350	2000	30	M	LIMA
10/2/2007	A320	330	-2000	30	M	ANTOFAGASTA
10/2/2007	B772	340	0	0		ROCHAMBEAU
10/3/2007	B737	380	2000	90	M	PANAMA OCEANIC
10/3/2007	A320	360	0	90	D/N	KINGSTON
10/6/2007	B763	350	2000	30	M	LIMA
10/9/2007	B752	410	2000	90	M	GUAYAQUIL
10/10/2007	B767	340	-2000	90	G	ASUNCION
10/10/2007	B737	390	1000	90	B	KINGSTON
10/11/2007	A343	320	0	180	N	ROCHAMBEAU
10/12/2007	B763	380				ASUNCION
10/12/2007	B763	350	0	600	N	GUAYAQUIL
10/13/2007	B763	370	2000	300	M	GUAYAQUIL

EVENT DATE	ACFT TYPE	EVENT FL	HT LHD	DURATION	CODE	FIR
10/13/2007	B772	390				ASUNCION
10/14/2007	A306	310	2000	90	M	GUAYAQUIL
10/14/2007	B763	329	100	2760	E	GUAYAQUIL
10/15/2007	B752	369	100	2760	E	GUAYAQUIL
10/15/2007	IL96	320				ASUNCION
10/17/2007	A319	360	0	0		GUAYAQUIL
10/23/2007	B752	360	0	90	N	PANAMA OCEANIC
10/25/2007	B757	370				ASUNCION
10/25/2007	B773	360	0	0		ROCHAMBEAU
10/26/2007	B744	400	0	90	N	ANTOFAGASTA
10/27/2007	B752	390	2000	90	M	GUAYAQUIL
10/27/2007	B744	330	2000	90	M	ATLANTICO
10/28/2007	B763	340	2000	30	M	ANTOFAGASTA
10/30/2007	B767	350	2000	30	M	LIMA
10/31/2007	B732	340	0	0		GUAYAQUIL
11/1/2007	A343	380				ASUNCION
11/7/2007	B737	380				ASUNCION
11/9/2007	B763	370				ASUNCION
11/11/2007	B732	340	2000	30	B	SANTIAGO
11/16/2007	B762	370	4000	90	M	GUAYAQUIL
11/16/2007	B763	350	2000	30	M	ANTOFAGASTA
11/17/2007	MD11	340	2000	90	M	GUAYAQUIL
11/18/2007	B767	350	2000	30	M	LIMA
11/18/2007	B767	330	-2000	30	M	LIMA
11/19/2007	B735	320	2000	10	B	SANTIAGO
11/20/2007	A320	350	0	90	N	GUAYAQUIL
11/21/2007	A319	350	0	0		GUAYAQUIL
11/22/2007	A343	400				ASUNCION
11/23/2007	B767	370	0			ASUNCION
11/23/2007	B752	380	2000	90	M	PANAMA OCEANIC
11/24/2007	A332	350	0	90	N	GUAYAQUIL
11/24/2007	B763	340	0	90	N	PANAMA OCEANIC
11/24/2007	E190	360	2000	90	M	GUAYAQUIL
11/24/2007	A320	350	0	0		GUAYAQUIL
11/25/2007	B737	380				ASUNCION
11/25/2007	A340	380				ASUNCION
11/27/2007	B763	320	0	0		GUAYAQUIL
11/29/2007	DC10	350	0	3600	N	ATLANTICO
11/29/2007	DC10	350	0			RECIFE
11/30/2007	B763	340	2000	15	M	ROCHAMBEAU
11/30/2007	A346	360	2000	15	M	ROCHAMBEAU
12/1/2007	B763	360	2000	30	M	GUAYAQUIL
12/3/2007	A342	360	2000	180	M	ATLANTICO
12/3/2007	A332	390	2000	120	M	ATLANTICO
12/5/2007	F100	340	2000	20	M	GUAYAQUIL
12/6/2007	B763	330				ASUNCION
12/9/2007	B763	330	2000	20	M	GUAYAQUIL
12/10/2007	B742	310	-2000	90	M	ANTOFAGASTA

EVENT DATE	ACFT TYPE	EVENT FL	HT LHD	DURATION	CODE	FIR
12/10/2007	CL60	410				ASUNCION
12/12/2007	H25A	400	0	15	N	ROCHAMBEAU
12/14/2007	B763	340	2000	30	M	ANTOFAGASTA
12/15/2007	HS54	350	0	30	N	GUAYAQUIL
12/16/2007	B767	350				ASUNCION
12/16/2007	B737	390	2000	20	M	GUAYAQUIL
12/17/2007	A321	330	0	20	N	GUAYAQUIL
12/24/2007	B763	370	0	15	N	ROCHAMBEAU
12/25/2007	B738	390	8000	30	M	PORT AU PRINCE
12/25/2007	A320	340	2000	30	M	ANTOFAGASTA
12/26/2007	E190	330	-2000	15	M	GUAYAQUIL
12/27/2007	B763	370	0	90	N	ANTOFAGASTA
12/27/2007	B762	400	4000	20	M	GUAYAQUIL
12/27/2007	A320	360	2000	30	M	ANTOFAGASTA
12/28/2007	B777	400				ASUNCION
12/29/2007	B747	400		0		ASUNCION

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APPENDIX F

ERROR CATEGORIZATION CODES

Code	Cause of Large Height Deviation
A	Failure to climb/descend as cleared
B	Climb/descend without ATC clearance
C	Entry into airspace at an incorrect flight level
D	Deviation due to turbulence or other weather related cause
E	Deviation due to equipment failure
F	Deviation due to collision avoidance system (TCAS) advisory
G	Deviation due to contingency event
H	Aircraft not approved for operation in RVSM restricted airspace
I	ATC system loop error ; (e.g. pilot misunderstands clearance message or ATC issues incorrect clearance)
J	Equipment control error encompassing incorrect operations of fully functional FMS or navigation system (e.g. by mistake the pilot incorrectly operates INS equipment)
K	Incorrect transcription of ATC clearance or re-clearance into the FMS
L	Wrong information faithfully transcribed into the FMS (e.g. flight plan followed rather than ATC clearance or original clearance followed instead of re-clearance)
M	Error in ATC-unit-to-ATC-unit transition message
N	Negative transfer received from transitioning ATC-unit
O	Other
P	Unknown

Agenda Item 2: Report of the ATM Committee Task Forces

2.1 *Performance-based navigation (PBN)*

2.1.1 The Meeting recalled that the PBN Task Force met in two occasions in order to make progress on the assigned tasks. The PBN/TF/1 Meeting discussed several issues regarding PBN implementation in the CAR/SAM Regions, mainly:

a) Air Traffic Working Group (ATC/WG)

- Revision status of Doc 9613, the Performance-Based Navigation (PBN) Manual
- Action taken by the GREPECAS/14 meeting with regard to performance-based navigation (PBN) in the CAR/SAM Regions
- Recommendations proposed by ICAO to develop the Roadmap by region
- PBN implementation
- PBN AIC model
- PBN training
- Terms of Reference and Work Programme of the PBN/TF

b) Operations and Airworthiness Working Group (OPS/AIR/WG)

- PBN Manual
- Development of the ICAO Roadmap
- Action taken by the GREPECAS/14 meeting

2.1.2 The PBN/TF/2 focused its work on updating information contained in the PBN/TF/1 (AP/ATM/13) Report, with the following result:

PBN issues related with the ATC Operations

Status of revised ICAO Doc 9613, Manual on Performance Based Navigation (PBN)

2.1.3 The Meeting recalled that in December 2003, ICAO established the Required Navigation Performance (RNP) Special Operations and Requirements Study Group (RNPSORSG), generally referred to as the ICAO RNP Study Group, to address the confusion in terms and proliferation of requirements for RNP-based operations. This Group amended ICAO Doc 9613, titling it as *Manual on Performance Based Navigation*, in two volumes. To review the mentioned Manual seminars for CAR/SAM regions were carried out in Lima (17 to 20 June 2008) and Santo Domingo (23 to 26 June 2008). These seminars provided feedback for the attendees on the concepts and implementation processes presented in Volume I of the Manual.

2.1.4 The participation of all stakeholders in the PBN implementation process at the PBN Seminars was beyond of the initial expectations. These included ATM planners, air navigation service providers, regulators, air operators, ATC and procedure design personnel, aerodrome management and others. The latest information on the seminars and PBN in general can be found at www.icao.int/pbn.

2.1.5 Volume II of the new ICAO PBN Manual contains detailed technical "Navigation Specifications" with standardized, harmonized airworthiness and operator requirements for several RNAV and RNP operations. These Navigation Specifications also contain detailed recommendations for pilot and controller training.

ICAO State Letter AN 1 1145-07122 Key Provisions

2.1.6 ICAO, recognizing that substantive changes to Volume II technical navigation specifications are not expected as a result of the PBN Manual seminars, sent a State Letter issued on 27 April 2007 stating that noting the great demand expressed by States to commence implementation of ATS routes and instrument flight procedures based on PBN, and in order to avoid proliferation of operational approval requirements, the relevant guidance material taken from the manual is being distributed at an earlier date so that States may make advance use of this critical information prior to publication of the new edition of the manual. Paragraph 5 of the referred letter urges all States wishing to implement PBN operations, to establish an appropriate approval process in accordance with the guidance material attached to the letter.

Implementation of Navigation Specifications

2.1.7 It is worth mentioning that Navigation Specifications as embodied in the PBN Manual are not by themselves, considered to be regulatory guidance material, therefore, each State should issue its own regulations. For example, in the United States, the FAA has recently revised Advisory Circular 90-100A to reflect the provisions for RNAV 1 and RNAV 2 operations detailed in the ICAO Navigation Specifications for RNAV 1 and RNAV 2.

Actions adopted by GREPECAS/14 Meeting with regard to Performance Based Navigation (PBN) in the CAR/SAM Regions

2.1.8 The Meeting took note of the actions adopted by GREPECAS/14 when reviewing the information concerning PBN, RNAV and RNP, and also the guidelines and directives for CAA inspectors to approve the following types of operations: RNP 10, RNP 4, RNAV 5, RNAV 2, RNAV 1, RNP APCH and RNP AR APCH (where beneficial).

2.1.9 With regard to Safety Assessment Methodology, GREPECAS acknowledged that, in order to implement the PBN concept in a harmonious manner, a safety assessment of different parts of the airspace, applying different methodologies, will be required. It was also considered that there were a limited number of professionals involved in the area of safety assessment. For this reason, a second course was carried out on this subject in 2008, and a third course is expected to be held by end 2008.

2.1.10 Likewise, taking into account that there was no common methodology for terminal area safety assessments, GREPECAS agreed on conclusion 14/47, through which ICAO is requested to promote seminars on safety assessment to train personnel for working in the future implementation of PBN; and encourage the Separation and Airspace Safety Panel (SASP) to develop a common terminal area safety assessment methodology. The Meeting was informed that the SASP study results will be announced soon.

2.1.11 Concerning Operational Errors in a PBN Environment, GREPECAS considered appropriate that when developing operational risk assessment requirements as well as national regulations for PBN approval of aircraft and operators, consideration be given to the guidance and operational criteria developed by the ATM Committee at its fifth meeting. Furthermore, it requested that States/Territories/International Organizations analyse the importance of operational errors in a PBN environment, and use all possible resources for training air traffic controllers and pilots in order to reduce these errors, bearing in mind the future implementation of this concept in the CAR/SAM Regions.

Recommendations proposed by ICAO for development of a PBN Roadmap by region

2.1.12 The Meeting was informed that ICAO, with the assistance of the RNP SORSG and other ICAO bodies (such as SASP, Instrument Flight Procedures Panel (formerly OCP) and Navigation Systems Panel), are carrying out work, to clarify all RNAV and RNP guidelines so as to ensure a common understanding of RNP and the relationship between RNP and RNAV functionality, facilitating at the same time global harmonization of existing applications as well as the establishment of the future basis of a global performance based air navigation system to benefit the entire global aviation community.

2.1.13 As a result of the above, new ICAO SARPs and guidelines, with amendments to various ICAO Annexes, the *Performance Based Navigation Manual*, and other related provisions are under development. Current status is as follows:

- Final draft of PBN manual is finalized and posted on ICAO-NET
- State Letter with Navigation Specifications is on ICAO-NET – AN 11/45-07/22, 27 April 2007
- PBN terminology changes to Annexes 2, 6, 10, 11 (2008), 4 and 15 (2009) and 3 (2010)
- Flight plan provisions: PANS-ATM (Nov 2012)
- Flight procedure design requirements: PANS-OPS (Nov 2008)
- ICAO RNP AR Procedure Design Manual (Doc 9905), (Final Draft) as of March 2008
- ICAO Quality Assurance Manual for Flight Procedure Design (Doc 9906)
- ATC Separation Criteria: -Currently under review by the Separation and Airspace Safety Panel (SASP)
- PBN Web Site: www.icao.int/pbn

2.1.14 It was recalled that the 36th Assembly Resolution 36/23 seeks that States and/or regions develop an implementation plan by 2009 to achieve the following goals:

a) States and planning and implementation regional groups (PIRGs) complete a PBN implementation plan by 2009 to achieve:

1) implementation of RNAV and RNP operations (where required) for en route and terminal areas according to established timelines and intermediate milestones; and
2) implementation of approach procedures with vertical guidance (APV) (Baro-VNAV and/or augmented GNSS) for all instrument runway ends, either as the primary approach or as a back-up for precision approaches by 2016 with intermediate milestones as follows: 30 per cent by 2010, 70 per cent by 2014; and

b) ICAO develop a coordinated action plan to assist States in the implementation of PBN and to ensure development and/or maintenance of globally harmonized SARPs, Procedures for Air Navigation Services (PANS) and guidance material including a global harmonized safety assessment methodology to keep pace with operational demands; and

c) States are urged to include in their PBN implementation plan provisions for implementation of approach procedures with vertical guidance (APV) to all runway ends serving aircraft with a maximum certificated take-off mass of 5700 kg or more, according to established timelines and intermediate milestones.

2.1.15 The Meeting recalled that the PBN Roadmap for the CAR/SAM Regions was approved by GREPECAS/14 through Conclusion 14/46 - *CAR/SAM PBN Roadmap*, encouraging States/Territories/International Organizations to adopt and apply the referred PBN Roadmap. This Roadmap included a short term and mid-term implementation strategy. In addition, GREPECAS requested to take into consideration the implementation plan developed by ICAO and, in this regard, to review the CAR/SAM PBN Roadmap.

2.1.16 In view of the above, the Meeting reviewed the CAR/SAM PBN Roadmap and considered that there is no prevision for implementation of a SBAS system in the CAR/SAM Region at short term for the implementation of APV-1 and APV-2 procedures, therefore, the only choice for non precision approach procedures implementation with vertical guidance are Baro-VNAV procedures.

2.1.17 Note was taken that ICAO Doc 9613 (PBN Manual) already contains navigation specifications for the use of APV procedures based on Baro-VNAV (Appendix A of Part B of Volume II). Doc 8168 (PANS-OPS), Volume II, establishes the criteria for preparation of Baro-VNAV procedures (Part III, Chapter 3, Section 43).

2.1.18 Since the CAR/SAM Roadmap for PBN does not contain guidance on the implementation of Baro-VNAV procedures, the Meeting deemed appropriate to insert the following new paragraph in Chapter 7 of such document:

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, based on the RNP APCH or RNP AR APCH navigation specifications.

7.3.3.2 PBN implementation plan provisions for implementation of approach procedures with vertical guidance (APV) shall include all runway ends serving aircraft with a maximum certificated take-off mass of 5700 kg or more.

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

2.1.19 Consequently, the Meeting agreed editorial changes in the PBN Roadmap, according with the PBN Manual (Doc 9613). This PBN roadmap was updated to include paragraphs 7.3.3.1 and 7.3.3.2 and minor editorial changes included in **Appendix A** to this part of the report.

PBN Implementation

2.1.20 The Meeting recognized that in an effort to assist States with the implementation of the global ATM Operational Concept, ICAO has drafted a new Global Air Navigation Plan (GANP), which focuses on an efficiency approach based on the operational and technical improvements that will enable aircraft operators to derive short- and medium-term benefits.

2.1.21 The Meeting recalled that GREPECAS, through Conclusion 14/51, approved the ATM Performance Objectives, supported by a series of "Global Plan Initiatives" (GPI), which will enable covering PBN implementation requirements particular to CAR and SAM Regions, and requested the States, Territories and International Organizations to develop their own action plans based on these ATM performance objectives. Among these, Performance-based navigation will be a key tool for a series of Global Plan Initiatives. The updated PBN related Performance Objectives are included in the Appendix to the Report on Agenda Item 5 of the ATM/CNS Subgroup.

2.1.22 PBN implementation planning in the CAR/SAM Regions was practically completed with the approval of the CAR/SAM PBN Roadmap. The main task of the PBN Task Force will be the optimization of ATS routes in the upper airspace and to harmonise PBN implementation in the CAR and SAM Regions, taking into account the need to avoid multiple ATC procedures and operational approval processes.

2.1.23 The Meeting considered that, in accordance with Resolution 36/23, the States, Territories and International Organizations should prepare their own PBN implementation plans including regional planning show in the roadmap. In order to provide guidance to the States on this matter, the PBN Task Force updated the PBN performance objectives and prepared an en-route, terminal area and approach (TMAS) shown in **Appendix B** to this part of the Report.

2.1.24 Additionally, the Meeting deemed appropriate that ICAO obtains from the States, Territories and International Organizations, the names and data of the officers designated as points-of-contact of these implementation plans, who should coordinate PBN implementation activities in their States.

2.1.25 The national implementation plans should count, among other matters, with the action plans including the associated activities, dates and responsible for each activity.

2.1.26 The action plan corresponding to the en-route phase could serve as model for CAR/SAM implementation groups, while the terminal and approach action plans could be used as guidance material for the States, Territories and International Organizations. In view of the above, the Meeting adopted the following draft conclusion:

DRAFT
CONCLUSION ATM/6/3 NATIONAL PBN IMPLEMENTATION PLANS

That in order to initiate PBN implementation and in accordance with Resolution 36/23, CAR/SAM States/Territories:

a) develop their PBN national implementation plans by December 2009 and present them to the corresponding Regional Offices;

b) consider to use as guidance material the PBN action plans models, presented in Attachment B to this part of the Report ; and

c) designate a Point of Contact who will coordinate PBN implementation activities in his/her State/Territory.

PBN AIC Model

2.1.27 On the other hand, it was noted that the some CAR/SAM Regions States and International Organizations have already published AIC containing basic information on PBN implementation. These AIC are included as a guidance model for States in ICAO PBN website.

PBN Training

2.1.28 The Meeting was of the opinion that in PBN implementation, training is of vital importance and considered that, in particular, civil aviation administrations should provide greater support in the instruction and regular training in the following areas:

a) instrument procedures design
b) Airspace Planning
c) Safety Assessment
d) Airworthiness and Operators Approval

2.1.29 This will permit that the States, Territories and International Organizations could accomplish the commitments acquired through the adoption of the PBN Roadmap in the CAR/SAM Regions. ICAO will publish all relevant material regarding these 4 areas on PBN Website, including ICAO Documentation and available courses in the States and International Organizations Training Institutes.

2.1.30 The Meeting also considered that it could be necessary to have available PBN training packages for pilots and controllers. In this regard, IATA that air carriers develop their a training plan for pilots. In addition, a working group shall be formed, in order to develop a CAR/SAM PBN/ATC Training Manual, based on the experience of Dominican Republic. This work should be carried out, in order to update Dominican Republic PBN manual, in accordance with ICAO provisions.

Terms of Reference and PBN/TF Work Programme

2.1.31 The Meeting agreed that PBN harmonized Implementation shall be carried out by GREPECAS PBN Task Force with the implementation groups support, in order to avoid duplication of efforts and to allow sharing experience among States and International Organizations. In this sense the ATM Committee shall discuss the best mean to achieve CAR/SAM PBN Implementation, as well as the need of revising the strategy contained in the CAR/SAM PBN Roadmap.

2.1.32 The reviewed Terms of Reference and PBN/TF Work Programme are presented in Appendix A to this part of the report for consideration of the ATM COMM Meeting.

PBN issues related with the Aircraft Operation and Airworthiness (OPS/AIR/WG)

2.1.33 The Meeting analyzed the PBN Manual, ICAO Doc. 9613 “Specifications for PBN implementation” and considered that the material included in the referred document is very valuable and should be taken into account as reference material for the preparation of national regulations, as well as of implementation programmes on PBN concept. It also mentioned that the navigation specifications established by ICAO and submitted to the States, Territories and International Organizations with State Letter AN1 1145-07122 of 27 April 2007, should be considered.

2.1.34 With regard to operational errors in a PBN environment, the OPS/AIR/WG was of the opinion that once the conclusions derived from the analysis of operational errors in a PBN environment are known, these will be considered and included in the crews training plans required in the operators approval process.

2.1.35 The working group reviewed the CAR/SAM PBN roadmap and underlined that the determination of exclusionary airspaces of terminal areas should be a local and not a regional decision. The study of the fleets operating in the referred airspace was used as a base for the decision.

2.1.36 Being aware of the operational advantages of having procedures considering stabilized approaches, related to approaches with vertical guidance procedures (APV), the working group was in agreement with the modifications proposed to the Navigation Roadmap. Additionally, the OPS/AIR/WG indicated that the design of vertical guidance procedures should consider their initiation at or below the transition levels.

2.1.37 The OPS/AIR working group provided information related to aircraft and operators approval and training to complete the action plans developed by the PBN Task Force.

2.1.38 The Meeting noted the core information on the implementation of RNP10, 50 NM lateral separation and associated operational policies, and ATS route structure redesign in the WATRS airspace.

2.1.39 It was recalled that, since September 2006 when the Caribbean and North Atlantic ATS Route Working Group started works for the implementation of WATRS Plus project scheduled for 5 June 2008, significant works have been carried out for the implementation of the RNP10 and redesign in the WATRS airspace. As follow up of these works over almost 2 years, ICAO NACC Office sent in October 2007 a State Letter to State Authorities and aircraft operators providing general information of WATRS Plus project. State Letter strongly encouraged concerned operators to ensure aircraft approval process for the implementation on time of WATRS Plus project.

2.1.40 Also in February 2008, ICAO NACC office sent a proposal for amendment to the Doc 7030 regarding RNP10 implementation in WATRS airspace. Once no objections were received, further actions were carried out to redesign the WATRS airspace.

2.1.41 The results of the implementation of RNAV10 (RNP10) in the WATRS Plus airspace have allowed the application of a 50 NM lateral separation and increases of approximately 40% in the number of routes and associated flight levels. Availability of new routes and flight levels have also allowed more aircraft to operate on time and new direct and efficient routes and flight levels thereby reducing route lengths, fuel burn and engine emissions.

2.1.42 The Meeting was informed of the preliminary performance measurements based on the analysis of two scenarios related to cost benefit and gas emissions are:

- First scenario: completed, assumes that all RNP10 or 4 approved flights project 15 year fuel savings of U.S.$741 million and annual CO2 fuel emissions reduction of 161,800 metric tons.

- Second scenario: in progress, will examine effect of 10% of flights conducted by non-RNP 10 aircraft.

2.1.43 All related information of the WATRS Plus project is on the permanent WATRS Plus Webpage:

(http://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/enroute/oceanic/)

2.1.44 The Meeting received detailed information on aircraft and operators approval process for the use of RNP 10 routes in the North Atlantic (WATRS) used by the FAA. This document is based on ICAO PBN Manual. The Meeting considered that this information is very useful as reference material in the preparation of national regulations for RNP 10 approval of aircraft and operators. The approval guidance is included in the FAA WATRS website.

Flight Procedure Office (FPO)

2.1.45 It also identified a number of issues to be addressed in progressing PBN implementations regionally and highlighted the following instrument procedure design-related issues and problems faced by States:

a) Lack of procedure design training: initial, OJT, and/or recurrent;
b) High turnover among procedure designers;
c) Insufficient procedure design work in some States to attain or maintain proficiency;
d) Lack of depth in procedure design organization to perform quality assurance (QA);
e) Insufficient expertise in procedure design organization to provide adequate QA of procedures;
f) Lack of procedure design and obstacle data storage automation in the States; and
g) Insufficient regulatory expertise to oversee the procedure design service provider.

2.1.46 The Meeting also noted an initiative in the Asia Pacific Region to establish an ICAO Asia-Pacific Flight Procedure Office (FPO) and considered that a similar office would assist States in the regions by providing capability to enhance the quality of their instrument flight procedures and capacity to meet the PBN implementation goals set by ICAO Assembly Resolution A36-23.

2.1.47 The goal of the FPO would be to address some of the issues above and foster implementation of flight procedures, developed with the appropriate quality systems, especially PBN and vertically guided instrument approach procedures by:

a) Assisting those States with sufficient density of procedures to establish a sustainable internal procedure design capability capable of meeting the requirements of PANS OPS and their responsibility under Annex 15 for the quality of their procedures;

b) Providing the appropriate level of technical expertise necessary to enable States that do not have the density of procedures necessary to sustain an internal procedure design capability, to meet their responsibilities under Annex 15 and PANS OPS; and

c) Providing a vehicle to improve quality in the States' procedure design process through access to procedure design automation solutions and associated data storage.

Strategic Lateral Offset Procedures (SLOP)

2.1.48 In accordance with State letter AN1311 1.6-04185, *"Revised guidelines on the use of strategic lateral offsets"* the Meeting recognized that ICAO Strategic Lateral Offset Procedures (SLOP) of Doc 4444 may improve the safety in the CAR/SAM Regions and concurred to incorporate them in the Regional Supplementary Procedures (Doc 7030), for its application in the airspace not covered by ATS surveillance systems (i.e., radar, ADS-B, etc.). To this end, the Meeting adopted the following:

DRAFT
CONCLUSION ATM/6/4 ADOPTION OF STRATEGIC LATERAL OFFSET PROCEDURES (SLOP)

That, recognizing that Strategic Lateral Offset Procedures SLOP may provide enhancements to safety in the CAR/SAM Regions, ICAO take the necessary measures to initiate the amendment to Doc 7030, based on PANS ATM (Doc 4444), for the application of SLOPs in areas where route separations be of at least 30 NM and no ATS surveillance systems coverage exist (radar, ADS-B, etc.)

2.2 *Air Traffic Flow Management (ATFM)*

2.2.1 The ATFM Task Force presented a report of its activities carried out since the Fourteenth Meeting of the CAR/SAM Regional Planning and Implementation Group (GREPECAS/14), San Jose, Costa Rica, 16 – 20 April 2007.

CAR/SAM ATFM CONOPS

2.2.2 The Meeting noted that the CAR/SAM ATFM CONOPS is a high-level document whose main objective is to define and guide ATFM implementation in a homogeneous manner in the CAR/SAM Regions. The Meeting also noted that, while ATFM planning will be carried out jointly in the two regions, ATFM implementation will be carried out according to the needs of each one of the regions involved.

2.2.3 In light of this, the Meeting made some modifications to the CAR/SAM ATFM CONOPS which significantly improved the document. The Meeting also requested that the Secretariat present the review of the document to GREPECAS through appropriate channels for its information. The new edition (Version 1.2) which includes all revisions and modifications accomplished through 22 June 2007 will be uploaded in the Webpage of the Regional Offices.

Aerodrome Capacity and ATC Sector Capacity

2.2.4 The Meeting noted that one of the important foundations for providing ATFM service is the establishment of the aerodrome acceptance rate (AAR) at key aerodromes. Traffic services require a numeric value for the acceptance rate in order to: measure the aircraft demand at the aerodrome against the available capacity; establish the traffic management initiatives required to balance demand and capacity; and evaluate the effectiveness of Air Traffic Flow Management (ATFM) measures.

2.2.5 After reviewing the information provided, the Meeting recognized the need to develop a common model of application for the CAR/SAM Regions. It was recognized the need prepare a model for determining Aerodrome Capacity, as well as a method for the determining ATC sector capacity and providing guidance material for a harmonized application by the CAR/SAM Regions States/Territories/International Organizations. It was concluded that these methodologies require further analysis. The analysis result is included in the **Appendix C**) to this part of the Report.

ATFM Documentation

2.2.6 The Meeting agreed that the development of ATFM documents should be continued such as: operational procedures manuals to be used by Flow Management Units (FMUs) and Flow Management Positions (FMPs); draft ATFM training plans and ATFM training material; ATFM common terminology.

2.2.7 Based on a review of existing information systems and the operational needs defined by the ATFM Task Force, the Meeting considered appropriate to continue to collect, define and propose structure of the information systems for ATFM implementation of the CAR and SAM Regions; assist and guide the ATFM Task Force concerning the different information systems available for ATFM.

2.2.8 The Meeting also noted that the working group agreed to conduct its work using electronic means and to participate in conferences in order to review the progress of the work being done. Colombia and Brazil offered to host the next ATFM/TF meeting.

2.2.9 The Meeting took note of the activities that States, Territories and International Organizations are carrying out in the CAR and SAM Regions. As part of these activities it was informed that next August Mexico is planning a Seminar in Mexico City with the participation of Colombia, Cuba, COCESNA and other CAR States. The delegate of Mexico extended the invitation to all States that wish to participate.

2.3 *ATM automation*

Duplicate Flight Plan Issue.

2.3.1 As a follow-up to the implementation activities carried out in the CAR/SAM Regions, the Meeting took note of the considerations and aspects that the NAM/CAR has considered for the implementation of ATM automated interfaces.

2.3.2 Among the main operational problems noted by the NACC/WG/2, duplicate flight plans (FPL) and errors in transmission of FPL data were two safety of flight issues that must be addressed by the States/Territories. The meeting recognized that a method for reporting and addressing these problems must be developed. In addition, the meeting endorsed ATM/COMM/WP/07 which included a draft conclusion (2/4) regarding the actions necessary to avoid duplication of flight plans

2.3.3 Taking into account the impact of operational deviations in flight plan data exchange (FPL) coordination between adjacent ACCs on safety matters, the Meeting considered that CAR/SAM States, Territories and International Organizations should:

a. report and document duplicate FPL and errors in the transmission of FPL data to the adjacent facility and/or operator, as appropriate, within 24 hours of becoming aware of such an occurrence;
b. apply appropriate Safety Management System (SMS) measures to investigate, track and apply appropriate mitigation measures;
c. coordinate results, as appropriate, of the investigation and/or mitigations with the adjacent ACC/operator;

d. forward tracking information and corrective actions to the ICAO Regional Offices for processing and follow-up; and
e. ICAO should act as a focal point for data collection and oversee the activities within the CAR/SAM Regions.

2.3.4 Among the main detected problems by the Meeting, it was considered that duplicity and errors in the transmission of flight plans is of a regional nature, and that active participation of all parties involved for a greater ATM automation will allow minimizing the issue.

2.3.5 The Meeting considered that messages in CPL format may be used for an effective exchange of flight plans updating, and that implementation and use do not require higher communications costs, in view that the flight plans may be transmitted through the AFTN network. CPL is included in the ICD messages package approved by GREPECAS.

2.3.6 The Meeting recognized that a high percentage of Control Centres and ATS Units in the CAR Region has been upgraded, thus allowing a greater data processing capacity with the implementation of flight data processing system (FDPS), radar processing (RDP), support systems, and other display and message switching systems. These actions have improved the efficiency of services and operations, as well as operational prevention tools (MSAW, DAIW, MTCA, etc.) which entails an enhancement to safety. This systems automation is in line with the guidelines indicated in the table agreed upon at GREPECAS.

2.3.7 In accordance with the provided analysis and data on Surveillance Systems contained in FASID Table CNS 4A corresponding to the CAR/NAM Regions, as well as the implementation of new surveillance systems as ADS-B, Mode S and Multilateration, it was concluded that several States/Territories/International Organizations are performing surveillance/radar data exchange through bilateral agreements improving and homologating the traffic situation in the Region and allowing a better radar and non-radar surveillance data source availability that may be useful in improving accuracy, availability and safety of services provision in the Region. The **Appendix D** to this part of the Report is a summary of the progress in radar data exchange in the CAR/NAM Regions.

2.3.8 It was noted that the existing communications infrastructure in the CAR/NAM Regions has improved with the implementation of digital networks, prone to the implementation of new communication services as is the case of ATN implementation, specifically the AMHS system as well as its use in surveillance data comparison/exchange. This digital network implementation has led to improvements in the performance of the Aeronautical Fixed Services Network both on a voice communications basis and on a ground communications of the AFTN network basis.

2.3.9 In this regard, it was informed that the Technical Management Group (TMG) of the MEVA Network, during its last meeting, has initiated the analysis of new communications services for its implementation in said network.

2.3.10 Bearing in mind the foregoing considerations and the regional strategy, the Meeting concluded that several States/Territories/International Organizations of the CAR Region may achieve ATM automation, in stages I and II, with their adjacent ATS centres, and therefore, it was urged that they reflect the necessary activities in their respective action plans in line with the format agreed upon.

APPENDIX A
CAR/SAM ROADMAP FOR PERFORMANCE-BASED NAVIGATION

Available at:

www.icao.int/icao/en/ro/nacc/edocs/PBNeng.pdf

APPENDIX B
SEAMLESS ATM SYSTEM

REGIONAL PLANNING PROCESS

The regional planning process shall be conducted in accordance with the global plan initiatives (GPIs) of the Global Plan (Doc 9750) and the ICAO vision for an integrated ATM system, harmonized and interoperable, as established in the Global ATM Operational Concept (Doc 9854).

The objective is to achieve the maximum level of inter-operability and harmonization among sub-systems for a seamless and interoperable regional ATM system for all users during all phases of flight, complying with agreed levels of safety, providing optimum economic operations, to be environmentally sustainable and to fulfil national aviation security requirements.

The planning should be developed based on clearly defined performance objectives. The planning horizon should be focused on the strategies of development, activities or main tasks for two periods – that of less than 5 years (short-term) and 6 to 10 years (medium-term). Some already identified tasks to be analyzed beyond this period may be included if they conform to ICAO ATM requirements**.**

ATM PERFORMANCE OBJECTIVES

The performance objectives for regional ATM work programmes should be developed with performance based approach that best reflects the necessary activities needed to support regional ATM system implementation.

During its life cycle, the performance objectives may change in a dynamic manner depending on the ATM system's evolution; therefore, these should be coordinated with and available to all interested parties within the ATM Community in order to achieve timely communication throughout the implementation process. The establishment of collaborative decision making processes (CDM) ensures that all stakeholders are involved in and concur with the requirements, tasks and timelines.

The following sections describe aspects pertaining to the performance objectives and required changes, and how these changes foster harmonized improvements throughout the regional ATM system.

Benefits

The ATM implementation strategies should provide a group of common benefits for all stakeholders and be achieved through the operational and technical activities planned in each performance objective. These benefits should be in accordance with the ICAO strategic objectives.

Identification of work

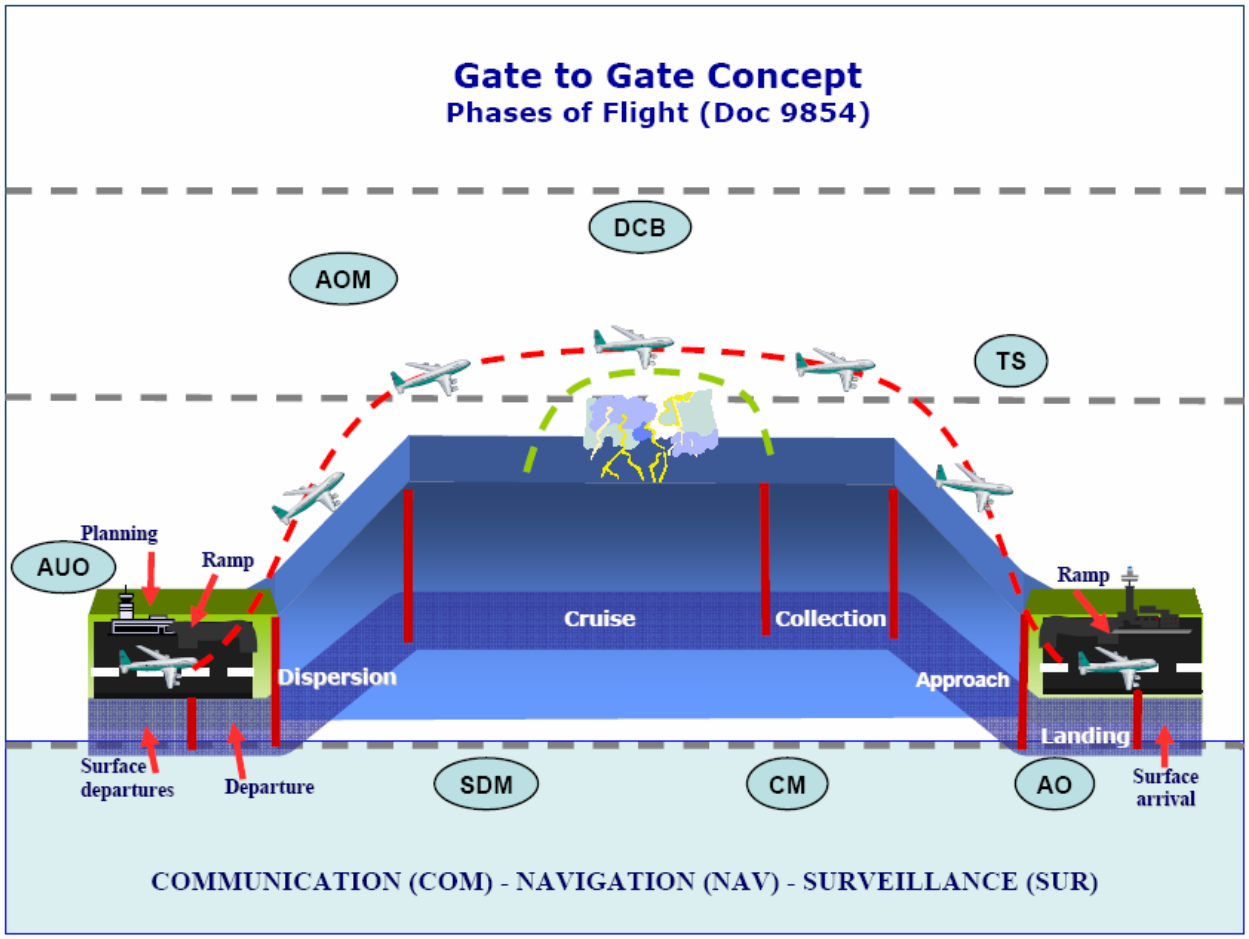
Each strategy or set of activities should be identified with associated components of the ATM system when describing the tasks. According to the Doc 9854, the designators for ATM components are as follows:

- **AOM** — Airspace organization and management
- **DCB** — Demand and capacity balancing
- **AO** — Aerodrome operations
- **TS** — Traffic synchronization
- **CM** — Conflict management
- **AUO** — Airspace user operations
- **ATM SDM** — ATM service delivery management

Each ATM system component pertains to tasks and activities related to phases of air operations (en-route, terminal and airport), capacity management, airspace management including its flexible use and aeronautical information management.

The infrastructure includes the ground technical systems and capacity required to support operations such as communications, navigation and surveillance, data processing, inter-operability of systems, information management system and spectrum management, including both civil and military systems.

The following diagram shows the ATM components in relation to the phases of flight:



Work Programmes

ATM evolution requires a clearly defined progressive strategy including tasks and activities which best represent the regional and national planning processes in accordance with the global planning framework. The goal is to obtain a harmonized regional implementation evolving toward a seamless global ATM system.

For this reason, it is necessary to develop short and medium term work programmes, focusing on the necessary changes to the system in which a clear work commitment will be carried out by the parties involved.

The regional work programmes should define additional tasks and activities, maintaining a direct relation with ATM system components such as airspace organization, civil-military coordination, human factors, aeronautical regulations, operational safety systems management and environmental protection, among others.

The referenced framework for regional activities should also include the coordination of activities with military authorities who play an important role in helping to ensure that the best use is made of the available airspace resources by all airspace users while still safeguarding national security.

The following principles should be considered when developing work programmes:

- The work should be organized using project management techniques and performance-based objectives in alignment with the strategic objectives of ICAO. The work programmes should be in accordance with the progress, characteristics and regional implementation needs.

- All activities involved in accomplishing the performance objectives should be designed following strategies, concepts, action plans and roadmaps which can be shared among States to align the regional work with the fundamental objective of achieving interoperability and seamlessness to the highest level.

- The planning of activities should include optimizing human resources, as well as encouraging dynamic use of electronic communication between States such as the Internet, videoconferences, teleconferences, e-mail, telephone and facsimile. Additionally, it should be ensured that resources will be efficiently used, avoiding any duplication or unnecessary work.

- The new work process and methods should ensure that performance objectives can be measured against timelines and the regional progress achieved can be easily reported to the Air Navigation Commission and to the ICAO Council.

Status

The status is mainly focused on monitoring the progress of the implementation activity as it progresses toward a specific completion date. The status of the activity is defined as follows:

■**Valid**	the feasibility and benefits of an activity has been confirmed, work has been initiated but the activity itself has not been finalized.
■**Completed**	implementation of the activity has been finalized by the involved parties.
■**Tentative**	the feasibility and benefits of an activity is being investigated or developed.

A tentative status indicates a potential activity; normally this activity will not be included in the regional planning documents unless it is an ICAO defined requirement.

Relationship between Performance Objectives and Global Plan Initiatives

The 23 GPIs provide a global strategic framework and are designed to contribute to achieving the regional performance objectives and to support the logical progression of regional implementation work programmes.

Each performance objective should be referenced to the pertinent GPIs. The goal is to ensure that the evolutionary work process will be integrated into the global planning framework

NATIONAL ACTION PLANS

States shall develop their own national action plans reflecting the specific activities or tasks along with the expected benefits to be obtained and the date by which each one should be completed according to its own needs and based on the regionally-agreed performance objectives. States should submit their national action plans to the ICAO regional Offices so they may report regional achievements to the Council of ICAO.

The activities should include the necessary detailed actions to successfully achieve the national performance objectives, relating these activities with the short and medium term regionally-agreed performance objectives.

National plans should identify the individual parties responsible for achieving the objectives as well as a means for monitoring and eventually reporting progress on the actions to ICAO. The responsibilities and time-tables should be clearly defined so that the involved parties are aware of their commitments throughout the planning process.

Additionally, national action plans should include adequate means to provide information on implementation progress achieved such as through a periodic reporting process. This facilitates senior management levels' efforts to prioritize the actions and resources required. The same information provided to ICAO will allow feedback and assistance to be provided specific for each Region as they work to achieve a Global ATM system.

PBN APP Action Plan GPI 1, 12, 16, 21, 23			
1 Airspace Concept	**Start**	**End**	**Remarks**
1.1 Establish and prioritize Strategic Objectives (Safety, Capacity, Environment, etc)			
1.2 Analyse aircraft fleet navigation capacity operating in the Airport			
1.3 Analyse communication, ground navigation (VOR, DME) and surveillance for navigation specification and reversionary mode compliance			
1.4 Design Instrument Approach Procedure (RNP APCH/APV Baro-VNAV or RNP AR), based on the strategic objective of the airspace concept. Consider Airspace Modelling, ATC simulations (fast time and/or real time), Live Trials, etc.			
2 Develop Performance Measurement Plan			
2.1 Prepare Performance Measurement Plan, including gas emission, safety, efficiency, etc.			
2.2 Conduct Performance Measurement Plan			
3 Procedure safety assessment			
3.1 Determine which methodology shall be used to evaluate procedure safety, depending on the navigation specification. Consider Airspace Modelling, ATC simulations (fast time and/or real time), Live Trials, etc.			
3.2 Prepare a data collection programme for airspace safety assessment			
3.3 Prepare preliminary procedure (s) safety assessment			
3.4 Prepare final procedure (s) safety assessment			
4 Establish collaboration decision making (CDM) process			
4.1 Coordinate planning and implementation needs with Air Navigation Service Providers, Regulators, Users, aircraft operators and military authorities			
4.2 Establish implementation date			
4.3 Establish the documentation format of CAR/SAM RNAV/RNP Website			

PBN APP Action Plan GPI 1, 12, 16, 21, 23			
4.4 Report planning and implementation progress to the corresponding Regional Office			
5 ATC Automated Systems			
5.1 Evaluate the PBN implementation in the ATC Automated Systems, considering the Amendment 1 to the PANS/ATM (FPLSG).			
5.2 Implement the necessary changes in the ATC Automated Systems			
6 Aircraft and operator approval			
6.1 Be aware of the national implementation programme and of the required navigation specifications			
6.2 Analyse aircraft approval requirements, aircrew and operator approval requirements for the navigation specifications to be implemented, as contained in the ICAO PBN Manual			
6.3 Publish the national regulations to implement the required ICAO navigation specifications			
6.4 Approval of aircraft and operators for each type of procedure and navigation specification			
6.5 Establish and keep updated a record of approved aircraft and operators			
6.6 Verify operations with a continuing monitoring programme			
7 Standards and procedures			
7.1 Evaluate regulations for GNSS use, and if such were the case, proceed to its publication.			
7.2 Develop and publish AIC notifying PBN implementation planning			
7.3 Publish AIP Supplement including applicable standards and procedures			
7.4 Review Procedural Manuals of the ATS units involved			

PBN APP Action Plan GPI 1, 12, 16, 21, 23			
7.5 Update Letters of Agreement between ATS units, if necessary			
7.6 Provide procedures to accommodate non-approved RNAV/RNP aircraft, when applicable			
7.7 Conduct ATC simulations to identify the workload/operational factors, if necessary.			
8 Training			
8.1 Develop a training programme and documentation for operators (pilots, dispatchers and maintenance)			
8.2 Develop training programme and documentation for Air Traffic Controllers and AIS Operators			
8.3 Develop training programme to regulators (aviation safety inspectors)			
8.4 Conduct training programmes			
8.5 Hold seminars oriented to operators, indicating the plans and the operational and financial benefits expected			
9 Decision for implementation			
9.1 Evaluate operational documentation availability (ATS, OPS/AIR)			
9.2 Evaluate the percentage of approved aircraft and operations (mixed equipage concerns)			
9.3 Review safety assessment results			
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			

PBN APP Action Plan GPI 1, 12, 16, 21, 23			
Definitive implementation date			

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ATS Routes Optimization Action Plan GPI 1, 4, 5, 7, 8, 10, 11, 12, 16, 21,23			
1 Airspace Concept	**Start**	**End**	**Remarks**
1.1 Establish and prioritize Strategic Objectives (Safety, Capacity, Environment, etc)			
1.2 Collect air traffic data to understand airspace traffic flows in a particular airspace.			
1.3 Analyse navigation capability of the fleet			
1.4 Analyse communication, ground navigation (VOR, DME) and surveillance for navigation specification and reversionary mode compliance.			
1.5 Optimise the airspace structure, by reorganising the network or implementing new routes based on the strategic objective of the airspace concept. Consider Airspace Modelling, ATC simulations (fast time and/or real time), Live Trials, etc.			
2 Develop Performance Measurement Plan			
2.1 Prepare Performance Measurement Plan, including gas emission, safety, efficiency, etc.			
2.2 Conduct Performance Measurement Plan			
3 Airspace safety assessment			
3.1 Determine which methodology shall be used to evaluate airspace safety and ATS routes spacing, depending on the navigation specification. Consider Airspace Modelling, ATC simulations (fast time and/or real time), Live Trials, etc.			
3.2 Prepare a data collection programme for airspace safety assessment			
3.3 Prepare preliminary airspace safety assessment			
3.4 Prepare final airspace safety assessment			
4 Establish collaboration decision making (CDM) process			
4.1 Coordinate planning and implementation needs with Air Navigation Service Providers, Regulators, Users, aircraft operators and military authorities			

4.2 Establish implementation date			
4.3 Establish the documentation format of CAR/SAM RNAV/RNP Website			
4.4 Report planning and implementation progress to the corresponding Regional Office			
5 ATC Automated Systems			
5.1 Evaluate the PBN implementation in the ATC Automated Systems, considering the Amendment 1 to the PANS/ATM (FPLSG).			
5.2 Implement the necessary changes in the ATC Automated Systems			
6 Aircraft and operators approval			
6.1 Be aware of the national implementation programme and of the required navigation specifications			
6.2 Analyse aircraft approval requirements, aircrew and operator approval requirements for the navigation specifications to be implemented, as contained in the ICAO PBN Manual			
6.3 Publish the national regulations to implement the required ICAO navigation specifications			
6.4 Approval of aircraft and operators for each type of procedure and navigation specification			
6.5 Establish and keep updated a record of approved aircraft and operators			
6.6 Verify operations with a continuing monitoring programme			
7 Standards and Procedures			
7.1 Evaluate regulations for GNSS use, and if such were the case, proceed to its publication.			
7.2 Finalize implementation of WGS-84			
7.3 Develop and publish AIC notifying PBN implementation planning			

7.4	Publish AIP Supplement including applicable standards and procedures			
7.5	Review Procedural Manuals of the ATS units involved			
7.6	Update Letters of Agreement between ATS units			
7.7	Develop amendment to the regional documentation, if necessary			
7.8	Provide procedures to accommodate non-approved RNAV/RNP aircraft, when applicable			
7.9	Identify transition areas and procedures, if necessary			
7.10	Conduct ATC simulations to identify the workload/operational factors, if necessary, and report the simulations activities to the ATM Committee			
8	**Training**			
8.1	Develop a training programme and documentation for operators (pilots, dispatchers and maintenance)			
8.2	Develop training programme and documentation for Air Traffic Controllers and AIS Operators			
8.3	Develop training programme to regulators (aviation safety inspectors)			
8.4	Conduct training programmes			
8.5	Hold seminars oriented to operators, indicating the plans and the operational and financial benefits expected			
9	**Decision for implementation**			
9.1	Evaluate operational documentation availability (ATS, OPS/AIR)			
9.2	Evaluate the percentage of approved aircraft and operations (mixed equipage concerns)			

9.3 Review safety assessment results			
10 System Performance Monitoring			
10.1 Develop post-implementation en-route operations monitoring programme			
10.2 Execute post-implementation en-route operations monitoring programme			
Pre operational implementation date			
Definitive implementation date			

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PBN TMA and Approach Action Plan GPI 5, 7, 8, 10, 11, 12			
1 Airspace Concept	**Start**	**End**	**Remarks**
1.1 Establish and prioritize Strategic Objectives (Safety, Capacity, Environment, etc)			
1.2 Collect air traffic data to understand airspace traffic flows in the TMA.			
1.3 Analyse aircraft fleet navigation capacity operating in the TMA			
1.4 Analyse communication, ground navigation (VOR, DME) and surveillance for navigation specification and reversionary mode compliance			
1.5 Optimise the airspace structure, by implementing new SID and STARS, based on the strategic objective of the airspace concept. Consider Airspace Modelling, ATC simulations (fast time and/or real time), Live Trials, etc.			
2. Develop Performance Measurement Plan			
2.1 Prepare Performance Measurement Plan, including gas emission, safety, efficiency, etc.			
2.2 Conduct Performance Measurement Plan			
3 Airspace safety assessment			
3.1 Determine which methodology shall be used to evaluate airspace safety and routes spacing, depending on the navigation specification. Consider Airspace Modelling, ATC simulations (fast time and/or real time), Live Trials, etc.			
3.2 Prepare a data collection programme for airspace safety assessment			
3.3 Prepare preliminary airspace safety assessment			
3.4 Prepare final airspace safety assessment			
4 Establish collaboration decision making (CDM) process			
4.1 Coordinate planning and implementation needs with Air Navigation Service Providers, Regulators, Users, aircraft operators and military authorities			
4.2 Establish implementation date			

PBN TMA and Approach Action Plan GPI 5, 7, 8, 10, 11, 12			
4.3 Establish the documentation format of CAR/SAM RNAV/RNP Website			
4.4 Report planning and implementation progress to the corresponding Regional Office			
5 ATC Automated Systems			
5.1 Evaluate the PBN implementation in the ATC Automated Systems, considering the Amendment 1 to the PANS/ATM (FPLSG).			
5.2 Implement the necessary changes in the ATC Automated Systems			
6 Aircraft and operator approval			
6.1 Be aware of the national implementation programme and of the required navigation specifications			
6.2 Analyse aircraft approval requirements, aircrew and operator approval requirements for the navigation specifications to be implemented, as contained in the ICAO PBN Manual			
6.3 Publish the national regulations to implement the required ICAO navigation specifications			
6.4 Approval of aircraft and operators for each type of procedure and navigation specification			
6.5 Establish and keep updated a record of approved aircraft and operators			
6.6 Verify operations with a continuing monitoring programme			
7 Standards and Procedures			
7.1 Evaluate regulations for GNSS use, and if such were the case, proceed to its publication.			
7.2 Develop and publish AIC notifying PBN implementation planning			
7.3 Publish AIP Supplement including applicable standards and procedures			
7.4 Review Procedural Manuals of the ATS units involved			

PBN TMA and Approach Action Plan GPI 5, 7, 8, 10, 11, 12			
7.5 SID and/or STAR Ground Validation and Flight Inspection/Flight Validation			
7.6 Data Base Validation Requirements/Procedures			
7.5 Update Letters of Agreement between ATS units			
7.6 Provide procedures to accommodate non-approved RNAV/RNP aircraft, when applicable			
7.7 Conduct ATC simulations to identify the workload/operational factors, if necessary.			
8 Training			
8.1 Develop a training programme and documentation for operators (pilots, dispatchers and maintenance)			
8.2 Develop training programme and documentation for Air Traffic Controllers and AIS Operators			
8.3 Develop training programme to regulators (aviation safety inspectors)			
8.4 Conduct training programmes			
8.5 Hold seminars oriented to operators, indicating the plans and the operational and financial benefits expected			
9 Decision for implementation			
9.1 Evaluate operational documentation availability (ATS, OPS/AIR)			
9.2 Evaluate the percentage of approved aircraft and operations (mixed equipage concerns)			
9.3 Review safety assessment results			
10 System Performance Monitoring			
10.1 Develop post-implementation TMA operations monitoring programme			
10.2 Execute post-implementation TMA operations monitoring programme			

PBN TMA and Approach Action Plan GPI 5, 7, 8, 10, 11, 12			
Pre operational implementation date			
Definitive implementation date			

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APPENDIX C

AIR TRAFFIC FLOW MANAGEMENT (ATFM) MANUAL

Introduction

1) Definition of ATFM

ATFM is a function established with the objective of producing a safe, orderly, and expeditious flow of traffic while minimizing delays. This is accomplished through continuous analysis, coordination, and dynamic use of traffic management initiatives.

2) Purpose.

The purpose of ATFM is to balance air traffic demand with system capacity to ensure the maximum, efficient use of the system airspace. This is accomplished by ensuring that capacity is utilized to the maximum extent possible and that air traffic volume is compatible with the capacities declared by the appropriate air traffic service providers.

3) Implementation.

a) Implementing of ATFM shall be established in accordance with a view to optimizing available capacity in the use of airspace and enhancing air traffic flow management processes. It shall be based on transparency and efficiency, ensuring that capacity is provided in a flexible and timely manner, consistent with the recommendations of the ICAO Regional Air Navigation Plan.

b) Implementing shall support operational decisions by air navigation service providers, airport operators and airspace users and shall cover the following areas:

1. flight planning;
2. use of available airspace capacity during all phases of flight; and
3. the creation of a single publication for route and traffic orientation.

c) Implementing shall seek to balance the financial impact on stakeholders with expected safety improvements and the operational and technical benefits, taking into account the requirement for global interoperability;

d) Implementing shall take into consideration the requirements of the military community.

e) ATFM implementing will aim at optimizing available capacity in the use of airspace and enhancing flow management processes. It shall also be based on transparency and efficiency, ensuring that capacity is provided in a flexible and timely manner.

f) It recognizes that airspace is a common resource for all categories of users that needs to be used flexibly by all of them, ensuring fairness and transparency while taking into account security and defense needs of Member States and their commitments with international organizations.

g) Air traffic flow management should be based on principles of partnership operated in accordance with the principles laid down in the ICAO Air Navigation Plan – FASID (Doc 7754), and contain the following functions:

1. Central unit for air traffic flow management
2. Flow Management Positions
3. Operators – general aviation, air carrier, military
4. Airport Operators

h) Military aircraft operating as general air traffic should be subject to air traffic flow management measures when operating or intending to operate within airspace to which air traffic flow management measures apply.

i) Member States, air navigation service providers and air carriers provide data to ETMS through VOLPE on a voluntary basis.

j) ATFM shall apply within the Member States' airspace to:

1. all flights intended to operate or operating as general air traffic and in accordance with the instrument flight rules
2. all phases of those flights.

k) ATFM shall apply to each of the following parties, or anyone acting on their behalf, involved in air traffic flow management activities:

1. operators,
2. air traffic service providers
3. entities involved in airspace management
4. airport operators
5. the entity charged by Member States with the provision of a single central unit for flow management.

Chapter 1: Demand and Capacity

1) In order to balance demand and capacity, it is first necessary to determine the aerodrome acceptance rate (AAR) and the sector capacity. Once these capacities are established, steps can be taken to monitor and evaluate the air traffic demand and implement measures to balance demand with declared capacity. There are a variety of ATFM tools available for monitoring and evaluating demand.

2) Determining the AAR

a) Definitions:

1. **Aerodrome Acceptance Rate (AAR):** A dynamic parameter specifying the number of arrival aircraft that an airport, in conjunction with terminal airspace, ramp space, parking space, and terminal facilities can accept under specific conditions during any consecutive 60 minute period.
2. **Aerodrome Primary Runway Configuration**: An aerodrome configuration which handles 3 percent or more of the annual operations.

b) Administrative considerations:

1. Identify the organization responsible for the establishment and implementation of AARs at select aerodromes.

2. Establish optimal AARs for the aerodromes identified.

3. Review and validate the aerodrome primary runway configurations and associated AARs at least once each year.

c) Determining AARs:

1. Calculate optimal AAR values for each aerodrome runway configuration for the following weather conditions:

(a) Visual Meteorological Conditions (VMC) - weather allows vectoring for visual approaches

(b) Marginal VMC - weather does not allow vectoring for visual approaches, but visual

(c) Instrument Meteorological Conditions (IMC) – Visual approaches and visual separation on final are not possible

d) Calculate the optimal AAR as follows:

1. Determine the average ground speed crossing the runway threshold and the spacing interval required between successive arrivals

2. Divide the groundspeed by the spacing interval to determine the optimum AAR

3. Formula method: Ground speed in knots at the runway threshold divided by spacing interval at the runway threshold in miles

NOTE: when the quotient is a fraction, round down to the next whole number

Example: 130 KTS / 3.25 nm = 40 Optimum AAR = 40 arrivals per hour
25 KTS / 3.0 nm = 41.66 round down to 41
Optimum AAR = 41 arrivals per hour

4. Table method:

Table 1: Optimum AAR

Nautical miles between aircraft at the Runway Threshold										
	3	3.5	4	4.5	5	6	7	8	9	10
	Potential AAR									
Ground Speed at the Runway Threshold										
140 knots	46	40	35	31	28	23	20	17	15	14
130 knots	43	37	32	28	26	21	18	16	14	13
120 knots	40	34	30	26	24	20	17	15	13	12
110 knots	36	31	27	24	22	18	15	13	12	11

e) Identify any conditions that may reduce the optimum AAR. Conditions include:

1. Intersecting arrival and departure runways
2. Lateral distance between arrival runways
3. Dual use runways – runways that share arrivals and departures

4. Land and Hold Short operations
5. Availability of high speed taxiways
6. Airspace limitations and constraints
7. Procedural limitations (noise abatement, missed approach procedures)
8. Taxiway layouts
9. Meteorological conditions

f) Determine the adjusted AAR using the previous factors for each runway used in an aerodrome configuration.

1. Add the adjusted AARs for all runways used in an aerodrome configuration to determine the optimal AAR for that runway configuration.

2. Real-time factors may require dynamic adjustments to the optimal AAR. These include:

(a) Aircraft type and fleet mix on final
(b) Runway conditions
(c) Runway/taxiway construction
(d) Equipment outages
(e) Approach control constraints

3. POTENTIAL AAR – ADJUSTMENT FACTORS = ACTUAL AAR

Table: ACTUAL AAR - EXAMPLE

RUNWAY CONFIGURATION	AAR for VMC	AAR for MARGINAL VMC	AAR for IMC
RWY 13	24	21	19
RWY 31	23	20	17

3) Determining sector capacity

a) Definitions.

1. Sector capacity is the average sector flight time in minutes from 7am to 7pm Monday through Friday.

2. Sector capacity is established for any 15-minute time period.

b) Calculate sector capacity as follows:

1. Formula method:

$$\frac{\text{(average sector flight time in minutes)} \times \text{(60 seconds)}}{\text{36 seconds}} = \text{Sector capacity value (optimum)}$$

a. Steps:

1. Manually monitor each sector, observe, and record the average flight time in minutes. After that time is determined:
2. Multiply that value by 60 seconds in order to compute the average sector flight time in seconds
3. Then divide by 36 seconds because each flight takes 36 seconds of a controller's work time

c) This is the sector capacity value (optimum)

1. Adjustments:

a. The optimum value for a sector is then adjusted for factors such as:
(1) Airway structure
(2) Airspace volume (vertically and laterally
(3) Complexity
(a) Climbing and descending traffic
(b) Terrain, if applicable
(c) Number of adjoining sectors that require interaction
(d) Military operations

d) Table method.

Average Sector Flight Time (in minutes)	**Optimum Sector Capacity Value (aircraft count)**
3 minutes	5 aircraft
4	7
5	8
6	10
7	12
8	13
9	15
10	17
11	18
12 minutes or more	18

4) Monitoring demand
a) Aerodrome
b) Sector
5) Evaluating demand
a) Evaluating the need for Traffic Management Initiatives

Chapter 2: Traffic Management Tools

1. ETMS
2. FSM
3. PROSAT

Chapter 3: Traffic Management Initiatives

1. Definition
2. Purpose
3. Types
a. Altitude initiatives
1. Capping
2. Tunneling

b. In-trail initiatives
    1. Miles-in-trail
    2. Minutes-in-trail
    3. Call for release (enroute spacing)
c. Fix balancing
d. Airborne holding
e. Reroutes
f. Sequencing programs
    1. Ground delay programs
    2. Ground stops

4. TMI approval authority
5. TMI processing

Chapter 3: Communications and Coordination

1. ATFM Terminology
2. Communicating traffic management information
    a. Planning telephone conferences
    b. Operational telephone conferences
    c. Web pages
3. Operations plan
4. Implementing Traffic Management Initiatives
5. Adjusting Traffic Management Initiatives
6. Cancelling Traffic Management Initiatives

Chapter 4: Organization and structure

1. Line of authority
2. Central Traffic Management Unit

2.1 Mission: Monitors and manages the flow of air traffic throughout the designated airspace system in order to produce a safe, orderly, and expeditious flow of air traffic while minimizing delays.

2.2 Duties
a. Analysis
b. Coordination
c. Intra-facility
d. Inter-facility
e. Telephone conferences
f. CDM approach
g. Documentation
    1. Operational log

2.3 Local Traffic Management Unit
a. Mission: Monitor and balance flows of air traffic within their area of responsibility.
b. Duties
    1. Analysis
    2. Coordination
    3. Intra-facility

4. Inter-facility
5. Telephone conferences
6. CDM approach
7. Documentation
    a. Operational log

3. Interface with International Traffic Management Units

Chapter 5: System performance metrics

1. Actual arrival and departure counts for main airports
2. Delay information

Chapter 6: Collaborative Decision Making

1. Organization

a. Roles and responsibilities

Chapter 7: Common ATFM Terminology

1. General

1.1 The primary goal of these guidelines is to develop terminology and phraseology for the exchange of ATFM messages between units providing ATFM services. The terminology and phraseology contained herein are intended to both reflect the current use of plain language and provide a basis for standardization and harmonization.

1.2 Although there are various plain language words and phrases in use today by ATFM service providers, these words and phrases can be organized into a modular and structured method of delivery to ensure communication harmonization and reduce the incidence of misunderstanding between units providing ATFM service.

1.3 It is not the intent of these guidelines to provide detailed information on ATFM concepts, procedures, and initiatives; however, since not all readers may be familiar with ATFM terms used in the examples, a brief description of ATFM initiatives is provided at Attachment 1. The list is not all-inclusive and does not preclude the innovation and application of other procedures that will result in improved service.

1.4 These guidelines include the concept of modular and structured ATFM messages and define an ATFM message's components as who, what, where, when and why. These five components are described as follows:

a. Who: The ATFM service unit being contacted followed by the ATFM service unit that is initiating the contact.
b. What: The ATFM objective to be achieved.
c. Where: The location of the ATFM objective to be achieved.
d. When: The time and/or duration of the ATFM objective to be achieved.
e. Why: The reason for the ATFM objective.

1.5 There is no module regarding “how” the ATFM restrictions should be achieved by the counterpart ATFM service provider. It is the counterpart’s responsibility how they fulfill the requested ATFM restrictions within their airspace. However, the center being asked for the ATFM restrictions may collaborate with the originating center on the type and method of ATFM measure

application. It should be noted that once information is exchanged regarding an ATFM restriction, it is considered MANDATORY unless otherwise agreed.

1.6 Below are the examples of possible ATFM messages:

- FAA COMMAND CENTER, THIS IS ABCD COMMAND CENTER … REQUIRE 100 MILES IN TRAIL REGARDLESS OF FLIGHT LEVEL ON R220, R580 AND ALL PACOTS TRACKS FOR TRAFFIC LANDING NARITA ESTIMATING FIR BOUNDARY FROM 0100 UTC UNTIL 0500 UTC DUE TO SEVERE WEATHER.
- ABCD COMMAND CENTER, THIS IS FAA COMMAND CENTER… CAPACITY RESTRICTION: LOS ANGELES HAS STARTED FLOW RESTRICTIONS FOR ALL AIRCRAFT LANDING LOS ANGELES DUE TO EARTHQUAKE. APPROACH HAS REQUESTED GROUND STOPS FOR ARRIVALS UNTIL FURTHER NOTICE.

2. ATFM Message Components

2.1 The use of a modular and structured ATFM message provides for consistent ATFM message design and delivery. Each of the ATFM message's five components can contain plain language elements that when combined provide a complete ATFM message. The harmonization achieved lies in the delivery of an ATFM message that has all of the required components in a structured format while making allowances for different plain language elements. This is of particular benefit for ATFM service providers that use different ATFM terminology or for non-native English speaking ATFM service providers.

2.2 As the modular and structured ATFM message may contain several different elements of plain language, this section will examine each of the five components and detail some of the possible plain language words and phrases that are in use today.

2.3 **WHO**: The **who** component identifies the ATFM service unit being contacted followed by the ATFM service unit that is initiating the contact. Examples of the who component:

- ABCD COMMAND CENTER THIS IS FAA COMMAND CENTER…
- FAA COMMAND CENTER, THIS IS ABCD COMMAND CENTER…

2.4 **WHAT**: The **what** component identifies the ATFM objective to be achieved. Objectives include but are not limited to:

REQUIRE
- (number) MILES [orMINUTES] IN TRAIL AT THE SAME FLIGHT LEVEL…
- (number) MILES [or MINUTES] IN TRAIL REGARDLESS OF FLIGHT LEVEL…
- A RATE OF (number) AIRCRAFT PER HOUR…
- FLIGHT LEVELS (number) AND (number) NOT AVAILABLE
- ONLY FLIGHT LEVELS (number), (number) AND (number) ARE AVAILABLE
- (route/airport/airspace) NOT AVAILABLE DUE (reason) ALTERNATIVE[S] IS/ARE (routes/airports)

2.5 **WHERE**: The **where** component represents the location of the ATFM objective to be achieved. It is often preceded by a modifying clause, indicating what aircraft or traffic the restriction will apply to. The modifying clause and the location combination are used to construct there where component.

Examples of location:

- …AT NIPPI…
- …NARITA AIRPORT…
- …ANCHORAGE APPROACH…
- …ON A337…
- …WESTBOUND ON PACOTS TRACK CHARLIE…
- …EASTBOUND ON A590…
- …INBOUND ON G344…
- …ON PACOTS TRACK 2 LANDING SAN FRANCISCO AIRPORT…
- …ON PACOTS TRACK ECHO BELOW FLIGHT LEVEL 350…
- …ABOVE FLIGHT LEVEL 300…
- …INBOUND TO TOKYO ACC…
- …INBOUND TO OAKLAND OCEANIC SECTOR 5
- ... WEST OF MARCC

Examples of what aircraft or traffic are included:

- …FOR ALL AIRCRAFT…
- …FOR TRAFFIC FASTER THAN 300 KNOTS…
- …FOR HEAVY AIRCRAFT…
- …FOR TRAFFIC LANDING…
- …FOR AIRCRAFT DEPARTING…
- …FOR TRAFFIC OVERFLYING…
- …FOR AIRCRAFT PASSING…

2.6 **WHEN**: The **when** component represents the time and/or duration of the ATFM objective to be achieved:

Examples of time/duration:

- …FROM 0300 UTC UNTIL 0600 UTC…
- …FROM NOW UNTIL 0600 UTC…
- …FROM 2300 UTC UNTIL FURTHER NOTICE…
- …UNTIL FURTHER NOTICE…

2.7 **WHY**: The **why** component represents the reason for the ATFM objective:

DUE TO/FOR…
- RUNWAY CLOSURE
- (SEVERE) WEATHER
- COMMUNICATION FAILURE
- RADAR FAILURE
- (significant event/natural disturbance such as FIRE or VOLCANIC ASH)

- STATE AIRCRAFT ACTIVITY
- MILITARY ACTIVITY
- EQUIPMENT OUTAGE
- EMERGENCY
- ATFM INITIATIVES IN (location)

3. ATFM Message Types

3.1 **Information to be shared prior to invoking the ATFM restrictions**: The information-sharing should be facilitated not only during the actual flow control but also (and more importantly) well prior to invoking the ATFM restrictions when the possibility of flow control arises. The following phrases will make clear the distinction between the ATFM messages and the information provided for situation awareness:

- POSSIBLE TRAFFIC FLOW RESTRICTIONS
- CAPACITY RELATED INFORMATION

Examples of messages sent prior to invoking ATFM restrictions follow:

- FAA COMMAND CENTER, THIS IS ABCD COMMAND CENTER…**POSSIBLE TRAFFIC FLOW RESTRICTIONS**… XYZ AIRPORT HAS CLOSED ONE RUNWAY AND STARTED SNOW REMOVAL.
- FAA COMMAND CENTER, THIS IS ABCD COMMAND CENTER…**CAPACITY RELATED INFORMATION**…XYZ AIRPORT HAS ENTERED THE STORM ZONE OF THE HURRICANE.

3.2 **ATFM Initiative Message**: ATFM initiatives communicate air traffic flow restrictions/objectives from one air traffic service provider to another. They follow the five component structure described earlier:

a. Who: The ATFM service unit being contacted followed by the ATFM service unit that is initiating the contact.
b. What: The ATFM objective to be achieved.
c. Where: The location of the ATFM objective to be achieved.
d. When: The time and/or duration of the ATFM objective to be achieved.
e. Why: The reason for the ATFM objective.

Examples of ATFM initiatives follow:

- ABCD COMMAND CENTER, THIS IS FAA COMMAND CENTER …REQUIRE 30 MINUTES IN TRAIL AT THE SAME FLIGHT LEVEL FOR ALL AIRCRAFT LANDING CHICAGO FROM 0800 UTC UNTIL FURTHER NOTICE DUE TO STATE AIRCRAFT ACTIVITIES.
- FAA COMMAND CENTER, THIS IS ABCD COMMAND CENTER… FL350 AND BELOW NOT AVAILABLE FOR AIRCRAFT OVERFLYING XYZ DOMESTIC AIRSPACE UNTIL 0900 UTC DUE TO EMERGENCY.

3.3 **Coordination of aircraft exempted from ATFM initiatives**: The following phrases will be used for the coordination of aircraft which are exempt from ATFM restrictions:

- REQUEST EXEMPTION FROM ATFM
- COORDINATION OF ATFM EXEMPTION

3.4 The following types of aircraft may be exempted from ATFM restrictions:

- Aircraft in a state of emergency
- Aircraft engaged in search and rescue missions
- Aircraft operating for humanitarian reasons
- Aircraft carrying the head of State or distinguished visitors of State
- Aircraft carrying a patient who needs urgent medical treatment

Examples of messages requesting ATFM exemption follow:

- ABCD COMMAND CENTER, THIS IS FAA COMMAND CENTER…**REQUEST EXEMPTION FROM ATFM**…UAL123 IS CARRYING A PATIENT WHO NEEDS URGENT MEDICAL TREATMENT.
  UAL123…EXEMPTION APPROVED.
- FAA COMMAND CENTER, THIS IS ABCD COMMAND CENTER…**COORDINATION OF ATFM EXEMPTION**… UAL501A IS OPERATING SEARCH AND RESCUE MISSIONS.

3.5 **Information for the next coordination**: If it is possible and appropriate, the expected time of next coordination will be forwarded with the ATFM messages:

- I WILL CALL YOU AT 0400 UTC FOR FURTHER COORDINATION
- WE WILL CALL YOU AGAIN IN 30 MINUTES

An example of a message with information for the next coordination follows:

- ABCD COMMAND CENTER, THIS IS FAA COMMAND CENTER… REQUIRE 30 MINUTES IN TRAIL REGARDLESS OF ALTITUDE FOR ALL AIRCRAFT ON PACOTS TRACK 8 FROM 1000 UTC UNTIL FURTHER NOTICE DUE TO MILITARY ACTIVITY. I WILL CALL YOU AGAIN IN 60 MINUTES.

3.6 **Amendment:** The amendment of an ATFM message should be structured as the initial message and include similar elements but with additional modifiers. These modifiers may include:

- CHANGE
- AMEND
- REDUCE
- INCREASE
- DECREASE

3.7 Amendment messages should also identify which message is being amended, as several restrictions could be in place at one time. Examples of ATFM amendment messages follow:

- FAA COMMAND CENTER, THIS IS ABCD COMMAND CENTER…WE HAVE **CHANGED** THE RESTRICTION ON TRAFFIC FLYING PACOTS TRACKS CHARLIE, ECHO AND FOXTROT FOR XYZ AIRPORT. WE NOW NEED 20 MINUTES IN TRAIL AT THE SAME FLIGHT LEVEL ON PACOTS TRACKS CHARLIE, ECHO AND FOXTROT FOR TRAFFIC LANDING XYZ AIRPORT FROM NOW UNTIL 0900 UTC.
- ABCD COMMAND CENTER, THIS IS FAA COMMAND CENTER…WE HAVE **INCREASED** THE INBOUND RATE FROM 5 AIRCRAFT PER HOUR TO 10 AIRCRAFT PER HOUR FOR TRAFFIC BEYOND OAKLAND FIR UNTIL FURTHER NOTICE.

3.8 **Cancellation**: The cancellation of an ATFM message should be structured the same as the initial message and include similar elements but also contain a canceling word or phrase. It is normally not necessary to state the reason for the cancellation. A canceling word or phrase may include:

- CANCEL
- RESUME
- RESUME NORMAL
- RELEASE

3.9 Cancellation messages should also identify which message is being cancelled, as several restrictions could be in place at one time. An example of an ATFM cancellation message follows:

- FAA COMMAND CENTER, this is ABCD COMMAND CENTER…**CANCEL** the restriction on traffic beyond the XYZ FIR at this time. **Resume normal** traffic flow.

4. Abbreviations

4.1 The abbreviations used by the ATCSCC and other Command Centers that are not defined in the ICAO Doc. 8400 (PANS-ABC), are shown in the Attachment. The shaded abbreviations are considered to be the common terms between the two centers.

Attachment

DESCRIPTION OF AIR TRAFFIC FLOW MANAGEMENT INITIATIVES

The following list is not all-inclusive and does not preclude the innovation and application of other procedures that will result in improved service.

Name	Description
Airborne holding	Planned holding of aircraft may be utilized. This is normally done when the operating environment supports holding and the weather conditions are expected to improve shortly; this ensures aircraft are available to fill the capacity at the airport.
Altitude	Utilized to segregate different flows of traffic, or to distribute the number of aircraft requesting access to a specified geographic region. **a. Capping**: Term to indicate aircraft will be cleared to an altitude lower than their requested altitude until they are clear of a particular airspace. Capping may apply to the initial segment of the flight or for the entire flight. **b. Tunneling**: Term to indicate traffic will be descended prior to the normal descent point at the arrival airport to remain clear of an airspace situation; e.g., holding.
Fix balancing	Assigning an aircraft a fix other than that in the filed flight plan in the arrival or departure phase of flight to equitably distribute demand.
Ground delay programs (GDP)	Aircraft are held on the ground in order prior to departure to manage capacity and demand at a specific location, by assigning arrival slots. The purpose of the program is to limit airborne holding.
Ground stops (GS)	GS is a process that requires aircraft that meet specific criteria to remain on the ground. Since this is one of the most restrictive methods of traffic management, alternative initiatives should be explored and implemented if appropriate. GSs should be used: **a.** In severely reduced capacity situations (below most user arrival minimums, airport/runway closed for snow removal, or aircraft accidents/incidents); **b**. To preclude extended periods of airborne holding; **c**. To preclude sector/center reaching near saturation levels or airport grid lock; **d**. In the event a facility is unable or partially unable to provide ATC services due to unforeseen circumstances; and **e**. When routings are unavailable due to severe weather or catastrophic events.
Miles-in-trail (MIT)	The number of miles required between aircraft that meet a specific criteria. The criteria may be separation, airport, fix, altitude, sector, or route specific. MIT are used to apportion traffic into manageable flows, as well as to provide space for additional traffic (merging or departing) to enter the flow of traffic.
Minutes-in-trail (MINIT)	The number of minutes required between successive aircraft. It is normally used in a non-radar environment, or when transitioning to a non-radar environment, or when additional spacing is required due to aircraft deviating around weather.
Reroutes	Reroutes are ATC routings other than the filed flight plan. They are issued to: **a.** Ensure aircraft operate with the “flow” of traffic. **b.** Remain clear of special use airspace. **c.** Avoid congested airspace. **d.** Avoid areas of known weather where aircraft are deviating or refusing to fly.

Name	Description
Sequencing programs	These programs are designed to achieve a specified interval between aircraft; they may be software generated or determined by ATFM personnel. Different types of programs accommodate different phases of flight. **1. Departure Sequencing Program (DSP)** - Assigns a departure time to achieve a constant flow of traffic over a common point. Normally, this involves departures from multiple airports. **2. En route Sequencing Program (ESP)** - Assigns a departure time that will facilitate integration in the en route stream. **3. Arrival Sequencing Program (ASP)** - Assigns fix crossing times to aircraft destined to the same airport.

TABLE OF ABBREVIATIONS

The abbreviations listed here are those used by ATCSCC and other Command Centers that are not defined in the ICAO Doc. 8400 (PANS-ABC). The shaded abbreviations are considered to be the common terms between the two centers. The asterisk shows verbatim difference in the original collocation but the abbreviation still indicates the common object.

	ATCSCC	Other Command Centers
AAR	Airport Acceptance Rate	
ACID	Aircraft Identification	
ADL	Aggregate Demand List	
ADR	Airport Departure Rate	
ADZY	Advisory	
AIM	Aeronautical Information Manual	
ALTRV	Altitude Reservation	Altitude Reservation
ANP	Air Navigation Plan	
AOA	Office of the Administrator	
AOC	Airline Operations Center	
AP	Air Patrol	
APREQ	Approval Request	Approval Request
APVL	Approval	Approval
ARINC	Aeronautical Radio Incorporated	
ARO	Airport Reservation Office	
ARTCC	Air Route Traffic Control Center	Air Route Traffic Control Center
ARU	Airspace Reservation Unit (Canada)	
ASM		Airspace Management
AT	Air Traffic	
ATCSCC	Air Traffic Control System Command Center	Air Traffic Control System Command Center
ATMC	Air Traffic Management Center	Air Traffic Management Center
ATMetC		Air Traffic Meteorological Center
ATO	Air Traffic Operations Program	

	ATCSCC	Other Command Centers
AUTODIN	Automatic Digital Network	
CARF	Central Altitude Reservation Function	
CCFP	Collaborative Collective Forecast Product	
CCWSU	Command Center Weather Service Unit	
CDM	Collaborative Decision Making	Collaborative Decision Making
CDR	Coded Departure Route(s)	Conditional Route
CDR	Continuous Data Recording	
CDT	Controlled Departure Time	
CFR	Code of Federal Regulations (formerly FAR)	
CIWS	Corridor Integrated Weather System	
COMSEC	Communications Security System	
CR	Collaborative Routing	
CT	Select Flights Ground Delay Program	
CTA	Controlled Time of Arrival	
CTAS-TMA	Center TRACON Automation System Traffic Management Advisor	
CVRS	Computerized Voice Reservation System	
CWA	Central Weather Advisory	
CWSU	Center Weather Service Unit	
DARC	Direct Access Radar Channel	
DCCWU	ATCSCC Weather Unit	
DOTS	Dynamic Ocean Track System	Dynamic Ocean Track System
DP	Departure Procedure	
DSP	Departure Sequencing Program	
EDCT	Expected Departure Clearance Time	Expected Departure Clearance Time
EFAS	Enroute Flight Advisory Service	
EFTO	Encrypt For Transmission Only	
EOF	Emergency Operations Facility	
EOR	Emergency Operations Room	
EPS	Engineered Performance Standards	
ESCAT	Emergency Security Control of Air Traffic	
ETE	Estimated Time Enroute	Estimated Time Enroute
ETMS	Enhanced Traffic Management System	
EUCARF	European Central Altitude Reservation Facility	
FA	General Ground Delay Program	
FAA	Federal Aviation Administration	Federal Aviation Administration
FADT	Fuel Advisory Delay Time	
FCA	Flow Constrained Area	

	ATCSCC	Other Command Centers
FDMS		Flight Data Management System
FDPS		Flight Data Processing Section
FEA	Flow Evaluation Area	
FP	Flight Plan	
FPL	Full Performance Level	
GA	General Aviation	
GAAP	General Aviation Airport Program	
GDP	Ground Delay Program	
GS	Ground Stop	
HARS	High Altitude Route System	
HDTA	High Density Traffic Airport	
IFCN	Interfacility Communication Network	
IFPFP	Individual Flight Plan From this Point	Individual Flight Plan From this Point
IFSS	International Flight Service Station	
INATS	Interruption of Air Traffic Service	
JCAB	Japan Civil Aviation Bureau	Japan Civil Aviation Bureau
LAA	Local Airport Advisory	
LADP	Local Airport Deicing Plan	
LOA	Letter of Agreement	Letter of Agreement
MAP	Monitor Alert Parameter	
MARSA	Military Assumes Responsibility for Separation of Aircraft	Military Assumes Responsibility for Separation of Aircraft
MEL	Minimum Equipment List	
MINIT	Minutes in Trail	
MIT	Miles in Trail	
MOS	Military Operations Specialist	
MTSAT	Multi-functional Transport Satellite	Multi-functional Transport Satellite
MVFR	Marginal Visual Flight Rules	
NADIN	National Airspace Data Interchange Network	
NAS	National Airspace System	
NAVAID*	Navigational Aid	Navigation Aid
NFDC	National Flight Data Center	
NMCC	National Maintenance Coordination Center	
NOAA	National Oceanic and Atmospheric Administration	
NOM	National Operations Manager	
NOPAC	North Pacific	North Pacific
NOS	National Oceanographic Service	
NRP	National Route Program	

	ATCSCC	Other Command Centers
NTMO	National Traffic Management Officer	
NWS	National Weather Service	
OAG	Official Airline Guide	
ODP		Oceanic Air Traffic Control Data Processing System
OPSNET	Operations Network	
OTG		Oceanic Track Generator
OTR		Oceanic Transition Route
PACMARF*	Pacific Military Altitude Reservation Facility	Pacific Military Altitude Reservation Function
PACOTS	Pacific Organized Track System	Pacific Organized Track System
PMTC	Pacific Missile Test Center	
PO	Plan of Operation	
Pref Route	Preferential Route	
PT	Planning Team	
RA	Route Advisory	
RAA	Remote Airport Advisory	
ROT	Runway Occupancy Time	
SAA	Special Activity Airspace	
SOP	Standard Operating Procedure	
STMP	Special Traffic Management Program	
SUA	Special Use Airspace	
SVRW	Severe Weather	
SWAP	Severe Weather Avoidance Program	
TEC	Tower-Enroute Control	
TELCON	Telephone Conference	
TFM	Traffic Flow Management	
TIS	Traffic Information System	
TMC	Traffic Management Coordinator	Traffic Management Coordinator
TMCIC	Traffic Management Coordinator in Charge	
TMI	Traffic Management Initiative	
TMU	Traffic Management Unit	Traffic Management Unit
TSTM	Thunderstorm	
WSO	Weather Service Office	

DOCUMENT CHANGE RECORD

The following table records the complete history of the successive versions of the present document.

Version Number	Date	Reason for Change	Pages Affected
1.0	12-05-08	Creation	All
1.1	xx-xx-0x	General Amendment	xx

Status: Draft

Version No: 1.0 Date: 12 May 2008

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APPENDIX D

SURVEILLANCE DATA EXCHANGE AND SHARING IN THE NAM/CAR REGION

During the NACC/WG/2 Meeting the coverage of current radar systems operating in the Region were presented to the Meeting. The Meeting was also informed of the radar data sharing activities carried out by States/Territories/International Organizations:

- Mexico and COCESNA have subscribed a technical co-operation agreement for radar data exchange, particularly of their Belize and Cancun radar systems. Likewise, information was received on coordination carried out between Cayman Islands and COCESNA on radar data sharing as part of the existing co-operation agreement between both Administrations.
- Data sharing between Bahamas, Bermuda, Canada and United States.
- Radar data exchange in Central America among the States and COCESNA: Niktun (Guatemala) radar, Managua and Bluefields (Nicaragua) radar, Monte Crudo (Honduras) radar and Mata de Caña (Costa Rica) radar, as well as radar data sharing for operational use (Radar data of Monte Crudo at the Toncontin airport in Honduras and radar data of Mata de Caña at the Juan Santa Maria airport in Costa Rica).
- Radar data sharing between COCESNA and Cayman Islands, as well as between COCESNA (Puerto Cabezas radar) and Panama.
- The beginning of a project for the exchange of radar data between Cuba, Jamaica and COCESNA.
- Coordination for radar data exchange between Trinidad and Tobago and French Antilles and Barbados.
- The modernization of the radar system installed in San Jose, Costa Rica.

The NACC/WG/2 Meeting noted the considerations for exchange and sharing of surveillance data, such as the operational considerations for ADS-B data (**Attachment** to this Appendix), a generic sample of Letter of Agreement and the current evolution status of the ASTERIX protocol, administered by EUROCONTROL, including categories for handling both radar data and ADS-B and multilateration data. Likewise, the Meeting noted the existence of communication means and capabilities for this radar data exchange through the digital networks in the Region.

ADS-B Data Sharing

The Meeting was informed that other regions have had the experience of surveillance data sharing both of radar data and ADS-B data, which is the case of Australia and Singapore, who have developed a Letter of Agreement sample, and therefore it concurred its consideration for ADS-B related activities.

ATTACHMENT

OPERATIONAL CONSIDERATIONS

1. Part VII "Automatic Dependent Surveillance Broadcast," Chapter 4 of the *Manual of Air Traffic Services Data Link Applications* (Doc 9694) describes the considerations and procedures in a radar surveillance environment, in ADS-B and mixed surveillance, as well as ADS-B use and requirements for ATS surveillance in en route, terminal and airport environments:

a) The increased accuracy, the update rate and additional parameters available with ADS-B should result in the following benefits:
- improved services in airspace not having radar coverage;
- improved airspace utilization;
- improved conflict prediction and detection;
- improved airport surface movement, guidance, and control;
- improved runway incursion prevention; and
- improved automated conformance monitoring.

Some benefits can be realized even before full aircraft equipage.

b) An operating environment with ADS-B will enhance ATC surveillance in the following ways:
- in a mixed ADS-B/radar surveillance environment, ADS-B data will complement or supplement radar data; and
- ADS-B will extend surveillance services into non-radar airspace, such as low-altitude airspace, remote airspace and coastal waters.

At such time that an airspace is fully populated with aircraft equipped with ADS-B, ATS providers may evaluate the necessity of replacing or maintaining other ground-based surveillance equipment. First results could be obtained based on the trials strategy that have commenced in the CAR Region.

Agenda Item 3: Review of Deficiencies and Pending Conclusions/Decisions of the GREPECAS Mechanism in the ATM and SAR Fields

3.1 The Meeting took note that during the ASB/8 meeting the deficiencies in the different areas of air navigation were analyzed and recognized the efforts carried out by the CAR and SAM Regional Offices to completely revise the method for presenting "U," "A" and "B" deficiencies in one report format. To achieve this goal, the way to capture information for the GANDD was reformulated. As a consequence, the former "A," "B," "C" and "D" Appendices used to report unresolved GREPECAS deficiencies are reduced to one appendix and "Corrected Deficiencies" are retained and presented only for statistical purposes. In this sense, it formulated the following Draft Decision ASB/8/1 - *Standard Classification to Air Navigation Deficiencies*, where the secretary of GREPECAS is requested to study the feasibility of applying the new classification procedure for "U" type deficiencies to classification of "A" and "B" air navigation deficiencies and present the results of the analysis to ASB/9.

3.2 Also, the Meeting took note that the ASB/8 analyzed the new Procedures for Classifying and Addressing GREPECAS "U" Deficiencies in the air navigation field, were analyzed formulating Draft Conclusion ASB/8/2 - *Classification of "U" Deficiencies* and agreed that GREPECAS "U" type deficiencies be sent to States/Territories and International Organizations to carry out a risk analysis assessment for each "U" deficiency and determine the Risk Index for each deficiency according to the ICAO SMS methodology for risk assessment. The said Conclusion was approved under the "fast track" procedure.

3.3 The Meeting also took note that the ASB/8 meeting resolved that the application of "last resort action," as required by GREPECAS Conclusion 13/92, is under study and will be finalized after States/Territories and International Organizations reply to the requirements of Conclusion ASB/8/2.

3.4 Following Conclusion ASB 8/2 the ATM Committee requested to the States/Territories to carry out necessary arrangements with their respective National Coordinator to update the GREPECAS Air Navigation Deficiencies Database (GANDD) carry out a risk assessment of each "U" using the ICAO SMS methodology for the risk assessment. The procedure for the use of the GANDD is included in **Appendix A** to this part of the Report.

Review of outstanding Conclusions/Decisions of previous GREPECAS Meetings

3.5 In accordance with the GREPECAS Procedural Handbook, the Meeting reviewed the Conclusions and Decisions in order to update them and to eliminate any completed or superseded ones base on the progress achieved.

3.6 The result of the analysis of Conclusions/Decisions in the ATM and SAR fields is detailed in **Appendix B** to this part of the Report.

INTERNATIONAL CIVIL AVIATION ORGANIZATION

GREPECAS AIR NAVIGATION DEFICIENCIES DATABASE

GANDD

Version 2.0

USER'S GUIDE

December 2007

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INTERNATIONAL CIVIL AVIATION ORGANIZATION

GREPECAS AIR NAVIGATION DEFICIENCIES DATABASE

(GANDD)

Version 2

User's Guide

1. Background

1.1 This document has been prepared to assist "Focal Points" named by States, Territories and International Organizations with updating the GREPECAS Air Navigation Deficiencies Database (GANDD).

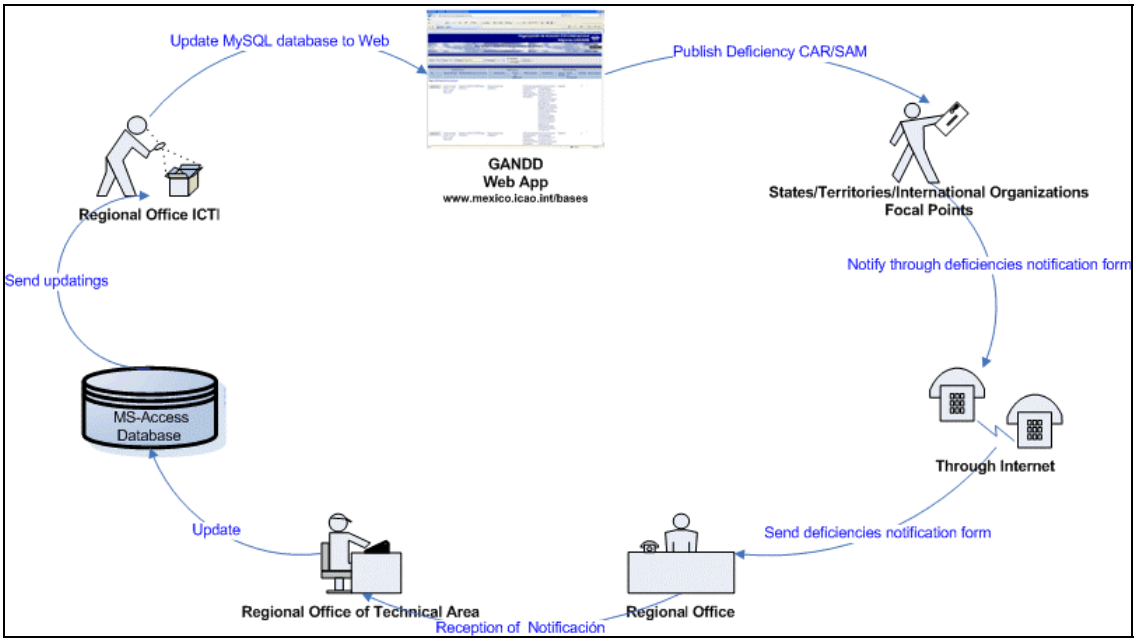
1.2 The second edition of the guidance material for using the database (http://www.mexico.icao.int/bases) in accordance with new "Procedures for the Treatment of the Solution of "U" Deficiencies in the Air Navigation Field," has been developed by the SAM and NACC Regional Offices, in response to GREPECAS/14, Decision 14/60.

2. Technical Requirements

2.1 Basic technical requirements are: a personal computer connected to the Internet, Pentium 4, 1Ghz, 5Gb of available hard disk space, 512Mb of main memory, preferably XP "Professional," Internet Explorer 6 or higher.

3. CAR/SAM Deficiencies Updating Diagram

3.1 The diagram below presents the flow of information, in order to serve as feedback to the GANDD. Actors involved are clearly identified in this process: GANDD Web App, States/Territories/International Organizations (Focal Points), Regional Offices, Regional Officers and ICT (Information and Communications Technology).



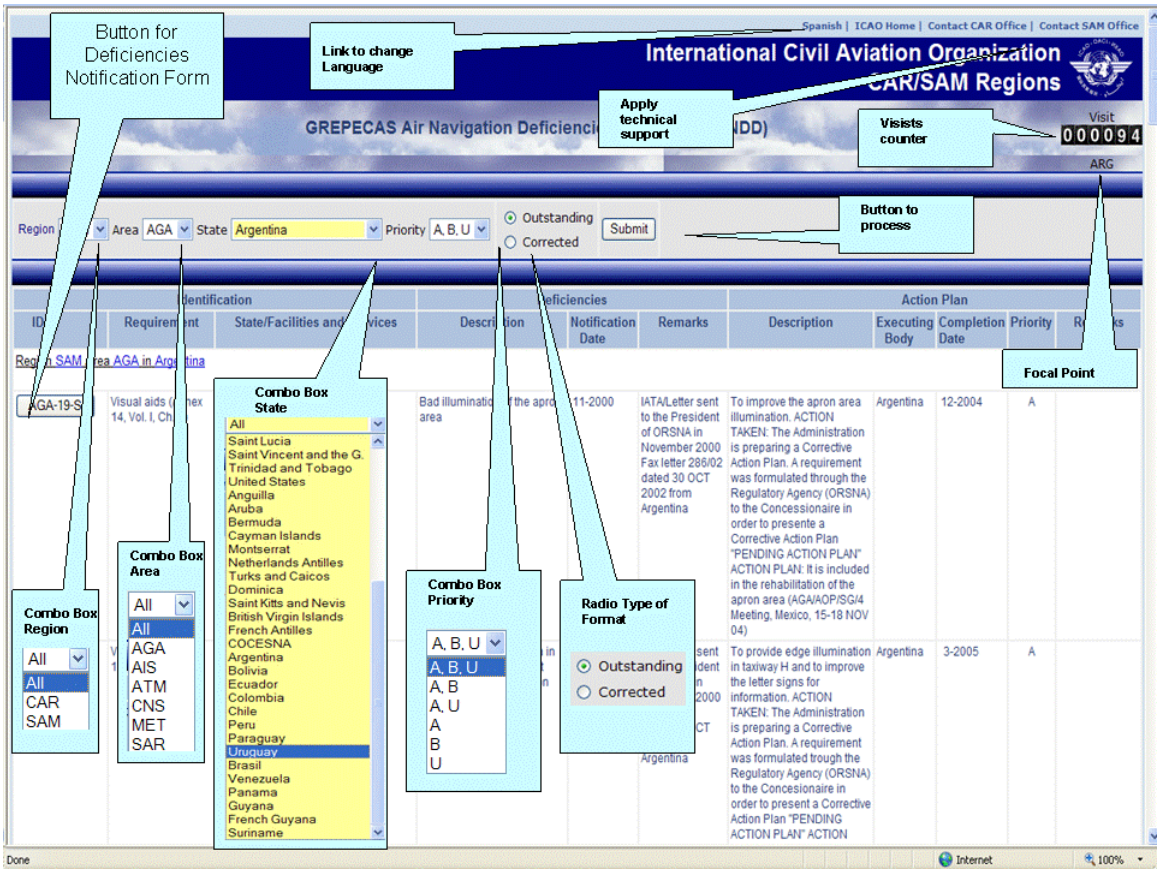
CHANGES TO THE DIAGRAM:

SHOULD IDENTIFY THE STARTING POINT
Add “Starting Point”

Published Deficiencies CAR/SAM (Publish Deficiency CAR/SAM
Receipt of Notification (Reception of Notification)
Regional Office Technical Area (Regional Office of Technical Area)
Send updated (Send updatings)
Update MySQL database in Web (Updated My SQL database to Web)

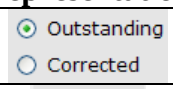
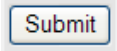
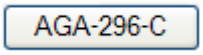
4. Description of the Main Web Form

4.1 The following figure shows the web form for queries to the GANDD. This form shall serve as main guidance for the Focal Point to view, select and report deficiencies.



4.2 In this same figure, the control types of the web form used in this interphase, are shown as follows:

Control type	Name	Graphical Representation	Purpose
Combo Box	Region	Region SAM	Select the Region
Combo Box	Area	Area AGA	Select the Area
Combo Box	State	State Argentina	Select the State
Combo Box	Priority	Priority A, B, U	Select the Priority

Control type	Name	Graphical Representation	Purpose
Radio	Type of query		Select the type of query for the deficiencies
Button	Present		Execute the selection criteria
Button	ID Area		Execute the deficiencies reporting form
Enlace	Language		Change the language of the interphase and results
Label	Visits counter		Shows number of visits to the GANDD Web App. (http://www.mexico.icao.int/bases)
Label	User		Identifies the user of the website.
Link	Request technical contact		Request technical support in the handling of GANDD Web App.

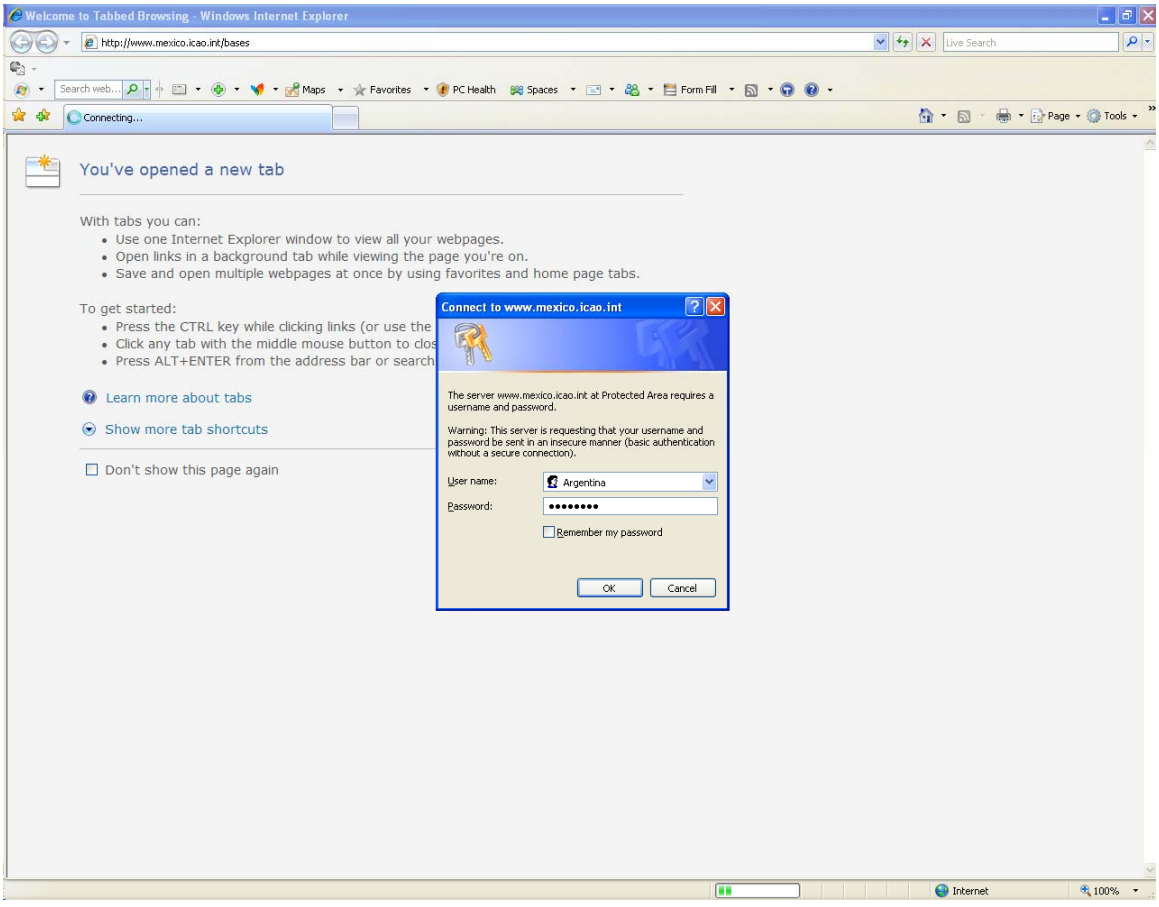
5. Procedure for Access to the GANDD Web Application

5.1 According to the Technical Requirements mentioned in item 2. for using the GANDD Web application, and in addition to State Letter LT 1/19-SA1185 dated 13 December 2004, where the name and password of the user are mentioned, (Username, Password), the Focal Point shall execute the following steps for initial access to the GANDD each time this tool is used.

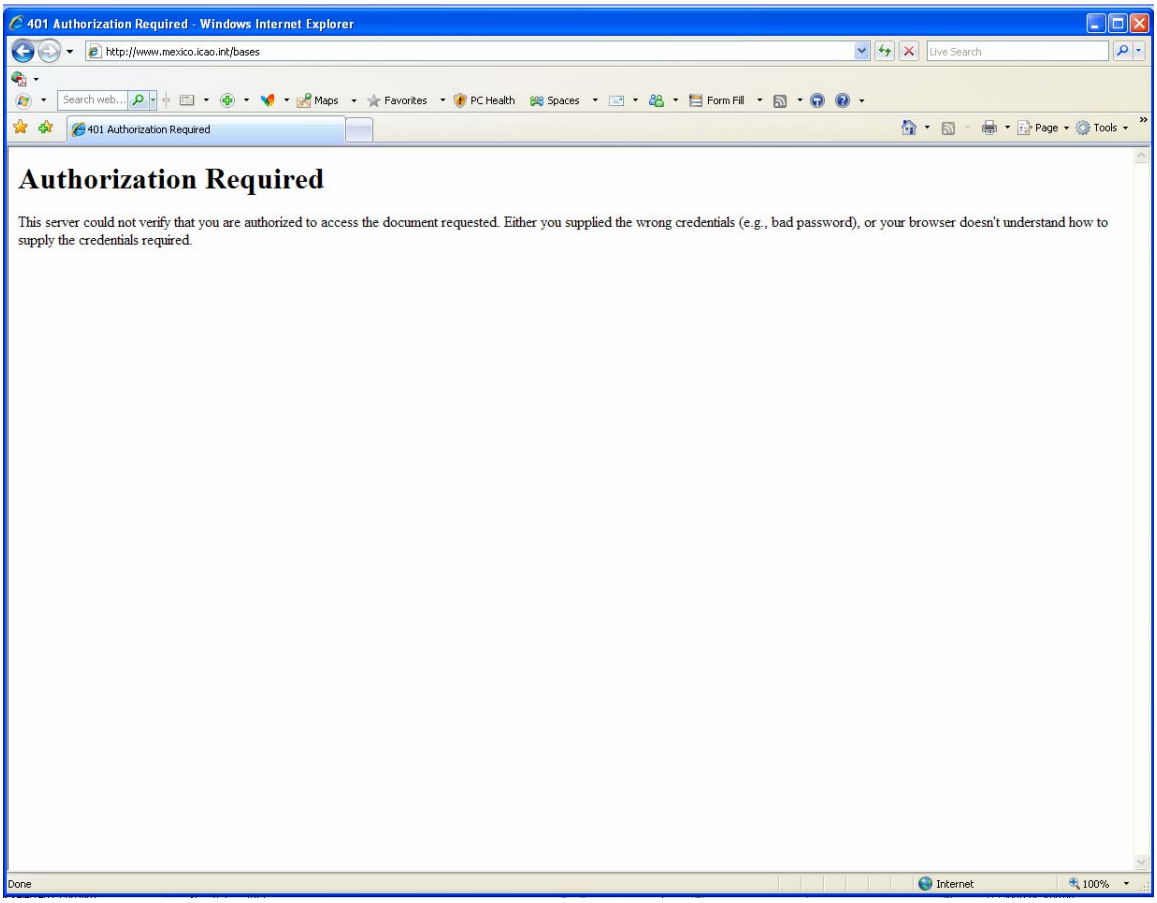
Note: the Username and Password are obtained by contacting the corresponding Regional Office.

5.2 Open a Microsoft Internet Explorer window (MS-IE) and enter the following URL address: http://www.mexico.icao.int/bases and press ENTER.

5.3 The MS-IE will request the "Username" and "Password" corresponding to the State, Territory or International Organization as indicated in the figure shown below with the example of the username: Argentina and corresponding Password:

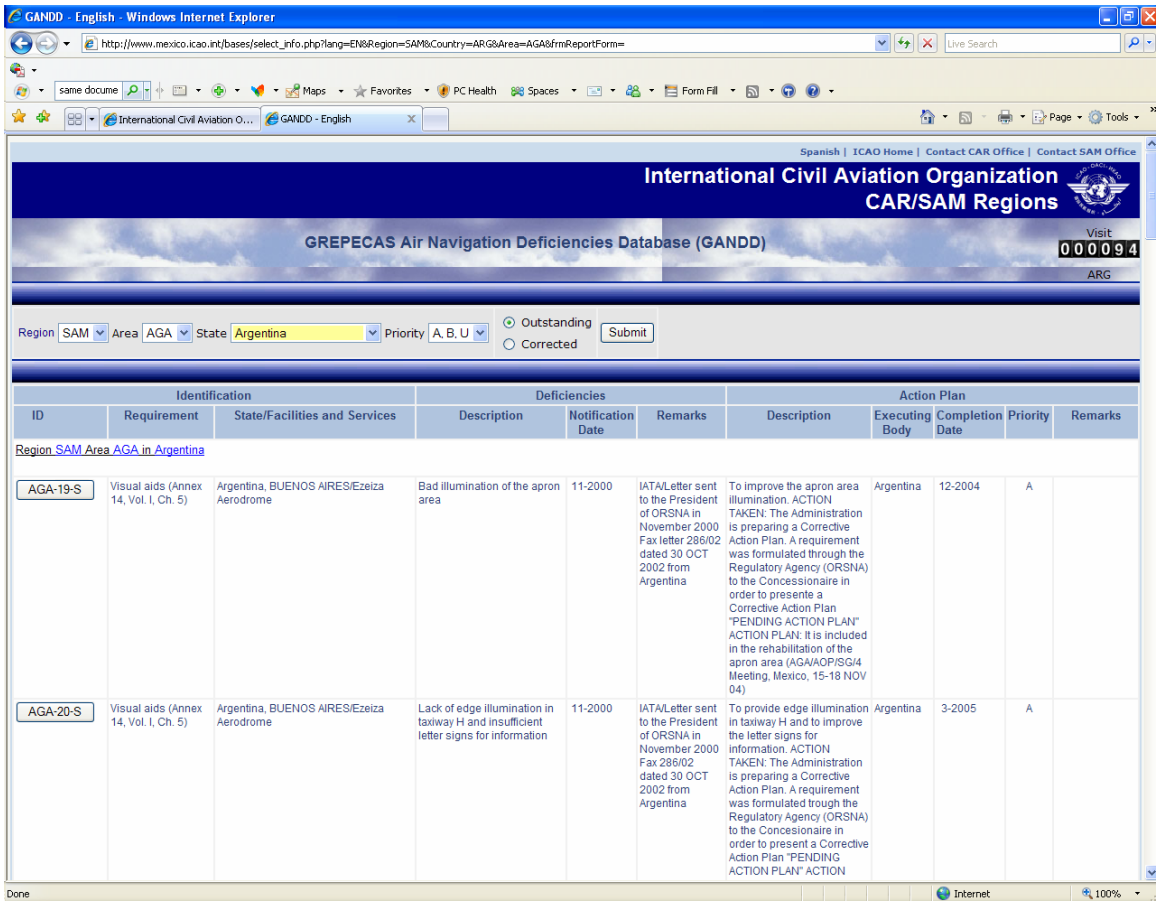


5.3.1 This process is termed “Authentication.” Once the Focal Point enters the correct data, the application will show the first results as depicted below. If the Focal Point does not enter the correct data, the MS-IE will show an error message as indicated in the following figure:



6. Procedure for the Selection of Query Criteria

6.1 Once authenticated with the procedure in item 5., the Focal Point shall obtain the Web form (for explanation, please refer to 4.1 and 4.2) shown below. Through this form, Focal Points will be able to view all CAR/SAM deficiencies.



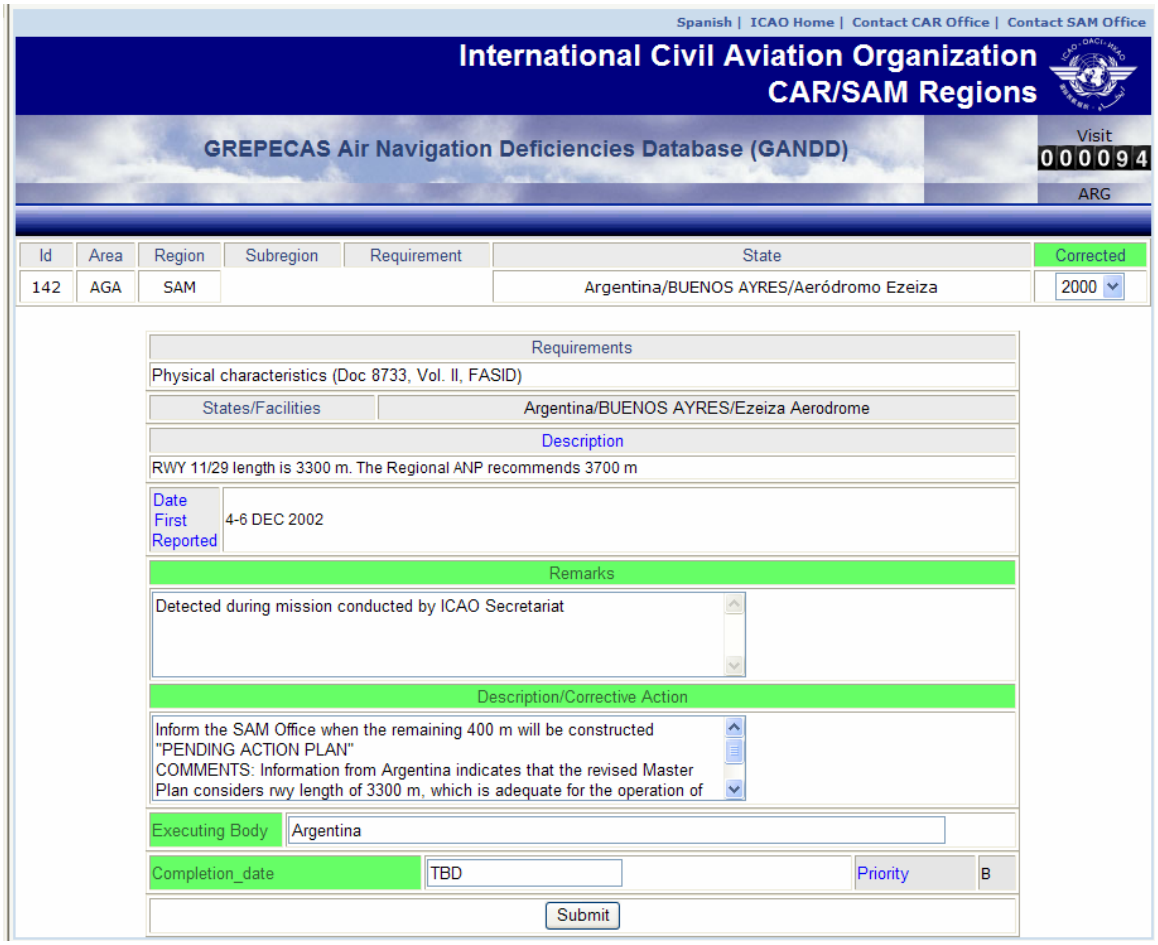
6.2 The Focal Point shall select with a “click” the corresponding information, making use of the Web controls listed in the table in 4.2. These controls are “combo box,” and “radio” to select and process.press the button “Submit.”

6.3 The combination of this selection criteria shall produce the visualization of the information requested. In item 9., some practical cases are shown.

6.4 International Organizations participating in the GREPECAS mechanism will also be able to view deficiencies.

7. Procedure for Reporting Changes to Deficiencies

7.1 In order to update deficiencies, the Focal Point shall use the deficiencies reporting form. Access by pressing the button which identifies (column ID) the deficiency with the nomenclature “Area-ID-Region” of the deficiency. In doing so, the following screen shall be displayed:



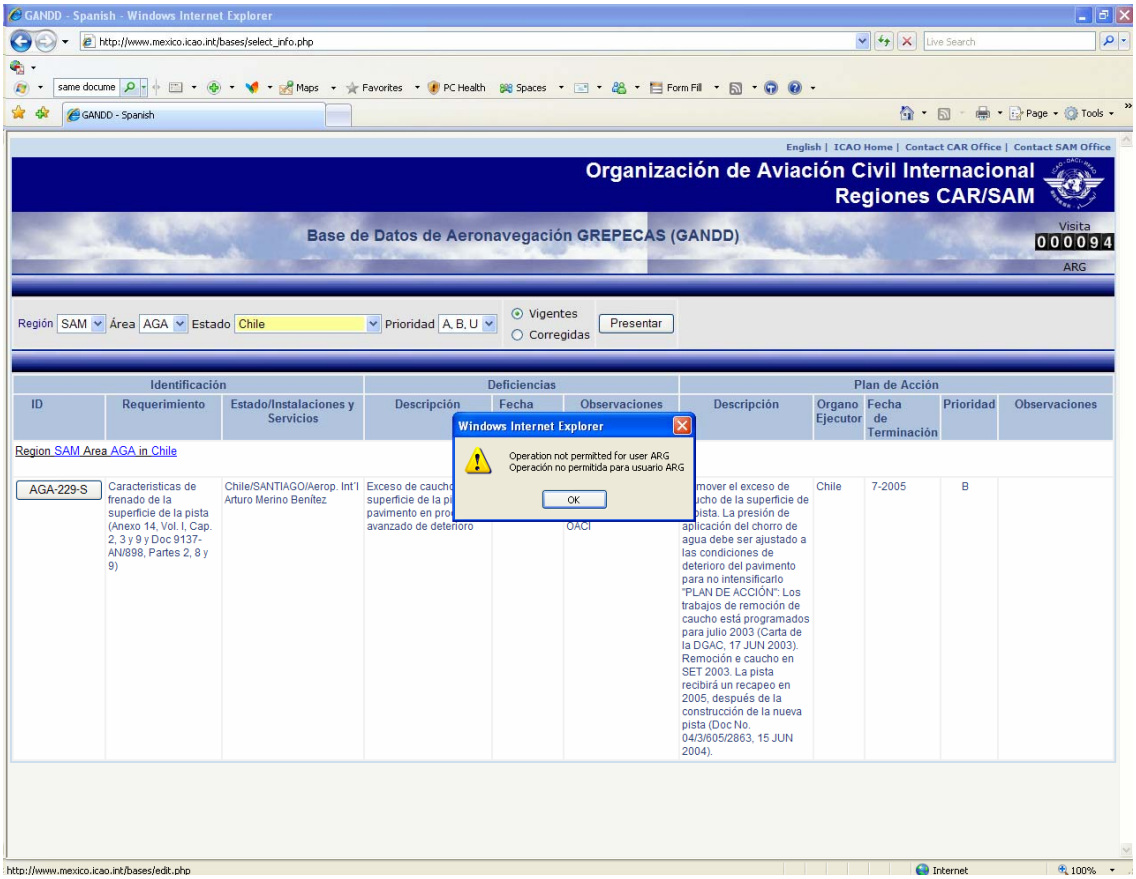
7.2 The Focal Point has access to the green fields depicted in the figure in 7.1, in order to report changes to deficiencies. These fields include "Corrected" to indicate the year in which the deficiency was corrected, "Remarks," "Description," "Executive Body" and "Completion Date" in the format month and year.

7.3 When changes in the fields are completed, the Focal Point shall submit the changes by clicking the "Submit" button. The Regional Office will receive the update as an e-mail, with a copy to the corresponding field (AGA, ATM, MET, CNS and SAR).

7.4 The Web form will finally show a message informing that the request is being processed as shown in the following figure below:

Your request has been processed. Thank you.

7.5 The button to report deficiency updates only operates with the deficiencies corresponding to the State in which the Focal Point has access. For example the focal point for Argentina will be able to see all CAR/SAM deficiencies, but will only be able to report those of Argentina. Otherwise, an error message will be received indicating that "the operation is not available" as shown in the following figure:



7.6 Through these changes, the State is able to report the Regional Offices with changes for updating deficiencies registered in the GANDD and is able to see them reflected in the documentation for revision by the GREPECAS mechanism meetings or other air navigation meetings.

8. Requesting Technical Support

8.1 The Focal Point will be able to request technical support by using the link shown in the upper right part of the form, as shown in figure in 4.1.

8.2 E-mail will be addressed to the ICT area of the corresponding Regional Office, to Messrs:

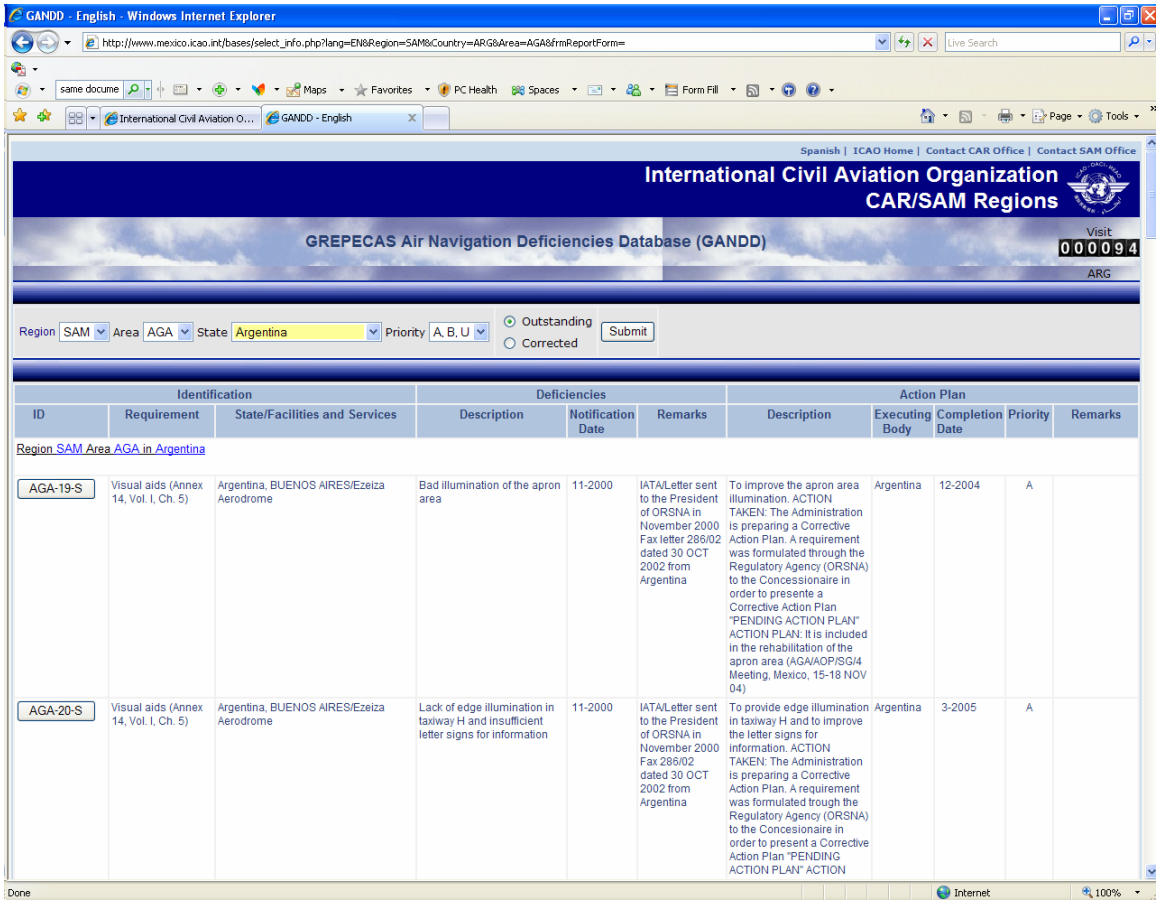
- Gabriel Meneses gmeneses@mexico.icao.int for the CAR Region.

- Arturo Martínez amartinez@lima.icao.int for the SAM Region.

9. Case Studies

9.1 Please note 4.1 and 4.2 for case selection of data criteria and reference.

9.2 Form for Outstanding Deficiencies for a Specific State and Area is shown below. State: Argentina, Area: AGA.



GANDD - English - Windows Internet Explorer

http://www.mexico.icao.int/bases/select_info.php?lang=EN&Region=SAM&Country=ARG&Area=AGA&frmReportForm=

Spanish | ICAO Home | Contact CAR Office | Contact SAM Office

International Civil Aviation Organization
CAR/SAM Regions

GREPECAS Air Navigation Deficiencies Database (GANDD)

Visit 000094

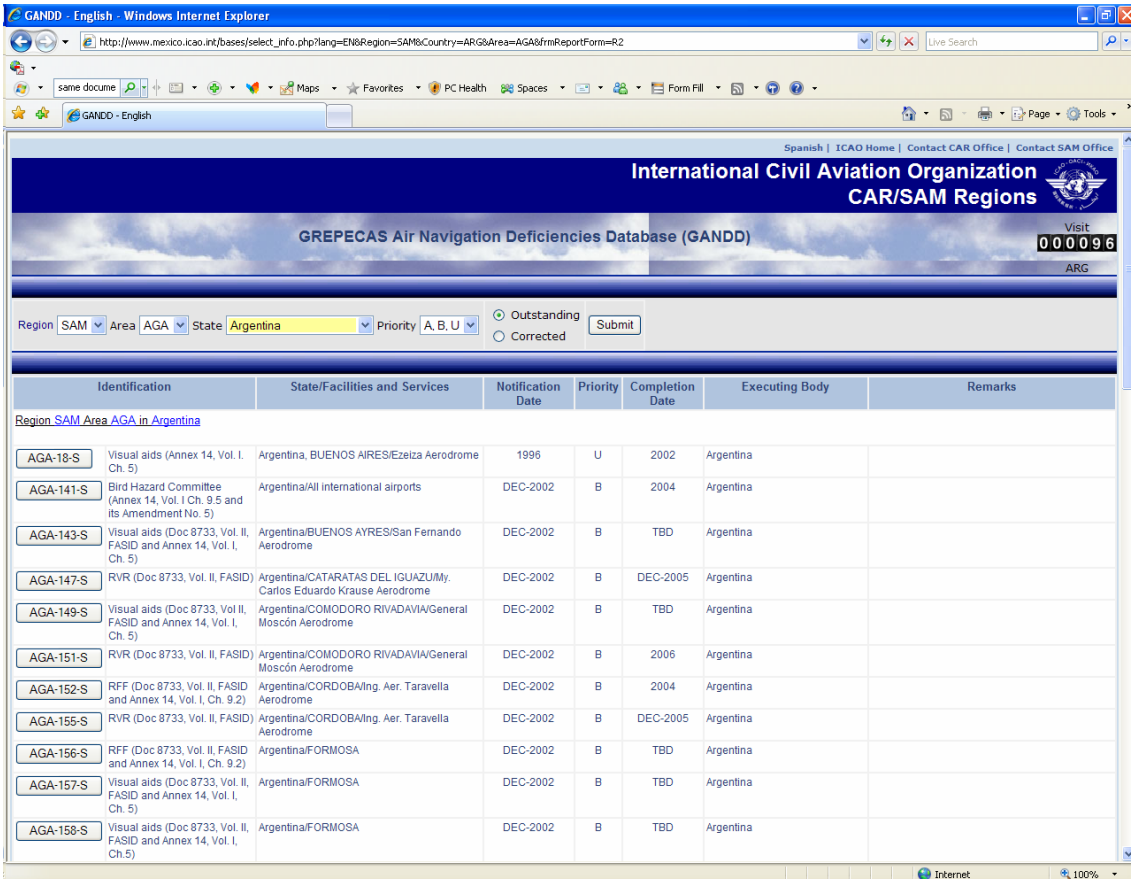
ARG

Region SAM Area AGA State Argentina Priority A, B, U Outstanding Corrected Submit

Identification			Deficiencies			Action Plan				
ID	Requirement	State/Facilities and Services	Description	Notification Date	Remarks	Description	Executing Body	Completion Date	Priority	Remarks
Region SAM Area AGA in Argentina										
AGA-19-S	Visual aids (Annex 14, Vol. I, Ch. 5)	Argentina, BUENOS AIRES/Ezeiza Aerodrome	Bad illumination of the apron area	11-2000	IATA/Letter sent to the President of ORSNA in November 2000 Fax letter 286/02 dated 30 OCT 2002 from Argentina	To improve the apron area illumination. ACTION TAKEN: The Administration is preparing a Corrective Action Plan. A requirement was formulated through the Regulatory Agency (ORSNA) to the Concessionaire in order to presente a Corrective Action Plan "PENDING ACTION PLAN" ACTION PLAN: It is included in the rehabilitation of the apron area (AGA/AOP/SG/4 Meeting, Mexico, 15-18 NOV 04)	Argentina	12-2004	A	
AGA-20-S	Visual aids (Annex 14, Vol. I, Ch. 5)	Argentina, BUENOS AIRES/Ezeiza Aerodrome	Lack of edge illumination in taxiway H and insufficient letter signs for information	11-2000	IATA/Letter sent to the President of ORSNA in November 2000 Fax 286/02 dated 30 OCT 2002 from Argentina	To provide edge illumination in taxiway H and to improve the letter signs for information. ACTION TAKEN: The Administration is preparing a Corrective Action Plan. A requirement was formulated trough the Regulatory Agency (ORSNA) to the Concesionaire in order to present a Corrective Action Plan "PENDING ACTION PLAN" ACTION	Argentina	3-2005	A	

Done Internet 100%

9.3 Form for Corrected Deficiencies for a Specific State and Area is shown below. State: Argentina, Area: AGA.



GANDD - English - Windows Internet Explorer

http://www.mexico.icao.int/bases/select_info.php?lang=EN&Region=SAM&Country=ARG&Area=AGA&frmReportForm=R2

Spanish | ICAO Home | Contact CAR Office | Contact SAM Office

International Civil Aviation Organization
CAR/SAM Regions

GREPECAS Air Navigation Deficiencies Database (GANDD)

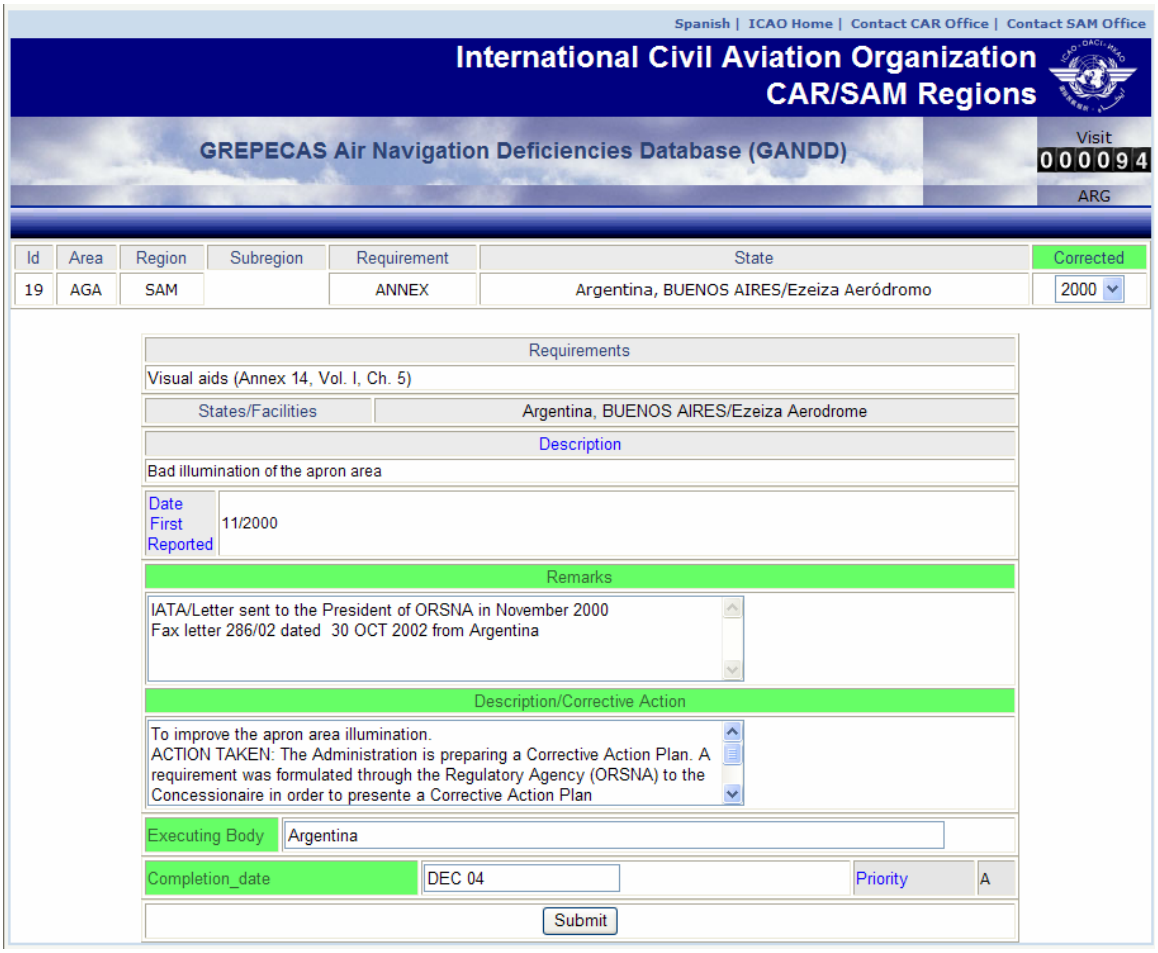
Visit 000096 ARG

Region SAM Area AGA State Argentina Priority A, B, U — Outstanding / Corrected — Submit

Identification		State/Facilities and Services	Notification Date	Priority	Completion Date	Executing Body	Remarks
Region SAM Area AGA in Argentina							
AGA-18-S	Visual aids (Annex 14, Vol. I. Ch. 5)	Argentina, BUENOS AIRES/Ezeiza Aerodrome	1996	U	2002	Argentina	
AGA-141-S	Bird Hazard Committee (Annex 14, Vol. I Ch. 9.5 and its Amendment No. 5)	Argentina/All international airports	DEC-2002	B	2004	Argentina	
AGA-143-S	Visual aids (Doc 8733, Vol. II, FASID and Annex 14, Vol. I, Ch. 5)	Argentina/BUENOS AYRES/San Fernando Aerodrome	DEC-2002	B	TBD	Argentina	
AGA-147-S	RVR (Doc 8733, Vol. II, FASID)	Argentina/CATARATAS DEL IGUAZU/My. Carlos Eduardo Krause Aerodrome	DEC-2002	B	DEC-2005	Argentina	
AGA-149-S	Visual aids (Doc 8733, Vol II, FASID and Annex 14, Vol. I, Ch. 5)	Argentina/COMODORO RIVADAVIA/General Moscón Aerodrome	DEC-2002	B	TBD	Argentina	
AGA-151-S	RVR (Doc 8733, Vol. II, FASID)	Argentina/COMODORO RIVADAVIA/General Moscón Aerodrome	DEC-2002	B	2006	Argentina	
AGA-152-S	RFF (Doc 8733, Vol. II, FASID and Annex 14, Vol. I, Ch. 9.2)	Argentina/CORDOBA/Ing. Aer. Taravella Aerodrome	DEC-2002	B	2004	Argentina	
AGA-155-S	RVR (Doc 8733, Vol. II, FASID)	Argentina/CORDOBA/Ing. Aer. Taravella Aerodrome	DEC-2002	B	DEC-2005	Argentina	
AGA-156-S	RFF (Doc 8733, Vol. II, FASID and Annex 14, Vol. I, Ch. 9.2)	Argentina/FORMOSA	DEC-2002	B	TBD	Argentina	
AGA-157-S	Visual aids (Doc 8733, Vol. II, FASID and Annex 14, Vol. I, Ch. 5)	Argentina/FORMOSA	DEC-2002	B	TBD	Argentina	
AGA-158-S	Visual aids (Doc 8733, Vol. II, FASID and Annex 14, Vol. I, Ch.5)	Argentina/FORMOSA	DEC-2002	B	TBD	Argentina	

Internet 100%

9.4 Form for reporting deficiencies.



Spanish | ICAO Home | Contact CAR Office | Contact SAM Office

International Civil Aviation Organization
CAR/SAM Regions

GREPECAS Air Navigation Deficiencies Database (GANDD)

Visit 000094

ARG

Id	Area	Region	Subregion	Requirement	State	Corrected
19	AGA	SAM		ANNEX	Argentina, BUENOS AIRES/Ezeiza Aeródromo	2000

Requirements	
Visual aids (Annex 14, Vol. I, Ch. 5)	
States/Facilities	Argentina, BUENOS AIRES/Ezeiza Aerodrome
Description	
Bad illumination of the apron area	
Date First Reported	11/2000
Remarks	
IATA/Letter sent to the President of ORSNA in November 2000 Fax letter 286/02 dated 30 OCT 2002 from Argentina	
Description/Corrective Action	
To improve the apron area illumination. ACTION TAKEN: The Administration is preparing a Corrective Action Plan. A requirement was formulated through the Regulatory Agency (ORSNA) to the Concessionaire in order to presente a Corrective Action Plan	
Executing Body	Argentina
Completion_date	DEC 04
Priority	A

Submit

APPENDIX B
ANALYSIS OF THE OUTSTANDING GREPECAS CONCLUSIONS/DECISIONS IN THE ATM/SAR FIELDS

CONCLUSION	ACTION FOR	COMMENTS AND FOLLOW-UP	STATUS
CONCLUSION 12/9 IMPLEMENTATION OF SIDs AND STARs That States/Territories/International Organizations implement standard arrivals and departures (SIDs and STARs) to link origin and destination aerodromes, as well as intermediate airports that make use of CAR/SAM RNAV routes.	States/International Organizations	SID and STARs required for connection with RNAV routes have been implemented in several airports. RNAV/GNSS course and basic courses with regional institutions have been coordinated. Superseded by GREPECAS Conclusion 14/46 and 14/51.	**Superseded**
CONCLUSION 12/10 USE OF REPORTING POINT AND ATS ROUTE DESIGNATORS That CAR/SAM Regions States/Territories/International Organizations: a) use only those designators for the identification of reporting points and ATS routes that have been assigned by the corresponding ICAO Regional Office; and b) when one or more designators for the identification of reporting points or ATS routes are deleted, the corresponding Regional Office should be informed, in order to re-incorporate them in the database, and be re-assigned in due time and fashion.	States/International Organizations and RO's	The preparation of an ICARD database at a worldwide level shall enable States to select five-letter name codes (5LNC) from the above mentioned and the intervention of the corresponding Regional Offices will be limited to the authorization, rejection and/or updating of such database.	**Completed**
CONCLUSION 12/31 REGIONAL STRATEGY FOR THE INTEGRATION OF ATM AUTOMATED SYSTEMS That, a) in view of a Regional Strategy for the integration of ATM automated systems, the CAR/SAM States/Territories/International Organizations: 1. Define an action plan, in coordination with ICAO NACC and SAM Regional Offices for the integration of ATM automated systems using the strategy described in **Appendix K** to this part of the Report; and 2. Submit to the ICAO NACC and SAM Regional Offices their Action Plan for the integration of ATM automated systems; and b) the RLA/98/003 Regional Project consider this strategy in the preparation of the guidance material as support to GREPECAS mechanism on this matter.	States/International Organizations	The CAR/SAM Regions have established a regional strategy for the integration of ATM automated systems in line with the strategy approved by GREPECAS.	**Completed**
CONCLUSION 12/32 ADS-B IMPLEMENTATION IN THE CAR/SAM REGIONS That the States/Territories/International Organizations of the CAR/SAM Regions that plan to implement ADS-B, coordinate with the ICAO NACC and SAM Regional Offices so as to ensure a harmonized implementation of this technology in the CAR/SAM Regions.	States/International Organizations	CAR/SAM Regions have established a surveillance systems implementation strategy which includes ADS-B implementation. Superseded by GREPECAS Conclusion 14/51	**Superseded**

CONCLUSION	ACTION FOR	COMMENTS AND FOLLOW-UP	STATUS
CONCLUSION 13/61 MEASURES TO REDUCE OPERATIONAL ERRORS IN THE ATC COORDINATION LOOP BETWEEN ADJACENT ACCs That, taking into account the impact that operational errors in the ATC coordination loop between adjacent ACCs have on safety, the CAR/SAM States/Territories/International Organizations agree: a) to adopt, as a matter of urgency, the appropriate measures described in **Appendix AI** to this part of the Report, in order to reduce LHDs caused by errors in ATC-unit-to-ATC-unit traffic coordination messages by at least 50% by **December 2005**, with a view to reaching the optimum operational efficiency; b) to continue with the efforts and programmes in order to reach 100% operational efficiency of their ATC coordination; and c) that ICAO coordinate, assist in, a follow-up the implementation of such remedial action and report the results of the effort to reduce this error to the 6th Meeting of the ATM Committee.	States/Territories and International Organizations	States/Territories and International Organizations continue to be encouraged to take appropriate measures in order to reduce operational errors. However, the optimum level has not been reached in the coordination cycle. Superseded by Draft Conclusion ATM/6/1	**Superseded**
CONCLUSION 13/66 NATIONAL PLANS FOR ATFM IMPLEMENTATION IN THE CAR/SAM REGIONS That, in order to achieve an integrated, harmonious and timely implementation, the CAR/SAM civil aviation administrations closely follow-up on the regional development of AFTM and, at the most convenient time, develop a national plan for ATFM implementation compatible with the Caribbean and South American Regions AFTM implementation programmes.	States/Territories and International Organizations	CAR and SAM States are developing their national plans. Superseded by GREPECAS Conclusion 14/51.	**Superseded**
CONCLUSION 13/68 ATM CONTINGENCY PLANS FOR THE CAR/SAM REGIONS That CAR/SAM States/Territories/International Organizations that have not yet done so: a) develop their ATM contingency plans for their airspace under their jurisdiction; b) establish bilateral or multi-lateral agreements with States/Territories/International Organizations responsible for the adjacent airspace, in coordination with the ICAO Regional Offices, in order to develop an ATM Contingency Plan, using the guidelines presented in **Appendix AO** to this part of the Report; and c(send to the corresponding ICAO Regional Office a copy of their ATM Contingency Plan by **30 June 2006.**	States/Territories and International Organizations	CAR/SAM States have prepared and harmonized their respective contingency plans and the pertinent information has been included in the corresponding catalogue.	**Completed**

CONCLUSION	ACTION FOR	COMMENTS AND FOLLOW-UP	STATUS
CONCLUSION 13/93 FOLLOW UP OF ATM DEFICIENCIES That ICAO, together with IATA, IFALPA and IFATCA, prepare a survey to follow-up and verify the status of the deficiencies related to aeronautical phraseology and the use of the English language in the CAR/SAM Regions.	States/Territories and International Organizations		**Completed**
CONCLUSION 14/4 SMS IMPLEMENTATION AND INSTRUCTOR TRAINING COURSES That the States, when planning SMS implementation: a) assign high priority to the implementation of these programmes; and b) when receiving training on safety management systems through the ICAO training programme, designate instructors to receive training courses with a view to the effective implementation of SMS in keeping with ICAO SARPS.	States	ICAO NACC and SAM Offices have provided SMS Courses and have trained instructors in most States.	**Completed**
CONCLUSION 14/45 TRAINING ON THE ANALYSIS OF LARGE HEIGHT DEVIATIONS (LHD) That in view of the need to have qualified experts for the activities of the Scrutiny Task Force (GTE), the CAR and SAM States/Territories/International Organizations: ***a) support training on the analysis of Large Height Deviations as part of regional activities;*** ***b) send technical experts to training sessions with a view to their regular participation in the GTE; and*** ***c) that ICAO take the necessary action to coordinate GTE training sessions in each Region.***	States/Territories and International Organizations	ICAO, with the support of the GTE, has carried out during 2007 a training course in each one of the Regions.	**Completed**
CONCLUSION 14/46 CAR/SAM ROADMAP FOR PBN That States/Territories/International Organizations adopt and apply the CAR/SAM PBN Roadmap shown in **Appendix W** to this part of the Report.	ICAO	States/Territories and International Organizations have adopted the CAR/SAM ROADMAP for PBN.	**Completed**
CONCLUSION 14/47 SAFETY ASSESSMENT SEMINARS AND METHODOLOGY That ICAO: a) promote seminars on safety assessment to train personnel for working in the future implementation of PBN; b) encourage the Separation and Airspace Safety Panel (SASP) to develop a common terminal area safety assessment methodology.	States/Territories and International Organizations	Target date for implementation: GREPECAS/15 Seminars and courses on safety assessment methodology have been held in both Regions.	**Completed**
CONCLUSION 14/48 ATFM OPERATIONAL AGREEMENTS That CAR/SAM States/Territories/International Organizations that so require and that have not yet done so, revise their bilateral operational agreements between ATS units by **30 November 2008,** to include demand/capacity balancing measures.	States/Territories and International Organizations	Target date for implementation: GREPECAS/16.	**Valid**

CONCLUSION	ACTION FOR	COMMENTS AND FOLLOW-UP	STATUS
CONCLUSION 14/49 ADOPTION OF THE CAR/SAM ATFM OPERATIONAL CONCEPT That CAR/SAM States/Territories and International Organizations: a) adopt the CAR/SAM ATFM Operational Concept (ATFM CONOPS) shown in **Appendix X** to this part of the Report; and b) establish a work programme for the implementation of the ATFM CONOPS.	States/Territories and International Organizations	CAR and SAM States/Territories and International Organizations have adopted ATFM CONOPS and have established an implementation strategy.	**Completed**
CONCLUSION 14/50 CATALOGUE OF CAR/SAM ATS CONTINGENCY PLANS That: a) the model Catalogue of CAR/SAM ATS Contingency Plans, shown in **Appendix Y** to this part of the Report be adopted; and b) CAR/SAM States/Territories/International Organizations forward updated information to ICAO by 1 July 2007, on the current status of their contingency plans, point of contact, and a general description of facilities and services guaranteeing continuity for inclusion in said document.	States/Territories and International Organizations	CAR/SAM States have finalized and incorporated essential points within the Contingency Plans Catalogue.	**Completed**
CONCLUSION 14/51 RE-ORGANIZATION OF WORK PROGRAMMES TO SUPPORT ATM PERFORMANCE OBJECTIVES FOR THE CAR/ SAM REGIONS That to support the transition from a system-based to a performance-based approach for the planning and implementation of air navigation infrastructure: a) CAR/SAM States/Territories/International Organizations take the necessary action to develop and implement national ATM work programmes in accordance with the performance objectives of the ATM Committee; and b) ICAO continue coordination of the re-organization of CAR/SAM ATM Work Programmes in accordance with the new Global Plan Initiatives (GPIs), and in support of ICAO Strategic Objectives.	States/Territories and International Organizations	Target date for implementation: GREPECAS/16 The work programme has been organized taking into account performance objectives and States have prepared ATM national work programmes according to the performance objectives of the ATM Committee.	**Valid**

Agenda Item 4: Issues Related to the Organization of Future Work of GREPECAS ATM Matters

4.1 Review the Terms of Reference and Work Programme of the ATM Committee and its Task Forces

4.1.1 The Meeting noted that ICAO Air Navigation Commission (ANC) Working Group on Regional Plans (WG/RPL) complimented GREPECAS on its initiative for developing ATM Performance objectives. In accordance with GREPECAS Conclusion 14/51 it was recalled that the dateline to finish reorganization of the ATM Committee work programme is end of 2009.

4.1.2 Considering the tasks assigned by GREPECAS to the ATM Committee, integrated in the ATM performance objectives of its work programme, a better harmonization in the implementation activities between the CAR/SAM Regions will be allowed. The planning horizon of the ATM performance objectives is focused on the strategies and tasks for two periods, one for less than 5 years (short-term) and another beyond 5 years but less than 10 years (medium-term). The progress and achievements of all related tasks included in the performance objectives will be reviewed and measured so as to ensure timely reports on the ATM regional work for GREPECAS, the ANC and ICAO Council.

4.1.3 The reorganization of the ATM work programme is consistent with the *Global Air Navigation Plan* (Doc 9750) and the ICAO vision as established in the *Global Air Traffic Management Operational Concept* (Doc 9854). Global Planning Initiatives (GPIs) were identified to support the tasks of the ATM performance objectives, for which it will be easy to quantify the cost/benefit relationship and therefore ensure the success of their implementation.

4.1.4 Including these ATM performance objectives as the work programme of the ATM Committee, will also allow dynamically amend the terms of reference and work programme of the Task Forces. The Terms of Reference and Work Programme of the ATM Committee and its Task Forces are included in **Appendix A** to this part of the report. The performance objectives were adopted as the ATM Committee work programme, in line with Draft Decision ATM/CNS/6/1 - *New CNS/ATM Subgroup*.

4.1.5 Note was taken that, in light of ATM/CNS/SG restructuring, the Meeting deemed appropriate that the Task Forces reviewed their own tasks considering the possibility of applying improvements to the work methodology and foster further coordination of the work through the use of teleconferences.

4.1.6 The Meeting noted the resignation as Chairman of Mr. Roberto Arca, and thanked him for his work during all the mandate.

4.2 Review the Future Work Plan of the ATM Committee

ATM System Perspectives

4.2.1 The Meeting recognized that metrics aspects such as indicators of overall ATM system performance look to achieve expectations of ATM community, and that the Performance Based Approach can be used to better meet those expectations as well as improving the performance of service providers. The identification of expectations with regards to the performance of flight operations, airspace/airport usage and air navigation services are:

- safety,
- security,
- environmental impact,
- cost effectiveness,
- capacity,
- flight efficiency,
- flexibility,
- predictability,
- access and equity,
- participation and collaboration,
- interoperability.

4.2.2 The evolution and enhancement of the ATM system will be directly related to the ATM community's ability to clearly define performance expectations, set a relevant performance framework, set achievable targets, and implement change cost-effectively, based on capabilities at any time along the planning horizon

4.2.3 The Meeting recognized that the achievable performance in expectations is made possible by:

- services and procedures,
- human resources,
- physical infrastructure
- systems and technology,

4.2.4 Since many of the practices and processes for the ATM system will continue through the planning horizon until 2025, the Manual on ATM System Requirements (Doc 9882) reflects the current reality and will allow identifying other requirements that will need a significant change to operating practices. The Meeting considered that this guidance will serve as guidance material so that the different Task Forces may define the implementation requirements. The requirements will be stable; that is, they should represent the fundamental characteristics/attributes required of the ATM system.

4.2.5 The ATM requirements, depicted in the **Appendix B** to this part of the report, is not intended to be exhaustive and is relatively small compared with other requirement sources envisioned in Doc 9854. These requirements should also be used by the States to develop implementation strategies and plans at regional and national level.

4.2.6 The performance requirements will support the ATM community in establishing a globally harmonized performance-based system, in accordance with the regional and national plans, and with Doc 9854. Each requirement is associated with the ATM components defined in Doc 9854.

Analysis of ICAO and GREPECAS Guidance on Global, Inter and Intra-Regional Air Navigation Activities

4.2.7 The Meeting recognized that the planning process will be facilitated by the use of planning tools, an air navigation planning electronic database, project management techniques and software and new report presentation methodologies.

4.2.8 The objective of these initiatives is to harmonise work programmes, improve report presentation processes and help ensuring the interoperability and transparency among the Regions, as well as to ensure the development and measurement of performance objectives.

4.2.9 It was recognized that, the strategies and the Action Plan represent a more effective planning of resources based on each Strategic Objective, and it means that the efforts of States and the Secretariat will focus more on resolving the main challenges through results-based planning and budget.

Performance Measurement

4.2.10 Performance-based approach require that when designing, planning, implementing and operating a global air navigation system, a performance measurement analysis is also to be recommended. In a follow-up action plan, while guarded against costly processes of data collection and analysis, performance measurement should focus on proactive results on the air navigation improvements and environmental benefits that result from work programmes.

4.2.11 The Meeting deemed appropriate that stakeholders participate to ensure specific results in relation to information sharing on economic and management performance. Implementations should include performance measurement in one of the following areas of safety, quality of service (such as capacity, delay and flight efficiency), productivity and cost-effectiveness.

4.2.12 To this end, simple and relevant indicators should be used to measure performance implementation. An example is RVSM implementation, which reduced fuel burn with economic benefits, but also resulted in the reduction of CO2 emissions on a regional and global basis.

APPENDIX A
TERMS OF REFERENCE AND WORK PROGRAMME OF THE ATM COMMITTEE

1. **Terms of reference**

a) To assist and guide CAR and SAM States/Territories/International Organizations in the implementation of ATS safety management programmes.

b) To identify, assess and address specific corrective actions to solve deficiencies in the ATM and SAR fields.

c) To study, analyse and propose measures that allow the improvement in the areas of Airspace Organization and Management (AOM), Air Traffic Services (ATS), Air Traffic Flow Management (ATFM), and Search and Rescue (SAR) in the CAR/SAM Regions, with a view to comply with ICAO strategic objectives, based on Global Plan Initiatives (GPI).

d) To promote and follow-up the implementation of the ATM and SAR requirements and keep updated the CAR/SAM Air Navigation Plan in accordance with the Global ATM operational concept (Doc 9854) and the Global Air Navigation Plan (Doc 9750);

e) To analyse guidance material and carry out permanent coordination with various GREPECAS Contributory Bodies in order to ensure implementation of collaborative tasks contributing to improve the CAR/SAM ANP.

2. Composition

Argentina, Barbados, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba**, Dominican Republic, Ecuador, France, Guatemala, Haiti, Jamaica, Mexico, Panama, Paraguay, Peru, Spain, Trinidad and Tobago, United States, Uruguay, Venezuela, ARINC, COCESNA, IATA, IFALPA, IFATCA and SITA.

3. *Chairperson: *Vacant*
**Vice-Chairman: Fidel Ara (Cuba)

4. Work Programme of the ATM Committee

CAR/SAM REGIONS PERFORMANCE OBJECTIVES

OPTIMIZE THE ATS ROUTE STRUCTURE EN-ROUTE AIRSPACE			
Benefits			
Environment **Efficiency**	• reductions in fuel consumption; • ability of aircraft to conduct flight more closely to preferred trajectories; • increase in airspace capacity; • facilitate the utilization of advanced technologies (e.g., FMS based arrivals) and ATC decision support tools (e.g., metering and sequencing), thereby increasing efficiency.		
Strategy ***(2008 - 2015)***			
TASK	**DESCRIPTION**	**START-END**	**STATUS**
AOM	***En-route airspace***		
	Develop regional action plan		
	Develop Airspace Concept based in CAR /SAM PBN Roadmap, in order 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		
	Develop performance measurement plan		
	Formulate safety plan		
	Establish collaborative decision making (CDM) process		
	Publish national regulations for aircraft and operators approval using PBN manual as guidance material		
	Identify training needs and develop corresponding guidelines		
	Formulate system performance monitoring plan monitor implementation progress in accordance with CAR/SAM PBN implementation roadmap and State implementation plan		
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.		

OPTIMIZE THE ATS ROUTE STRUCTURE IN TERMINAL AIRSPACE			
Benefits			
Environment **Efficiency**	• 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.		
Strategy ***(2008 - 2015)***			
TASK	**DESCRIPTION**	**START-END**	**STATUS**
AOM	***In terminal airspace***		
	Develop State PBN implementation plan		
	Develop Airspace Concept based in CAR /SAM PBN Roadmap, in order to design and implement 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 Basic-RNP12		
	Develop performance measurement plan		
	Formulate safety plan		
	Establish collaborative decision making (CDM) process		
	Publish national regulations for aircraft and operators approval using PBN manual as guidance material		
	Identify training needs and develop corresponding guidelines		
	Formulate system performance monitoring plan		
	develop a regional strategy and work programme for implementation of; and		
	monitor implementation progress in accordance with CAR/SAM PBN implementation roadmap and State implementation plan		
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.		

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**
	Develop State PBN implementation plan		
	Develop Airspace Concept based in CAR /SAM PBN Roadmap, in order to design and implement RNP APCH with Baro-VNAV in accordance with assembly resolution A36-23, and RNP AR APCH where beneficial		
	Develop performance measurement plan		
	Formulate safety plan		
	Establish collaborative decision making (CDM) process		
	Publish national regulations for aircraft and operators approval using PBN manual as guidance material		
	Identify training needs and develop corresponding guidelines		
	Formulate system performance monitoring plan		
	monitor implementation progress in accordance with CAR/SAM PBN implementation roadmap and State implementation plan		
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.		

ENHANCE CIVIL/MILITARY COORDINATION AND CO-OPERATION			
Benefits			
Efficiency	• increase airspace capacity;		
Continuity	• allow a more efficient ATS route structure • ensure safe and efficient action in the event of unlawful interference; • make available military restricted airspace more hours of the day so that aircraft can fly on their preferred trajectories; and • improve search and rescue services.		
Strategy (2008-2012)			
TASK	**DESCRIPTION**	**START-END**	**STATUS**
AOM	• develop guidance material on civil/military coordination and co-operation to be used by States/Territories to develop national policies, procedures and rules;		
	• establish civil/military coordination bodies;		
	• arrange for permanent liaison and close cooperation between civil ATS units and appropriate air defence units;		
	• conduct a regional review of special use airspace;		
	• develop a regional strategy and work programme for implementation of flexible use of airspace in a phased approach beginning with more dynamic sharing of restricted airspace while working towards full integration of civil and military aviation activities by **2012**; and		
	• monitor implementation progress		
References	GPI/1: flexible use of airspace.		

<table>
<tr><th colspan="4">ALIGN UPPER AIRSPACE CLASSIFICATION</th></tr>
<tr><th colspan="4">Benefits</th></tr>
<tr><td>Efficiency

Continuity</td><td colspan="3">• better utilization of data link communication;
• optimize use of flight plan data processing systems;
• enhance airspace management coordination, message exchange capabilities and utilization of flexible and dynamic airspace management techniques;
• harmonization of interregional coordination processes;
• improvement of airspace interoperability and seamlessness; and
• ensure the provision of positive air traffic control services to all aircraft operations.</td></tr>
<tr><td colspan="4">Strategy
(Target: 2008)</td></tr>
<tr><td>TASK</td><td>DESCRIPTION</td><td>START-END</td><td>STATUS</td></tr>
<tr><td rowspan="8">AOM</td><td>• Develop a regional implementation strategy and work programme for the implementation of ICAO Annex 11 airspace Class A above FL 195</td><td rowspan="8"></td><td rowspan="8"></td></tr>
<tr><td>• identify key stakeholders, ATCOs, pilots, and relevant international organisations for coordination and cooperation on changes for new airspace organization, using a CDM process;</td></tr>
<tr><td>• develop new national airspace organization in accordance with ICAO provisions, as needed;</td></tr>
<tr><td>• Coordinate changes for regional and national documents;
▪ Doc 8733, CAR/SAM ANP;
▪ AIP; and,
▪ ATS letters of agreement</td></tr>
<tr><td>• carry out improvements in ground systems to support new airspace organization configurations, as necessary;</td></tr>
<tr><td>• publish national regulatory material for implementation of new rules and procedures to reflect airspace organizational changes;</td></tr>
<tr><td>• train ATCOs and pilots in new procedures, including all civil and military airspace users, as required;</td></tr>
<tr><td>• monitor implementation progress.</td></tr>
<tr><td>References</td><td colspan="3">GPI/4: align upper airspace classification.</td></tr>
</table>

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IMPROVE DEMAND AND CAPACITY BALANCING			
Benefits			
Environment	• reduction in weather- and traffic-induced holding, leading to reduced fuel consumption and emissions;		
Efficiency	• improved and smoother traffic flows; • improved predictability; • improved management of excess demand for service in ATC sectors and aerodromes; • improved operational efficiency; • enhanced airport capacity; • enhanced airspace capacity; and		
Safety	• improved safety management.		
Strategy ***Near term (2008)***			
TASK	**DESCRIPTION**	**START-END**	**STATUS**
DCB	• identify key stakeholders (ATC service providers and users, military authorities, airport authorities, aircraft operators and relevant international organisations) for purposes of coordination and cooperation, using a CDM process;		
	• identify and analyse traffic flow problems and develop methods for improving efficiencies on a gradual basis, as needed, through enhancements in current: o airspace organization and management (AOM) and ATS routes structure (unidirectional routes) and SID and STARS, o communication, navigation and surveillance systems, o aerodrome capacity, o ATS capacity, o training for pilots and Controllers; and o ATS letters of agreement;		
	• define common elements of situational awareness between FMUs; o common traffic displays, o common weather displays (Internet), o communications (teleconferences, web), and o daily teleconference/messages methodology advisories;		
	• develop methods to establish demand/capacity forecasting;		
	• develop a regional strategy and work programme for harmonized implementation of ATFM service; and,		

Medium term (2010)			
	• develop a regional strategy for the implementation of flexible use of airspace (FUA); o assess use of airspace management processes; o improve current national airspace management to adjust dynamic changes in tactical stage to traffic flows; o introduce improvements in ground support systems and associated procedures for the extension of FUA with dynamic airspace management processes; o implement dynamic ATC sectorization in order to provide the best balance between demand and capacity to respond in real-time to changing situations in traffic flows, and to accommodate in short-term the preferred routes of users;		
	• define common electronic information and minimum databases required for decision support and alerting systems for interoperable situational awareness between Centralized ATFM units;		
	• develop regional procedures for efficient and optimum use of aerodrome and runway capacity;		
	• develop a regional ATFM procedural manual to manage demand/capacity balancing;		
	• develop a regional strategy and framework for the implementation of a Centralized ATFM unit;		
	• develop operational agreements between Centralized ATFM units for interregional demand/capacity balancing; and,		
	• monitor implementation progress.		
References	GPI/1: flexible use of airspace; GPI/6: air traffic flow management; GPI/7: dynamic and flexible ATS route management; GPI/9: Situational awareness; GPI/13: aerodrome design and management; GPI/14: runway operations; and GPI/16: decision support and alerting systems.		

IMPROVE ATM SITUATIONAL AWARENESS			
Benefits			
Efficiency	• enhanced traffic surveillance; • enhanced collaboration between flight crew and the ATM system; • improved collaborative decision-making through sharing electronic aeronautical data information; • reduced of workload for both pilots and controllers; • improved operational efficiency; • enhanced airspace capacity; • improved implementation on a cost-effective basis;		
Safety	• improved available electronic terrain and obstacle data in the cockpit; • reduced of the number of controlled flight into terrain related accidents; and • improved safety management.		
Strategy ***Near term (2010)***			
TASK	**DESCRIPTION**	**START-END**	**STATUS**
SDM	• identify parties concerned • identify the automation level required according to the ATM service provided in airspace and international aerodromes, assessing o operational architecture design, o characteristics and attributes for interoperability, o data bases and software, and o technical requirements;		
	• improve ATS interfacility communication		
	• implement flight plan data processing system and electronic transmission tools		
	• implement radar data sharing programs where benefits can be obtained		
	• develop situational awareness training programmes for pilots and controllers		
	• implement ATM surveillance systems for situational traffic information and associated procedures		
	• implement ATS automated message exchanges, as required o FPL, CPL, CNL, DLA, etc.		
	• implement automated radar handovers, where able;		
	• implement ground and air electronic warnings, as needed o Conflict prediction o Terrain proximity o MSAW o DAIW o Surveillance system for surface movement		
	• implement data link surveillance technologies and applications: ADS, CPDLC, AIDC, as required.		

Medium term (2015)			
	• implement additional/advanced automation support tools to increase sharing of aeronautical information o ETMS or similar o MET information o AIS/NOTAM dissemination o Surveillance tools to identify airspace sector constraints o A-SMGC in specific aerodromes, as required		
	• implement teleconferences with ATM stakeholders		
	• monitor implementation progress		
References	GPI/1: flexible use of airspace; GPI/6: air traffic flow management; and GPI/7: dynamic and flexible ATS route management; GPI/9: Situational awareness; GPI/13: aerodrome design and management; GPI/14: runway operations; and GPI/16: decision support and alerting systems; GPI/17: implementation of data link applications; GPI/18: aeronautical Information; GPI/19: meteorological systems.		

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TERMS OF REFERENCE AND WORK PROGRAMME OF THE ATM COMMITTEE TASK FORCES

TERMS OF REFERENCE AND WORK PROGRAMME OF THE PERFORMANCE-BASED NAVIGATION TASK FORCE (PBN/TF)

1. Terms of reference

Carry out specific studies and develop guidance material for RNAV/RNP implementation 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 (GPI 5, 7, 10, 11, 12, 20, 21).

2. Work Programme

a) Analyse the application of GNSS to support all flight phases.

b) Update the Action Plan for the Implementation of PBN for en-route operations, taking into account the CAR/SAM Regions Roadmap.

c) Develop the Action Plan tasks for the implementation of PBN for en-route operations.

d) Update the Action Plan Model for PBN Implementation in TMA.

e) Update the Action Plan Model for Approach PBN.

f) Develop training guidelines for the implementationof PBN in TMA and Approach including: cost/benefit analysis, safety assessment, air navigation procedures building, ATC simulations (real time and accelerated time), ATC automated systems, air traffic controllers training, aircraft and operators approval, Terminal Control Area design and management, AIC Model on GNSS application, etc.

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

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

i) Submit the developed PBN work to the ATM Committee.

3. Composition

Argentina, Brazil*, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, France, Haiti, Panamá, Peru, Trinidad and Tobago, United States, Uruguay, Venezuela, COCESNA, IATA, IFALPA, IFATCA, and SITA.

4. Rapporteur

Julio César Pereira*

TERMS OF REFERENCE AND WORK PROGRAMME OF THE FLEXIBLE USE OF AIRSPACE TASK FORCE

1. Terms of reference

Conduct specific studies and develop guidance material for the implementation of the flexible use of airspace, to support the implementation of the CAR/SAM Regional Air Navigation Plan, in keeping with ICAO Strategic Objectives and Global Plan Initiatives on this matter (GPI 1).

2. Work Programme

a) Develop a Model Action Plan for the Flexible Use of Airspace

b) Develop guidelines for the implementation of procedures for the flexible use of airspace.

c) Present the work carried out to the ATM Committee

3. Composition

TBD

4. Rapporteur

TBD

TERMS OF REFERENCE AND WORK PROGRAMME OF THE ATFM TASK FORCE

1. Terms of reference

Carry out specific studies in order to determine and elaborate guidance material on an Air Traffic Flow Management (ATFM) system to ensure an optimum air traffic flow in the CAR/SAM Regions.

2. Work Programme

a) Review the documentation on air traffic flow management and the policies globally established;
b) Review the ATFM regional plans of other regions;
c) Review the existing ATFM national plans;
d) In coordination with the GREPECAS Task Force on Institutional Aspects consider, in the development of all its activities the institutional aspects involved in a multinational environment;
e) Review the ATFM technical and operational aspects;
f) Identify the minimum requirements to implement ATFM;
g) Define the principles in which the CAR/SAM ATFM service will be based;
h) Evaluate different alternatives and strategies that may satisfy the future air traffic flow management in the CAR/SAM Regions;
i) Prepare the necessary ATFM documentation for the CAR/SAM Regions;
j) Harmonize the ATFM implementation plans among the CAR and SAM Regions as well as with other ICAO Regions; and
k) Present not later than ATM/6 Committee the documentation for their approval.

3. Composition

Víctor Marcelo De Virgilio (Argentina), Bolivia, Brazil, Jesús Sánchez (Chile), Colombia, Edwin Jiménez (Costa Rica), Cuba, Dominican Republic, El Salvador, Haiti, Jamaica, Mexico, Panama, Paraguay, Jaime Contreras (Peru), Trinidad and Tobago, United States, Uruguay, Carlos Ochoa (Venezuela), Uriel Urbizo (COCESNA), IATA, Fernando Álvarez (IFALPA) and Alex Figuereo (IFATCA).

4. Rapporteur

Joe Hof

TERMS OF REFERENCE AND WORK PROGRAMME OF THE ATM AUTOMATION TASK FORCE (AUTOM/TF)

1. Terms of reference

Conduct specific studies and develop guidance material for the implementation of automated ATM systems to support the implementation of the CAR/SAM Regional Air Navigation Plan, in keeping with ICAO Strategic Objectives and Global Plan Initiatives (GPI) on this matter (GPI 6, 7, 9, 17, 18 and 19).

2. Work Programme

a) Review and update the Interface Control Document (ICD) for its use in short and medium term in the CAR/SAM Regions.
b) Analyse and prepare proposals for updating the regional strategy for the evolutionary implementation of ATM automation in the CAR/SAM Regions according to the new ICAO Global Air Navigation Plan (Doc 9750) and other related initiatives.
c) Prepare general guidance material containing references on the ATM automation functions and its improvement levels for ATS units.
d) Develop and document an action plan that facilitate the implementation of new ATM automated systems, as well as the interfacing among existing ATM automated systems.

3. Composition

Arrile Torino (Brazil), José Arturo García Torres (Colombia), Ramón Navarro (Cuba), José Luis Fernández Rosario (Dominican Republic), Roger Prudent (France), Marc Paulemon (Haiti), Sergio Valencia (México), Panama, Juan de Mata (Spain), C. Martin Cacioppo (United States), José Ramón Oyuela (COCESNA) and IFATCA.

Note: Composed by ATM and CNS experts.

4. Rapporteur

Sergio Valencia (México).

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APPENDIX B

ATM SYSTEM REQUIREMENTS

1 PERFORMANCE AND EXPECTATIONS

1.1 General

The Global ATM Operational Concept envisions a system that is service oriented, performance driven and predicated on the guiding principles described in the OCD (Global Air Traffic Management Operational Concept, Doc 9854).

To fulfil this vision, the ATM system shall:

a. Ensure that performance forms the basis for all ATM system development;

b. Treat performance as a whole, that is, considering all the ATM community expectations and their relationships;

Explanatory Text: The holistic treatment of performance should be done by means of a system performance approach resulting in performance cases. A performance case can be seen as the combination of the various cases that together address and balance all areas in which the ATM community has expectations e.g., the safety case, together with the business case, together with the environment case, etc.

c. Ensure the establishment of performance cases (safety, business, environmental, etc.) before implementing changes;

d. Ensure that performance targets are defined, regularly reviewed and monitored;

e. Establish interchange of global benchmarking performance data as a cornerstone of ATM system management;

f. Ensure that all information for performance management is available to the concerned parties transparently and that information disclosure rules are in place;

g. Ensure that any performance management system establishes rules for, among other things, performance measurement, performance maintenance, performance management, and performance enhancement;

h. Establish Quality of Service requirements to support provision of services within the ATM system;

i. Ensure that Quality of Service includes performance requirements related to availability, continuity, reliability and integrity; and

j. Balance the expectations of the ATM community.

Explanatory Text: The ATM system will consider the trajectory of a vehicle during all phases of flight and manage the interaction of that trajectory with other trajectories or hazards to achieve the optimum system outcome with the minimal deviation from the user-requested flight trajectory, whenever possible. The ATM system will provide seamless service to the user at all times and will operate on the basis of uniformity throughout all airspace. Uniformity embodies both application of common ATM system rules and procedures across all airspace and use of common core, technical functionality in the systems used.

It is not intended that this will establish an all-embracing requirement for identical equipment or systems, although minimizing system duplication or reducing equipment or systems needed to operate in a global ATM system environment is an obvious goal.

It is intended that agreed required minimum levels of aircraft equipment, performance, and ATM system network capabilities will be matched by defined levels of service. It is intended that the ATM system should provide all users, at a minimum, the same level of access to runways and airspace when compared to a regionally agreed baseline year.

1.2 Safety

Safety is a key and constant performance expectation of the ATM system. To meet this expectation, the ATM system shall:

a. Be based on the principle that the safety of the ATM system, or its components and parts, is evidence based;

b. Define common safety indicators to be used by all States;

c. Ensure that safety data will be recorded, processed, and analyzed centrally within a State, region, or group of States, taking into account the experience of existing State incident reporting schemes; furthermore, safety data will be shared globally;

d. Ensure a consistent approach to the collection, evaluation and review of safety-related data, including the understanding of causes and effects that can be applied over time and across segments of the community for the purpose of making informative comparisons;

Explanatory Text: This does not mean that all community members use the same approach but rather, that they can communicate by sharing a wide, diverse, and yet common set of models, assumptions, definitions, and so on.

e. Support system safety with lead indicator and causal factor analysis, in addition to traditional lag indicator statistical analysis in the ongoing monitoring of safety;

f. Ensure application of the System Safety Approach to all life-cycle phases of the ATM system and its elements, supported by Safety Cases;

g. Ensure that all safety practices and processes are explicit and that they comply with the safety requirements and standards of ICAO, state regulatory and other appropriate parties;

Explanatory Text: ATM system performance requirements should be based on the key understanding that the ATM system is a collective integration of parts, including, humans, information, services and technology. When contemplating or undertaking a change to a particular part of the ATM system, whether at the local, State, regional, or global level, one must give due consideration to the potential effect on adjacent parts of the system through a safety case. The decision regarding the level of assessment will be made pragmatically, but transparently. In establishing safety management systems, determining safety targets, and in conducting safety cases, the accumulated effect—in addition to the individual effects— on safety of those parts should be taken into account.

h. Ensure that ATM system safety is maintained during any transition;

i. Establish contingency plans at all levels of operation to deal with anomalies/disruptions and to ensure safety and appropriate level of operations;

j. Be designed so that the operation and continued evolution of the ATM system incorporates mechanisms so that information and/or actions concerning emergency and/or unexpected events involving any of the airborne or ground-based ATM community members can be communicated to all ATM system participants who need to respond to or be aware of the event or actions;

Explanatory Text: An enhanced capability will be provided to disseminate information regarding emergency situations to appropriate ATM community members so that the necessary response actions and intervention can be initiated more effectively.

k. Accommodate the determination of levels of safety and risk which may be expressed in various manners;

Explanatory Text: There is no single and universally valid way of expressing the level of safety or risk. It is however desirable to express safety and risk in a manner that provides reference over time despite system changes.

l. Ensure that the target level of safety is the minimum level of safety to be achieved;

Explanatory Text: The ATM system recognizes that absolute safety cannot be achieved; however, it should always be a desired goal. In the evolution of the ATM system, safety targets will be established reflecting a continuing desire to improve current levels of safety. In setting safety targets from time to time, each organization, State, region, or global group should generate a better safety outcome than the previous target within practicable limits; that is, all components of the ATM system should strive to reduce incidents and accidents and increase positive safety indicators.

m. Recognize that there are three safety risk bands: intolerable, As Low As Reasonably Practical (ALARP), and broadly acceptable;

Explanatory Text: *The safety industry generally recognizes that there are situations in which the continuous range of possible levels of safety cannot be divided into only two bands, "intolerable" and "broadly acceptable". There is a third, intermediate region between these two levels. Where such an intermediate region exists, the question becomes how to make decisions if the level of risk falls within that region. To make such decisions, the safety industry generally uses the so-called ALARP. This means that measures to reduce risk must be taken until the cost of further risk*

reduction would be grossly disproportionate to the reduction in risk that would be achieved; hence, the "ALARP region".

n. Ensure that safety risk is calculated with scientific rigor, however accommodate the determination of safety risk acceptability by value judgement;

Explanatory Text: A distinction should be made between both activities (safety risk calculation and acceptability determination) and their respective boundaries and logic.

o. Be designed so that the human is never in doubt as to the ongoing status of the ATM system or the flight environment as appropriate to the human task undertaken; and

p. Be designed so that collision avoidance systems remain a safety net independent from separation provision.

1.3 Security

Performance of the ATM system depends on security related to both the internal elements of the ATM system—including personnel, infrastructure, and data—and the external expectations of the broader community, including national security interests. To meet these expectations, the ATM system shall:

a. Be based on the principle that the operation of the ATM system will not compromise the sovereignty of any State;

b. Ensure appropriate levels of security;

c. Recognize that the requirements associated with security may vary from time to time and according to location; and

d. Coordinate these requirements through strategic, pre-tactical and tactical collaborative decision making to allow agreed performance parameters to be met by ATM system partners.

1.4 Cost-Effectiveness

To meet the expectations of the ATM community regarding cost-effectiveness, the ATM system shall:

a. Ensure that where they are required, validation and cost-benefit analysis[1] are achieved through focused research and development and establishment of business cases[2] prior to implementation of the changes.

1.5 Access and Equity

To meet the expectations of the ATM community regarding access and equity, the ATM system shall:

a. Ensure that, in the design of the ATM system, the principles of access and equity are taken into account;

b. Be designed to accommodate all types of airspace user missions and all types of vehicles and associated characteristics; and

Explanatory Text: Any type of user mission will be accommodated, and an appropriate type/level of service will be provided. Different types of mission will- or may have- different planning horizons. The ATM system will accommodate and be able to handle different planning horizons.

It is intended that the ATM system will be able to accommodate a wide variety of vehicles, with a similarly wide variety of characteristics and capabilities, not only based on current knowledge, but also for the evolutionary future. The expectation is that these new types of vehicles, characteristics, and capabilities should be accommodated in a manner that achieves the optimum system outcome with minimal deviation from the user requested flight trajectory when they may appear in the future.

It is expected that unmanned aerial vehicles will be operated either remotely by a human operator or execute their pre-programmed mission automatically, and that some vehicles may not be able to dynamically change their trajectory. It is intended that the ATM system will accommodate such pre-programmed missions after strategic collaboration.

It is intended that the ATM system will provide services according to the maximum level of vehicle capabilities.

c. Be designed to minimize restriction of access to airspace.

1.6 Capacity

To meet the expectations of the ATM community regarding capacity, the ATM system shall:

a. Provide the collaboratively agreed level(s) of capacity;

b. Ensure that sufficient capacity is provided through Collaborative Decision Making (CDM);

c. Ensure that the ATM community works collaboratively to plan and implement the capacity needed to cost-effectively meet the forecast demand;

Explanatory Text: Through collaboration, ATM community members will determine the appropriate investments and associated commitments to make available the desired capacity of ATM system resources. The investments and commitments include those by both users and service providers. (e.g. "matched" commitments include infrastructure deployment by service providers and equipage or training.)

d. Ensure that all available capacity is fully and efficiently used; and

Explanatory Text: The intent is not to create capacity for its own sake, but to ensure that the available capacity is efficiently used given existing demand.

e. Minimize the impact of adverse weather on the total ATM system, so as to ensure that maximum throughput is generated in all meteorological conditions.

1.7 Environment

Environmental considerations are increasingly important in ATM system design, and will continue to be so through future development of the ATM system. To meet the expectations of the ATM community regarding environment, the ATM system shall:

a. Ensure that environmental issues are considered in the design, development, and operation of all aspects of the ATM system;

b. Establish and monitor agreed environmental performance targets to ensure that the expectations of society for the aviation industry contribute to the reduction of impacts on the environment, including noise, gaseous emissions, and effect on the amenity of particular areas is met; and

c. Facilitate collaborative decision making between the appropriate community members and appropriate environmental authorities to ensure that an appropriate balance exists between the need to mitigate the effects of the ATM system on the environment and the economic benefit to States derived from operation of the ATM system.

Explanatory Text: ATM system components and the ATM community, when agreeing performance targets, will consider measures that will not only contribute to a sustainable environment from a purely ATM system perspective, but also in the context of the complete transport value chain as imposed on the ATM community.

1.8 Predictability

To meet the expectations of the ATM community regarding predictability, the ATM system shall:

a. Ensure that ATM community members provide past, current, and predicted information as required by the system for predictability of services; and

b. Provide the ATM community with data essential to the planning of their operations.

1.9 Community Participation

To meet the expectations of the ATM community regarding community participation, the ATM system shall:

a. Be designed in such a way as to ensure that all pertinent ATM community members are included in relevant CDM and have easy access to the associated necessary information.

1.10 Flexibility

To meet the expectations of the ATM community regarding flexibility, the ATM system shall:

a. Implement and operate in such a way that the varying and diverse user requirements will be met as closely as technically possible within the defined equity and access; and

b. Enable all airspace users to adjust departure and arrival times and modify flight trajectories dynamically, where necessary renegotiating trajectory agreements, thereby permitting them to exploit operational opportunities as they occur.

1.11 Efficiency

To meet the expectations of the ATM community regarding efficiency, the ATM system shall:

a. Address the operational and economic cost-effectiveness of gate-to-gate flight operations from a single-flight perspective; and

Explanatory Text: Airspace users want to depart and arrive at the times they select and fly the trajectory they determine to be optimum in all phases of flight.

b. Modify the airspace user's preferred trajectory:

i. when required to achieve overall ATM system performance requirements; and/or

ii. collaboratively with the airspace user, in a manner that recognizes the airspace user's need for single-flight efficiencies.

1.12 Global Interoperability

To meet the expectations of the ATM community regarding global interoperability, the ATM system shall:

a. Be based on global standards and uniform principles, ensure the technical and operational interoperability of ATM systems and facilitate homogeneous and nondiscriminatory global and regional traffic flows; and

b. Establish common operational procedures within similar operational environments.

2 INFORMATION MANAGEMENT AND SERVICES

2.1 Information Services

Managing information and providing information services are critical to the development of the ATM system envisioned in the OCD. These activities ensure cohesion and linkages between the various ATM components described in the OCD as well as performance expectation areas described in previous sections of this document. To meet the expectations for the ATM system regarding information services, the ATM system shall:

a. Implement system wide information management;

b. Provide a global, common aviation data standard and reference system to allow fusion and conflation and provide comprehensive situational awareness and conflict management;

c. Establish information exchange protocols and procedures to ensure that appropriate performance can be achieved within the agreed rules;

Explanatory Text: These "agreed rules" would be determined through collaborative decision making.

d. Provide to the ATM community accredited, quality-assured, and timely information meeting the identified standards of performance, including quality of services;

Explanatory Text: It is essential that information does not change character or value as it travels through various systems. It is assumed that information may be combined, segregated, or reformatted in accordance with the needs of the end user; however, the content (i.e., character, data values, and so on) should not change the context (the environment from which the information originated). In summary, received information content is exactly the same as the information from the originator.

The differences brought about by evolution in technology are not expected to have any impact on the efficient transmission of the information among the ATM community members. The requirements of seamlessness and interoperability dictate that systems— whether proprietary or not—conform to openly available standards regarding the format and character of transmitted or transferred information. It is intended that there will be development of fully interoperable information systems capable of seamless information transfer throughout the ATM system.

e. Provide information systems that identify the nature of the information in terms of timeframe - historical, current, or planned;

f. Ensure that a relevant validity period of ATM system information is evident to the user of that information;

Explanatory Text: Information that is expected to change over short intervals must have a validity period that is evident to the user of the information. Conversely, information elements that are not expected to change except after system design changes should not need to be repeated at short intervals. The information management system is expected to explicitly reveal the validity period for the demanded information.

g. Be capable of collecting and integrating information from diverse sources to produce a complete and accurate view of the ATM system state;

Explanatory Text: The originator of information is the ATM community member at the first point of entry where the information can be acquired. To ensure that the information is properly accredited and a quality assurance framework is in place, the responsibility for timely acquisition of information meeting quality parameters must rest with the ATM community member closest to the information event. The intention is that there will be tracking and quality assurance mechanisms that will ensure the integrity of information through transfer as well as through developing compliance mechanisms for information quality standards.

h. Support a reduction in transactional friction for transmission of information across systems;

Explanatory Text: Information management systems will be capable of collecting, storing, and aggregating vast amounts of information from, and for use by, ATM community members. It will be necessary to ensure that information needs are legitimate and validated to allow for transparent access to information without being compromised by confidentiality and proprietary interests. Any restrictions on information access should be identified and mechanisms developed and employed for resolution based on balancing access against the legitimate needs of users.

i. Assemble the best possible integrated picture of the historical, real-time, and planned or foreseen future state of the ATM system situation and relevant, quality-assured and accredited information shall be made available to the ATM system;

j. Ensure that the airspace user makes available relevant, operational information to the ATM system;

k. Use relevant, airspace user operational information to optimize flight operation management;

l. Use relevant data to dynamically optimize 4-D trajectory planning and operation;

Explanatory Text: The global exchange of information (from individual aircraft performance to ATM system resources) will allow full use of 4-D trajectory management/operation. The 4-D trajectory management optimization may be a function of either ground or air systems or both.

m. Provide the status of ATM system resources;

Explanatory Text: The ATM system will monitor the status/availability of all resources within the system and make them readily available, within security constraints, so that entities, operators, or agents may use the information to their best advantage in support of their operational objective. For example, based on ATM system resource reports, an operator whose objective is to perform photographic land survey is able to amend its work schedule in response to changes in the availability of specific airspace or navaids necessary for the mission. (Since the activity is linked to the physical surface, the option of negotiating another route to avoid the resource limitation is not available, but the operator's work plan, under its control, is amended at the operator's discretion. That is, the activity day/date is amended.)

n. Make available to the ATM system flight parameters and aircraft performance characteristics;

o. Establish standards for meteorological model accuracy and resolution and agree performance requirements;

p. Provide timely access to all relevant meteorological information; and

Explanatory Text: It is expected that within the constraints of authorized access, the ATM community will be permitted to obtain the information required for the discharge of responsibilities. For example, it is expected that historical meteorological data will be available for strategic planning, preplanning, and tactical planning.

q. Utilize meteorological data, and information derived from it, to assist in analysis and evaluation of agreed environmental performance targets.

Explanatory Text: It is expected that increasingly more accurate and timely meteorological and climatological information and analysis material will be available to the ATM community. This information will be increasingly integrated strategically with historical aircraft performance and other data, and tactically with meteorological data from onboard sensors and "down-linked" actual aircraft performance parameters and other data. The enhanced information will allow appropriate members of the ATM community to:

- *Predict environmentally optimum trajectories, which, when integrated with other operational factors, will allow generation of ATM system optimum trajectories (this includes use of dynamic wake vortex spacing), including monitoring of execution;*
- *Facilitate operations of aircraft along environmentally optimum trajectories;*
- *Allow establishment of pragmatic environmental performance targets; and*
- *More accurately measure and report the effect of air operations on the environment.*

2.2 Collaboration

To meet the expectations for the ATM system regarding collaboration, the ATM system shall:

a. Ensure that ATM system design, development, implementation, and operation are determined by collaborative decision making, system safety, and system wide business cases;

b. Ensure that decisions affecting the evolution of the ATM system are made in consultation with all affected ATM community members;

c. Ensure that the airspace user community is able to participate in collaborative decision making;

d. Ensure mutual exchange of relevant and timely data:
– for the benefit of situational awareness;
– for conflict-free trajectory management; and
– to allow collaborative decision making concerning consequences of airspace user system design changes; and

Explanatory Text: Increased data sharing between all members of the ATM community will enhance both situational awareness and conflict management. This means that both Airspace Users and Service Providers should be able to develop their situational awareness and conflict management tools making full use of appropriate exchange of data. The intention is to make available, to each ATM system user, comprehensive information to support situational awareness and subsequent decisions based on the user's location in real time.

e. Employ collaborative decision-making to reconcile differences between information needs and the availability of, or access to, information.

Explanatory Text: It is essential that the information needed by an ATM community member to fulfil an ATM system function is acquired and disseminated for use by that member. It is intended that individual ATM community members will be able to access the information relevant to their specific needs.

3 SYSTEM DESIGN AND ENGINEERING

Consistent and coherent system design and engineering is critical to achieving the performance expectations; the ATM system shall:

a. Be based on common global standards and procedures;

b. Be based on elements that ensure global interoperability;

Explanatory Text: The expectation is that ICAO will, in a timely manner, be responsible for adoption/approval of SARPs and PANS in order for the ATM community to progress the evolution of the ATM system.

c. Utilize systems standardized at a functional level; and

d. Incorporate interoperability during the design of any changes to ATM system.

3.1 Interoperability, Seamlessness, and Infrastructure

To meet the expectations for the ATM system regarding interoperability, seamlessness, and infrastructure, the ATM system shall:

a. Establish a global ATM system vocabulary with a well-defined form (syntax) and meaning (semantics) such that each participating entity in the exchange will be able to interpret the information provided in precisely the same way. In this context, information is considered to encompass voice, text, data, and imagery elements;

Explanatory Text: Interoperable and seamless global ATM system capability cannot be achieved through application of agreed technical requirements alone; they must also be addressed at the institutional and operational levels.

b. Ensure that each participating ATM community entity in any transaction uses the global ATM system vocabulary to describe the ATM services that they provide within their area of service provision;

c. Ensure that each participating ATM community entity provides a means for other participating entities to identify and access its services. The means for determining and accessing service shall be based on a common description framework and associated method(s) that the participating entities can use to facilitate the introduction and transition to new technologies;

d. Ensure that the communication media/protocols used to support interoperability— in both determining and providing services across discontinuities—are agreed in conformance with internationally approved, open and non-proprietary standards. That is, the specification of the media/protocols and their operational performance must be freely available;

Explanatory Text: The specific call for use of open, non-proprietary standards will apply to their use regionally or globally. It is not intended to preclude the notion of agreements between a limited number of service providers that may rely on "closed" or proprietary mechanisms separate from the global standards—provided that they impose no cost or other burden on those not party to the specific agreement.

e. Ensure selection and adoption and, where necessary, the development of interoperability standards and related materials that enable mutual exchange of relevant and timely data; and

Explanatory Text: The expectation is that the ATM community will be responsible for selection and, where necessary, the development of candidate global standards (and related material) on interoperability for the ATM system. However, given that the ATM community will rely on these standards (and related material) to progress in the evolution of the ATM system, and given that the proliferation of standards (and related material) may impact performance, the expectation is:

(a) that only some of the candidate standards (and related material) will become ICAO Standards (and related material, such as, Recommended Practices, procedures, guidance material, etc.); and

(b) that the selection process will be based on the ICAO processes.

f. Provide a collaboratively agreed minimum notice period in which a State or region intends to change or withdraw existing infrastructure and/or services.

Explanatory Text: Continuity of service provision requires strategic agreement on facilities and services. Significant investments are made to achieve continuity—they must be protected.

3.2 Human Design and Automation

To meet the expectations for the ATM system regarding human design and automation, the ATM system shall:

a. Give due consideration to the interaction of humans and technology; for example, the "human machine interface" in design of the ATM system or its parts;

b. Demonstrate this consideration in the safety analysis accompanying the system design;

c. Guard against the potential to create a safety hazard by information overload; and

Explanatory Text: The human is an essential part of the ATM system. Both in the aircraft and on the ground, the role of the human is to manage the system and supervise control functions. It is intended that in the design of the ATM system or its parts, due consideration will be given to factors that affect human performance, human roles and responsibilities, and the potential for errors so that automation shall be seen as supporting areas of human weakness and complementing areas of human strength.

d. Use automation collaboratively where deemed appropriate to achieve the ATM system performance targets.

3.3 Spectrum

To meet the expectations for the ATM system regarding spectrum, the ATM system shall:

a. Ensure that in supporting ATM system expectations, the developers of telecommunications systems ensure that harmful interference will neither be caused by, nor received from, other authorized users;

b. Establish and maintain frequency and spectrum allocation and management assistance programmes; and

c. Provide frequency and spectrum management assistance to all new and existing programmes to ensure that national and international standards are complied with and that no new items of equipment are introduced that would interfere with existing systems.

Explanatory Text: Formal programmes will be established to ensure that frequency and spectrum development activities for new systems being conducted by States are compatible with current

and projected use by national and international aviation interests. Frequency allocation proposed for new transmitting and receiving equipment at a site should be coordinated to ensure electromagnetic compatibility with existing systems present or planned for that site. Coordination with external (non-aviation) agencies is required to prevent electromagnetic compatibility problems and resolve out-of- band interference problems with other new or existing national or international systems.

3.4 Aircraft Design

The aircraft is a key element of the ATM system. The aircraft should be totally integrated in the collaborative decision making of the airspace user operation, and its design should allow it to comply with all relevant ATM system requirements. To meet the expectations for the ATM system regarding aircraft design, the ATM system shall:

a. Make the best use of aircraft capabilities;

Explanatory Text: ATM system design will be capable of fully exploiting flight deck systems and aircraft design.

b. Ensure that the interrelationship and the interdependencies of aircraft design with ATM performance is a key consideration in aircraft design; and

Explanatory Text: The design of an aircraft to provide maximum efficiency of ATM system operation relates to the performance in specific areas; the notion of design for overall effectiveness relates to the effect of the aircraft across a range of performance areas to enhance total system performance. In this case, there may be tradeoffs between an aircraft's overall effectiveness and its ability to provide maximum efficiency in one particular area.

It is expected that aircraft design will:

- *Reduce the occurrence and/or effect of wake vortexes;*
- *Take into account environmental considerations such that noise and emissions are reduced;*
- *Enable aerodrome operation without requiring changes to the infrastructure; and*
- *Facilitate cooperation and integration with the ATM system through the flight deck, including avionics and overall aircraft system design.*

The design of the ATM system will reflect the business case process described in the OCD. Cost-benefit assessments should consider the effects of the proposed changes at an overall level, and for the typical main groups of interests, to ensure that the changes proposed are both viable and affordable. ATM system design will be capable of fully exploiting flight deck systems and aircraft design.

c. Ensure that aircraft capabilities will be totally integrated in the collaborative decision making process of the ATM community and allow them to comply with all relevant ATM system requirements.

Explanatory Text: Flight crews are deeply involved in the ATM system, in addition to traditional aircraft handling. It is intended that flight deck design should enable better integration with the total ATM system.

4 ATM SYSTEM COMPONENTS

4.1 Airspace Organization and Management

Airspace organization establishes airspace structures to accommodate the different types of air activity, volume of traffic, and differing levels of service. Airspace management is the process by which the airspace options are selected and applied to meet the needs of the ATM community. To meet the expectations of the ATM system deriving from airspace organization and management, the ATM system shall:

a. Recognize that operation of the ATM system will not compromise the sovereignty of any State;

b. Establish agreements to ensure that sovereignty of airspace is respected without imposing inefficiencies on ATM airspace management;

Explanatory Text: ATM system services will be provided supra-State or extra-State, in whole or in part, subject to agreement of the appropriate authority within the State or States concerned.

c. Define, through collaborative decision-making, airspace structures and procedures to accommodate all types of air activity;

d. Utilize the collaborative decision-making process across state boundaries to support homogeneous traffic flows and seamless airspace;

Explanatory Text: Airspace should be organized to be simple and easily understandable.

e. Ensure that airspace users are included in all aspects of airspace management via the collaborative decision-making process;

f. Recognize that airspace will be managed on the basis of flexible allocation;

g. Recognize the principles of access and equity in the organization, flexible allocation, and use of airspace;

h. Manage airspace dynamically and flexibly based on services demanded;

i. Recognize that any restrictions on airspace availability will be minimized, and none will be permanent;

Explanatory Text: All ATM system users will be able to present a safety, business, or personal outcome requirement for use of the airspace, increasing information flow and ability to manage use of all airspace efficiently and effectively. More efficient and transparent ATM system user objectives will be achieved and made known to the system. The principles of access and equity will be realized in a practical way.

j. Adapt airspace organizational boundaries, divisions, and categories based on traffic patterns, changing situations, and unplanned requirements, supporting efficient operation of the other ATM services while not being constrained by national or facility boundaries;

k. Allocate volumes that enable safe and efficient trajectory allocation and modification, from strategic to tactical;

l. Manage all airspace, and where necessary, shall be responsible for amending priorities relating to access and equity that may have been established for particular volumes of airspace. Where such authority is exercised, it shall be subject to rules or procedures established through collaborative decision-making;

Explanatory Text: It is accepted that certain volumes of airspace may be established to meet certain ATM system user expectations, including security (or national interest). This may be deemed the primary use. Where that primary use is not operationally required, the ATM system should provide access to those members of the ATM community who were subject to access restriction, until prioritization is required again. It should also be accepted that there will be situations in which priority access is required in response to abnormal operations, such as emergency situations or deviations around severe weather.

m. Accommodate mixed equipage without unduly constraining the primary use of a given volume of airspace;

n. Determine through collaborative decision-making the level of service for a particular airspace volume, whether determined strategically, pre-tactically, or tactically;

o. Facilitate, as feasible, provision for tactical or pre-tactical approval of preferred routing or re-routing in those areas where approvals are required for civil or State aircraft to operate over, into, or from a particular State;

Explanatory Text: Currently, many States require significant advance notice before approving overflight; this is particularly true of State aircraft operations. The information-rich environment of 2025 should render such restrictions redundant. Additionally, the ATM system should enable enhanced civil and military cooperation and coordination regarding airspace usage and ATM services. Furthermore, it should support models where the military ATM services are already integrated into the civil ATM services.

p. Operate on the principle that all airspace is the concern of the ATM system and is a usable resource, and any restriction on the use of any airspace will be considered transitory; and

q. Operate on the principle that all airspace will be managed and all related activity within airspace will be known to the ATM system to the degree necessary to meet performance expectations.

4.2 Aerodrome Operations

As an integral part of the ATM system, the aerodrome must provide the needed ground infrastructure including, *inter alia*, lighting, taxiways, runways, and precise surface movement guidance to improve safety and to maximize aerodrome capacity in all meteorological conditions.

The ATM system will enable the efficient use of the capacity of the aerodrome airside infrastructure. To meet the performance expectations of the ATM system stemming from aerodrome operations, the ATM system shall:

a. Provide a facility and/or procedure, as required, to monitor or manage aircraft operations safely and expeditiously within the confines of the aerodrome and its immediate surroundings;

Explanatory Text: In considering the need for a service facility, such as a control tower, careful thought should be given to the volume and complexity of traffic. Where required, such facilities should enable direct or individual visual monitoring and/or control. However, increasing needs for (vertically) higher visual control rooms to enable direct sighting requirements may lead to alternative methods of surveillance or control. Cost efficiency of services may also become an influencing actor. This may lead to implementation of procedures, such as pilot autonomy (e.g. self-separation) rather than establishment or refurbishment of a facility.

b. Provide collaboratively agreed aerodrome capacity;

Explanatory Text: At all aerodromes, a commonly/collaboratively agreed-to target level of safety will be established, which is subsequently non-negotiable by an individual party. It must be accepted that though performance may be measured on an individual basis, the relationship between each aerodrome will result, by necessity, in a compromise. Performance criteria may be established at the regional or local level; however, consideration should be given to aerodrome performance impact on the ATM system as a whole. The freedom of the performance level to termination per aerodrome may be constrained by the performance level of the overall ATM system. It may be easier to consider aerodrome operations within an "en route-to-en route"[3] perspective in determining its role within the ATM system.

It is intended that sufficient airside infrastructure be provided so as to optimize the efficiency of the ATM system and provide predictability.

c. Ensure through collaborative decision-making, that the most effective means of surface management are employed to respond to demand;

d. Ensure that the position and intent of all aircraft and vehicles operating on the movement area are precisely determined;

Explanatory Text: Precise surface movement guidance will be required in all conditions. This may not necessarily be met by high-level technology but should be appropriate to the operations (i.e. traffic volume, complexity of traffic movements, traffic mix and so on). Information on the position, to an appropriate level of accuracy, and intent of all aircraft and vehicles operating on the ground will be available to the appropriate ATM community members. Any activities that take place on the movement area can have a direct influence on the ATM system.

e. Ensure that the aerodrome community, including emergency and essential services, provide and receive relevant information in order for dynamic, tactical, and strategic decisions to be made;

f. Ensure that flight parameters and aircraft performance characteristics are available to the ATM system;

Explanatory Text: As is the case across the whole ATM system, in relation to aerodrome operations, the availability and exchange of information will facilitate management by trajectory. It is expected that the collaborative exchange process and respective facilities will allow for efficient management of air traffic flow through use of information on a system wide basis of air traffic flow, weather, and assets. This process will also allow, for example, allocation of entry/exit times for aerodromes and subsequent dynamic changes to mitigate for any imbalance.

g. Determine through collaborative decision-making, suitable aerodrome facilities to enable efficient maintenance of capacity in all meteorological conditions;

h. Support the same throughput in all meteorological conditions at aerodromes where benefits can be demonstrated;

Explanatory Text: *Planned ATM system optimum throughput should be maintained through meteorological conditions that do not present safety limitations and have been agreed by the affected ATM community members.*

i. Consider environmental issues in design, development, and operation of the aerodrome;

Explanatory Text: The aerodrome operations through the ATM system should contribute to the protection of the environment by considering all environmental impact areas to the extent that safety is not compromised.

It is expected that in the design of terminal area procedures, responsible authorities will work closely with local agencies to mitigate, to the extent possible, the effect of aviation on communities living within the terminal area of an airport. In so doing, all parties should strike an appropriate balance between the need to mitigate the effects of aviation on the environment and the significant economic benefit to States of promoting a healthy aviation industry.

It is expected that airspace users, in determining and executing user-preferred trajectories, will incorporate requirements to ameliorate unnecessary gaseous emissions. The ATM system should recognize and accommodate such trajectories wherever practicable to reduce environmental impact.

Meteorological information, both current and forecast, will be an important contributing factor in managing environmental issues. It is expected that while aerodrome operations will not be responsible for determining environmental constraints, they will comply with local and national requirements.

As one of the sources of environmental pollution, aerodrome layouts and operations will through collaboration alleviate environmental concerns. (For example, reduction of holding will assist aerodromes in complying with emission controls as will the reduction in taxiing times.)

j. Establish, through strategic, pre-tactical, and tactical collaborative decision-making, processes for facilitating throughput of passengers and/or cargo and freight at airports that will allow agreed performance parameters to be met by the ATM system partners;

Explanatory Text: It is expected that landside operations will become an integral part of this process. Although not directly part of the ATM system, landside operations will have an impact on aerodrome operations, and a downstream effect on other parts of the ATM system. Data on such areas as modal transportation systems, customs, security, baggage handling, fuel supply, and so on, shared through collaborative information exchange, will optimize operations.

Real-time data, together with system trends and forecasts, fused with a range of automated decision support or decision making tools, will enable optimization of services. A common understanding of needs and capabilities of all parties will instigate a better response to a given situation. Gate management will benefit from the ability to tactically and collaboratively modify sequences to optimize aerodrome operations. It is expected that those ATM community members

interfacing with landside operations will manage/mitigate the effects of landside operations so that impacts on the ATM system are minimized or eliminated.

k. Ensure appropriate levels of security, recognizing that security is most visible in the aerodrome environment and that the requirements associated with security may vary from time to time and according to location;

Explanatory Text: It is expected that increasingly, law enforcement agencies will require flight identification and trajectory data as well as general information concerning traffic at aerodromes. Data exchange will be subject to agreement among interested parties and may be influenced by commercial and regulatory factors. It is noted that, in some instances, access to certain areas may be restricted to only those who are willing to provide a minimum level of information (e.g. specific aircraft flying into certain aerodromes and airspaces).

l. Establish procedures reducing any need for departing or arriving aircraft to spend ground time holding for services with engines operating; and

m. Establish procedures to accommodate arrivals without aircraft having to enter airborne holds for aerodrome service accommodation as a routine.

4.3 Demand and Capacity Balancing

Demand and capacity balancing will strategically evaluate system-wide traffic flows and aerodrome capacities to allow airspace users to determine when, where and how they operate, while mitigating conflicting needs for airspace and aerodrome capacity. This collaborative process will allow for the efficient management of the air traffic flow through use of information on system-wide air traffic flows, weather and assets.

To increase service predictability, maximize capacity utilization, and achieve collaboratively agreed performance targets for the ATM system in those areas to which the ATM system component of Demand and Capacity Balancing contributes, the ATM system shall:

In relation to the Provision of Information

a. Provide timely and accurate information regarding projected demand and capacity levels;

b. Facilitate, as appropriate and on request, conduct of capacity and demand projections, and make the results of that analysis available to the ATM service delivery management function; and

c. Facilitate provision of ATM system demand and capacity projections to relevant ATM community members for up to an agreed/specified time in advance.

Explanatory Text: In relation to the provision of information for demand and capacity balancing (DCB), the ATM system will be capable of projecting the current and future capacity of, and demand on, specified operating sectors or airspace volumes or routes/route segments using all available data and information. This includes the actual and forecast meteorological conditions, navigation equipment operational status, aerodrome operational status, runway configuration, and aircraft performance characteristics.

The ATM system will also monitor and use information pertinent to demand projections, including, stored flight plan information, filed flight plan information, aerodrome operational status, historic demand profiles, scheduled special events, and military operations.

In relation to Access to Information

d. Provide timely access to all relevant information, including meteorological information; and

e. Provide all users the same level of access to collaborative decision-making concerning ATM resources, realizing the diverse need to balance the expectations and interests of all members of the ATM community in achieving equity and access.

In relation to the Use of Information

f. Facilitate collaboration on projections and responses regarding demand, capacity, predictability, capacity utilization, and cost-effectiveness;

g. Utilize historical and forecast meteorological information, including seasonal pattern and major meteorological phenomena;

h. Use information on changes in infrastructure status to increase predictability and maximize capacity utilization to meet performance targets;

i. Ensure collaboration on post-event analysis to support strategic planning;

j. Utilize projected traffic demand and planned trajectories;

k. Accommodate revisions to trajectory requests and resources status;

l. Ensure collaboration on projections and responses;

m. Facilitate collaboration on trajectory changes and traffic demands; and

n. Consider current and predicted airspace conditions and projected demand as well as past performance.

Explanatory Text: In relation to use of information for DCB, it is intended that within the constraints of authorized access, the appropriate ATM community members will be permitted to obtain as much of the information required to perform their responsibilities.

For example, it is intended that historical meteorological data will be available for strategic planning of long-term capacity and demand balancing. This will be coupled with predicted and current meteorological information to facilitate determination of the level of demand and effect on capacity.

It is intended that tactical information from onboard sensors will be integrated into the data stream. Where there is a conflict regarding access to information, it is expected to be resolved within the Service Delivery Management function.

It is intended that strategic evaluation of available information—including system wide traffic flows, aerodrome capacities and active runways, meteorological information, and flow

management information—will facilitate determination by airspace users of when, where, and how they operate. It is intended that collaborative use of common data, information, and decision support tools will:

- *Ensure the most efficient use of all available and potential resources;*
- *Provide the greatest possible access to aerodrome services*
- *Provide equitable access for all airspace users;*
- *Accommodate user preferences; and*
- *Ensure that demand on an aerodrome and other services will not exceed its capacity.*

In relation to provision of service

o. Provide a capability to meter traffic to achieve a balance between traffic demand and capacity of the ATM system;

p. Establish a collaborative process to allow for efficient management of the air traffic flow through use of information on system wide air traffic flow, weather, and assets;

q. Utilize system wide balancing techniques to collaboratively resolve local demand and capacity balancing problems; and

Explanatory Text: In relation to providing services for DCB, while principles of access and equity will apply throughout the ATM system, it is intended that operators of an aircraft not being compatible with the majority of users in a given operational scenario will not be granted the right of equity and access without due consideration of the impact on the performance of the ATM system as a whole. It is intended that arbitration of access and equity issues, at least at a tactical level, will be conducted through the Service Delivery Management function.

It is intended that the Demand and Capacity Balancing function within the ATM system will support the Service Delivery Management function in conducting strategic planning- (e.g. airspace, optimal staffing, and routing); pre-tactical planning- (e.g., adjust staffing, forecast initiatives [fine-tune routing, etc.]; airspace user schedule adjustments); and tactical planning- (e.g., flow initiatives [rerouting, sequencing, and spacing of aircraft, etc.] and airspace user schedule adjustments), all based on forecast and known demand and capacity and analysis of historical performance data.

It is intended that with increased reliability of and access to information, potential saturation of airspace or aerodromes will be predicted sufficiently in advance to ameliorate—or negate—the impact of that saturation event. It is intended that the ATM system will enable a capability to determine actual or potential saturation of any selected airspace and/or aerodromes. In accordance with other ATM system requirements, it is intended that any such information will be made available to relevant ATM community members.

r. Provide a capability to evaluate the effectiveness of flow restrictions implemented in the ATM system. Effectiveness criteria shall include overall system performance measures.

Explanatory Text: The ATM system will include the capability to monitor its performance and effectiveness in meeting the range of performance targets. This applies particularly to Demand and Capacity Balancing, where there is a high degree of criticality to overall ATM system

performance and where decisions—strategic and tactical—are made largely on the basis of historical data and observed performance.

4.4 Traffic Synchronization

Traffic synchronization refers to the tactical establishment and maintenance of a safe, orderly, and efficient flow of air traffic. To meet the performance expectations, the ATM system shall:

a. Provide for an orderly flow of traffic from gate to gate by dynamically renegotiating the 4D trajectory contract;

b. Apply traffic synchronization for the purpose of maximizing throughput of a particular ATM environment in the most effective and efficient manner;

Explanatory Text: It is possible to achieve high throughput inefficiently. It is expected that Traffic Synchronization will be applied to achieve high throughput and high efficiency, whether or not 4-D trajectories are being applied.

c. Maximize, through the use of traffic synchronization, throughput to meet ATM performance requirements;

d. Manage 4-D trajectory contracts to achieve safe and efficient trajectories;

Explanatory Text: Agreed 4-D trajectory contracts will be dynamically updated and communicated to the ATM community. Safety and efficiency in collaboration are key to the changes regardless of whether the service is done from the air or the ground. Negotiation and control will make use of the best available automated tools for communication, analysis, and action.

It is expected that through dynamic renegotiations of agreed 4-D trajectory contracts— and subject to the appropriate business case to ensure cost-effectiveness—the ATM system will not experience "chokepoints." Potential ATM system chokepoints should be increasingly more predictable as 4-D trajectories become available together with automated tools for mitigation. The balancing of traffic density with variations in demand should be based, where appropriate, using the 4-D trajectory contracts received from demand and capacity management.

It is expected that automation both in the air and on the ground will be used fully in order to create an efficient and safe flow of traffic for all phases of flight. The ATM system, through full use of available automation, will be able to analyze and accurately predict future situations in order to achieve the best performance.

Requirements for the airspace user to adhere to the agreed trajectory, within agreed tolerances, will remove much of the uncertainty regarding the future positions of aircraft.

e. Support the discharge of traffic synchronization by both airborne and ground-based systems;

f. Use 4-D trajectory control and/or flight deck delegation for aircraft spacing;

g. Utilize the 4-D trajectory for traffic synchronization applications to meet the ATM system performance targets, unless under certain conditions other means are determined to be more effective;

Explanatory Text: It is expected that the separation mode, including wake vortex separation minima will determine the minimum possible aircraft spacing. It is expected that flight parameters, as part of the 4-D trajectories management, will be available to the ATM system to dynamically allow for spacing and sequencing of arriving as well as departing aircraft. It is expected that as flight parameters are available on airborne systems, they will be used continuously and dynamically, both between aircraft and between aircraft and ground, to maximize utilization of the best information available. This will constitute/facilitate a safer and more efficient use of available airspace and will increase aerodrome throughput.

It is expected that flight plans will be replaced by 4-D trajectory contracts for all phases of flight. 4-D trajectory contracts will constitute a prerequisite for dynamic control of aircraft and vehicles. Negotiations will take place dynamically, as total awareness will be available to the complete ATM community. Agreed 4-D trajectories will increase predictability as well as reduce the need for current traditional path-stretching methodologies.

It is expected that spacing between aircraft will be done through the use of 4-D trajectories, which will be updated and interacted upon collaboratively. The 4-D trajectories will be provided as 4-D trajectory contracts and will be modified and acted upon dynamically and according to at least the criteria defined by conflict management to create a safe and orderly flow of traffic.

It is expected that when traffic density becomes a critical factor affecting performance — whether of an aerodrome or an airspace — application of traffic synchronization will be used and tailored for best performance. The decision to apply traffic synchronization in this case may be taken in advance of flights. In any case, it will be closely coordinated with the demand and capacity balancing function to ensure timely and accurate application of traffic synchronization.

h. Ensure that traffic synchronization throughput actions are matched by aerodrome low visibility throughput capacity where this is determined to be cost-effective by the appropriate business case;

Explanatory Text: It is expected that traffic synchronization will be applied to achieve high throughput and high efficiency across the entire ATM system. This will include working collaboratively with both Aerodrome Operations and Airport Landside Operations to ensure that ground throughput does not become an obstacle to overall ATM system efficiency.

i. Recognize that traffic synchronization encompasses both the ground and the airborne part of the ATM system and constitutes a flexible mechanism for capacity management; and

Explanatory Text: It is expected that traffic synchronization will contribute to optimized aerodrome operations performance. This will be done through increased awareness and predictability for the ATM community as well as through fulfilment of collaboratively agreed actions leading to achievement of best performance.

j. Manage surface, departure, and arrival and en route flow of traffic dynamically to optimize traffic flow or throughput.

4.5 Airspace User Operations

The ATM system is primarily established to service the needs of the airspace user community. Increasingly, the capabilities of the user community are such that they participate as active components of

the system. ATM system performance is directly influenced by the performance of the airspace user. To meet the performance expectations of the ATM system stemming from airspace user operations, the ATM system shall:

a. Recognize and exploit airspace user capabilities to generate, negotiate, and adhere to user-preferred 4-D trajectories;

b. Consider the trajectory of a vehicle during all phases of flight and manage the interaction of that trajectory with other trajectories or hazards to achieve the optimum system outcome with minimal deviation from the user-requested flight trajectory, whenever possible;

c. Provide, consistently with available ATM system resources, airspace users the capability to fly dynamic user-preferred 4D trajectories;

Explanatory Text: It is expected that user-preferred trajectories will provide the most efficient flight operations and that the airspace users will provide these trajectories to the ATM system. These trajectories should be the key/core element of the (shared) information management. The expectation is that the global exchange of information (from individual aircraft performance up to ATM resources) should allow full use of 4-D trajectory management/operation. The expectation is that the 4-D trajectory management optimization could be a function of either the ground or the air or both.

d. Provide, through its evolution, incentives to upgrade to new capabilities;

e. Provide benefits commensurate with the level of aircraft capabilities or performance;

Explanatory Text: It is expected that
- *operational benefits and incentives will accelerate the evolution of the ATM system;*
- *incentives will ensure consistent and interoperable evolution of the ATM system; and*
- *the degree of benefits and incentives will be different depending on the type of users.*

It is further expected that
- *a level of ATM system benefits will be defined in accordance with a level of aircraft capabilities;*
- *ICAO will develop global Standards for new ATM systems in a timely manner;*
- *States, recognizing global Standards, will file minimal differences; and*
- *even during the transition phase, global interoperability will be ensured/managed through benefits commensurate with the aircraft capabilities.*

f. Utilize relevant airspace user operational information to meet performance targets;

g. Operate on the basis that airspace users will make available the relevant operational information to the ATM system and vice versa;

h. Operate on the basis that airspace users will provide information on individual aircraft performance;

i. Operate on the basis that airspace users will provide information on the individual operating environment as experienced (real time);

Explanatory Text: - It is expected that the ATM system will provide the necessary information for mission planning and coordination, and that mission planning will first interact with airspace organization and/or aerodrome operations for long-term planning and then with airspace management and demand and capacity balancing.

j. Operate on the basis that airspace users will establish and execute operational control of their missions;

k. Accommodate operational control activity; and

Explanatory Text: - It is expected that operational control, where utilized, will be exercised over individual missions from initiation to termination. The division between operational control and the flight authority's (captain's or commander's) responsibility for the safety of the flight mission is considered to be a key contributor to the safe operation of the flight.

l. Allow airspace users to fly user-preferred trajectories that are consistent with the applicable airspace management requirements and aircraft capabilities.

4.6 Conflict Management

Conflict management limits, to an acceptable level, the risk of collision between aircraft and hazards. Hazards from which an aircraft will be separated are: another aircraft, terrain, weather, wake turbulence, incompatible airspace activity and when the aircraft is on the ground: surface vehicles, and other obstructions on the apron and maneuvering areas.

Conflict management will consist of three layers:

a) strategic conflict management;
b) separation provision; and
c) collision avoidance.

To meet the performance expectations of the ATM system stemming from conflict management, the ATM system shall:

a. Implement the conflict management function;

b. Define the predetermined separator prior to commencement of separation provision; however, the role of separator may be delegated;

c. Provide rules and means to delegate the role of separator;

Explanatory Text: When the role of separator is delegated then the conditions for both start and end of the delegation shall be defined in advance of the delegation. Changes of delegation shall be by agreement.

d. Determine the separator for each renegotiated 4-D trajectory;

e. Provide separation provision service when required by safety or ATM system design;

f. Designate the airspace user as the predetermined separator, unless safety or ATM system design requires a separation provision service;
g. Define separation modes for separation from all hazards, including weather, applicable to all airspace and movement areas;

Explanatory Text: The selection of separation minima within ATM system performance constraints seeks to balance the need for appropriate levels of safety performance with other performance expectations, including cost-effectiveness, capacity, and efficiency. While it may be possible, for example, to select small (distance/time) separation minima to be applied in a particular operational area, the requirements for supporting navigation, surveillance, communications, and intervention capability performance may be prohibitively expensive, or they may not permit the expected capacity enhancements (e.g. because of communication volume limitations, etc.). The choice of appropriate separation minima and supporting infrastructure would be determined through collaborative decision making.

h. Select the applicable separation modes and separation minima for conflict management that best meet the ATM system performance targets;

i. Support strategic, pre-tactical and tactical conflict management. The selection of the type of conflict management shall be based on meeting ATM system performance targets, both before and after departure;

j. Apply tactical conflict management when strategic conflict management cannot be used efficiently;

k. Apply separation provision only when strategic conflict management cannot be used effectively;

l. Limit, to an acceptable level of safety, the risk of collision between aircraft and hazards; and

m. Ensure that collision avoidance systems activate when the separation mode has been compromised.

Explanatory Text: The risk of collision is maintained at an acceptable level of safety by selecting and applying appropriately defined separation minima (displacements between an aircraft and a hazard). It is intended that the "acceptable" level of safety will be determined from the perception of safety needs by society and the international community, related to the trust required from the ATM system. It is intended that the target level of safety will be based on risk assessment and acceptance criteria and be equal to or better than the "acceptable" level of safety. It is intended that the collision avoidance function not be included in determining the calculated level of safety required for separation provision, although it constitutes the third layer of conflict management and, hence, part of ATM safety management.

4.7 ATM Service Delivery Management

ATM service delivery management will operate seamlessly from gate to gate for all phases of flight and across all service providers. The ATM service delivery management component balances and consolidates the decisions of the various other processes/services, as well as the time horizon at which, and the conditions under which, these decisions are made. Flight trajectories, intent, and agreements will be important components for delivering a balance of decisions. To meet the performance expectations of the ATM system stemming from conflict management, the ATM system shall:

a. Optimize system-level performance as its highest priority with individual component performance subject to that prioritization;

b. Provide services predicated on management by trajectory and monitor compliance with the agreed trajectory;

c. Define the predetermined separation responsibility;

Explanatory Text: System wide optimization is a high priority and individual component optimizations operate within the constraints of that priority. The hierarchy of decision-making is consistent with these principles. Every decision has an identified responsible party.

d. Operate on the basis that the airspace user will provide flight and aircraft intent to the ATM system for use in planning and managing 4-D trajectories;

e. Approve execution of 4-D trajectory agreements through issuance of clearances;

f. Monitor and alert when the clearance is inconsistent with the agreement;

g. Monitor and alert when indications are that an aircraft will not be in conformance/compliance with the agreement;

Explanatory Text: Flight intent forms the basis for an ATM system agreement, and changes to the flight intent represent a request for modifications to the agreement. Aircraft intent forms the basis for ATM system confirmation of compliance with the agreement. The allowable variation from the agreed threshold is locally adaptable. Generating an agreement does not imply authority to execute. Initiating the agreement or any portion thereof requires a clearance. Clearances may not represent the entire agreement; the system shall alert the appropriate party when this is the case. The intent is to preclude an inadvertent entry into holding or inability to make the next trajectory point due to unintentional failure to provide follow-on clearance. The greater flexibility inherent in management by trajectory requires automated monitoring of adherence to and variance from the agreed trajectory. All ATM data will be available for accessing and use. The ATM system will automatically monitor, alert, and develop responses

h. Utilize flight trajectory, flight intent, and individual aircraft performance characteristics in providing ATM services;

Explanatory Text: It is expected that the 4-D trajectory will be globally shared and used by the ATM community in all aspects of its operations. The requirement recognizes the difference between the tolerances associated with the 4-D contracts and what may be more stringent performance capabilities of the individual aircraft. For example, aircraft providing the ATM system with knowledge of their very accurate performance capabilities would, as a result, provide the ATM system opportunity to identify conformance/compliance irregularities that could be used in providing such services as conflict management, security notification/response, and so on.

i. Operate on the basis that all operations are “known to the system”;

Explanatory Text: While aircraft may not be subject to any particular service, their participation in the ATM system must be announced either strategically, or pre-tactically by notification of intent, or tactically by immediate notification of intent or operation of identification devices or by

operation in predetermined areas. As an example, an aircraft classified in 2000 as a VFR aircraft operating in Class G airspace will be able to operate with the same degree of freedom in the future ATM system, either by notifying intent to operate in a particular way, by carriage and operation of an identification device such as a transponder, or by operating in predesignated airspace, such as the equivalent of Class G.

j. Predict potential saturation of airspace or aerodromes in advance and to a level of accuracy to meet ATM system performance objectives;

Explanatory Text: It is expected that the ATM system will be able to determine actual or potential saturation of any selected airspace and/or aerodromes. It is intended that information will be generated that will summarize the problems regarding saturated airspace. If airspace or aerodromes are or will be saturated, the capacity management function shall have the capability to allocate available airspace or aerodrome capacity, determine flight restrictions for specific aircraft, and communicate these restrictions and alternate courses of action to users

k. Provide a capability to evaluate effectiveness of flow restrictions implemented in the ATM system. Effectiveness criteria shall include overall system performance measures;

Explanatory Text: It is expected that the ATM system will provide recommendations for future runway selection based on forecast meteorological conditions, traffic, and other conditions that influence the best system solution

l. Establish an on-request basis for ATM service delivery;

m. Manage distribution of responsibilities for the various services and their seamless performance, including designation of the predetermined separator for separation provision;

Explanatory Text: Where ATM system technological solutions and infrastructure are provided across a region or globally by one or more States or organizations, long-term use and operational arrangements shall be established via the CDM process with the affected ATM community members on behalf of, or for the benefit of, multiple users, States, and/or organizations.

n. Work to reduce voice communications as far as is practicable in delivery of ATM services;

Explanatory Text: Clarification of the strategic provision of service (i.e. publication of rules for a specific airspace; the publication constitutes the communication). This should apply equally for NAVIGATION, SURVEILLANCE, and AIRSPACE. Depending on the phase of flight and the requirements associated with any separation mode being applied at the time, provision shall be available for direct or indirect voice or data link communication between the aircraft and the ground air traffic management authority and vice versa. Where communication performance requirements are established, they shall be determined on the basis of the urgency of the communication and whether or not the proposed transmissions are related to command and control-type (i.e. intervention capability) communication. Communications media consist of voice communication (direct or indirect), data link communication, or other means, including visual, aural, or sensory signals, to provide or exchange information, data, or alert or acknowledgment messages. The media or combination of media to be used for a particular application or function shall be determined from the appropriate Concept of Use in a region or State. However, in all cases, the selection of communications media shall be based on the principle of global

seamlessness and harmonization. Where seamlessness cannot be achieved for technical or cost-effective reasons, communications media must be interoperable.

o. Be based on self-contained navigation supported primarily by onboard and/or space-based systems, as far as is practicable;

Explanatory Text: Precision navigation guidance within terminal areas, on final approach, on the ground, and/or in the initial departure phase, may be provided by dependent or independent self-contained onboard navigation systems or independent ground-based systems. Depending on the phase of flight and requirements associated with any separation mode or minima being applied at the time, navigation performance requirements may be established. These may be based on predicted and/or anticipated performance (contained navigation performance) or actual and/or observed performance (actual navigation performance).

p. Operate on the basis that services to airspace users will be based on the actual navigation performance of the users at the time of service. Where navigation performance requirements are specified, they will be determined on the basis of the navigation accuracy required in a given volume of airspace and/or through specific procedures to maintain appropriate levels of safety with respect to other hazards;

Explanatory Text: It is expected that as is the case with current Instrument Landing System categorization (i.e. Cat I, II, III, etc.), having defined a particular performance expectation for a given volume of airspace, or other delineation, it will be the airspace users who will determine both how they achieve the requirement and/or whether they can meet the requirement at the time of operation. In the ILS scenario, it is the meteorological conditions at the time of arrival that dictate the minimum performance requirement; and the airspace user determines if the entire system (aircraft equipage, pilot training, ground systems, etc.) is sufficient for the user to attempt an approach.

q. Demonstrate an increased responsiveness across the spectrum of ATM services to real time changes in airspace users' needs. Furthermore, the ATM system should provide the user with at least one alternative in case of changes imposed by the ATM system;

Explanatory Text: It is expected that changes imposed by the ATM system will be defined to include changes of status of individual ATM system elements (e.g. revised status of special use airspace or meteorological conditions).

r. Operate on the basis that where surveillance performance requirements are specified, they will be determined on the basis of the accuracy of position determination (and subsequent display) required in a given volume of airspace and/or specific procedure to maintain appropriate levels of safety with respect to other hazards;

Explanatory Text: Depending on the phase of flight and the requirements associated with any separation mode or minima being applied at the time, surveillance requirements and surveillance performance requirements may be established. When specifying these requirements or performance expectations, consideration should be given to the potential inaccuracy of position derived from either dependent or independent surveillance (as a result of the uncertainty of position of the aircraft in the case of dependent surveillance or the system inaccuracies engendered by independent surveillance systems) and to the ability of the various systems to either predict future position or provide intent.

s. Operate on the basis that where there is a conflict between access and equity, allocation of priority to airspace users will be based on the principle of maximizing ATM system performance;

Explanatory Text: Existing practices relating to access and equity, particularly the "first come-first served" paradigm, should be amended to reflect the overall intent to improve ATM system performance. This is not intended to prohibit or block access to airspace; it is intended to allow establishment of procedures through collaborative decision making that optimize use of runways and/or airspace.

t. Operate on the basis that ATM service delivery will participate in determination of airport capacity and will be aware of the available airport capacity at relevant airports at all times to be able to maximize use of that capacity; and

Explanatory Text: ATM system capacity at and around airports should not act as a constraint on airport scheduling. It is expected that the ATM system will be capable of projecting for specified aerodromes and runways the numbers of arrivals and departures that can be handled and the numbers of planned arrivals and departures. The number of arrivals and departures of IFR traffic that can be handled by a specific aerodrome, and the number of planned arrivals and departures of IFR traffic projected in the future at a specific aerodrome or runway, will be provided through effective information management by the ATM system.

It is expected that factors such as runway surface conditions, surface meteorological conditions, winds aloft, local acceptance rate data, and terminal navigation equipment status will be monitored and used to determine actual capacity projections. It is expected that information will be delivered upon request to the level of detail specified by the user.

u. Ensure that appropriate mechanisms are established and maintained to ensure appropriate authority, responsibility, and data control of all ATM system information so that the various parties use a coherent set of data.

Agenda Item 5: Other Business

5.1 No other business was discussed.

INTERNATIONAL CIVIL AVIATION ORGANIZATION

CAR/SAM REGIONAL PLANNING AND IMPLEMENTATION GROUP

(GREPECAS)

ATTACHMENT 2

TO THE REPORT OF THE SIXTH MEETING OF THE ATM/CNS SUBGROUP OF GREPECAS

"REPORT OF THE SIXTH MEETING OF THE CNS COMMITTEE OF THE ATM/CNS SUBGROUP OF GREPECAS" (CNS/COMM/6)"

Boca Chica, Dominican Republic
30 June to 4 July 2008

Prepared by the GREPECAS
ATM/CNS Subgroup Secretariat

July 2008

The designation employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of ICAO concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

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Development and integration of ATM Automated systems *4-1*

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History of the Meeting

ii.1 Duration and site of the Meeting

The Sixth Meeting of the CNS Committee (CNS/COMM/6) of the GREPECAS ATM/CNS Subgroup (ATM/CNS/SG/6) was held at the Oasis Hotel & Resort in Boca Chica, Dominican Republic. The Meeting commenced on 30 June and ended on 4 July 2008. The Report of the CNS/COMM/6 Meeting was reviewed and adopted by the ATM/CNS Subgroup on 4 July 2008.

ii.2 Organization of the Meeting

The Meeting was chaired by Mr. Ricardo Bordali (Chile), Chairperson of the CNS Committee, assisted by Mrs. Veronica Ramdath (Trinidad and Tobago), Vice- Chairperson. Mr. Onofrio Smarrelli, Regional Officer, Communications, Navigation and Surveillance from the ICAO SAM Regional Office acted as Secretary of the CNS Committee and was assisted by Mr. Julio Siu, Regional Officer, Communications, Navigation and Surveillance from the ICAO NACC Regional Office.

ii.3 Working Languages

The working languages of the Meeting were English and Spanish. The documentation and the Report of the Meeting were issued in both languages.

ii.4 Agenda

The following agenda was adopted by the Meeting:

Agenda Item 1: Communication systems developments

- 1.1 Review of the progress achieved in the integration/interconnection of regional digital networks
- 1.2 Follow up to the implementation/planning of air-ground data links
- 1.3 Follow up to the implementation of ATN and its applications
- 1.4 Communications systems requirements for the integration of ATM automated systems and ATFM requirements
- 1.5 Communications systems requirements in support of the migration towards meteorological message exchange in BUFR code format

Agenda Item 2: Navigation systems developments

- 2.1 Review of the GNSS regional implementation plan
- 2.2 Follow up on the planning/implementation activities of the SBAS and GBAS augmentation systems in the CAR/SAM Regions
- 2.3 NDB gradual regional deactivation plan

Agenda Item 3: **Surveillance systems developments**

3.1 Review of the regional strategy of the implementation of surveillance systems in the CAR/SAM Regions

3.2 Follow up to the surveillance systems planning/ implementation/ trials (ADS-C, ADS-B, Radar Mode S, multilateration, etc.)

3.3 Surveillance systems requirements for the integration of ATM automated systems and ATFM requirements

3.4 Standardized regional registry for aircraft with Mode S transponder

Agenda Item 4: **Review of the deficiencies related to the CNS systems and other general issues**

4.1 Review to the status of the air navigation deficiencies related with the CNS systems

4.2 Review and updating of valid GREPECAS CNS related conclusions/decisions

4.3 Results of the ITU 2007 World Radio Communications Conference (WRC-2007) and position of ICAO at the ITU WRC-2011

Agenda Item 5: **Future organization of CNS work within the GREPECAS environment**

Agenda Item 6: **Other business**

ii.5 **List of Working Papers**

WORKING PAPERS

Number	Agenda Item	Title	Date	Prepared and Presented by
WP/01	--	Draft Agenda, Explanatory Notes, Modality, Working Methods, Organization and Schedule of the CNS/COMM/6 Meeting	13/05/08	Secretariat
WP/02	1.1	Follow up to the MEVA II- REDDIG interconnection activities	13/05/08	Secretariat
WP/03	1.2	Revision of the air-ground data link plan	26/05/08	Secretariat
WP/04	1.3	Regional ATN plan and its applications	31/05/08	Secretariat
WP/05	1.5	Follow up on activities for the migration to a new OPMET format	21/05/08	Secretariat
WP/06	2.1	Proposal of amendment to the Regional Air Navigation Pan – Tble CNS/3 of FASID	13/05/08	Secretariat
WP/07	2.2	Report of the Third meeting of the GNSS Task Force	05/06/08	Rapporteur of GNSS Task Force

WORKING PAPERS

Number	Agenda Item	Title	Date	Prepared and Presented by
WP/08	2.3	Deactivation of NDB stations	20/05/08	Secretariat
WP/09	3.1 and 3.2	Work accomplished by the Surveillance Task Force	13/05/08	Rapporteur Surveillance Task Force
WP/10	1.3	Work accomplished by the ATN Task Force	27/06/08	Rapporteur of ATN Task Force
WP/11	3.3	Interconnection of automated systems in the CAR/SAM Regions	21/05/08	Secretariat
WP/12	3.4	Guidelines and considerations for a normalized registry of aircrafts with Mode S transponder	13/05/08	Secretariat
WP/13	4.1	Review of CNS deficiencies in the CAR/SAM Regions	16/05/08	Secretariat
WP/14	4.2	Analysis of the status of GREPECAS conclusions	26/05/08	Secretariat
WP/15	4.3	Results of the ITU World Radio Communication Conference WRC 2007 and initial ICAO position for the WRC 2011.	31/05/08	Secretariat
WP/16	5	Terms of reference and work programme of the CNS committee.	16/06/08	Secretariat
WP/17	2.2	Status of the studies and works realized by the RLA/03/902 project.	04/06/08	SACCSA Members Project
WP/18	3.3	Activities in the CAR/NAM Regions for the implementation of the ATM Automation	23/06/08	Secretariat
WP/19	3.2	ICAO APANPIRG ADS-B service performance parameters.	17/06/08	SITA
WP/20	2.2	Own SBAS system	20/06/08	Brazil

ii.6 **List of Information Papers**

INFORMATION PAPERS				
Number	Agenda Item	Title	Date	Prepared and Presented by
IP/01	--	List of Working and Information Papers	27/06/08	Secretariat
NI/02	1.2, 1.3 y 2.2	Enmienda 83 al anexo 10 – Telecomunicaciones aeronáuticas	20/05/08	Secretariat
IP/03	6	ICAO framework for transition to an Electronic Air Navigation Plan (eANP)	20/05/08	Secretariat
IP/04	3	References on surveillance SARPS , planning and works of ASP panel	09/06/08	Secretariat
IP/05	1.2 and 3	Progress on global data link harmonization strategy	23/06/08	Secretariat
IP/06	2.2	Follow up on the planning/implementation activities of the SBAS and GBAS augmentation systems in the CAR/SAM Regions	27/06/08	United States
IP/07	1.2 and 3.2	Satellite Data Communications Performance in Oceanic and Remote Regions and the work of the FANS Satcom Improvement Team (FANS SIT)	27/06/08	United States
IP/08	3.2	Automatic Dependent Surveillance – Broadcast (ADS-B)	27/06/08	United States
IP/01	1.3	The Federal Aviation Administration Air Traffic Service Message Handling System (AMHS) Planning	27/06/08	United States

ii.7 **Schedule and Work Mode**

The Meeting held its sessions from 09:00 to 16:00 hours with two breaks, except on 30 June and 4 July 2008, during which this schedule was modified to attend to the ATM/CNS plenary meeting and other arrangements.

ii.8 **Conclusions and Decisions**

The CNS Committee recorded its activities in the form of Draft Conclusions, Draft Decisions, and Decisions, as follows:

Draft Conclusions:	*Conclusions that require approval by GREPECAS prior to their implementation.*
Draft Decisions:	*Decisions that require approval by GREPECAS prior to their implementation*
Decisions:	*Decisions that deal with matters of concern to the ATM/CNS Subgroup and its Committees.*

ii.9 **Draft Conclusions**

Number	Title	Page
CNS/6/1	Seminar/workshop on the implementation of air-ground data links and its applications	1-3
CNS/6/2	Participation of ICAO in the new formats studies for the transmission of OPMET information	1-7
CNS/6/3	Amendment to the Regional Air Navigation Plan – Table CNS/3 of FASID	2-2
CNS/6/4	Availability of GNSS receiver for Project RLA/03/902 ionospheric analyses and studies	2-2
CNS/6/5	Acceptance of an own SBAS and support for Project RLA/03/902-SACCSA	2-3
CNS/6/6	Short-term GNSS use	2-4
CNS/6/7	Review of the plan for the progressive deactivation OF NDB stations	2-5
CNS/6/8	CAR/SAM regional action for the preparation and support of the ICAO position for WRC-11	4-2

Agenda Item 1: Communication systems developments

MEVA II / REDDIG Interconnection

1.1 Review of the progress achieved in the integration/interconnection of regional digital networks

1.1.1 On this agenda item, the Meeting took note of the pending activities for the MEVA II / REDDIG interconnection regarding the activities of the focal points, the activities of REDDIG Administrator, the activities of the MEVA II Service Provider, the acceptance of the MoU for the MEVA II / REDDIG interconnection, the satellite contingency plan and the update of the respective action plan of activities.

Focal point activities

1.1.2 The Meeting was informed about the names of the focal points and provides their address, phone number and e-mail information as well as the assignment of the first activities for the focal points, such as the analysis, to determine the electric power, physical space, protection requirements, required cables, racks and other important data on the sites where the necessary equipment for the interconnection will be installed.

REDDIG Administration Activities

1.1.3 The Meeting took note that the REDDIG Administration, in order to comply with the foreseen MEVA II / REDDIG interconnection activities, held a public procurement tender for the equipment to be installed in the Caracas and Bogotá REDDIG nodes and the Tegucigalpa MEVA II node through the ICAO Technical Co-operation Bureau.

1.1.4 Furthermore, the Meeting was informed that the REDDIG Administration and COCESNA are coordinating as necessary an agreement to establish the technical, administrative and financial responsibilities of the two parties.

1.1.5 The Meeting also took note that the REDDIG Administration is likewise reviewing the MEVA II service supply contract for its acceptance, which specifies the activities that the service provider will perform and the technical, administrative and financial responsibilities of the two parties (REDDIG Administration and the MEVA II service provider).

Activities of the MEVA II Service Provider

1.1.6 The Meeting was informed that the MEVA II service provider will change the polarity of all antennas in the MEVA II network nodes from horizontal to vertical to permit the interconnection of the REDDIG and MEVA II networks. The changes in polarity would be made once the REDDIG Administration reviews and signs the contract prepared by the MEVA II service provider.

Memorandum of Understanding (MoU) for the MEVA II- REDDIG interconnection

1.1.7 The Meeting recalled that the MoU for the MEVA II / REDDIG interconnection is established for the purpose of facilitating coordinated planning for the interconnection of the MEVA II and REDDIG networks and that it stipulates the necessary technical, operational and administrative aspects for the interconnection of the MEVA II and REDDIG VSAT digital networks, in order to meet aeronautical telecommunication requirements between the CAR/SAM Regions.

1.1.8 The Meeting took note that all States/Territories and Organisations members of the MEVA II and REDDIG networks had expressed their willingness to accept the MoU and that many of the members of the two networks have already signed that MoU and urged remaining members who have not yet signed to do so as soon as possible.

Satellite Contingency Plan

1.1.9 The Meeting was informed that during the Sixth MEVA II - REDDIG Coordination Meeting (MR/6), the REDDIG Administration and the MEVA II service provider presented a satellite contingency plan to be applied in the event of satellite transponder failure or of a total satellite failure.

1.1.10 Also, the meeting was informed that INTELSAT planned to launch a new INTELSAT 14 (IS-14) satellite in the second quarter of 2009 that would be replacing its current IS-1R (formerly known as PAS-1R) satellite.

1.1.11 In this respect, the Meeting was informed that the REDDIG Administration and the MEVA II service provider had expressed their intention, in this regard, to migrate to the new satellite on the cited date.

MEVA II / REDDIG Interconnection Date

1.1.12 The Meeting analyzed the schedule of activities specified in the action plan reviewed and approved at the Sixth MEVA II – REDDIG (MR/6) Coordination Meeting, which is presented as **Appendix A** to this agenda item.

1.2 Follow up to the implementation/planning of air-ground data links

1.2.1 Within this Agenda Item, the Meeting was informed about a summary of matters relating to the implementation of air-ground data links and considerations about their implementation.

1.2.2 Taking into account the regional guidelines agreed by GREPECAS and specifically those adopted by GREPECAS through Conclusions 13/71 – *Update and implementation of the AMS and AMSS satellite, HF, and VHF Voice Communication Plan,* and 13/72 – *Regional strategy for the update and progressive implementation of the air-ground data link plan*, the Meeting was informed about the update of the Aeronautical Mobile Service (AMS) and the Aeronautical Mobile Satellite Service (AMSS) contained in Table CNS 2A of the CAR/SAM Regional Air Navigation Plan, Doc 8733, Volume II (FASID), informed to States as an amendment through the ICAO Regional Offices.

1.2.3 The Meeting took note that the regional strategy for the update and implementation of the air-ground data link plan agreed in Conclusion 13/72 is consistent with the Global Air Navigation Plan (Doc 9750 – AN/963) Initiatives IPM-17 – *Implementation of data link applications,* which promotes increased use of data link applications, such as D-ATIS, and controller-pilot data link communication (CPDLC) and Initiative IPM-22 – *Communication Infrastructure*.

1.2.4 The Meeting was informed about the actions and considerations undertaken in the CAR and SAM Regions, respectively, with regard to the implementation of air-ground data links (**Appendix B** to this agenda item).

1.2.5 The Meeting took note that generally the new versions and models of AMS-VHF radio equipment are being produced with data transmission (generally VDL Mode 2) capability and that some CAR/SAM States have acquired these new versions of VHF radio equipment and that some radio-equipped aircraft with data transmission (VDL 2) capability are operating in the region today; therefore, studies could be undertaken for conducting VDL data transmission trials. In order to support the study of a plan for air-ground data transmission trials, it would be advisable for ICAO to plan a seminar for the dissemination of experiences in the implementation of data transmission in other Regions, the functions or applications implemented through these links, ICAO SARPs in force and those planned in this respect, together with information about future air-ground data communication systems being considered by ICAO.

1.2.6 In this respect, the Meeting agreed on the following Draft Conclusion:

DRAFT
CONCLUSION CNS/6/1 SEMINAR/WORKSHOP ON THE IMPLEMENTATION OF AIR-GROUND DATA LINKS AND ITS APPLICATIONS

To support the study of the trial plan for air-ground data transmission and the functionalities or applications implemented through these links, ICAO is urged to plan and convene a Seminar/Workshop on this respect to be held for the last quarter of 2009.

1.3 Follow up to the implementation of ATN and its applications

Global Plan initiatives

1.3.1 Following-up on Conclusion 5/2 of the ALLPIRG/5 meeting (Montreal 23-24 March 2006), the Meeting learned that that the plans for the implementation of ATN and its applications in the CAR/SAM Regions were in line with Global Plan Initiatives GPI-17 (*Implementation of data link applications)* and GPI-22 *(Communication infrastructure*).

Status of ICAO ATN SARPs

1.3.2 The Meeting took note that under amendment 83 to Annex 10 Aeronautical Telecommunications, Vol. III, Parts I and III, the technology of the Internet protocol suite (IPS) was introduced in the Aeronautical Telecommunication Network (ATN) effective on 20 November 2008.

1.3.3 The Meeting was informed that the amendment introduces IPS elements in Annex 10 that are essential for IPS-based ATN. The amendment makes reference to the standards developed by the Internet Engineering Task Force (IETF) under the sponsorship of the Internet Society (ISOC). These are open standards and can be obtained cost-free. Following IETF standards, provisions have been introduced into the amendment for the TCP (Transmission Control Protocol), UDP (User Datagram Protocol), and IPv6 BGP (Border Gateway Protocol).

1.3.4 The detailed technical specifications will be incorporated into the new ATN/IPS Manual, document 9896, which is scheduled for publication in November 2008. This document is divided into three parts: the first spells out the detailed technical specifications, the second covers IPS applications and the third contains the guidance material.

1.3.5 Likewise, the Meeting was informed that among the pending activities of the ICAO Aeronautical Communications Panel (ACP) is the preparation of the IPv6 Addressing Plan, the ATN/IPS requirements for VoIP and Mobility, ATN IPS Safety Material, and ATN/IPS adjustments for ATN applications.

ATN router implementation plans

1.3.6 The Meeting reviewed the preliminary ATN router plan (Table CNS 1Ba) of the CAR/SAM Regions reviewed during the Fourth Meeting of the ATN Task Force, held in Santo Domingo, 27 to 28 June 2008. In the **Appendix C and D** to this agenda item the ATN router plan of the CAR and SAM Regions is presented which are incorporated in table CNS 1Ba of the FASID.

1.3.7 The Meeting noted that the ATN Task Force will carry out communication trials using IP protocols to determine the performance of circuits in order to be able to determine the proper link velocity for the ATN network and to complete the Table CNS 1Ba. To this respect, trials shall be done:

- Between MTAs: Argentina-Paraguay; Argentina-Brazil; United States-COCESNA and national MTA trials in Brazil y Argentina;
- Between MTA and UA: Argentina-Peru and national MTA-UA trials in Argentina and Brazil.
- Radar transmission trial: Venezuela-Brazil and Jamaica-COCESNA
- Voice over IP: Argentina-Brazil.

1.3.8 The Meeting considered that the results of the mentioned trials will be used to analyze if the topology/infrastructure could be modified and to also determine its economic impact. In this regard, the Meeting considered the need for trials concerning the prevision of bandwidth increments, delays and other considerations in regional networks foreseeing the implementation of new services in States/Territories/International Organizations in the short term.

Implementation plans for ATN ground-ground applications

1.3.9 The Meeting reviewed and updated the FASID Table CNS 1Bb for the CAR/SAM Regions presented as **Appendix E and F** to this agenda item The following can be noted from the information given in table CNS 1Bb for the CAR and SAM Regions:

a) AMHS implementation will be underway in most of the CAR/SAM States and Territories by 2015. In the case of AIDC, no implementation date has been set of yet.

b) the IP protocol is the standard to be used for ATN ground-ground applications. At present, the IP protocol version 4 is being used in the CAR/SAM Regions where AMHS systems are being implemented.

1.3.10 The Meeting noted that the preliminary approach to IP implementation for the CAR/SAM Regions was prepared at the third meeting of the ATN Task Force of the CNS Committee of the GREPECAS CNS/ATM Subgroup (Miami Florida, 20-23 March 2007) which proposed the use of the Internet Protocol version 4 (IPv4) to accelerate AMHS implementation in the CAR/SAM Regions during the initial stage and then of the IPv6 protocol to establish interregional connectivity. A transition phase was also foreseen using a dual stack transition that would involve implementation of IPv4 and IPv6 in the AMHS systems and that would eventually lead to a network based only on IPv6, deactivating the IPv4.

1.3.11 The Meeting analyzed the modifications made to the initial transition AMHS Plan during the 4th meeting of the CNS ATN Task Force. The Fourth Meeting of the ATN Task Force updated the initial Transition Plan for the ATN based on the above mentioned ATN/TF/3 Conclusion 3/1, in which the advances in the guidance material for ATN/IPS (Doc. 9896) and the recent publication of ICAO Doc. 9880 Part II B for AMHS were considered. The CAR/SAM Regional AMHS Transition Plan will limit its scope to implementing the AMHS and AFTN/AMHS Gateway as specified in ICAO Doc. 9880 Part IIB to replace the existing AFTN. It will cover the operational procedures and temporary measures necessary during the transition period. The security and protection of the network will be addressed to prevent AMHS TCP/IP dedicated circuits network from interfacing with public internet.

1.3.12 The meeting noted that during the review of such document that the following appendices should be incorporated in the document. Some of the appendices are completed and others have to be developed by the Task Force:

Appendix I	CAR/SAM AMHS Network Status Table
Appendix II	CAR/SAM AMHS Network Backbone Trunks
Appendix III	CAR/SAM TCP/IP v4 Routing Policy
Appendix IV	IPv4 Addressing Scheme
Appendix V	IP Router Interface Control Document
Appendix VI	MTA Routing Policy
Appendix VII	AMHS Address Designation
Appendix VIII	CAR/SAM Directory Service
Appendix IX	AMHS and IP Router Compatibility Test Procedure
Appendix X	AMHS IP Security
Appendix XI	CAR/SAM ATN Task Force Task Assignment
Appendix XII	CAR/SAM AFTN Infrastructure

1.3.13 The Meeting noted that the initial transition Plan for ATN with the above-mentioned Appendices would be settled when the Fifth Meeting of the ATN Task Force group meets at the end of the first quarter of 2009 at the ICAO NACC Office in Mexico.

IP Addressing Plan

1.3.14 The meeting took note of the analysis performed by the ATN Task Force on alternatives for the CAR/SAM TCP/IP implementation identifying the options available to ease this implementation in the AMHS service. This is configured according to the ICAO Document 9880 Part IIB.

1.3.15 To this respect the Meeting agreed on two viable options for the implementation of TCP/IP.

a) AMHS using RFC1006 over TCP/IP Router (IPv4) using RFC1006 incorporated in the AMHS to allow AMHS interface directly with IPv4 based Router for intra-regional connections

b) AMHS configuration as specified in a) with added capability for IPv4 to IPv6 translation by implementing an IP gateway router function for inter-regional connections.

1.3.16 The Meeting analyzed an IP CAR/SAM Addressing Plan which was performed and reviewed by the ATN Task Force group in its Fourth Meeting. The IP addressing Plan is based for a private IPv4 space address, considering the IPv4 limited public addresses availability and the eventual IPv6 transition plan. The scheme adopted is presented as **Appendix G** to this agenda item.

1.3.17 The Meeting considered that the IP Addressing Plan adopted for the CAR/SAM Regions would be sent to the ICAO for its review.

Regional AMHS addressing plan

1.3.18 The Meeting reviewed the preliminary AMHS addressing plan in the CAR/SAM Regions included as **Appendix H** to this agenda item.

1.3.19 Also, the Meeting considered the importance to establish an entity to manage the AMHS addressing scheme and coordinate this work with other ICAO regions. It was also noted that EUROCONTROL already has an Administrative Management Centre (AMC) and extended an offer to the CAR/SAM Region States that already AMHS implemented in order to become familiar with their program.

1.3.20 To be able to establish an AMHS addressing Administrative Management Centre in the CAR/SAM Regions the Meeting considered that ICAO will invite EUROCONTROL to the Fifth Meeting of the ATN Task Force, to perform an AMC functioning demonstration.

Regional ATN air-ground application plan

1.3.21 The Meeting considered that the ATN air-ground application plan will be completed once the ICAO SARPs on ATN IPS for air-ground applications have been completed.

1.3.22 The Meeting thanked the ATN Task Force for their excellent work carried out.

1.4 Communications systems requirements for the integration of ATM automated systems and ATFM requirements

1.4.1 This issue was dealt with under Agenda Item 3.3 – *Surveillance systems requirements for the integration of ATM automated systems and ATFM requirements*.

1.5 Communications systems requirements in support of the migration towards meteorological message exchange in BUFR code format

1.5.1 The Meeting took note that the ICAO Air Navigation Commission, at the fourth meeting of its 176th session (25 October 2007), approved the suspension of migration towards the BUFR code until the studies of XML use for OPMET data exchanges have been completed by the WMO expert team.

1.5.2 In the light of the suspension of migration towards the BUFR code until the WMO studies on XML use have been completed, the Meeting considered that the ATN Task Force and the COMMET Committee of the MET Subgroup should suspend their studies on communication aspects considered necessary for migration towards the exchange of meteorological messages in BUFR codes until the XML studies for OPMET data exchanges have been completed.

1.5.3 The Meeting took note that the WMO Expert Team had not yet started the studies of XML for OPMET message transmission (METAR/SPECI and TAF), and that these activities were expected to be completed by the year 2009.

1.5.4 The Meeting considered that ICAO, as the ad hoc Meeting on the planned migration of OPMET data toward table-driven code forms (Geneva, Switzerland, 13 April 2007) determined, should participate actively in the work of the WMO Expert team for the studies of XML application in OPMET message transmission, in order to avoid what happened to the migration of OPMET messages to the BUFR code form.

1.5.5 In addition, the Meeting considered that the WMO Expert team, together with ICAO, should, as part their studies of XML application in OPMET message transmission, analyze its possible impact on systems that are replacing the AFTN, such as the AMHS system, which is in growing use in the CAR/SAM Regions and other regions of the world. On this respect, the Meeting formulated the following Draft Conclusion:

DRAFT
CONCLUSION CNS/6/2 PARTICIPATION OF ICAO IN THE NEW FORMATS STUDIES FOR THE TRANSMISSION OF OPMET INFORMATION

That ICAO actively participate in the work of the WMO groups of experts on the XML studies for the transmission of OPMET messages, in order to avoid what happened to the migration of OPMET messages to the BUFR code.

APPENDIX A

PLAN DE ACCIÓN ACTUALIZADO PARA LA IMPLANTACIÓN DE LAS INTERCONEXIONES MEVA II Y REDDIG
UPDATED ACTION PLAN FOR IMPLEMENTATION OF MEVA II AND REDDIG INTERCONNECTIONS

Date/Fecha: April/Abril 2008

Item No.	Action / Acción	Responsible / Responsable	Completion Date / Fecha de Finalización	Status- Encountered Difficulties / Estado-Dificultades encontradas
1	2	3	4	5
1	RFP Completion/Finalización del RFP	COCESNA	30-Apr-07	Completed / Finalizado
2	Required connections: / Conexiones requeridas: Aruba COCESNA Ecuador Colombia Peru Venezuela Brazil / Brasil Panama United States / Estados Unidos Jamaica Curacao / Curazao	MEVA II Service Provider and REDDIG Administration / Proveedor Servicio MEVA II y Administración REDDIG	30-Apr-07 / 30-Abr-07	Completed / Finalizado
3	Identification of Current Equipment / Identificación de Equipo Actual	MEVA II Service Provider and REDDIG Administration / Proveedor Servicio MEVA II y Administración REDDIG	28 Sep-07	Completed / Finalizado

Item No.	Action / Acción	Responsible / Responsable	Completion Date / Fecha de Finalización	Status- Encountered Difficulties / Estado-Dificultades encontradas
1	2	3	4	5
4	Completion of SLA / Finalización de SLA	MEVA II Service Provider and REDDIG Administrator / Proveedor Servicio MEVA II y Administración REDDIG	30 Nov07	Valid/Valido Is part of the Service Contract/Es parte del Contrato de Servicio
5	Review of RFP / Revisión de RFP	MEVA II and REDDIG Members / Miembros MEVA II y REDDIG	29 June -07/ 29 Junio 07	The RFP was reviewed and approved by all MEVA II / REDDIG Member Administrations. / El RFP fue revisado y aprobado por todas las Administraciones miembros de las redes MEVA II y REDDIG.
6	Proposals response / Respuesta de propuestas	MEVA II Service Provider and REDDIG Administration / Proveedor Servicio MEVA II y Administración REDDIG	26 Sep.-07	The response for the RFP from the MEVA II Service Provider and REDDIG Administration was presented at the MR/5 Meeting/ Las respuestas al RFP por parte del Proveedor de Servicio MEVA II y la Administración de la REDDIG se presentó en la Reunión MR/5.
7	Proposals review / Revisión de propuestas	Coordination meeting / Reunión de coordinación	5 Oct.-07	The proposal was reviewed in the MR/5 Meeting. / La propuesta se revisó en la Reunión MR/5.

Item No.	Action / Acción		Responsible / Responsable	Completion Date / Fecha de Finalización	Status- Encountered Difficulties / Estado-Dificultades encontradas
1	2		3	4	5
8	Focal Point nomination / Nombramiento Punto Focal	Send a letter to MEVA II / REDDIG Member Administrations / Envio carta a las Administraciones miembros de las redes MEVA II y REDDIG.	ICAO Regional Offices / Oficinas Regionales OACI	15 Oct. 07	The ICAO Regional Offices sent to the States/Organization involved in the MEVAII REDDIG interconnection a letter in order to nominate focal points. Las oficinas regionales de la OACI enviaron una carta invitando los Estados/Organización involucrados en la interconexión la nominación de puntos focales.
		Focal point designation/ Designación punto focal	MEVA II and REDDIG Members involved / Miembros de MEVA II y REDDIG involucrados	30-Oct-07	All the States/Organization members of MEVA II and REDDIG network involved in the interconnection nominated focal points. Todos los Estados/Organización miembros de la REDDIG y MEVA II involucrados en la interconexión nominaron puntos focales
9	Application of MoU reviewed / Aplicación del MoU revisado		MEVA II / REDDIG Member Administrations / Administraciones miembros de las redes MEVA II y REDDIG	30-Oct-07	The ICAO Regional Offices sent to the States/Organization of MEVA II and REDDIG network in order to sign the MoU reviewed.
10	Review and acceptance of equipment costs for the MEVA II / REDDIG interconnection by the REDDIG Member Administrations / Revisión y aceptación por parte de las Administraciones Miembros de la REDDIG sobre costo de equipamiento para la interconexión MEVA II / REDDIG		All the REDDIG Member States / Todos Estados miembros de REDDIG	30 Oct-07	No comments were received No se recibieron comentarios al respecto

Item No.	Action / Acción	Responsible / Responsable	Completion Date / Fecha de Finalización	Status- Encountered Difficulties / Estado-Dificultades encontradas
1	2	3	4	5
11	Review and acceptance of equipment costs for the MEVA II / REDDIG interconnection by the MEVA II Member Administrations involved / Revisión y aceptación por parte de las Administraciones Miembros de la MEVA II involucradas sobre costo de equipamiento para la interconexión MEVA II / REDDIG	Aruba, Curaçao, Jamaica, Panama, USA (Miami and Puerto Rico) and COCESNA / Aruba, Curaçao, Jamaica Panamá, USA (Miami y Puerto Rico) y COCESNA	30 Oct -07	No comments were received No se recibieron comentarios al respecto
12	Review and acceptance of proposed recurrent costs for the MEVA II / REDDIG interconnection/ Revisión y aprobación costos recurrentes propuestos para la interconexión MEVA II REDDIG	MEVA II/ REDDIG Member Administrations involved / Administraciones Miembros de la MEVA II y REDDIG involucradas	30 Oct- 07	No comments were received No se recibieron comentarios al respecto
13	Revised MoU Signature / Firma del MoU Revisado	MEVA II and REDDIG Members / Miembros MEVA II y REDDIG	30 Nov 07	The following States sent the MoU reviewed signed/Los siguientes Estados enviaron el MoU revisado firmado: Argentina, Brasil, Chile, Cuba, COCESNA, Estados Unidos, Guyana, Peru y/and Uruguay

Item No.	Action / Acción	Responsible / Responsable	Completion Date / Fecha de Finalización	Status- Encountered Difficulties / Estado-Dificultades encontradas
1	2	3	4	5
14	Review, approval and signing of contracts or contract amendments to carry out the MEVA II / REDDIG interconnection presented by the MEVA II Service Provider / Revisión, aprobación y firma de los contratos o enmienda de los mismos para llevar a cabo la interconexión MEVA II/REDDIG presentada a través del Proveedor de Servicio de la MEVA II	MEVA II Member Administrations involved and REDDIG Administration / Administraciones Miembros de la MEVA II involucradas y Administración REDDIG	~~30 Nov 07~~/ June 2008/ Junio 2008	The REDDIG members assigned REDDIG Administration the revision and signature of AGS contract. The ICAO Technical Cooperation after reviewed the AGS contract considered the necessity to separate the no recurrent and recurrent costs. The decision took long time from December 2007 to April 2008. For the adquisition of the equipment a bid is necessary and so ICAO Technical Cooperation will proceed with this process. For the services cost AGS is to modify the contract in order to include only the service costs. Los miembros de la REDDIG asignaron a la Administración de la REDDIG la revisión y firma del contrato. La Cooperación Técnica de la OACI después de revisar el contrato de AGS consideró la necesidad de separar los costos recurrentes de los no recurrentes. La decisión fue tomada después de un largo periodo de diciembre de 2007 a abril de 2008. Para la adquisición del equipo se procederá a un proceso de licitación publica y por lo cual Cooperación Técnica de la OACI procederá según este proceso. Para los costos de los servicios se consideró que AGS modificara el contrato de forma tal que incluyera solamente los costos de los servicios.

Item No.	Action / Acción	Responsible / Responsable	Completion Date / Fecha de Finalización	Status- Encountered Difficulties / Estado-Dificultades encontradas
1	2	3	4	5
15	To ensure that all MEVA II and REDDIG nodes work with IS-IR Satellite, using Band C transponder with US/Latin America hemispheric beam and Co-Linear Vertical polarization / Asegurar que todos los nodos de la MEVA II y REDDIG operen en el satélite IS-1R, empleando transpondedores de banda C con haz hemisférico US/Latin America y polarización co-lineal vertical.	MEVA II Service Provider and REDDIG Administration/ Proveedor Servicio MEVA II/Administración REDDIG	~~30 Nov 07~~ June 08/ Junio 08	No change of polarity was executed. AGS is will proceed upon the signature of the contract for this interconnection. No se ha efectuado todavía el cambio de polaridad. AGS procedera cuando se firme el contracto para esta interconexión.
16	Equipment and spare parts acquisition for MEVA II/REDDIG interconnection/ Adquisición de equipamiento y repuestos para la interconexión MEVA II / REDDIG.	REDDIG Administration and MEVA II involved Member Administrations / Administración de la REDDIG y Administraciones Miembros de la MEVA II involucradas	~~14 Dec 07/14 Dic 07~~ End of July 08/Fin de julio 08	The ICAO Technical Cooperation informed that the bid process for the acquisition of equipments through a bid process will take a duration of approximately two months. La Cooperación Técnica de la OACI informó que el proceso de licitación para la adquisición de los equipos durara dos meses aproximadamente.
17	Site survey for Bogota, Caracas and COCESNA, / Inspección sitio para Bogota, Caracas and COCESNA,	MEVA II Service Provider and REDDIG Administration / Proveedor MEVA II y Administración REDDIG	~~15 Jan 08/15 Ene 08~~ End of July 08/Fin de Julio 08	Site survey is considered as part of the services to be provided. El estudio de sitio se considera parte de los servicios a ser provistos.
18	Site preparation for equipment installation for MEVA II / REDDIG interconnection / Preparación de los sitios para albergar equipamiento para la interconexión MEVA II / REDDIG	Colombia, Venezuela and/y COCESNA	~~30 Jan 08/30 Ene 08~~ Aug08/Ago08	

Item No.	Action / Acción	Responsible / Responsable	Completion Date / Fecha de Finalización	Status- Encountered Difficulties / Estado-Dificultades encontradas
1	2	3	4	5
19	Delivery of purchased equipment at the required sites. / Entrega de equipamiento adquirido en los sitios requeridos	MEVA II Service Provider and REDDIG Administration / Proveedor de Servicio MEVA II y Administración REDDIG	~~15 Feb 08~~ Sep08	
20	Equipment installation / Instalación equipamiento	MEVA II Service Provider and REDDIG Administration / Proveedor de Servicio MEVA II y Administración REDDIG	~~14 Mar 08~~ Oct08	
21	Satellite line-up, configuration of site equipment and NCC for the interconnection/ Line-up satelital, configuración equipamiento en sitio y NCC para interconexión	MEVA II Service Provider and REDDIG Administration / Proveedor de Servicio MEVA II y Administración REDDIG	~~21 Mar 08~~ Oct08	
22	End-to-end trials for voice and data circuits / Pruebas de extremos a extremos para los circuitos de voz y datos	MEVAII Service Provider and REDDIG Administration / Proveedor de Servicio MEVA II y Administración REDDIG	~~27 Mar 08~~ Nov 08	
23	System Performance Evaluation / Evaluación de la performance del sistema	MEVA II Service Provider and REDDIG Administration / Proveedor de Servicio MEVA II y Administración REDDIG	~~25 Apr 08/25 Abr 08~~ Dec08/Dic08	
24	Service acceptance / Aceptación de los servicios /	MEVA II / REDDIG Member Administrations / Administraciones miembros de las redes MEVA II y REDDIG	~~30 Apr 08/30 Abr 08~~ Jan09/Ene09	
25	MEVA II / REDDIG Interconnection Implementation / Implantación de la interconexión MEVA II / REDDIG	MEVA II / REDDIG Member Administrations, MEVA II Service Provider and REDDIG Administrator / Administraciones miembros de las redes MEVA II y REDDIG, Proveedor Servicio MEVA II y Administración REDDIG	~~May 08/~~ ~~Mayo 08~~ Feb09	

Legend / Leyenda:
MoU: Memorandum of Understanding / Memorando de Entendimiento
RFP: Request for Tecnical and Econmic Proposal / Solicitud de Propuestas Técnicas y Económicas
SLA: Service Level Agreement / Acuerdo de Nivel de Servicio

APPENDIX B

AIR-GROUND DATA LINK IMPLEMENTATION ACTIVITIES IN THE CAR/SAM REGIONS

CAR REGION

1. In the update of the *CAR/SAM Regional Plan for the Aeronautical Mobile Service (AMS) and the Aeronautical Mobile Satellite Service (AMSS)* contained in Table CNS 2A of the CAR/SAM Regional Air Navigation Plan, Doc 8733, Volume II (FASID), it can be noted that several States/Territories have plans to provide data link automatic terminal information service (D-ATIS).

2. Several States/Territories/International Organisations in the CAR Region have renewed their VHF radio equipment, of which some is compatible with or capable of establishing VDL data links through configuration of the equipment or the acquisition of additional modules.

3. COCESNA has reported that its current Control Centre in CENAMER has ADS data processing capability and provides CPDLC service through data links *via* its data link server processors (DLSP).

4. During the first meeting of the CAR/NAM Working Group, CAR/WG/01, a recommendation was made in Conclusion 1/5 b) to amend the format of FASID Table CNS 2A by combining all of the data communication requirement columns [columns: 4 (VHF data), 6 (HF data), 8 (satellite data) and 9 (Mode S)] in a single column entitled “A/G data” and to estimate a completion date later than 2015.

5. Both the first and second meetings of the CAR/NAM Working Group, NACC/WG, agreed, in order to orient the definition of national implementation plans, to review, complete and execute the respective Action Plan for implementation of ground-ground and air-ground voice and data communication based on the format presented in an attachment to this appendix.

SAM REGION

1 By the end of July 2008, Brazil will have implemented data link automatic terminal information service (D-ATIS) at its Rio de Janeiro and Sao Paulo Airports. The ADS/CPDLC FANS 1/A system is expected to enter into operation in its Oceanic FIR by April 2009.

2 Chile and Argentina have started implementing ADS and CPDLC functions in their oceanic FIR and plan to complete the process by 2009.

3 Many States in the SAM Region have implemented VHF radio systems with VDL capabilities, even though they have no short-term plans as yet for their operational use.

ATTACHMENT

ACTION PLAN FOR THE FOLLOW UP AND IMPLEMENTATION OF AIR-GROUND AND GROUND-GROUND COMMUNICATIONS

State/Organisation Fecha:

No.	Strategic Objective / Objetivo	Global Plan / Plan Mundial - GP	GREPECAS No. Con/Dec/Pa	Target Activity / Actividad Meta	Follow-up Action / Acción de seguimiento	To be developed by / A ser desarrollado por	Deliverable / Entregable	Target date / Fecha límite	Remarks / Observaciones
1	2	3	4	5	6	7	8	9	10
1	A, D	GPI-17	13/71 a)	Improve or mitigate VHF and HS/AMS (r) coerages		States and International Organizations	Fulfilment of required coverage		
2	A, D	GPI-17	13/71 b)	Implement the satellite voice communiations tht may be needed		States and International Organizations	Implement the required voice communications		
3	A, D	GPI-17	13/71 b)	Review and propose an amendment to FASID Table CNS 2A, in accordance with the results of action 13/71 a)		States and International Organizations	Proposal of amendment		
4	A, D	GPI-17	13/71 c)	Inform the ICAO NACC Office about the progess made in actions a) and b) of Con. 13/71		States and International Organizations	Information sent		
5	A, D	GPI-17	13/72 a)	Draw up an evolutionary air-ground data linkimplementation plan based on the Plan of Activities and the Implementation Programme presented in Appendices AW and AX to the GREPECAS/13 Report, under Agenda Item 3		States and International Organizations	Plan drawn up		
6	A, D	GPI-17	13/72 b)	Review and propose an amendment to FASID Table CNS 2A, in accordance with the results of action 13/72 a)		States and International Organizations	Proposal of amendment		
7	A, D	GPI-17	13/72 c)	Inform the ICAO NACC Office about the results of actions a) and b) of Con. 13/72		States and International Organizations	Information sent		
8	A, D	GPI-17	13/74	Insert the proposal of amendment according to the ATN regional plan format		ICAO	Proposal of amendment inserted		
9	A, D	GPI-17	13/75 a)	Analise requirements and draw up plans for implementing ATN ground-ground applications, such as AMHS and AIDC		States and International Organizations	Plan drawn up		
10	A, D	GPI-17	13/75 a)	Inform the ICAO NACC Office about the results of Con. 13/75, action a).		States and International Organizations	Information sent		
11	A, D	GPI-17	13/78	Undertake activities for the deployment of the ATN and its applications, in keeping with the target dates and strategy presented in Appendix BA to the report of the GREPECAS/13 meeting, under Agenda Item 3		States and International Organizations	ATN deployment in keeping with planned dates		
12	A, D	GPI-17	13/79	Develop national plans for AMHS and AIDC implementation, thereby contributing to ATM automation		States and International Organizations	Plan prepared		

APPENDIX C

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

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
Anguilla	IP	Intra Regional	Trinidad and Tobago (Piarco)	TBD	IPv4	Eastern Caribbean Network	TBD	
Antigua	IP	Intra Regional	Trinidad and Tobago (Piarco)	TBD	IPv4	Eastern Caribbean Network	TBD	
Aruba	IP	Intra Regional	Jamaica (Kingston), Curacao	TBD	IPv4	MEVA	TBD	
Bahamas/ Nassau	IP	Intra Regional	Haiti (Port –of-Prince), USA (Miami)	TBD	IPv4	MEVA	TBD	
Barbados	IP	Intra Regional	Trinidad and Tobago (Piarco)	TBD	IPv4	Eastern Caribbean Network	TBD	
Belice/ Belice	IP	Intra Regional	Honduras – COCESNA (Tegucigalpa)	TBD	IPv4	CAMSAT	2008	
British Virgen Island (Tortola)	IP	Intra Regional	USA (Miami)	TBD	IPv4	MEVA	TBD	
Cayman I.	IP	Intra Regional	Jamaica (Kingston), Cuba (La Habana)	TBD	IPv4	MEVA	TBD	
Costa Rica/San José	IP	Intra Regional	Honduras – COCESNA (Tegucigalpa)	TBD	IPv4	CAMSAT	2008	
Cuba/La Habana	IP	Intra Regional	Haiti (Port –of-Prince), USA (Miami), Jamaica (Kingston), Cayman I., Honduras – COCESNA (Tegucigalpa)	TBD	IPv4	MEVA	TBD	
			Mexico	TBD	IPv4	TBD	TBD	
Curacao	IP	Intra Regional	Aruba, Dominican Republic (Sto. Domingo), Haiti (Port of Prince), Jamaica (Kingston), Puerto Rico (San Juan)	TBD	IPv4	MEVA	TBD	
Dominican Republic/Sto. Domingo	IP	Intra Regional	Haiti (Port of Prince), Puerto Rico (San Juan), Curacao / Miami	TBD	IPv4	MEVA	TBD	

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
El Salvador/San Salvador	IP	Intra Regional	Honduras – COCESNA (Tegucigalpa)	TBD	IPv4	CAMSAT	2008	
French Antilles (Martinique) /Fort-au-France	IP	Intra Regional	Trinidad and Tobago (Piarco)	TBD	IPv4	Eastern Caribbean Network	TBD	
French Antilles (Guadalupe) /Point-a Pitre	IP	Intra Regional	Trinidad and Tobago (Piarco)	TBD	IPv4	Eastern Caribbean Network	TBD	
Grenada	IP	Intra Regional	Trinidad and Tobago (Piarco)	TBD	IPv4	Eastern Caribbean Network	TBD	
Guatemala/La Aurora	IP	Intra Regional	Honduras – COCESNA (Tegucigalpa)	TBD	IPv4	CAMSAT	2008	
Haiti / raba f Prince	IP	Intra Regional	Bahamas, Cuba (La Habana), Curacao, Dominican Republic (Sto. Domingo), Jamaica (Kingston)	TBD	IPv4	MEVA	TBD	
Honduras /Tegucigalpa COCESNA	IP	Intra Regional	Belice (Belice), Costa Rica (San Jose), Guatemala (La Aurora), Honduras (San Pedro Sula), Nicaragua (Managua),	TBD	IPv4	CAMSAT	2008	
		Inter/ Intra Regional	Cuba (La Habana), NAM (Atlanta), Panama, USA (Miami)	TBD	IPv4	MEVA	TBD	
		Intra Regional	Mexico,	TBD	IPv4	TBD	TBD	
Honduras/ San Pedro Sula	IP	Intra Regional	Honduras – COCESNA (Tegucigalpa)	TBD	IPv4	CAMSAT	2008	
Jamaica/Kingston	IP	Intra Regional	raba, Cayman I., Cuba (La Habana), Curacao, Haiti (Port of Prince).	TBD	IPv4	MEVA	TBD	
Mexico	IP	Inter/ Intra Regional	Cuba (La Habana), Honduras (Tegucigalpa), NAM (Atlanta),	TBD	IPv4	TBD	TBD	

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
Monserrat	IP	Intra Regional	Trinidad and Tobago (Piarco)	TBD	IPv4	Eastern Caribbean Network	TBD	
Nicaragua / Managua	IP	Intra Regional	Honduras – COCESNA (Tegucigalpa)	TBD	IPv4	CAMSAT	2008	
Puerto Rico/ San Juan	IP	Inter/ Intra Regional	Curacao, Dominican republic (Sto. Domingo), USA (Miami).	TBD	IPv4	MEVA	TBD	
			SAM (Caracas), Trinidad and Tobago (Piarco),	TBD	IPv4	TBD	TBD	
St. Kitts & Nives	IP	Intra Regional	Trinidad and Tobago (Piarco)	TBD	IPv4	Eastern Caribbean Network	TBD	
St. Lucia	IP	Intra Regional	Trinidad and Tobago (Piarco)	TBD	IPv4	Eastern Caribbean Network	TBD	
St Marteen	IP	Intra Regional	USA (Miami)	TBD	IPv4	MEVA	TBD	
St. Vincent	IP	Intra Regional	Trinidad and Tobago (Piarco)	TBD	IPv4	Eastern Caribbean Network	TBD	
Turks & Caicos/ Grand Turk	IP	Intra Regional	USA (Miami)	TBD	IPv4	MEVA	TBD	
Trinidad and Tobago /Piarco	IP	Intra Regional	Angula, Antigua, Barbados, French Antilles (Fort-au-France, Point-a-Pitre), Grenada, Monserrat, St. Kitts & Nives, St. Lucia, St. Vincent.	TBD	IPv4	Eastern Caribbean Network	TBD	
		Intra Regional	Puerto Rico (San Juan)	TBD	IPv4	TBD	TBD	
		Inter Regional	EUR (Madrid),	TBD	IPv4	TBD	TBD	
		Inter Regional	SAM (Caracas)	TBD	IPv4	REDDIG	TBD	

APPENDIX D

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

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		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)	TBD	IPv4	CAFSAT REDDIG	2008	
Bolivia /La Paz	IP	Intra Regional	Argentina (Buenos Aires), Brasil (Brasilia)y Perú (Lima)	TBD	IPv4	REDDIG	2010	
Brasil /Manaus	IP	Intra Regional	Colombia (Bogotá),Guyana (Georgetown), Guyana Francesa (Cayena), Perú (Lima), Surinam(Paramaribo) y Venezuela (Caracas)	TBD	IPv4	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)	TBD	IPv4	CAFSAT REDDIG	2009	
Chile/Santiago	IP	Inter/Intra Regional	PAC(Christchurch), Argentina (Buenos Aires) y Perú (Lima)	TBD	IPv4	PTT REDDIG	2008	
Colombia /Bogotá	IP	Inter/Intra Regional	NAM (Atlanta)*, Ecuador (Guayaquil), Brasil (Manaus) Perú (Lima), Venezuela (Caracas)	TBD	IPv4	*Intercon-nection MEVA II REDDIG REDDIG	2009	

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		7	8	9
Ecuador/Guayaquil	IP	Intra Regional	Colombia (Bogotá) , Perú (Lima) y Venezuela (Caracas)	TBD	IPv4	REDDIG	2010	
Guyana Francesa/Cayenne	IP	Intra Regional	Brasil (Manaus) y Surinam (Paramaribo)	TBD	IPv4	REDDIG	2010	
Guyana /Georgetown	IP	Inter/Intra Regional	C-CAR (Piarco), Brasil (Manaos) , Surinam(Paramaribo) y Venezuela(Caracas)	TBD	IPv4	REDDIG	2010	
Panamá/Ciudad de Panamá	IP	Inter/Intra Regional	NAM (Atlanta) Colombia (Bogota)	TBD	IPv4	MEVA II Intercon-nection MEVA II REDDIG	2010	
Paraguay/Asunción	IP	Intra Regional	Argentina (Buenos Aires) Brasil (Brasilia)	TBD	IPv4	REDDIG	2008	
Perú/Lima	IP	Inter/Intra Regional	NAM(Atlanta),,Argentina(BuenosAires),Bolivia (La Paz),Brasil (Manaos),Chile(Santiago),Colombia (Bogotá),Ecuador (Guayaquil y Venezuela (Caracas),	TBD	IPv4	REDDIG	2009	
Suriname/Paramaribo	IP	Inter Regional	Brasil (Manaos), Guyana Francesa(Cayena) y Venezuela (Caracas)	TBD	IPv4	REDDIG	2010	
Uruguay /Montevideo	IP	Intra Regional	Argentina(Buenos Aires), Brasil (Brasilia)	TBD	IPv4	REDDIG	2010	
Venezuela/Caracas	IP	Inter/Intra Regional	CAM (San Juan), EUR(Madrid), Brasil (Manaus), Colombia (Bogotá) ,Ecuador(Quito), Guyana(Georgetown), y Suriname (Paramaribo) y Trinidad&Tobago (Piarco)	TBD	IPv4	Intercon-nection MEVAII REDDIG PTT REDDIG	2009	

APPENDIX E

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

ATN GROUND-GROUND APPLICATIONS PLAN / PLAN DEAUX APLICATIONS TERRE – TERRE DE L'ATN / PLAN DE APLICACIONES TIERRA-TIERRA					
Administration and Location/ Administration et Emplacement/ Administración y localidad	**Application Type/ Type de Application/ Tipo de Aplicación**	**Connected with Administration & Location of/ Connecté avec Administration et emplacement/ Conectada con Administración y Localidad de**	**Used Standard / Norma usage/ Norma usada**	**Implementation Date/ date of mise en oeuvre/ Fecha de Implementación**	**Remarks/ Remarques/ Observaciones**
1	**2**	**3**	**4**	**5**	**6**
ARUBA, Aruba	AMHS	FAA-Atlanta	IPS	TBD	
BAHAMAS, Nassau,	AMHS	FAA-Atlanta	IPS	TBD	
CAYMAN ISLANDS, Grand Cayman ISLAS CAIMANES , Gran Caimán	AMHS	FAA-Atlanta	IPS	TBD	
CUBA, Havana CUBA, La Habana	AMHS	FAA-Atlanta	IPS	2009	
	AIDC	TBD	TBD	TBD	
DOMINICAN REPUBLIC, Santo Domingo/ REPÚBLICA DOMINICANA, Santo Domingo	AMHS	FAA-Atlanta	IPS	2008	
	AIDC	TBD	TBD	TBD	
HAITI, Port-au-Prince/ HAITÍ, Puerto Príncipe,	AMHS	FAA-Atlanta	IPS	2009	
HONDURAS, Tegucigalpa (COCESNA)	AMHS	FAA-Atlanta	IPS	2008	
	AIDC	TBD	TBD	TBD	

ATN GROUND-GROUND APPLICATIONS PLAN / PLAN DEAUX APLICATIONS TERRE – TERRE DE L'ATN / PLAN DE APLICACIONES TIERRA-TIERRA					
Administration and Location/ Administration et Emplacement/ Administración y localidad	**Application Type/ Type de Application/ Tipo de Aplicación**	**Connected with Administration & Location of/ Connecté avec Administration et emplacement/ Conectada con Administración y Localidad de**	**Used Standard / Norma usage/ Norma usada**	**Implementation Date/ date of mise en oeuvre/ Fecha de Implementación**	**Remarks/ Remarques/ Observaciones**
1	**2**	**3**	**4**	**5**	**6**
JAMAICA, Kingston	AMHS	FAA-Atlanta	IPS	2008	
	AIDC	TBD	IPS	TBD	
MEXICO, Mexico City MÉXICO, Ciudad de México	AMHS	FAA-Atlanta	IPS	TBD	
	AIDC	FAA- TBD	TBD	TBD	
	AIDC	TBD	TBD	TBD	
NETHERLANDS ANTILLES (Curacao) / ANTILLAS NEERLANDESAS (Curazao)	AMHS	FAA-Atlanta	IPS	TBD	
TRINIDAD AND TOBAGO, Piarco	AMHS	FAA-Atlanta	IPS	TBD	
	AIDC	TBD	TBD	TBD	
UNITED STATES, Atlanta ESTADOS UNIDOS, Atlanta	AMHS	Aruba	IPS	TBD	03 2007 - USA Availability to connect to the CAR/SAM Regions/ Disponibilidad de conectar con las Regiones CAR/SAM
	AMHS	Bahamas Nassau,	IPS	TBD	
	AMHS	Cayman Islands, Grand Cayman Islas Caimanes , Gran Caimán	IPS	TBD	
	AMHS	Cuba, Havana Cuba, La Habana	IPS	2009	
	AMHS	Dominican Republic, Santo Domingo/ República Dominicana, Santo Domingo	IPS	2008	

ATN GROUND-GROUND APPLICATIONS PLAN / PLAN DEAUX APLICATIONS TERRE – TERRE DE L'ATN / PLAN DE APLICACIONES TIERRA-TIERRA					
Administration and Location/ Administration et Emplacement/ Administración y localidad	**Application Type/ Type de Application/ Tipo de Aplicación**	**Connected with Administration & Location of/ Connecté avec Administration et emplacement/ Conectada con Administración y Localidad de**	**Used Standard / Norma usage/ Norma usada**	**Implementation Date/ date of mise en oeuvre/ Fecha de Implementación**	**Remarks/ Remarques/ Observaciones**
1	**2**	**3**	**4**	**5**	**6**
	AMHS	Haiti, Port-au-Prince/ Haití, Puerto Príncipe,	IPS	2008	
	AMHS	Honduras, Tegucigalpa (COCESNA)	IPS	2008	
	AMHS	Jamaica, Kingston	IPS	2008	
	AMHS	Mexico, Mexico	IPS	TBD	
	AMHS	Netherlands Antilles (Curacao) / Antillas Neerlandesas (Curazao)	IPS	TBD	
	AMHS	Panama, Panama City/ Panamá, Ciudad de Panamá	IPS	TBD	
	AMHS	Peru, Lima	IPS	TBD	
	AMHS	Trinidad and Tobago, Piarco	IPS	2009	
	AMHS	Venezuela, Maiquetía	IPS	2009	
UNITED STATES, TBD ESTADOS UNIDOS, Por determinar	AIDC	MEXICO, TBD	TBD	TBD	
	AIDC	TBD	TBD	TBD	

APPENDIX F

TABLE CNS 1BB –GROUND-GROUND APPLICATIONS PLAN / TABLA CNS1 BB – PLAN DE APLICACIONES TIERRA-TIERRA (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	IPS	2005	
	AIDC	Bolivia, Brasil, Chile, Paraguay Perú, Uruguay y AFI	IPS	TBD /Por determinar	
Bolivia , La Paz	AMHS	Argentina , Brasil y Perú	IPS	2010	
	AIDC	Argentina , Brasil y Perú	IPS	TBD /Por determinar	
Brasil, Brasilia	AMHS	Argentina, Bolivia,Paraguay,Uruguay, NAM,EUR,AFI	IPS	2008	
	AIDC	Argentina,Bolivia ,Paraguay,Uruguay, NAM,EUR,AFI	IPS	TBD/ Por determinar	
Brasil Manaus	AMHS	Colombia, Guyana, Guyana Francesa, Perú , Surinam y Venezuela	IPS	2008	
	AIDC	Colombia, Guyana, Guyana Francesa ,Perú , Surinam y Venezuela	IPS	TBD/ Por determinar	
Chile, Santiago	AMHS	Argentina, Perú y PAC.	IPS	2009	
	AIDC	Argentina, Perú y PAC.	IPS	TBD/Por determinar	
Colombia , Bogotá	AMHS	Brasil , Ecuador, Perú y Venezuela	IPS	2008	
	AIDC	Brasil, Ecuador,Perú y Venezuela	IPS	TBD/Por determinar	
Ecuador ,Quito	AMHS	Colombia , Perú y Venezuela	IPS	2009	
	AIDC	Colombia , Perú y Venezuela	IPS	TBD/Por determinar	
French Guyana , Cayenne	AMHS	Brasil, Surinam y Venezuela	IPS	2009	
	AIDC	Brasil, Surinam y Venezuela	IPS	TBD/Por determinar	
Guyana, Georgetown	AMHS	Brasil, Trinidad Tobago y Venezuela	IPS	2009	
	AIDC	Brasil, Trinidad Tobago y Venezuela	IPS	TBD/Por determinar	
Panamá, Ciudad de Panamá	AMHS	Colombia, NAM	IPS	2008	
	AIDC	Colombia, NAM	IPS	TBD/Por determinar	

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
Paraguay, Asunción	AMHS	Argentina, Brasil	IPS	2007	
	AIDC	Argentina, Brasil	IPS	TBD/Por determinar	
Perú	AMHS	Argentina, Bolivia Brasil, Chile Colombia, Ecuador, Venezuela y NAM	IPS	2007	
	AIDC	Argentina, Bolivia, Brasil, Chile Colombia, Ecuador Venezuela y NAM	IPS	TBD/Por determinar	
Surinam	AMHS	Brasil, French Guyana y Venezuela	IPS	2009	
	AIDC	Brasil, French Guyana y Venezuela	IPS	TBD/Por determinar	
Uruguay	AMHS	Argentina, Brasil	IPS	2008	
	AIDC	Argentina, Brasil	IPS	TBD/Por determinar	
Venezuela	AMHS	Brasil, Colombia, Ecuador, Guyana, Guyana Francesa , Perú, Suriname, NAM, CAR y EUR	IPS	2008	
	AIDC	Brasil, Colombia, Ecuador Guyana, Guyana Francesa , Perú, Suriname, NAM,CAR y EUR	IPS	TBD/Por determinar	

APPENDIX G

IP ADDRESS PLAN (IPv4)

The IP address structure (Private IPv4) to be adopted in the CAR/SAM Region was the following:

1st BYTE	2nd BYTE		3th BYTE		4th BYTE
8 bits	4 bits	4 bits	4 bits	4 bits	8 bits
00001010	Region	State		Host	

The structure has as a first byte the fixed value of 10 in decimal number
The rest of 24 bits (3 bytes) have the following distribution, part of the 2nd byte should be used for identification of Regions; and part of the 3rd bytes should be used for State identification. The 4th and part of the 3rd byte should be used for hosts

The address structure has the following codification :

10.XXXX YYYY.YYYYZZZZ.ZZZZZZZZ
Sub mask 255.255.240.0
X= Region (16 regions allowed)
Y= States/Territories (256 States /Territories allowed)
Z= host (4096 hosts allowed)

APPENDIX H

AMHS MD REGISTER FOR CAR/NAM REGIONS

http://www.icao.int/anb/panels/acp/amhs

State		AMHS Address Specification					
Nationality Letters	**Name**	**Country name (C)**	**ADMD name (A)**	**PRMD name (P)**	**Addressing scheme**	**Organization name (O*)**	**Remark**
TQ	Anguilla (U.K.)	XX	ICAO	TQ	XF	AFTN	
TA	Antigua and Barbuda	XX	ICAO	TA	XF	AFTN	
TB	Barbados	XX	ICAO	TB	CAAS	AFTN	State Letter Confirmed
TU	British Virgin Islands (U.K.)	XX	ICAO	TU	XF	AFTN	
TF	French Antilles	XX	ICAO	TF	XF	AFTN	State letter confirmed
TG	Grenada	XX	ICAO	TG	XF	AFTN	
TR	Montserrat (U.K.)	XX	ICAO	TR	XF	AFTN	
TK	Saint Kitts and Nevis	XX	ICAO	TK	XF	AFTN	
TL	Saint Lucia	XX	ICAO	TL	XF	AFTN	
TD	Dominica	XX	ICAO	TD	XF	AFTN	
TV	Saint Vincent and the Grenadines	XX	ICAO	TV	XF	AFTN	
TT	Trinidad and Tobago	XX	ICAO	TT	XF	AFTN	
TN	Netherlands Antilles	XX	ICAO	TN	XF	AFTN	
TNCA	Aruba	XX	ICAO	TNCA	XF	AFTN	
MY	Bahamas	XX	ICAO	MY	XF	AFTN	
MU	Cuba	XX	ICAO	MU	CAAS	MU	State letter confirmed
MT	Haiti	XX	ICAO	MT	XF	AFTN	
MW	Cayman Islands (U.K.)	XX	ICAO	MW	XF	AFTN	
MB	Turks and Caicos Islands (U.K.)	XX	ICAO	MB	XF	AFTN	
MK	Jamaica	XX	ICAO	MK	XF	AFTN	
MD	Dominican Republic	XX	ICAO	MD	XF	AFTN	
TI	Virgin Islands (U.S.)	XX	ICAO	TI	XF	AFTN	
MZ	Belize	XX	ICAO	MZ	XF	AFTN	
MR	Costa Rica	XX	ICAO	MR	XF	AFTN	
MS	El Salvador	XX	ICAO	MS	XF	AFTN	
MG	Guatemala	XX	ICAO	MG	XF	AFTN	
MH	Honduras	XX	ICAO	MH	XF	AFTN	
MN	Nicaragua	XX	ICAO	MN	XF	AFTN	
MM	Mexico	XX	ICAO	MM	CAAS	MM	State letter confirmed
TX	Bermuda (U.K.)	XX	ICAO	TX	XF	AFTN	
TJ	Puerto Rico	XX	ICAO	TJ	XF	AFTN	
C*	Canada	XX	ICAO	C	XF	AFTN	
K*	United States	XX	ICAO	USA	CAAS		State letter confirmed

Date: 25 March 2008

PROPOSED AMHS MD REGISTER FOR SAM REGION /
REGISTRO AMHS MD PARA LAS REGIONES SAM PROPUESTO

ESTADO	ESPECIFICACIONES DE DIRECCIONAMIENTO AMHS					
	NOMBRE ESTADO (C)	NOMBRE ADMD (A)	NOMBRE PRMD (P)	NOMBRE ORGANIZACIÓN (O) *	NOMBRE UNIDAD ORGANIZACIONAL (OUI)	NOMBRE COMUN (CN)
ARGENTINA	XX	ICAO	ARGENTINA	SAEZ	Todas las cuatro letras indicadas en el Documento 7910 de la OACI	Dirección AFTN (8 letras) de usuario
BOLIVIA	XX	ICAO	BOLIVIA	SLLF	Id	Id
BRASIL	XX	ICAO	BRASIL	SBBF	Id	Id
CHILE	XX	ICAO	CHILE	SCEZ	Id	Id
COLOMBIA	XX	ICAO	COLOMBIA	SKED	Id	Id
ECUADOR	XX	ICAO	ECUADOR	SEGU	Id	Id
GUYANA FRANCESA	XX	ICAO	GUYANA FRANCESA	SOCA	Id	Id
GUYANA	XX	ICAO	GUYANA	SYCJ	Id	Id
PANAMA	XX	ICAO	PANAMA	MPTO	Id	Id
PARAGUAY	XX	ICAO	PARAGUAY	SGAS	Id	Id
PERU	XX	ICAO	PERU	SPLI	Id	Id
SURINAME	XX	ICAO	SURINAME	SMPM	Id	Id
URUGUAY	XX	ICAO	URUGUAY	SUEO	Id	Id
VENEZUELA	XX	ICAO	VENEZUELA	SVZM	Id	Id

Agenda Item 2: Navigation systems developments

2.1 Review of the GNSS regional implementation plan

Proposal of Amendment to the Regional Air Navigation Plan – FASID Table CNS/3

2.1.1 The Meeting recalled that GNSS elements considered in FASID Table CNS 3 are the ground-based augmentation system (GBAS) and the satellite-based augmentation system (SBAS). According to Table CNS 3, GBAS systems would be implemented for categories I, II and III precision approach and landing operations, and SBAS systems for en route, terminal, non-precision approach, non-precision approach with vertical guidance and landing operations.

2.1.2 Concerning the implementation of GBAS systems, the Meeting took note that Brazil is the only country that has installed a GBAS system in the CAR/SAM Regions for trial purposes at the Río de Janeiro international airport. These trials are aimed at ensuring an operating and commissioned GBAS by 2010.

2.1.3 Regarding the implementation of a SBAS system in the CAR/SAM Regions, the Meeting took note that currently, only the Regional Project RLA/03/902 (SACCSA) is continuing to make the necessary studies to determine the technical and financial feasibility of a SBAS system in the Region.

2.1.4 Also, the Meeting took note that, ever since the mid nineties, CAR/SAM States and Territories have been approving the use of GPS as supplementary, and in some cases primary, aid basically for en route air navigation operations. Today almost all of the CAR/SAM States and Territories have published an AIC approving GPS use.

2.1.5 In addition, a significant number of CAR/SAM States, Territories and International Organisations have implemented and published GNSS non-precision (NPA) procedures in their AIPs for lateral navigation operations (LNAV), using aircraft-based augmentation systems (ABAS), specifically GPS with RAIM.

2.1.6 The Meeting was also informed that the the Third Meeting of the GNSS Task Force, held in Lima on 2-3 June 2008, taking into account ICAO SARPs and guidelines and the capacity/development of aircraft operating in CAR/SAM airspace, formulated draft Conclusion 03/04 – *Use of GNSS in the short term*, urging States, Territories and International Organisations to complete the development and approval of non-precision operations based on aircraft-based augmentation systems.

2.1.7 Taking into account the aforementioned aspects, the Meeting took note that it can be noted that the current Air Navigation Plan does not contemplate the planning of aircraft-based GNSS augmentation systems. Therefore, in the light of the need to plan for the use of aircraft-based augmentation systems in the short and medium terms in order to meet PBN requirements, the Meeting considered that Table CNS 3 from the CAR/SAM Regional Air Navigation Plan should be amended.

2.1.8 The amendment of Table CNS 3 approved by the Meeting is shown as an **Appendix A** to this part of the report. The amendment consists of the addition of a new column under GNSS requirements, entitled "ABAS"

2.1.9 For this reason and in the light of the aforementioned aspects, the following draft conclusion was agreed by the Meeting:

DRAFT
CONCLUSION CNS/6/3 AMENDMENT TO THE REGIONAL AIR NAVIGATION PLAN – TABLE CNS/3 OF FASID

That ICAO consider amending the format of the Regional Air Navigation Plan Table CNS 3 of the FASID by adding a new column under GNSS requirements to reflect the planning of ABAS requirements, as shown in the Appendix A to this part of the report.

2.2 Follow up on the planning/implementation activities of the SBAS and GBAS augmentation systems in the CAR/SAM Regions

2.2.1 The Meeting was informed about the results and work accomplished by the GNSS Task Force (CNS/TF/GNSS) during its third GNSS-TF meeting:

Review of the results of activities and studies concerning the ionosphere

2.2.2 The GNSS Task Force analyzed the results accomplished by the RLA/03/902 SACCSA Project and the Seminar hosted by the RLA/00/009 and agreed that the use of ionospheric data currently available should used in the studies being conducted by project RLA/03/902. States that have GNSS receivers such as the Members of the RLA/00/009, should inform the operational condition of these receivers, as well as other information on availability of GNSS receivers with an L1 and L2 data collection capability per second**,** reporting their geographic location and the type of equipment to the ICAO Regional Offices for the RLA/03/902 Project to analyze the feasibility of using this information for its studies. Therefore, the Meeting approved the following Draft Conclusion:

DRAFT
CONCLUSION CNS/6/4 AVAILABILITY OF GNSS RECEIVER FOR PROJECT RLA/03/902 IONOSPHERIC ANALYSES AND STUDIES

In order to support the ionospheric analyses and studies being conducted by project RLA/03/902, CAR/SAM States/Territories/International Organizations are urged to inform ICAO, through their respective Regional Offices, no later than GREPECAS/15**,** about the existence and availability of GNSS receivers with an L1 and L2 data collection capability per second**,** reporting their geographic location and the type of equipment.

Review of the results of trials and studies on the implementation of SBAS systems in the CAR/SAM Regions

2.2.3 The Meeting was informed about the systematic and operational improvements made in the United States SBAS systems (WAAS) and that with the increased use of SBAS, it is essential that operational requirements and procedure design criteria be globally harmonized. It was informed of the results of the Phase III of RLA/03/902 SACCSA, detailed in WP/17 of the Sixth meeting of the CNS Committee as well as other considerations of the Project Members regarding the importance of incorporating other States to Phase III of the Project. Therefore, the Meeting drafted the following draft conclusion:

DRAFT
CONCLUSION CNS/6/5 ACCEPTANCE OF AN OWN SBAS AND SUPPORT FOR PROJECT RLA/03/902-SACCSA

Bearing in mind

- that Phase III of SACCSA could provide definitive elements for decision-making by the CAR/SAM Regions with regard to the implementation of an own SBAS;

- that the proposed ionosphere studies are of considerable importance for gaining a knowledge and characterizing of its actual behaviour and, therefore, for the implementation/planning of the GNSS solution;

- the importance of having CAR/SAM States be willing to be incorporated into and participate in Phase III of RLA/03/902 SACCSA for the efficient completion of the project,

States/Territories/International Organizations are urged to:

a) present, within the GREPECAS mechanism, their will to implement an own SBAS, in case the results of the SACCSA Phase III proves the feasibility to implement a SBAS in the CAR/SAM Regions.

b) express their support for Phase III of project RLA/03/902 SACCSA and their willingness to participate in it.

Review of the results of trials and studies on the implementation of GBAS systems in the CAR/SAM Regions

2.2.4 The Meeting was informed about the GBAS Work Programme of Brazil, the GBAS activities that the United States has carried out and about the importance of local data gathering for the GBAS Stations implementation process, in order to prove that the risk model used to guarantee the safety of operations.

Review of GNSS requirements for PBN implementation

2.2.5 The GNSS Task Force (CNS/GNSS/TF) provided information about the United States navigation system roadmap and that this task force will work in the development of a regional strategy for the evolution of navigation systems to support the PBN roadmap in the CAR/SAM Regions in order to provide States with guidance for the development of their national plans as well as users of the air navigation services.

2.2.6 The CNS/GNSSTF indicated the need to inform CNS National Groups in order to plan the GNSS implementation in short, medium and long terms.

2.2.7 The Meeting agreed on the need to plan the implementation, in the short term, of the use of GPS RAIM, Baro-VNAV GPS in the CAR/SAM Regions in order to support the development of the PBN national plans implementation according to PBN roadmap in the CAR/SAM Regions and, to this respect, it formulated the following Draft Conclusion:

DRAFT
CONCLUSION CNS/6/6 SHORT-TERM GNSS USE

In order to support the development of the PBN National Plans according to PBN roadmap in the CAR/SAM Regions, States/Territories/International Organizations are urged to complete the development and approval of NPA operations based on GPS, establishing regulations and procedures (NOTAM, AIC, etc.) for the use of GPS RAIM, short-term Baro-VNAV GPS.

2.2.8 The Meeting congratulated the GNSS Task Force for the outstanding work performed.

2.2.9 Likewise, the Meeting was informed of the progress and results accomplished by the SACCSA RLA/03/902 Project within its different work packages and the need to complete the work initiated in Phase II through Phase III, highlighting necessity to conclude the ionospheric studies, the importance of formative aspects on GNSS that the Project offers to States/Territories/International Organizations and the importance of greater participation of the remaining States/Territories/International Organizations in the RLA/03/02 Project.

2.2.10 Taking into account ATM operational requirements, Brazil informed about their plans oriented to the ATM Operational Concept supported by CNS/ATM Systems, in the short, medium and long term in Brazil that do not foresee the implementation of a SBAS system to support operations in the Brazilian airspace.

2.3 NDB gradual regional deactivation plan

2.3.1 Attending GREPECAS Conclusion - 14/56 *Progressive deactivation of NDB stations,* States, Territories, International Organisations and airspace users, were urged to inform *ICAO regarding their respective plan for the phase out of NDB stations and* GREPECAS Conclusion 14/57 instructed the CNS Committee to prepare a *Plan for the Deactivation of NDB Stations,* based on responses received from States/Territories/International Organisations, and the corresponding amendment of the Regional Plan contained in Doc. 8733 – CAR/SAM Air Navigation Plan, Volume II – FASID, Table CNS 3 – Table of Radio Navigation Aids.

2.3.2 The ICAO Regional Offices have sent out letters to the States/Territories/International Organisations, reminding them to send this information. Regarding the information received, it was noted that this information contains data on NDBs used in support of international navigation, and on those used for domestic purposes. Therefore, it was clarified to the Meeting that the Plan for the Deactivation of NDB Stations only referred to those NDB that offer their services to international traffic, that is, to the NDBs specified in FASID Table CNS 3.

2.3.4 Also, the information received reveals that the data supplied by some States/Territories/International Organisations is not complete in accordance with GREPECAS Conclusion 14/56. In the SAM Region, only Argentina, Bolivia, Brazil, Colombia, Guyana and Suriname have sent information about NDB phase out plans. It can be noted from the responses received that some States reported only the NDBs that have been deactivated to date, others reported the estimated deactivation date and, lastly, those that supplied information as requested lacked data about NDB function. In the CAR Region, information was received from all the Eastern Caribbean States/Territories, as well as Cuba, Dominican Republic, Haiti, Honduras, Jamaica and Netherlands Antilles. It has also been learned that work is underway on the preparation of this information by Costa Rica and COCESNA. In several responses, the information was partial, covering only some of their NDBs and in others there was a reference only to NDBs that have already been deactivated.

2.3.5 In order to complete the Regional Plan for the Progressive Deactivation of NDB Stations, all States should review and provide the required information. The first version of the Regional Plan for the Progressive Deactivation of NDB Stations in the CAR and SAM Regions is attached in **Appendix B** to this part of the Report. Accordingly, the following draft conclusion was agreed by the meeting:

DRAFT
CONCLUSION CNS/6/7 REVIEW OF THE PLAN FOR THE PROGRESSIVE DEACTIVATION OF NDB STATIONS

That States/Territories /International Organisations review and complete the information on the Regional Plan for the Progressive Deactivation of NDB Stations in the CAR and SAM Regions that appears in Appendix B to this part of the Report and send in the missing information to the respective ICAO Regional Offices before **30 September 2008.**

APPENDIX A

TABLE CNS 3 / TABLA CNS 3

TABLE OF RADIO NAVIGATION AIDS
TABLA DE AYUDAS PARA LA RADIONAVEGACIÓN

EXPLANATION OF THE TABLE

Column

1 Name of the country, city and aerodrome and, for route aids, the location of the installation.

2 The designator number and runway type:

NINST Visual flight runway
NPA Non precision approach runway
PA1 Precision approach runway, Category I
PA2 Precision approach runway, Category II
PA3 Precision approach runway, Category III

3 The functions carried out by the aids appear in columns 4 to 8 and 10 to 12.

A/L Approach and landing
T Terminal
E En route

4 ILS Instrument landing system. Roman numerals I, II and III indicate the acting category of the ILS I, II or III. (I) indicates that the facility is implemented.

The letter "D" indicates a DME requirement to serve as a substitute for a marker beacon component of an ILS.

Note. Indication of the category refers to the performance standard to be achieved and maintained, in accordance with pertinent specifications in ICAO Annex 10, and not to specifications of the ILS equipment, since both specifications are not necessarily the same.

An asterisk (*) indicates that the ILS requires a Category II signal, but without the reliability and availability which redundant equipment and automatic switching provide.

5 Radio beacon localizer, be it associated with an ILS or to be used as an approach aid at an aerodrome.

6 Radiotelemetrical equipment. When an "X" appears in column 6 in line with the VOR in column 7, this indicates the need that the DME be installed at a common site with the VOR.

7 VOR VHF omnidirectional radio range.

8 NDB Non-directional radio beacon.

9 The distances and altitude to which the VOR or VOR/DME signals are required, indicated in nautical miles (NM) or thousands of feet, or the nominal coverage recommended of the NDB, indicated in nautical miles.

10, 11, 12 GNSS global navigation satellite system (includes ABAS, GBAS and SBAS).

ABAS (aircraft based augmentation system) implementation planned to be used for route navigation, for terminal and for non precision approach. Filling this column indicates when navigation services are allowed through the single use of, GPS + RAIM or GPS +RAIM with any other onboard supporting equipment.

GBAS (ground-based augmentation system) implementation planned to be used in precision approach and landing CAT I, CAT II, CAT III.

SBAS (satellite-based augmentation system) implementation planned to be used for route navigation, for terminal, for non precision approach, non precision approach with vertical guidance and landing. An "X" indicates service availability; exact location of installation will be determined.

13 Remarks

Note. Columns 5 to 12 use the following symbols:

D DME required but not implemented.
DI DME required and implemented.
X Required but not implemented.
XI Required and implemented.

EXPLICACIÓN DE LA TABLA

Columna

1 Nombre del país, ciudad y aeródromo y, para las ayudas en ruta, el emplazamiento de la instalación.

2 Número de designador y tipo de pista:

NINST Pista de vuelo visual
NPA Pista de aproximación que no es de precisión
PA1 Pista de aproximación de precisión, Categoría I
PA2 Pista de aproximación de precisión, Categoría II
PA3 Pista de aproximación de precisión, Categoría III

3 La función efectuada por las ayudas figura en las Columnas 4 a 8 y 10 a 12.

A/L Aproximación y aterrizaje
T Terminal
E En ruta

4 ILS Sistema de aterrizaje por instrumentos. Los números romanos I, II y III indican la categoría de actuación del ILS, I, II o III. (I) indican que la instalación está en servicio.

La letra “D” indica que se requiere un DME para sustituir a un componente de radiobaliza de un ILS.

Nota. La indicación de la categoría se refiere a la norma de performance que ha de alcanzarse y mantenerse, de conformidad con las especificaciones pertinentes del Anexo 10 de la OACI, y no con las especificaciones del equipo ILS, ya que ambas especificaciones no son necesariamente las mismas.

Un asterisco (*) indica que el ILS requiere una señal de Categoría II, pero sin la fiabilidad y disponibilidad que proporcionan el equipo de reserva y la conmutación automática.

5 Localizador de radiofaro, asociado a un ILS o para utilizarlo como ayuda de aproximación en un aeródromo.

6 Equipo radiotelemétrico. Cuando figura una AX@ en la Columna 6 junto con el VOR de la Columna 7, quiere decir que el DME debe instalarse en un sitio común con el VOR.

7 VOR Radiofaro omnidireccional en VHF.

8 NDB Radiofaro no direccional.

9 Las distancias y altitud a las cuales se requieren señales VOR o VOR/DME indicadas en millas marinas (NM) o miles de pies, o la cobertura nominal recomendada del NDB indicada en millas marinas.

10, 11, 12 GNSS sistema mundial de navegación por satélite (incluye ABAS, GBAS y SBAS).

ABAS (sistema de aumentación basado en aeronave) según lo previsto, se utilizará en navegación en ruta, terminal, y aproximaciones que no son de precisión. Llenando esta columna indica cuando los servicios de navegación son permitidos a través del uso del GPS + RAIM o GPS + RAIM con cualquier otro sistema de apoyo abordo.

GBAS (sistema de aumentación basado en tierra) según lo previsto se utilizará en las aproximaciones y aterrizajes de precisión de CAT I, CAT II y CAT III.

SBAS (sistema de aumentación basado en satélites) según lo previsto, se utilizará en navegación en ruta, terminal, aproximaciones de no precisión con guiado vertical y aterrizajes que no son de precisión. La X indica disponibilidad de servicio; se determinará el emplazamiento exacto de la instalación.

13 Observaciones

Nota. En las Columnas 5 a 12 se utilizan los símbolos siguientes:

D DME requerido pero no en servicio.
DI DME requerido y en servicio.
X Requerido pero no en servicio.
XI Requerido y en servicio.

TABLE CNS 3 / TABLA CNS 3

TABLE OF RADIO NAVIGATION AIDS
TABLA DE AYUDAS PARA LA RADIONAVEGACIÓN

Station/Territory Estación/Territorio	Rwy type Tipo de pista	Function Función	ILS	L	DME	VOR	NDB	Coverage Cobertura	GNSS			Remarks Observaciones
									ABAS	GBAS	SBAS	
1	2	3	4	5	6	7	8	9	10	11	12	13

APPENDIX B

REGIONAL DEACTIVATION PLAN OF NDB STATIONS

PLAN REGIONAL PARA DESACTIVACION DE ESTACIONES NDB

CAR REGION/ REGION CAR

Update: June 05, 2008

Administration/Location Administración/ Lugar	Identification/ Identificación	Function/ Función	Deactivation Date/ Fecha de desactivación	Remarks/ Observaciones
1	2	3	4	5
ANGUILLA (United Kingdom) THE VALLEY WALL BLAKE, Anguilla I.	ANG	A/E	2018	As indicated in Conclusion 1/8 de NACC/WG/01
ANTIGUA AND BARBUDA SAINT JOHNS/V.C. Bird, Antigua I.	ANU	A/E	2018	As indicated in Conclusion 1/8 de NACC/WG/01
	ZDX	A/E	2018	As indicated in Conclusion 1/8 de NACC/WG/01
BAHAMAS ALICE TOWN/South Bimini, Bimini I.	ZBB	E	?	
FREEPORT/Intl, Grand Bahama I.	ZFP	AE	?	
GEORGE TOWN/EXUMA Intl,	ZGT	A/L	?	
NASSAU/Intl, New Providence I.	ZQA	AE	?	
BARBADOS				
BRIDGETOWN/Grantley Adams Intl.	BGI	A/E	2005	It will remain serviceable until maintenance support becomes exhaustive. No later than 2018
BELIZE				
BELIZE/Intl.	BZE	AE	?	
CAYMAN ISLANDS				
CAYMAN BRAC/Gerrard Smith Intl.	CBC	AE	?	
GEORGETOWN/Owen Roberts Intl.	ZIY	AE	?	

Administration/Location Administración/ Lugar	Identification/ Identificación	Function/ Función	Deactivation Date/ Fecha de desactivación	Remarks/ Observaciones
1	2	3	4	5
COSTA RICA				
COTO	COT	AE	?	
CHILES	CHI	E	?	
HORCONES	HOR	AE	?	
PARRITA	PAR	E	?	
CUBA				
CAYABO	UCY	T, E	?	
CAYO LARGO DEL SUR/Vilo Acuña Intl.	UCL	AE	?	
CIEGO DE AVILA/Maximo Gomez Intl.	UCV	A	?	
HOLGUIN/Frank Pais Intl.	UHG	AE	?	
NUEVA GERONA	UNG	AE	?	
SANTIAGO DE CUBA/Antonio Maceo	UCU	AE	?	
DOMINICAN REPUBLIC				
BARAHONA/María Montés Intl.	BHN	AE	-	Decomissioned
HERRERA/Herrera Intl.	HER	AE	-	Decomissioned
LA ROMANA/La Romana Intl.	LRN	AE	?	
PUERTO PLATA/Gregorio Luperon Intl.	PPA	AE	?	
PUNTA CANA/Punta Cana Intl.	PCA	AE	?	
PUNTA CAUCEDO/SANTO DOMINGO/De las Américas Intl.	HIJ	AE	-	Decomissioned
GUERRA	LAS	AE	?	
Higuero	HGR	AE	?	
EL SALVADOR				
SAN SALVADOR/El Salvador Intl.	LAN	A	?	
SAN SALVADOR/Ilopango Intl.	YSX	A	?	
FRENCH ANTILLES (France)				
FORT DE FRANCE/Le Lamentin, Martinique	FXF	AE	2018	As indicated in Conclusion 1/8 de NACC/WG/01
FORT DE FRANCE/Le Lamentin, Martinique	FOF	AE	2018	As indicated in Conclusion 1/8 de NACC/WG/01
POINTE-A PITRE/Le Raizet, Guadeloupe	PTP	A	2018	As indicated in Conclusion 1/8 de NACC/WG/01

Administration/Location Administración/ Lugar	Identification/ Identificación	Function/ Función	Deactivation Date/ Fecha de desactivación	Remarks/ Observaciones
1	2	3	4	5
GRENADA				
SAINT GEORGES/Point Salines	GND	AE	2018	As indicated in Conclusion 1/8 de NACC/WG/01
GUATEMALA				
Mundo Maya/Flores Intl.	TIK	AE	?	
GUATEMALA/La Aurora	GUA	T	?	
IZTAPA	IZP	A	?	
PUERTO BARRIOS/Puerto Barrios	BAR	AE	?	
RABINAL	RBN	E	?	
HAITI				
Port-Au-Prince/Port-Au-Prince Intl.	HHP	AE	-	Decomissioned
HONDURAS				
COPAN RUINAS	RUI	E	?	
LA CEIBA/Golosón Intl.	LCE	AE	?	
Coxen Hole/ROATAN	ROA	A	?	
SAN PEDRO SULA/La Mesa Intl.	SAP	A	?	
TEGUCIGALPA/Toncontín Intl.	TGU	AE	-	Decomissioned: COCESNA
	TNT	AE	-	Decomissioned: COCESNA
PUNTA CASTILLA	CTL	AE	?	
PUERTO LEMPIRA	PLP	E	?	
PICACHO/Tegucigalpa	PIC	E	2008	Decomissioned: AIP Honduras
JAMAICA				
KINGSTON/Norman Manley Intl.	KIN	AE	November 20,2006	Jamaica Letter: 04 April, 2008
MONTEGO BAY/Sangster Intl.	MBJ	AE	13-Mar-08	Jamaica Letter: 04 April, 2008
MEXICO				
ACAPULCO/Gral. Juan N. Alvarez Intl.	SMS	E	?	
CHETUMAL/Chetumal Intl.	CTM	A	?	

Administration/Location Administración/ Lugar	Identification/ Identificación	Function/ Función	Deactivation Date/ Fecha de desactivación	Remarks/ Observaciones
1	2	3	4	5
CHIHUAHUA/Gral. Roberto Fierro Villalobos Intl.	CUW	AE	?	
CHOIX	CHX	E	?	
COZUMEL/Cozumel Intl.	CZL	AE	?	
GUAYMAS/Gral. José Maria Yañez Intl.	GYM	AE	?	
LOS MOCHIS			?	RECOMENDADO
MERIDA/Lic. Manuel Crescencio Rejón Intl. (PROGRESO)	MPG	E	?	
MEXICO/Lic. Benito Juárez Intl.	MW	A	?	
SAN MARCOS	SMC	A	?	
SANTA ANITA		A	?	RECOMENDADO
TAMPICO/Gral. Francisco Javier Mina Intl.	TAM	A	?	
TEPIC		E	?	proyectado
MONTSERRAT (United Kingdom)				
PLYMOUTH/W.H. Bramble, Montserrat I.	MON	A/L	2018	As indicated in Conclusion 1/8 de NACC/WG/01
NETHERLANDS ANTILLES (Netherlands)				
PHILIPSBURG/Prinses Juliana, St. Maarten I.	PJM	AE	?	
WILLEMSTAD/Hato, Curacao I.	PJG	AE	?	
NICARAGUA				
MANAGUA/Augusto César Sandino Intl.	YNP	AE	?	
PUERTO RICO (United States)				
DORADO	DDP	AE	?	
MAYAQUEZ/Mayaquez	MAZ	A	?	
POINT TUNA	X	E	?	
ROOSEVELT ROADS	NRR	T	?	
SAN JUAN DE PUERTO RICO/Luis Muñoz Marín Intl.	L	A	?	
SAN PAT		T	?	
Saint Kitts and Nevis				

Administration/Location Administración/ Lugar	Identification/ Identificación	Function/ Función	Deactivation Date/ Fecha de desactivación	Remarks/ Observaciones
1	2	3	4	5
Basseterre/ Robert L. BradShaw, St. Kitts Is.	SKB	AE	2018	As indicated in Conclusion 1/8 de NACC/WG/01
SAINT LUCIA				
CASTRIES/George F. Charles	SLU	AE	2018	As indicated in Conclusion 1/8 de NACC/WG/01
VIEUXFORT/Hewanorra Intl.	BNE	AE	2018	As indicated in Conclusion 1/8 de NACC/WG/01
SAINT VINCENT AND THE GRENADINES				
CANOUAN/Canouan Is.	CAI	A	2018	As indicated in Conclusion 1/8 de NACC/WG/01
KINGSTOWN/E.T. Joshua	SV	AE	?	As indicated in Conclusion 1/8 de NACC/WG/01
MUSTIQUE/ Mustique Intl.				proyected
TRINIDAD AND TOBAGO				
PORT OF SPAIN/Piarco Intl. Trinidad I.	TRI	AE	2018	As indicated in Conclusion 1/8 de NACC/WG/01
PIARCO APP/ Galeota	GAL	A	2018	As indicated in Conclusion 1/8 de NACC/WG/01
SCARBOROUGH/Crown Point, Tobago I.	TAB	AE	2018	As indicated in Conclusion 1/8 de NACC/WG/01
TURKS AND CAICOS ISLANDS (United Kingdom)				
GRAND TURK/Grand Turk Intl.	GT	A	?	
PROVIDENCIALES/Providenciales Intl.	PV	AE	?	
SOUTH CAICOS/South Caicos Intl.	SC	A	?	
VIRGIN ISLANDS (United Kingdom)				
ROADTOWN/Terrance B. Lettsome, Tortola I.	BFI	AE	2018	As indicated in Conclusion 1/8 de NACC/WG/01
VIRGIN ISLANDS (United States)				
CHRISTIANSTED/Henry E. Rohlsen,	SX	A	2018	As indicated in Conclusion 1/8 de NACC/WG/01

SAM REGION / REGION SAM

Administration/Location Administración/ Lugar	Identification/ Identificación	Function/ Función	Deactivation Date/ Fecha de desactivación	Remarks/ Observaciones
1	2	3	4	5
ARGENTINA				
COMODORO RIVADAVIA/Gral. Mosconi		E		
CORDOBA/Ing. Aer. A. L. Taravella		A/L/T/E	2008	
FORMOSA/Formosa		A/L/T		
GENERAL PICO		E		
JUJUY/Jujuy		A/L/E	2008	
JUNIN		E		
LA PLATA		E		
MALARGUE		E		
MAR DE PLATA/Brig. Gral. B. de la Colina		A/L/T/E		
MENDOZA/El Plumerillo		A/L/T		
NEUQUEN/Presidente Peron		E		
ORAN		E	2008	
POSADAS/Libertador Gral. D. José de San Martín		A/L		
RESISTENCIA/Resistencia		A/L/E		
RIO GALLEGOS/Piloto Civil N. Fernández		A/L/E	2008	
RIO GRANDE/Rio Grande		A/L/E		
SALTA/Salta		A/L		
SAN ANTONIO DE ARECO		E		
SAN CARLOS DE BARILOCHE/San Carlos de Bariloche		A/L/E		
SAN JUAN		E		
TUCUMAN/Tte. Benjamín Matienzo		A/L		
BOLIVIA				
CHARAÑA		E	2017	
COCHABAMBA/Jorge Wilsterman		E	2017	
LA PAZ/El Atlo Intl.		A/L/T/E	2017	
RIBERALTA		E	2017	
ROBORE		E	2017	
SANTA ANA		E	2017	
SANTA CRUZ/Viru Viru		A/L/E	2017	
SUCRE		E	2017	
TARIJA/Oriel Lea Plaza		E	2017	
TRINIDAD/Tte. Av. Jorge Henrich Arauz		A/L/E	2017	
YACUIBA		E	2017	

Administration/Location Administración/ Lugar	Identification/ Identificación	Function/ Función	Deactivation Date/ Fecha de desactivación	Remarks/ Observaciones
1	2	3	4	5
BRAZIL				
ABROLHOS		E		
ALDEIA		T/E		
ALTA FLORESTA	ATF	E	Enero 2012	245Khz
AMAPA	AMP	E	Enero2019	275Khz
ARACAJU	ACJ	E	Enero 2012	335Khz
BAGE	BGE	E	Enero 2012	235Khz
BARREIRAS	BRR	E	Enero 2012	375Khz
BAURU	BRU	E	Enero2019	380Khz
BELEM/Val De Caes	BEL	A/L/E	Enero 2012	250Khz
BELO HORIZONTE/Tancredo Neves Intl.	BHZ	A/L/T/E	Enero 2012	520Khz
BOA VISTA/Boa Vista Intl.	BVI	A/L/E	Enero 2012	405Khz
BRASILIA/Brasilia Intl.	BRS	T/E	Enero 2012	340Khz
CAMPO GRANDE/Campo Grande Intl.	IG	A/L/T/E	Enero 2019	395Khz
	CGR		Enero 2019	270Khz
CAMPOS		E		
CARAJÁS		E		
CARAUARI	CUA	E	Enero 2019	285Khz
CARAVELAS	CVL	E	Enero 2012	365Khz
CAROLINA	CNA	E	Enero 2012	330Khz
CAXIAS	CXS	T	Enero 2012	1690Khz
CORUMBÁ/Corumbá Intl.	CUB	A/L/T/E	Enero 2019	375Khz
CRUZEIRO DO SUL/Cruzeiro do Sul Intl.	CZS	A/L/E	Enero 2012	260Khz
CUIABÁ/Marechal Rondom	CIA	A/L/T/E	Enero 2012	380Khz
CURITIBA/Afonso Pena Intl.	PNH	A/L/T/E	Enero 2012	255Khz
FLORIANÓPOLIS/ Hercílio Luz Intl.	BKO	A/L/E	Enero 2019	380Khz
	IL		Enero 2019	350Khz
FORTALEZA/ Pinto Martins	PCI	A/L/E	Enero 2019	210Khz
FOZ DO IGUACU/Cataratas Intl.	QQ	A/L	Enero 2019	395Khz
GABRIEL		E		
GUAJARÁ		E		
ILHEUS	YLH	E	Enero 2019	305 Khz
ITACOATIARA	YTC	E	Enero 2019	320 Khz
JACAREACANGA	JAC	E	Enero 2012	360Khz
LAGES	LJS	E	Enero 2019	240Khz
LAPA		E		
LUZIANIA	LVZ	T	Enero 2012	400Khz
MACAPA/Macapa Intl.	MCP	A/L/E	Enero 2012	215Khz
MACEIO	MCO	E	Enero 2012	340Khz
MANAUS/Eduardo Gomes Intl.	PEL	A/L/T	Enero 2062	410Khz
MONTES CLAROS		E		
MOSSORO	MSS	E	Enero 2012	275Khz

Administration/Location Administración/ Lugar	Identification/ Identificación	Function/ Función	Deactivation Date/ Fecha de desactivación	Remarks/ Observaciones
1	2	3	4	5
MOZ		E		
NATAL/Augusto Severo Intl.	MXN	A/L/E	Enero 2016	205Khz
PALMAS	PMS	E	Enero 2012	255Khz
PARANAGUA	PNG	E	Enero 2019	340 Khz
PARNAIBA	PNB	E	Enero 2019	365 Khz
PAULO AFONSO	PAF	E	Enero 2012	325Khz
PELOTAS	PTS	E	Enero 2012	340Khz
PETROLINA	PTL	E	Enero 2012	345Khz
PIRAI		E		
POCOS	PCL	E	Enero 2019	415 Khz
PONTA PORA/Ponta Pora Intl.		A/L/E		
PORTO ALEGRE/Salgado Filho Intl.	PA	T/E	Enero 2012	315Khz
	PAG		Enero 2012	330KHZ
RECIFE /Guararapes	VSA	A/L/E	Enero 2012	285Khz
RIO BRANCO	RBC	E	Enero 2012	355Khz
RIO DE JANEIRO/Galeão Antônio Carlos Jobim Intl.	YLA	A/L	Enero 2014	330Khz
RONDONIA		E		
SALVADOR/Deputado Luis Eduardo Magalhaes	SVD	A/L/T	Enero 2012	275Khz
SANTAREM/Santarem Intl.	STM	A/L/T/E	Enero 2012	350Khz
SAO LUIS/ Marechal Cunha Machado	SLI	A/L/T/E	Enero 2012	280kHZ
TABATINGA/Tabatinga Intl.		A/L/T		
TEFE	TFE	E	Enero 2012	300Khz
UBERABA		E		
URUBUPUNGA	URP	E	Enero 2012	335Khz
URUBURETAMA	URT	E	Enero 2014	235Khz
URUGUAIANA/ Rubem Berta Intl.		A/L/T		
CHILE				
ARICA/Chaculluta		A/L		
BALMACEDA		E		
CALAMA		E		
CALDERA		E		
CHAITEN		E		
CHILLAN		E		
CONCEPCION/Carriel Sur		T/E		
CURICO		E		
ISLA REY JORGE		E		
IQUIQUE/Gral. Diego Aracena		A/L		
PUERTO AGUIRRE		E		
PUERTO MONTT/El Tepual		E		

Administration/Location Administración/ Lugar	Identification/ Identificación	Function/ Función	Deactivation Date/ Fecha de desactivación	Remarks/ Observaciones
1	2	3	4	5
PUNTA ARENAS/Presidente Cabo Ibañez del Campo		T/E		
SANTIAGO/Arturo Merino Benitez		E		
SANTO DOMINGO		E		
TABON		E		
TONGOY		E		
COLOMBIA				
ABEJORRAL		E		
AMBALEMA		E		
BARRANCA BERMEJA		E		
BARRANQUILLA/Ernesto Cortissoz		A/L/E		
SANTAFE DE BOGOTA/Eldorado		A/L/T/E		
BUCARAMANGA		E		
BUENAVENTURA	BUN	E	2005	Reemplazado por VOR/DME
CALI/Alfonso Bonilla Aragón	CLO	T/E	2008	Reemplazado por VOR/DME
CARTAGENA/Rafael Nuñez		A/L		
LETICIA/Alfredo Vasquez Cobo	LET	A/L/E	2009-2018	
MERCADERES	MER	E	1997	Reemplazado por VOR/DME
MITU		E		
PEREIRA		E		
RIO HACHA		E		
SAN ANDRES /Gustavo Rojas Pinilla		A/L/T/E		
SAN JOSE DEL GUAVIARE		E		
TECHO	TEH	E	2006	Reemplazado por VOR/DME
TULUA		E		
TUMACO	TCO	E	2007	Reemplazado por VOR/DME
VILLAVICENCIO		E		
ZIPAQUIRA		E		
ECUADOR				
AZCAZUBI		T		
CHONGON		T		
CUENCA		E		
ESMERALDAS		E		
LATACUNGA/Cotopaxi Intl		A/L		
PALMA		T		

Administration/Location Administración/ Lugar	Identification/ Identificación	Function/ Función	Deactivation Date/ Fecha de desactivación	Remarks/ Observaciones
1	2	3	4	5
FRENCH GUIANA **(France)**				
CAYENNE/Rochambeau	08 PA1	A/L/E		
GUYANA				
TIMEHRI/Cheddi Japan Intl.	06 PA1	A/L/E		Decomissioned / Desmantelado
KATA		T/E		Decomissioned / Desmantelado
PANAMA				
DAVID/Enrique Malek	04 NPA	A/L		
PANAMA/Tocumen Intl.	03R PA1	A/L		
TABOGA		E		
WANNKANDI		E		
PARAGUAY				
ASUNCION/Silvio Pettirossi	02 NPA	A/L/E		
CONCEPCION		E		
ESTIGARRIBIA		E		
FILADELFIA		E		
PERU				
AYACUCHO		E		
CAJAMARCA		E		
PISCO/Pisco	21 NPA	T		
TARAPOTO		E		
SURINAME				
PARAMARIBO/Zorg En Hoop	NINST			Decomissioned / Desmantelado
ZANDERY/Johan Adolfo Pengel Intl.	11 PA1	A/L/E		Decomissioned / Desmantelado
URUGUAY				
COLONIA/Internacional de Colonia	12 NPA	A/L		
MALDONADO/Intl C/C Calos A. Curbelo Laguna del Sauce	08 PA1	A/L		
MONTEVIDEO/Aeropuerto Angel S. Adami Intl.	18 NPA	A/L		

Administration/Location Administración/ Lugar	Identification/ Identificación	Function/ Función	Deactivation Date/ Fecha de desactivación	Remarks/ Observaciones
1	2	3	4	5
MONTEVIDEO/Carrasco Intl.	06 NPA	A/L/T/E		
RIVERA/Cerro Chapeu Intl.	04 NPA	A/L		
SALTO/Nueva Hesperides Intl.	04 NPA	A/L/E		
VENEZUELA				
CABO CODERA		E		
CARACAS/Simon Bolivar Intl., Maiquetia	09 PA1	A/L/E		
CARUPANO		E		
ELORZA		E		
GRAND ROQUE		E		
LA DIVINA PASTORA		E		
MARACAIBO/La Chinita Intl.	02L PA1	A/L/E		
MARGARITA I./ Intl. Del Caribe, Gral. Santiago Marino	09 PA1	A/L/E		
TUCUPITA		E		
VALENCIA/Zim Valencia Intl.		A/L		

Agenda Item 3: Surveillance systems developments

3.1 Review of the regional strategy of the implementation of surveillance systems in the CAR/SAM Regions

3.2 Follow up to the surveillance systems planning/ implementation/ trials (ADS-C, ADS-B, Radar Mode S, multilateration, etc.)

3.1.1 The Meeting took note of the activities carried out by the surveillance task force, which met twice since the Fifth Meeting of the CNS Committee, the first in Trinidad and Tobago from 20 to 21 June 2007, and the second in Lima, from 9 to 10 May 2008.

3.1.2 On this regard, the Meeting reviewed the draft document of the unified Surveillance Regional Strategy that was prepared by the surveillance task force. The delegate from IATA presented updated information regarding the aircraft communications, navigation and surveillance equipment on board as well as other additional information to amend this document.

3.1.3 **Appendix A** to this Agenda Item contains the final document of the unified Surveillance Regional Strategy, including IATA information.

3.1.4 The Meeting also analyzed the ADS-C, ADS-B and multilateration trials in the CAR/SAM Regions, as well as foreseen activities on this regard, which are presented in **Appendix B** to this agenda item.

3.1.5 In addition, the Meeting was informed of the work carried out by the Surveillance Task Force in the activities to be considered by the ADS-B Trials contained in **Appendix C** to this agenda item, which presents these activities for the consideration of States/Territories/International Organizations when implementing ADS-B trials.

3.1.6 The Meeting also noted the considerations that have to be followed by those States/Territories/International Organizations who wish to carry out ADS-B trials with the FAA, which are indicated in **Appendix D** to this part of the Report.

3.1.7 The Meeting thanked the work of the Surveillance Task Force for the excellent job performed.

3.1.8 The Meeting took note of the adoption of the ADS-B service provision model, its main benefits and the essential service parameters for ADS-B performance adopted by the APANPIRG/18 and considered that the surveillance task force analyze it within the ADS-B trials programme.

3.3 Surveillance and communication systems requirements for the integration of ATM automated systems and ATFM requirements

3.3.1 The Meeting took note of considerations on surveillance and communications systems for the integration of the ATM automated systems discussed under automation activities carried out through the ICAO Technical Co-operation Project RLA/98/003, as well as automation activities in CAR and NAM Regions. The review of these automation aspects was carried out by an automation ad hoc Group composed by CNS and ATM Committees delegates, which results are being presented under Agenda Item 6 (Other Issues) of the Report of the Sixth Meeting of the ATM/CNS Subgroup.

3.4 Standardized regional registry for aircraft with Mode S transponder

3.4.1 The Meeting recalled within the guidelines on the preliminary elements for a consolidated regional strategy for the implementation of surveillance systems, agreed at the GREPECAS/14 meeting, stipulate that regarding the considerations for the implementation of secondary surveillance radars (SSRs) in Mode S. The Meeting also recalled that GREPECAS/14 instructed that with respect to the mode S transponder capability of aircraft operating in the CAR/SAM Regions, States, Territories and International Organisations should apply the procedure established by ICAO for aircraft identification (Assignment of 24-bit aircraft addresses as stipulated in Annex 10, Volume III, part I, Appendix to Chapter 9 [*Global Plan for the allocation, assignment and application of aircraft addresses*]), considering that it would be beneficial to implement national data bases containing standardised information on aircraft with assigned 24-bit addresses, which would give surveillance service providers updated aircraft identification information, especially for radar processing systems.

3.4.2 In this regard, the Meeting recalled that GREPECAS/14 agreed that the CNS Committee would work on this matter in order to help CAR/SAM States, Territories and International Organisations standardise 24-bit address assignment registration information for the identification of aircraft with Mode S transponders.

3.4.3 In this respect, the Meeting took note that the Guidelines and considerations that the details that need to be considered for standardised registration of aircraft with Mode S transponders are contained in the **Appendix E** to this Part of the Report.

APPENDIX A

UNIFIED REGIONAL SURVEILLANCE STRATEGY
CAR/SAM REGION

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Surveillance Strategy for CAR/SAM Region

1. Introduction

1.1. General considerations

1.1.1 This initial document is the result of the task assigned to CNS Committee - CNS/SUR/TF from GREPECAS 14 Meeting in which the Preliminary elements for a Regional Surveillance Strategy and the Regional CAR/SAM Strategy for short, medium and long term ADS-C and ADS-B use have been integrated into a Unified Regional Strategy for the Implementation of Surveillance Systems. This is a live document based on the Global and Regional Planning:

a) The Global Strategies are described on Doc 9750 Global Air Navigation Plan on its initiatives:

- GPI-09 Situational Awareness: promotes the operational implementation of data link surveillance, and the definition of the use of ADS-B and ADS-C.
- GPI-17 Data link Applications promotes the use of data link applications, and its harmonization for seamless and interoperable operations.

b) The CAR/SAM Regional Implementation of Surveillance Systems: Doc. 8733 "CAR/SAM Regional Air Navigation Plan" CNS Table 4A Surveillance System Regional Plan.

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

1.1.3 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.

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

1.2 Scope of the Surveillance Strategy

1.2.1 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.

1.2.2 The surveillance technologies considered in this strategy to meet present and future operational expectations are listed below and briefly explained in Annex C:

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

1.2.3 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 presented in chronological order.

1.2.4 The dates illustrated in this document define when surveillance systems are estimated to

become regionally operational. Nevertheless, some of the surveillance systems described in this strategy will be used to solve local issues prior to the timelines in this document, and thereby will migrate from pioneer areas into larger regional areas.

1.2.5 New surveillance technologies implementation policy for the CAR/SAM Regions should be based first on a voluntary implementation 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.

1.2.6 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.

1.2.7 This surveillance strategy is derived from the Global Air Navigation Plan for CNS/ATM Systems (Doc. 9750).

1.2.8 CAR/SAM States, Territories and International Organizations when implementing surveillance systems, need to be cognizant of the operational requirements of the Global ANP in particular GPIs 09 and 17 (Situational Awareness and Implementation of data link applications).

1.3 Structure of the Document

1.3.1 This document is structured as follows:

- Section 1 (this section) presents the general considerations, 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 short (2008-2011), medium (2011-2015) and long terms (2015-2025) in the Air Surveillance field, for En-Route and TMA Airspace, Aerodrome Operations and Aircraft Systems.
- Section 3 details the Surveillance Infrastructure Evolution required to cope with the foreseen operational environment and specifies a tentative action plan that needs to be accomplished in a timely manner, in order to promote 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 surveillance techniques discussed in this document.
- Annex D presents the potential airspaces for ADS-C and ADS-B implementation.
- Annex E presents IATA survey on navigation, surveillance and communication equipment on board of aircrafts.

1.4 Intended Readers

1.4.1 This strategy was developed for the following stakeholders group within the CAR/SAM Regions:

- The departments of the National Supervisory Authorities of CAR/SAM countries who are responsible for verifying ATM Surveillance Systems;
- The departments of the civil and military ANSP of CAR/SAM states that 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 clients of the ATM Surveillance Systems.

2. Surveillance Operational Scenario Evolution

2.1. En-Route and TMA Airspace

2.1.1. Each State/Territory/International Organization needs to evaluate the present day maximum density traffic and that expected for the year 2005 and give due consideration to the useful life of their radars and the potentiality for their replacement with ADS-B.

2.1.2. The surveillance operational scenario evolution for En-Route and TMA airspace is based on three fundamental principles for ground users in such airspace. These principles 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.

2.1.3. For En-Route and TMA Airspace, security and safety will remain key requirements throughout. 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.

2.1.4. Short term (until 2011)

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

2.1.5. Medium term (2011-2015)

2.1.5.1. 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).

2.1.5.2. 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 2015.

2.1.6. Long term (until 2015-2025)

2.1.6.1. Other possible new applications are 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.

2.1.6.2. It is anticipated 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.

2.1.6.3. Until 2015, the ground service provider will remain responsible for the separation service and for maintaining separation. However, from 2015 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 automation. The controller will make use of ADD to provide a more accurate view of the situation and improvements in safety nets;
- 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 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

2.2.1 Short term (until 2011)

2.2.1.1 For selected airports, detection of all mobiles within the aerodrome area is permanent in short term and throughout the strategy timeframe.

2.2.2 Medium term (2011-2015)

2.2.2.1 The use of ADDs to support aerodrome operations is envisaged; and 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 Multilateration

2.2.3 Long term (until 2015-2025)

2.2.3.1 Where airport operators foresee a benefit, a long term implementation of A-SMGCS level III (which may include the ADS-B Package I, ATSA SURF application) and A-SMGCS IV may start. This may require an ADS-B-in infrastructure and an equipage of selected, appropriate airport vehicles with transponders.

2.3. Aircraft Systems

2.3.1 Short term (until 2011)

2.3.1.1 In the short term, the use of SSR or SSR Mode S systems for ground based surveillance radar or Multilateration systems will continue. This means that no additional equipment is foreseen on the aircraft until 2011.

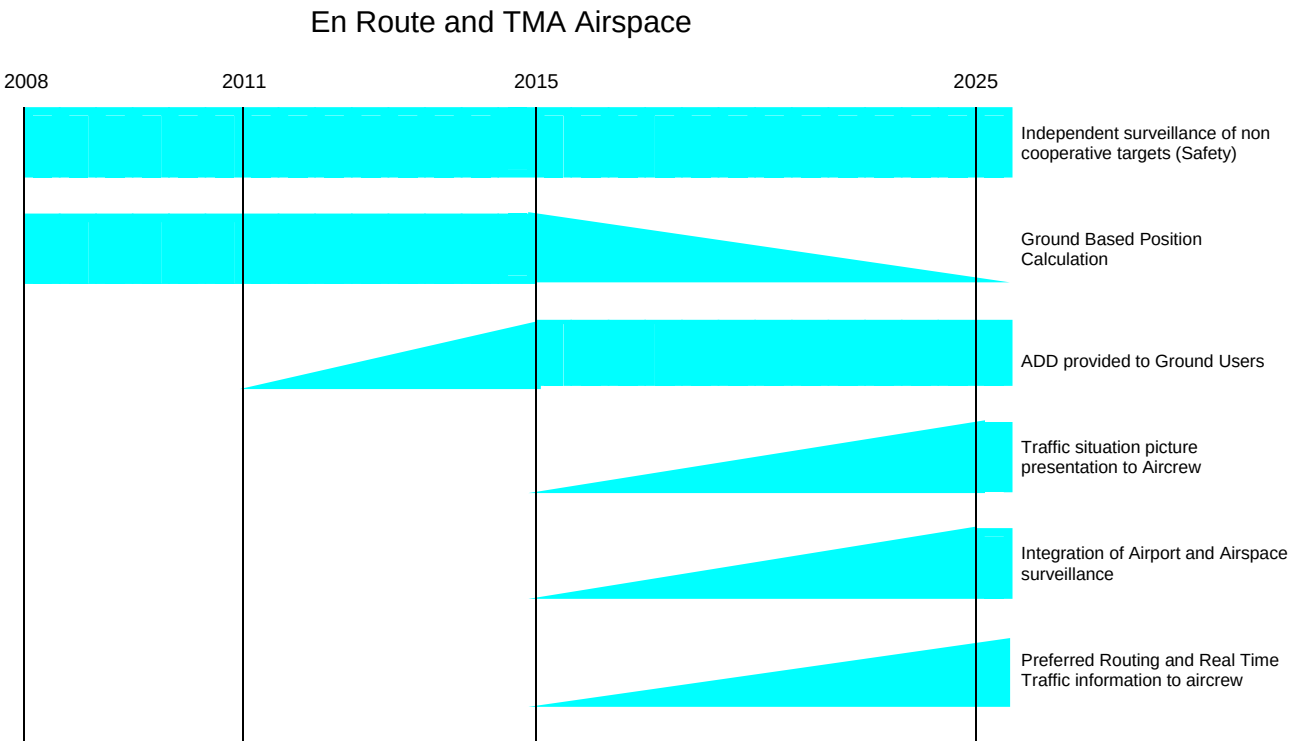
2.3.2 Medium term (2011-2015)

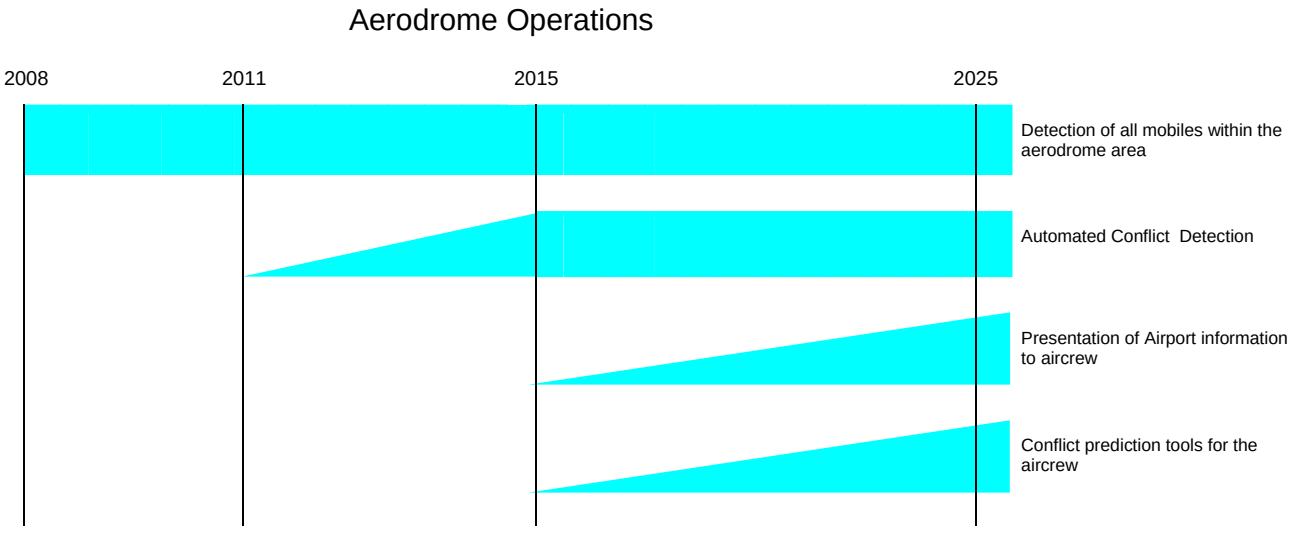
2.3.2.1 The implementation of new ground Surveillance Applications (ADS-B out) will increase, which will require integration between the aircraft navigation system and mode S transponders, in order to transmit intent information to other aircraft and ground users. This will be enabled by ADS-B using 1090 MHz Extended Squitter.

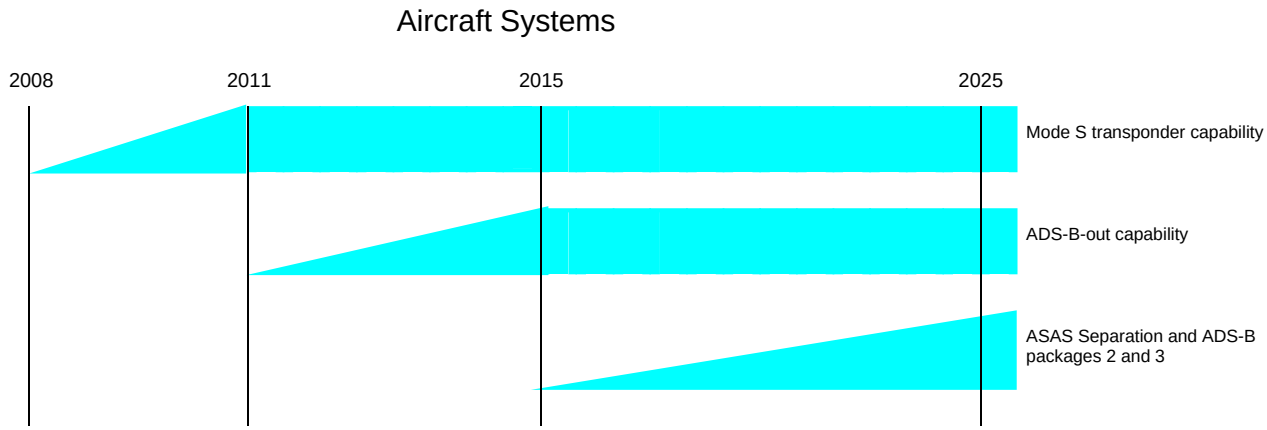
2.3.3 Long term (until 2015-2025)

2.3.3.1 The implementation of ADS-B ASAS situational awareness applications will require an airborne SDPS and display system.

2.4. Operational Drivers Timeframe







3. Surveillance Infrastructure Evolution

3.1. En-Route and TMA Airspace

3.1.1. Independent Surveillance, in the form of Primary Surveillance Radar still be used in En-Route Surveillance and Terminal Maneuvering Area (TMA) based on local country specific security requirements.

3.1.2 Short term (until 2011)

3.1.2.1 From 2008 to 2011, 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). Implementation of monopulse SSR, adaptable to Mode S, in medium- and high-traffic en route and terminal areas will continue. Use of ADS-B (ES Mode S receivers) will begin to provide surveillance for en-route and terminal areas not covered with radar and to strengthen surveillance in areas covered with SSR Modes A/C and S.

3.1.3 Medium term (2011-2015)

3.1.3.1 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 will not be able to reply on mode S, a mixed mode interrogation will be required up to 2015.

3.1.3.2 Ground implementation for ADS-B (based on ES Mode S receivers) will increase from 2011 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.

3.1.3.3 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.

3.1.3.4 ADS-C surveillance should be operationally used in all oceanic and remote airspace associated with FANS 1/A capacities.

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

3.1.3.6 Each State/Territory/Organization should investigate and report their Administration's policy in respect to the ADS-B data sharing with their neighbors and from cooperative goals.

3.1.3.7 The ADS-B data sharing plan should be based on selecting centres by pairs and analyzing the benefits and formulating proposals for the ADS-B use for each pair of centre/city with the purpose to improve the surveillance capacity.

3.1.3.8 To support the ADS-C and ADS-B regional plan, the States/Territories/International organizations, as well as the entity representing the airspace users, should organized and provide the following information; a focal point of contact, its respective implementation plan, including a time-table, and information on its air-ground communications and automation systems.

3.1.3.9 The ADS-B data links technology that will be used for the Mode S 1,090 MHz extended squitter (1090 ES). ADS-B data sharing could be initiated.

3.1.3.10 SSR Mode A/C and SSR Mode S will continue to be the main surveillance elements for approach, en route, and terminal areas.

3.1.4 Long term (until 2015-2025)

3.1.4.1 The majority of the SSR and SSR Mode S systems currently installed would be at the end of their operational life by 2015. SSR Mode A/C radars that have completed their life cycle by that time will not be replaced. Continuation of the ADS-B use with the 1090 ES technique and the planning initiation for the ADS-B implementation by new data links to satisfy the ATM global system requirements will fully replace those decommissioned SSRs.

3.2. Aerodrome Operations

3.2.1 Short term (until 2011)

3.2.1.1 The main technology for calculating the position of mobiles (both aircraft and vehicles) will be Surface Movement (primary) Radar. Implementation of multilateration will gradually increase, where aircraft respond to SSR Mode A/C or SSR Mode S queries.

3.2.2 Medium term (2011-2015)

3.2.2.1 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.

3.2.3 Long term (until 2015-2025)

3.2.3.1 The introduction of A-SMGCS Levels III/IV at selected aerodromes will require aircrew to be presented, 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

3.3.1 Short term (until 2011)

3.3.1.1 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 2011 on that matter.

3.3.1.2 The proportions of equipped aircrafts are also critical for the ADS-C and ADS-B deployment, for which it is required that ANSP and aircraft users periodically coordinate, al least, the following information: number of equipped aircrafts operating in the concern airspace, number and name of the airlines that have equipped aircrafts for ADS-C and ADS-B, type of equipped aircrafts, categorization of the accuracy/integrity data available in the aircrafts.

3.3.1.3 Until 2011 the implementation of ACAS II systems throughout commercial and general aviation will be completed using basic Mode S transponder for elementary surveillance (ELS). ADS transponders are to be integrated into the GNSS avionics for valid data.

3.3.1.4 This period will see:

- Implementation of SSR radars Mode S only in high-traffic-density approach, en route, and terminal areas,
- Implementation of monopulse SSR, adaptable to Mode S, in medium- and high-traffic en route and terminal areas.
- Begin ground implementation for ADS-B (ES Mode S receivers) for en route and terminal areas not covered with radar, and strengthen surveillance in areas covered with SSR Modes A/C and S.
- Begin the implementation of multilateration, where aircraft respond to SSR Mode A/C or SSR Mode S queries for aerodrome surface movement surveillance.

3.3.2 Medium term (2011-2015)

3.3.2.1 2011-2015 will see the implementation of Mode S in those monopulse SSRs that have Mode S capabilities, in areas with coverage and increased air traffic, increased ADS-B installations on ground (ES Mode S receivers) for en route and terminal areas not covered by radar, and strengthened surveillance in areas covered by SSR Mode A/C and SSR Mode S. The update of Mode S transponder will begin, so that it can operate in ADS-B and multilateration environments.

3.3.2.2 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.

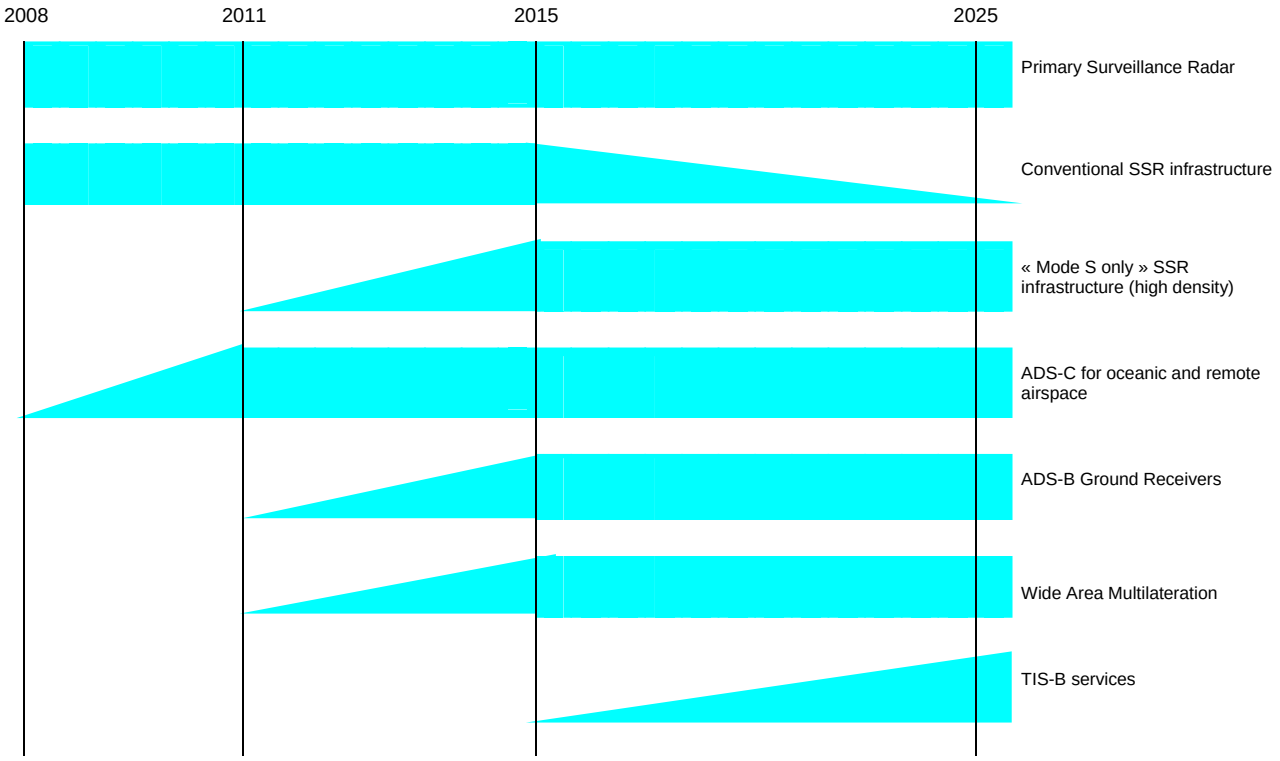
3.3.2.3 During the period 2011 – 2015 there will be increased implementation of multilateration, where aircraft respond to SSR Modes A/C and S queries for surveillance of aerodrome surface movements, and begin the implementation of surveillance applications in approach, en route and terminal areas (wide area multilateration, WAM) in areas that are not covered by radar surveillance and to strengthen radar surveillance.

3.3.3 Long term (until 2015-2025)

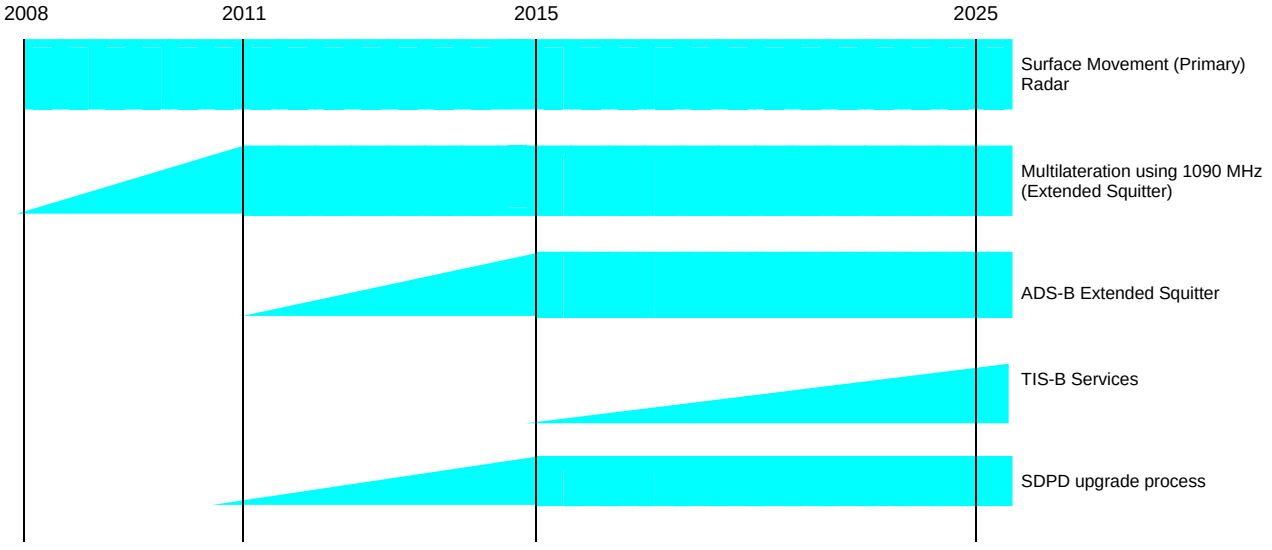
3.3.3.1 From 2015 onwards, the move from ASAS spacing to ASAS separation and preferred routing may require a high integrity traffic situation picture, therefore the use of TIS-B may be required as well as the implementation of an airborne Surveillance Data Processing System (SDPS) to integrate ADS-B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

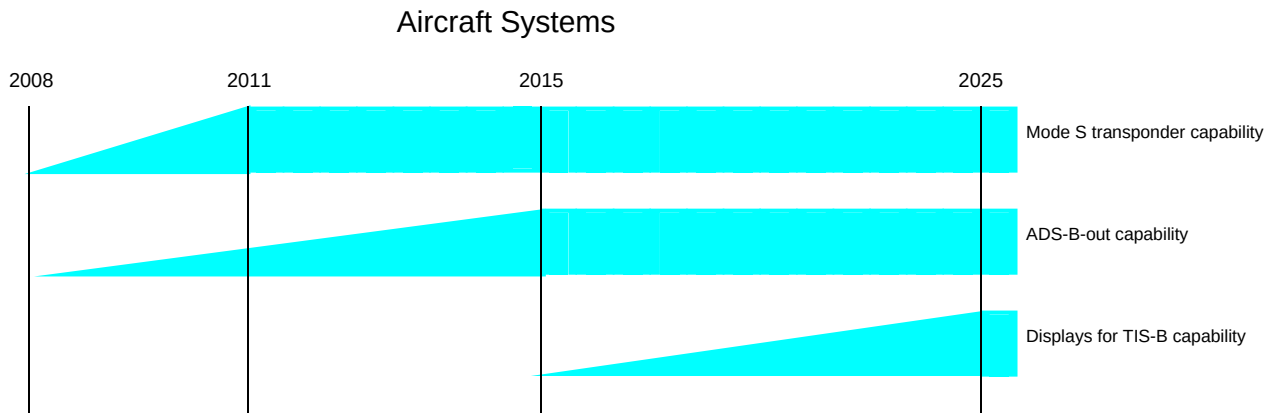
3.4. Surveillance Infrastructure Timeframe

En Route and TMA Airspace



Aerodrome Operations





3.5. Regional Action Plan

3.5.1. Short term (until 2011)

3.5.1.1. There will be a continuous need in short term to perform periodic assignment and monitoring of mode S 24-bits address by all Civil Aviation Authorities in the CAR/SAM Regions. 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 Analyses, safety assessments and detailing operational requirements. In order to validate the timeframe forecasted by this surveillance strategy and assess the proportions of equipped aircrafts, 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 2025;
- 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.

3.5.1.2. 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, establishing a plan in the potential areas of ADS-B data sharing, aimed at a coordinated, harmonious and interoperable implementation. 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).

3.5.1.3. 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 whether the use of 1090MHz will continue to support surveillance requirements.

3.5.2 Medium term (2011-2015)

3.5.2.1 In medium term, 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.

3.5.3 Long term (until 2015-2025)

3.5.3.1 In long term, it is required to identify the impact of the new procedures that are predicted to require 'intent' information from the aircraft. The precise definition of intent requires clarification to ensure avionics equipment and ground processing products can be developed in time to deliver the required information. It is also 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.

3.6. Regional Action Plan Timeframe

Regional Action Plan Timeframe

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 Organization
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
SMR	Surface movement Radar
SSR	Secondary Surveillance Radar
TCAS	Traffic Collision Avoidance System
TIS-B	Traffic Information Service - Broadcast
TMA	Terminal Maneuver (Control) Area

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 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:

- 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. 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 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.

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.

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.

Annex D

Potential airspaces for ADS-C and ADS-B implementation in CAR/SAM Region

Nb	State or Organization/ Center	Air Space	ADS Type	Status	Impl. Date	Remarks
1	Bahamas/ Nassau ACC	Nassau FIR	ADS-B	Study		Studies are being carried out
2	Cuba/ Habana ACC	Havana FIR (South East Zone)	ADS-B	Study		Studies are being carried out
3	Haiti/ Port au Prince ACC	Port au Prince FIR	ADS-B	Study		Studies are being carried out
4	México/ Mérida ACC Monterrey ACC	Golf of Mexico (Central zone between Houston Oceanic and Mexico FIRs)	ADS-B	Planned		Based on an agreement Mexico - USA
5	Trinidad and Tobago / Piarco ACC	Piarco FIR	ADS-B ADS-C (*)	Planned		Studies are being carried out *Oceanic East Sector
6	United States/ Houston ARTCC Miami ARTCC	Golf of Mexico (Central zone between Houston Oceanic and Mexico FIRs) Miami Oceanic FIR (Domestic Zone)	ADS-B ADS-B	Planned Planned		Based on an agreement Mexico - USA
7	COCESNA/ Cenamer ACC	Cenamer FIR (Caribbean and Pacific Oceanic sectors)	ADS-B	Study		Studies are being carried out
8	Argentina	Ezeiza FIR Oceanic Zone	ADS-C	Planned		Planned to be implemented at the end of first trimester of 2007
9	Brasil/ Atlântico ACC	Atlântico FIR	ADS-C	Planned		Planned to be fully implemented at the end of second trimester of 2009
10	Chile/ Chile´s ACC	Chile FIR (Continental and Oceanic air Space)	ADS-C	Study		

IATA SURVEY

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Airline	Airplane type	NAVIGATION																		SURVEILLANCE				COMMUNICATIONS					COMMENTS
		1 x FMS	2 x FMS	GNSS STAND ALONE	GNSS COUPLED TO FMS	IRU	RNAV DME/DME	RNAV DME/DME/IRU	RNAV GNSS	RNP 10	RNP 4 Oceanic	RNAV 5	RNAV 1	RNP 1.0	RNP .3	RNP <.3	SBAS	GBAS	FANS	ADS	ADS-B	Mode S	Mode S Enhan	HF	HF DATA LINK	ACARS	VDL 2	SATCOM	
Air Canada	A319		Y		Y	Y	Y	Y	Y	Y																Y			
	A320		Y		Y	Y	Y	Y	Y	Y																Y			
	A330		Y		Y	Y	Y	Y	Y	Y	Y	Y	Y						Y	Y	Y					Y		Y	
	A340		Y		Y	Y	Y	Y	Y	Y	Y	Y	Y						Y	Y	Y			Y		Y		Y	
	B767		Y		Y	Y	Y	Y	Y	Y		Y												Y		Y		Y*	*15 of 40 have SATCOM
Air Europa	A330-200		Y		Y	Y		Y		Y	Y	Y	Y		Y				Y	Y			Y	Y		Y	Y	Y	
	B767-300		Y		Y	Y		Y		Y	Y	Y	Y			Y						Y		Y					
Air France	A320		Y		Y	Y		Y	Y	Y	Y	Y	Y	Y	Y						Y	Y	Y	Y		Y			ADS-B OUT capable but not certified
	A330		Y		Y	Y		Y	Y	Y	Y	Y	Y	Y	Y				Y	Y	Y	Y	Y	Y		Y		Y	ADS-B OUT capable but not certified
	A340		Y		Y	Y		Y	Y	Y	Y	Y	Y	Y	Y				Y	Y	Y	Y	Y	Y		Y		Y	ADS-B OUT capable but not certified
	B747-200F		Y		Y	Y	Y		Y	Y	Y	Y	Y	Y	Y							Y	Y	Y		Y	Y		
	B747-400/400ERF		Y		Y	Y		Y	Y	Y	Y	Y	Y	Y	Y				Y	Y		Y	Y	Y		Y	Y*	Y	*only 8 VDL2 equipped airplanes
	B777-200ER/300ER		Y		Y	Y		Y	Y	Y	Y	Y	Y	Y	Y				Y	Y		Y	Y	Y		Y		Y	
American Airlines	A300-600		Y			Y		Y		Y		Y										Y		Y		Y			
	B737-800		Y		Y	Y			Y	Y			Y		Y							Y		Y		Y			
	B757-200		Y		Y*	Y		Y	Y*	Y			Y		Y*	Y*						Y*	Y*	Y		Y	Y*		* some aircraft (partial fleet)
	B767-300		Y		Y*	Y		Y	Y*	Y			Y							Y*			Y	Y		Y	Y*	Y	* some aircraft (partial fleet)
	B777-200		Y		Y	Y			Y	Y			Y		Y				Y	Y			Y	Y		Y		Y	
	MD80			Y					Y				Y									Y				Y			
British Airways	B747-400		Y		Y	Y		Y	Y	Y		Y	Y	Y	Y	Y					Y	Y	Y	Y		Y		Y	
	B767-300		Y	Y		Y		Y		Y		Y	Y									Y	Y	Y		Y			
	B777		Y		Y	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y			Y	Y	Y	Y	Y	Y		Y		Y	
Caribbean Airlines	B737-800		Y		Y	Y		Y	Y		Y				Y							Y		Y		Y			
Continental Airlines	737-300	Y																				Y				Y			
	737-500		Y		Y	Y		Y	Y	Y		Y	Y	Y	Y							Y				Y			
	737-700		Y		Y	Y		Y	Y	Y		Y	Y	Y	Y	Y						Y		Y		Y			
	737-800		Y		Y	Y		Y	Y	Y		Y	Y	Y	Y	Y					Y	Y		Y		Y			40 existing + 35 new by end-2007
	737-900		Y		Y	Y		Y	Y	Y		Y	Y	Y	Y	Y						Y		Y		Y			
	757-200		Y		Y	Y		Y	Y	Y		Y	Y	Y	Y	Y						Y	Y	Y	Y	Y			Mode S Enhanced in work to meet European mandate
	757-300		Y		Y	Y		Y	Y	Y		Y	Y	Y	Y				Y			Y	Y	Y		Y	Y		
	767-200		Y		Y	Y		Y	Y	Y		Y	Y	Y	Y				Y		Y	Y	Y	Y	Y	Y		Y	Mode S Enhanced in work to meet European mandate
	767-400		Y		Y	Y		Y	Y	Y		Y	Y	Y	Y	Y			Y		Y	Y	Y	Y	Y	Y	Y	Y	Mode S Enhanced in work to meet European mandate
	777-200		Y		Y	Y		Y	Y	Y		Y	Y	Y	Y	Y			Y		Y	Y		Y	Y	Y		Y	Mode S Enhanced in work to meet European mandate
COPA	B737-700		Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y						Y		Y	Y	Y			
	B737-800		Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y						Y		Y	Y	Y			
	ERJ-190		Y		Y	Y	Y	Y	Y	Y	Y											Y		Y		Y			
Delta	B737-800		Y		Y	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y						Y		Y		Y			
	B757-200		Y		Y*	Y		Y	Y	Y		Y	Y	Y	Y							Y		Y		Y			* approx 20% have GPS
	B757-200ER		Y		Y*	Y		Y	Y	Y		Y	Y	Y	Y							Y	Y	Y		Y			* approx 25% have GPS
	B767-300 / 300ER		Y		Y*	Y		Y	Y	Y	Y	Y	Y	Y	Y				Y*	Y*		Y	Y	Y		Y		Y*	* approx 65% have SATCOM currently / approx 25% have GPS
	B767-400		Y		Y	Y		Y	Y	Y	Y	Y	Y	Y	Y				Y*	Y*		Y	Y	Y		Y		Y*	* approx 40% have SATCOM currently
	B777		Y		Y	Y		Y	Y	Y	Y	Y	Y	Y	Y				Y	Y		Y	Y	Y		Y		Y	
	A340-300		Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y					Y	Y	Y	Y		Y		Y	
Emirates	A340-500		Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y			Y	Y	Y	Y	Y	Y	Y	Y		Y	
	B777-200/300		Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y			Y	Y	Y	Y	Y	Y		Y		Y	
	B777-300ER		Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y			Y	Y	Y	Y	Y	Y		Y		Y	
FedEx	A300		Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y							Y	Y			Y	Y		
	A310		Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y							Y	Y			Y	Y		
	B727			Y*								Y																	* approx. 20% of fleet has GPS
	MD-10		Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y							Y	Y	Y	Y	Y	Y		
	MD-11		Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y				Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
Iberia	A340		Y		Y	Y	Y	Y	Y	Y		Y	Y									Y	Y	Y		Y		Y	

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Airline	Airplane type	NAVIGATION																		SURVEILLANCE				COMMUNICATIONS					COMMENTS
		1 x FMS	2 x FMS	GNSS STAND ALONE	GNSS COUPLED TO FMS	IRU	RNAV DME/DME	RNAV DME/DME/IRU	RNAV GNSS	RNP 10	RNP 4 Oceanic	RNAV 5	RNAV 1	RNP 1.0	RNP .3	RNP <.3	SBAS	GBAS	FANS	ADS	ADS-B	Mode S	Mode S Enhan	HF	HF DATA LINK	ACARS	VDL 2	SATCOM	
JAL	B747 (without FMS,GPS)		N	–	N	N (INS)	–	N	N	Y	N	Y	N	N	N	N	N	N	N	N	N	Y	N	Y	N	N	N	N	
	B747 (with FMS,GPS)		Y	–	Y	Y	–	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N	Y	Y	Y※4	Y	N	Y	N	Y	Y	Y	※4:Applicable only for airplanes complied with European EL (Transponder with Extended Squitter)
	B747-400		Y	–	Y	Y	–	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y※2	Y※5	Y	Y※5	Y	N	Y	N	Y※2	※2:Applicable only for international airplanes※5:Applicable only for long range international airplanes
	B777		Y	–	Y	Y	–	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y※2	Y※6	Y	Y※6	Y	N	Y	N	Y※2	※2:Applicable only for international airplanes※6:Applicable only for long range international airplanes and airplanes delivered after April 2004.
KLM	A330-200		Y		Y	Y	Y	Y	Y	Y	Y	Y	Y						Y	Y		Y	Y	Y		Y		Y	
	B747-400		Y		Y	Y	Y	Y	Y	Y	Y	Y	Y									Y	Y	Y		Y		Y	
	B747-400F		Y		Y	Y	Y	Y	Y	Y	Y	Y	Y						Y	Y		Y	Y	Y		Y		Y	
	B777-200		Y		Y	Y	Y	Y	Y	Y	Y	Y	Y						Y	Y		Y	Y	Y		Y		Y	
	MD-11		Y		Y	Y	Y	Y	Y	Y	Y	Y	Y									Y	Y	Y		Y		Y	
LAN	A319-100		Y		Y	Y	Y	Y	Y	Y		Y	Y			Y								Y		Y			
	A320-200		Y		Y	Y	Y	Y	Y	Y		Y	Y			Y								Y	Y	Y			
	A340-300		Y		Y	Y	Y	Y	Y	Y	Y	Y	Y						Y	Y			Y	Y		Y		Y	
	B767-300		Y		Y*	Y	Y	Y	Y	Y		Y	Y											Y	Y*	Y			*10 of 29 B767s have GPS. Non-GPS 767s have HF datalnk
Lufthansa	A340-300		Y		Y	Y		Y	Y				Y						Y			Y	Y	Y		Y	Y	Y	
	A340-600		Y		Y	Y		Y	Y				Y						Y			Y	Y	Y		Y	Y	Y	
	B747-400		Y		Y	Y		Y	Y				Y						Y			Y	Y	Y		Y	Y	Y	
Mexicana	A318		Y			Y		Y						Y								Y				Y			
	A319		Y			Y		Y						Y								Y		Y*		Y			* 3 of 16 have HF
	A320		Y			Y		Y						Y								Y		Y*		Y			* 20 of 30 have HF
	B757		Y			Y		Y				Y										Y				Y			
	B767		Y			Y		Y				Y										Y				Y			
Northwest	A319		Y			Y		Y		Y			Y									Y				Y			
	A320		Y			Y		Y		Y			Y									Y				Y			
	A330-200/300		Y		Y	Y		Y		Y		Y	Y		Y				Y	Y		Y	Y	Y		Y	Y	Y	
	B757-200/300		Y		Y*	Y		Y		Y		Y	Y									Y	Y	Y*		Y			* part of the fleet only
Pluna	B767-300		Y			Y	Y	Y		Y	Y	Y										Y		Y		Y			
SAA	A340-200		Y			Y				Y	Y	Y	Y	Y	Y									Y		Y		Y	
	A340-300		Y			Y				Y	Y	Y	Y	Y	Y				Y	Y	Y			Y	Y	Y		Y	
	A340-600		Y			Y				Y	Y	Y	Y	Y	Y				Y	Y	Y			Y	Y	Y		Y	
	B747-400		Y	Y*	Y	Y				Y	Y	Y							Y*					Y	Y	Y		Y*	* some aircraft only. Only 4 aircraft have SATCOM.
TACA	A319		Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y							Y		Y		Y			
	A320		Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y							Y		Y		Y			
	A321		Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y							Y		Y		Y			
TAM	A319		Y		Y	Y	Y	Y		Y		Y	Y		Y							Y		Y		Y		Y	
	A320		Y		Y	Y	Y	Y		Y		Y	Y		Y							Y		Y		Y		Y	
	A330-200		Y		Y	Y	Y	Y		Y		Y	Y	Y	Y				Y			Y	Y	Y		Y		Y	
	F100		Y			Y	Y	Y														Y		Y					
	MD-11		Y			Y	Y	Y		Y		Y										Y		Y					
United	A319/A320		Y		Y*	Y		Y	Y*			Y	Y	Y	Y*							Y				Y			*About 50% of fleet has GPS and is RNP 0.3 capable
	B757-200		Y			Y		Y				Y	Y									Y				Y			
	B767-300		Y		Y*	Y		Y	Y*	Y	Y	Y	Y	Y	Y							Y	Y			Y		Y	*About 40% of fleet has GPS and is RNP 0.3 capable
UPS	A300		Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y							Y	Y	Y	Y		Y			
	B757		Y			Y	Y	Y		Y	Y	Y									Y	Y	Y	Y*	Y*	Y			* HF and HFDL on 20 out of 75 airplanes
	B767		Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y							Y	Y	Y	Y	Y	Y			
US Airways	A319/320/321		Y		Y	Y			Y						Y								Y	Y*		Y			* Some A319/320/321
	B737-300/400 **	Y				Y		Y		Y		Y	Y													Y			
	B757-200 (23N) ETOPS		Y		Y	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y			Y			Y		Y	Y	Y			
	B757-200 ETOPS		Y			Y		Y		Y	Y	Y	Y	Y	Y							Y		Y		Y			
	B757-200		Y			Y		Y		Y	Y	Y	Y	Y	Y											Y			

APPENDIX B

ADS-B, ADS-C AND MULTILATERATION TRIALS IN THE CAR/SAM REGIONS

Brazil

Brazil informed that ADS-C operational capability will be achieved in Oct/2008, and that ADS/CPDLC FANS 1/A will attain operational capabilities in Apr/2009, using a final platform developed by ATECH. Regarding ADS-B and MLAT, the Brazilian Administration has promoted modernization programs on current surveillance radar systems and has installed new radars throughout the country. The result of those initiatives is that the current radar network in Brazil is considerably new (less than 7 years old) and the coverage for secondary radars is complete for the entire territory (FL 200 and above). Considering the above mentioned, Brazil has no plans in short terms to migrate to ADS-B or MLAT for En-route and TMA in continental areas. Nevertheless, there is a specific operational need in the Oil Platforms area close to Rio de Janeiro (Bacia de Campos) that might be suitable for trials on ADS-B/MLAT, since it represents an homogeneous airspace (helicopters only) that has partial radar coverage and would be a good Test Bed for the comparison between the performance of ADS-B/MLAT and a radar system. Recently, DECEA, Petrobrás (Brazilian Oil Company) and the helicopters operators worked on the re-design of the routes (RNAV) based on GNSS procedures. It is expected that the design of new routes will be ready in September 2008. Once that work is done, it will be possible to identify the surveillance operational needs in order to decide which surveillance application would be the most appropriate to that area.

Cuba

The phase of collecting ADS-B data from their first trials has been completed AND more ADS-B trials will be done during the 2008-2010 period.

Trinidad and Tobago

Trinidad and Tobago stated that they have not progressed with the ADS-B trials as identified in the SUR/TF/1 and explained that as custodian of the Piarco FIR they will eventually migrate to ADS-B as its main mode of surveillance in accordance with the Regional Plan. For the near to medium term surveillance will be via MSSR the existing and planned Radars which are relatively new and are expected to be available for use beyond 2015. Surveillance within the Piarco FIR should migrate to ADS-B via MLAT and that ADS-B trials are to be conducted not before 2015 within the FIR. Trinidad & Tobago stated that implementation of ADS-C should be carried out in 2010/11 when the new ATM System is fully up and running.

United States

United States informed the Meeting that the ADS-B program in the United States will be deploying communications, weather, and ADS-B stations on oil platforms in the Gulf of Mexico, beginning this year 2008. Multilateration is being deployed in Colorado and Juneau, Alaska for surveillance services.

COCESNA

ADS-B trials were conducted in order to obtain statistical information on the equipage of aircrafts in the Region. Refer to the **Annex**.

ANNEX
COCESNA ADS-B TRIAL ACTIVITIES

Phase I:

This phase consisted in monitoring the aircrafts that have this technology and that over fly the Central American airspace. The activities carried out were:

Acquisition of a receptor equipment Mode-S/ADS-B (SBS-1) for the management of aircrafts signs. This equipment included a software application (base station) that shows the received information on a screen as a virtual radar allowing the presentation in real time of the aircrafts. In the application all equipped Mode-S/ADS-B aircrafts, within the receptor's coverage, are shown. The real coverage of this receptor is approximately 250 NM.

Since January 30, tests have been carried out by a team based on COCESNA Headquarters in Tegucigalpa and in the Radar Site of Monte Crudo. Preliminary results indicate that several aircrafts of the main airlines fleets that over fly the central area of Honduras and its proximities use ADS-B regularly, among the monitored ones:

- Taca (Flights: THAI 390 391 215 214)
- UPS (Flights UPS 392 376 368 364)
- BSK (Flights BSK 670 671)
- American (Flights AAL 953 954 940 2166 945)
- Continental (Flights COA 14471868 1446 1447)
- Mexican (I Fly MXA 382)
- Spirit Wing (I Fly NKS 756)
- Airtransac (I Fly TSC 325)
- Servivensa (Flights SSV 328 3285)
- Iberia (Flights IBE 6313 6347)
- Lacsa (Flights LRC 643 642 654 655 8632)

In total, 61 aircrafts has been registered (in different days and with different assigned flights).

The following fields of information has been identified among the ADS data that has been gathered of these flights: Track position (longitude and latitude), call sign, Mode-S Address, Ground speed, Altitude, Vertical Rate and status (on-ground or during flight).

Phase II

Among the planned activities, data is to be collected in different points of the Central America FIR, specifically in radar sites to have a greater number of data with the best coverage to process as statistic information.

Prosecution of ADS data and CPDLC Communications:

With respect to the facilities and capacities available in COCESNA Air Traffic Control Centers and the actions undertaken in the planning and execution of tests for the prosecution of the Data ADS and CPDLC communications, mainly for the Pacific non radar-covered oceanic area of the of the Central America FIR, the following is indicated:

- COCESNA has in Ilopango, El Salvador a system that serves as a contingency back-up for CENAMER ACC Control Center, with the same functionalities for ATC.

- The current functions in both Control Centers can process ADS C data and manage CPDLC communications,

- CENAMER Control Center has ADS/CPDLC Data Connection Servers (DataLink Servers–DLS). This system has the capacity to manage ADS/CPDLC communications through connections provided by Datalink Suppliers, carry out the exchanges of messages between the aircrafts and the Data Terminal, the distribution of ADS data to the Surveillance Data Proccesors (SDP) for processing as ADS and ADS/SSR information, as well as the recording of all these messages.

APPENDIX C

ACTIVITIES TO BE CONSIDERED FOR ADS-B TRIAL

Activities to be considered for ADS B Trial

Five main topics should be considered by the States that are interested in performing some trials on ADS-B, which are:

- Planning Function
- Expected Criteria
- Test Parameters
- Trial Limitation
- Results Dissemination

Planning Function

There's a need to develop a Concept of Operations (CONOPS), in which the scope has to be clearly stated and what the operational requirements are, as well as the issues that have to be addressed (e.g. efficiency improvement, fuel savings, capacity enhancement, etc.)

The above mentioned CONOPS should also define what kind of service will be provided in the trial area (e.g. radar like service) and the complete schedule to perform the actions required, from planning to final report.

All stakeholders should be identified and brought to the program by promoting some user and customer conferences, to discuss the contents of the CONOPS and present the benefits of new technologies. It is also important to have some Airline candidates to commit and be part of the program from the beginning.

Expected Criteria

- The migration for an ADS-B environment should be cost effective;
- The use of the new technology must provide some safety benefit;
- The trial must be concluded in a reasonable time frame;
- The Air Navigation Service providers (ANSP) must get full commitment from users and regulators before the beginning of activities;
- It is important to have some radar coverage (at least partial) over the trial area to validate ADS-B position reports;
- A performance baseline for the designated areas of trials (e.g. existing routes) should be established to make future comparisons possible;
- A Cost Benefit analysis (CBA) should be performed for the customers by the ANSP; and
- Data collection should be performed and a safety case based on that data should be presented to regulators.

Test parameters

- The update rate of the prototype system should be measured and compared to the expected rate, depending on the designated airspace (en-route, TMA, ground);
- The accuracy of the system should be evaluated by comparison with a known legacy system (e.g. secondary radars);
- The performance of the system should be monitored, in terms of NUC (for D260 compatible avionics) or Navigation Integrity Category (NIC), Navigation Accuracy Category (NAC), System Integrity Level (SIL) (for D260A compatible avionics);
- The probability of reception should also be measured over a very large sampling of flights;
- The flight ID sent by any aircraft should be assessed by the technical teams;
- The overall service availability must be measured and determined. Anomalies of all types shall be recorded and analyzed.

Trial Limitations

- The trials should be limited to ADS-B out only;
- There is a need to validate the performance of the existing communication infrastructure;
- The spectrum within the trial area should be monitored in order to make sure that the frequency 1090MHz won't be affected for the legacy systems that are currently deployed;
- It is desirable to have a monitoring system for the health of the GPS constellation to validate its performance during the test event.

Results dissemination

During the trial processes, a dedicated team should be assigned to collect, organize and analyze data that will be used to write a complete report of the ADS-B trial results and to submit that report to GREPECAS through the Surveillance Task Force. These results and data should be sent to the Rapporteur of the Surveillance Task Force.

APPENDIX D

CONSIDERATIONS FOR STATES/TERRITORIES/INTERNATIONAL ORGANIZATIONS TO CARRY OUT ADS-B TRIALS WITH THE FAA

The CAR/SAM State makes an official request via memorandum, e-mail, or fax to "The Federal Aviation Administration (Office of International Aviation, AWH-10,800 Independence Ave. S.W., Washington D.C." (202) 267-5032 --Fax).

The FAA and the CAR/SAM State develop a bilateral agreement that both parties to sign.

Timelines established in accordance to terms of bilateral agreement.

Start of the activities.

Roles and Responsibilities:

The U.S. FAA will:

a) Following request from a Civil Aviation Authority (CAA), negotiate and enter into a bilateral agreement;

b) Provide analysis and technical assistance to explore Surveillance and Broadcast Services solutions and benefits; and

c) Provide a service provider option for the participating State to procure surveillance services.

The CAR/SAM States/Territories/International Organizations:

a) Establish a bilateral agreement with the United States;

b) Provide ground-based surveillance technology;

c) Provide infrastructure necessary to install ground stations in suitable geographic locations; the infrastructure will include telecommunications, power, and equipment shelters;

d) Collect and record ADS-B messages from aircraft transitioning, departing, or landing at various airports; and

e) Participate in data reduction and analysis.

APPENDIX E

SAMPLE AERONAUTICAL INFORMATION CIRCULAR (AIC)
RECOMMENDED TEXT OF STATE AIC

Notes		ICAO 24-Bit Aircraft Addresses and Aircraft Identification Reporting
1. State to insert date and reference of last circular issued for Mode S Surveillance, if applicable.		**1 INTRODUCTION** 1.1 The provision of air traffic services (ATS) using SSR Mode S will rely on a unique ICAO 24-bit aircraft address for selective interrogation of individual aircraft. The 24-bit aircraft address is also an essential element of the airborne collision and avoidance system, ACAS II. In addition, Mode S surveillance requires the reporting of aircraft identification as stated in previous circulars concerning Mode S airborne equipment requirements. (note 1). 1.2 The aircraft address shall be one of 16 777 214 twenty-four-bit aircraft addresses allocated by ICAO to the State of Registry or common mark registering authority and assigned as prescribed in the Appendix to Chapter 9, Part I, Volume III, ICAO Annex 10. 1.3 All Mode S equipped aircraft engaged in international civil aviation are required to have an aircraft identification feature as prescribed in ICAO Annex 10, Volume IV, Chapter 2, 2.1.5.2. 1.4 This circular provides guidance to ensure consistency regarding 24-bit aircraft addresses and the reporting of aircraft identification relevant to the operational introduction of Mode S Elementary and Enhanced Surveillance. In particular: a) Adherence to the world-wide scheme for assignment of ICAO 24-bit Aircraft Addresses. b) Correct setting of Aircraft Identification by flight crew.
2. Insert name of State and title of applicable organisation responsible for		**2 THE ICAO 24-BIT AIRCRAFT ADDRESS** 2.1 Instances occur of incorrect 24-bit aircraft addresses being installed/hard-wired on individual aircraft. This has happened not only on first installation of a Mode S transponder but also when a major modification has been made to the Mode S equipment, and following a change of State of Registration. Incorrect installation, such as setting the address to all zeros, or, inadvertent duplication of an address can pose a severe risk to flight safety. In particular, the airborne collision avoidance system, ACAS II, performs on the assumption that only a single, unique 24-bit aircraft address per airframe exists. The performance of ACAS II can be seriously degraded and in some instances disabled if an incorrect or duplicate address is installed on an aircraft. 2.2 Incorrect or duplicated 24-bit aircraft addresses will also undermine the effectiveness of surveillance services based on SSR Mode S. 2.3 It is essential that aircraft operators comply with the aircraft address assignment procedures of the State regulatory authority to which blocks of addresses have been allocated by ICAO (note 2).

Notes		ICAO 24-Bit Aircraft Addresses and Aircraft Identification Reporting
24-bit aircraft address assignment		2.4 The world-wide addressing scheme has been designed so that, at any one time, no address is assigned to more than one aircraft. Only one address can be assigned to an aircraft and it cannot be changed except under exceptional circumstances authorised by the State regulatory authority concerned.
		2.5 When an aircraft changes its State of Registry, the previously assigned address is to be relinquished and a new address assigned by the new registering authority. 2.6 It is essential that the aircraft address is periodically verified using ramp tests. Such checks must also be conducted when a major maintenance check has taken place and when the aircraft has changed registration, to ensure that a newly assigned address has been properly set.
		3 CORRECT SETTING OF AIRCRAFT IDENTIFICATION 3.1 To comply with European airborne equipment requirements, Mode S transponder equipped aircraft must incorporate an Aircraft Identification Feature. Correct setting of aircraft identification is essential for the correlation of radar tracks with flight plan data in the ATM and Airport Operator ground systems. Initial operational trials using SSR Mode S have shown that many aircraft are transmitting incorrect aircraft identification, e.g. BC_1234 instead of ABC1234. Such erroneous settings of aircraft identification prohibit automatic flight plan correlation and, if perpetuated, will severely limit the effectiveness of Mode S to relieve the shortage of SSR codes. 3.2 In accordance with ICAO Doc 8168 *[PANS-OPS]* Vol. I, Part VIII, 1.3, flight crew of aircraft equipped with Mode S having an aircraft identification feature shall set the aircraft identification in the transponder. This setting shall correspond to the aircraft identification specified in item 7 of the ICAO flight plan, or, if no flight plan has been filed, the aircraft registration. 3.3 Aircraft Identification, not exceeding 7 characters is to be entered in item 7 of the flight plan and set in the aircraft as follows: Either, a) The ICAO three-letter designator for the aircraft operating agency followed by the flight identification (e.g. KLM511, BAW213, JTR25), when: in radiotelephony the callsign used consists of the ICAO telephony designator for the operating agency followed by the flight identification (e.g. KLM 511, SPEEDBIRD 213, HERBIE 25). Or, b) The registration marking of the aircraft (e.g. EIAKO, 4XBCD, OOTEK), when: 1) in radiotelephony the callsign used consists of the registration marking alone (e.g. EIAKO), or preceded by the ICAO telephony designator for the operating agency (e.g.

Notes		ICAO 24-Bit Aircraft Addresses and Aircraft Identification Reporting
		SVENAIR EIAKO), 2) the aircraft is not equipped with radio. Note 1 No zeros, dashes or spaces are to be added when the Aircraft Identification consists of less than 7 characters. Note 2 Appendix 2 to ICAO Doc 4444 *[PANS-ATM]*, refers. ICAO designators and telephony designators for aircraft operating agencies are contained in ICAO Doc 8585.
3. State to insert local points of contact		**4 FURTHER INFORMATION** Further information or guidance may be obtained from: DGAC contact information or Website

Agenda Item 4: Review of the deficiencies related to the CNS systems and other general issues

4.1 Review to the status of the air navigation deficiencies related with the CNS systems

4.1.1 The Meeting examined the CNS deficiencies list and to this respect considered that the States review the CNS deficiencies list and update them taking into consideration the Deficiencies Classification type U adopted by the Eight Meeting of the Civil Aviation Safety Board (ASB/8) using the application of the risk analysis method following ICAO Safety Management System (SMS) methodology. **Appendices A and B** present the list of deficiencies of the CAR and SAM Regions.

4.1.2 The Meeting took note that any update to the corrective actions for the deficiencies can be performed through the established procedure of the GANDD database, for which it was detailed that this database, installed on the websites of the ICAO Regional Offices; contained descriptive information for its usage (public access) apart from the deficiencies information (restricted access).

4.2 Review and updating of valid GREPECAS CNS related conclusions/decisions

4.2.1 The Meeting reviewed the progress and updates on the status of GREPECAS valid conclusions/decisions related with to the CNS, for its consideration by GREPECAS. This proposal is shown in **Appendix C** to this Report.

4.3 Results of the ITU 2007 World Radiocommunications Conference (WRC-2007) and position of ICAO at the ITU World Radiocommunications Conference (WRC-2011)

4.3.1 The Meeting took note of the WRC-07 results for international civil aviation, as well as the ICAO preliminary position for the WRC-11.

4.3.2 It was also informed that the next meeting of ACP Working Group F will take place in September 2008 to review the ICAO position at WRC11. Once reviewed, the preliminary position will be submitted to the Air Navigation Commission in November 2008. At the end of 2008, the ICAO preliminary position will be circulated to States for comments. The ICAO position for the ITU is expected to be completed and circulated to ICAO Contracting States, International Organizations and the ICAO Secretariat by mid 2009.

4.3.3 The Meeting considered that the CAR/SAM States and International Organisations, in preparation and support of the ICAO position for the WRC-11, should support and follow up on the preparation and updating of the ICAO position for WRC-11. They should also appoint, as they did in preparation for WRC-07, a focal point or person to serve as a liaison with ICAO and with the national radio frequency spectrum management authority to coordinate matters concerning WRC-11. Focal points should, in addition, continue to participate actively in the Organization of American States (OAS) CITEL meetings in preparation for WRC-11, as well as in any meetings or seminars convened by ICAO to explain and analyse the position of this organisation for WRC-11, and participate actively in WRC-11 in support of the ICAO position. In this regard, the Meeting formulated the following draft conclusion:

DRAFT
CONCLUSION CNS/6/8 CAR/SAM REGIONAL ACTION FOR THE PREPARATION AND SUPPORT OF THE ICAO POSITION FOR WRC-11

That CAR/SAM States and international organisations, in preparation and support of the ICAO position for the ITU World Radiocommunication Conference – 2011 (WRC-11), should:

a) support and follow up on the work of ICAO to prepare and update its position for WRC-11;

b) appoint a focal point or a person to serve as a liaison with ICAO and with the national radio frequency spectrum management authority to coordinate matters concerning WRC-11;

c) participate actively in the Organization of American States (OAS) CITEL meetings in preparation for WRC-11;

d) participate actively in any meetings and seminars convened by ICAO to explain and analyse the position of this organization for WRC-11;

e) participate actively in WRC-11 in support of the ICAO position; and

f) recommend and implement other appropriate measures

OUTSTANDING DEFICIENCIES

REPORTING FORM ON AIR NAVIGATION DEFICIENCIES IN THE *CNS* FIELD IN THE *CAR* REGION

IDENTIFICATION			DEFICIENCY				ACTION PLAN			
ID	Requirements	States/facilities	Description	Date first reported	Remarks	Priority	Description	Executing body	Date of completion	Remarks
1	2	3	4	5	6	7	8	9	10	11
ABW Aruba										
CNS 29 CAR	Surveillance Systems (Table CNS 4A)	Aruba/Reina Beatrix APP/Aruba's radar	Current radar deficiency of Aruba relates to replacement of antenna motor and substitution of wave-guide.	6 / 2000		A	Repair the radar.	Aruba		
ANT Netherlands Antilles										
CNS 23 CAR	Radio Navigation Aids (Table CNS 3) - VOR/DME ABA	Netherlands Antilles	DME in bad conditions, and the VOR and DME need to be replaced. VOR/DME ABA is installed in Aruba/Reina Beatrix Intl., but is the responsibility of Netherlands Antilles.	6 / 2000		A	VOR DME equipment need to be replaced. Action Plan: The Administration has no plans to replace the VOR/DME ABA installed in Aruba.	Netherlands Antilles		
CNS 27 CAR	Radio Navigation Aids (Table CNS 3) - ILS Cat. I	Netherlands Antilles/Philipsburg/Princess Juliana, St. Maarten I.	This ILS is not implemented.	2 / 1999	The facility was recommended for final approach and landing.	A	Netherlands Antilles plans to implement the ILS or GNSS Cat I system should be updated. Action Plan: GNSS procedures will be applied.	Netherlands Antilles		The ILS required for the St. Maarten airport could not be installed due to construction obstacles.
CNS 28 CAR	Radio Navigation Aids (Table CNS 3) - VOR/DME	Netherlands Antilles/Willemstad/Hato, Curacao	The VOR and the DME are implemented, but the VOR is disabled due to close construction.	2 / 1999	The facility was recommended for en-route, navigation, terminal area and approach and landing.	A	There are plans in the Netherlands Antilles to replace this facility by a new VOR/DME. Action Plan: A new VOR/DME will be installed in the Hato International Airport, Curacao in 2007.	Netherlands Antilles	DEC/ 2007	
CNS 51 CAR	ATS Speech Circuits Plan (Table CNS 1C) Curaçao ACC-Baranquilla ACC	Neetherland Antilles and Colombia	Due to a broken down the circuit was discontinued and the impossibility to replace the Curaçao terminal equipment. For this, the IDD is use.	3 / 2003	Informed in the C/CAR WG/3 Meeting	A	Implement in a short-term this circuit through a MEVA II and REDDIG interconnection	Netherlands Antilles and Colombia		
BHS Bahamas										
CNS 24 CAR	Radio Navigation Aids (Table CNS 3) - ILS Cat. I Runway 14	Bahamas/Freeport Intl.	This ILS is not in service.	0 /	The facility was recommended for final approach and landing.	A	Bahamas plans to replace the ILS.	Bahamas		
CNS 49 CAR	Radio Navigation Aids (Table CNS 3) VOR/DME West End	Bahamas/West End	The VOR/DME stations is recommended in the FASID, but it is not implemented.	1 / 2004		B	This station is recommended for the West End Intl. Airport, Grand Bahamas Island.	Bahamas		
BLZ Belize										

IDENTIFICATION			DEFICIENCY				ACTION PLAN			
ID	Requirements	States/facilities	Description	Date first reported	Remarks	Priority	Description	Executing body	Date of completion	Remarks
1	2	3	4	5	6	7	8	9	10	11
CNS 9 CAR	ATS Speech Circuits Plan (Table CNS 1C) - Belize APP-Puerto Barrios TWR	Belize-Guatemala/COCESNA	The required circuit is not implemented.	11 / 1999	COCESNA informed that the Puerto Barrios Airport changed to a National Airport, therefore, this circuit would no longer be an international requirement.	A	Study and implement a possible via. Action Plan: The category of the Puerto Barrios airport was changed to domestic; therefore, this circuit is no longer an international requirement.	Belize, Guatemala and COCESNA		
CNS 57 CAR	ATS speech circuits plan (Table CNS 1C) Belize APP - Merida ACC	Belize and Mexico	The circuit is out of service since 1 June 2003.	6 / 2003	Informed during the CA/ANE/WG/3 Meeting and reported by the DCA of Belize.	A	To implement a direct circuit to establish communications in 15 seconds.	Mexico and Belize		
GTM Guatemala										
CNS 18 CAR	ATS Speech Circuits Plan (Table CNS 1C) - La Mesa APP - Puerto Barrios TWR	Guatemala- Honduras-COCESNA	The required circuit is not implemented. An IDD is being used.	11 / 1999	COCESNA informed that the required circuit is not being implemented, due to the fact that there are no facilities, but possible communications links will be analyzed.	A	COCESNA informed that the airport changed to national category. Action Plan: The category of the Puerto Barrios airport was changed to domestic; therefore, this circuit is no longer an international requirement.	Guatemala, Honduras and COCESNA		
MEX Mexico										
CNS 54 CAR	VHF/AMS-voice. Aeronautical Mobile Service Plan (Table CNS 2A)	United States	Lack of VHF-AMS oral coverage under the FL280 in Houston oceanic FIR in the CTA Merida boundaries with the CTA Monterrey. This requirement does not figure in the Table CNS 2A of the FASID, which ICAO is coordinating with the United States.	1 / 2002	RO/ATM mission	U	To implement the required equipment for the operation of VHF/AMS oral functions. Implement a VHF remote stations in Mexico, based in a current agreement between Unites States and Mexico, as well as its mitigation by implementing ADS-B.	United States/Mexico		Budget specific approval for this purpose.
CNS 56 CAR	ATS speech circuits plan (Table CNS 1C) Belize APP - Merida ACC	Belize and Mexico	The circuit is out of service since 1 June 2003.	6 / 2003	Informed during the CA/ANE/WG/3 Meeting and reported by the DCA of Belize.	A	To implement a direct circuit to establish communications in 15 seconds. Action Plan: ICAO will convene a Meeting with the participation of Belize, Mexico and COCESNA to analyse this situation.	Mexico and Belize		The MID/ACC reports indicate that the traffic registered is very scarce between MID/ACC and BZE/APP and the coordination is made through CENAMER/ACC-MID/ACC as established in the corresponding Letter of Agreement between both Units.
TTO Trinidad and Tobago										

IDENTIFICATION			DEFICIENCY				ACTION PLAN			
ID	Requirements	States/facilities	Description	Date first reported	Remarks	Priority	Description	Executing body	Date of completion	Remarks
1	2	3	4	5	6	7	8	9	10	11
CNS 2 CAR	AFTN Plan (Table CNS 1A) AFTN Circuits Georgetown's)-Port of Spain (M)	Guyana-Trinidad & Tobago/AFTN COM Centres	The circuit was upgraded to 300 baud as interim measure, but the availability is low.	3 / 2001	Reported by CAR/SAM AIS/ATM/CNS 02/00Informal Meeting	A	To implement a circuit by 2400 bps, IA-5 code and X.25 protocol. Guyana is planning to implement this circuit through REDDIG. The AFTN traffic of Guyana was temporarily rerouted through Caracas, Venezuela.	Guyana and Trinidad and Tobago	DEC/ 2004	
CNS 4 CAR	ATS Speech Circuits Plan (Table CNS 1C) - Piarco ACC/Georgetown ACC (CM5 Circuit)	Trinidad and Tobago-Guyana	The circuit is reliable only at 90%.	3 / 1998	Reported by the NACC and SAM Regional Offices.	A	There are plans to implement this circuit through REDDIG.	CAAs Trinidad & Tobago and Guyana	DEC/ 2004	
CNS 22 CAR	VHF/HF-AMS Communications Plan (Table CNS 2A) TTZP Piarco HF Voice	Trinidad and Tobago/CAR-A(3), CAR-B(1), SAM-2(2)	Several reports of pilots indicated that Piarco ACC was not available via HF frequencies. The Piarco centre has not implemented all required frequency, so it does not has 24 hours a day communication availability.	3 / 2001	Reported by the CAR/SAM AIS/ATM/CNS 02/00 Informal Meeting and examined by the 26th and 27th Eastern Caribbean Informal Working Group.	U	It has been agreed that airlines contact Piarco ACC through ARINC's HF radio facilities in New York, this temporary solution was implemented. Through an ICAO Technical cooperation project a new equipment has been installed and according to information from Trinidad and Tobago, it was expeted that its commissioning would be in September 2005.	CAA Trinidad and Tobago.	SEP/ 2005	
CNS 52 CAR	ATS Speech Circuits Plan (Table CNS 1C) Piarco ACC/Paramaibo ACC	Trinidad and Tobago-Suriname	A IDD is used; but according to the FASID a direct circuit (D) is required	11 / 2003	Reported in RO/CNS mission	A	There are plans to implement this circuit through REDDIG.	Trinidad and Tobago-Suriname	DEC/ 2004	
CNS 53 CAR	Communications Plan VHF/HF AMS (Table CNS 2A) TTCP Crown Point Intl. Airport - APP-I	Trinidad & Tobago	The APP-I service is not implemented	11 / 2003	Reported in the RO/CNS mission	A	Implement the APP/service station, but Trinidad & Tobago informed that the APP service at Crown Point Intl. Airport is provided by Piarco. Trinidad & Tobao will sent a letter to ICAO proposing the removal of this requirement in the table CNS 2A of the FASID.	Trinidad & Tobago		

OUTSTANDING DEFICIENCIES

REPORTING FORM ON AIR NAVIGATION DEFICIENCIES IN THE CNS FIELD IN THE SAM REGION

IDENTIFICATION			DEFICIENCY				ACTION PLAN			
ID	Requirements	States/facilities	Description	Date first reported	Remarks	Priority	Description	Executing body	Date of completion	Remarks
1	2	3	4	5	6	7	8	9	10	11
ARG Argentina										
CNS 11 SAM	Aeronautical Mobile Service Plan. Table CNS 1A. Lack of HF communicaitons coverage in the Ezeiza FIR, Oceanic Sector	Argentina	Deficiencies in the HF communications have been identified in the oceanic part of the Ezeiza FIR.	SEP/ 1994	GREPECAS/4. IATA Report.	U	Total renewal of the HF equipments in Ezeiza (October 1999). The HF transmitter and receiver field antenna repaired on October 1999. FA Atlantic circuit, links verified 86,84%. New position was incorporated for the FA Atlantico. Operational extension of ACC Ezeiza and TMA Baires. Incorporation of means of communications between the aeronautical station and the remote equipment, obtaining the noise suppression in aeronautical station of the ACC. Receive only one HF frequency it is missing the monitor of other HF frequencies of the family assigned.	Argentina CAA		Installation of a module in the Ezeiza ACC that permit the selection of more than one HF frequency.
BRA Brasil										
CNS 19 SAM	Radio Navigation Service Plan. Table CNS 3. VOR/DME	Brazil, Corumba	This VOR/DME is not implemented	MAY/ 1989	This VOR would support air navigation along the air routes UA300 and UA304. Currently, an NDB is operating at the significant point	A	VOR/DME will be not installed . They asked to remove it fromTable CNS 3 of FASID	Brazil		It will be not implemented
CNS 23 SAM	Radio Navigation Service Plan. Table CNS 3. VOR/DME	Brazil, Ilheus	This VOR/DME is not implemented	MAY/ 1989	This facility, recommended for en route navigation, would support the air route UA314. Currently, an NDB is operating at the significant point	B	VOR/DME will be not installed . Brazil asked to remove it fromTable CNS 3 of FASID	Brazil		It willbe not implemented
ECU Ecuador										
CNS 29 SAM	Aeronautical Mobile Service Plan. Table CNS 1A. Lack of HF AMS communications in the Guayaquil FIR	Ecuador	Guayaquil AMS HF system out of service	SEP/ 2004	Due to civil works in Guayaquil International Airport the HF station of the mobile aeronautical service is out of service .	A	No information was received on action plan to re install the HF equipments.	Estado		
GUY Guyana										

OUTSTANDING DEFICIENCIES

REPORTING FORM ON AIR NAVIGATION DEFICIENCIES IN THE CNS FIELD IN THE SAM REGION

IDENTIFICATION			DEFICIENCY				ACTION PLAN			
ID	Requirements	States/facilities	Description	Date first reported	Remarks	Priority	Description	Executing body	Date of completion	Remarks
1	2	3	4	5	6	7	8	9	10	11
CNS 30 SAM	FASID Table CNS 3	Timehri /Cheddi Jagan Intl Airport	ILS system out of service . This system was installed in 1978. Difficults in its maintenance.	OCT/ 2004	Since the ends of 2003 the ILS system is completely out of service. Lack of spare parts to repair the equipments .This was verified during the CNS mission in Guyana on October 2004.	A	No plan to implemt in a short term.	State		Lack of resource
CNS 31 SAM	FASID Table CNS 3	Timehri /Cheddi Jagan Intl Airport	DME system out of service . This system was installed in 1978. Difficults in its maintenance. Both DME unities out of service in their RF final power.	OCT/ 2003	Since the ends of 2003 the DME system is completely out of service. Lack of spare parts to repair the equipments .This was verified during the CNS mission in Guyana on October 2004.	A	No plan to implemt in a short term.	State		Lack of resource
PRY Paraguay										
CNS 15 SAM	Radio Navigation Service Plan. Table CNS 3. DME	Paraguay ASUNCION/S. Pettirossi	This DME is not implemented	MAY/ 1989	This DME is associated with the ILS for approach and landing operations. NDBs are used as markers	A	PARAGUAY informed that they are not going to install the DME associated to the ILS , because the ILS counts with a medium and external radio marker.	Paraguay		It will be not implemented
CNS 21 SAM	Radio Navigation Service Plan. Table CNS 3. VOR	Paraguay, Mariscal Estigarribia	This VOR is not implemented	MAY/ 1989	This facility, recommended for en-route navigation, would support air routes UA320 and UA321	A	The modernization project of the Paraguayan air navigation system considers the VOR/DME. Date of VOR/DME implementation was not supplied.	Paraguay		
PER Peru										
CNS 25 SAM	Radio Navigation Service Plan. Table CNS 3. ILS CAT II	Peru LIMA-CALLAO/Jorge Chavez	The current ILS sytem meets CAT I performance	MAY/ 1989	According to the Plan, the ILS requires Category II signal quality	B	Peru has indicated that the airport meets operational conditions for the Category. Only pending is ILS flight inspection.	Peru		
SUR Suriname										
CNS 26 SAM	Radio Navigation Service Plan. Table CNS 3. NDB	Suriname PARAMARIBO/Zorg en Hoop	This NDB is not implemented	MAY/ 1989	This facility was recommended for terminal navigation	B	The NDB won´t be installed The Aeronautical Administration of Surinam asked to remove the NDB from Table 3 of FASID.	Suriname		It will be not implemented
VEN Venezuela										

OUTSTANDING DEFICIENCIES

REPORTING FORM ON AIR NAVIGATION DEFICIENCIES IN THE CNS FIELD IN THE SAM REGION

IDENTIFICATION			DEFICIENCY				ACTION PLAN			
ID	Requirements	States/facilities	Description	Date first reported	Remarks	Priority	Description	Executing body	Date of completion	Remarks
1	2	3	4	5	6	7	8	9	10	11
CNS 14 SAM	Aeronautical Mobile Service Plan. Table CNS 1A. Lack of VHF communications in the Maiquetia FIR	Venezuela	Due to the lack of VHF coverage in some segments of ATS routes crossing the Maiquetia FIR, ATS is not yet provided in the required level	MAY/ 2001	AP/ATM/2 meeting.	U	A new VHF communication system for Maiquetía ACC was acquired through the ICAO Technical Cooperation Section with the aim to guarantee the complete coverage of the ACC .The system is in the installation phase and it is foreseen its operation at the middle of 2008.	Venezuela CAA	OCT/ 2007	

APPENDIX C

FOLLOW-UP TO VALID CNS RELATED GREPECAS CONCLUSIONS/DECISIONS

Conclusion/ Decision	Text of Conclusion/Decision	Responsibility	Target Date for Implementation	Follow-up Action	Recommended Status
Conclusion 10/32	**UPDATING AND PUBLICATION OF NATIONAL LEGISLATION/REGULATIONS AUTHORIZING THE USE OF GNSS** That, CAR/SAM States/International Organizations: a) that have not done so yet, publish or update, as soon as possible, an AIC on their legislation/regulation, authorizing the use of GNSS as a primary/supplementary means of navigation for terminal area and en-route operations in their respective airspace, also specifying equipment, certification, and training requirements; and b) that have already established the operational use of GNSS, exchange information on their operational experience with other States/International Organizations in order to enhance the regional knowledge.	States/ International Organization	2009	The majority of the CAR/SAM States have updated and published their national legislation/regulations for the use of GNSS. It is expected that at the end of 2009 all the States of the CAR/SAM that have not published their national legislation/regulations for the use of GNSS complete the task.	Valid
Conclusion 12/32	**ADS-B IMPLEMENTATION IN THE CAR/SAM REGIONS** That the States/Territories/International Organizations of the CAR/SAM Regions that plan to implement ADS-B, coordinate with the ICAO NACC and SAM Regional Offices so as to ensure a harmonized implementation of this technology in the CAR/SAM Regions.	States /International Organization	-	The States/ Territories/ International Organizations of the CAR/SAM Regions had coordinated with ICAO Regional Offices and this plan information is included as part of the CNS Committee tasks.	Completed
Conclusion 12/37	**IMPROVEMENT OF THE AFTN OPERATION IN THE CAR/SAM REGIONS** That; a) ICAO NACC and SAM Regional Offices, in coordination with the States/Territories/International Organizations, continue their tasks to update the AFTN routing lists according with the amendment to the AFTN Plan; and b) States/Territories/International Organizations involved consider adopting the methods recommended in the Action Plan to improve the AFTN circuits and centres indicated in Appendix N of this part of the Report.	Regional Offices and States/ Territories/ International Organizations	2010	a) The AFTN routing lists of the CAR and SAM Regions were update according at the AFTN Plan (Table CNS 1A) amendments. b) Cayman Island AFTN circuit with Atlanta has been implemented. Guyana does not count with an AFTN switching center and for this reason the AFTN circuit between Georgetown and Caracas and Georgetown and Paramaribo are not implemented	Completed Valid

Conclusion/ Decision	Text of Conclusion/Decision	Responsibility	Target Date for Implementation	Follow-up Action	Recommended Status
Conclusion 12/45	**AMENDMENT TO THE "REGIONAL GUIDELINES FOR THE TRANSITION TO THE GLOBAL NAVIGATION SATELLITE SYSTEMS (GNSS)" AND THE "REGIONAL STRATEGY FOR THE INTRODUCTION AND APPLICATION OF NON VISUAL AIDS TO APPROACH, LANDING AND DEPARTURE"** That, a) CAR/SAM States / Territories / International Organizations take into account the new "Regional guidelines for the transition to the global navigation satellite systems (GNSS)" and the "Regional strategy for the introduction and application of non visual aids to approach, landing and departure", presented in Appendices S and T, respectively; and b) ICAO, amend Attachments H and I to Part IV of Volume I, Basic ANP (Doc. 8733) in conformity with the above indicated new guidelines and strategy.	States/ Territories/ International Organizations and ICAO	2009	a) CAR/SAM States/ Territories/ International Organizations had taken into account the new "Regional guidelines for the transition to the global navigation satellite systems (GNSS)" and the "Regional strategy for the introduction and application of non visual aids to approach, landing and departure". b) Actual Amendment to Volume I of Doc. 8733 is to be done, specifically with the eANP.	Completed Valid
Conclusion 13/53	**INFORMATION REQUEST ON AIRCRAFT CAPABILITY TO OPERATE SSR IN MODE S, ADS AND ADS-B** That ICAO, a) request information from IATA on their airlines members capability to operate with Mode S transponders with elementary and enhanced capacity, as well as with ADS and ADS-B; and b) collect information from the States / Territories / International Organizations on the existing and planned ATC automation systems capabilities to support ADS-B systems.	ICAO	2009	a) IATA had provided information to ICAO from its airlines members for the capability to operate with Mode S transponders with elementary and enhanced capacity, as well as with ADS and ADS-B; further detailed information was presented on this ATM/CNS/6 CNS Meeting. More detailed information is to be submitted by IATA for the CAR/SAM Regions. b) The information from the States/Territories/International Organizations on the existing and planned ATC automation systems capabilities to support ADS-B systems is being considered on the Automation reference information being collected.	Valid Valid

Conclusion/ Decision	Text of Conclusion/Decision	Responsibility	Target Date for Implementation	Follow-up Action	Recommended Status
Conclusion 13/71	**UPDATE AND IMPLEMENTATION OF THE VHF, HF AND SATELLITE VOICE COMMUNICATION OF THE AMS AND AMSS PLAN** That States/ Territories/ International Organizations: a) executing action plans to improve or mitigate the VHF and HF/AMS coverage in their respective airspace, promote their execution by defining an implementation target date, as soon as possible; b) examine and recommend actions to complete the implementation of the required satellite voice communication and if appropriate, propose updating the regional Plan (FASID Table CNS 2A); and c) keep the ICAO NACC or SAM offices informed, as appropriate, on the progress of the actions described in items a) and b) of this Conclusion, so that these actions finalize by **30 May 2006**.	States/ Territories/ International Organizations		States/Territories/International Organizations had informed ICAO on their plans for improving VHF and HF/AMS coverage and implementation of satellite voice communication. Based on this information the Regional Plan (Table CNS 2A) has been amended.	Completed
Conclusion 13/72	**REGIONAL STRATEGY FOR UPDATING EVOLUTIONARY IMPLEMENTATION OF THE AIR-GROUND DATA LINKS PLAN** That, for the evolutionary implementation of air-ground data links, States/Territories/International Organizations: a) carry out activities aimed at the deployment of air-ground data links based on the Regional strategy for updating and implementing the air-ground data links, made up of the Activities Plan and the Programme for the implementation presented in Appendices AW and AX respectively to this part of the Report; b) review and suggest updates to the corresponding parts of the air-ground data link implementation Plan of the CAR/SAM Regions contained in the FASID Table CNS2A based on the Regional strategy mentioned in the above paragraph a); and c) inform the ICAO NACC or SAM Office, before **30 May 2006**, the results of the of the actions described in items b) of this Conclusion.	States/ Territories/ International Organizations:	2010	a) Ongoing activity. b) and c) States/ Territories/ International Organizations had informed ICAO on their plans for implementing air-ground data link, and the Plan (Table CNS 2A) has been updated. The follow-up of this plan is included as part of the CNS Committee tasks.	Valid Completed

Conclusion/ Decision	Text of Conclusion/Decision	Responsibility	Target Date for Implementation	Follow-up Action	Recommended Status
Conclusion 13/74	**PROPOSAL OF AMENDMENT TO ATN REGIONAL PLAN** That ICAO consider the amendment to the ATN Regional Plan contained in the FASID Table CNS/1B, by replacing that table format with the following: • Table CNS 1Ba – CAR/SAM regional Plan of ATN routers • Table CNS 1Bb – CAR/SAM regional Plan of ground-ground applications • Table CNS 1Bc – CAR/SAM regional Plan of air-ground applications *Note: -The proposed Tables CNS 1Ba and CNS 1Bb formats are shown in Appendices AY and AZ respectively. The Table CNS 1Bc would be developed by the CNS Committee soon.*	ICAO	2009	Actual Amendment to ATN Regional plan (Table CNS 1B) is to be done, specifically with the eANP, but indicated amendment is already is considered in Regional Planning and implementation.	Valid
Conclusion 13/75	**REQUEST FOR INFORMATION ON PLANS TO IMPLEMENT ATN GROUND-GROUND APPLICATIONS** That, a) based on the Table contained in the Appendix AZ to this part of the Report, the States, Territories and International Organizations, that have not yet done so, provide detailed information on the requirements and plans to implement the ATN ground-ground applications, such as AMHS and AIDC; and b) the replies to the action in item a) above be submitted to the ICAO NACC or SAM offices, as appropriate, so that they be received before **28 April 2006**.	States/ Territories/ International Organizations		Information had been received from the States, Territories and International Organizations and an updated version of CNS Table 1Bb has been completed by ICAO.	Completed
Conclusion 13/78	**STRATEGY AND TARGET DATES FOR THE DEPLOYMENT OF ATN IN THE CAR/SAM REGIONS** That States/Territories/International Organizations of the CAR/SAM Regions undertake their activities for the deployment of ATN and its applications in accordance with the target dates and strategy presented in Appendix BA to this part of the Report.	States/ Territories/ International Organizations		States/Territories/International Organizations of the CAR/SAM Regions have taken note of the target dates and strategy for the deployment of the ATN. This information is considered in the Regional implementation of the system.	Completed

Conclusion/ Decision	Text of Conclusion/Decision	Responsibility	Target Date for Implementation	Follow-up Action	Recommended Status
Conclusion 13/79	**DEVELOPMENT OF NATIONAL PLANS TO PRIORITIZE THE AMHS AND AIDC IMPLEMENTATION AND CONTRIBUTE TO ATM AUTOMATION** That the States/Territories/International Organizations develop their respective national plans for the prioritization of the AMHS and AIDC implementation, based on the ATN routers table, the ATN ground-ground applications plan, and the regional AMHS addressing plan, and relevant ATN – AMHS regional documentation, also contributing to the progress towards the development of ATM automation supporting air traffic services.	States/ Territories/ International Organizations	2009	States/Territories/International Organizations of the CAR/SAM Regions have taken note that in the development of their respective national plans to prioritize the AMHS and AIDC implementation, based on the ATN routers table, the ATN ground-ground applications plan, and the regional AMHS addressing plan, and relevant ATN – AMHS regional documentation. National Plans are in progress.	Valid

Conclusion/ Decision	Text of Conclusion/Decision	Responsibility	Target Date for Implementation	Follow-up Action	Recommended Status
Conclusion 13/84	**STUDIES FOR A CAR/SAM REGIONAL SBAS SOLUTION** That, since it is technically and operationally impracticable to extend the existing SBAS systems (WAAS and EGNOS) to the CAR/SAM Regions, according to the studies carried out, States, Territories and International Organizations: a) are urged to continue introducing the GNSS in an evolutionary and coordinated manner, according to the ICAO global plan; conducting the studies for a regional SBAS solution consistent with the requirements and characteristics of the CAR/SAM Regions; and applying other augmentations, also taking into account that added benefits should help to justify the cost of reaching the ultimate goal of migrating to the GNSS once ground-based aids are dismantled; b) are urged to withdraw from the work programmes of projects RLA/00/009 and RLA/03/902 - Phase II, those tasks related to studying the feasibility of extending the current EGNOS and WAAS to the CAR/SAM Regions; c) that participate in regional projects RLA/00/009 and RLA/03/902 under the coordination of the GNSS Task Force, are urged to coordinate their efforts and actions in pro of the study of a SBAS solution; and d) interested in participating in the activities of Project RLA/03/902, are urged to consider the revised quotas for joining this project.* ***Note:** The revised quotas for States/Organizations to join Phase II of Project RLA/03/902, are based on the following criteria:* *a) Members of Project RLA/00/009: US$25,000* *b) other States/Organizations: US$35,000*	States/ Territories/ International Organizations	2011	Actions have been conducted as indicated in the Conclusion: a) and c) ongoing activities b) and d) the work programmes have been updated in accordance with the indications and note has been taken	 Valid Completed
Conclusion 13/85	**FOSTER THE USE OF GNSS IN DIVERSE SECTORS OF THE STATES** That States/Territories/International Organizations foster the use of GNSS in diverse sectors of their respective States and disseminate the results of the studies on the solution of SBAS.	States/ Territories/ International Organizations	2011	Studies for a SBAS System are on going.	Valida

Conclusion/ Decision	Text of Conclusion/Decision	Responsibility	Target Date for Implementation	Follow-up Action	Recommended Status
Conclusion 13/87	**ADS-B TRIALS PROGRAMME IN THE CAR/SAM REGIONS** That, States/Territories/International Organizations in collaboration with the airspace users, establish and execute an ADS-B trials programme using the available technology and services, aimed at improving the ADS-B knowledge and evaluating the benefits for the Air Traffic Management in the CAR/SAM Regions.	States/ Territories/ International Organizations	2009	Some States/ Territories/ International Organizations of the CAR/SAM Regions have conducted ADS-B Trials.	Valid
Conclusion 13/89	**SUPPORT OF STATES IN THE CAR/SAM REGIONS TO THE ICAO POSITION FOR THE ITU WRC-2007** That the Civil Aviation Administrations of the States of the CAR/SAM Regions, that not yet have done it, adopt the following measures to support the ICAO position for the ITU WRC-2007, in order to protect the aeronautical radiofrequency spectrum for radio-communications and radionavigation systems required for current and future safety-of-flight applications: a) designate a focal point or a contact person with the respective national authority of radio-frequency spectrum management, in order to incorporate ICAO position which is presented as the Attachment to States Letter Ref.: E 3/5-05/85, dated 12 August 2005, when developing the State's position for the WRC-07, as well as with ICAO for the coordination of matters related with the mentioned conference; b) participate in an active manner in the preparatory work for the WRC-07 in the CITEL meetings of the Organization of American States (OAS); c) participate in an active manner, whenever possible, in meetings and other activities convened by ICAO regarding the WRC-07; and d) ensure that, to the extent possible, representatives from civil aviation administrations are included in the national delegations to the conference to support ICAO position during the WRC-07.	States/ Territories/ International Organizations	2007	ICAO Position for the WRC-2007 has been supported by the States. Details of the results of this action are given on Agenda Item 4.3 of this CNS/COMM/06 Meeting.	Completed

Conclusion/ Decision	Text of Conclusion/Decision	Responsibility	Target Date for Implementation	Follow-up Action	Recommended Status
Decision 14/1	**IMPLEMENTATION OF ALLPIRG/5 CONCLUSION S BY GREPECAS** That the following conclusions of ALLPIRG/5 be studied by the concerned subgroups, that action be taken to implement them, and that the outcome be presented to ensuing GREPECAS meetings: Conclusions 5/2 and 5/5: AGA/AOP/SG Conclusions 5/2, 5/4, 5/5, 5/7, 5/8, 5/9, 5/11, 5/13, 5/16 and 5/17: ATM/CNS/SG Conclusions 5/2 and 5/5: AIS/MAP/SG Conclusions 5/2 and 5/5: AERMET/SG Conclusions 5/14 and 5/15: ASB Conclusions 5/4: IA/TF.	CNS Committee	2008	CNS Committee has implemented the indicated ALLPIRG/5 Conclusions.	Completed
Conclusion 14/43	**AGREEMENTS FOR ATM AUTOMATED SYSTEM INTERFACE** That CAR/SAM States/Territories/International Organizations: a) take into account technical feasibility studies and operational benefits, and coordinate the establishment of bilateral and multilateral agreements for the interface of automated systems between adjacent units; b) use guidance material specified as the "Interface Control Document for Data Communications between ATS Units in the Caribbean and South American Regions (CAR/SAM ICD)," included in Appendix 4A to this part of the Report, keeping in mind that: i) ICAO guidance material contained in said document is applicable at the regional level; ii) material within the document that does not comply with ICAO guidelines should be used only as a reference and should be agreed to on a bilateral or multilateral basis as required; and c) the automated facilities that have another interface can use this advantage in order to link their systems under bilateral or multilateral agreements.	States/ Territories/ International Organizations	2010	Automation activities are being ongoing.	Valid

Conclusion/ Decision	Text of Conclusion/Decision	Responsibility	Target Date for Implementation	Follow-up Action	Recommended Status
Conclusion 14/44	**ESTABLISHMENT OF AN ACTION PLAN FOR THE INTERFACE OF ATM AUTOMATED SYSTEMS** That CAR/SAM States/Territories/International Organizations formulate an action plan to interface ATM automated systems, which includes: a) the assignment of an expert as point-of-contact to carry out regional coordination for the interface of ATM automated systems; b) the analysis of the current service level provided by ATS automated systems, as well as requirements to satisfy future operational applications of the ATM community using the Table of ATS Operational Requirements for Automated Systems included in Appendix 4B to this part of the Report; and c) document the action plan and share best practices and experiences with other States/Territories/International Organizations, as required.	States/ Territories/ International Organizations	2010	Automation activities are being ongoing.	Valid
Conclusion 14/52	**REVIEW FOR THE ADOPTION OF THE MEMORANDUM OF UNDERSTANDING AND IMPLEMENTATION OF THE ACTION PLAN FOR THE MEVA II / REDDIG INTERCONNECTION** That in order to implement the interconnection of the VSAT MEVA II and the organization of the REDDIG networks, the Member States/Territories/International Organizations of these networks: a) study and review the feasibility to adopt the Memorandum of Understanding (MoU); and b) Approve and implement the tasks related to the Action Plan presented in Appendix Z to this part of the Report.	Members of MEVA II / REDDIG	2009	a) The MoU has been adopted by the Members involved in the Interconnection Process and the Action Plan has been updated. b) The tasks of the action plan are not completely implemented	Completed Valid
Conclusion 14/53	**UPDATING OF THE AMS AND AMSS REGIONAL PLAN** That ICAO forward the proposal for amendment to the CAR/SAM Regional Plan for the Aeronautical Mobile Service (AMS) and the Aeronautical Mobile Satellite Service (AMSS) included in Table CNS 2A of the FASID, as presented in Appendix AA to this part of the Report.	ICAO		Amendment to table CNS 2A of the FASID has been done and informed.	Completed

Conclusion/ Decision	Text of Conclusion/Decision	Responsibility	Target Date for Implementation	Follow-up Action	Recommended Status
Decision 14/54	**COMMUNICATION ASPECTS FOR THE MIGRATION TOWARDS THE METEOROLOGICAL MESSAGE EXCHANGE IN BUFR CODE** That the ATN Task Force of the CNS Committee, as well as the COM/MET Task Force of AERMET Subgroup, analyse in detail the following communication aspects considered necessary for the migration towards the meteorological message exchange in BUFR format in the CAR/SAM Regions for possible implementation for first and second transition stages: use of terminals with coding/decoding capacity; use of AMHS systems with extended service; and development of an Interface Control Document (ICD) to integrate AMHS and MET systems, establish standards for presentation systems and specifications for the conversion of templates and security aspects.	ATN Task Force of the CNS Committee, as well as the COM/MET Task Force of AERMET	Postponed	Issue discussed on Agenda Item 1.5 of the CNS Comm/06 Meeting. The communication aspects were addressed according to the initial indications, but certain requirements are to be defined as the format of this interchange by the OMM.	Completed
Decision 14/55	**APV I CAPABILITY AS A MINIMUM PERFORMANCE REQUIREMENT FOR CAR/SAM REGIONAL SBAS IMPLEMENTATION** That in order to coordinate the initiatives and projects for the SBAS solutions proposed for the CAR/SAM Regions, the CNS Committee must keep in mind that they be capable of achieving at least APV I capability	CNS Committee	2008	The CNS Committee have taken note that an SBAS solution must be capable of achieving at least APV I capability.	Completed
Conclusion 14/56	**PROGRESSIVE DEACTIVATION OF NDB STATIONS** That in order to develop progressive deactivation of NDB Stations without affecting safety, States / Territories / International Organizations and airspace users: a) analyse the service provided by each NDB station, its function, and procedural existence with other aids such as VOR/DME, GNSS-RNAV, as well as aircraft capacity/development operated in serviced airspace; b) based on the analysis described in item a) above, and in the Table included in Appendix AF to this part of the Report, develop a plan for the progressive deactivation of NDB stations; and c) inform the corresponding ICAO NACC or SAM Regional Office regarding their respective plan for the progressive deactivation of NDB stations before 30 November 2007.	States/ Territories/ International Organizations and airspace user	2008	Some States/Territories/International Organizations sent the requested information.	Valid

Conclusion/ Decision	Text of Conclusion/Decision	Responsibility	Target Date for Implementation	Follow-up Action	Recommended Status
Decision 14/57	**DEVELOPMENT OF A REGIONAL PLAN FOR THE PROGRESSIVE DEACTIVATION OF NDB STATIONS** That the CNS Committee: a) prepare a regional plan for the progressive deactivation of NDB stations, taking into account the responses received from States/Territories/International Organizations and airspace users to Conclusion 14/56 and the Table presented in Appendix AF to this part of the Report; and b) based on the results of item a) above, propose the corresponding amendments to Table CNS 3 of the FASID.	CNS Committee	2008	With the information received, an Initial NDB Deactivation Plan has been elaborated, details on Agenda Item 2.3 of the CNS Comm/06 Meeting.	Valid

FOLLOW-UP TO VALID CNS COMMITTEE DECISIONS

Conclusion/ Decision	Text of Conclusion/Decision	Responsibility	Target Date for Implementation	Follow-up Action	Recommended Status
Decision CNS/5/3	**IP ADDRESSING REGIONAL PLAN FOR ATN AND ITS APPLICATION MANAGEMENT** That the ATN Task Force: a) identify the specific requirements for Naming and ATN IP Addressing Management; and b) propose an entity [Member State(s), Territory(ies) or Organization(s)] capable to coordinate within the CAR/SAM Regions and other international entities (EuroControl for European region and AeroThai for Asia/Pacific Region) to implement the requirements mentioned in paragraph a) above.	CNS/ATN/TF	2008 2009	The ATN Task Force presented its work on the subject Turing the meeting of the CNS Committee. a) Se propuso un esquema de direccionamiento en IPv4 en vista de que las directrices de OACI sobre el uso del direccionamiento IPV6 están en proceso de completacion y definición. b) Se ha propuesto la participación de EUROCONTROL como operador del AMHS Management Center (AMC) para comunicar sus experiencias y consideraciones para una entidad que maneje lo indicado en el inciso a).	Completed Valid
Decision CNS/5/14	**UNIFIED REGIONAL STRATEGY ON THE IMPLEMENTATION OF SURVEILLANCE SYSTEMS** That, in order to have a CAR/SAM regional unified strategy for the implementation of surveillance systems, the CNS Committee review and integrate the elements of the surveillance strategy contained in Appendix 3A with the ADS-C and ADS-B implementation strategy indicated in paragraph 3.2.2 of this part of the Report.	CNS/SUR/TF	2008	The Surveillance Task Force presented this unified regional strategy during the meeting of the CNS Committee.	Completed
Decision CNS/5/15	**CREATION OF A SURVEILLANCE TASK FORCE** That, a Surveillance Task Force be created according to the Terms of Reference, Work Programme and Composition presented in Appendix 3E to this part of the Report.	CNS Committee	2006	The Surveillance Task Force was established, and will present a report on its results during the meeting of the CNS Committee.	Completed

Agenda Item 5: Future organization of CNS work within the GREPECAS environment

5.1 The Meeting reviewed the Terms of Reference and Work Programme of the current CNS Committee and its Task Forces presenting them in a format referencing the activities with a task number of the programme, the ICAO Strategic Objective(s), the references to the Regional Air Navigation Plan (FASID) and the valid conclusions/decisions applicable to GREPECAS, associating each activity with the expected products, responsible, dates, deadlines for each item and a break down of the activities in accordance with the indications adopted during the seventh Meeting of the Administration Coordination Group (ACG/7) through Decision ACG/7/2

1.2 The Terms of Reference and Work Programme of the CNS Committee are presented as **Appendix A** to this Agenda Item. **Appendices B, C** and **D** present the Work Programme of ATN, GNSS and Surveillance Task Forces, respectively.

APPENDIX A

PROGRAMA DE TRABAJO PROPUESTO DEL COMITÉ CNS TOMANDO EN CUENTA LAS ORIENTACIONES DEL PROYECTO DE DECISIÓN ACG/7/02

PROPOSED WORK PROGRAMME OF THE CNS COMMITTEE TAKING INTO ACCOUNT ORIENTATIONS OF DRAFT DECISION ACG/7/02

No.	Objetivo Estratégico, Iniciativas Plan Mundial, Plan Regional FASID y/o Conclusiones/Decisiones válidas GREPECAS Strategic Objective, Global Performance Indicators, FASID Regional Plan and/or valid GREPECAS Conclusions/ Decisions	Actividad/ Activity	Acción de seguimiento/ Follow-up Action	Entregable/ Deliverable	Responsable/ Responsible	Fecha límite/ Deadline	Observaciones/ Remarks
1	2	3	4	5	6	7	8
CNS/2-1.1	Objetivo EsT: D, IPM/GPI: 22, Conclusión 14/52	Guiar la interconexión/ integración de redes digitales de comunicaciones. Guide the interconnection/integration of Communications digital networks	Oficinas Regionales, Reuniones OACI Regional Offices, ICAO Meetings	Implantación de la interconexión de las Redes MEVAII REDDIG Implementation of MEVAII/ REDDIG Interconnection Consideraciones Preliminares para la integración de las redes MEVA II REDDIG y borrador de MoU para la integración MEVA II REDDIG Preliminary Considerations for the integration of MEVA II / REDDIG Networks and Draft MoU for MEVA II/REDDIG integration	Grupo/Group MEVAII REDDIG / OACI/ICAO Grupo/Group MEVAII REDDIG / OACI/ICAO	Mayo/May 2009 Abril/April 2009	
CNS/2-1.2.3	Objetivo EsT: D, IPM/GPI: 17, Tabla CNS 2A, Conclusión 13/72	Desarrollar un plan de implantación VDL y su aplicación Develop a VDL implementation Plan and its application	Oficinas Regionales Reuniones OACI Regional Offices, ICAO Meetings	Plan de implementación VDL con sus aplicaciones VDL Implement. Plan and applications	Comité CNS CNS Committee	End/Finales 2009	Se ha formulado una actualizacion para el Plan contenido en la Tabla CNS 2A./ An update to the Plan in CNS Table 2A was formulated.

No.	Objetivo Estratégico, Iniciativas Plan Mundial, Plan Regional FASID y/o Conclusiones/Decisiones válidas GREPECAS Strategic Objective, Global Performance Indicators, FASID Regional Plan and/or valid GREPECAS Conclusions/ Decisions	Actividad/ Activity	Acción de seguimiento/ Follow-up Action	Entregable/ Deliverable	Responsable/ Responsible	Fecha límite/ Deadline	Observaciones/ Remarks
1	2	3	4	5	6	7	8
CNS/2-1.3.2	Objetivo EsT: D, IPM/GPI: 17 y 22, Tabla CNS 1Ba-1Bb-1Bc Conclusiones 13/74 y 13/79	Revisar, actualizar y completar el plan de transición inicial para el desarrollo evolutivo de la ATN y sus aplicaciones Review, update and complete inicial transition plan for the evolutionary development of ATN and applications	Oficinas Regionales Reuniones OACI Regional Offices, ICAO Meetings	Plan de Transición Inicial ATN Initial ATN Transition Plan Información para actualización de los Planes del ATN (Tablas CNS 1Ba y 1Bc) Information for the update of ATN Plans (Tables CNS 1Ba and 1Bc)	Grupo de Tarea ATN ATN Task Force Grupo de Tarea ATN ATN Task Force	End/Finales 2009 Julio/July 2009	Se elabor[o una primera version para el Plan de encaminadores ATN (Tabla CNS 1Ba)/ An inicial version of the ATN routers Plan (CNS Table 1Ba) was done.
CNS/2-1.3.3	Objetivo EsT: D, IPM/GPI: 22 y 17, CNS/COMM Decisión 5/3	Orientar el desarrollo del plan de direccionamiento ATN, de conformidad con los principios y disposiciones técnicas de la OACI Guide de development of ATN addressing plan according to ICAO technical principles and guidelines	Oficinas Regionales Reuniones OACI Regional Offices, ICAO Meetings	Plan de direccionamiento ATN ATN addressing Plan	Grupo de Tarea ATN ATN Task Force	Julio/July 2009	The ATN Addressing Plan was reviewed/ El Plan de direccionamiento ATn fue revisado.
CNS/2-1.3.4	Objetivo EsT:D, IPM/GPI: 17 y 22, Tabla CNS 1Bc, Conclusiones 13/74 y 13/79	Desarrollar planes para la implantación evolutiva de la infraestructura terrestre de la ATN y el desarrollo de aplicaciones tierra-tierra, tales como AIDC y AMHS. Develop plans for the evolutionary implementation of ATN ground infrastructure and the development of ground-ground applications, such as AIDC and AMHS.	Oficinas Regionales Reuniones OACI Regional Offices, ICAO Meetings	Información para actualización de Plan de implantación de aplicaciones tierra-tierra como AMHS y AIDC (tabla CNS 1Bb) Information for updating Implementation plan for ground-ground application, such as AMHS and AIDC (Table CNS 1Bb) Resultados de las pruebas de comunicaciones del ATN (Datos Radar, MTA-MTA, MTA-UA, …)/ Communications trial results of the ATN (Radar data, MTA-MTA, MTA-UA, …)	Grupo de Tarea ATN ATN Task Force	Julio/July 2008 Julio/July 2009	Se elaboro una revision del Plan de Aplicaciones tierra-tierra del ATN (Tabla CNS 1Bb)/ A reviewed version of the ATN ground-ground Applications Plan was done (CNS Table 1Bb).

No.	Objetivo Estratégico, Iniciativas Plan Mundial, Plan Regional FASID y/o Conclusiones/Decisiones válidas GREPECAS Strategic Objective, Global Performance Indicators, FASID Regional Plan and/or valid GREPECAS Conclusions/ Decisions	Actividad/ Activity	Acción de seguimiento/ Follow-up Action	Entregable/ Deliverable	Responsable/ Responsible	Fecha límite/ Deadline	Observaciones/ Remarks
1	2	3	4	5	6	7	8
CNS/2-1.3.5	Objetivo EsT: D, IPM/GPI: 17 y 22, Conclusiones 13/74 y 13/79	Establecer dentro de la ATN el uso inicial a nivel operacional y gerencial de: Establish within ATN the initial use at operational and managerial level of:	Oficinas Regionales Reuniones OACI Regional Offices, ICAO Meetings				
		a) aplicaciones tierra-tierra; y ground to ground applications and		Uso inicial aplicaciones tierra-tierra Initial use of ground-ground applications	Estados Regiones CAR/SAM States Regions	Julio/July 2008	Se recabo información sobre los planes de los Estados/ Information was collected of State's Plan
		b) aplicaciones aire-tierra. air-ground applications.		Uso inicial aplicaciones tierra aire Initial use of air-ground applications	Estados Regiones CAR/SAM States Regions	Diciembre/ December 2010	
CNS/2-1.3.6	Objetivo EsT: D, IPM/GPI: 17 y 22, Conclusiones 14/43 y 14/44	Analizar las propuestas de infraestructura de comunicaciones de datos en apoyo de la implantación de la ATFM Analyse proposals for data Communications infrastructure in support of ATFM implementation	Oficinas Regionales Reuniones OACI Regional Offices, ICAO Meetings	Propuesta de infraestructura de comunicaciones para la ATFM Proposal for ATFM Communications infrastructure	Comité CNS CNS Committee	Junio/June 2010	
CNS/2-1.5	Objetivo EsT: D, IPM/GPI: 17 y 22, Tabla MET 2A y 2B, Conclusión 14/54	Elaborar un plan CAR/SAM para establecer el sistema de comunicaciones necesario para la migración hacia el intercambio de mensajes aeronáuticos MET (METAR/SPECI y TAF) en el nuevo formato a definirse Elaborate a CAR/SAM plan for the establishment of the communications system needed for the migration towards aeronautical MET messages exchange (METAR/SPECI and TAF) in the new format to be defined.	Oficinas Regionales Reuniones OACI Regional Offices, ICAO Meetings	Definición de los requerimientos/consideraciones en comunicaciones para el intercambio de mensajes aeronáuticos MET en nuevos formatos Definition of requirements and considerations in Communications for MET aeronautical messages Exchange in new formats	Grupo de Tarea ATN ATN Task Force	End/Final 2009	Tarea conjunta con COM/MET del Subgrupo MET Joint tasks with COM/MET of MET Subgroup

No.	Objetivo Estratégico, Iniciativas Plan Mundial, Plan Regional FASID y/o Conclusiones/Decisiones válidas GREPECAS Strategic Objective, Global Performance Indicators, FASID Regional Plan and/or valid GREPECAS Conclusions/ Decisions	Actividad/ Activity	Acción de seguimiento/ Follow-up Action	Entregable/ Deliverable	Responsable/ Responsible	Fecha límite/ Deadline	Observaciones/ Remarks
1	2	3	4	5	6	7	8
CNS/3-2.1	Objetivo EsT: D, IPM/GPI: 21 y 5	Analizar los resultados de los ensayos de aumentación SBAS realizados en las Regiones CAR/SAM Analyse results of SBAS augmentation trials carried out in CAR/SAM Regions	Oficinas Regionales Reuniones OACI Regional Offices, ICAO Meetings	Análisis de los resultados de los ensayos SBAS. Analysis of SBAS trials results.	Grupo de tarea GNSS GNSS Task Force	Diciembre/ December 2011	Se han analizados los resultados de los Proyectos RLA/00/009 y RLA/03/902 Fase II Los resultados de la Fase III del RLA/03/902 se completaran hasta el 2011/The results of the RLA/00/009 and Phase II of RLA/03/902 had been analyzed.. RLA/03/902 Phase III Results Hill be complete until 2011.
CNS/3-2.2.1	Objetivo EsT: D, IPM/GPI: 21 y 5, Conclusión 12/45 y Decisión 14/55	Actualizar los textos de orientación y las estrategias regionales para la instalación e implantación de los sistemas de aumentación GNSS Update guideline texts and regional strategies for the installation and implementation of GNSS augmentation Systems.	Oficinas Regionales Reuniones OACI Regional Offices, ICAO Meetings	Propuesta de actualizaciones a Estrategia Regional para la implementación de los sistemas de aumentación GNSS Regional Strategy update proposal for the implementation of the GNSS augmentation Systems.	Grupo de tarea GNSS GNSS Task Force	Diciembre/ December 2011	Se estima actualizaciones con los estudios en GBAS (2010) y SBAS (2011)/ Updates expected with GBAS (2010) and SBAS (2011) studies.
CNS/3.2.3.1	Objetivo EsT: D, IPM/GPI: 21 y 5, Tabla CNS 3, Conclusión 12/45 y Decisión 14/55	Consideraciones sobre la factibilidad de la aplicación regional, los aspectos técnicos, los beneficios operacionales, los costos asociados, la implantación, las implicancias para los equipos de a bordo y otros aspectos pertinentes. Considerations on regional application, technical aspects, operational benefits, associated costs, implementation itself, implications for on/board equipment and other pertinent aspects.	Oficinas Regionales Reuniones OACI Regional Offices, ICAO Meetings	Análisis costo beneficio para la implementación de sistemas de aumentación GNSS Cost-benefit analysis for the implementation of GNSS augmentation systems	Grupo de Tarea GNSS GNSS Task Force	Diciembre/ December 2011	El RLA/03/902 ha suministrado un estudio preliminar de coste-beneficio sobre el SBAS. Dentro de la Fase III se realizara el analisis mas detallado./ RLA/03/902 had provided a preliminary cost-benefit study for the SBAS. Under its Phase III a detailed study will be done.

No.	Objetivo Estratégico, Iniciativas Plan Mundial, Plan Regional FASID y/o Conclusiones/Decisiones válidas GREPECAS Strategic Objective, Global Performance Indicators, FASID Regional Plan and/or valid GREPECAS Conclusions/ Decisions	Actividad/ Activity	Acción de seguimiento/ Follow-up Action	Entregable/ Deliverable	Responsable/ Responsible	Fecha límite/ Deadline	Observaciones/ Remarks
1	2	3	4	5	6	7	8
CNS/3.2.3.2	Objetivo EsT: D, IPM/GPI: 21 y 5, Tabla CNS 3, Conclusión 12/45	Dirigir estudios sobre las opciones de implantación de un sistema SBAS/GBAS a nivel regional, tomando en cuenta la evolución del GNSS. Carry out studies on the options for the implementation of a regional SBAS/ GBAS system, taking into account GNSS evolution.	Oficinas Regionales Reuniones OACI Regional Offices, ICAO Meetings	Estudio sobre opciones de implementación de un sistema SBAS/GBAS Study on implementation options of a SBAS/GBAS system	Comité CNS CNS Committee	Diciembre/December 2011	Se estiman la completacion de los estudios en GBAS (2010) y SBAS (2011)/ Completion of studies expected for GBAS (2010) and SBAS (2011).
CNS/3-3.5	Objetivo EsT: D, IPM/GPI: 21 y 5, Tabla CNS 3, Conclusiones 14/56 y 14/57	Elaborar un plan regional para la desactivación de los NDB. Elaborate a regional for NDB deactivation.	Oficinas Regionales Reuniones OACI Regional Offices, ICAO Meetings	Plan Regional de desactivación de Estación NDB Regional Plan for deactivation of NDB Station	Comité CNS CNS Committee	Diciembre/December 2008	Plan Regional Inicial por completarse por los Estados/ Inicial Regional Plan to be completed by the Status.
CNS/4-3.2	Objetivo EsT: D, IPM/GPI: 9 y 17, Conclusión 13/87	Estudios y recomendaciones de acción para el SSR en Modo S, ADS-C, ADS-B y otros sistemas de vigilancia, implantación a nivel sub-regional/regional. Studies and recommendations for the SSR in Mode S, ADS-C, ADS-B and other surveillance Systems, subregional/regional implementation	Oficinas Regionales Reuniones OACI Regional Offices, ICAO Meetings	Estrategia unificada de implementación de sistemas de vigilancia Unified Strategy for the implementation of surveillance systems	Grupo de tarea de vigilancia Surveillance Task Force	Julio/July 2008	Borrador de Estrategia Unificada presentada por el TF/SUR. / Draft uified stategy presented by TF/SUR.
CNS/4-3.3	Objetivo EsT: D, IPM/GPI: 9 y 17, Tabla CNS 4A, Conclusión 13/87	Elaboración de un plan regional para la implantación ADS-C y ADS-B. Elaboration of a regional plan for ADS-C and ADS-B implementation.	Oficinas Regionales Reuniones OACI Regional Offices, ICAO Meetings	información para actualización de Plan de Sistemas de Vigilancia (Tabla CNS 4A) en sus apartados de ADS-B y ADS-C Updated information of the Surveillance System Plan (Table CNS 4A) parts ADS-B and ADS-C	Grupo de Tarea de Vigilancia Surveillance Task Force	Julio/July 2009	

EXPLICACIÓN DE LA TABLA/EXPLANATION OF THE TABLE

PROGRAMA DE TRABAJO PROPUESTO PARA EL COMITÉ CNS Y FUTURO SUBGRUPO CNS/
PROPOSED WORK PROGRAMME FOR THE CNS COMITÉ AND FUTURE CNS SUBGROUP

Número / Título de Columna Number / Column Title		Descripción del Contenido / Content Description
1 / No.		Indica el numero de tarea asociado al Comité CNS y futuro Subgrupo CNS / Indicates the task number in relation to the CNS Committee and future CNS Subgroup
2/ Objetivo Estratégico, Iniciativas del Plan mundial, Plan Regional FASID y/o Conclusiones/Decisiones válidas GREPECAS / Strategic Objective, Global Performance Indicators, Regional Plan FASID and/or GREPECAS valid Conclusions/Decisions		Indica la relación de la tarea con el /los objetivos estratégicos de la OACI, las Iniciativas del Plan Mundial de la OACI, el Plan Regional FASID y/o las conclusiones o decisiones válidas del GREPECAS / Indicates the relation of the task with ICAO strategic objective/objectives, ICAO Global Performance Indicators, Regional Plan FASID and/or GREPECAS valid conclusions or decisions
3/ Actividad / Activity		Descripción de la Tarea a realizar / Description of the Task to be carried out
4/ Acción de seguimiento / Follow-up Action		Indica los mecanismo para el seguimiento de la ejecución de las tareas (Actividades de las Oficinas Regionales de la OACI, Reuniones de coordinación, de grupo de tareas del subgrupo o informales, etc.) / Indicates the mechanism for follow up of the tasks execution (ICAO Regional Offices Activities, Coordination Meeting, Meetings of the Subgroup Task Forces or informal meetings, etc.)
5/ Entregable / Deliverable		Indica el producto esperado a obtenerse / Indicates the expected product
6/ Responsable / Responsible		Indica Responsable/s para la ejecución de la tarea / Indicates Responsible person or group for the execution of the task
7/ Fecha limite / Deadline		Indica la fecha limite para la entrega del producto descrito en la columna 5 / Indicates the deadline for the delivery of the product describes in column 5
8/ Observaciones / Remarks		Indica observaciones relevantes a la tarea indicada / Indicates relevant remarks for the indicated task

APPENDIX B

ATN TASK FORCE WORK PROGRAMME

Reference	Title/Description/Updates	Deliverables	Action by	Target Dates	Last Activities
Work Programme	Keep up-to-date the Work Programme	Work Programme	Rapporteur	On-Going	
AMHS over TCP/IP	Study TCP/IP a protocol for the intra-regional connections	Recommendation to CNS on TCP/IP	Colombia, COCESNA	**Completed**	Nov-06
CAR/SAM ATN Transition Plan	Update the Initial Transition Plan for the Evolutionary Development of the ATN in the CAR/SAM Regions to integrate the CAR/SAM ground-ground Transition, air-ground Transition, and ATN Implementation Plan Updated on March 2007 to add the following documents: a) Caribbean/South America (CAR/SAM) Regional ATN Ground-to-Ground Transition Plan b) Caribbean/South America (CAR/SAM) ATN Implementation Plan c) Caribbean/South America (CAR/SAM) AMHS Transition Plan	CAR/SAM ATN Plan	Dulce Roses ATN Task Force Rapporteur	On-Going	Jun-08
AMHS Guidance Transition Material	Strategy and guidance to transition from AFTN to AMHS environment utilizing IPS	ATN Task Force	Noel Ellis Jamaica	**Completed**	Nov-06
ATN Routing Policy	Develop the MTA Routing Policy - June 08 - Document will review and results will be presented during the next Task Force Meeting based on Table CNS 1Ba	Initial ATN Routing Policy	Brazil / Argentina / COCESNA	Feb-09	28-Jun
IP Addressing Scheme	Develop the IP addressing scheme – **June 2008** - The Plan was presented and will be reviewed.	Initial IP Addressing Scheme Plan	Argentina	Feb-09	Jun-08
IP Security	Develop guidelines for IP security (Note: FAA will provide information on Security to Task Force before this is assigned.)	IP Security Guidelines	Vic Patel FAA/USA	2009	07-Mar
IP Routing Policy	Develop a routing policy for IP – **June-08** Draft IP Routing Policy document will be distributed to the ATN Task Force Member for review	IP Routing Policy Document	Hoang Tran T. McParland FAA/USA	2008	Jul-08
IP ICD	Create an IP Interface Control Document – **June-08** Document was presented for review and comments by the Task Force. Response should be in by November 2008	IP Interface Document	USA/FAA (Roberto Delgado)	2008	Feb-09

Reference	Title/Description/Updates	Deliverables	Action by	Target Dates	Last Activities
Develop Test Procedures	June-08 Develop the test procedures for ATN applications and IP Router; (MTA-MTA, MTA-UA, Radar, and VoIP) Jamaica and COCESNA will develop the Radar test procedures. Argentina will do VOiP MTA-UA Testing between Argentina and Peru MTA-MTA Testing between Argentina and Paraguay Radar Testing between Brazil and Venezuela, Jamaica and COCESNA. MTA-MTA Testing between COCESNA and USA	ATN Applications and IP Router Test Procedures	Brazil / Argentina USA/FAA	Feb-09	Jun-08
CAR/SAM Major Hubs Backbone Note: This should be integrated to the ATN Routing Policy and Test Procedures	Update the CAR/SAM Regional Telecommunication Major Hub Backbone: a) Identify the Communication Centres that require AMHS or UA only b) Identify the circuits that need to be upgraded before the transition c)Develop waterfall schedule for transition for an entire region	ATN Task Force	Jamaica, COCESNA, T&T, Brazil	09-Feb	30-Jun
IPv4 vs. IPv6	Evaluate the IPv6 vs. IPv4 due to compatibility issues with European region	ATN Task Force		**Completed**	2007
Network Operation Procedures	Develop Network Operation Procedures **Note**: EUROCONTROL will host the meeting in June 2007	ATN Task Force	Dulce Roses ATN Task Force Rapporteur FAA/USA/ Aena / Eurocontrol	Completed	07-Mar
Management of AMHS Addressing Scheme	Develop an entity to manage AMHS Addressing Scheme and coordinate this work with other ICAO regions (Note: Those States that have already implemented AMHS should contact EUROCONTROL AMC to provide support in maintaining the data-base. Argentina is already doing this. EUROCONTROL will be invited to the next ATN Task Force for a briefing on AMC)		Reps from CAR/SAM Region		Feb-09
AMHS Addressing Scheme verification	ICAO Regional Offices to verify with States and update the addressing scheme accordingly. (ICAO adopt CAAS addressing scheme)	Update AMHS addressing table	ICAO	2009	Mar-09

APPENDIX C

GNSS TASK FORCE WORK PROGRAMME

No.	Strategic Objective	Global Plan/ Plan Mundial - GPI	Regional Plan - FASID	GREPECAS No. Con/Dec/Pa	Target activity	Follow-up action	Deliverable	Responsible	Target date	Remarks
1	2	3	4	5	6	7	8	9	10	11
1	A, D	GPI-21	CNS -3	12/45 12/46 13/84 14/55	Develop draft regional guidelines for the evolution of air navigation systems		- List of avionics available in aircraft in the CAR/SAM Regions and projected future systems - List of navigation aids existing in the CAR/SAM States, together with their installation dates - Evolution strategy/ Roadmap of air navigation systems for the CAR/SAM Regions	IATA Participating States Spain Brazil	GNSS TF 04	
2	A, D	GPI-21	CNS-3	12/129 b)	Propose technical training programmes in GNSS systems for the CAR/SAM States		- Technical training programme in basic GNSS systems - Technical training programme in SBAS systems - Technical training programme in GBAS systems	Spain Spain Brazil	GNSS TF 04	
3	D	GPI-21	CNS-3	12/46	Guide the States of the Region in the practical methodology for the implementation of GBAS systems		- Practical guide for the implementation of GBAS systems in the CAR/SAM Region	FAA Spain Brazil	GNSS TF 04	

APPENDIX D

SURVEILLANCE TASK FORCE PROGRAMME

No.	Strategic Objetive	Global Plan/ Plan Mundial - GPI	Regional Plan - FASID	GREPECAS No. Con/Dec/Pa	Goal Activities	Follow-up	Deliverables	Responsible	Target Dates	Remarks
1	2	3	4	5	6	7	8	9	10	11
1	A, D	GPI-09	CNS-4A	13/54	Propose surveillance systems susceptible to be implemented in the CAR/SAM regions.		- Update version of Unified CAR/SAM Surveillance Strategy	Brazil	SUR TF 03 (2009)	
2	D	GPI-09	CNS-4A	13/54	Develop an implementation plan for short and medium term Surveillance applications in the CAR/SAM regions		- Surveillance system comparison document and general considerations for implementation - Guidance considerations for Multilateration implementation	United States SITA	SUR TF 03 (2009)	

Agenda Item 6: Other business

6.1 Nil.