

**Doc 8733**



**Caribbean and South American Regions  
Régions Caraïbes et Amérique du Sud  
Regiones del Caribe y Sudamérica**

# **Air Navigation Plan Plan de navigation aérienne Plan de navegación aérea**

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**Volume I, Basic ANP  
Volume I, ANP de base  
Volumen I, ANP básico**

**Not to be used for operational purposes  
Ne pas utiliser pour l'exploitation  
No debe utilizarse para fines de operaciones**

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**BASIC AIR NAVIGATION PLAN —  
CARIBBEAN AND SOUTH AMERICAN REGIONS**

**PLAN DE NAVIGATION AÉRIENNE DE BASE —  
RÉGIONS CARAÏBES ET AMÉRIQUE DU SUD**

**PLAN DE NAVEGACIÓN AÉREA BÁSICO —  
REGIONES DEL CARIBE Y DE SUDAMÉRICA**

Doc 8733  
Volume I  
Volumen I

Amendment No. 2  
Amendement N° 2  
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27/6/05

1. Insert the following replacement pages:

Table of Contents	0-E-iii
Table des matières	0-F-III
Índice	0-S-iii
Part I	I-E-1 to I-E-12
Partie I	I-F-1 to I-F-14
Parte I	I-S-1 to I-S-12

2. Record the entry of this amendment on page ii.
- 

1. Insérer les pages de remplacement suivantes:

Table of Contents	0-E-iii
Table des matières	0-F-III
Índice	0-S-iii
Part I	I-E-1 à I-E-12
Partie I	I-F-1 à I-F-14
Parte I	I-S-1 à I-S-12

2. Inscrire l'amendement à la page ii.
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1. Insértense las siguientes páginas sustitutivas:

Table of Contents	0-E-iii
Table des matières	0-F-III
Índice	0-S-iii
Part I	I-E-1 a I-E-12
Partie I	I-F-1 a I-F-14
Parte I	I-S-1 a I-S-12

2. Anótese esta enmienda en la página ii.
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Doc 8733  
Volume I  
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1  
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27/2/04

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1. Insert the following new and replacement pages and charts:

Table of Contents	0-E-iv
Part V	V-A-40 to V-A-42 Charts ATS 7A, 7B and 7C
Appendix	A-E-1

2. Remove the following chart:

Part V	Chart ATS 7D
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3. Record the entry of this amendment on page ii.
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1. Insérer la nouvelle page et la page révisée et la carte ci-jointes:

Partie V	V-A-40 à V-A-42 Carte ATS 6B
Appendice	A-F-1

2. Inscrire l'amendement à la page ii.
- 

1. Insértense las siguientes páginas nuevas y sustitutivas y la carta:

Índice	0-S-iv
Parte V	V-A-40 a V-A-42 Carta ATS 6B
Apéndice	A-S-1

2. Suprímase la siguiente carta:

Parte V	Carta ATS 7D
---------	--------------

3. Anótese esta enmienda en la página ii.

# TABLE OF CONTENTS

	<i>Page</i>
<b>Introduction</b>	
New concept of air navigation plans .....	0-E-1
Introduction of CNS/ATM elements into the plan .....	0-E-1
Format and scope of the plan .....	0-E-1
States' responsibilities .....	0-E-2
Contents of the plan .....	0-E-2
CAR/SAM regional planning .....	0-E-2
Principles and guidelines for the development of a CNS/ATM plan and its implementation for the region ..	0-E-3
CNS/ATM evolution concept .....	0-E-3
Procedure for the amendment of regional plans, including FASID material .....	0-E-4
Procedure for the amendment of approved Basic Air Navigation Plans .....	0-E-8
Procedure for the amendment of the Facilities and Services Implementation Document (FASID) .....	0-E-9
Abbreviations .....	0-E-9
Alphabetical index of States and territories .....	0-11
<b>Part I — Basic operational requirements and planning criteria (BORPC)</b>	
Introduction .....	I-E-1
General (applicable to both international commercial air transport and international general aviation) .....	I-E-1
Aerodromes .....	I-E-3
Air traffic management .....	I-E-4
Search and rescue .....	I-E-7
Communications .....	I-E-7
Navigation .....	I-E-8
Surveillance .....	I-E-10
Meteorology .....	I-E-11
Aeronautical information services and aeronautical charts .....	I-E-12
<b>Part II — General planning aspects (GEN)</b>	
Introduction .....	II-E-1
Implementation strategy .....	II-E-4
<b>Part III — Aerodrome operational planning (AOP)</b>	
Introduction .....	III-E-1
Aerodrome operational planning (AOP) .....	III-E-1
Aerodrome services .....	III-E-2
Appendix — International aerodromes required in the CAR/SAM region .....	III-A-1

---

**Part IV — Communications, navigation and surveillance (CNS)**

Introduction .....	IV-E-1
Communications .....	IV-E-1
Navigation .....	IV-E-4
Surveillance .....	IV-E-5
Aeronautical radiofrequency management .....	IV-E-6
Attachment A — Operational features considered necessary for a main aeronautical fixed telecommunication network (AFTN) communications centre .....	IV-E-A1
Attachment B — Guidance material for the preparation of AFTN message traffic statistics .....	IV-E-B1
Attachment C — Planning and technical principles for ATS voice networks .....	IV-E-C1
Attachment D — Harmful interference report form .....	IV-E-D1
Attachment E — AM(R)S planning principles .....	IV-E-E1
Attachment F — Geographical separation criteria .....	IV-E-F1
Attachment G — AM(R) VHF sub-bands allotment table .....	IV-E-G1
Attachment H — Planning principles for the aeronautical radio navigation aids .....	IV-E-H1
Attachment I — Regional strategy for the introduction and application of non-visual aids for approach, landing and departure .....	IV-E-I1

**Part V — Air traffic management (ATM)**

Introduction .....	V-E-1
Objectives of air traffic management .....	V-E-1

**Part V.I — Airspace management (ASM)**

Objectives of ASM .....	V-E-3
Plan of flight information region (FIR) boundaries, including ATS routes .....	V-E-4
General guidelines .....	V-E-4
Implementation .....	V-E-6

**Part V.II — Air traffic services (ATS)**

Introduction .....	V-E-6
--------------------	-------

**Part V.III — Air traffic flow management (ATFM)**

General principles of the ATFM service .....	V-E-9
--	-------

Appendix A — Table ATS 1 — ATS route network .....	V-A-1
Chart ATS 1 — Flight Information Service — Lower airspace	
Chart ATS 2 — Flight Information Service — Upper airspace	
Chart ATS 3 — Area Control Service — Lower airspace	
Chart ATS 4 — Area Control Service — Upper airspace	
Chart ATS 5 — SSR code allocation plan — participation areas	
Charts ATS 6A, 6B, 6C, 6D — Area control service — ATS routes — Lower airspace	
Charts ATS 7A, 7B, 7C — Area control service — ATS routes — Upper airspace	
Appendix B — Air traffic management system implementation .....	V-B-E-1

	<i>Page</i>
<b>Part VI — Meteorology (MET)</b>	
Introduction .....	VI-E-1
Meteorological service required at aerodromes and requirements for meteorological watch offices .....	VI-E-1
Meteorological observations and reports .....	VI-E-2
Aircraft observations and reports .....	VI-E-2
Forecasts .....	VI-E-2
SIGMET and AIRMET information .....	VI-E-3
Exchange of operational meteorological information .....	VI-E-3
World area forecast system (WAFS) .....	VI-E-4
 <b>Part VII— Search and rescue (SAR) services</b>	
Introduction .....	VII-E-1
Plan of search and rescue regions (SRR) .....	VII-E-1
Search and rescue services .....	VII-E-1
Search and rescue operations .....	VII-E-2
Chart SAR 1 — Search and Rescue Facilities	
 <b>Part VIII — Aeronautical information services and charts (AIS/MAP)</b>	
Introduction .....	VIII-E-1
General procedures .....	VIII-E-1
Organization of aeronautical information services .....	VIII-E-3
Integrated aeronautical information package .....	VIII-E-4
World Geodetic System — 1984 (WGS-84) .....	VIII-E-5
Aeronautical charts .....	VIII-E-6
Automation in AIS .....	VIII-E-7
Attachment — concept for an integrated automated AIS system for the CAR/SAM regions .....	VIII-E-A1
 <b>Appendix — Summary of Amendments to the Basic ANP .....</b>	<b>A-E-1</b>

## INTRODUCTION

### NEW CONCEPT OF AIR NAVIGATION PLANS

1. Air navigation plans set forth in detail the facilities, services and procedures required for international air navigation within a specified area. Such plans contain recommendations that governments can follow in programming the provision of their air navigation facilities and services, with the assurance that facilities and services furnished in accordance with the plan will form with those of other States an integrated system adequate for the foreseeable future.

2. On 26 February 1997, the ICAO Council decided that the regional air navigation plans (ANPs) should be published in two volumes: a Basic ANP and a facilities and services implementation document (FASID). It was agreed that the Basic ANP would contain stable plan material such as:

- a) the geographical area constituted by the flight information regions (FIRs) covered by the plan;
- b) the basic operational requirements and planning criteria (BORPC), as approved by the Air Navigation Commission (ANC) for application in all regions except Europe; and
- c) the latest planning and implementation guidance formulated for the region through recommendations by regional air navigation (RAN) meetings.

3. It was agreed that the FASID would set forth the dynamic material from the plan constituted by the facilities and services required for international air navigation within the specified area. The FASID would also include appropriate additional guidance, particularly with regard to implementation, to complement the material contained in the Basic ANP.

### INTRODUCTION OF CNS/ATM ELEMENTS INTO THE PLAN

4. While the traditional focus of a regional ANP has been to cover the facilities and services required for a period of five years, the introduction of CNS/ATM systems with longer planning horizons is recognized and CNS/ATM planning and implementation elements are being introduced progressively into regional ANPs.

5. Such introduction of CNS/ATM planning elements is guided by the ICAO Global Air Navigation Plan for CNS/ATM Systems, which has been developed so that it has a clear and functional relationship with the regional air navigation plans. This has been accomplished by dividing the Global Plan into two parts. Volume I guides further development of the operational requirements and planning criteria of the regional air navigation plans. The tables in Volume II form the framework to guide the implementation of CNS/ATM systems on a global basis, using the traditional regional planning processes, leading to a global integrated ATM system. The document therefore offers, under one cover, a global snapshot of progress achieved and work remaining toward implementation of CNS/ATM systems, thereby serving as a consolidated planning tool.

### FORMAT AND SCOPE OF THE PLAN

6. The first volume of this document is the basic air navigation plan. It contains general planning criteria, implementation guidelines and stable plan elements. The second volume, the facilities and services implementation document (FASID) sets forth in general terms the facilities, services and procedures required for international air navigation within a specified area. This FASID contains specifications which governments can follow in programming the provision of their air navigation facilities and services, with the assurance that facilities and services

f u r n i s h e d i n

accordance with the basic plan will form with those of other States an integrated system adequate for the foreseeable future.

7. In technical scope the plans comprise statements of required facilities and services in the AOP, AIS, ATM, CNS, MET and SAR fields, in sufficient detail to ensure proper functioning of the plan as a whole and its adequacy to meet present and foreseen operational requirements. They also include any special procedures considered necessary to supplement the worldwide procedures contained in Annexes and PANS. As living documents, the format and content of the Basic ANP and FASID should be kept under review by the CAR/SAM Regional Planning and Implementation Group (GREPECAS) in order, inter alia, to meet the requirements of the ICAO Global Air Navigation Plan for Communications, Navigation and Surveillance/Air Traffic Management (CNS/ATM) Systems.

8. In geographical scope the plan is related to the Caribbean and South American ICAO air navigation regions. The plan may call for the provision of basic facilities and services beyond the charted boundaries of a region where such facilities and services are necessary to meet the requirements of international air navigation within that region.

### **STATES' RESPONSIBILITIES**

9. Each Contracting State is responsible for the provision of facilities and services in its territory under Article 28 of the Convention. The Council has recommended that these facilities and services include those specified in the air navigation plans.

10. Inclusion in air navigation plan documents of basic facilities and services in non-Contracting States and territories is simply a recognition that they are needed by or likely to affect international civil aircraft operations of Contracting States or the facilities and services of these States.

### **CONTENTS OF THE PLAN**

11. This basic air navigation plan document presents in general terms the ICAO plan for the provision of facilities and services for international air navigation in the ICAO Caribbean and South American regions. It has incorporated in an evolutionary manner requirements emanating from

introduction of the ICAO Global Air Navigation Plan for CNS/ATM Systems. The companion document to this plan, the CAR/SAM facilities and services implementation document (FASID) includes detailed information on States' facilities, services, and plans for implementation. Facilities and services outside of the prescribed regional boundaries may also have been included in order to maintain the integrity of "systems" and to ensure in so far as possible that all the facilities and services provided by any one State appear in one air navigation plan document.

12. Most of the contents of the plan have originated from recommendations of the Third CAR/SAM Regional Air Navigation Meeting (Buenos Aires, October 1999), and the CAR/SAM Regional Planning and Implementation Group (GREPECAS) activities.

13. The statement of basic operational requirements and planning criteria for regional planning on which the plan is based is found in Part I — BORPC. In addition, planning in the CAR/SAM regions is based on traffic forecasts as indicated in Part II — GEN. Part II also includes information on the present approach to planning, which is based on homogeneous ATM areas and major traffic flow, as well as a set of general guidelines on the establishment and provision of a multinational facility/service.

14. It should also be noted that the plan does not list all facilities and services existing in the region but only those required as approved by ICAO Council for international civil aviation operations. Aeronautical information publications, NOTAM and other State documents should be consulted for information on additional facilities and services and for operational information in general.

### **CAR/SAM REGIONAL PLANNING**

15. Planning in the CAR/SAM regions is organized largely through the GREPECAS mechanism. The approach being taken to planning is similar to that of other regions and is based on homogenous areas and major international flows as indicated below. In 1998, as a result of a Council-approved special implementation project (SIP) carried out in the CAR/SAM regions a practical regional planning methodology started to emerge. The different elements of the methodology included the following analysis:

- a) establishment of present level of airspace utilization;
- b) projection of traffic growth;

- c) identification of congestion (segments) on the flow;
- d) identification of possible ATM solutions;
- e) identification of CNS elements to support ATM solutions;
- f) cost/benefit analysis to determine viability of the project; and
- g) sensitivity analysis to determine the most appropriate technical and operational solutions as well as their timing for implementation.

16. The Technical Co-operation project (UNDP/ICAO RLA/98/003) is conducting, in consultation with States concerned, the analysis of all the different traffic flows identified in Volume II of the CAR/SAM Regional CNS/ATM Plan, applying the methodology developed by the SIP.

17. The methodology being used has as a cornerstone the use of cost/benefit techniques based on ICAO Circular 257 which deals with this subject in a substantive way. The recommended approach is used to estimate the economic viability of a planned investment project, that is the extent to which the total benefit of the investment exceeds its total cost. States may wish to identify socio-economic benefits as well.

18. To ensure the successful implementation of the ANP in general and that of the CNS/ATM systems in particular, the providers of air traffic services and the users of these services and financing organizations all need to be advised of the financial implications and convinced of the economic viability of new systems. This can be achieved through the development of a comprehensive cost/benefit analysis which includes the financial consequences affecting all the partners involved in the implementation process. Cost/benefit analyses can also provide guidance on the appropriate timing for implementation of various elements of a new system. In addition, to demonstrate financial viability, business cases for homogeneous ATM areas and/or major air traffic flows can be conducted at the regional, sub-regional or national level.

19. The costs of air navigation systems elements are to be included in the cost basis for air navigation services charges and, where relevant, airport charges, and recovered in accordance with the principles contained in the *Convention on International Civil Aviation* (Doc 7300) and the *Statements by the Council to Contracting States on Charges for Airports and Air Navigation Services* (Doc 9082).

20. Financing CNS/ATM systems elements, particularly at the national level, is normally to be approached in a manner similar to that applied to conventional air navigation systems. However, a characteristic of most CNS/ATM systems elements which differentiates them from conventional air navigation systems is their multinational dimension. Consequently, and because of the magnitude of the investments involved, financing of basic systems elements may, in many cases, need to be a joint venture by the States involved at the regional or global level.

#### **PRINCIPLES AND GUIDELINES FOR THE DEVELOPMENT OF A CNS/ATM PLAN AND ITS IMPLEMENTATION FOR THE REGION**

21. ICAO's strategic vision is to foster implementation of a seamless, global air traffic management system that will enable aircraft operators to meet their planned times of departure and arrival and adhere to their preferred flight profiles with minimum constraints and without compromising agreed levels of safety.

22. ICAO's mission of implementation is to develop a seamless, globally coordinated system of air navigation services that will cope with worldwide growth in air traffic demand while:

- a) improving upon the present levels of safety;
- b) improving upon the present levels of regularity;
- c) improving upon the overall efficiency of airspace and airport operations, leading to increased capacity;
- d) increasing the availability of user-preferred flight schedules and profiles; and
- e) minimizing differing equipment carriage requirements between regions.

23. It is against this background and in consonance with the Statement of ICAO Policy on CNS/ATM Systems Implementation and Operation approved by the Council (141/13) on 9 March 1994 and reproduced at the Appendix to Chapter 2 of the Global Plan that CNS/ATM systems are being planned and included in the regional air navigation plan.

**CNS/ATM EVOLUTION CONCEPT**

24. The following CNS/ATM systems evolution tables and its objectives constitute the long-term vision of the make-up and benefits of future systems in the CAR/SAM regions. These tables are presented as reference for use by States in the region in its transition planning process. Final systems configurations describes in these tables do not constitute an obligation by States to implement all systems as described herein. The implementation tables for the CAR/SAM regions are contained in the FASID section of this plan.

25. Table Intro-1, CNS systems evolution, describes equipment in current and future systems under several operating environments. Table Intro-2, Objectives of CNS/ATM systems, outlines the benefits that these systems can deliver to air traffic management and flight operations.

26. This plan contains a number of the CNS/ATM elements which have been developed in the CAR/SAM Regional CNS/ATM Plan that is maintained as a working

tool by the GREPECAS mechanism. GREPECAS continues to study possible contributions that could enhance the final configuration of CNS/ATM systems. That mechanism provides for the regular transfer of mature CNS/ATM planning material from the working tool that the CNS/ATM plan constitutes.

27. Meteorology, aeronautical information service, aerodromes and search and rescue evolution will be included in the evolution tables when further development of the Global Air Navigation Plan for CNS/ATM Systems takes place.

**PROCEDURE FOR THE AMENDMENT OF REGIONAL PLANS, INCLUDING FASID MATERIAL**

28. The Basic ANP and FASID may be amended by a regional air navigation meeting or by following the amendment procedures below.

**Table Intro-1. CNS systems evolution**

Function	Current system	Future system
Oceanic/continental en-route airspace with low-density traffic (Note 6)		
Navigation	LORAN-C NDB VOR/DME Barometric altitude INS/IRS	RNAV/RNP GNSS Barometric altitude High altitude GNSS (Note 2) INS/IRS
Air-ground communications  Ground-ground communications	VHF and HF communications voice system  AFTN and ATS speech circuits	VHF and AMSS voice/data communications via ATN (Note 5) HF voice poles only (Note 4) HF DL Data communications via the ATN
Surveillance	Primary radar/SSR Voice position reports	ADS via the ATN
Continental airspace with high-density traffic		
Navigation	LORAN-C NDB VOR/DME Barometric altitude INS/IRS	RNAV/RNP GNSS Barometric altitude High altitude GNSS altimetry (Note 2) INS/IRS

Function	Current system	Future system
Air-ground communications Ground-ground communications	VHF communications voice systems AFTN and ATS speech circuits	VHF and AMSS voice/data Communications and SSR Mode S data link via the ATN Data communications via the ATN
Surveillance	Primary radar SSR Mode A/C	SSR Mode A/C or SSR Mode S ADS via the ATN
Oceanic airspace with high-density traffic		
Navigation	MNPS LORAN-C Barometric altitude INS/IRS	RNAV/RNP GNSS Barometric altitude High altitude GNSS altimetry (Note 2) INS/IRS
Air-ground communications Ground-ground communications	HF voice systems AFTN and ATS speech circuits	AMSS voice/data communications via the ATN Data communications via the ATN
Surveillance	Voice positions reports via HF speech circuits	ADS via the ATN
Terminal areas with high-density traffic		
Navigation	NDB VOR/DME ILS Barometric altitude INS/IRS	RNAV/RNP GNSS ILS, NDB (Note 3) VOR/DME (Note 3) Barometric altitude INS/IRS
Air-ground communications Ground-ground communications	VHF voice systems AFTN and ATS speech circuits	VHF and AMSS voice/data Communications and SSR Mode S data link via the ATN (Note 6) Data communications via the ATN
Surveillance	PSR SSR Mode A/C	PSR (Note 3) SSR Mode A/C or SSR Mode S ADS via the ATN (Note 1)

*Note 1.— The need for primary radar is reduced.*

*Note 2.— To be used where barometric altimetry is not functional especially at high altitudes.*

*Note 3.— Will be progressively withdrawn.*

*Note 4.— Until such time as satellite communications are available.*

*Note 5.— Includes low-altitude, off-shore and remote areas.*

*Note 6.— Depends on outcome of feasibility studies.*

**Table Intro-2. Objectives of CNS/ATM Systems**

Air traffic management	Flight operations
General	
<ul style="list-style-type: none"> <li>• ensure that all necessary information including information needed for dynamic flight planning is available to all ground and airborne systems</li> <li>• enhance functional integration of ground systems with airborne systems and the ATM-related aspects of flight operations</li> <li>• enhance the accuracy of conflict prediction and resolution and the provision of real time information to controllers and operators</li> </ul>	<ul style="list-style-type: none"> <li>• enhance the accuracy of information related to flight progress</li> <li>• enhance functional integration of airborne systems and flight operations with ground systems</li> <li>• ensure the provision of accurate information between airborne system elements with ground system elements necessary for dynamic flight planning</li> </ul>
Air operations safety	
<ul style="list-style-type: none"> <li>• ensure the provision of well adapted and harmonized safe procedures on a global basis</li> <li>• ensure that separation between aircraft is maintained</li> <li>• ensure that clearance between aircraft and obstacles is maintained</li> <li>• provide for enhanced contingency planning</li> <li>• ensure that rapid alerting service is available</li> <li>• ensure that safety levels are maintained as the use of automation increases</li> </ul>	<ul style="list-style-type: none"> <li>• improve pilot situational awareness*</li> <li>• ensure adequate clearance from terrain</li> <li>• enable aircraft to maintain their own separation under specific circumstances*</li> <li>• ensure that safety levels are maintained as the use of automation increases</li> <li>• ensure integrity of database information</li> </ul>
Regularity and efficiency of air operations	
<ul style="list-style-type: none"> <li>• provide for the application of global ATM under all operational conditions</li> <li>• improve the application of tactical airspace management through dynamic user involvement, leading to more efficient airspace utilization</li> <li>• improve strategic airspace management while increasing tactical airspace flexibility</li> <li>• ensure the provision of information necessary for tactical and strategic ATFM</li> <li>• enhance over-all tactical and strategic ATFM so that demand does not exceed capacity</li> <li>• increase available capacity without increasing controller workload</li> </ul>	<ul style="list-style-type: none"> <li>• ensure that aircraft can operate under all types of weather conditions</li> <li>• provide for the application of user-preferred flight profiles</li> <li>• ensure that the necessary infrastructure is available to support gate-to-gate operations</li> <li>• improve user capability to optimize flight planning dynamically, in order to improve airspace capacity through more flexible operations</li> <li>• minimize aircraft operating cost penalties</li> <li>• minimize differing equipment carriage requirements between regions</li> </ul>

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Communications, navigation and surveillance	
Communications	<ul style="list-style-type: none"><li>• to enhance coverage, accessibility, capability, integrity, security and performance of aeronautical communication systems in accordance with ATM requirements</li></ul>
Navigation	<ul style="list-style-type: none"><li>• to enhance coverage and allow for all-weather navigation capability in all airspace, including approach and landing, while maintaining or improving integrity, accuracy and performance in accordance with ATM requirements</li></ul>
Surveillance	<ul style="list-style-type: none"><li>• to enhance and extend effective surveillance to oceanic and remote areas while improving air traffic situational awareness* in the cockpit in accordance with ATM requirements</li></ul>

\* Emerging concept or technology-consensus still to be reached

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## PROCEDURE FOR THE AMENDMENT OF APPROVED BASIC AIR NAVIGATION PLANS

*Approved by Council on 25 February 1998*

### 1. Introduction

The procedure outlined below has been evolved to provide a means of maintaining basic regional plans in a current condition by correspondence.

### 2. General criteria

2.1 The Assembly has resolved that regional plans shall be revised when it becomes apparent that they are no longer consistent with current and foreseen requirements of international civil aviation and that, when the nature of a required change permits, the associated amendment of the regional plan shall be undertaken by correspondence between the Organization and the Contracting States and international organizations concerned.

2.2 When a State cannot immediately implement a particular part or a specific detail of a regional plan, although it intends to do so when practicable, this in itself should not cause the State to propose an amendment to the plan.

### 3. Procedure

3.1 If, in the light of the above criteria, any Contracting State (or group of States) of a region wishes to effect a change in the approved basic air navigation plan for that region it should propose to the Secretary General, through the regional office accredited to that State, an appropriate amendment to the plan, adequately documented; the proposal should include the facts that lead the State to the conclusion that the amendment is necessary. Such amendments may include additions, modifications or deletions. (This procedure does not preclude a State having previous consultation with other States before submitting an amendment proposal to the regional office.)

3.2 The Secretary General will circulate the proposal, adequately documented, with a request for comments to all

provider and user States of the region considered affected as well as to user States outside the region and international organizations which may be invited to attend suitable ICAO meetings and which may be concerned with the proposal. If, however, the Secretary General considers that the proposed amendment conflicts with established ICAO policy, or that it raises questions which the Secretary General considers should be brought to the attention of the Air Navigation Commission, the proposal will be first presented, adequately documented, to the Commission. In such cases, the Commission will decide the action to be taken on the proposal.

3.3 If, in reply to the Secretary General's inquiry to States and selected international organizations, no objection is raised to the proposal by a date specified, the proposal shall be submitted to the President of the Council, who is authorized to approve the amendment on behalf of the Council.

3.4 If, in reply to the Secretary General's inquiry to States and selected international organizations any objection is raised, and if objection remains after further consultation, the matter will be documented for formal consideration by the Air Navigation Commission. If the Commission concludes that the amendment is acceptable in its original or other form, it will present appropriate recommendations to the Council.

3.5 Proposals for the amendment of regional plans submitted by international organizations directly concerned with the operation of aircraft, which may be invited to attend suitable ICAO meetings and which attended the meeting(s) where the relevant plan was prepared, will be dealt with in the same manner as those received from States, except that, before circulating a proposal to States and selected international organizations pursuant to 3.2 above, the Secretary General will ascertain whether it has adequate support from the State or States whose facilities will be affected. If such support is not forthcoming, the proposal will be presented to the Commission, and the Commission will decide on the action to be taken on the proposal.

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3.6 Proposals for the amendment of regional plans may also be initiated by the Secretary General provided that the State or States whose facilities will be affected have expressed their concurrence with the proposal.

3.7 Amendment to regional plans which have been approved in accordance with the above procedure will be promulgated at convenient intervals.

## **PROCEDURE FOR THE AMENDMENT OF THE FACILITIES AND SERVICES IMPLEMENTATION DOCUMENT (FASID)**

*Approved by Council on 26 February 1997*

1. Amendments to the FASID shall be effected on the basis of an adequately documented proposal submitted by a Contracting State (or a group of States) to the ICAO Regional Office; the proposal should include the facts that lead to the conclusion that the amendment is necessary. Such amendments may include additions, modifications or deletions to the FASID. (This procedure does not preclude a State having previous consultation with other States before submitting the amendment proposal to the ICAO Regional Office.)

2. The ICAO Regional Office will circulate the proposal, adequately documented, with a request for comments to the provider States in the region and to user States except those which obviously are not affected, and, for information and comments if necessary, to international organizations which may be invited to attend suitable ICAO meetings and which may be concerned with the proposal. If, however, it is considered that the proposed amendment conflicts with established ICAO policy, or that it raises questions which should be brought to the attention of the Air Navigation Commission, the proposal will be adequately documented and presented to the Air Navigation Commission. In such cases, the Commission will decide the action to be taken on the proposal.

3. If, in reply to the ICAO Regional Office's inquiry, no objection is raised to the proposal by a specified date, it will be deemed that a regional agreement on the subject has been reached and the proposal shall be incorporated into the FASID.

4. If, in reply to the ICAO Regional Office's inquiry, any State objects to the proposal, and if objection remains after further consultation, the matter will be documented for discussion by the respective planning and implementation regional group (PIRG) and, ultimately, for formal consideration by the Air Navigation Commission, if necessary. If the Commission concludes that the amendment is acceptable in its original or other form, it will present appropriate recommendations to the Council.

5. Proposals for the amendment of the FASID submitted by international organizations directly concerned with the operation of aircraft in the region, which may be invited to attend suitable ICAO meetings where the FASID was prepared, will be dealt with in the same manner as those received from States, except that, before circulating the proposal to all interested States, it will be ascertained whether the proposal has adequate support from the State or States whose facilities or services will be affected. If such support is not forthcoming, the proposal will not be pursued.

6. Proposals for the amendment of the FASID may also be initiated by the ICAO Regional Office provided that the State or States whose facilities or services will be affected have expressed their concurrence with the proposal.

7. Amendments to the FASID which have been approved in accordance with the above procedure will be promulgated at convenient intervals.

### **ABBREVIATIONS**

All abbreviations used in this document are contained in the *Procedures for Air Navigation Services — ICAO Abbreviations and Codes (PANS-ABC)* (Doc 8400), with the exception of those used in the explanations of the various tables, which also give their meaning.

**ALPHABETICAL INDEX OF STATES AND TERRITORIES**  
**LISTE ALPHABÉTIQUE DES PAYS ET TERRITOIRES**  
**ÍNDICE ALFABÉTICO DE PAÍSES Y TERRITORIOS**

This index is for the purpose of determining the name under which information appears  
 La présente liste permet de déterminer sous quel nom figurent les renseignements  
 Este índice permite determinar bajo qué nombre aparece la información

<i>State or territory Pays ou territoire País o territorio</i>	<i>Name used in tables Nom employé dans les tableaux Nombre empleado en las tablas</i>	<i>State or territory Pays ou territoire País o territorio</i>	<i>Name used in tables Nom employé dans les tableaux Nombre empleado en las tablas</i>
Afganistán	Afghanistan	Bénin	Benin
Afghanistan	Afghanistan	Bermuda	Bermuda (United Kingdom)
Afrique du Sud	South Africa	Bermudas	Bermuda (United Kingdom)
Albania	Albania	Bermudes	Bermuda (United Kingdom)
Albanie	Albania	Bhoutan	Bhutan
Alemania	Germany	Bhutan	Bhutan
Algeria	Algeria	Bhután	Bhutan
Algérie	Algeria	Bolivia	Bolivia
Allemagne	Germany	Bolivie	Bolivia
American Samoa	American Samoa	Bosnia and Herzegovina	Bosnia and Herzegovina
Andorra	Andorra	Bosnia y Herzegovina	Bosnia and Herzegovina
Andorre	Andorra	Bosnie-Herzégovine	Bosnia and Herzegovina
Angola	Angola	Botswana	Botswana
Antigua and Barbuda	Antigua and Barbuda	Brasil	Brazil
Antigua-et-Barbuda	Antigua and Barbuda	Brazil	Brazil
Antigua y Barbuda	Antigua and Barbuda	Brésil	Brazil
Antillas Francesas	French Antilles (France)	Brunei Darussalam	Brunei Darussalam
Antillas Neerlandesas	Netherlands Antilles (Netherlands)	Brunéi Darussalam	Brunei Darussalam
Antilles françaises	French Antilles (France)	Bulgaria	Bulgaria
Antilles néerlandaises	Netherlands Antilles (Netherlands)	Bulgarie	Bulgaria
Arabia Saudita	Saudi Arabia	Burkina Faso	Burkina Faso
Arabie saoudite	Saudi Arabia	Burundi	Burundi
Argelia	Algeria		
Argentina	Argentina	Cabo Verde	Cape Verde
Argentine	Argentina	Cambodge	Cambodia
Armenia	Armenia	Cambodia	Cambodia
Arménie	Armenia	Camboya	Cambodia
Aruba	Aruba (Netherlands)	Cameroon	Cameroon
Australia	Australia	Cameroun	Cameroon
Australie	Australia	Camérún	Cameroon
Austria	Austria	Canada	Canada
Autriche	Austria	Canadá	Canada
Azerbaijdjan	Azerbaijan	Canary Islands	Spain
Azerbaijan	Azerbaijan	Cape Verde	Cape Verde
Azerbaiján	Azerbaijan	Cap-Vert	Cape Verde
		Cayman Islands	Cayman Is. (United Kingdom)
Bahamas	Bahamas	Central African Republic	Central African Republic
Bahrain	Bahrain	Chad	Chad
Bahreïn	Bahrain	Chile	Chile
Bahreïn	Bahrain	Chili	Chile
Bangladesh	Bangladesh	China	China
Barbade	Barbados	Chine	China
Barbados	Barbados	Chipre	Cyprus
Belarus	Belarus	Chypre	Cyprus
Bélarus	Belarus	Colombia	Colombia
Belarús	Belarus	Colombie	Colombia
Bélgica	Belgium	Comoras	Comoros
Belgique	Belgium	Comores	Comoros
Belgium	Belgium	Comoros	Comoros
Belice	Belize	Congo	Congo
Belize	Belize	Cook Islands	Cook Is.
Benin	Benin	Costa Rica	Costa Rica

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Côte d'Ivoire	Côte d'Ivoire	Géorgie	Georgia
Croacia	Croatia	Germany	Germany
Croatia	Croatia	Ghana	Ghana
Croatie	Croatia	Gibraltar	Gibraltar (United Kingdom)
Cuba	Cuba	Granada	Grenada
Cyprus	Cyprus	Grèce	Greece
Czech Republic	Czech Republic	Grecia	Greece
		Greece	Greece
Danemark	Denmark	Greenland	Denmark
Democratic People's Republic of Korea	Democratic People's Republic of Korea	Grenada	Grenada
Democratic Republic of the Congo	Democratic Republic of the Congo	Grenade	Grenada
Denmark	Denmark	Groenland	Denmark
Dinamarca	Denmark	Groenlandia	Denmark
Djibouti	Djibouti	Guatemala	Guatemala
Dominica	Dominica	Guayana Francesa	French Guiana (France)
Dominican Republic	Dominican Republic	Guinea	Guinea
Dominique	Dominica	Guinea-Bissau	Guinea-Bissau
		Guinea Ecuatorial	Equatorial Guinea
East Timor	East Timor	Guinée	Guinea
Ecuador	Ecuador	Guinée-Bissau	Guinea-Bissau
Egipto	Egypt	Guinée équatoriale	Equatorial Guinea
Egypt	Egypt	Guyana	Guyana
Égypte	Egypt	Guyane française	French Guiana (France)
El Salvador	El Salvador		
Emiratos Árabes Unidos	United Arab Emirates	Haiti	Haiti
Émirats arabes unis	United Arab Emirates	Haití	Haiti
Équateur	Ecuador	Haiti	Haiti
Equatorial Guinea	Equatorial Guinea	Holy See (the)	Holy See (the)
Eritrea	Eritrea	Honduras	Honduras
Érythée	Eritrea	Hong Kong	Hong Kong, China
Eslovaquia	Slovakia	Hongrie	Hungary
Eslovenia	Slovenia	Hungary	Hungary
Espagne	Spain	Hungría	Hungary
España	Spain		
Estados Unidos	United States	Iceland	Iceland
Estonia	Estonia	Îles Caïmanes	Cayman Is. (United Kingdom)
Estonie	Estonia	Îles Canaries	Spain
États-Unis	United States	Îles Cook	Cook Is.
Ethiopia	Ethiopia	Îles Mariannes septentrionales	Northern Mariana Is. (United States)
Éthiopie	Ethiopia	Îles Marshall	Marshall Is.
Etiópía	Ethiopia	Îles Salomon	Solomon Is.
		Îles Turques et Caïques	Turks and Caicos Is. (United Kingdom)
Federación de Rusia	Russian Federation	Îles Vierges	Virgin Is. (United Kingdom)
Fédération de Russie	Russian Federation		Virgin Is. (United States)
Fidji	Fiji	Îles Wallis	Wallis Is. (France)
Fiji	Fiji	Île Wake	Wake I. (United States)
Filipinas	Philippines	Inde	India
Finland	Finland	India	India
Finlande	Finland	Indonesia	Indonesia
Finlandia	Finland	Indonésie	Indonesia
France	France	Iran (Islamic Rep. of)	Iran (Islamic Rep. of)
Francia	France	Irán (Rep. Islámica del)	Iran (Islamic Rep. of)
French Antilles	French Antilles (France)	Iran (Rép. islamique d')	Iran (Islamic Rep. of)
French Guiana	French Guiana (France)	Iraq	Iraq
French Polynesia	French Polynesia	Ireland	Ireland
		Irlanda	Ireland
Gabon	Gabon	Irlande	Ireland
Gabón	Gabon	Islande	Iceland
Gambia	Gambia	Islandia	Iceland
Gambie	Gambia	Islas Caimanes	Cayman Is. (United Kingdom)
Georgia	Georgia	Islas Canarias	Spain

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Islas Cook	Cook Is.	Macao	Macao, China
Islas Marianas del Norte	Northern Mariana Is. (United States)	Macao	Macao, China
Islas Marshall	Marshall Is.	Madagascar	Madagascar
Islas Salomón	Solomon Is.	Malaisie	Malaysia
Islas Turcas y Caicos	Turks and Caicos Is. (United Kingdom)	Malasia	Malaysia
Islas Vírgenes	Virgin Is. (United States)	Malawi	Malawi
Islas Vírgenes Británicas	Virgin Is. (United Kingdom)	Malaysia	Malaysia
Islas Wallis	Wallis Is. (France)	Maldivas	Maldives
Isla Wake	Wake I. (United States)	Maldives	Maldives
Israel	Israel	Mali	Mali
Israël	Israel	Malí	Mali
Italia	Italy	Malta	Malta
Italie	Italy	Malte	Malta
Italy	Italy	Maroc	Morocco
Jamahiriya Árabe Libia	Libyan Arab Jamahiriya	Marruecos	Morocco
Jamahiriya arabe libyenne	Libyan Arab Jamahiriya	Marshall Islands	Marshall Is.
Jamaica	Jamaica	Maurice	Mauritius
Jamaïque	Jamaica	Mauricio	Mauritius
Japan	Japan	Mauritania	Mauritania
Japon	Japan	Mauritanie	Mauritania
Japón	Japan	Mauritius	Mauritius
Johnston	Johnston I. (United States)	Mexico	Mexico
Johnston Island	Johnston I. (United States)	México	Mexico
Jordan	Jordan	Mexique	Mexico
Jordania	Jordan	Micronesia (Estados Federados de)	Micronesia (Federated States of)
Jordanie	Jordan	Micronesia (Federated States of)	Micronesia (Federated States of)
Kazajstán	Kazakhstan	Micronésie (États fédérés de)	Micronesia (Federated States of)
Kazakhstan	Kazakhstan	Monaco	Monaco
Kenya	Kenya	Mónaco	Monaco
Kirghizistan	Kyrgyzstan	Mongolia	Mongolia
Kirguistán	Kyrgyzstan	Mongolie	Mongolia
Kiribati	Kiribati	Montserrat	Montserrat (United Kingdom)
Koweït	Kuwait	Morocco	Morocco
Kuwait	Kuwait	Mozambique	Mozambique
Kyrgyzstan	Kyrgyzstan	Myanmar	Myanmar
La ex República Yugoslava de Macedonia	The former Yugoslav Republic of Macedonia	Namibia	Namibia
Lao People's Democratic Republic	Lao People's Democratic Republic	Namibie	Namibia
Latvia	Latvia	Nauru	Nauru
Lebanon	Lebanon	Nepal	Nepal
Lesotho	Lesotho	Népal	Nepal
Letonia	Latvia	Netherlands Antilles	Netherlands Antilles (Netherlands)
Lettonie	Latvia	Netherlands	Netherlands
L'ex-République yougoslave de Macédoine	The former Yugoslav Republic of Macedonia	New Caledonia	New Caledonia (France)
Liban	Lebanon	New Zealand	New Zealand
Libano	Lebanon	Nicaragua	Nicaragua
Liberia	Liberia	Niger	Niger
Libéria	Liberia	Níger	Niger
Libyan Arab Jamahiriya	Libyan Arab Jamahiriya	Nigeria	Nigeria
Liechtenstein	Liechtenstein	Nigéria	Nigeria
Lithuania	Lithuania	Nioué	Niue I. (New Zealand)
Lituania	Lithuania	Niue	Niue I. (New Zealand)
Lituanie	Lithuania	Northern Mariana Islands	Northern Mariana Is. (United States)
Luxembourg	Luxembourg	Noruega	Norway
Luxemburgo	Luxembourg	Norvège	Norway
		Norway	Norway
		Nouvelle-Calédonie	New Caledonia (France)
		Nouvelle-Zélande	New Zealand
		Nueva Caledonia	New Caledonia (France)
		Nueva Zelandia	New Zealand
		Oman	Oman

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Omán	Oman	Reunión	Reunion (France)
Ouganda	Uganda	Romania	Romania
Ouzbékistan	Uzbekistan	Roumanie	Romania
Países Bajos	Netherlands	Royaume-Uni	United Kingdom
Pakistan	Pakistan	Rumania	Romania
Pakistán	Pakistan	Russian Federation	Russian Federation
Palaos	Palau	Rwanda	Rwanda
Palau	Palau	Sahara occidental	Western Sahara
Panama	Panama	Sahara Occidental	Western Sahara
Panamá	Panama	Sainte-Lucie	Saint Lucia
Papouasie-Nouvelle-Guinée	Papua New Guinea	Saint Kitts and Nevis	Saint Kitts and Nevis
Papua New Guinea	Papua New Guinea	Saint-Kitts-et-Nevis	Saint Kitts and Nevis
Papua Nueva Guinea	Papua New Guinea	Saint Kitts y Nevis	Saint Kitts and Nevis
Paraguay	Paraguay	Saint Lucia	Saint Lucia
Pays-Bas	Netherlands	Saint-Marin	San Marino
Pérou	Peru	Saint-Siège (le)	Holy See (the)
Peru	Peru	Saint Vincent and the Grenadines	Saint Vincent and the Grenadines
Perú	Peru	Saint-Vincent-et-les Grenadines	Saint Vincent and the Grenadines
Philippines	Philippines	Samoa	Samoa
Poland	Poland	Samoa américaines	American Samoa
Polinesia Francesa	French Polynesia	Samoa Estadounidense	American Samoa
Pologne	Poland	San Marino	San Marino
Polonia	Poland	Santa Lucía	Saint Lucia
Polynésie française	French Polynesia	Santa Sede (la)	Holy See (the)
Porto Rico	Puerto Rico (United States)	Santo Tomé y Príncipe	Sao Tome and Principe
Portugal	Portugal	San Vicente y las Granadinas	Saint Vincent and the Grenadines
Puerto Rico	Puerto Rico (United States)	Sao Tome and Principe	Sao Tome and Principe
Qatar	Qatar	Sao Tomé-et-Príncipe	Sao Tome and Principe
Reino Unido	United Kingdom	Saudi Arabia	Saudi Arabia
Republic of Korea	Republic of Korea	Senegal	Senegal
Republic of Moldova	Republic of Moldova	Sénégal	Senegal
República Árabe Siria	Syrian Arab Republic	Seychelles	Seychelles
República Centrafricana	Central African Republic	Sierra Leona	Sierra Leone
República Checa	Czech Republic	Sierra Leone	Sierra Leone
República de Corea	Republic of Korea	Singapore	Singapore
República Democrática del Congo	Democratic Republic of the Congo	Singapour	Singapore
República Democrática Popular Lao	Lao People's Democratic Republic	Singapur	Singapore
República de Moldova	Republic of Moldova	Slovakia	Slovakia
República Dominicana	Dominican Republic	Slovaquie	Slovakia
República Popular Democrática de Corea	Republic of Korea	Slovenia	Slovenia
República Unida de Tanzania	United Republic of Tanzania	Slovénie	Slovenia
République arabe syrienne	Syrian Arab Republic	Solomon Islands	Solomon Is.
République centrafricaine	Central African Republic	Somalia	Somalia
République de Corée	Republic of Korea	Somalie	Somalia
République démocratique du Congo	Democratic Republic of the Congo	Soudan	Sudan
République démocratique populaire lao	Lao People's Democratic Republic	South Africa	South Africa
République de Moldova	Republic of Moldova	Spain	Spain
République dominicaine	Dominican Republic	Sri Lanka	Sri Lanka
République populaire démocratique de Corée	Democratic People's Republic of Korea	Sudáfrica	South Africa
République tchèque	Czech Republic	Sudan	Sudan
République-Unie de Tanzanie	United Republic of Tanzania	Sudán	Sudan
Reunion	Reunion (France)	Suecia	Sweden
Réunion	Reunion (France)	Suède	Sweden
		Suisse	Switzerland
		Suiza	Switzerland
		Suriname	Suriname
		Swaziland	Swaziland
		Swazilandia	Swaziland
		Sweden	Sweden
		Switzerland	Switzerland
		Syrian Arab Republic	Syrian Arab Republic

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Tadjikistan	Tajikistan	Ucrania	Ukraine
Tailandia	Thailand	Uganda	Uganda
Tajikistan	Tajikistan	Ukraine	Ukraine
Tayikistán	Tajikistan	United Arab Emirates	United Arab Emirates
Tchad	Chad	United Kingdom	United Kingdom
Thailand	Thailand	United Republic of Tanzania	United Republic of Tanzania
Thaïlande	Thailand	United States	United States
The former Yugoslav Republic of Macedonia	The former Yugoslav Republic of Macedonia	Uruguay	Uruguay
Timor oriental	East Timor	Uzbekistan	Uzbekistan
Timor Oriental	East Timor	Uzbekistán	Uzbekistán
Togo	Togo	Vanuatu	Vanuatu
Tonga	Tonga	Venezuela	Venezuela
Trinidad and Tobago	Trinidad and Tobago	Viet Nam	Viet Nam
Trinidad y Tabago	Trinidad and Tobago	Virgin Islands	Virgin Is. (United Kingdom)
Trinité-et-Tobago	Trinidad and Tobago		Virgin Is. (United States)
Túnez	Tunisia	Wake Island	Wake I. (United States)
Tunisia	Tunisia	Wallis Islands	Wallis Is. (France)
Tunisie	Tunisia	Western Sahara	Western Sahara
Turkey	Turkey	Yemen	Yemen
Turkmenistan	Turkmenistan	Yémen	Yemen
Turkménistan	Turkmenistan	Yougoslavie	Yugoslavia
Turkmenistán	Turkmenistan	Yugoslavia	Yugoslavia
Turks and Caicos Islands	Turks and Caicos Is. (United Kingdom)	Zambia	Zambia
Turquía	Turkey	Zambie	Zambia
Turquie	Turkey	Zimbabwe	Zimbabwe
Tuvalu	Tuvalu		

## Part I

# BASIC OPERATIONAL REQUIREMENTS AND PLANNING CRITERIA (BORPC) FOR REGIONAL AIR NAVIGATION PLANNING

### INTRODUCTION

1. On 22 February 2005, the Air Navigation Commission approved this Statement of Basic Operational Requirements and Planning Criteria (BORPC) which is applicable to all the ICAO regions.

2. The Commission has considered that in planning the facilities and services related to communications, navigation and surveillance/air traffic management (CNS/ATM) systems, the Global Air Traffic Management Operational Concept, supplemented by the *Global Air Navigation Plan for CNS/ATM Systems* (Doc 9750), provides the framework to be followed. In addition, relevant recommendations, accepted by the Council, contained in the report of the Eleventh Air Navigation Conference (Montreal, 22 September to 3 October 2003) should be taken into account. The importance of planning on the basis of homogeneous areas and major traffic flows, as referred to in the Global Plan, is also stressed. As ATM requirements are developed, the BORPC will be updated to take into account the most up-to-date work on follow-up activities related to the operational concept.

3. The Commission has also considered it unnecessary to repeat in this statement any pertinent requirements already contained in the Convention, Annexes or Procedures for Air Navigation Services.

### GENERAL (APPLICABLE TO BOTH INTERNATIONAL COMMERCIAL AIR TRANSPORT AND INTERNATIONAL GENERAL AVIATION)

4. Air navigation facilities, services and procedures

recommended for the area under consideration should form an integrated system designed to meet the requirements of all international civil aircraft operations. The plan should meet the requirements of all operations planned to take place in the area during the next five years, but not necessarily limited to that period, taking due account of the long-term planning and implementation strategies regarding CNS/ATM systems. Due account should be taken of the possible effects that changes could have on adjacent regions.

5. Traffic forecasts have a special role in planning the implementation of CNS/ATM systems. The forecasts represent the demand for future ATM. Forecasts of aircraft movements within homogeneous ATM areas and along major international air traffic flows form the basis for planning of the infrastructure and arrangements which will supply the required level of air traffic services (ATS).

6. The planning should be based on historical trends or, if otherwise available, traffic forecasts, and should be used taking into account the normal ranges of operating characteristics of the aircraft. The system should be sufficiently flexible to accommodate aircraft operational characteristics outside the normal range.

7. Aircraft engaged or planned to be engaged in international operations have been grouped into the following categories:

- a) turbo-jet aeroplanes;
- b) multi-engine turboprop aeroplanes;
- c) piston-engine aeroplanes and single-engine turboprop aeroplanes with:

1) a normal cruising speed of more than 260 km/h

(140 kt) (type A); and

2) a normal cruising speed up to 260 km/h (140 kt) (type B);

d) helicopters; and

e) other aircraft (V/STOL, gliders, balloons, etc.).

*Note.— Aircraft listed in e) are to be included only to the extent that they require consideration in regional planning.*

8. The normal operating characteristics listed below for each group of aircraft should be taken into account in the development of facilities, services and procedures to the extent that relevant categories operate, or will operate, within the system.

#### 8.1 Turbo-jet aeroplanes.

a) *Climb performance:* 8 – 25 m/s (1 500 – 5 000 ft/min).

b) *Speed range in cruising flight:* 780 – 1 020 km/h (420 – 550 kt) (Mach 0.71 – 0.92).

c) *Range of desirable cruising levels:* 8 250 – 13 700 m (FL 270 – 450).

d) *Descent performance:* 10 – 25 m/s (2 000 – 5 000 ft/min).

#### 8.2 Multi-engine turboprop aeroplanes.

a) *Climb performance:* 5 – 15 m/s (1 000 – 3 000 ft/min).

b) *Speed range in cruising flight:* 460 – 650 km/h (250 – 350 kt).

c) *Range of desirable cruising levels:* 5 200 – 8 250 m (FL 170 – 270).

d) *Descent performance:* 8 – 15 m/s (1 500 – 3 000 ft/min).

#### 8.3 Piston-engine aeroplanes and single-engine turboprop aeroplanes.

a) *Climb performance:*

1) Type A: 2 – 10 m/s (500 – 2 000 ft/min);

2) Type B: 2 – 5 m/s (500 – 1 000 ft/min).

b) *Speed range in cruising flight:*

1) Type A: 260 – 460 km/h (141 – 250 kt);

2) Type B: 110 – 260 km/h (60 – 140 kt).

c) *Range of desirable cruising levels:*

1) Type A: up to 6 100 m (FL 200);

2) Type B: up to 3 050 m (FL 100).

d) *Descent performance:*

1) Type A: 5 – 10 m/s (1 000 – 2 000 ft/min);

2) Type B: 2 – 5 m/s (500 – 1 000 ft/min).

#### 8.4 Helicopters.

a) *Climb performance:* up to 8 m/s (1 500 ft/min).

b) *Speed range in cruising flight:* up to 370 km/h (200 kt).

c) *Range of desirable cruising levels:* up to 3 050 m (FL 100).

d) *Descent performance:* up to 8 m/s (1 500 ft/min).

*Note 1.— Further to 6 above, it is emphasized that the values given in 8 represent average values covering the majority of aircraft types in each category. Also, depending on circumstances (e.g. load, stage length of a flight), considerable deviations from them may occur for specific flights.*

*Note 2.— Performance of military aircraft not covered by the above values may be considerably in excess of those quoted. It is, however, assumed that in such cases national arrangements will be made to cater for these aircraft.*

9. Planning should not include an aerodrome or other facility or service used only by operators of the State in which the aerodrome or other facility or service is located unless such planning is required to protect the integrity of the plan.

10. Planning for facilities and services, in addition to meeting the operational requirements, should take into account the need for:

a) efficiency in operation; and

b) economy in equipment and personnel,

with due consideration being given to capability for future expansion without major redesign or replanning.

11. Planning should take into account the need for an adequate number of technically qualified personnel to be employed in the system to supervise, maintain and operate air navigation facilities and services and should result in recommendations, as necessary, to meet such a need. Human resource development capabilities should be compatible with the plans to implement facilities and services. A systematic and quantitative approach towards analysing human resource needs should be used to ensure that the consequential training capabilities are available and accessible.

12. The facilities, services and procedures recommended for implementation should not result in imposing on flight crew or ground personnel, employed in the system developed in accordance with the plan, a workload level that would impair safety or efficiency. The integration of human factors knowledge into the design and certification of facilities, services and procedures is therefore essential. In order to achieve a workload level that would not impair safety and efficiency, as well as to introduce the capability for future expansion without major redesign or replanning, human factors issues should be considered during the process of design and certification of facilities, services and procedures, before they are operationally deployed.

13. Special operational features of the area under consideration, such as those which may have been associated with causal factors noted in aircraft accident investigation and incident reports, should be taken into account, particularly if there are indications, such as those given in the “recommendations” of aircraft accident investigation and incident reports, that special measures are called for to prevent recurrence of accidents and incidents from the same cause or causes.

14. Planning for facilities and services should normally provide for their availability on a 24-hour basis. In cases where part-time availability is deemed adequate to meet the operational requirements, a brief description of the circumstances should be given in the plan. Lighting aids should be planned when use of the aerodromes at night or during low visibility conditions is expected.

15. It is essential that the overall plan:

a) satisfy the requirements of all aircraft, including

domestic and military traffic to the extent that it may affect international traffic;

- b) ensure compatibility of facilities, services and procedures with those recommended for operations in adjacent areas;
- c) ensure that operators have access to information necessary to exercise effective operational control;
- d) provide for speedy exchanges of necessary information between the various units providing air navigation services and between such units and operators; and
- e) take account of aircraft performance and navigational capability in specifying requirements for the carriage of airborne equipment, as well as having due regard for the operational environment.

16. In the development of the plan, full cognizance should be taken of the cost-effectiveness of the recommended facilities, services and procedures. Planning should be directed towards facilitating implementation of essential improvements required for existing and anticipated operations in the region. The objective should be to expedite the eradication of current deficiencies in the air navigation facilities and services. Project management techniques should be employed for the implementation of CNS facilities and services to facilitate the phased introduction of ATM system enhancements.

## **AERODROMES**

### **International commercial air transport operations**

17. Regular aerodromes and their alternates should be determined based on the needs identified by users. When studying the requirements for alternate aerodromes, the guiding principle should be that, to the greatest practicable extent, the requirements for alternate aerodromes be satisfied by regular aerodromes used for international aircraft operations. Additionally, the requirements of extended-range twin-engine operations for en-route alternate aerodromes should also be considered.

18. Physical characteristics, visual aids and emergency as well as other services should be determined for each regular and alternate aerodrome required for international operations and should include runway length and strength, as well as the aerodrome reference code(s) selected for

runway and taxiway planning purposes.

19. Where at an aerodrome, planning for Category II or III operations, as the case may be, is not a requirement during the plan period but such operations are contemplated at a time beyond the plan period, planning should take into account the possible requirement for Category II or III operations so that at least one runway and the related ground-air environment may be provided in the future to accommodate such operations.

20. In cases where the extension or development of an aerodrome to meet infrequent critical operations would entail disproportionate expenditures, alternative solutions should be explored.

*Note.— If it is found that the full operational requirements cannot be met at an aerodrome, then the maximum practicable development to facilitate operations should be recommended and the relevant reasons for this included in the report.*

21. At alternate aerodromes, the physical characteristics should be determined in accordance with the landing requirements of the diverted critical aircraft and the take-off requirements for the aircraft for a flight to the aerodrome of intended destination. To ensure safe taxiing operations, a specified taxiway route should be determined for the diverted critical aircraft. The adequacy of the emergency response and rescue and firefighting services to meet the requirements of the diverted critical aircraft should be reviewed to plan the necessary augmentation from sources nearby.

*Note.— Where more than one alternate aerodrome is available, the requirements should be based on the types of aircraft each is intended to serve.*

#### **International general aviation (IGA)**

22. Aerodromes, in addition to those required for international commercial air transport operations, should be determined to meet the needs of the IGA flights as identified by user requirements.

23. Physical characteristics, visual aids and emergency as well as other services should be determined for each aerodrome to meet at least the needs of the most commonly used aircraft operated or intended to be operated at the aerodrome by IGA and should include runway length and strength, as well as the aerodrome reference code(s) selected for runway and taxiway planning purposes.

#### **Certification of aerodromes and safety management system**

24. Annex 14—*Aerodromes*, Volume I—*Aerodrome Design and Operations*, requires States to certify their aerodromes used for international operations in accordance with the specifications in that Annex, as well as other relevant ICAO specifications, through an appropriate regulatory framework. Additionally, the Annex recommends that States certify aerodromes open to public use. The regulatory framework should include the establishment of criteria for certification of aerodromes. Furthermore, the certification should be based on the review and approval/acceptance of an aerodrome manual to be submitted by the aerodrome operator which would include all relevant information such as location, facilities, services, equipment, operating procedures, organization and management structure of the operator. The aerodrome manual should also include details of the aerodrome safety management system as implemented by the aerodrome operator. The intent of a safety management system is to ensure the implementation of aerodrome safety policies by an aerodrome operator, which provide for the control of safety at, and the safe use of, the aerodrome. Therefore, the safety management system of the aerodrome operator should be compatible with those of the ATS provider and other agencies working on the aerodrome to ensure total system safety.

25. The existence of basic aviation law that empowers a suitable aviation civil regulatory agency is a primary requirement. Such an entity may be the civil aviation authority or the directorate-general of civil aviation, adequately staffed to assess an application for granting of the aerodrome certificate, inspecting and evaluating the aerodrome facilities and services and operating procedures, and coordinating with other appropriate agencies such as the aviation security agency, ATS provider, aeronautical information services (AIS) and meteorological (MET) services as detailed in the aerodrome manual submitted with the application.

*Note.— Further guidance on certification of aerodromes can be found in the Manual on Certification of Aerodromes (Doc 9774).*

#### **AIR TRAFFIC MANAGEMENT**

26. Air traffic management should enable aircraft operators to meet their planned times of departure and

arrival and adhere to their preferred flight profiles with minimum constraints without compromising agreed levels of safety. The ATS to be provided, the airspace organization, the associated facilities, and the required navigation performance (RNP) should be determined on the basis of an agreed network of ATS routes or organized track system taking account of the type, density and complexity of traffic.

### **Airspace management**

27. The airspace structure and organization should include a network of ATS routes or organized track system established so as to enable aircraft to operate along, or as near as practicable to, the preferred flight path, in both the horizontal and vertical planes, from the departure aerodrome to the destination aerodrome. ATS routes based on area navigation (RNAV) should be recommended where appropriate and feasible. ATS routes shall be great circles between significant points, wherever possible. Standard instrument arrival routes (STARs) should be established when the density of air traffic justifies their application in a terminal control area (TMA) and to facilitate the description of the route and procedure in air traffic control (ATC) clearances. Standard instrument departure routes (SIDs) should be established for each instrument runway.

28. Whenever the circumstances warrant, the airspace organization should be designed to support the ultimate goal of allowing each aircraft to fly its own optimized flight path. To achieve this, procedures that support collaborative decision-making should be developed.

29. The airspace organization should be indicated in accordance with the ICAO airspace classification.

30. Airspace restrictions should be subject to a continuing review procedure with the object of eliminating them or reducing their restrictive effects to a minimum, with particular emphasis on the need to achieve effective civil/military coordination. Permanent segregation of airspace should be avoided. Temporary airspace reservations, where necessary to cater for large formation flights or other military air operations, should be minimized in time and space, closely coordinated, and promulgated in a timely manner. Military operations should not only be promulgated in a timely manner but also through international dissemination (international NOTAM).

### **Air traffic services**

31. Flight information service and alerting service

should be provided throughout the area under consideration. The plan of flight information regions (FIRs) should provide for the least number of FIRs compatible with efficiency of service and with economy. In this connection, the evolutionary introduction of CNS/ATM systems should be taken into account and consideration should be given to cooperative efforts for introducing more efficiency in airspace management by reducing the number of FIRs. In delineating FIR boundaries, due consideration should be given to:

- a) the need for adequate air-ground communications coverage from the location of the flight information centre/area control centre (FIC/ACC);
- b) the need to minimize frequency and secondary surveillance radar (SSR) code changes, position reporting by aircraft, and coordination between FICs/ACCs; and
- c) the need to minimize problems relating to climbing and descending traffic at major aerodromes located in the vicinity of FIR boundaries.

32. Area control service should be provided for instrument flight rules (IFR) flights operating in controlled airspace except where the type and density of traffic clearly do not justify the provision of such service. Controlled airspace, in the form of airways, control areas of larger dimensions and TMAs, should be recommended to encompass all relevant ATS routes. In delineating control area boundaries, due account should be taken of the factors listed in 31 above.

33. Approach control service should be provided at all aerodromes used for international aircraft operations and equipped with navigation aids for instrument approach and landing, except where the type and density of traffic clearly do not justify the provision of such service. Controlled airspace, in the form of TMAs and control zones, should be recommended to encompass at least the climb to cruising level of departing aircraft and the descent from cruising level of arriving aircraft.

34. Aerodrome control service should be provided at all regular and alternate aerodromes to be used for international commercial air transport operations. Aerodrome control service should also be provided at those additional aerodromes used by IGA aircraft where the type and density of traffic warrant it. At aerodromes used by IGA aircraft, where the type and density of traffic clearly do not justify the provision of aerodrome control service, the provision of aerodrome flight information service by a unit

located at the aerodrome should be recommended.

35. Air traffic advisory service should not be recommended as part of the plan. Where provided (to IFR flights in advisory airspace or on advisory routes), its replacement by ATC service at the earliest possible time should be recommended.

36. The ATS system and procedures should:

- a) permit the most efficient use to be made of the airspace by all users and provide for the most expeditious handling of the various types of traffic;
- b) be so designed that the number of air-ground communications contacts, frequency changes and SSR code changes required of aircraft, and the amount of coordination required between ATS units, are kept to a minimum;
- c) ensure the prompt and timely transmission to all aircraft concerned of information on hazardous meteorological conditions, operational flight information and other available information affecting the safety and efficiency of flight;
- d) require the use of uniform altimeter setting procedures throughout the area under consideration when operating below the established transition level or climbing up to the established transition altitude; and
- e) establish a common transition altitude on an area basis and, where possible, on a regional basis.

37. Information on destination meteorological conditions, the integrated operational status of facilities associated with the runway in use, and the runway conditions should be provided to aircraft (in voice or data format) by the transmission of operational flight information service (OFIS) messages, including VOLMET, or by the appropriate FIC/ACC upon request, prior to commencement of descent. Where this information is transmitted in voice format, a discrete frequency should be assigned for this purpose. Air-ground data links are particularly efficient for this type of service, as well as for clearance delivery, and should be recommended when a sufficient number of aircraft are appropriately equipped.

38. Contingency plans should be developed to mitigate the effects of volcanic eruptions or tropical cyclones as required. In addition, contingency plans should be developed to mitigate disruptions in ATS due to any other cause.

39. To assist in the prevention of controlled flight into terrain (CFIT), efforts should be made to implement a minimum safe altitude warning system or equivalent.

40. To assist in the prevention of CFIT, every effort should be made, in cooperation with the operators, to identify locations at which unwanted ground proximity warning system (GPWS) warnings occur. These warnings can occur due to conflict between ATS procedures, or operator procedures, and the characteristics of the terrain and/or those of the GPWS equipment in use. Effort should further be made, with cooperation between the ATS authority and the operators, to eliminate the occurrence of unwanted GPWS warnings by appropriate adjustment of ATS and/or operator procedures.

*Note.— Where adjustment of procedures is not possible, or is not effective, it may be possible to eliminate unwanted warnings, at a specific location, by GPWS envelope modulation. This possibility will be based on technical data of the equipment manufacturer and will be proposed by the operator for acceptance by the operator's authority.*

#### **Air traffic flow management and capacity management**

41. Air traffic flow management and capacity management should be provided to ensure an optimum flow of air traffic to, from, through or within defined areas during times when demand exceeds, or is expected to exceed, the available capacity of the ATS system, including relevant aerodromes. However, this should not preclude the need for planning airspace to adequately meet demand.

#### **Safety management**

42. The Standards and Recommended Practices relating to the implementation by States of safety management programmes for ATS are contained in Annex 11 — *Air Traffic Services*, 2.26. Further provisions relating to the implementation of these safety management programmes are contained in Chapter 2 of the *Procedures for Air Navigation Services — Air Traffic Management* (PANS-ATM, Doc 4444).

43. Annex 11, 2.26, requires States to implement systematic and appropriate safety management programmes in relation to the provision of ATS. It will therefore be necessary for all States to establish regulatory provisions concerning ATS safety management, together with the

necessary supporting infrastructure to enable them to discharge their responsibilities in relation to oversight of these provisions. There are two prerequisites for the introduction of a regulatory system. These are:

- a) the provision, in the basic aviation law of the State, for a code of air navigation regulations and the promulgation thereof; and
- b) the establishment of an appropriate State body, herein-after referred to as the civil aviation authority (CAA), with the necessary powers to ensure compliance with the regulations.

### SEARCH AND RESCUE

44. Planning for search and rescue (SAR) service should take into account, to the maximum practicable extent, existing facilities, even if they are provided for purposes not connected with SAR. Such planning should take into account the delimitation of maritime search and rescue regions (SRRs).

45. A single SAR point of contact (SPOC) should be designated for each SRR to facilitate cooperation with the associated mission control centre of the COSPAS-SARSAT\* system.

*Note.— A SPOC may be an aeronautical or a maritime rescue coordination centre.*

46. Where aircraft of the long-range and longer-range categories are required for the provision of air coverage of large oceanic SRRs, but such aircraft cannot be made available by the State responsible for SAR services, specific cooperative arrangements should be made for the deployment of such aircraft from other locations in an attempt to meet the requirements for sufficient air coverage of the appropriate regions.

47. SAR organization, plans, procedures, operations and equipment should be in accordance with the provisions of Volumes I, II and III of the *International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual* (Doc 9731), to the extent practicable.

### COMMUNICATIONS

#### Aeronautical fixed service (AFS)

#### planning and engineering

48. The AFS recommended should be designed to meet the agreed requirements for AIS, ATS, MET, SAR and aircraft operating agencies for voice, message and data communications.

\* COSPAS ! Space system for search for vessels in distress  
SARSAT ! Search and rescue satellite-aided tracking

49. The planning of the aeronautical fixed telecommunication network (AFTN) should be based on the guidance material contained in the *Manual on the Planning and Engineering of the Aeronautical Fixed Telecommunication Network* (Doc 8259) and taking into account the predominating characteristics for conditions in the region or area concerned.

50. The AFS should be designed so as to meet transit time criteria as follows:

In the peak season of the year, even in the average peak hours, at least 95 per cent of the messages should achieve transit times of less than the following:

SIGMET and AIRMET messages, volcanic ash and tropical cyclone advisory information and special air-reports	5 minutes
Amended aerodrome forecasts (in meteorological code (TAF))	5 minutes
METAR/SPECI, trend forecasts and TAF	
from 0 to 900 km (500 NM)	5 minutes
for distances exceeding 900 km (500 NM)	10 minutes

Transit times for request/reply for international operational meteorological (OPMET) data banks should be less than 5 minutes.

51. TAF bulletins originated by meteorological offices in the region should be available, at all locations in the region to which they are addressed, at least 30 minutes before their period of validity commences.

52. The dissemination means for world area forecast system (WAFS) products should be such as to guarantee availability of these products throughout the region at international aerodromes and other locations as appropriate to meet operational needs.

53. Planning of ATS ground-to-ground communication networks comprising direct and switched ATS speech circuits should take account of operational voice communication requirements. It should also take into account relevant ICAO documentation with regard to the application of analogue and digital voice switching and signalling systems.

54. With the introduction of automation in ATM, many coordination functions will be accomplished through data interchange between ATM systems using aeronautical telecommunication network (ATN) applications such as ATS interfacility data communication (AIDC) or ATS message handling services (ATSMHS). As such, the planning for ATN should include the provision of suitable gateways to facilitate the exchange of information between existing and newly established networks.

55. For planning of AFS, attention should be paid to the establishment of institutional arrangements for the implementation by States of coordinated digital networks, using appropriate technology to meet, in an integrated way, current and future communications requirements.

#### **Aeronautical mobile service (AMS) and aeronautical mobile satellite service (AMSS)**

56. Air-ground data link and voice communications facilities should be recommended to meet effectively and reliably the agreed requirements for ATS as well as, to the extent required, all other classes of traffic acceptable on the AMS. The facilities should employ voice and data communications links based on available transmission media (e.g. HF, VHF, satellite). This decision should be based on system performance and economical criteria to comply with operational needs.

57. Regional planning should take into account AMSS ground earth station (GES) redundancy requirements in coordination with the AMSS service provider(s) with a view to avoiding an unnecessary proliferation of facilities.

58. Automatic terminal information service and VOLMET or OFIS broadcasts should be recommended only if overloading of air-ground channels due to request/reply communications has occurred, or is expected to occur. When justified by the number of aircraft suitably equipped, data links should be recommended for these functions, as well as for certain clearance deliveries.

59. Aerodromes having a significant volume of IGA traffic should be served by stations of the AMS, and such

stations should operate on frequencies within the bands normally used by aircraft constituting this traffic.

60. Selective calling (SELCAL) devices should be employed, wherever possible and necessary, at aeronautical stations.

61. An air-to-air VHF communication channel (INTERPILOT) on the frequency 123.450 MHz should be used over remote and oceanic areas, provided users are out of range of VHF ground stations, to enable pilots to exchange the necessary operational information.

#### **Frequency assignment plans**

62. Frequency assignment planning should be done in accordance with the method applicable to the region and using the relevant ICAO Regional Office Frequency Lists.

## **NAVIGATION**

### **General**

63. The planning of navigation aids should be on a system basis, recognizing that the requirements for both long-range and short-range navigation may be met by different navigation systems having RNAV capability, including the global navigation satellite system (GNSS). It may be practicable to establish ATS routes not provided with ground station-referenced aids for suitably equipped aircraft. For routes or areas which require that aircraft achieve an acceptable level of navigation accuracy, the requirement should be specified, e.g. in the form of a required navigation performance (RNP) type to support a selected horizontal separation minimum, or a minimum aircraft system performance specification to support a selected vertical separation minimum. The navigation systems should meet the needs of all aircraft using it and form an adequate basis for the provision of ATS.

64. Where aircraft are using different systems for navigation and position determination within the same controlled airspace, the facilities involved should, in so far as practicable, be located and oriented to enable a fully integrated ATC structure to be established.

65. Planning should take into account the need of civil aircraft for sufficiently accurate navigation guidance to

remain clear of restricted, prohibited and danger areas as required.

### **International commercial air transport operations**

#### ***En-route aids***

66. The en-route aids to be recommended should provide navigation assistance to permit en-route navigation on the agreed ATS route network with the accuracy required.

67. It is expected that GNSS will ultimately meet all requirements for en-route navigation. Planning for other en-route aids should take due account of the need for a gradual transition towards the use of GNSS in lieu of en-route ground-based navigation aids. Pending implementation of GNSS, VHF omnidirectional radio range (VOR) supplemented as necessary by distance measuring equipment (DME) should be installed as the primary aid for this purpose.

68. Where VOR is used, supplemented as necessary by DME, a total navigation error value for VOR of  $\pm 5^\circ$  (95 per cent probability) should be assumed for planning purposes. However, the specific value of VOR radial signal error for individual facilities/radials should be obtained by flight checking, and if these values are worse than  $\pm 3^\circ$ , appropriate precautions should be taken in respect of the routes concerned.

69. Long-distance radio navigation aids should continue to be provided where required.

#### ***Terminal area aids***

70. The terminal area aids should permit navigation for arrival and approach, holding and departure to be carried out with the accuracy required.

71. It is expected that GNSS will ultimately meet all requirements for terminal navigation. Planning for other terminal aids should take due account of the need for a gradual transition towards the use of GNSS in lieu of terminal area ground-based navigation aids. Introduction of GNSS-based navigation services, such as Basic GNSS and satellite-based augmentation system (SBAS), should be considered as initial transition steps.

72. Where VOR is used as the primary aid, it should be so located as to permit the most efficient approach and ATC procedures, and to give the pilot maximum assistance in adhering to requisite patterns. Whenever possible, VORs should be located and operated so that they can serve both the requirements for en-route and terminal navigation guidance, including holding. Where the provision of VORs for holding is not practicable, non-directional beacons (NDBs) can be used for this purpose.

73. Consideration should be given to the provision of DME to be collocated with VORs whenever this is required to ensure necessary ATC flexibility in the routing of air traffic in a given TMA using RNAV procedures based on VOR/DME and when improved accuracy in navigation is a prerequisite to such flexibility.

74. Consideration should also be given to the provision of suitably located DMEs in support of RNAV procedures based on DME/DME.

#### ***Non-visual aids to final approach and landing***

75. The standard non-visual aids to final approach and landing (ILS, MLS and augmented GNSS), supporting precision approach and landing operations, shall comply with general provisions in Annex 10 — *Aeronautical Telecommunications, Volume I — Radio Navigation Aids*, 2.1, and technical specifications in Chapter 3, and their introduction and application are expected to be in line with the strategy contained in Attachment B to Volume I.

76. In planning the requirements for aids to final approach and landing, each aerodrome should be considered in relation to its traffic, its meteorological conditions and other aspects of its physical environment. In addition, the following two aspects should be taken into consideration in the determination of specific requirements:

- a) *The aerodynamic and handling characteristics of the aircraft.* Turbo-jet aeroplanes need precise approach path guidance during approach and landing, irrespective of weather conditions. Such guidance should be provided to runways intended to serve these aeroplanes as follows:
  - 1) On a runway having significant traffic, the facilities to be provided should be an ICAO standard non-visual aid to final approach and landing, complemented by a visual approach slope indicator system. When a standard non-visual aid cannot be implemented in the first instance, this should not

delay the installation of a visual approach slope indicator system.

- 2) On a runway not having significant traffic, the facilities to be provided should at least include a visual approach slope indicator system.
- b) *Routine auto-coupled approaches.* Where auto-coupled approaches are to be made on a routine basis, an ICAO standard non-visual aid to final approach and landing, i.e. ILS, MLS or GNSS (GBAS), should be provided as appropriate to the type of operation planned at the aerodrome. In the case of an ILS of facility performance Category I, the ILS should be of Category II signal quality, without necessarily meeting the associated reliability and availability criteria for back-up equipment and automatic changeover of facility performance Category II. It should be adjusted and maintained to the greatest possible extent and accuracy, and its performance characteristics should be published in Aeronautical Information Publications or other suitable documents.

#### ***Precision approach and landing procedures***

77. Precision approach and landing operations are to be based on standard non-visual aids indicated in 75 above.

#### ***Approach with vertical guidance***

78. Consideration should be given to approach with vertical guidance.

#### ***Non-precision instrument approach procedures***

79. Non-precision instrument approach procedures are to be based on terminal area aids (see 70 to 74 above) which should also support SIDs and STARs. These approach procedures should be constructed whenever possible in accordance with the concept of the stabilized approach; to provide an equivalent three degree final approach glide path; to eliminate stepped approaches; and to provide a final approach fix.

80. Particular account should be taken of 79 in the design of non-precision instrument approach procedures for use with GNSS which should also support SIDs and STARs.

#### ***RNAV procedures***

81. RNAV procedures can be based on terminal area aids (e.g. VOR/DME, DME/DME) or GNSS (e.g. Basic GNSS, SBAS or GBAS positioning services).

#### **International general aviation**

##### ***Short-distance aids***

82. Appropriate aids such as GNSS for short-distance navigation should be provided to serve the additional aerodromes referred to in 22 where the density of traffic and the meteorological conditions so warrant, with due account being taken of the airborne equipment carried by aircraft. These aids should, as appropriate, be located so as to permit instrument approaches.

##### **Flight testing of visual and non-visual navigation aids**

83. Cooperative arrangements for the flight testing of visual and non-visual navigation aids (Annex 10, Volume I, 2.7) should be recommended where flight testing on a national basis would be impracticable or uneconomical.

#### **SURVEILLANCE**

84. Surveillance systems should provide adequate support to all phases of flight and meet ATM requirements. A table of surveillance facilities/services (including radars, automatic dependent surveillance (ADS) and automatic dependent surveillance-broadcast (ADS-B)), together with an associated chart, is considered to be a useful tool in the planning and implementation of surveillance systems.

85. Surveillance should be provided as an integral part of ATC where practicable and desirable or necessary in the interest of safety, efficiency and economy of operations, in particular for those areas where traffic density and/or the multiplicity or complexity of ATS routes create constraints. Primary and/or secondary surveillance radar systems may be used to fulfil this requirement. Subject to availability and cost-effectiveness, and provided that the required level of safety is maintained, ADS and ADS-B may be used in airspace where surveillance by radar is impracticable or cannot be justified.

86. Provision should also be made for the use of surveillance systems for the purpose of monitoring air traffic and identifying civil aircraft in areas where they might otherwise be intercepted.

*Note.— This requirement does not constitute a justification or operational requirement for installation of new radars. Since interceptions would normally only take place under existing military radar control, this should be interpreted as a requirement for a State to make better use of existing measures and to improve civil/military coordination.*

## METEOROLOGY

### World area forecast system (WAFS) — regional aspects

87. Planning for regional aspects of the WAFS should be undertaken, with particular reference to user States' requirements for WAFS products, service areas and areas of coverage of charts to be included in flight documentation. Areas of coverage of charts to be provided under the WAFS should be selected so as to ensure the required coverage for flights departing aerodromes.

88. Requirements for the issuance of medium-level significant weather (SIGWX) forecasts (FL 100–250) under the WAFS should only be specified for limited geographical areas having a large number of international flight operations using those flight levels and for extended-range operations.

### Meteorological services at aerodromes

89. The meteorological service to be provided for operators and flight crews should be specified for each international aerodrome.

### Aerodrome forecasts

90. TAF and amendments thereto should be exchanged to meet the needs of current flight operations, including IGA. TAF for the aerodromes of departure and destination and their respective alternates, and en-route alternates, should be disseminated so as to be available at departure aerodromes and at ATS units designated to provide data link-VOLMET or VOLMET broadcasts for aircraft in flight. In addition,

they should be disseminated to be available at ATS units for transmission to aircraft in flight up to a distance from the aircraft corresponding to two hours' flying time.

91. The determination of the aerodromes at which landing forecasts are required should take into consideration relevant operational and climatological factors, including the weekly number of flights requiring those forecasts and the incidence of adverse meteorological conditions.

### Meteorological observations and reports

92. Meteorological observations and reports should be made at hourly intervals. However, the intervals should be half-hourly at aerodromes where the volume of traffic and the variability of meteorological conditions so justify, and/or reports are required for data link-VOLMET or VOLMET broadcasts, and relevant OPMET bulletin exchange schemes.

93. METAR and SPECI should be exchanged to meet the needs of current flight operations. METAR and SPECI for the aerodromes of departure and destination and their respective alternates, and en-route alternates, should be disseminated so as to be available at departure aerodromes and at ATS units designated to provide data link-VOLMET or VOLMET broadcasts for aircraft in flight. In addition, they should be disseminated to be available at ATS units for transmission to aircraft in flight up to a distance from the aircraft corresponding to two hours' flying time.

### Aircraft reports and SIGMET and AIRMET information

94. For international air routes having a high density of air traffic, air-reporting exemption or designation procedures should be developed to reduce the frequency of routine air-reports commensurate with the minimum requirements of meteorological offices. The procedures should be included in the *Regional Supplementary Procedures* (Doc 7030).

95. SIGMET and AIRMET messages, as well as special air-reports which have not been used for the preparation of a SIGMET, should be disseminated to meteorological offices so as to be available at departure aerodromes for the whole route and at ATS units designated to provide data link-VOLMET or VOLMET broadcasts for aircraft in flight. In addition, they should be disseminated to be available at ATS units for transmission to aircraft in flight for the route ahead up to a distance corresponding to two

hours' flying time.

#### **International airways volcano watch (IAVW) — regional aspects**

96. Planning for regional aspects of the IAVW should be undertaken, including the designation of volcanic ash advisory centres (VAACs) and selected State volcano observatories.

#### **Tropical cyclone watch — regional aspects**

97. Planning for regional aspects of the tropical cyclone watch should be undertaken for regions affected by tropical cyclones, including the designation of tropical cyclone advisory centres (TCACs) among the centres of the WMO Tropical Cyclone Programme.

### **AERONAUTICAL INFORMATION SERVICES AND AERONAUTICAL CHARTS**

98. The designation of international NOTAM offices and their areas of responsibility should be based on maximum efficiency in the dissemination and exchange of aeronautical information/data by telecommunications and on optimum use of the AFS.

99. Arrangements for the international exchange of elements of the Integrated Aeronautical Information Package and aeronautical charts should be established to meet the needs of all forms of international civil aviation.

100. Arrangements for the transmission and exchange of NOTAM should be planned with a view to recommending measures to ensure that adequate information is available to users in a timely manner, and that their presentation is efficient as to format and selective as to contents.

101. The advantages of using integrated automated AIS systems should be considered when planning the exchange of aeronautical information/data.

102. Priority for the planning and implementation of aerodrome AIS units should be based on aerodrome designation (RS, RNS, RG, AS and EAS) as set out in the Appendix to Part III — AOP.

103. Pre-flight information bulletins (PIBs) should be

made available at designated international aerodromes at least one hour before each flight in order to meet the operational requirements of users.

104. Planning and arrangements should be made for the introduction by States of a quality management system for aeronautical information and chart services. The system must include procedures, processes and resources necessary to ensure that the procedures are put in place for all the functional stages of the aeronautical data process, from origination until the next intended user.

105. Aeronautical geographical coordinates should be stated in terms of the World Geodetic System — 1984 (WGS-84).

106. Arrangements should be made for those States that have not yet done so, to make available, as applicable, at least the following types of charts:

- a) Aerodrome Obstacle Chart — ICAO Type A;
- b) Aerodrome Obstacle Chart — ICAO Type C;
- c) Precision Approach Terrain Chart — ICAO;
- d) Enroute Chart — ICAO ;
- e) Area Chart — ICAO;
- f) Standard Departure Chart — Instrument (SID) — ICAO;
- g) Standard Arrival Chart — Instrument (STAR) — ICAO;
- h) Aerodrome/Heliport Chart — ICAO;
- i) Instrument Approach Chart — ICAO;
- j) Visual Approach Chart; and
- k) World Aeronautical Chart — ICAO 1:1 000 000.

107. States which have not yet produced the World Aeronautical Chart — ICAO 1:1 000 000 should in accordance with established sheet distribution and regional arrangements, take measures to ensure the preparation of the sheets for which they are responsible, either through individual effort or with the collaboration of other States or specialized cartographic agencies.

*Note.— When operational or chart production considerations indicate that operational requirements can effectively*

*be satisfied by Aeronautical Chart — ICAO 1:500 000, the chart may be made available instead of World Aeronautical*

*Chart — ICAO 1: 1 000 000.*

## Part II

### GENERAL PLANNING ASPECTS (GEN)

#### INTRODUCTION

1. As traffic volumes grow worldwide, the demands on the ATS provider in a given airspace increase, as do the complexities of air traffic management. The number of flights unable to follow optimum flight paths also increases with an increase in traffic density. This creates pressure to upgrade the level of ATS by, inter alia, reducing separation standards.

#### Air traffic forecasts

2. Air traffic forecasts are produced in response to the needs of Member States of ICAO, air navigation service providers and regional planning groups, in particular the ICAO Caribbean and South American Regional Planning and Implementation Group (GREPECAS).

3. A uniform strategy has been adopted by ICAO for the purpose of preparing traffic forecasts in support of the regional planning process. This involves the establishment of a small group of forecasting and planning experts in each of the ICAO regions. The ICAO CAR/SAM Traffic Forecasting Task Force was formed in 1996 with the objective of developing traffic forecasts and other planning parameters required for the planning of Air Navigation Services in the CAR/SAM region.

4. The main purpose of the CAR/SAM-TFG is to support the planning of air navigation services in the CAR/SAM region. Traffic forecasts and peak-period planning parameters are important in anticipating where and when airspace and airport congestion occur. It is then possible to plan for the required expansion of capacity. These forecasts also have an important role in planning the implementation of CNS/ATM systems components. The primary users of the forecasts developed by the CAR/SAM-TFG are expected to be member states of ICAO, ATS service providers in the region, and GREPECAS, the ICAO

planning and implementation group for CAR/SAM regions.

5. Implementation of CNS/ATM systems are expected to be able to provide sufficient capacity to meet the increasing demand, while producing additional benefits in the way of more efficient flight profiles and increased levels of safety. The potential of new technologies to significantly reduce service costs, however, will require new arrangements in the provision of services and changes in air traffic management procedures.

6. Chapter 3 of the Global Plan provides the means to begin the process of identification of ATM requirements, on the basis of identified homogeneous ATM areas and major international traffic flows, followed by the determination of the regional and global CNS system elements needed to meet the ATM requirements.

#### Regional Implementation Concept

7. The Regional Implementation Concept defined by GREPECAS is linked to ATM improvement for the CAR/SAM regions and the communication, navigation and surveillance requirements this generates. The ATM improvements have been defined on the basis of the major international traffic flows identified in the homogenous areas as set out in the tables of Part V of the FASID.

8. The method of identifying homogeneous ATM areas involves consideration of the varying degrees of complexity and diversity of the worldwide air navigation infrastructure. Based on these considerations, it is considered that planning could best be achieved, at the global level, if it were organized based on ATM areas of common requirements and interest, taking into account traffic density and level of sophistication required.

9. Major international traffic flows consist of areas which include groupings of routes wherein it is specified a

detailed plan for the implementation of CNS/ATM systems and procedures, where the objective is to attain a seamless system throughout the area concerned. These are defined by origin and destination geographic areas which could be States/Territories, specific portions of States/Territories, or groupings of smaller States/Territories. They may also include oceanic and continental en-route areas.

10. The basic planning parameter is the number of aircraft movements which must be provided with ATM services along a particular international flow. Estimates and forecasts of annual aircraft movements over the planning period are required for high level planning. Forecasts of aircraft movements in peak periods, such as during a particularly busy hour, are needed for detailed planning. Additionally, the establishment of major international traffic flows will require appropriate civil/military coordination and consideration of special use airspace (SUA).

11. Considering the global guidelines described in the preceding paragraphs, the CAR/SAM regions should take into account the need to coordinate their regional plan with the adjacent regions, specially with the NAM region, since air traffic density between this region and the CAR/SAM regions is quite high. Coordination of the regional CAR/SAM planning for the CNS/ATM transition with the indicated regions will be necessary. Finally, in the long term there would be a continuing need for coordination after the completion of the Global Transition Plan.

### **States/Territories Plans**

12. States/Territories have the responsibility for implementation of the new CNS/ATM system within their areas of responsibility. It will however be necessary for each State within the CAR/SAM region to develop and publish its own CNS/ATM implementation plan. These State plans should be coordinated within the flight information regions and with adjacent flight information regions to ensure the optimum use is made of all aspects of CNS/ATM.

### **Airlines Plans**

13. The airlines have already invested significant sums to equip aircraft with transitional CNS/ATM systems such as FANS, Data link, RNAV and Satcom. These systems permit use of currently available technologies to obtain early benefits within the CNS/ATM concept. To retain a cost-effective evolution towards CNS/ATM the airlines believe

that it is imperative to ensure that appropriate accommodation for these transitional systems be retained.

14. The airlines will continue to pursue implementation of CNS/ATM on an evolutionary basis. To accomplish this objective, an IATA CAR/SAM CNS/ATM User Driven Transition Plan was elaborated in 1996, reflecting the consensus of the airlines operating in the region. This plan is in general agreement with the GREPECAS CAR/SAM regional CNS/ATM plan.

### **Benefits**

15. With the benefits from the new CNS/ATM systems, there is need and enthusiasm for its implementation, but there are many hard decisions to be made, particularly on timing. Global and regional cooperation on an unprecedented scale will be required.

16. The regional planning process is the principal engine of ICAO's planning and implementation work. It is here that the top-down approach, comprising global guidance and regional-harmonization measures, converges with the bottom-up approach constituted by States/Territories and aircraft operators and their proposals for implementation options.

17. In its most basic form, the output from the regional planning process should be a listing of air navigation facilities and services together with their achievable time frames, necessary for CNS/ATM systems implementation. These listings will be included in the CAR/SAM regional air navigation plan (ANP) and maintained updated by the ICAO CAR/SAM Regional Planning and Implementation Group (GREPECAS) with the assistance of ICAO's Regional Offices.

18. The objective of the global plan is to guide a progressive and coordinated worldwide implementation of the elements of the future air navigation system in a timely and cost-beneficial manner. To this end, the plan fulfills two principal functions:

- a) it provides guidelines for use by regional planning bodies, States/Territories, service providers and users, for transitions from the current ground-based air navigation system to the future satellite-based system; and
- b) it functions as a benchmark for the evaluation of implementation progress.

19. The implementation of the current CNS/ATM systems has basically been a regional responsibility, i.e. States/Territories or groups of States/Territories working together within the framework of the concept and implementation strategy developed for the respective region by the corresponding regional planning group. ICAO air navigation planning should continue to be conducted through the established regional planning process.

20. States/Territories have the responsibility for implementation of the new CNS/ATM system within their areas of responsibility. It will, however, be necessary for each State within the CAR/SAM region to develop and publish its own CNS/ATM implementation plan. These State plans should be coordinated within the flight information regions and with adjacent flight information regions to ensure that optimum use is made of all aspects of CNS/ATM.

### **Evolution and implementation**

21. In considering the overall system concept, the questions of evolution and transition are most important. For instance, careful planning will be necessary to ensure that aircraft of the future are not unnecessarily required to carry a multiplicity of existing and new CNS equipment. In addition, as already referred to, there is a close relationship between the required CNS services and the desired level of ATM and, finally, there is, for reasons of both economy and efficiency, a need to ensure that differences in the pace of development around the world do not lead to incompatibility between elements of the CNS/ATM system. Particularly, because of the wide coverage of satellite CNS systems, the above considerations call for conscientious worldwide and regional coordination of the planning and implementation if such systems are to be optimized.

### **Human factors considerations**

22. The high level of automation and interdependency of the CNS/ATM system raises several human factors issues. Lessons learned concerning human factors indicate that they should be considered as an integral part of any plan to implement the new technologies. The most important human factors issue regarding the human-machine interface is the ability of the human operator to maintain situational awareness. A by-product of degraded situational awareness is mode error. Mode error is defined as a joint human-machine system breakdown in which a human loses track of the current machine configuration, and a machine interprets

the human's input differently from that intended. The "joint human-machine system" should be considered during design of the systems so that mode errors can be pro-actively anticipated and eliminated. Furthermore, existing air navigation systems and CNS/ATM systems will operate in parallel for a period of time. Operating old and new systems in parallel will introduce human factors considerations that will also need to be considered.

23. Human factors issues should be considered before CNS/ATM technologies are implemented, during the process of design and certification of the technology and associated standard operating procedures. States in the CAR/SAM regions and organizations which design and provide CNS/ATM systems should take into account ICAO guidelines when developing national regulations and incorporate human factors Standards in the processes of design and certification of equipment and procedures.

24. Involving human factors expertise during technology design might incur additional initial expenses, but the costs are paid once in the system's lifetime. Coping with flawed human-technology interfaces through training will result in a requirement for continuous training and higher costs.

### **Training planning**

25. A major goal of CNS/ATM systems is to create a seamless air navigation system. A seamless air navigation environment will require an international team prepared to perform their jobs in such an environment. At the same time, shortcomings in human resource planning and training are frequently cited as an important reason for the lack of implementation of regional air navigation plans. Human resource development challenges will be compounded during the transition period to CNS/ATM systems. As the existing and emerging air navigation technologies will operate in parallel for a period of time, civil aviation personnel will need to learn new skills, as well as retain the skills needed to operate and maintain existing systems. To meet this challenge, a cooperative approach should be used in civil aviation training within the CAR/SAM regions. This approach should:

- a) ensure that the training requirements of the CAR/SAM regions are available within the regions;
- b) facilitate a training planning process that would help to

determine the training capabilities needed within the region or sub-regions for specialized types of training that individual States cannot justify based on their national training needs alone;

- c) ensure that an adequate market exists to support the development and ongoing implementation of high quality training within one or more training centres within the region or sub-regions; and
- d) endeavour to distribute regional training activities among more training centres within the region or sub-regions.

26. Appropriate bodies should be established to facilitate regional and sub-regional training planning. A quantitative approach should be used to determine the training capabilities needed within a region or sub-region. Decisions concerning training capabilities required should be based on an aggregate of training demand for existing air navigation technologies, as well as emerging technologies. A State-to-State consultative process should be used to formulate a plan for the establishment of specific regional training centres.

27. GREPECAS should ensure that training offered within the CAR/SAM regions is sufficient to meet the implementation requirements of the regional air navigation plan.

### IMPLEMENTATION STRATEGY

28. This section deals with the steps that can be taken, and the options that can be explored, to increase the probability of the facilities and services called for by the plan being fully implemented according to the sets of time-lines set out in the ANP as well ensuring that the number of shortcomings and deficiencies is minimized. While the plan represents the collective commitment of CAR/SAM States to provide and maintain the infrastructure that the facilities and services defined in the plan constitute as a whole, it is expected that users of the infrastructure will also cooperate to contribute indirectly to maintaining a safe and efficient environment in the region. The implementation strategy for this plan, is based, therefore, on the premise that all partners involved in aviation in the region will work together harmoniously, for the most part within the GREPECAS mechanism.

29. In this regard, irrespective of the relationships that exist between service providers and users, financing is

required if plans are to be implemented. Since services and facilities need to be put into place before benefits can be enjoyed, it follows that States initial commitment to obtaining the necessary initial financing for “their” parts of the plan is key.

30. States can, of course, enact that commitment alone, but it is likely that in those cases the benefits that derive, for example, from cooperative or sharing options such as international cooperative ventures including international operating agencies, joint charges collection agencies, multi-national facilities and services or joint financing arrangements would not be obtained.

31. Similarly, it is not always economically efficient to manage alone the expenses incurred in purchasing facilities and services and the income gathered from users of the infrastructure. Key here are the elements of cost recovery policy with a possible emphasis on autonomy at the national level which might lead to the creation of independent entities or bodies established for the purpose of operating certain facilities and providing specific services, and being granted operational and financial freedom to carry out its functions.

32. If States are committed to implementing the plan, then the implementation strategy should address how that can be achieved in the most cost-effective way.

33. The vehicle for this commitment to seek out cost-effective implementation techniques is the GREPECAS mechanism where States can explore the possibilities of sub-regional approaches not only to their planning activities but also to the implementation of those plans. Such approaches might be developed with the help of the General Guidelines on the Establishment and Provision of Multinational Facilities/Services in the CAR/SAM regions, set out in the FASID. Furthermore, the new involvement of the ICAO Technical Co-operation Programme in the regional planning process creates opportunities for service providers and users to work out mutually attractive implementation strategies.

34. The way in which this overall approach can move forward will be conditioned by the emphasis being placed on planning according to homogeneous areas and major traffic flows, most of the latter of which extend beyond the limits of the CAR/SAM regions. The work being done in the context of the South Atlantic Task Force and the Technical Co-operation Programme initiative calls for work groups comprised of selected States and users to develop concrete plans for the areas defined by the major traffic flows.

35. Resources from ICAO’s modest special implemen-

tation budget or help from the Technical Co-operation project to support implementation should therefore be channelled into this approach. The next steps can involve GREPECAS formalizing the work group approach mentioned above and developing it as a model for use by other planning and implementation regional planning groups. This would be a natural development since other PIRGs have defined areas of interest which extend beyond their region. In addition, when such an approach gathers

momentum it can serve as a key element of ICAO's inter-regional planning which strives to balance global and regional priorities through bodies such as ALLPIRG or an ALLPIRG sub-group.

36. ICAO is active in all the above areas and stands ready to support initiatives by all partners in the planning process to achieve the steps towards the safe and efficient implementation of the planned infrastructure.

## Part III

# AERODROME OPERATIONAL PLANNING (AOP)

### INTRODUCTION

1. This part of the Caribbean and South American Basic Air Navigation Plan contains elements of the existing planning system and introduces the basic planning principles, operational requirements and planning criteria related to aerodrome operational planning (AOP) as developed for the CAR/SAM regions.

2. As a complement to the statement of basic operational requirements and planning criteria set out in Part I of the Basic ANP, Part III constitutes the stable guidance material considered to be the minimum necessary for effective planning of AOP facilities and services in the Caribbean and South American regions. This guidance material has been developed through the ICAO regional planning processes which, in the case of the CAR/SAM regions, is based largely on the work of the Regional Offices in close cooperation with CAR/SAM States and on the outcome of the CAR/SAM regional air navigation meetings. Background information of importance in the understanding and effective application of this part of the plan is contained in the *Report of the Third Caribbean/South American Regional Air Navigation Meeting* (Doc 9749, CAR/SAM/3 (1999)) on Agenda items 2, 3 and 4.

3. The Standards, Recommended Practices and Procedures to be applied and other related guidance material are contained in:

- a) Annex 14 — *Aerodromes*, Volume I — *Aerodrome Design and Operations*;
- b) Annex 10 — *Aeronautical Telecommunications* — Volume I;
- c) *Aerodrome Design Manual* (Doc 9157);
- d) *Airport Services Manual* (Doc 9137);

e) *Airport Planning Manual* (Doc 9184).

4. The elements of guidance referred to above are presented in the following paragraphs with appropriate cross-references to GREPECAS conclusions and/or CAR/SAM RAN meeting recommendations. A basic list of aerodromes (including their designations) required in the CAR/SAM regions to serve international civil aviation operations is given in the Appendix to this part. The details of the facilities and services to be provided by States in order to fulfill the requirements in this field are contained in the CAR/SAM FASID (Part III).

### AERODROME OPERATIONAL PLANNING (AOP)

#### General (Table FASID AOP 1)

[CAR/SAM/3, Rec. 3/1]

5. The list of regular and alternate aerodromes required for international scheduled air transport, non-scheduled air transport and general aviation operations as agreed in the CAR/SAM/3 RAN Meeting is given in Table AOP 1 of the FASID.

#### Implementation of physical characteristics, visual and non-visual aids at aerodromes

[CAR/SAM/3, Rec. 3/3]

6. States should study the planned provision of facilities and services listed in Table AOP 1 of the FASID and develop a plan for their implementation based on requirements of projected air traffic, in consultation with aircraft operators.

**Aerodromes located in the vicinity  
of international boundaries**

[CAR/SAM/2, Conc. 3/3]

7. States, in cooperation with each other and with the assistance of ICAO, should make arrangements for aerodromes located in the vicinity of international boundaries to ensure that the provisions in ICAO regulatory documents are met and continue to be met in the future.

**Measuring and reporting of runway surface  
condition information**

8. Part III — AOP of the CAR/SAM FASID contains information on runway surface conditions.

**AERODROME SERVICES**

**Implementation of physical characteristics  
and visual and non-visual aids**

[CAR/SAM/3, Rec. 4/2]

9. States:

- a) should make every effort to ensure that the required physical characteristics of their aerodromes are in accordance with the Standards and Recommended Practices specified in Annex 14, Volume I;
- b) should ensure that the required visual and non-visual aids are implemented at their aerodromes; and
- c) in the process of privatization of their aerodromes, are encouraged to ensure continued compliance with ICAO provisions by specifying in the privatization contracts the requirement to meet relevant ICAO Standards and Recommended Practices.

**Aerodrome equipment, installations and services**

[CAR/SAM/3, Conc. 4/4]

10. For the general improvement of safety, efficiency and regularity of aircraft operations, States should take appropriate action to provide as soon as possible the equipment, installations and services recommended in Annex 14, Volume I, Chapters 8 and 9.

**Improvement of runway surface conditions**

[CAR/SAM/3, Rec. 4/5]

11. States should carry out a study to identify runways which have deficiencies in respect of surface friction characteristics, runway surface unevenness, and the drainage system and take appropriate remedial measures.

**Additional aircraft recovery equipment kit**

[CAR/SAM/3, Rec. 4/6]

12. Aircraft operators should give consideration to the desirability of providing an aircraft recovery equipment kit at an airport closer to, or within, the Caribbean region.

**Updating of disabled aircraft removal plan**

[CAR/SAM/3, Conc. 4/7]

13. Taking into account the special aircraft recovery kits available from airlines at particular airports, States should in consultation with the aircraft operators and, where appropriate, aircraft manufacturers, update as necessary the plan for the removal of disabled aircraft.

**Rescue and fire fighting services**

[CAR/SAM/3, Conc. 4/8]

14. States should give priority to the provision of adequate rescue and fire fighting services at their international airports in accordance with the provisions of Annex 14, Volume I including annual training of RFF personnel.

**Bird hazard control and reduction**

[CAR/SAM/3, Conc. 4/10]

15. States should submit to ICAO on a regular basis, bird strike reports and publish the most recent information about the presence of birds, and their migratory routes, that could cause damage to arriving and departing aircraft.

16. States should also take necessary measures, in coordination with concerned agencies, for overall management of bird strike hazard reduction.

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**Establishment of preventive maintenance programmes**

[CAR/SAM/3, Conc. 4/13]

17. States should establish and put into practice at their airports adequate maintenance and training programmes and take appropriate measures to prevent foreign-object damage to aircraft.

**Land use at airports and adjacent areas**

[CAR/SAM/3, Rec. 4/14]

18. States should revise and/or adopt regulations governing the use of land adjacent to airports in order to prevent the construction of obstacles, obstruction of visual aids, interference with radio aids and presence of birds. States should also adopt regulations which govern the use of lands adjacent to airports taking into account the impact of aircraft noise.

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## Appendix — Appendice — Apéndice

### INTERNATIONAL AERODROMES REQUIRED IN THE CAR/SAM REGION

#### EXPLANATION OF THE LIST

CITY/AERODROME      Name of the city and aerodrome, preceded by the location indicator.

USE                      Designation of the aerodrome as:

- RS      international scheduled air transport, regular use;
- RNS    international non-scheduled air transport, regular use;
- RG      international general aviation, regular use; and
- AS      international scheduled air transport, alternate use

*Note.— When an aerodrome is needed for more than one type of use, normally only the use highest on the above list is shown. An exception is that AS aerodromes are identified even when they are required for regular use by international non-scheduled air transport or international general aviation, as some specifications in Annex 14, Volume I place special requirements on these aerodromes.*

Example 1 — An aerodrome required for both RS and RG use would only be shown as RS in the list.

Example 2 — An aerodrome required for both RS and AS use would only be shown as RS in the list. However, this table may still show specific requirements for AS use.

City/Aerodrome/Use  
French text  
Ciudad/Aeródromo/Usó

City/Aerodrome/Use  
French text  
Ciudad/Aeródromo/Usó

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City/Aerodrome/Use French text Ciudad/Aeródromo/Usó	City/Aerodrome/Use French text Ciudad/Aeródromo/Usó
<b>ANGUILLA</b> (United Kingdom)	SARE RESISTENCIA/Resistencia RNS & AS
TQPF THE VALLEY/Wallblake, Anguilla I. RS	SAWG RIO GALLEGOS/Piloto Civil N. Fernández RS
<b>ANTIGUA AND BARBUDA</b>	SAWE RIO GRANDE/Rio Grande RNS & AS
TAPA SAINT JOHNS/V.C. Bird, Antigua I. RS	SAAR ROSARIO/Rosario RS
<b>ARGENTINA</b>	SASA SALTA/Salta RS
SABE BUENOS AIRES/Aeroparque Jorge Newbery RS	SAZS SAN CARLOS DE BARILOCHE/San Carlos de Bariloche RNS & AS
SADD BUENOS AIRES/Don Torcuato RG	SANT TUCUMAN/Tte. Benjamin Matienzo RS
SAEZ BUENOS AIRES/Ezeiza Ministro Pistarini RS	SAWH USHUAIA/Malvinas Argentinas RNS & AS
SADF BUENOS AIRES/San Fernando RG	<b>ARUBA</b> (Netherlands)
SARI CATARATAS DEL IGUAZÚ/My. D. Carlos Eduardo Krause RNS & AS	TNCA ORANJESTAD/Reina Beatrix, Aruba I. RS
SAVC COMODORO RIVADAVIA/General Mosconi RS	<b>BAHAMAS</b>
SACO CORDOBA/Ing. Aer. A.L. Taravella RS	MYBS ALICE TOWN/South Bimini, Bimini I. RS
SARF FORMOSA/Formosa RG	MYSM COCKBURN TOWN/San Salvador I. RS
SASJ JUJUY/Gobernador Guzmán RS	MYGF FREEPORT/Freeport Intl, Grand Bahama I. RS
SAZM MAR DEL PLATA/Bgdier. Gral. B. de la Colina RG & AS	MYEG GEORGE TOWN/George Town, Exuma I. RS
SAME MENDOZA/EI Plumerillo RS	MYEM GOVERNOR'S HARBOUR/Governor's Harbour, Eleuthera I. RS
SAZN NEUQUEN/Presidente Perón RNS & AS	
SARP POSADAS/Libertador Gral. D. José de San Martín RNS	

City/Aerodrome/Use French text Ciudad/Aeródromo/Usó		City/Aerodrome/Use French text Ciudad/Aeródromo/Usó	
MYAM	MARSH HARBOUR/Marsh Harbour, Abaco I. RS	SBCF	BELO HORIZONTE/Tancredo Neves Intl RS
MYNN	NASSAU/Nassau Intl, New Providence I. RS	SBBV	BOA VISTA/Boa Vista Intl RS
MYEH	NORTH ELEUTHERA/North Eleuthera, Eleuthera I. RS	SBBR	BRASÍLIA/Brasília Intl RS
MYLS	STELLA MARIS/Long Island I. RS	SBKP	CAMPINAS/Viracopos Intl RS
MYAT	TREASURE CAY/Treasure Cay, Abaco I. RS	SBCG	CAMPO GRANDE/Campo Grande Intl RS
MYGW	WEST END/West End, Grand Bahama I. RNS & AS	SBCR	CORUMBÁ/Corumbá Intl RS
<b>BARBADOS</b>		SBCZ	CRUZEIRO DO SUL/Cruzeiro do Sul Intl RS
TBPB	BRIDGETOWN/Grantley Adams Intl RS	SBCY	CUIABÁ/Marechal Rondon Intl RS
<b>BELIZE</b>		SBCT	CURITIBA/Afonso Pena Intl RS
MZBZ	BELIZE/Philip S.W. Goldson Intl RS	SBFL	FLORIANÓPOLIS/Hercílio Luz Intl RS
<b>BOLIVIA</b>		SBFZ	FORTALEZA/Pinto Martins Intl RS
SLCB	COCHABAMBA/Jorge Wilsterman AS	SBFI	FOZ DO IGUAÇU/Cataratas Intl RS
SLLP	LA PAZ/EI Alto RS	SBMQ	MACAPÁ/Macapá Intl RS
SLVR	SANTA CRUZ/Viru Viru RS	SBEG	MANAUS/Eduardo Gomes Intl RS
SLTJ	TARIJA/Oriel Lea Plaza RNS & AS	SBNT	NATAL/Augusto Severo Intl AS
SLTR	TRINIDAD/Tte. Av. Jorge Henrich Arauz AS	SBPP	PONTA PORÃ/Ponta Porã Intl RS
<b>BRAZIL</b>			
SBBE	BELÉM/Val-de-Cães Intl RS		

City/Aerodrome/Use French text Ciudad/Aeródromo/Usó		City/Aerodrome/Use French text Ciudad/Aeródromo/Usó	
SBPA	PORTO ALEGRE/Salgado Filho Intl RS	SCTE	PUERTO MONTT/EI Tepual RS
SBRF	RECIFE/Guararapes Intl RS	SCCI	PUNTA ARENAS/Pdte. C. Ibañez del Campo AS
SBGL	RIO DE JANEIRO/Galeão, Antonio Carlos Jobim Intl RS	SCEL	SANTIAGO/Arturo Merino Benítez RS
SBSV	SALVADOR/Deputado Luis Eduardo Magalhães Intl RS	SCTC	TEMUCO/Manquehue RS
SBSN	SANTARÉM/Santarém Intl AS	<b>COLOMBIA</b>	
SBSL	SÃO LUIS/Marechal Cunha Machado Intl AS	SKBQ	BARRANQUILLA/Ernesto Cortissoz RS
SBGR	SÃO PAULO/Guarulhos Intl RS	SKCL	CALI/Alfonso Bonilla Aragón RS
SBTT	TABATINGA/Tabatinga Intl RS	SKCG	CARTAGENA/Rafael Nuñez RS
SBUG	URUGUAIANA/Rubem Berta Intl RS	SKCC	CUCUTA/Camilo Daza RNS & AS
<b>CAYMAN ISLANDS</b> <b>(United Kingdom)</b>		SKLT	LETICIA/Alfredo Vásquez Cobo RNS & AS
MWCB	CAYMAN BRAC/Gerrard Smith Intl RS	SKRG	RIONEGRO/José María Córdoba RS
MWCR	GEORGETOWN/Owen Roberts Intl RS	SKSP	SAN ANDRES I./Sesquicentenario RS
<b>CHILE</b>		SKBO	SANTAFÉ DE BOGOTÁ/Eldorado RS
SCFA	ANTOFAGASTA/Cerro Moreno AS	<b>COSTA RICA</b>	
SCAR	ARICA/Chacalluta RS	MROC	ALAJUELA/Juan Santamaría Intl RS
SCIE	CONCEPCIÓN/Carriel Sur RS	MRLB	LIBERIA/Daniel Oduber Quirós RNS & AS
SCDA	IQUIQUE/Gral. Diego Aracena RS	MRLM	LIMÓN/Limón Intl RG

City/Aerodrome/Use French text Ciudad/Aeródromo/Usó		City/Aerodrome/Use French text Ciudad/Aeródromo/Usó	
MRPV	PAVAS/Tobías Bolanos Intl RG	MDST	SANTIAGO/Cibao Intl RS
<b>CUBA</b>		MDSO	SANTO DOMINGO/De Las Américas Intl RS
MUCM	CAMAGUEY/Ignacio Agramonte RS	<b>ECUADOR</b>	
MUCL	CAYO LARGO DEL SUR/Vilo Acuña RS	SEGU	GUAYAQUIL/Simón Bolívar RS
MUCA	CIEGO DE AVILA/Máximo Gómez RS	SELT	LATACUNGA/Cotopaxi RNS & AS
MUHA	HABANA/José Martí RS	SEMT	MANTA/Eloy Alfaro RS
MUHG	HOLGUÍN/Frank País RS	SEQU	QUITO/Mariscal Sucre RS
MUCU	SANTIAGO DE CUBA/Antonio Maceo RS	<b>EL SALVADOR</b>	
MUVR	VARADERO/Juan Gualberto Gómez RS	MSLP	SAN SALVADOR/EI Salvador Intl RS
<b>DOMINICA</b>		MSSS	SAN SALVADOR/Ilopango Intl RG
TDPD	MELVILLE HALL/Dominica RS	<b>FRENCH ANTILLES</b>	
TDPR	ROSEAU/Canefield RS	TFFF	FORT DE FRANCE/Le Lamentin, Martinique RS
<b>DOMINICAN REPUBLIC</b>		TFFR	POINTE À PITRE/Le Raizet, Guadeloupe RS
MDBH	BARAHONA/Arpto. Internacional María Montes RS	TFFJ	SAINT BARTHELEMY/Saint Barthelemy, Guadeloupe RS
MDHE	HERRERA/Arpto. Internacional de Herrera RS	TFFG	SAINT MARTIN/Grand Case, Guadeloupe RS
MDLR	LA ROMANA/La Romana Intl RS	<b>FRENCH GUIANA</b>	
MDPP	PUERTO PLATA/Gregorio Luperón Intl RS	(France)	
MDPC	PUNTA CANA/Punta Cana Intl RS	SOCA	CAYENNE/Rochambeau RS
		<b>GRENADA</b>	
		TGPZ	LURISTON/Carriacou I. RS

City/Aerodrome/Use French text Ciudad/Aeródromo/Usó	City/Aerodrome/Use French text Ciudad/Aeródromo/Usó
TGPY SAINT GEORGES/Pointe Salines RS	<b>MEXICO</b>
<b>GUATEMALA</b>	MMAA ACAPULCO/Gral. Juan N. Alvarez Intl RS
MGFL FLORES/Flores Intl RS	MMBT BAHÍAS DE HUATULCO/Bahías de Huatulco RNS & AS
MGGT GUATEMALA/La Aurora RS	MMCP CAMPECHE/Ing. Alberto Acuña Ongay RG
MGPB PUERTO BARRIOS/Puerto Barrios RG & AS	MMUN CANCÚN/Cancún Intl RS
MGSJ SAN JOSÉ/San José RG & AS	MMCM CHETUMAL/Chetumal Intl RS
<b>GUYANA</b>	MMCU CHIHUAHUA/Gral. Roberto Fierro Villalobos Intl RS
SYCJ TIMEHRI/Cheddi Jagan Intl RS	MMMC CIUDAD ACUÑA/Ciudad Acuña Intl RG
<b>HAITI</b>	MMCS CIUDAD JUAREZ/Abraham González Intl RG & AS
MTCH CAP HAITIEN/Cap Haitien Intl RS	MMCZ COZUMEL/Cozumel Intl RS
MTPP PORT-AU-PRINCE/Port-au-Prince Intl RS	MMCL CULIACÁN/Fidel Bachigualato RS
<b>HONDURAS</b>	MMDO DURANGO/Pte. Guadalupe Victoria Intl RS
MHLC LA CEIBA/Goloson Intl RS	MMGL GUADALAJARA/Miguel Hidalgo Costilla Intl RS
MHRO ROATAN/Juan Manuel Galvez Intl RS	MMGM GUAYMAS/Gral. José Maria Yañez Intl RS
MHLM SAN PEDRO SULA/La Mesa Intl RS	MMHO HERMOSILLO/Gral. I. Pesqueira García Intl RS
MHTG TEGUCIGALPA/Toncontin Intl RS	MMZH IXTAPA-ZIHUATANEJO/Ixtapa-Zihuatanejo Intl RS
<b>JAMAICA</b>	MMLP LA PAZ/Gral. Manuel Márquez de León Intl RS
MKJP KINGSTON/Norman Manley Intl RS	
MKJS MONTEGO BAY/Sangster Intl RS	

City/Aerodrome/Use French text Ciudad/Aeródromo/Usó		City/Aerodrome/Use French text Ciudad/Aeródromo/Usó	
MMLO	LEÓN/Guanajuato RS	MMSF	SAN FELIPE/San Felipe Intl RG
MMLT	LORETO/Loreto Intl RS	MMSD	SAN JOSÉ DEL CABO/San José del Cabo Intl RS
MMZO	MANZANILLO/Playa de Oro Intl RS	MMTM	TAMPICO/Gral. Francisco Javier Mina Intl RS
MMMA	MATAMOROS/Matamoros Intl RG & AS	MMTP	TAPACHULA/Tapachula Intl RNS
MMMZ	MAZATLAN/Gral. Rafael Buelna Intl RS	MMTJ	TIJUANA/Gral. Abelardo L. Rodríguez Intl RS
MMMD	MERIDA/Lic. Manuel Crescencio Rejón Intl RS	MMTO	TOLUCA/Lic. Adolfo López Mateos RNS
MMML	MEXICALI/Gral. Rodolfo Sánchez Taboada Intl RG	MMTC	TORREÓN/Torreón Intl RS
MMMXX	MÉXICO/Lic. Benito Juárez Intl RS	MMVR	VERACRUZ/Gral. Heiberto Jara Intl RS
MMAN	MONTERREY/Del Norte Intl RG & AS	MMVA	VILLAHERMOSA/C.P.A. Carlos Roviroza Intl RS
MMMY	MONTERREY/Gral. Mariano Escobedo Intl RS	MMZC	ZACATECAS/Gral. Leobardo C. Ruíz Intl RS
MMMM	MORELIA/Gral. Francisco J. Mujica Intl RS	<b>MONTERRAT</b> <b>(United Kingdom)</b>	
MMNG	NOGALES/Nogales Intl RG	TRPM	PLYMOUTH/W.H. Bramble, Montserrat I. RS
MMNL	NUEVO LAREDO/Quetzalcoatl Intl RG	<b>NETHERLANDS ANTILLES</b> <b>(Netherlands)</b>	
MMPG	PIEDRAS NEGRAS/Piedras Negras Intl RG	TNCB	KRALENDIJK/Flamingo, Bonaire I. RS
MMPR	PUERTO VALLARTA/Lic. Gustavo Díaz Ordaz Intl RS	TNCE	ORANJESTAD/F.D. Roosevelt, Saint Eustatius I. RS
MMRX	REYNOSA/Gral. Lucio Blanco Intl RG	TNCM	PHILIPSBURG/Princess Juliana, St. Maarten I. RS
		TNCC	WILLEMSTAD/Hato, Curaçao I. RS

City/Aerodrome/Use French text Ciudad/Aeródromo/Usó
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**NICARAGUA**

MNMG MANAGUA/Augusto César Sandino Intl  
RS

MNPC PUERTO CABEZAS/Puerto Cabezas  
AS

**PANAMA**

MPBO BOCAS DEL TORO/Bocas Del Toro  
RG & AS

MPCH CHANGUINOLA/Cap. Manuel Nino  
RG & AS

MPDA DAVID/Enrique Malek  
RS

MPMG PANAMÁ/Marcos A. Gelabert  
RG & AS

MPTO PANAMÁ/Tocumén Intl  
RS

**PARAGUAY**

SGAS ASUNCIÓN/Silvio Pettrossi  
RS

SGES CIUDAD DEL ESTE/Guaraní  
RS

**PERU**

SPQU AREQUIPA/Rodríguez Ballón Intl  
AS

SPHI CHICLAYO/Cap. José Quinoñes Gonzalez  
AS

SPZO CUZCO/Velazco Astete  
RS

SPQT IQUITOS/Crnel. FAP Francisco Secada Vignetta  
RS

SPIM LIMA-CALLAO/Jorge Chávez Intl  
RS

SPSO PISCO/Pisco  
AS

City/Aerodrome/Use French text Ciudad/Aeródromo/Usó
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SPTN TACNA/Crnel. FAP Carlos Ciriani Santa Rosa  
RG

SPRU TRUJILLO/Capitan Carlos Martínez de Pinillos  
AS

**PUERTO RICO  
(United States)**

TJBQ AGUADILLA/Rafael Hernández Intl  
RS

TJFA FAJARDO/Diego Jiménez Torres  
RS

TJPS PONCE/Ponce-Mercedita  
AS

TJSJ SAN JUAN/Luis Muñoz Marín Intl  
RS

TJVQ VIEQUES/Antonio Rivera  
RS

**SAINT KITTS AND NEVIS**

TKPK BASSETERRE/Robert L. Bradshaw, Saint Kitts I.  
RS

TKPN CHARLESTOWN/Newcastle, Nevis I.  
RS

**SAINT LUCIA**

TLPC CASTRIES/Vigie  
RS

TLPL VIEUX-FORT/Hewanorra Intl  
RS

**SAINT VINCENT AND THE GRENADINES**

TVSB BEQUIA/J.F. Mitchell  
RS

TVSC CANOUAN/Canouan  
RS

TVSV KINGSTOWN/E.T. Joshua  
RS

City/Aerodrome/Use French text Ciudad/Aeródromo/Usó		City/Aerodrome/Use French text Ciudad/Aeródromo/Usó	
TVSM	MUSTIQUE/Mustique RNS	SURV	RIVERA/Cerro Chapeu Intl RS
TVSU	UNION ISLAND/Union Island RS	SUSO	SALTO/Nueva Hesperides Intl RG
<b>SURINAME</b>		<b>VENEZUELA</b>	
SMNI	NEW NICKERIE/Maj. Fernandes AS	SVBC	BARCELONA/Gral. José Antonio Anzóategui Intl RNS
SMZO	PARAMARIBO/Zorg en Hoop RG	SVMl	CARACAS/Simón Bolívar Intl, Maiquetía RS
SMJP	ZANDERY/Johan Adolf Pengel Intl RS	SVMC	MARACAIBO/La Chinita Intl RS
<b>TRINIDAD AND TOBAGO</b>		SVMG	MARGARITA/Intl Del Caribe Gral. Santiago Marino RS
TTPP	PORT OF SPAIN/Piarco Intl, Trinidad I. RS	SVJC	PARAGUANA/Josefa Camejo Intl RS
TTCP	SCARBOROUGH/Crown Point, Tobago I. RS	SVSA	SAN ANTONIO DEL TÁCHIRA/San Antonio del Táchira Intl RS
<b>TURKS AND CAICOS ISLANDS (United Kingdom)</b>		SVVA	VALENCIA/Zim Valencia Intl RS
MBGT	GRAND TURK/Grand Turk Intl RS	<b>VIRGIN ISLANDS (United Kingdom)</b>	
MBPV	PROVIDENCIALES/Providenciales Intl RS	TUPJ	ROADTOWN/Beef Island RS
MBSC	SOUTH CAICOS/South Caicos Intl RS	TUPW	VIRGIN GORDA I./Virgin Gorda RS
<b>URUGUAY</b>		<b>VIRGIN ISLANDS (United States)</b>	
SUCA	COLONIA/Internacional de Colonia RG	TISX	CHRISTIANSTED/Henry E. Rohlsen, St. Croix RS
SULS	MALDONADO/Int. C/C, Carlos A. Curbelo Laguna del Sauce RS	TIST	SAINT THOMAS/Cyril E. King RS
SUAA	MONTEVIDEO/Aeropuerto Angel S. Adami Intl RG		
SUMU	MONTEVIDEO/Carrasco Intl Gral. Cesáreo L. Berisso RS		

## Part IV

# COMMUNICATIONS, NAVIGATION AND SURVEILLANCE (CNS)

### INTRODUCTION

1. This part of the Caribbean and South American Basic Air Navigation Plan contains material considered to be the minimum necessary for effective planning of CNS facilities and services in the Caribbean and South American regions.

2. Most of the material contained in this part has been developed by the CAR/SAM Regional Planning and Implementation Group (GREPECAS) based on the Statement of Basic Operational Requirements and Planning Criteria (BORPC) and finalized by the CAR/SAM/3 RAN Meeting. Background information of importance in the understanding and effective application of this part of the plan is contained in the *Report of the Third Caribbean/South American Regional Air Navigation Meeting* (Doc 9749, CAR/SAM/3 (1999)) on Agenda Items 9, 10 and 11.

3. The Standards, Recommended Practices and Procedures to be applied are contained in:

- a) Annex 10 — *Aeronautical Telecommunications*, Volumes I, II, III, IV and V;
- b) Annex 6 — *Operation of Aircraft*, Parts I (Chapter 7), II (Chapter 7) and III (Chapter 5);
- c) Annex 11 — *Air Traffic Services*, Chapter 6; and
- d) *Regional Supplementary Procedures* (Doc 7030).

4. The elements of material referred to above are presented in the following paragraphs with appropriate cross-references to CAR/SAM/3 RAN Meeting recommendations and/or conclusions.

### COMMUNICATIONS

#### General

5. The main function of the communication systems is to provide for the exchange of aeronautical voice, text and/or data between users or automated systems (for data). The infrastructure used for communications can also be used in support of specific navigation and surveillance functions.

6. There are basically two categories of aeronautical communications:

- a) safety-related communications requiring high integrity and rapid delivery:
  - 1) air traffic services communications (ATSC) carried out between ATS units or an ATS unit and aircraft for ATC, flight information, alerting, etc.;
  - 2) aeronautical operational control (AOC) communications carried out by aircraft operators on matters related to safety, regularity and efficiency of flights; and
- b) non-safety related communications:
  - 1) aeronautical administrative communications (AAC) carried out by aeronautical personnel and/or organizations on administrative and private matters; and
  - 2) aeronautical passenger communications (APC).

7. In general, communication systems used in the communications, navigation and surveillance/air traffic management (CNS/ATM) systems are capable of carrying

both of the above-mentioned categories. However, safety-related communications shall always have priority over non-safety ones.

### **Aeronautical fixed service (AFS)**

8. The aeronautical fixed service comprises:
- a) the aeronautical fixed telecommunication network (AFTN);
  - b) data communications subnetworks and associated systems supporting the ground-ground applications of the aeronautical telecommunication network (ATN), namely the ATS message handling services (ATS MHS) and inter-centre communications (ICC);
  - c) gateways enabling inter-operation (to the extent possible) between a), and b) above;
  - d) ATS voice communication circuits and networks; and
  - e) aeronautical broadcast systems (e.g. for dissemination of world area forecast (WAFS)).

### ***Implementation of digital networks to improve the current AFS and to facilitate the introduction of the ATN***

[CAR/SAM/3, Rec. 9/1]

9. In order to meet, in a reliable and cost-effective manner, current and future AFS requirements for voice/data communications and to facilitate the introduction of ATN, States in CAR/SAM regions should make an effort to proceed with the process of implementing modern digital communication networks in a coordinated manner.

### ***Application of X.25 protocol for communications between AFTN COM Centres***

[CAR/SAM/3, Rec. 9/3]

10. In order to ensure data integrity and to improve data transmission rate, States in the CAR/SAM regions should expedite the implementation of X.25 protocol for communication between AFTN COM Centres based on provisions contained in Annex 10, Volume III and the appropriate Regional Interface Control Document (ICD).

### ***Operational characteristics for main AFTN COM Centres***

[CAR/SAM/3, Rec. 9/4]

11. States responsible for the operation of Main AFTN COM Centres ensure that those facilities satisfy operational characteristics presented in Attachment A.

### ***AFTN traffic statistics***

[CAR/SAM/3, Rec. 9/5]

12. States using the guidance material presented in Attachment B should:

- a) monitor AFTN traffic;
- b) maintain AFTN occupancy factor of AFTN circuits below 0.4; and
- c) prepare monthly traffic statistics.

### ***Operational availability of AFTN circuits***

[CAR/SAM/3, Conc. 9/6]

13. States in the CAR/SAM regions should:

- a) take the necessary measures to ensure that end-to-end monthly operational availability of AFTN circuits does not fall below 98 per cent and, therefore, reliability and efficiency requirements for the provision of communication services to AIS, ATS, MET and SAR are met; and
- b) provide alternative measures to route AFTN traffic during circuit outages.

14. ATN development should be introduced in an evolutionary and cost-effective manner based on available ICAO SARPs material. States can progress their implementation according to their own requirements and time-frame. It is expected that the ground part of the ATN would be first developed.

### ***ATS voice networks***

[CAR/SAM/3, Conc. 9/10]

15. GREPECAS, based on the ICAO SARPs and guidance material on analogue and digital ATS voice networks, carry out the necessary studies to evaluate the

application of digital voice switching and signalling systems in upgrading facilities shown in the CAR/SAM ATS Speech Circuits Plan.

***Planning and technical principles to be applied for ATS voice circuits networks***

[CAR/SAM/3, Rec. 9/11]

16. States, for the planning, implementation and operation of ATS voice circuits networks, should follow the set of planning and technical principles shown in Attachment C.

***Misuse of AM(R)S frequencies***

[CAR/SAM/3, Rec. 9/12]

17. States should eliminate the use of AM(R)S frequencies for point-to-point communications by:

- a) implementing reliable circuits according to the ATS Speech Circuits Plan; and
- b) pending a) above, or during circuit outages, using IDD services as an alternative means of communication for AFS purposes with due regard to Annex 11 requirements.

***Satellite broadcast***

[CAR/SAM/3, Rec. 9/14]

18. World area forecast system (WAFS) products should be disseminated in the CAR/SAM region by satellite broadcast as part of the aeronautical fixed service (AFS). The satellite broadcast to serve the CAR/SAM regions is the international satellite communications system (ISCS) provided by the world area forecast centre (WAFS) Washington. The area to be served by the ISCS is given on FASID Chart CNS 4.

*Note.— Area covered by ISCS is identical to the “footprint” of INTELSAT communication satellite located over the Atlantic Ocean at the longitude of 325.5°E.*

**Aeronautical mobile service (AMS)**

19. The AMS comprises:

- a) air-ground voice and data communication systems;

- b) air-to-air voice (and data as applicable) communication systems; and

- c) ground-to-air broadcast systems.

***Harmful interference to radio frequency bands allocated to the aeronautical services***

[CAR/SAM/3 Concs. 9/17 and 9/18]

20. States should:

- a) develop, in coordination with frequency spectrum management authorities and considering relevant ITU procedures, suitable mechanism for detection and elimination of unauthorized transmission causing interference to the aeronautical service; and
- b) notify ITU of causes of serious and persistent harmful interference, and the ICAO Regional Offices accredited to them, for further coordination on this matter, using the form provided in Attachment D.

***AM(R)S planning principles***

[CAR/SAM/3, Rec. 9/19]

21. The principles outlined in Attachment E should be considered by States for the planning of the AM(R)S in the CAR/SAM regions.

***Aeronautical operational control (AOC) voice communication***

[CAR/SAM/3, Rec. 9/20]

22. For aeronautical operational control purposes:

- a) when an aircraft in flight is within the coverage of an appropriate VHF aeronautical station, channels from the relevant VHF sub-band should be used;
- b) where communications cannot be established in accordance with a) and the flight lies wholly within an RDARA, an assigned HF frequency from the relevant RDARA allocation should be used; and
- c) if the flight extends beyond RDARA limits and communications cannot be established in accordance with b) above, an appropriate worldwide HF frequency should be used.

***Geographical separation criteria for VHF air-ground communications***

[CAR/SAM/3 Rec. 9/22]

23. CAR/SAM States, to the extent possible, should use for VHF frequency assignments the geographical criteria outlined in Attachment F.

***VHF frequency allocations for ATS functions in the CAR/SAM regions***

[CAR/SAM/3, Rec. 9/23]

24. CAR/SAM States, to the extent possible, should select frequencies from the VHF sub-bands indicated in Attachment G for their AM(R)S allocations.

***Maintenance of ICAO COM List 3 – “Frequency Assignments in the Band 117.975 – 137.000 kHz”***

[CAR/SAM/3, Rec. 9/25]

25. States:

- a) in order to support the frequency management functions of the ICAO Regional Offices (including the publication of the COM List No. 3), should expeditiously notify the appropriate ICAO Regional Office of any changes to their VHF AM(R)S frequency assignments; and
- b) should release any assigned VHF AM(R)S frequency which is not intended for operational use in the near future and notify the appropriate ICAO Regional Office accordingly.

***ATIS, OFIS and VOLMET***

[CAR/SAM/3 Rec. 9/26]

26. States should use the sub-bands 127.600 – 127.900 MHz/132.050 – 132.950 MHz or available VOR frequencies for the provision of automatic terminal information service (ATIS), operational flight information service (OFIS), and meteorological broadcast (VOLMET).

***Interpilot air-to-air communication channel***

27. The ICAO Council, in March 1999, adopted Amendment 74 to Annex 10 which includes, among other

things, the designation of VHF frequency 123.45 MHz as the worldwide air-to-air communication channel. States should make all efforts to avoid problems for the implementation of that frequency in the CAR/SAM region.

**Communications systems implementation and regional timelines**

28. It is intended to include regional timelines for communications systems implementation when planning material is sufficiently mature.

**NAVIGATION**

**General**

29. The aeronautical radio navigation plan comprises all facilities that provide navigation support to en-route, terminal, approach, landing and surface movement operations.

30. The growing number of modern aircraft equipped with area navigation (RNAV) and the increasing emphasis on required navigation performance (RNP) result in more flexible route selection and less dependence on any particular type of navigation system. Nevertheless, every single radio navigation facility must operate in strict conformance with the applicable standards.

31. It is foreseen that the provision of radio navigation services will gradually change from a ground-based to a satellite-based system. The global navigation satellite system (GNSS) is the generic term used for the satellite-based aeronautical radio navigation system. Existing and/or emerging navigation satellite constellations and their associated satellite-based, aircraft-based and ground-based augmentation systems (SBAS, ABAS and GBAS, respectively) all form elements of the GNSS.

***Planning principles for radio navigation aids***

[CAR/SAM/3, Rec. 10/1]

32. States, in planning the implementation of radio navigation services, should consider the principles shown in Attachment A.

***Maintenance of ICAO COM List No. 1 “List of Facilities Operating on Frequencies in the LF/MF Band (190 – 1 750 kHz)” and ICAO COM List No. 2 “Record of VHF Frequencies Assignments to Caribbean and South American VOR and ILS Radio Navigation Aids”***

[CAR/SAM/3, Rec. 10/3]

33. States:

- a) in order to support the frequency management functions of the ICAO Regional Offices (including the publication of the COM Lists Nos. 1 and 2), should notify the relevant Regional Office of all changes to their frequency assignments; and
- b) should release any assigned frequency which is not included in firm plans for operational use in the near future and notify accordingly the relevant ICAO Regional Office.

***Flight testing of radio navigation aids***

[CAR/SAM/3, Rec. 10/4]

34. States should:

- a) make every effort to maintain their radio navigation aids operational at all times;
- b) perform flight test of navigation aids periodically in accordance with Annex 10 requirements and at intervals indicated in ICAO Doc 8071; and
- c) be encouraged to establish bilateral and/or multilateral agreements on sharing of flight test capabilities.

***Termination of the use of the band 1 559 – 1 610 MHz (allocated to the RNSS) by fixed services***

[CAR/SAM/3, Rec. 10/6]

35. Considering the incompatibility of sharing of the band 1 559 – 1 610 MHz allocated to the RNSS with the fixed services, States should coordinate with the corresponding national frequency management authority in order to:

- a) determine if any fixed service stations operate in the band 1 559 – 1 610 MHz and, if so, either cease their operation or relocate them to other fixed-service bands

before GNSS-based operations are approved; and

- b) establish plans to avoid any future implementation of fixed service stations to operate in the band 1 559 – 1 610 MHz.

**Navigation systems implementation and regional timelines**

36. It is intended to include regional timelines for navigation systems implementation when planning material is sufficiently mature.

**SURVEILLANCE**

**General**

37. The aeronautical surveillance plan comprises all facilities, systems and procedures that support the provision of aircraft position information to air traffic services (ATS) units.

38. Traditionally, aeronautical surveillance has been performed by means of voice position reporting, primary surveillance radar (PSR) or secondary surveillance radar (SSR). SSR Mode S ground stations have been implemented in several parts of the world and their operation depends on properly equipped aircraft (i.e. Mode S transponder with assigned 24-bit address). An inherent feature of the SSR Mode S (for surveillance and/or data link) is the unique 24-bit aircraft address assigned to each aircraft; a worldwide scheme for allocation, assignment and operation of such addresses is already in place (Annex 10, Volume III, Part I, Chapter 9 refers).

39. However, advances in aeronautical data links and on-board navigation systems now allow for aircraft to transmit their position and other information to the appropriate ATS units, or even broadcast such information. These systems have been designated as the automatic dependent surveillance (ADS), which is based on a contract between the ATS unit and the aircraft, and ADS-broadcast (ADS-B), which allows other aircraft and ground systems within its area of coverage to receive the information.

40. It is envisaged that the use of ADS/ADS-B will gradually increase, especially in areas where the provision of radars is not practical or economical. It is also foreseen that

the use of PSR for international civil aviation operations will diminish.

***Planning and implementation of surveillance radar systems***

[CAR/SAM/3, Rec 11/1]

41. CAR/SAM States, during the planning and implementation of new surveillance radar systems or in improving existing facilities, should consider the GREPECAS Guidelines.

***Planning and implementation of ADS***

[CAR/SAM/3, Rec. 11/2]

42. CAR/SAM States, in coordination with airspace users, should consider the implementation of ADS for providing surveillance in areas in which the provision of radar is not feasible or economical.

***Sharing of radar data***

[CAR/SAM/3, Rec. 11/5]

43. In order to facilitate the implementation of surveillance radar service in a safe, efficient and cost-beneficial manner, CAR/SAM States should consider the possibility of bilateral/multilateral arrangements for sharing of radar data between the ATC centres in neighbouring States and the use of a common radar data format and a common communication protocol for radar data exchange in the CAR/SAM regions to be adopted by GREPECAS.

***Application of procedures for 24-bit aircraft address assignment***

[CAR/SAM/3, Conc. 11/6]

44. Those CAR/SAM States which have not already done so should establish, as a matter of urgency, application of the ICAO procedures for the assignment of 24-bit aircraft addresses.

**AERONAUTICAL RADIOFREQUENCY  
MANAGEMENT**

**General**

45. The radio frequency spectrum is a scarce natural resource with finite capacity limits for which demand is constantly increasing. ICAO is just one of the entities

competing for spectrum allocation on behalf of the aviation community it serves and, like its competitors, must continue to justify spectrum requirements.

46. The cornerstone of arguments to justify continued allocation of an adequate aeronautical spectrum are centred around safety-of-life issues, which are recognized internationally. On the other hand, there are increased demands for spectrum allocation from a growing number of competitors. Spectrum-efficient operation has thus become an obligation for all users and technological developments are helping in that regard.

47. However, the rules of the International Telecommunication Union (ITU) mechanism for spectrum allocation are such that safety-of-life and other justifying arguments need to be presented with force and States and international organizations have thus been invited by ICAO Assembly Resolution to support ICAO's position at World Radiocommunication Conferences (WRCs) and in regional and other international activities conducted in preparation for WRCs by a number of means.

**Policy statements**

48. Given the quasi-triennial pattern of WRC meetings recently adopted by the ITU and the importance of keeping up with the rapid developments in telecommunications, ICAO decided to develop and maintain an ICAO radio frequency (RF) document in the form of the *Handbook on Radio Frequency Spectrum Requirements for Civil Aviation* (Doc 9718) which contains ICAO policy statements relevant to the aviation requirements for radio frequency spectrum. The handbook is intended to assist States and ICAO in preparing for ITU conferences.

**Regional planning criteria**

***Geographical separation criteria for VHF air-ground communications***

[CAR/SAM/3, Rec. 9/22]

49. Geographical separation criteria as shown in Part IV, Attachment F should be used for international VHF frequency assignment in the CAR/SAM regions.

**Radiofrequency interference issues**

50. The subject of harmful interference to aeronautical

communication, navigation and surveillance services has always been of paramount concern to the international civil aviation community. In particular, any interference to the aeronautical services in the band 108 – 137 MHz has usually been, and needs to be, treated by aviation administrations in an urgent and serious manner.

***Measures to reduce harmful interference to aviation from VHF broadcast services***

[CAR/SAM/3, Rec. 9/18]

51. States should:

- a) take action to develop with the appropriate national bodies, and assist in the development by the appropriate ITU bodies, technical criteria to avoid harmful interference to the aeronautical services operating in the frequency band 108 – 137 MHz from broadcast services operating in the adjacent frequency band 100 – 108 MHz; and
- b) establish national regulations to protect aeronautical communication and radio navigation services operating in the VHF bands from harmful interference emanating from broadcast services in adjacent VHF bands.

## Attachment A

# OPERATIONAL FEATURES CONSIDERED NECESSARY FOR A MAIN AERONAUTICAL FIXED TELECOMMUNICATION NETWORK (AFTN) COMMUNICATIONS CENTRE

1. Meet AFTN requirements as defined in ICAO Annex 10, Volumes II and III and in the ICAO *Manual on the Planning and Engineering of the Aeronautical Fixed Telecommunication Network* (Doc 8259).
  2. Throughput capability commensurate with operational requirements, number and modulation rate of circuits to be served, 100 per cent growth capability and with peak hour throughput equal to or better than 10 per cent daily load.
  3. Capable of accommodating circuits employing international telegraph alphabet No. 2 (ITA-2) and international alphabet No. 5 (IA-5) with code conversion between them.
  4. Capable of accommodating circuit modulation rates up to and including 9 600 bits/s.
  5. Apply bit-oriented data link control procedures (Annex 10, Part I, Volume III, 8.6.4 refers) between main AFTN communication centres.
  6. Provide for operational personnel to make changes, additions and deletions to accommodate:
    - a) routing definitions; and
    - b) line servicing (including circuits, stations, codes, protocols and modulation rates).
  7. Provide for the generation of alarms or reports and the ability to input supervisory commands (necessary to operationally control the system) by non-technical/non-programmer operational personnel.
  8. Operate in a store and forward mode with incoming immediate messages written to duplicated mass storage devices before output.
  9. Ensure that messages are not lost by the system.
  10. Capable of servicing circuits operating at different speeds, codes, parity, modes of transmission, interfaces and protocols.
  11. Capable of accommodating diversion routing.
  12. Capable of message storage in event of circuit outage with no diversion route available.
  13. Capable of accommodating predetermined distribution.
  14. Provision of a designated terminal with keyboard for entering supervisory commands to control the operation of the switching system. This terminal permits, for example, the supervisor to control the system, examine or change message tables, display reports and system status, retrieve messages from storage and divert errors to an intercept terminal, and to provide for the recall of pre-formatted messages to assist the AFTN centre personnel in the generation of service messages.
  15. Deliver supervisory reports to a designated station, including status of system operation, e.g. re-start recovery, changeover, etc.
  16. Deliver journal records to a designated station, to include time of day, received message information and transmitted message information.
-

17. Deliver statistical information to a designated station.
  18. Automatic functions initiated without supervisor intervention (e.g. message assurance features (time responses), generation of service messages, changeover, restart and recovery).
  19. Provide diagnostic testing.
  20. Dual mode operation with automatic changeover from a "hot" to "standby" and vice versa.
-

## Attachment B

# GUIDANCE MATERIAL FOR THE PREPARATION OF AFTN MESSAGE TRAFFIC STATISTICS

### References:

ICAO *Manual on the Planning and Engineering of the Aeronautical Fixed Telecommunication Network* (Doc 8259)

Interim Pilot Study on the replanning of the AFS/AFTN presented by the ASPENN Regional Planning Group;

ICAO *Air Navigation Plan — Caribbean and South American Regions* (Doc 8733), 14th edition;

Report of the Fifth Meeting of the GREPECAS; and

Report of the Fifth Meeting of the GREPECAS COM/SG.

monitoring functions, prepare traffic statistics for the messages transmitted through the network. The statistics will allow, among other things, the network supervisor to configure the network to meet the messages traffic demand, in order to avoid/minimize congestion resulting in longer message transit times. The average congestion delay suffered by a message in awaiting access to a channel for its transmission is given by:

$$t = w.T/(1-w) \quad (1)$$

where:

$t$  is the average congestion delay experienced by messages throughout the hour;

$w$  is the channel occupancy factor;

$T$  is the time required by the channel to transmit a message, which is inversely proportional to the channel modulation rate in bits/s.

3. The above expression (1) shows a strong dependency between the congestion delay time and the channel occupancy factor. As the occupancy factor increases to values higher than 0.4 (40 per cent) the delay grows rapidly and tends to infinity when the occupancy factor approaches unity. The way to reduce delay is to decrease  $T$ , i.e. to increase the modulation rate of the AFTN channel or circuit.

### BACKGROUND

1. The GREPECAS, at its fifth meeting, requested (by Conclusion 5/19 – AFTN ANNUAL TRAFFIC STATISTICS) that ICAO Regional Offices coordinate with States, so that they provide traffic statistics of messages transmitted through the AFTN. This guidance material has been prepared in reply to referred Conclusion 5/19 and is aimed at providing the methodology to prepare the AFTN traffic statistics applying a format shown below as the AFTN circuit load statistics table.

### STATISTICS OF MESSAGE TRAFFIC TRANSMITTED THROUGH THE AFTN

#### General overview

2. From the point of view of the AFTN performance, it is necessary that the AFTN COM Centres, as part of their

#### Method for preparation of statistics

4. The objective of preparing statistics is to allow the administrations to collect and process message traffic data transmitted through the AFTN, in order to determine the occupancy factor of an AFTN circuit, which affects the

message transit time as indicated above. The message transit time is defined as “the elapsed time between the instant of filing of a message with an AFTN station for transmission on the network and the instant that it is made available to the addressee”. Furthermore, the transit time is formulated as an operational requirement as follows:

In the peak season of the year, even in the average peak hours, at least 95 per cent of the messages should achieve transit times of less than the following:

SIGMET messages	5 minutes
Amendments to aerodrome forecasts	5 minutes
Aerodrome reports/landing forecasts/ selected special reports:	
from 0 to 550 nautical miles	5 minutes
for distances larger than 550 nautical miles	10 minutes

Transit times for Request/Reply of OPMET data banks should be less than five minutes.

4.1 The 95 per cent does not mean that the remaining 5 per cent may experience any delay; actually, the administrations should investigate if there is excess of delay and should try to avoid its occurrence.

4.2 As can be observed from the formulation of the operational requirement of transit times, the important matter to be determined to monitor the message traffic is the quantity of characters transmitted through the channel in the average peak hour during the peak season of the year, in which a maximum of message traffic is produced.

4.3 In relation to the period of time for the peak season in the year, Doc 8259 neither establishes nor suggests specific periods. In this regard, the ASPENN Group recommended a one-month period as a compromise figure for the peak season, in order to perform studies on message traffic statistics for general purposes, with daily samples during one year. The GREPECAS adopted this criteria.

4.4 The quantity of characters transmitted in the peak hour is related to the circuit load or occupancy factor. Doc 8259 recommends that this factor be kept lower than 0.4 in the average peak hour in the peak season of the year, meaning 40 per cent, which would allow the AFTN channel to provide capacity for traffic in diversion and to keep the transit times under this condition within acceptable values. The occupancy factors higher than 0.4 significantly increase, as previously stated, the message congestion delays. The practical way to measure the occupancy factor is to divide

the number of characters transmitted in one hour by the maximum quantity of characters that can be transmitted in an hour through the channel. For example, in any channel through which baudot code messages (consisting of 5 information, 1 start and 1.5 stop bits) are transmitted, a maximum of  $480 \times B$  characters can be sent, where B is the modulation rate. If B is 50 bits/s, a maximum of 24 000 characters can be sent in an hour. If information on the number of characters per hour and per channel is not available at the AFTN COM Centre and only the number of messages per hour is available, in order to obtain the number of characters per hour, the number of messages per hour should be multiplied by 300 (the average length of an AFTN message).

4.5 For the purpose of finding the AFTN circuit occupancy during the peak season of the year, the following method should be used:

Let N designate the number of days in the peak month. If during that month, the peak hour occupancies are  $Lx_1 + Lx_2 + Lx_3 + \dots + Lx_n$ , the average monthly occupancy will be:

$$Lx(\text{average}) = (Lx_1 + Lx_2 + Lx_3 + \dots + Lx_n)/N \quad (2)$$

4.6 Figures obtained through the above-mentioned method would provide data for columns 3 and 7 of the AFTN circuits load statistics table below, in order to complete the information required in the average load factor cell. For a good performance of the AFTN, the  $Lx(\text{average})$  should be kept lower or equal to 0.4.

#### **Explanation of the AFTN circuits load statistics table**

5. The table below should be completed by each AFTN COM Centre during the period of one month with daily data of the message traffic of each of the AFTN international circuits/channels that are connected to the centre. This monthly evaluation is aimed at capturing the seasonal factor of the message traffic during the year. For each AFTN circuit/channel, it is required to indicate in the table the corresponding modulation rate and the line code [Baudot (ITA-2) or IA-5]. Likewise, it is required that the names with location indicators of the origin and destination stations should be also filled out in the table header. As a relevant part and summary of the data processing, it is necessary to indicate the transmission average load factor (TX) and the reception average load factor (RX). An explanation of the

columns follows:

Column 1	Date of the data processed
Columns 2 and 6	Number of characters in the peak hour
Columns 3 and 7	Load factor in the peak hour
Columns 4 and 8	Number of characters per day
Columns 5 and 9	Daily load factor (as a percentage figure)

5.1 Load factors could be calculated as follows:

- a) to calculate the peak hour load factor (HLF), the number of characters (NCH) of columns 2 and 6 should be divided separately by the channel effective capacity (CEC) and multiplied by 100. The result will always be lower or equal to 100 per cent:

$$\text{HLF}(\%) = \text{NCH} \times 100 / \text{CEC}$$

Some examples of CEC are provided (for several modulation rates and line codes) following the AFTN circuits load statistics table; and

- b) to calculate the daily load factor (DLF) of the channel, the number of characters (NCD) of columns 4 and 8 should be divided separately by the channel effective capacity (CEC) multiplied by 24 and the result is multiplied by 100. The result will always be lower or equal to 100 per cent:

$$\text{DLF}(\%) = \text{NCD} \times 100 / \text{CEC} \times 24$$

5.2 To calculate the average load factor RX or TX (cells shown in the table header), the above expression (2) is applied with  $L_{x1}$  to  $L_{xn}$  taken from the cells of columns 3 and 7 with N equal to the number of days of the month of evaluation.



### EXAMPLES OF CHANNEL EFFECTIVE CAPACITY

ITA-2 Line Code (1½ stop bits)	
Modulation rate (bits/s)	Channel effective capacity (Characters/hour)
50	24 000
75	36 000
100	48 000
150	72 000
300	144 000

IA-5 Line Code, Asynchronous (1 stop bit)		
Modulation rate (bits/s)	Channel effective capacity (Characters/hour)	
	Without protocol	CAT B protocol (93%)*
300	108 000	100 400
600	216 000	200 880
1 200	432 000	401 760
2 400	864 000	803 520
4 800	1 720 000	1 707 040
9 600	3 456 000	3 214 080

IA-5 Line Code, Synchronic		
Modulation rate (bits/s)	Channel effective capacity (Characters/hour)	
	CAT B protocol (93%)*	(DHLC protocol (97%)**
2 400	1004 400	1 047 600
4 800	2 008 800	2 095 200
9 600	4 017 600	4 190 400

\* The effective capacity has been reduced to 93 per cent to allow the protocol header.

\*\* The effective capacity has been reduced to 97 per cent to allow the protocol header.

## Attachment C

### PLANNING AND TECHNICAL PRINCIPLES FOR ATS VOICE NETWORKS

Planning and operation of ATS voice communication network in the CAR/SAM regions should be based on relevant ICAO SARPs and guidance material. Pending the availability of updated ICAO provisions relating to digital and analogue voice switching and signalling systems, the following principles should be applied for implementation of analogue voice network:

- a) the voice switched network should be in compliance with Annex 10, Volume III, Part II, Chapter 4;
  - b) for satellite circuits, the additional propagation delay should be duly accounted for and the total delay be maintained, to the extent possible, within the limits of Recommendation Q.41 of the ITU-T;
  - c) the switch shall operate automatically, i.e. being able to receive and route calls from stations connected to the network without intervention of a third person;
  - d) the system should have the capability of providing priority access. Signalling tones should also be provided to announce intrusion;
  - e) the system should provide automatic call back capability;
  - f) the capability of conference service to ATS units should be provided as required;
  - g) disconnect should occur automatically when either party terminates a two-party communication (“unhook” operation);
  - h) the configuration of the network should provide for alternate routing. Also, switches serving the network should provide automatic routing for primary and alternate routes;
  - i) the capability of tandem interconnection of circuits between the calling and the called stations should be provided, while recognizing that the number of such circuits in tandem is limited, particularly if satellite circuits are employed;
  - j) interconnection through the switch between stations on local circuits, or between a local circuit and a trunk circuit, should not preclude or disturb other established connections. The switch shall be able to establish as many simultaneous communications as half the number of connected lines;
  - k) to protect the hearing of the operators, the signalling tones should be attenuated at least 10 dB with respect to receive level in the earphone;
  - l) to ensure the intelligibility and to permit the application of speech-plus data techniques, the system should be engineered to operate within the 300 to 2 640 Hz bandwidth;
  - m) to ensure the intelligibility of the communication, the attenuation level of the voice signal between users should not be greater than 6 dB;
  - n) the network segments that will contain more than one satellite link should be identified so that the necessary compensatory measures and procedures may be applied, as required;
  - o) it should be possible to change and/or reassign the numbers in the numbering plan by simple operations;
  - p) the signalling system between voice switches should be the ITU-T signalling system No. 5;
-

- q) to limit misuse of the international network by unauthorized domestic units, it may be prudent to limit calls to and from international circuits to those units which have an operational requirement to use the facility while barring other users by means of software tables in the switching centre;
  - r) the end system provided for the user should afford minimum complexity of procedures and a minimum number of physical actions necessary to initiate a call;
  - s) the switches should have the capability of handling trunk circuits, local circuits and tie lines in sufficient number to satisfy the ATS requirements, as determined in each particular case.
-

## Attachment D

# HARMFUL INTERFERENCE REPORT FORM

This form should be used in cases of harmful interference with aeronautical services and only in those instances where the procedure outlined in the ITU-R Radio Regulations has not produced satisfactory results. The form should only be submitted after at least the sections marked with an asterisk have been completed.

- \* State or organization submitting report .....
- \* 1. Frequency of channel interfered with .....
- \* 2. Station or route interfered with .....
- \* 3. Is the interference persistent? .....
- \* 3.1 Altitude, position, and time at which interference was observed:

Date	Time (GMT)	Altitude	Position

*Note.— Report forms should not be sent unless the interference has been observed a sufficient number of times to justify setting international administrative machinery into motion, or unless it is considered to be endangering a radio navigation or safety service.*

- 4. Has your Administration already applied, regarding this case of interference, any part(s) (state which) of the ITU procedures laid down in Article S15 of the ITU-R Radio Regulations?  
.....
- \* 5. Call sign of IS (IS = Interfering Station) (See note below.) .....
- 6. Name of IS corresponding to the call sign .....
- 7. Notified frequency on which IS should operate (if known). .....
- 8. (a) Approximate frequency of IS ..... kHz/MHz (circle applicable abbreviation)
- (b) Strength of IS (QSA or SINPFEMO - See ICAO Doc 8400/3) .....

- 9. Class of emission of IS .....
- 10. Language used by IS .....
- 11. Call sign of station in communication with IS .....

*Note.— If the call sign referred to in 5 could not be received, or if the call sign received is not in the international series and cannot be interpreted, the report form should not be sent unless at least one of the questions under 12, 13 and 14 can be answered.*

- 12. Location of the IS (accurate or approximate coordinates) .....
- 13. Country where interfering station is believed to be located .....
- 14. Bearing (in degrees true) of the IS (with indication of location of D/F station) .....

**ITU DEFINITION OF HARMFUL INTERFERENCE**

Harmful interference: interference which endangers the functioning of a radionavigation service or of other safety services or seriously degrades, obstructs, or repeatedly interrupts a radiocommunication service operating in accordance with these Regulations.

## Attachment E

### AM(R)S PLANNING PRINCIPLES

In the planning of the AM(R)S the following principles should be taken into account:

- a) based on the ATS providers' and aircraft operators' plans, the implementation of air-ground data link communications in the CAR/SAM regions should be carried out in a progressive manner taking into account cost-benefit considerations;
  - b) communications data links, when implemented, should be used for routine air-ground communications. Voice communications capability should be maintained for emergency purposes at the ATM units;
  - c) VHF communications, supported by extended range facilities where required, should be used to cover ATS routes to the maximum extent possible;
  - d) VHF planning should be based on channel spacing of 25 kHz and assignment of frequencies in the band 117.975 to 137 MHz should be based on the principles set out in Annex 10, Volume V;
  - e) in coordination with States, VHF frequency channels assignment for planned and operational air-to-ground communications should be recorded and published by the ICAO Regional Offices;
  - f) where full VHF coverage is provided, the requirements of HF should be withdrawn;
  - g) where full VHF RTF coverage is not practicable, or cannot be guaranteed at all times, HF RTF communications should be provided;
  - h) the assignments of HF/SSB frequencies for voice communications should be made in accordance with the allotment plan and technical principles for the AM(R)S contained in Appendix S27 of the ITU-R Radio Regulations. The assignments for HF data communications should be made based on the agreement to be made in this respect between ICAO and the ITU;
  - i) satellite voice communications must be capable of providing a quality equivalent to that of VHF voice and priority must be available for satellite ATS voice communications in both "to" and "from" aircraft directions;
  - j) in planning the AMS(R)S, proliferation of AMSS ground earth stations (GES) should be avoided; and
  - k) for the remote and oceanic areas without VHF coverage, satellite air-ground data links of the AMSS should be planned and complemented as necessary with HF DL services.
-

## Attachment F

### GEOGRAPHICAL SEPARATION CRITERIA

Air/ground communication for	Symbol	Designated operational coverage		Minimum geographical separation (NM)	Adjacent channel separation (NM)
		NM	Up to m (ft)		
Aerodrome control	TWR	25	1 200 (4 000)	175	50
Surface movement control	SMC	Limits of the aerodrome	Surface	25	25
Approach control up to FL 450	APP/U	150	13 700 (45 000)	820	180
Approach control up to FL 250	APP/I	75	7 600 (25 000)	550	95
Approach control up to FL 120	APP/L	50	3 650 (12 000)	370	60
Area control up to FL 450	AC/U	Within the area plus 50 NM	13 700 (45 000)	520 between limits of service areas	180 between limits of service areas
Area control up to FL 250	AC/L	Within the area plus 50 NM	7 600 (25 000)	390 between limits of service areas	95 between limits of service areas
SST high level operations or VHF/ER	AC/R	To be specified	20 000 (66 000)	1 300	350
VOLMET up to FL 450	V	Maximum omni-directional available	13 700 (45 000)	520	180

## Attachment G

### AM(R) VHF SUB-BANDS ALLOTMENT TABLE

Frequency sub-band (MHz)	Worldwide utilization	CAR/SAM application	Remarks
118.00 – 118.925	National/International	TWR	
119.00 – 121.375	National/International	APP	
121.5	Emergency frequency	Emergency frequency	
121.60 – 121.975	National/International	SMC	
122.00 – 123.05	National	—	
123.1	Aux. frequency SAR	Aux. frequency SAR	
123.15 – 123.675	National	—	Note
123.45	Air-to-air communications	Air-to-air communications	
123.70 – 126.675	National/International	ACC	
126.70 – 127.575	National/International	General purpose (GP)	
127.60 – 127.90	National/International	VOLMET/ATIS	
127.950 – 128.80	National/International	ACC	
128.850 – 129.850	National/International	APP	
129.90 – 132.025	National/International	AOC	
132.050 – 132.950	National/International	VOLMET/ATIS	
133.00 – 135.950	National/International	ACC	
136.00 – 136.875	National/International	—	
136.90 – 136.975	National/International	Reserved for VDL	

*Note.— With the exception of 123.45 MHz, which is also used as the worldwide air-to-air communications channel.*

## Attachment H

# PLANNING PRINCIPLES FOR THE AERONAUTICAL RADIO NAVIGATION AIDS

The current CAR/SAM aeronautical radio navigation plan is based on certain planning principles which have been developed through the years. An updated list of such planning principles, which incorporates the latest developments especially with regard to satellite navigation matters, is presented below.

### a) NDB

- 1) An NDB should be implemented where the provision of a VOR is not feasible. Guidance material for NDBs is contained in Annex 10, Volume I, Attachment C, Section 6.
- 2) Radio frequencies assigned to NDBs shall be selected from those available in the portion of the spectrum between 190 to 1 750 kHz. A minimum ratio of 15 dB between wanted and unwanted signals shall be used.
- 3) Between 30ES and 30EN, the minimum value of field strength at the limit of the rated NDBs coverage shall be 120 microvolts/m. Otherwise, 70 microvolts/m shall be provided.
- 4) In selecting frequencies for modulation tones of NDBs, the 1 020 Hz tone should be used unless interference on adjacent carrier frequencies is experienced, in which case 400 Hz may be used.

### b) VOR

- 1) For VORs located in the CAR/SAM regions required to serve flights up to FL450 (using 100 kHz channel spacing in odd tenths of a megahertz in the band 111.975 – 117.975 MHz), a geographical separation of 550 NM for co-channel and 220 NM for adjacent channel frequency assignment should be used.
- 2) For VORs in congested areas where older receivers (with a 100 kHz spacing operate in a mixed 100 kHz – 50 kHz channel spacing environment, geographical separation for adjacent channel should be greater than 500 NM.
- 3) In that part of the North America (NAM) region bordering the CAR region, as well as in certain parts of the CAR region, there is a congestion of VOR facilities, and it has become increasingly difficult to assign new VOR frequencies that are not in conflict with other assignments. Where there is congestion of VOR facilities, consideration should be given to reducing the service volume to what is actually required for operational use. In such cases, the reduced service volumes and geographical separations used are:

Class of facility	Frequency-protected volume of airspace	Minimum co-channel	Minimum adjacent channel separation
Terminal	25 NM (46 km) radius, up to 12 000 ft (3 658 m) mean sea level (MSL)	130 NM (241 km)	30 NM (56 km)
Low	40 NM (74 km) radius, up to 18 000 ft (5 486 m) MSL	185 NM (343 km)	50 NM (83 km)
High	130 NM (241 km) radius up to 45 000 ft (13 716 m) MSL	390 NM (722 km)	150 NM (275 km)

4) It is recognized that in applying the concept of

reduced service volumes to overcome difficulties in

VOR frequency deployment in any given area of congestion, there may be a special requirement to exceed the minimally set service volume to accommodate a certain portion of airspace or certain operational procedures. In such case, an “expanded service volume” covering the airspace or operational procedure in question could be established and provided with special frequency protection. This could be done, in general, on a case-by-case basis.

c) Non-visual aids for final approach and landing

- 1) A regional strategy for the introduction of final approach and landing was developed by GREPECAS as part of the CAR/SAM Regional CNS/ATM Plan. This strategy is presented in the attachment.
- 2) In the CAR/SAM regions, the majority of aircraft carry ILS localizer and glide path receivers with channel spacing of 100 kHz and 300 kHz, respectively. Moreover, it is considered that the density of ILS facilities in the CAR/SAM regions is such that localizer and glide path frequencies can be assigned, in accordance with the provisions of Annex 10, Volume I, 3.1.6.1.1. The minimum geographical separation between ILS facilities would be 175 NM for co-channel and 45 NM for adjacent channel. Guidance material on this matter is provided in Annex 10, Volume I, Attachment C, 2.6.
- 3) GBAS carrier frequencies will have to be selected in accordance with applicable GNSS SARPs. ILS/GBAS and COM (VHF)/GBAS geographical separation criteria are currently under development. Until these criteria are defined and included in the SARPs, GBAS frequencies can be selected from the band 112.050 – 117.900 MHz.

d) DME

For most DME facilities which operate in association with VORs, the same geographical separation criteria established for the VOR are equally applicable.

Guidance material on geographical separation criteria for different DME types is provided in Annex 10, Volume I, Attachment C, 7.1.7.

e) Guidelines for transition to satellite navigation systems

- 1) The GNSS should be introduced in an evolutionary manner.
- 2) The ground infrastructure for current navigation systems must be available during the transition period.
- 3) States/regions should consider segregating traffic according to navigation capability and granting preferred routes to aircraft with better navigation performance.
- 4) States/regions should coordinate to ensure that separation standards and procedures for appropriately equipped aircraft are introduced approximately simultaneously in all flight information regions (FIRs) along major traffic routes.
- 5) In planning the transition to GNSS, the following issues must be considered:
  - schedule for availability and approval of GNSS-based service;
  - extent of existing ground-based radio navigation service;
  - level of user equipage;
  - provision of other systems required for air traffic services (i.e. surveillance and communication);
  - density of traffic/frequency of operations; and
  - mitigation of risks associated with radio frequency interference.

## Attachment I

# REGIONAL STRATEGY FOR THE INTRODUCTION AND APPLICATION OF NON-VISUAL AIDS FOR APPROACH, LANDING AND DEPARTURE

1. Maintain the ILS as the ICAO standard precision approach and landing system as long as necessary and as long as it remains operationally acceptable and economically beneficial.
  2. Promote, in the short term, the use of GNSS in support of non-precision approach operations and the augmented GNSS for CAT I precision approaches and landing in accordance with the available SARPs and guidance material of ICAO.
  3. Promote and monitor the studies on the viability of CAT II and CAT III GNSS operations with the corresponding necessary augmentations, to apply those capabilities in operationally acceptable and economically beneficial cases.
  4. Taking into consideration the projected availability of SARPs and guidance material of ICAO, in regard to GNSS operations, States/territories requiring implementation of these systems for approach, landing and departure operations, conduct, as soon as possible, studies for the implementation of local ground stations for complementary data link systems and for GNSS avionics equipment.
  5. Support the application of the required navigation performance (RNP) for approach, landing and departure operations in accordance with ICAO provisions when applicable.
  6. Promote the development and validate the use of a multi-mode receiver (MMR) or the use of an on-board capability based on the operation, that allows the maximum transition flexibility in the future, in order to facilitate the transition and maintain the inter-functionability of air navigation systems and services.
-

## Part V

# AIR TRAFFIC MANAGEMENT (ATM)

### INTRODUCTION

1. This part of the Caribbean and South American Basic Air Navigation Plan contains elements of the existing planning processes and introduces the basic operational requirements and planning criteria related to air traffic management (ATM) as developed for the CAR/SAM regions.

2. As a complement to the statement of Basic Operational Requirements and Planning Criteria set out in Part I of the Basic ANP, Part V constitutes the stable guidance material considered to be the minimum necessary for effective planning of ATM facilities and services in the Caribbean and South American regions. This guidance material has been developed through the ICAO regional planning processes which, in the case of the CAR/SAM regions, is based largely on the work of the CAR/SAM Regional Planning and Implementation Group (GREPECAS) and CAR/SAM regional air navigation meetings. Background information of importance in the understanding and effective application of this part of the plan is contained in the *Report of the Third Caribbean/South American Regional Air Navigation Meeting* (Doc 9749, CAR/SAM/3 (1999)) on Agenda Item 5.

3. The Standards, Recommended Practices and Procedures to be applied are contained in:

- a) Annex 2 — *Rules of the Air*;
- b) Annex 6 — *Operation of Aircraft*;
- c) Annex 11 — *Air Traffic Services*;
- d) *Procedures for Air Navigation Services — Rules of the Air and Air Traffic Services* (Doc 4444);
- e) *Procedures for Air Navigation Services — Aircraft*

*Operations* (Doc 8168); and

- f) *Regional Supplementary Procedures* (Doc 7030), Part 1 — *Rules of the Air, Air Traffic Services and Search and Rescue*.

4. The elements of the material referred to above are presented in the following paragraphs under the headings of Airspace Management (Part V.I – ASM), Air Traffic Services (Part V.II – ATS) and Air Traffic Flow Management (Part V.III – ATFM), with appropriate cross-references to CAR/SAM RAN meeting recommendations.

5. A detailed description/list of the facilities and/or services to be provided by States in order to fulfil the requirements of the ANP is contained in the CAR/SAM Facilities and Services Implementation Document (FASID). During the transition and pending full implementation of the future communications, navigation and surveillance/air traffic management (CNS/ATM) systems, it is expected that the existing requirements will gradually be replaced by new CNS/ATM systems-related requirements. Further, it is expected that some elements of the CNS/ATM systems will be subject to amendment, as necessary, on the basis of experience gained in their implementation.

### OBJECTIVES OF AIR TRAFFIC MANAGEMENT

#### General

6. The primary objective of an integrated ATM system in the CAR/SAM regions is to enable aircraft operators to meet their planned times of departure and arrival and adhere to their preferred flight profiles with minimum constraints and with no compromise to safety. To accomplish this, the technologies afforded through new CNS systems will have to

be fully exploited through international harmonization of ATM standards and procedures. From the aircraft operator's point of view, it is desirable to equip aircraft operating internationally with a minimum set of avionics usable everywhere. Additionally, many of the expected service improvements cannot be meaningfully implemented by one State, but must be implemented in contiguous regions. Therefore, the ATM regional concept of providing ATM over expanded areas must be pursued.

### **Elements of the air traffic management system**

7. The envisaged ATM system in the CAR/SAM regions will consist of several sub-elements; these are: airspace management (ASM), ATS, air traffic flow management (ATFM) and the ATM-related aspects of flight operations. These sub-elements will evolve and take on different roles, mainly because they will integrate into a total system. Rather than viewing ground and air as separate functions, the ATM-related aspects of flight operations will be fully integrated as a functional part of the ATM system. Ultimately, this inter-operability and functional integration into a total system is expected to yield a synergy of operations that does not currently exist. Through the use of data link for data interchange between elements of the ATM system, this functional integration will be accomplished.

#### ***Airspace management***

8. The objective of ASM is to maximize, within a given airspace structure, the utilization of available airspace by dynamic time-sharing and, at times, segregation of airspace among various categories of users based on short-term needs.

9. In the emerging ATM system in the CAR/SAM regions, airspace management will encompass more than it has traditionally. Consequently, in the seamless, global ATM system, airspace management will not be limited only to tactical aspects of airspace use. Its main scope will be toward a strategic planning function of airspace infrastructure and flexibility of airspace use.

#### ***Air traffic services***

10. ATS will continue to be the primary element of ATM in the CAR/SAM regions. The ATS are composed of several sub-elements: alerting service, flight information service (FIS) and ATC. The primary objective of ATC

service is to prevent collisions between aircraft and between aircraft and obstructions on the manoeuvring area and to expedite and maintain an orderly flow of air traffic. The objective of FIS is to provide advice and information useful for the safe and efficient conduct of flights. The objective of the alerting service is to notify appropriate organizations regarding aircraft in need of search and rescue aid and assist such organizations as required.

11. Significant progress has been made on the development of provisions related to ATS in CNS/ATM systems. Standardization and harmonized implementation planning in the CAR/SAM regions will ensure that ATS systems supporting ATM are developed so as to provide integration into a regional and global network of continuous service. This requires harmonization of radar data and flight data processing systems, among others. The functional capabilities of ATS support systems such as conflict prediction, detection, advisory and resolution should be harmonized across the CAR/SAM regions.

#### ***Air traffic flow management***

12. The objective of ATFM is to ensure an optimum flow of air traffic to or through areas during times when demand exceeds or is expected to exceed the available capacity of the ATC system. The ATFM system in the CAR/SAM regions should therefore reduce delays to aircraft both in flight and on the ground and prevent system overload. The ATFM system will assist ATC in meeting its objectives and achieving the most efficient utilization of available airspace and airport capacity. The ATFM system in the CAR/SAM regions should also ensure that safety is not compromised by the development of unacceptable levels of traffic congestion and, at the same time, to assure that traffic is managed efficiently without unnecessary flow restrictions being applied.

### **ATM system regional evolution and implementation timelines**

13. Although changes in the ATM system in the CAR/SAM regions will be implemented in an evolutionary manner, the design of the emerging system should allow for the implementation of a series of well-planned and feasible improvements with a favourable cost-benefit ratio. The ATM system should satisfy user needs while meeting safety, capacity, efficiency, regularity and environmental protection

requirements. The implementation plan should allow for incremental improvements, so that the services provided are appropriate to given applications and areas, thereby ensuring homogeneous, continuous and effective service from gate-to-gate. A well-planned implementation schedule is also essential to guarantee an interface between adjacent systems so that boundaries remain transparent to airspace users.

14. The evolution of ATM in the CAR/SAM regions

has been planned on the basis of an integrated regional infrastructure. This is accomplished through planning based on a series of homogeneous areas and major international air traffic flows. Eight areas have been identified, taking into consideration the varying degrees of complexity and diversity in the region. A high-level view of ATM system implementation is depicted in the Regional ATM System Implementation Table at Appendix B.

## Part V.I

### AIRSPACE MANAGEMENT (ASM)

#### OBJECTIVES OF ASM

15. Best use of airspace and airport capacity requires an efficient airspace structure which permits collaboration planning between the aircraft and the ground ATM system. The airspace structure should be capable of dynamically adapting to changing circumstances and also accommodating the capabilities and desires of the airspace users, utilizing all available data.

16. The careful monitoring and efficient coordination of airspace use is essential to ATM. Therefore, the main objective of ASM is the avoidance of permanent reservation of parts of the airspace for one particular user. This applies to all airspace, but the objective is of special importance in airspace where the ATM system is based on a less rigid track structure, as opposed to a fixed network of ATS routes. When airspace user requirements conflict, resolution should be accomplished through coordination between all concerned parties, with a view to sharing airspace when possible and keeping the exclusive use of blocks of airspace to a minimum. Finally, close cooperation should result in information being readily available on expected and actual utilization of temporarily reserved airspace. The principles below highlight the main points of an effective ASM:

a) airspace use should be carefully coordinated and monitored in order to cater for the conflicting legitimate requirements of all users and to minimize any constraints on operations;

b) when it is unavoidable to segregate different categories of traffic, the size, shape and regulation category of airspace should be tailored to the minimum required to protect the operations concerned;

c) permanent segregation of airspace should be avoided in favour of flexible use of airspace; however, where it is necessary to cater for specific flight operations, e.g. military, reservation of airspace for such events should be limited in time and space to the minimum required; and

d) efficient communications should be provided between the entities providing services to air traffic, in order to enhance civil/military coordination in real-time.

17. The aim of airspace sectorization should be to develop an optimum airspace configuration, in combination with the use of other suitable methods for increasing ATM system capacity.

18. In order to accomplish this aim, the following functions are necessary:

a) collection and evaluation of all requests which require temporary airspace allocation;

b) planning and allocation of the required airspace to the users concerned where segregation is necessary;

c) activation and de-activation of such airspace within narrow time tolerances, in close cooperation with ATS

units and civil or military units concerned; and

- d) dissemination of detailed information, both in advance and in real-time, to all parties concerned.

19. Background information of importance in the understanding and effective application of the plan is contained in the *Report of the Caribbean/South American Regional Air Navigation Meeting* (Doc 9194) and the Reports of the Second and Third Caribbean/South American Regional Air Navigation Meetings (Doc 9543 and Doc 9749 respectively).

### **PLAN OF FLIGHT INFORMATION REGION (FIR) BOUNDARIES, INCLUDING ATS ROUTES**

20. Regional air navigation meeting recommendations shown in brackets below a heading indicate the origin of all paragraphs following that heading. A recommendation shown in brackets below a paragraph indicates the origin of that particular paragraph.

21. Flight information service is to be provided on a 24-hour basis for each flight information region and upper information region depicted on Charts ATS 1 and 2 respectively. This service is to be provided either by an area control centre (ACC) providing area control service within an FIR or upper flight information region (UIR) or, where there is no ACC, by a flight information centre (FIC) established for this purpose.

#### **ATS routes plan**

[CAR/SAM/3, Rec. 5/14]

22. The plan of ATS routes shown at Appendix A should form the ATS route network for the CAR/SAM regions. The proposed additions, deletions and changes to the requirements for the ATS routes network should be coordinated through the ICAO Regional Office concerned.

### **GENERAL GUIDELINES**

#### **A cooperative approach to airspace management**

[CAR/SAM/3, Rec. 5/1 ]

23. States, taking into account the need for cost-effective introduction and operation of CNS/ATM systems, should give consideration to cooperative efforts for introducing more efficiency in airspace management, particularly through globalization of upper airspace management, in order to facilitate the safe, orderly and expeditious flow of air traffic.

#### **Plane of division between the lower and upper airspace**

[CAR/SAM/3 Rec. 5/13]

24. Where a division of the airspace into an upper and lower position is required, States should consider the establishment of a uniform plane of division at FL 245. States that are unable to implement FL 245 as the plane of division between lower and upper airspaces should, as far as possible, select a level already used by adjacent States.

#### **Civil/military coordination**

25. In order to achieve optimum civil/military coordination and joint use of airspace with a maximum degree of safety, regularity and efficiency of international civil air traffic, States should:

- a) establish appropriate civil/military coordination bodies to ensure, at all levels, the coordination of decisions relating to civil and military problems of airspace management and air traffic control;
- b) make known to military authorities the existing ICAO provisions (Assembly Resolution A32-14, Appendix P, Annex 11, 2.16 and 2.17) and guidance material [*Manual Concerning Safety Measures Relating to Military Activities Potentially Hazardous to Civil Aircraft Operations* (Doc 9554) and *Manual concerning Interception of Civil Aircraft* (Doc 9433)] related to civil/military coordination and promote familiarization visits by military personnel to air traffic services (ATS) units;
- c) arrange permanent liaison and close coordination between civil ATS units and relevant military air defence units, in order to ensure the daily integration or segregation of civil and military air traffic operating within the same or immediately adjacent portions of airspace, employing civil and/or military radars as necessary, and to obviate the need for civil aircraft to obtain special "air defence" clearances; and

- d) take the necessary steps to prevent, as far as possible, penetration of controlled airspace by military aircraft without coordination with the air traffic control unit concerned.

[CAR/SAM/3, Rec. 5/6]

26. In light of evolving CNS/ATM systems technologies, States should conduct a review of special-use airspace with the objective of validating actual use in order to release airspace for civil use or to obtain joint-use airspace agreements and, while conducting the review, take the necessary actions to ensure that the prohibited, restricted, and danger areas are in compliance with Annexes 2 and 15.

[CAR/SAM/3, Rec. 5/7]

**Promulgation of prohibited, restricted and danger areas**

[CAR/SAM/2, Rec. 5/26]

27. States should refrain, to the extent possible, from establishing prohibited, restricted or danger areas, bearing in mind that, in accordance with Annex 15, prohibited areas or restricted areas may only be established over the territories of a State and not over international waters and apply the following principles when the establishment of prohibited, restricted or danger areas becomes unavoidable:

- a) give due regard to the need not to prejudice the safe and economical operation of civil aircraft;
- b) provide adequate buffer, in terms of time and size, within the designated area, appropriate to the activities to be conducted;
- c) use standard ICAO terminology in designation of the areas;
- d) promulgate information regarding the establishment and day-to-day use of the areas well in advance of the effective date(s);
- e) arrange for the closest possible coordination between civil ATS units and relevant units responsible for activities within the restricted or danger areas so as to enable the ATS units to authorize civil aircraft to traverse the areas in emergencies, to avoid adverse weather and to indicate whenever the restrictions do not apply or the areas are not active; and

- f) review the continuing need for the prohibited, restricted or danger areas at regular intervals.

28. When the establishment of danger areas outside territorial limits becomes unavoidable, it should be of a temporary nature and States should apply the following principles:

- a) prior to requesting the establishment of a temporary airspace reservation, the requesting authority shall obtain full information on the likely effect of such a reservation on air traffic. Such information shall include areas of high traffic density which may exist in the vicinity or at the planned location of the airspace reservation, as well as information on peak periods of traffic operating through such areas. In the light of that information, the requesting authority should, to the extent possible, select the site of the airspace reservation, and the time and duration so that this will have the least effect on normal flight operations conducted in the area in question;
- b) in specifying the extent of a requested temporary airspace reservation and its duration, the requesting authority shall limit the size of the area to the absolute minimum required to contain the activities intended to be conducted within that area, taking due account of:
  - 1) the navigation capability of aircraft or other vehicles within the airspace reservation;
  - 2) the means available to monitor those activities so as to guarantee that they will be confined within the airspace reservation; and
  - 3) the ability to interrupt or terminate activities;
- c) the duration of the airspace reservation shall be limited, taking a realistic account of preparation of the activities and the time required to vacate the reservation after the completion of the activities; and
- d) the actual use of the temporary airspace reservation shall be based on appropriate arrangements made between the ATS unit normally responsible for the airspace and the

requesting authority. Such arrangements shall be based on the general agreement reached previously between the competent ATS authority or ATS authorities and the requesting authority. They should, *inter alia*, cover:

- 1) the start of the use of the temporary airspace reservation;
- 2) the termination of its use; and
- 3) emergency provisions in case of unforeseen events affecting the activities to be conducted within the temporary airspace reservation.

29. When developing the plans for its future ATS system, prime consideration should be given to the creation of an integrated civil/military ATS system capable of meeting the requirements of both categories of users in the most effective manner.

## IMPLEMENTATION

### Implementation of air traffic control service

[CAR/SAM/3, Rec. 5/33]

30. States, which have not already done so, should implement air traffic control service for IFR flights along all ATS routes used for international aircraft operations, except where the type and density of traffic clearly do not justify the provision of such service.

### Implementation of approach control service

[CAR/SAM/2, Rec. 14/27]

31. States, not yet having done so, should implement, as a matter of urgency, approach control service at all international regular scheduled airports listed in Table AOP 1 of the FASID.

### Target level of safety for the introduction

### of reduced vertical separation minimum (RVSM)

[CAR/SAM/3, Rec. 5/29]

32. Before implementing RVSM, and while operations continue in a 2 000 ft vertical separation minimum environment, verification should be made that the level of safety of the proposed designated airspace would remain equal to or better than a TLS of  $5 \times 10^{-9}$  fatal accidents per flight hour due to the loss of vertical separation for all causes of risk.

### Implementation of radar

[CAR/SAM/2, Rec. 14/31]

33. Implementation of radar should be pursued as an enhancement to air traffic services where so required and the use of secondary surveillance radar (SSR) alone, in accordance with the procedures in the PANS-RAC (Doc 4444) and the CAR/SAM SUPPs (Doc 7030), should be considered as a cost-effective alternative to primary surveillance radar.

### Implementation of ATS speech circuits

[CAR/SAM/2, Rec. 14/28]

34. States should accord special priority to the implementation of ATS speech circuits and should use the following priority criteria as a planning basis for the implementation of ATS speech circuits:

- a) *Priority one.* Circuits between ATS units providing service in contiguous airspace where air traffic control service is being provided or is required.
- b) *Priority two.* Circuits between an aerodrome located close to an FIR boundary and the FIC/ACC located in the adjacent FIR.
- c) *Priority three:* Circuits between adjacent FICs/ACCs providing ATS along routes where neither air traffic control service nor air traffic advisory service is provided.

## Part V.II

## AIR TRAFFIC SERVICES (ATS)

## INTRODUCTION

35. Regional air navigation meeting recommendations shown in brackets below a heading indicate the origin of all paragraphs following that heading. A recommendation shown in brackets below a paragraph indicates the origin of that particular paragraph.

### **Implementation of an ATS quality assurance programme**

[CAR/SAM/3, Rec. 5/38]

36. States/ATS service providers within the CAR/SAM regions should implement an ATS quality assurance programme with associated supporting documents. The programme should outline the purpose, goals, objectives and responsibilities of the programme within the State/ATS service provider, and each ATS unit should establish such a programme.

### **Reporting and investigation of ATS incidents**

#### ***Reporting of ATS incidents***

[CAR/SAM/2, Rec. 6/12]

37. Aircraft operators should ensure that in cases where the aerodrome of intended landing is located in a different FIR from that in which the air traffic incident occurred, the ATS reporting office at the aerodrome of landing sends immediately after landing of the aircraft concerned, an AFTN message to the ATS unit(s) directly involved with the incident, containing all information provided on the air traffic incident report form. Aircraft operators should endeavour to ensure that an incident notification message is sent using the most reliable means available so as to reach the authority responsible for investigation within fifteen days of the incident, followed up by notification, in writing, using an air traffic incident report form, to reach the authority concerned within 21 days of the incident.

#### ***Investigation of ATS incidents***

[CAR/SAM/2, Rec. 6/11]

38. States which have not already done so should:

- a) promulgate a requirement in the RAC part of their AIP, to report air traffic incidents using a form and associated reporting procedures based on the procedures contained

in the PANS-RAC;

- b) establish, as a matter of urgency, machinery and procedures permitting the rapid processing and investigation of such reports in accordance with the material in the PANS-RAC and the *Air Traffic Services Planning Manual* (Doc 9426), Part II, Section I, Chapter 3;
- c) emphasize the need for rapid notification of the results of the investigation to all parties concerned including pilots, operators, other ATS units, etc., and to the relevant ICAO Regional Office, since the systematic receipt and analysis of incident reports is essential for the identification of deficiencies and the remedial action required; and
- d) cooperate with other States in order to ensure that ATS incidents are properly investigated.

#### ***Repetitive flight plans***

[CAR/SAM/2, Rec. 6/3]

39. In consultation with operators, States should consider the advantages offered by the use of repetitive flight plans and conclude agreements as necessary concerning the introduction of repetitive flight plan procedures.

#### ***Publication of interception of civil aircraft information in AIPs***

[CAR/SAM/3, Rec. 5/11]

40. States which have determined that there is a risk of interception in case of penetration of certain areas adjacent to air traffic services (ATS) routes should include in their aeronautical information publications (AIPs), as soon as possible, text relating to the potential risk of interception, including the navigation requirements to keep clear of the area.

41. States which have not determined the existence of interception risk, but which are affected by a situation of this nature, should adopt, as soon as possible, all measures which may be necessary to comply with the indications referred to in paragraph 40 above.

42. States which possess the facilities to monitor deviations from track which may involve the possibility of penetrating airspaces where interception procedures are implemented should include in their AIPs information to indicate that such deviations will be communicated to the

aircraft concerned.

43. Aeronautical information services (AIS) units should prepare a separate pre-flight bulletin on dangers to air navigation with details on activated areas, for distribution to flight crews, and other personnel as required.

***Operational Letter of Agreement between  
ATS and military units***

[CAR/SAM/3, Rec. 5/12]

44. In order to facilitate uniformity in the application of ICAO Standards and Recommended Practices relating to the interception of civil aircraft, States should, as far as possible, when establishing agreements between air traffic services (ATS) units and between ATS units and appropriate military units, use, to the extent possible, the model Letter of Agreement appearing at Appendix B to the *Manual concerning Interception of Civil Aircraft* (Doc 9433).

***Provision of area control service***

[CAR/SAM/2, Rec. 5/20]

45. Area control service should be provided on a 24-hour basis for flights along all ATS routes as shown in Appendix A to Agenda Item 5 contained in Doc 9543, except where the type and density of traffic clearly do not justify the provision of such service.

***Delivery of ATC clearance***

[CAR/SAM/3, Rec. 5/34]

46. In order to enhance safety and expedite aircraft operations, States should, at airports where necessary, implement provisions for pre-taxi ATC clearance delivery at international airports that have not already implemented such procedures.

***Establishment of standard departure (SID)  
and arrival (STAR) routes***

[CAR/SAM/3, Rec. 5/32]

47. States, which have not yet done so, should establish SID and STAR routes wherever necessary, taking into account the relevant ICAO provisions of Annex 11 — *Air Traffic Services*, Appendix 3, and guidance material in the *Air Traffic Services Planning Manual* (Doc 9426), as well as the *CAR/SAM Regional Plan for the Implementation of the CNS/ATM Systems (Table on ATM Evolution in the*

*CAR/SAM Regions — Operations in Terminal Areas)*.

***Provision of voice-automatic terminal  
information service/data link-automatic  
terminal information service***

[CAR/SAM/3, Rec. 5/17]

48. Voice-ATIS should be provided at those international aerodromes in the CAR/SAM regions where congestion on the VHF air-ground channels exists during peak traffic periods.

49. Either a discrete VHF frequency or the voice feature of the VOR normally associated with the initial approach should be used as determined by States.

50. In light of new technology, voice-ATIS should be complemented with D-ATIS when a sufficient number of aircraft are suitably equipped.

51. Pertinent provision for the use of ATIS should be included in States' aeronautical information publications (AIP).

***Extension of VHF air-ground  
communications coverage***

[CAR/SAM/2, Rec. 14/29]

52. States should implement VHF facilities, including extended-range VHF and remote VHF stations where so required for ATS purposes to permit effective direct pilot-controller communications.

***Near-term areas of application of  
area navigation (RNAV)***

[CAR/SAM/3, Rec. 5/16]

53. States, through GREPECAS, should identify those areas within their respective flight information regions (FIRs) where RNAV techniques can be applied, in order to take full advantage of the navigational capability of RNAV-equipped aircraft to meet a specified required navigation performance (RNP).

54. In the identification of such areas, the trajectories linking city-pairs of the CAR/SAM regions as shown in Appendix E to Agenda Item 5 contained in Doc 9749 should be taken into account, as well as major cities in the

CAR/SAM regions and those in adjacent regions.

***Uniform longitudinal separation***

[CAR/SAM/2, Rec. 6/2]

55. States should make all efforts to implement the required ATS direct speech circuits and take all other necessary measures to enable uniform application of the lowest longitudinal separation minima commensurate with safety along successive ATS route segments.

***Implementation of 10-minute longitudinal separation minimum with Mach number technique***

[CAR/SAM/3, Rec. 5/24]

56. A 10-minute longitudinal separation minimum with Mach number technique should be implemented in the CAR/SAM regions in areas lacking appropriate communications, navigation and surveillance facilities to support other separation minima.

***Consistent application of 10-minute and 80 NM RNAV distance-based longitudinal separation minima***

[CAR/SAM/3, Rec. 5/22]

57. States should implement the facilities necessary to permit the introduction of 10 minutes and 80 NM RNAV distance-based longitudinal separation minima on high density ATS trunk routes.

***Operational agreements to maintain the SSR codes over several FIRs***

[CAR/SAM/3, Rec. 5/21]

58. States should enter into operational agreements so that aircraft can maintain the assigned SSR code beyond the participating area, particularly in regions with high traffic density.

***Maintenance of guard on the emergency channel 121.5 MHz***

[CAR/SAM/2, Rec. 5/23]

59. Provision should be made for maintenance of guard on the emergency channel 121.5 MHz at each location indicated in Table CNS 2A in the FASID of the CAR/SAM Air Navigation Plan.

***Selective calling (SELCAL)***

[CAR/SAM/2, Rec. 5/24]

60. Wherever applicable, air-ground communications at aeronautical stations guarding general purpose frequencies should be equipped with selective calling (SELCAL) devices to facilitate efficient communications with SELCAL-equipped aircraft and to reduce cockpit workload.

***Implementation of English language programmes***

[CAR/SAM/3, Rec. 5/35]

61. States in the CAR/SAM regions should implement language programmes to improve English language proficiency among operational personnel.

## Part V.III

### AIR TRAFFIC FLOW MANAGEMENT (ATFM)

#### GENERAL PRINCIPLES OF THE ATFM SERVICE

62. In airspaces with high volumes of air traffic, ATFM

is needed to support ATM as a planning tool by providing for an optimum flow of air traffic to or through areas during times when demand exceeds or is expected to exceed, the available capacity of the ATM system. The oceanic ATFM service should

be interfaced with domestic ATFM organizations/units to provide maximum harmonization.

63. When operationally required, the GREPECAS should develop appropriate procedures for the provision of the ATFM service within the CAR/SAM regions to cater for the requirements of flights to and from FIRs in the region and adjacent to it. To achieve this, the following basic principles should be covered in the future ATFM system:

- a) pro-active ATFM requires the ability to dynamically interact with the strategic planning of traffic flows. Therefore, ATFM in the CAR/SAM regions should be interfaced with the overall ATFM strategies in other regions. To this end, the ATM system should also be capable of adjusting to the varying requirements;
  - b) re-active ATFM is required to take account of short-term contingencies. The ATM system should be able to react quickly and provide early information and advice to the controller and the pilot of the best tactical response necessary to achieve ATFM objectives;
  - c) data should be collated on likely future demand using historical information, planned development by airports and airlines, aircraft manufacturers, plus the economic forecasts and trends in States of the regions;
  - d) a recognized and common methodology for the assessment of the capacity of the current and planned ATM system should be developed to include sector capacities and in particular “choke” points;
  - e) regions should consider the introduction of a centralized flow management unit; and
  - f) where more than one flow management unit exists, plans to harmonize procedures and practices with adjacent units should be developed.
-

## Appendix A — Appendice A — Apéndice A

**TABLE ATS 1 — ATS ROUTE NETWORK**  
**TABLEAU ATS 1 —**  
**TABLA ATS 1 – RED DE RUTAS ATS**

### EXPLANATION OF THE TABLE

The following table describes the basic ATS route network in the lower and upper airspaces of the CAR/SAM regions. For ease of reference, RNAV routes have been listed separately at the end of the table.

#### *Column*

- 1 Designator of ATS route. Left-hand side of page lists lower ATS routes, right-hand side of page lists upper ATS routes.
- 2 Significant points defining the ATS routes. Each significant point is identified by a navigation facility name or a five-letter name-code. The significant points of each ATS route are those which identify route ends, FIR boundaries or an equivalent point, are 300 NM or more from another significant point, indicate a heading change of 30E or more, and other points considered necessary to identify the route. Locations shown in parentheses indicate significant points outside the CAR/SAM regions.

*Note 1.— Indicates route or route segment not implemented.*

*Note 2.— Indicates route or route segment published by the State with a designator that does not comply with Annex 11.*

### EXPLICACIÓN

En la tabla siguiente describe la red de rutas ATS básica en el espacio aéreo inferior y el espacio aéreo superior de las regiones CAR/SAM. Para facilitar la referencia, las rutas RNAV figuran separadamente al final de la tabla.

#### *Columna*

- 1 Designador de ruta ATS. En el lado izquierdo de la página figuran las rutas ATS inferiores y en el lado derecho de la página figuran las rutas ATS superiores.
  - 2 Puntos significativos que definen las rutas ATS. Cada punto significativo está identificado mediante el nombre de una instalación para la navegación o por un “nombre-clave” de cinco letras. Los puntos significativos de cada ruta ATS son aquellos que indican el término de la ruta, los límites FIR o u punto equivalente, que están a 300 NM o más de otro punto significativo, que indican un cambio de ruta de 30° o más, y otros puntos considerados necesarios para identificar la ruta. Los lugares entre corchetes indican puntos significativos fuera de la región CAR/SAM.
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*Nota 1.— Indica una ruta, o tramo de ruta, no implantada.*

*Nota 2.—Indica la ruta, o tramo de ruta, publicada por el Estado con un designador que no se ajusta al Anexo 11.*

ATS routes — Lower airspace French Text Rutas ATS — Espacio aereo inferior	ATS routes — Upper airspace French Text Rutas ATS — Espacio aereo superior
<p><b>A300</b></p> <p>KAVANAYEN GUAYANA MATURIN MARGARITA KIKER DORADO KRAFT (KENNEDY)</p>	<p><b>UA300</b> See Note/Ver Nota 2*</p> <p>EZEIZA KORTA MONTE CASEROS REPAM ASUNCION ARPAT CORUMBA YACAR BORGA UGINA NENET MANAUS BOA VISTA PAKON GUAYANA MATURIN MARGARITA KIKER DORADO (KENNEDY) *From/A partir KIKER/A partir de KIKER</p>
<p><b>A301</b></p> <p>VIRU VIRU TRINIDAD SANTA ANA VILUX RIO BRANCO LETICIA MIRAFLORES S. JOSE DE GUAVIARE BARRANCA BERMEJA DAGAN BARRANQUILLA OTAMO MANLEY TOTON AVILA URSUS BIMINI ANAME</p>	<p><b>UA301</b> See Note/Ver Nota 2*</p> <p>MARIANO MORENO GUALEGUAYCHU TODES RESISTENCIA EDVIM OBLUN VIRU VIRU TRINIDAD VILUX RIO BRANCO LETICIA PUPAS S. JOSE DE GUAVIARE BARRANCA BERMEJA DAGAN BARRANQUILLA OTAMO MANLEY TOTON AVILA URSUS BIMINI DAGAN *Between/Entre URSUS/BIMINI</p>
	<p><b>UA302</b></p> <p>LA PLATA DORVO MELO PORTO ALEGRE ETANO</p>

ATS routes — Lower airspace French Text Rutas ATS — Espacio aereo inferior	ATS routes — Upper airspace French Text Rutas ATS — Espacio aereo superior
	MARICA ALDEIA VITORIA
<b>A303</b>  LIMA GELIS CALAMA	<b>UA303</b>  LIMA GELIS CALAMA KONRI TUCUMAN CERES ISOPO ROSARIO SAN. ANTONIO DE ARECO
<b>A304</b>  LA PAZ VIRU VIRU CORUMBA URUBUPUNGA SANTANA SANTA CRUZ PORTO CONFINS	<b>UA304</b>  LIMA ASIA ELAKO LA PAZ VIRU VIRU CORUMBA CAMPO GRANDE BAURU PIRAN BONSUCESSO SANTA CRUZ PORTO CONFINS
<b>A305</b>  SANTO DOMINGO ALBAL UTRET GENERAL PICO EZEIZA DORVO CAP. CURBELO UGELO PELOTAS	<b>UA305</b>  SANTO DOMINGO ALBAL UTRET GENERAL PICCO EZEIZA DORVO CAP. CURBELO UGELO PELOTAS
<b>A306</b>  CAP. CURBELO SARGO EZEIZA	<b>UA306</b>  CAP. CURBELO SARGO EZEIZA TOSOR MENDOZA UMKAL TABON

ATS routes — Lower airspace French Text Rutas ATS — Espacio aereo inferior	ATS routes — Upper airspace French Text Rutas ATS — Espacio aereo superior
<b>A307</b>  SANTO DOMINGO NEBEG ESITO MENDOZA SOLER CORDOBA CERES SARNA RESISTENCIA BOBIK FOZ	<b>UA307</b>  SANTO DOMINGO NEBEG ESITO MENDOZA SOLER CORDOBA CERES SARNA RESISTENCIA BOBIK FOZ MUSGO CAMPINAS
	<b>UA308</b>  LA PLATA DORVO MELO PORTO ALEGRE COBRA BONSUCESSO
<b>A309</b>  CARRASCO UGURA PORTO ALEGRE	<b>UA309</b>  CARRASCO UGURA PORTO ALEGRE SOROCABA
<b>A310</b>  BAGE ASUMA MELO CARRASCO DARKA MAR DEL PLATA	<b>UA310</b>  SOROCABA CURITIBA MELO CARRASCO DARKA MAR DEL PLATA
<b>A311</b>  FOZ ASUNCION	<b>UA311</b>  MARICA REDE SOROCABA FOZ ASUNCION
<b>A312</b>	<b>UA312</b> See Note/Ver Nota 1*  PORTO BRASILIA BOMAL SANTAREM

ATS routes — Lower airspace French Text Rutas ATS — Espacio aereo inferior	ATS routes — Upper airspace French Text Rutas ATS — Espacio aereo superior
TIMEHRI DALGA FORT-DE-FRANCE MELVILLE HALL POINTE-A-PITRE V.C. BIRD ODKAM GRANN	ACARI KOXAM TIMEHRI DALGA FORT-DE-FRANCE POINTE-A-PITRE V.C. BIRD ODKAM GRANN *Between/Entre ODKAM/GRANN
<b>A314</b>	<b>UA314</b>
PORTO ALEGRE BAGE ISALA DURAZNO PAPIX EZEIZA	RECIFE SALVADOR NANUQUE PORTO MARICA ETANO FLORIANOPOLIS PORTO ALEGRE BAGE ISALA DURAZNO PAPIX EZEIZA
<b>A315</b>	<b>UA315</b> See Note/Ver Nota 1*
MAIQUETIA AVELO CURACAO VESKA CABO ROJO PORT-AU-PRINCE JOSES GREAT INAGUA BIMINI	PORTO BRASILIA XINGU JACAREACANGA MANAUS VAGAN KAMUT MAIQUETIA AVELO CURACAO VESKA CABO ROJO OBLEON JOSES GREAT INAGUA BIMINI *Between/Entre JOSES/BIMINI
<b>A316</b>	<b>UA316</b>
SALTA JUJUY YACUIBA VIRU VIRU	SALTA JUJUY BUTIL TARIJA

ATS routes — Lower airspace French Text Rutas ATS — Espacio aereo inferior	ATS routes — Upper airspace French Text Rutas ATS — Espacio aereo superior
	VIRU VIRU ILRES BOKOL MANAUS
<b>A317</b>  TAPACHULA SAN JOSE EL SALVADOR MANAGUA LIMON BUFEO TABOGA DAKMO	<b>UA317</b>  TAPACHULA SAN JOSE EL SALVADOR MANAGUA LIMON BUFEO TABOGA DAKMO MARIQUITA BOGOTA MITU TEFE REMIL XINGU BRASILIA PIRAI
	<b>UA318</b>  SALVADOR SAGAZ CONFINS CAMPINAS SOROCABA CURITIBA BAGE ISALA PAPIX EZEIZA
<b>A319</b>  THANK BETIR PUNTA CAUCEDO PALAS LIDOL OROSA AGUJA TABOGA	<b>UA319</b> See Note/Ver Nota 2*  THANK BETIR PUNTA CAUCEDO PALAS LIDOL OROSA AGUJA TABOGA *Between/Entre THANK/BETIR



ATS routes — Lower airspace French Text Rutas ATS — Espacio aereo inferior	ATS routes — Upper airspace French Text Rutas ATS — Espacio aereo superior
E.T. JOSHUA HEWANORRA FORT-DE-FRANCE	FORT-DE-FRANCE
	<b>UA425</b>  MARICA ETANO FLORIANOPOLIS PORTO ALEGRE MELO CARRASCO
<b>A426</b>  JOSES SAVAR PORT-AU-PRINCE	
<b>A428</b>  RESISTENCIA ARPAS ASUNCION GEMAS LONDRINA SOROCABA CONGONHAS	
<b>A430</b>  POSADAS ASUNCION PONTA PORA CAMPO GRANDE TOSAR CUIABA UGINA SILIC FLOTE RIO BRANCO	
	<b>UA432</b>  CORDOBA VAPES SALTO GAMOT PORTO ALEGRE
<b>A502</b>  TONCONTIN MANAGUA EL COCO	<b>UA502</b>  TONCONTIN MANAGUA EL COCO

<p>ATS routes — Lower airspace                  French Text                  Rutas ATS — Espacio aereo inferior</p>	<p>ATS routes — Upper airspace                  French Text                  Rutas ATS — Espacio aereo superior</p>
<p>POXON                  DAVID                  TABOGA</p>	<p>POXON                  DAVID                  TABOGA</p>
<p><b>A509</b>                   (DOLPHIN)                  MINOW                  NULEY                  CARPA                  NUBEL                  NAUTLA</p>	
<p><b>A511</b>                   ADAMS                  E.T. JOSHUA                  BOGSI                  VODIN                  TARBA                  KINGSTON                  MONTEGO BAY                  LESOM                  CAYO L. DEL SUR</p>	<p><b>UA511</b>                   ADAMS                  E.T. JOSHUA                  BOGSI                  VODIN                  TARBA                  KINGSTON                  MONTEGO BAY                  LESOM                  CAYO L. DEL SUR</p>
<p><b>A516</b>                   ST. MAARTEN                  MILOK                  ACORA                  CURACAO</p>	<p><b>UA516</b> See Note/Ver Nota 2*                   ST. MAARTEN                  MILOK                  ACORA                  CURACAO                  *Between/Entre ST. MAARTEN/MILOK</p>
<p><b>A517</b>                   POINTE-A-PITRE                  GOLDEN ROCK                  TIKAL                  ST. MAARTEN</p>	
<p><b>A523</b>                   GRANN                  THANK                  VERMO                  DDP</p>	
<p><b>A550</b>                   EL CANTON                  PUERTO CABELLO                  MAIQUETIA                  ITEGO                  POINTE-A-PITRE</p>	<p><b>UA550</b>                   GUAYAQUIL                  BOKAN                  BOGOTA                  KIKAS                  MAIQUETIA                  ITEGO                  POINTE-A-PITRE</p>

ATS routes — Lower airspace French Text Rutas ATS — Espacio aereo inferior	ATS routes — Upper airspace French Text Rutas ATS — Espacio aereo superior
<b>A551</b>  MAIQUETIA ONGAL FORT-DE-FRANCE	<b>UA551</b>  MAIQUETIA ONGAL FORT-DE-FRANCE
<b>A552</b>  TIBBY CLONN TAMPICO NAUTLA VERACRUZ MINATITLAN TUXTLA ERBOR LA AURORA TONCONTIN PUERTO CABEZAS FALLA SAN ANDRES ALPON BARRANQUILLA MARACAIBO PUERTO CABELLO CABO CODERA CARUPANO MEGIR PIARCO	<b>UA552</b>   TAMPICO NAUTLA VERACRUZ MINATITLAN TUXTLA ERBOR LA AURORA TONCONTIN PUERTO CABEZAS FALLA SAN ANDRES ALPON BARRANQUILLA ORTIZ MARACAIBO PUERTO CABELLO CABO CODERA CARUPANO MEGIR PIARCO
	<b>UA553</b>  PUERTO CABELLO SIDOS ESEDA TABOGA
<b>A554</b>  LAMER TOOMS GRAND TURK SEKAR PUERTO PLATA PUNTA CAUCEDO POKAK KABON MAIQUETIA	<b>UA554</b> See Note/Ver Nota 2*  LAMER TOOMS GRAND TURK SEKAR PUERTO PLATA PUNTA CAUCEDO POKAK KABON MAIQUETIA *To/Hasta SEKAR
<b>A555</b>  BELEM OIAPOQUE	<b>UA555</b>  BELEM OIAPOQUE

ATS routes — Lower airspace French Text Rutas ATS — Espacio aereo inferior	ATS routes — Upper airspace French Text Rutas ATS — Espacio aereo superior
ROCHAMBEAU TRAPP ADAMS FORT-DE-FRANCE ILURI ST. CROIX HARDY GRAND TURK BIMINI	ROCHAMBEAU TRAPP ADAMS FORT-DE-FRANCE ILURI
<b>A556</b>  CARRASCO MONTE CASEROS REPAM ASUNCION GERNI VIRU VIRU RIO BRANCO	<b>UA556</b>  CARRASCO MONTE CASEROS REPAM ASUNCION
	<b>UA558</b>  ESNAS ROSARIO ISOPO CERES JUJUY OROKO LA PAZ
<b>A561</b>  ADAMS POINT SALINES DAREK MARGARITA CABO CODERA	<b>UA561</b>  ADAMS POINT SALINES DAREK MARGARITA CABO CODERA
<b>A562</b>  MATURIN PARIA PIARCO	<b>UA562</b>  MATURIN PARIA PIARCO
<b>A563</b>  CURACAO BONAX GRAND ROQUE TOROP MARGARITA CARUPANO MEGIR PIARCO	<b>UA563</b> See Note/Ver Nota 1*  CURACAO BONAX GRAND ROQUE TOROP MARGARITA CARUPANO MEGIR PIARCO

ATS routes — Lower airspace French Text Rutas ATS — Espacio aereo inferior	ATS routes — Upper airspace French Text Rutas ATS — Espacio aereo superior
	<p><b>UA565</b></p> <p>CONDORCOCHA TERAS IQUITOS LETICIA KENOK TEFE ALTA FLORESTA XINGU BRASILIA PIRAI</p>
<p><b>A566</b></p> <p>GUAYAQUIL KORBO IQUITOS KALOR LETICIA ATUBA KENOK MANAUS REKER SANTAREM BELEM</p>	<p><b>UA566</b></p> <p>GUAYAQUIL KORBO IQUITOS LETICIA KENOK TEFE MANAUS</p>
<p><b>A567</b></p> <p>BOGOTA UTICA BUVIS CUCUTA ENPUT MENE MAUROA ARUBA BEROX PUNTA CAUCEDO</p>	<p><b>UA567</b> See Note/Ver Nota 1*</p> <p>BOGOTA UTICA BUVIS CUCUTA ENPUT MENE MAUROA ARUBA BEROX PUNTA CAUCEDO</p>
<p><b>A568</b></p> <p>LA PAZ CHARAÑA ARICA</p>	<p><b>UA568</b></p> <p>TRINIDAD LA PAZ CHARAÑA ARICA</p>
<p><b>A570</b></p> <p>RIO GALLEGOS</p>	<p><b>UA570</b></p> <p>LA PLATA IREMO VIEDMA COMODORO RIVADAVIA RIO GALLEGOS</p>

ATS routes — Lower airspace French Text Rutas ATS — Espacio aereo inferior	ATS routes — Upper airspace French Text Rutas ATS — Espacio aereo superior
PALIX PUNTA ARENAS	PALIX PUNTA ARENAS
<b>A573</b>  LA PAZ ORALO TACNA ILO	<b>UA573</b>  LA PAZ ORALO TACNA ILO
<b>A574</b>  TABOGA BOGAL CARTAGENA BARRANQUILLA SANTA MARTA TIGRO GILGA DATOR ARUBA CURACAO	<b>UA574</b> See Note/Ver Nota 1  TABOGA BOGAL CARTAGENA BARRANQUILLA GILGA DATOR ARUBA CURACAO
<b>A626</b>  (LEVILLE) BUFFI SWORD COZUMEL	<b>UA626</b> See Note/Ver Nota 2*  (LEVILLE) BUFFI SWORD COZUMEL *To/Hasta SWORD
<b>A632</b>  (BERMUDA) LOPPS PISAX TOTEM V.C. BIRD ADAMS EGEMA TIMEHRI	<b>UA632</b>  (BERMUDA) TOTEM V.C. BIRD ADAMS EGEMA TIMEHRI
<b>A636</b>  GREAT INAGUA ALBEE RETAK PUERTO PLATA KATOK BORINQUEN	<b>UA636</b> See Note/Ver Nota 2*  GREAT INAGUA ALBEE RETAK PUERTO PLATA KATOK BORINQUEN *Between/Entre GREAT INAGUA/RETAK and between/y entre KATOK/BORINQUEN

ATS routes — Lower airspace French Text Rutas ATS — Espacio aereo inferior	ATS routes — Upper airspace French Text Rutas ATS — Espacio aereo superior
<b>A637</b>  (BERMUDA) PRUIT MILLE COBBL	<b>UA637</b> See Note/Ver Nota 2  (BERMUDA) PRUIT MILLE COBBL
<b>A638</b>  STT GUYRO SLUGO	
<b>A649</b>  (LEVILLE) COKER RAKAS POZA RICA	
<b>A685</b>  RIO BRANCO METRO GUAJARA	
<b>A699</b>  FT. LAUDERDALE LOUIZ JESEE (SABLES IS.)	<b>UA699</b> See Note/Ver Nota 2  FT. LAUDERDALE LOUIZ JESEE (SABLES IS.)
<b>A700</b>  HOBEE JAINS (DOWNT) (HALIFAX)	<b>UA700</b>  HOBEE JAINS (DOWNT)
<b>A754</b>  BELIZE UTILA LA CEIBA TONCONTIN EL SALVADOR	<b>UA754</b>  BELIZE UTILA LA CEIBA TONCONTIN EL SALVADOR
<b>A756</b>  STELLA MARIS GREAT INAGUA BODLO	<b>UA756</b> See Note/Ver Nota 2*  STELLA MARIS GREAT INAGUA BODLO

ATS routes — Lower airspace French Text Rutas ATS — Espacio aereo inferior	ATS routes — Upper airspace French Text Rutas ATS — Espacio aereo superior
CAP HAITIEN	CAP HAITIEN *Up to/Hasta BODLO
<b>A758</b>  MERIDA AVRIS ILOPANGO	<b>UA758</b>  MERIDA AVRIS ILOPANGO
<b>A766</b>  (SABINE PASS) KEHLI COZUMEL SIGMA PUERTO LEMPIRA	<b>UA766</b> See Note/Ver Nota 2*  KELPI KEHLI COZUMEL SIGMA PUERTO LEMPIRA *Up to/Hasta KEHLI
<b>A770</b>  LEVILLE KEHLI MERIDA NALDA LA AURORA ILOPANGO	<b>UA770</b>  (LEVILLE) KEHLI MERIDA NALDA LA AURORA ILOPANGO
<b>B24</b> See Note/Ver Nota 2*  ZIN BDA GABES	
	<b>UB449</b>  GUALEGUAYCHU MELO
<b>B500</b>  CAYO L. DEL SUR LENOS PISIS UTILA LA MESA EL SALVADOR	<b>UB500</b>  CAYO L. DEL SUR LENOS PISIS UTILA LA MESA EL SALVADOR
<b>B503</b>  NASSAU ENAMO NUEVAS MANZANILLO	<b>UB503</b> See Note/Ver Nota 2*  NASSAU ENAMO NUEVAS MANZANILLO

ATS routes — Lower airspace French Text Rutas ATS — Espacio aereo inferior	ATS routes — Upper airspace French Text Rutas ATS — Espacio aereo superior
BEMOL MANLEY	BEMOL MANLEY *Up to/Hasta ENAMO
<b>B510</b>  MONTEGO BAY COLBY TABOGA KUBEK OTU	<b>UB510</b>  MONTEGO BAY COLBY TABOGA KUBEK OTU
<b>B518</b>  TIKAL YAXJA DEDAL ULBIN BELIZE	<b>UB518</b>  TIKAL YAXJA DEDAL BELIZE
<b>B520</b>  ISLA DEL CISNE PESTO MANLEY SASON CABO ROJO LECKY PUNTA CAUCEDO ANTEX DORADO ST. MAARTEN ELOPO V.C. BIRD	<b>UB520</b> See Note/Ver Nota 2*  ISLA DEL CISNE PESTO MANLEY SASON CABO ROJO LECKY PUNTA CAUCEDO ANTEX DORADO ST. MAARTEN ELOPO V.C. BIRD *Between/Entre ELOPO/ANTEX
<b>B552</b>  PUCALLPA CRUZEIRO DO SUL EIRUNEPE JURAR TEFE	
<b>B553</b>  MENE MAUROA URIBI RIO HACHA	
	<b>UB554</b>  RIO BRANCO FLOTE SILIC

ATS routes — Lower airspace French Text Rutas ATS — Espacio aereo inferior	ATS routes — Upper airspace French Text Rutas ATS — Espacio aereo superior
	UGINA CUIABA TOSAR CAMPO GRANDE TEDAS OSITA FOZ
<b>B555</b>  CARRASCO GUALEGUAYCHU PARANA	<b>UB555</b>  CARRASCO GUALEGUAYCHU PARANA
<b>B556</b>  NEUQUEN TUNAS TEMUCO	<b>UB556</b>  NEUQUEN TUNAS TEMUCO
<b>B560</b>  SAN JUAN MIBAS TONGOY	<b>UB560</b>  SAN JUAN MIBAS TONGOY
<b>B561</b>  RIO GRANDE TOGOR PUNTA ARENAS	<b>UB561</b>  RIO GRANDE TOGOR PUNTA ARENAS
	<b>UB602</b>  SALVADOR MOSSORO
<b>B623</b> See Note/Ver Nota 1  (SAL) RAKUD NORONHA RECIFE	<b>UB623</b> See Note/Ver Nota 1  (SAL) RAKUD NORONHA RECIFE
<b>B646</b>  (BERMUDA) GRATX NASSAU MARATHON FISH HOOK CANOA	<b>UB646</b> See Note/Ver Nota 2*  (BERMUDA) GRATX NASSAU MARATHON CANOA LENUK

ATS routes — Lower airspace French Text Rutas ATS — Espacio aereo inferior	ATS routes — Upper airspace French Text Rutas ATS — Espacio aereo superior
LENUK MERIDA	MERIDA *Up to/Hasta CANOA
<b>B652</b>  CUIABA SAN MATIAS VIRU VIRU	<b>UB652</b>  CUIABA SAN MATIAS VIRU VIRU SUCRE KULPA INCAS CALAMA MEJILLONES
	<b>UB677</b>  LIMA ASIA AREQUIPA KOMPA LA PAZ CALAMARCA COCHABAMBA VIRU VIRU
	<b>UB679</b>  LIMA ASIA AREQUIPA ARUL KULPA CHARAÑA AROLO KULPA REMAN JUJUY
	<b>UB680</b>  ZANDERY DIMAS ATITA DELON PALMAS CONFINS PIRAI
<b>B681</b>  TIMEHRI GEMOL BOA VISTA	<b>UB681</b>  TIMEHRI GEMOL BOA VISTA

ATS routes — Lower airspace French Text Rutas ATS — Espacio aereo inferior	ATS routes — Upper airspace French Text Rutas ATS — Espacio aereo superior
	ROGIM SANTAREM
<b>B682</b>  PUERTO MONTT TONAR BARILOCHE	<b>UB682</b>  PUERTO MONTT TONAR BARILOCHE
<b>B684</b>  CURICO ANKON LOLAS GRAL.PICO	<b>UB684</b>  CURICO ANKON LOLAS GRAL. PICO
	<b>UB686</b>  VIRU VIRU CAMIRI MARIA CERES
<b>B687</b>  RESISTENCIA POSADAS LUCIA ALDOS C. DEL IGUAZU	<b>UB687</b>  RESISTENCIA POSADAS LUCIA C. DEL IGUAZU
<b>B688</b>  EZEIZA GUALEGUAYCHU MONTE CASEROS POSADAS ORUGA FOZ	<b>UB688</b>  MONTE CASEROS POSADAS FOZ URUBUPUNGA TURMA BRASILIA FRONT MATRI FORTALEZA
<b>B689</b>  SAN ANDRES KAKOL RIO NEGRO MARIQUITA BOGOTA SAN JOSE	<b>UB689</b>  SAN ANDRES KAKOL RIO NEGRO MARIQUITA BOGOTA SAN JOSE

ATS routes — Lower airspace French Text Rutas ATS — Espacio aereo inferior	ATS routes — Upper airspace French Text Rutas ATS — Espacio aereo superior
PABON LETICIA	PABON LETICIA
<b>B690</b>  SAN ANDRES ANSON PUERTO LIMON EL COCO	<b>UB690</b>  SAN ANDRES ANSON PUERTO LIMON EL COCO
	<b>UB695</b>  ASUNCION KALAD URUBUPUNGA TURMA BRASILIA BAIAN LAPA RECIFE
	<b>UB696</b>  GUAYAQUIL MACHALA TOGOS OKASO
<b>B753</b>  (SCHOLES) MARTE MERIDA PENSO BELIZE LA MESA TONCONTIN	<b>UB753</b> See Note/Ver Nota 2*  (SCHOLES) MARTE MERIDA PENSO BELIZE LA MESA TONCONTIN *Up to/Hasta MARTE
<b>B760</b>  UNV IMELA BORDO MENDL LEEVI 2BV	<b>UB760</b>  UNV IMELA BORDO
<b>B764</b>  VINKA EMOSA COZUMEL SATOS BELIZE	<b>UB764</b>  VINKA EMOSA COZUMEL SATOS BELIZE

ATS routes — Lower airspace French Text Rutas ATS — Espacio aereo inferior	ATS routes — Upper airspace French Text Rutas ATS — Espacio aereo superior
PUERTO BARRIOS ILOPANGO	PUERTO BARRIOS ILOPANGO
<b>B767</b>  AVILA IBSEN KANEX GRAND CAYMAN PESTO PUERTO CABEZAS BLUEFIELDS EL COCO PARRITA PULGO	<b>UB767</b>  AVILA IBSEN KANEX GRAND CAYMAN PESTO PUERTO CABEZAS BLUEFIELDS EL COCO PARRITA PULGO
<b>B879</b>  VINKA NOSAT	<b>UB879</b>  VINKA NOSAT
<b>B881</b>  CIGAR EPSON MYDIA ROBIN CANCUN COZUMEL ANIKO UTILA	<b>UB881</b>  CIGAR EPSON MYDIA ROBIN CANCUN COZUMEL ANIKO UTILA
	<b>UB882</b> See Note/Ver Nota 2*  GRAND TURK ALBEE BENET *Up to/Hasta ALBEE
<b>B891</b>  ETBOD PUERTO PLATA POKEG WATRS GRANN	<b>UB891</b>  ETBOD PUERTO PLATA POKEG WATRS GRANN
<b>B892</b>  MAZ ANTEX PNA	

ATS routes — Lower airspace French Text Rutas ATS — Espacio aereo inferior	ATS routes — Upper airspace French Text Rutas ATS — Espacio aereo superior
<b>G300</b>	
CUCUTA EL CANTON ARAUCA	
<b>G426</b>	<b>UG426</b>
CONDORCOCHA ENSOL TUMACO TOKUT TABOGA	LIMA SALINAS CHACHAPOYAS MIRLO CONDORCOCHA ENSOL TUMACO TOKUT TABOGA
<b>G427</b>	<b>UG427</b>
ATONO PUERTO CABELLO ELORZA	ATONO PUERTO CABELLO ELORZA KOVEX SAN JOSE DEL GUAVIARE ENRUT IQUITOS
<b>G430</b>	<b>UG430</b>
GIRARDOT CARTAGENA KILER MONTEGO BAY PUTUL AVILA TANIA	IQUITOS LEGUIZAMO GIRARDOT CARTAGENA KILER MONTEGO BAY PUTUL AVILA TANIA
<b>G431</b>	<b>UG431</b>
BOGOTA BUVIS BARRANCA BERMEJA CUCUTA ENPUT SANTA BARBARA MENE MAUROA CURACAO SCAPA	LIMA SALINAS TARAPOTO LEGUIZAMO GIRARDOT BOGOTA BUVIS BARRANCA BERMEJA CUCUTA ENPUT SANTA BARBARA ALCOT CURACAO SCAPA

ATS routes — Lower airspace French Text Rutas ATS — Espacio aereo inferior	ATS routes — Upper airspace French Text Rutas ATS — Espacio aereo superior
DORADO ELMUC LETON	DORADO ELMUC LETON
<b>G432</b>  MAIQUETIA ARMUR DORADO GRANN (BERMUDA)	<b>UB432</b> See Note/Ver Nota 2*  MAIQUETIA ARMUR DORADO GRANN (BERMUDA) *From/A partir ARMUR
<b>G433</b>  BELEM AMAPA OIAPOQUE ROCHAMBEAU MIKOK ZANDERY GEBON TIMEHRI AKROK MATURIN MAIQUETIA	
<b>G434</b>  TABOGA KASOR MANLEY	<b>UG434</b>  TABOGA KASOR MANLEY
<b>G435</b>  TABOGA ARNAL GRAND CAYMAN KARUL GERONA	<b>UG435</b>  TABOGA ARNAL GRAND CAYMAN KARUL GERONA
<b>G436</b>  TIGIR LIBERIA AMATECAMPO LA AURORA	<b>UG436</b>  LIMA SALINAS ARNEL LIXAS RADIM TIGIR LIBERIA AMATECAMPO LA AURORA
<b>G437</b>	<b>UG437</b> See Note/Ver Nota 2*

ATS routes — Lower airspace French Text Rutas ATS — Espacio aereo inferior	ATS routes — Upper airspace French Text Rutas ATS — Espacio aereo superior
GUAYAQUIL ESMERALDAS SISEL UKLOS TABOGA DUXUN GONIS AVILA DINAH NASSAU MAPYL (SARJE)	LIMA SALINAS PADOX MACHALA ESMERALDAS SISEL UKLOS TABOGA DUXUN GONIS AVILA DINAH NASSAU MAPYL (SARJE) *From/A partir DINAH
<b>G439</b>	<b>UG438</b>
CONDORCOCHA MOXAS TILSO PULGO LIBERIA MANAGUA ISLA DEL CISNE SELEK CAYO L. DEL SUR	CONDORCOCHA BOKAN CALI RIO NEGRO CARTAGENA
<b>G440</b>	<b>UG439</b>
TABOGA ISEBA EL COCO LIBERIA	CONDORCOCHA MOXAS TILSO PAPIN LIBERIA MANAGUA ISLA DEL CISNE SELEK CAYO L. DEL SUR
<b>G442</b>	<b>UG440</b>
CAYO L. DEL SUR KATAL MONTEGO BAY MANLEY AMBIN ARUBA	TABOGA ISEBA EL COCO LIBERIA
<b>G442</b>	<b>UG442</b>
CAYO L. DEL SUR KATAL MONTEGO BAY MANLEY AMBIN ARUBA	CAYO L. DEL SUR KATAL MONTEGO BAY MANLEY AMBIN ARUBA

ATS routes — Lower airspace French Text Rutas ATS — Espacio aereo inferior	ATS routes — Upper airspace French Text Rutas ATS — Espacio aereo superior
ALCOT PUNTA SAN JUAN	ALCOT PUNTA SAN JUAN
<b>G443</b>  BELEM AMAPA OIAPOQUE ROCHAMBEAU MIKOK ZANDERY GEBON TIMEHRI AKROK MATURIN MAIQUETIA	<b>UG443</b>   ROCHAMBEAU MIKOK ZANDERY GEBON TIMEHRI AKROK MATURIN MAIQUETIA
<b>G444</b>   LENOM PORT-AU-PRINCE CAP. HAITIEN BOTES GRAND TURK	<b>UG444</b> See Note/Ver Nota 2*   LEGUIZAMO VILLAVICENCIO BARRANCABERMEJA EL BANCO SELAN LENOM OBLEON CAP. HAITIEN BOTES GRAND TURK *From/A partir BOTES/GRAND TURK
<b>G445</b>  SAN ANDRES AGUJA CARTAGENA TIGRO RIO HACHA OSAKA MARACAIBO	<b>UG445</b>  SAN ANDRES AGUJA CARTAGENA BARRANQUILLA
<b>G446</b>  (OLDEY) BROOM GRAND TURK BESAS KOBET CAUCEDO KARUM CURACAO REPIS	<b>UG446</b> See Note/Ver Nota 2*  (OLDEY) BROOM GRAND TURK BESAS KOBET CAUCEDO KARUM CURACAO REPIS

ATS routes — Lower airspace French Text Rutas ATS — Espacio aereo inferior	ATS routes — Upper airspace French Text Rutas ATS — Espacio aereo superior
PUNTA SAN JUAN MAIQUETIA	PUNTA SAN JUAN MAIQUETIA *Up to/Hasta POKEG
	<b>UG447</b>  BOGOTA ARORO SAN ANDRES
<b>G448</b>  SAN ANDRES LEVOR GRAND CAYMAN ATUVI CAYO LARGO VARDER TADPO MARATHON	<b>UG448</b> See Note/Ver Nota 2*  SAN ANDRES LEVOR GRAND CAYMAN ATUVI CAYO LARGO VARDER TADPO MARATHON *From/A partir TADPO
<b>G449</b>  DORADO ANADA PELMA PERRY PERGA PIARCO KORTO GEKOS ZANDERY REBER AMAPA BELEM IMPERATRIZ IVONE PALMAS BRASILIA UBERABA POÇOS DE CALDAS CONGOHNAS NIBGA CURITIBA PORTO ALEGRE	<b>UG449</b> See Note/Ver Nota 2*  DORADO ANADA PERRY PIARCO KORTO GEKOS SANDERY OTONI BELEM   *Up to/Hasta ANADA
<b>G521</b>  COZUMEL AMIDA LA MESA	<b>UG521</b>  COZUMEL AMIDA LA MESA
<b>G550</b>  PUERTO MONTT BALMACEDA EGOSA	<b>UG550</b>  PUERTO MONTT BALMACEDA EGOSA

ATS routes — Lower airspace French Text Rutas ATS — Espacio aereo inferior	ATS routes — Upper airspace French Text Rutas ATS — Espacio aereo superior
PUNTA ARENAS LITOK USHUAIA	PUNTA ARENAS LITOK USHUAIA PTO. WILLIAM
	<b>UG551</b>  KRILL PUNTA ARENAS PUERTO AGUIRRE PUERTO MONTT SANTIAGO TONGOY
<b>G629</b>  GREAT INAGUA PROVIDENCIALES RAHAM	
<b>G630</b>  CAP HAITIEN SAVAR	
<b>G633</b>  VILLAHERMOSA EMADA NALDA BELIZE NUBIS GRAND CAYMAN MONTEGO BAY MANLEY BENET PORT AU PRINCE ETBOD LECKY PUNTA CAUCEDO MELLA DORADO TUNNA GABAR V.C. BIRD	<b>UG633</b> See Note/Ver Nota 2*  VILLA HERMOSA EMADA BELIZE NUBIS GRAND CAYMAN MONTEGO BAY MANLEY BENET OBLEON ETBOD LECKY PUNTA CAUCEDO MELLA DORADO TUNNA V.C. BIRD *Between/Entre MELLA/GABAR
<b>G642</b>  VIGIE ADAMS	

ATS routes — Lower airspace French Text Rutas ATS — Espacio aereo inferior	ATS routes — Upper airspace French Text Rutas ATS — Espacio aereo superior
<p><b>G648</b></p> <p>GRAND TURK PROVIDENCIALES MICAS</p>	<p><b>UG648</b> See Note/Ver Nota 1</p> <p>GRAND TURK PROVIDENCIALES MICAS</p>
<p><b>G675</b></p> <p>CALI IPIALES PAJOL CONDORCOCHA GUAYAQUIL MACHALA TOGOS CHIRA LIMA IREMI TONGOY TEMUCO PUERTO MONTT BALMACEDA ASOPA EGOSA PUNTA ARENAS</p>	
<p><b>G678</b></p> <p>CABO CODERA CIUDAD BOLIVAR DIVINA PASTORA BOA VISTA MANAUS ALTA FLORESTA XINGU BRASILIA CONFINS PIRAI MARICA REDE ASONO PARANAGUA CURITIBA</p>	
<p><b>G679</b></p> <p>LIMA ILMAR ARICA TONGOY SANTO DOMINGO CONCEPCION PUERTO MONTT PTA ARENAS</p>	

ATS routes — Lower airspace French Text Rutas ATS — Espacio aereo inferior	ATS routes — Upper airspace French Text Rutas ATS — Espacio aereo superior
<b>G680</b>  BAGE TULIO GUALEGUAYCHU ROSARIO	<b>UG680</b>  BAGE TULIO GUALEGUAYCHU ROSARIO
	<b>UG741</b>  FORTALEZA PETROLINA KAKUD MONTES CLAROS CAMPINAS
<b>G757</b>  CHETUMAL TIKAL RABINAL	<b>UG757</b>  CHETUMAL TIKAL RABINAL
<b>G765</b>  FISH HOOK MAXIM NUKAN COZUMEL CHETUMAL RABINAL	<b>UG765</b> See Note/Ver Nota 2*  FISH ROCK MAXIM NUKAN COZUMEL CHETUMAL RABINAL *Up to/Hasta MAXIM
<b>G877</b>  CAYO L. DEL SUR DEBOR RIKEL GRAND CAYMAN UMAKA PUERTO LEMPIRA MANAGUA	<b>UG877</b>  CAYO L. DEL SUR DEBOR RIKEL GRAND CAYMAN UMAKA PUERTO LEMPIRA MANAGUA
<b>G880</b>  CABO ROJO PIRON DARSI MELLA	<b>UG880</b>  CABO ROJO PIRON DARSI MELLA
<b>G885</b>  ARUBA BEXER	<b>UG885</b> See Note/Ver Nota 1  ARUBA BEXER

ATS routes — Lower airspace French Text Rutas ATS — Espacio aereo inferior	ATS routes — Upper airspace French Text Rutas ATS — Espacio aereo superior
<b>R505</b>  ARLEN MANAGUA BUBIT DURAM SAN ANDRES	<b>UR505</b>  ARLEN MANAGUA BUBIT DURAM SAN ANDRES
<b>R507</b>  GRAND TURK CONCH DORADO	<b>UR507</b> See Note/Ver Nota 1  GRAND TURK CONCH DORADO
<b>R512</b>  BACUS PRISS BERMUDA	<b>UR512</b>  BACUS PRISS BERMUDA
<b>R513</b>  JAINS PRISS BERMUDA	<b>UR513</b> See Note/Ver Nota 1  JAINS PRISS BERMUDA
<b>R514</b>  LOUIZ PRISS BERMUDA	<b>UR514</b> See Note/Ver Nota 1  LOUIZ PRISS BERMUDA
<b>R515</b>  ADAMS CROWN POINT PIARCO	<b>UR515</b>  ADAMS PIARCO
<b>R519</b>  GERONA NUDAL CANCUN	<b>UR519</b>  GERONA NUDAL CANCUN
<b>R522</b>  CAYABO ALURU MARS ROZA RICA	<b>UR522</b>  CAYABO ALURU MARS POZA RICA

ATS routes — Lower airspace French Text Rutas ATS — Espacio aereo inferior	ATS routes — Upper airspace French Text Rutas ATS — Espacio aereo superior
	<p><b>UR550</b></p> <p>CORDOBA TUCUMAN JUJUY GESPA COCHABAMBA SAN BORJA CITRA RIO BRANCO</p>
	<p><b>UR554</b></p> <p>RESISTENCIA ARPAS ASUNCION</p>
	<p><b>UR558</b></p> <p>LA PAZ GRAFO RIO BRANCO</p>
	<p><b>UR559</b></p> <p>LA PAZ RAXUN ASOLA POSKA IQUITOS</p>
<p><b>R560</b></p> <p>ASUNCION PORTU LAS LOMITAS ASKAR JUJUY</p>	<p><b>UR560</b></p> <p>ASUNCION PORTU LAS LOMITAS ASKAR JUJUY KADAT CALAMA IQUIQUE</p>
<p><b>R563</b></p> <p>FOZ IRIGO PORTO ALEGRE</p>	<p><b>UR563</b></p> <p>FOZ IRIGO PORTO ALEGRE</p>
<p><b>R564</b></p> <p>ESMERALDAS ANGEL TUMACO CALI GIRARDOT</p>	<p><b>UR564</b></p> <p>ESMERALDAS ANGEL CALI GIRARDOT</p>

ATS routes — Lower airspace French Text Rutas ATS — Espacio aereo inferior	ATS routes — Upper airspace French Text Rutas ATS — Espacio aereo superior
<b>R567</b>  CALI PAPAN LEGUIZAMO ARPEN LETICIA	<b>UR567</b>  LEGUIZAMO ARPEN LETICIA
<b>R568</b>  MENE MAUROA PARAGUANA ITSEL ARUBA	
<b>R625</b>  MANZANILLO MATOS	<b>UR625</b>  MANZANILLO MATOS MONTEGO BAY
<b>R628</b>  VARDER TANIA NASSAU	<b>UR628</b> See Note/Ver Nota 2*  VARDER TANIA NASSAU *From/A partir TANIA
<b>R630</b>  CAYO. L. DEL SUR BISTO BELIZE RABINAL	<b>UR630</b>  CAYO L. DEL SUR BISTO BELIZE RABINAL
<b>R635</b>  BARAS ILOPANGO TONCONTIN PUERTO LEMPIRA CRUTA	<b>UR635</b>  BARAS ILOPANGO TONCONTIN PUERTO LEMPIRA CRUTA
<b>R640</b>  COZUMEL DANUL MAMBI GRAND CAYMAN MONTEGO BAY KINGSTON EDROD URIBI MARACAIBO	<b>UR640</b>  COZUMEL DANUL MAMBI GRAND CAYMAN MONTEGO BAY KINGSTON EDROD URIBI MARACAIBO PUERTO AYACUCHO NEBIL MANAUS

ATS routes — Lower airspace French Text Rutas ATS — Espacio aereo inferior	ATS routes — Upper airspace French Text Rutas ATS — Espacio aereo superior
<b>R644</b>  CAYMAN BRAC GRAND CAYMAN ULISA IS. DEL CISNE UTILA LA MESA LA AURORA TAPACHULA	<b>UR644</b>  CAYMAN BRAC GRAND CAYMAN ULISA IS. DEL CISNE UTILA LA MESA LA AURORA TAPACHULA
<b>R645</b>  LA MESA LA CEIBA	<b>UR645</b>  LA MESA LA CEIBA
<b>R683</b>  NEUQUEN EPGOL KAMUR CHILLAN	<b>UR683</b>  NEUQUEN EPGOL KAMUR CHILLAN
<b>R750</b>  HEWANORRA ADAMS	<b>UR750</b>  HEWANORRA ADAMS
<b>R763</b>  (BACUS) LETON GRAND TURK BORINQUEN	<b>UR763</b> See Note/Ver Nota 2  (BACUS) LETON GRAND TURK BORINQUEN
<b>R773</b>  LIBERIA PARRITA COTO 47	<b>UR773</b>  LIBERIA PARRITA COTO 47
<b>R878</b>  PUERTO CABEZAS MANAGUA	<b>UR878</b>  PUERTO CABEZAS MANAGUA
<b>R883</b>  ILOPANGO SEDRO	<b>UR883</b>  ILOPANGO SEDRO

ATS routes — Lower airspace French Text Rutas ATS — Espacio aereo inferior	ATS routes — Upper airspace French Text Rutas ATS — Espacio aereo superior
<b>R888</b>  SAINT CROIX MODUX POINTE-A-PITRE	<b>UR888</b> See Note/Ver Nota 2*  SAINT CROIX MODUX POINTE-A-PITRE *Up to/Hasta MODUX
<b>R890</b>  SWA CORAL AGUAN ANGEL TNT GALAN TUKOR ANAPO	<b>UR890</b>  SWA CORAL AGUAN ANGEL TNT GALAN TUKOR ANAPO
<b>R899</b>  PUERTO CABEZAS PUERTO LEMPIRA ROATAN BELIZE CHETUMAL	<b>UR899</b>  PUERTO CABEZAS PUERTO LEMPIRA ROATAN BELIZE CHETUMAL
<b>RNAV ROUTES / RUTAS RNAV</b>	
	<b>UL200</b>  LIMON LIBERIA TAMES ALSAL
	<b>UL201</b>  MITU MULIR SIGNO CAMPINAS
	<b>UL203</b>  ALSAL BETIS COCOS LIXAS
	<b>UL205</b>  POS LIMBO ANU

ATS routes — Lower airspace French Text Rutas ATS — Espacio aereo inferior	ATS routes — Upper airspace French Text Rutas ATS — Espacio aereo superior
	<p><b>UL206</b></p> <p>VICTORIA CALVO AGVAD BUGAT KODOS (DAKAR)</p>
	<p><b>UL211 F</b></p> <p>LA PLATA ESLAN GATOS KILOS MUNES (CAPE TOWN)</p>
	<p><b>UL214</b></p> <p>(LEVILLE) COKER RAKAS POZA RICA</p>
	<p><b>UL216</b></p> <p>RESISTENCIA MUNRO PUTSI SOVNI BUDSO SULKI PORTO VELHO LOTRA GABRIEL ZORRO AYACUCHO MAIQUETIA</p>
	<p><b>UL224</b></p> <p>MARICA KABUK OPERA ITGIV (CAPE TOWN)</p>
	<p><b>UL300</b></p> <p>TONGOY ARICA SELVA OSORA</p>

ATS routes — Lower airspace French Text Rutas ATS — Espacio aereo inferior	ATS routes — Upper airspace French Text Rutas ATS — Espacio aereo superior
	IQUITOS ROLUS BOGOTA
	<b>UL301</b>  CAMPINAS OSITA ASUNCION
	<b>UL302</b>  LIMA IREMI TONGOY
	<b>UL304</b> See Note/Ver Nota 2*  PORTO BRASILIA TESAL BOA VISTA ISANI CANAIMA CABO CODERA* GRAN ROQUE* CAP HAITIEN BODLO GREAT INAGUA* *Not implemented between/no implantada entre CABO CODERA/GREAT INAGUA
	<b>UL305</b>  LIMA SALINAS TERAS PULTU GIRARDOT BARRANQUILLA
	<b>UL306</b>  LIMA SELVA FORMA MANAUS ROGIN SIROS DIMAS ROCHAMBEAU
	<b>UL308</b>  PUEBLA OAXACA ATULCO

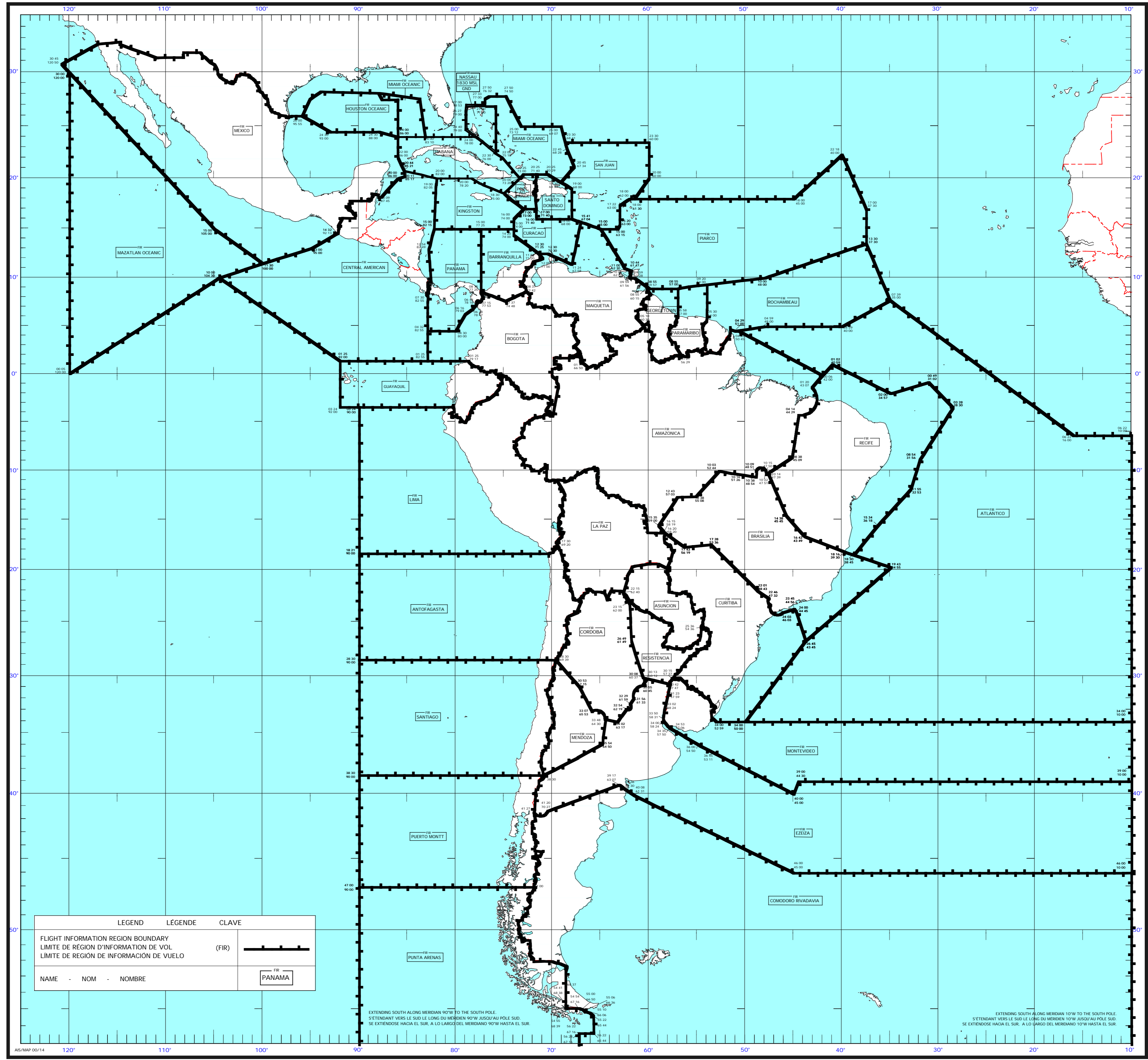
ATS routes — Lower airspace French Text Rutas ATS — Espacio aereo inferior	ATS routes — Upper airspace French Text Rutas ATS — Espacio aereo superior
	ANREX ISERU UGADI ANPAL UGEMA SALINAS LIMA
	<b>UL309</b>  TABON CALAMA EMPEX AROLO LA PAZ RIO BRANCO DARUK GABRIEL ZORRO PTO AYACUCHO MAIQUETIA
	<b>UL310</b>  POSADAS IRIGO SOROCABA
	<b>UL312</b>  QUINTERO MUDAR SALINAS OSAKI LOGAL UKABO ROTRO KATIS LA PAZ SAUZA
	<b>UL315</b>  BIVAM VARES LOGOL KOLSA SINOR NILTO RIO BRANCO
	<b>UL318</b>  ESMERALDAS VAMOS BOLDO RADIM EBDEL

ATS routes — Lower airspace French Text Rutas ATS — Espacio aereo inferior	ATS routes — Upper airspace French Text Rutas ATS — Espacio aereo superior
	ALSAL PUEBLA MEXICO
	<b>UL320</b> MOSSORO CONTA PORTO
	<b>UL322</b> SALTA GAXOK VIRU VIRU
	<b>UL324</b> FOZ CATARATAS DEL IGUAZU ELAMO CUARA KUKEN EZEIZA
	<b>UL327</b> PORTO PORGA ONSEK SERIM (MONROVIA)
	<b>UL330</b> VITORIA POLVO EMTUP ASDOK (FREETOWN)
	<b>UL332</b> NAUTLA NUBEL SWORD MINOW (MIAMI)



ATS routes — Lower airspace Routes ATS — Espace aérien inférieur Rutas ATS — Espacio aéreo inferior	ATS routes — Upper airspace Routes ATS — Espace aérien supérieur Rutas ATS — Espacio aéreo superior
	ETIMO, S050242 W0222830 ISUPA, S074312 W0193142 LOKIM, S112000 W015000 ETAXO, S155124 W0100000 (BUTOG), S165336 W0081030
	<b>UL401</b>  QUINTERO ESDIN KARAZ OSELO UKABO POGAM
	<b>UL415</b>  PARANA UDOLU KOLSA
	<b>UL435</b>  (DIBOX), N202700 W0500800 BUTUX, N180000 W0452248 PAKER, N152000 W0400000 IRELA, N140000 W0372600 (DIGUN), N093930 W0312200
	<b>UL550</b>  CALAMA KONRI OSILI EGORO ROSARIO
	<b>UL650</b>  CATAMARCA MUKIS GEKAL CALDERA
	<b>UL695</b>  TAPA(Antigua), N170742 W0614754 KIGAP, N163000 W0600000 AROPU, N143800 W0560000 ASALI, N120000 W0500000 BISUK, N103000 W0463000 DETOM, N083000 W0420000 ARUSI, N062500 W0372000 EGIMI, N060000 W0362000 DIKEB, N042954 W0340918 OBKUT, N032542 W0323700 ORARO, N021418 W0305442 BODAK, N013554 W0295942

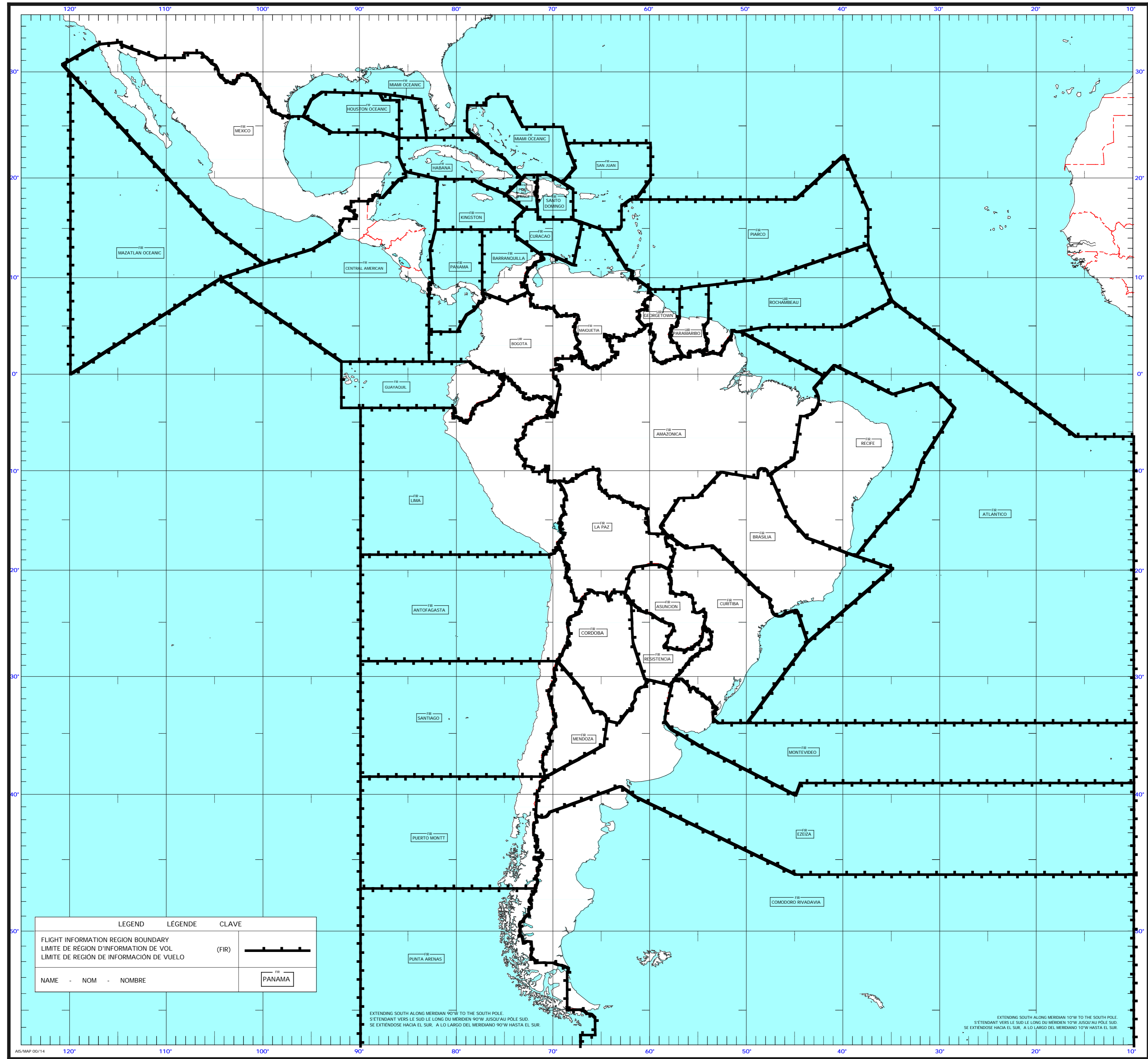
ATS routes — Lower airspace Routes ATS — Espace aérien inférieur Rutas ATS — Espacio aéreo inferior	ATS routes — Upper airspace Routes ATS — Espace aérien supérieur Rutas ATS — Espacio aéreo superior
	NOISE, N012336 W0294212 DIGOR, N004000 W0284000 BUTAP, S001606 W0270742 EGUPA, S023348 W0231730 ASANU, S034948 W0211018 DAGAM, S061042 W0171454 FHAW (Ascension Is.), S075812 W0142398
<b>L775</b>  GUTIN PABAL ESQUEL	<b>UL775</b>  GUTIN PABAL ESQUEL
	<b>UN741</b> See Note/Voir Note/Véase Nota 1  (PORTO SANTO) NANIK FORTALEZA
	<b>UN857</b> See Note/Voir Note/Véase Nota 1  (LANZAROTE) ERETU NORONHA RECIFE PIANO NANUQUE MARICA
	<b>UN866</b> See Note/Voir Note/Véase Nota 1  (GOMER) DEKON MOSSORO PLANE CONFINS
	<b>UN873</b> See Note/Voir Note/Véase Nota 1  (SAL) TASIL NATAL EVIAR CONFINS





LEGEND	LEGENDE	CLAVE
FLIGHT INFORMATION REGION BOUNDARY LIMITE DE REGION D'INFORMATION DE VOL LIMITE DE REGION DE INFORMACION DE VUELO	(FIR)	
NAME - NOM - NOMBRE		

EXTENDING SOUTH ALONG MERIDIAN 90°W TO THE SOUTH POLE.  
S'ETENDANT VERS LE SUD LE LONG DU MERIDIEN 90°W JUSQU'AU POLE SUD.  
SE EXTIENDESE HACIA EL SUR, A LO LARGO DEL MERIDIANO 90°W HASTA EL SUR.

EXTENDING SOUTH ALONG MERIDIAN 10°W TO THE SOUTH POLE.  
S'ETENDANT VERS LE SUD LE LONG DU MERIDIEN 10°W JUSQU'AU POLE SUD.  
SE EXTIENDESE HACIA EL SUR, A LO LARGO DEL MERIDIANO 10°W HASTA EL SUR.

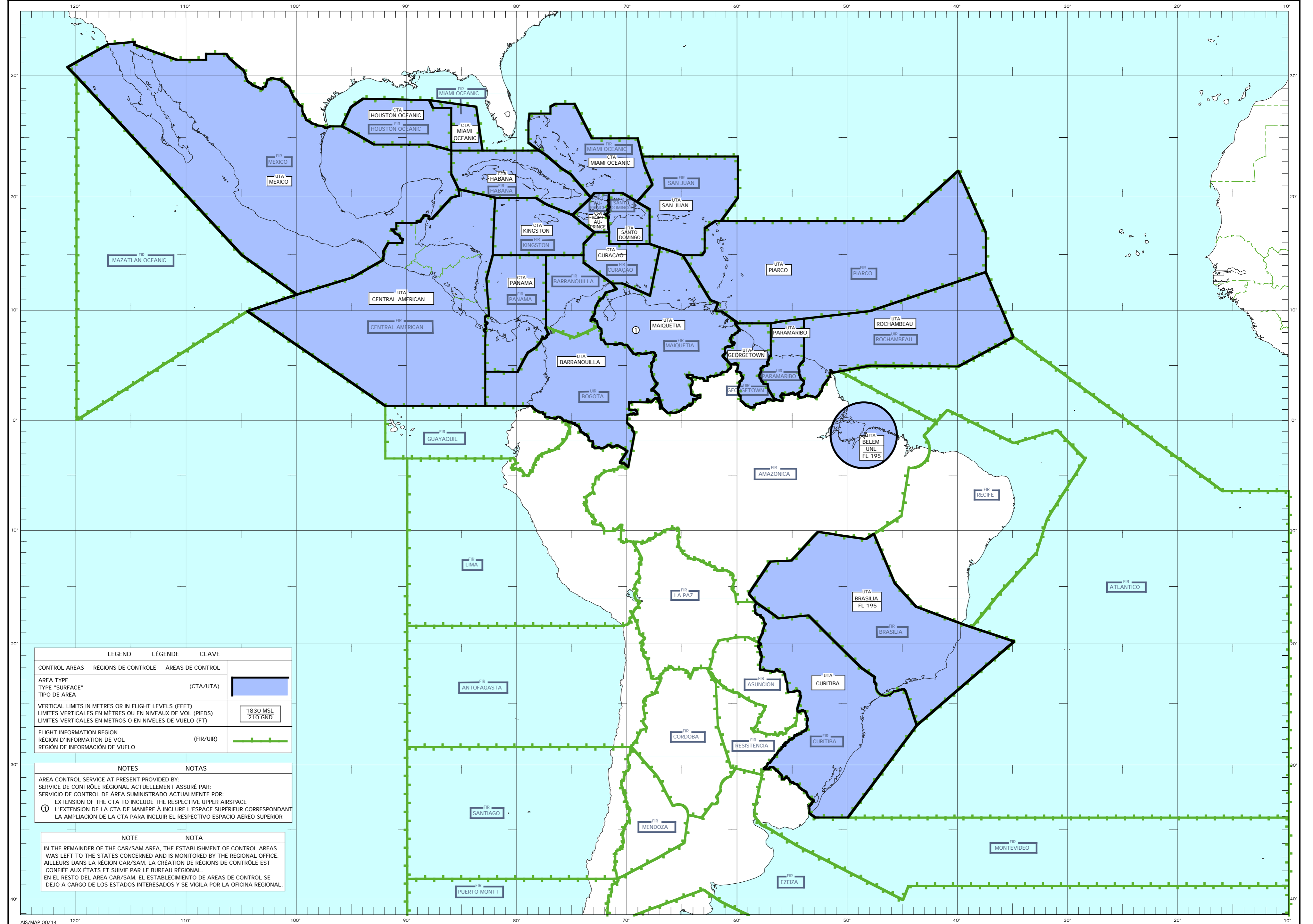


LEGEND	LEGENDE	CLAVE
FLIGHT INFORMATION REGION BOUNDARY LIMITE DE RÉGION D'INFORMATION DE VOL LÍMITE DE REGIÓN DE INFORMACIÓN DE VUELO		(FIR) 
NAME - NOM - NOMBRE		

EXTENDING SOUTH ALONG MERIDIAN 90°W TO THE SOUTH POLE.  
S'ÉTENDANT VERS LE SUD LE LONG DU MÉRIDIEN 90°W JUSQU'AU PÔLE SUD.  
SE EXTIENDE HACIA EL SUR. A LO LARGO DEL MERIDIANO 90°W HASTA EL SUR.

EXTENDING SOUTH ALONG MERIDIAN 10°W TO THE SOUTH POLE.  
S'ÉTENDANT VERS LE SUD LE LONG DU MÉRIDIEN 10°W JUSQU'AU PÔLE SUD.  
SE EXTIENDE HACIA EL SUR. A LO LARGO DEL MERIDIANO 10°W HASTA EL SUR.





LEGEND	LÉGENDE	CLAVE
CONTROL AREAS	RÉGIONS DE CONTRÔLE	ÁREAS DE CONTROL
AREA TYPE TYPE "SURFACE" TIPO DE ÁREA	(CTA/UTA)	
VERTICAL LIMITS IN METRES OR IN FLIGHT LEVELS (FEET) LIMITES VERTICALES EN METROS OU EN NIVEAUX DE VOL (PIEDS) LIMITES VERTICALES EN METROS O EN NIVEAUX DE VUELO (FT)		1830 MSL ZTO GND
FLIGHT INFORMATION REGION REGION D'INFORMATION DE VOL REGION DE INFORMACION DE VUELO	(FIR/UIR)	

**NOTES** / **NOTAS**

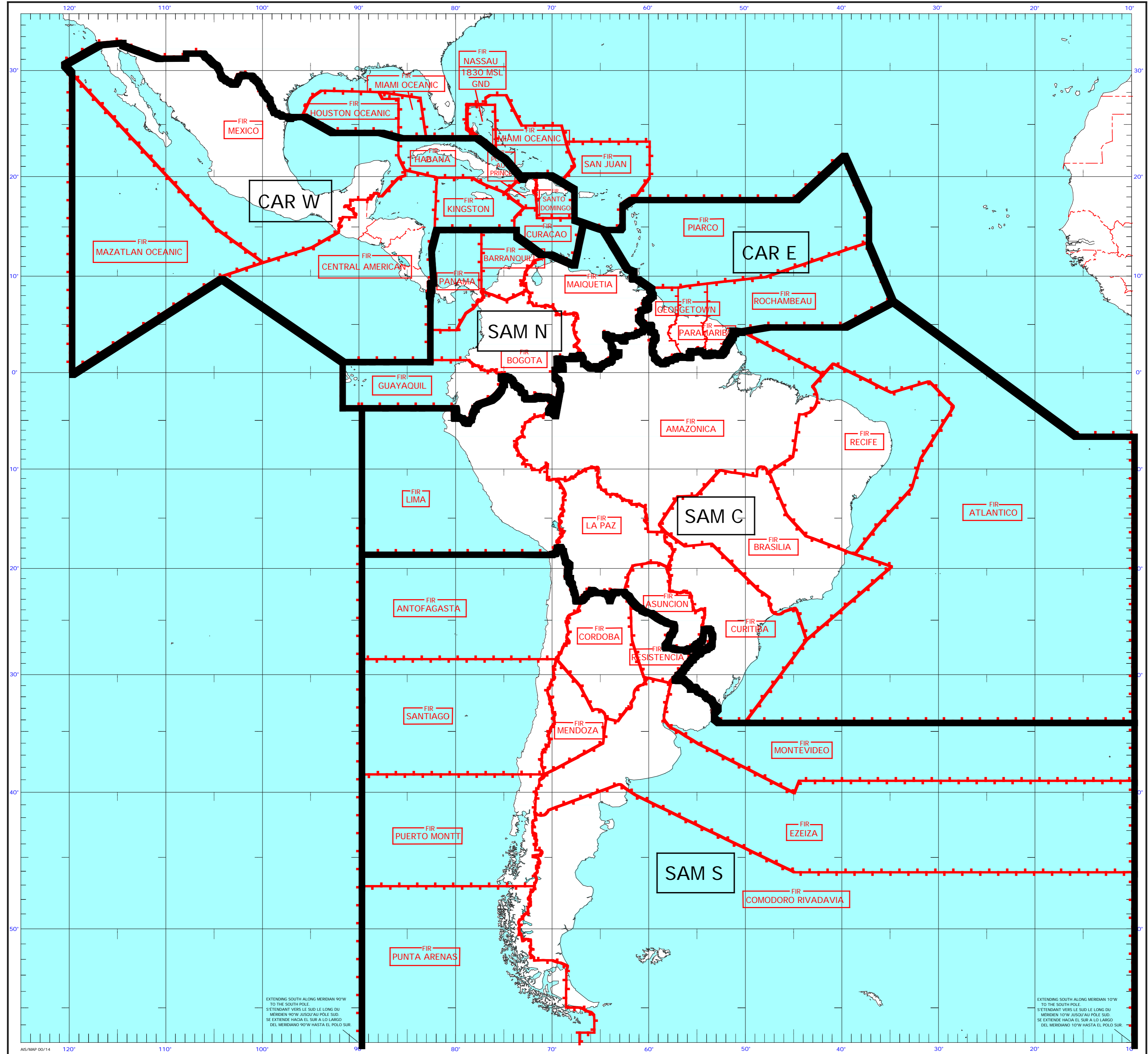
AREA CONTROL SERVICE AT PRESENT PROVIDED BY:  
SERVICE DE CONTRÔLE RÉGIONAL ACTUELLEMENT ASSURÉ PAR:  
SERVICIO DE CONTROL DE ÁREA SUMINISTRADO ACTUALMENTE POR:

EXTENSION OF THE CTA TO INCLUDE THE RESPECTIVE UPPER AIRSPACE  
L'EXTENSION DE LA CTA DE MANIÈRE À INCLURE L'ESPACE SUPÉRIEUR CORRESPONDANT  
LA AMPLIACION DE LA CTA PARA INCLUIR EL RESPECTIVO ESPACIO AÉREO SUPERIOR

**NOTE** / **NOTA**

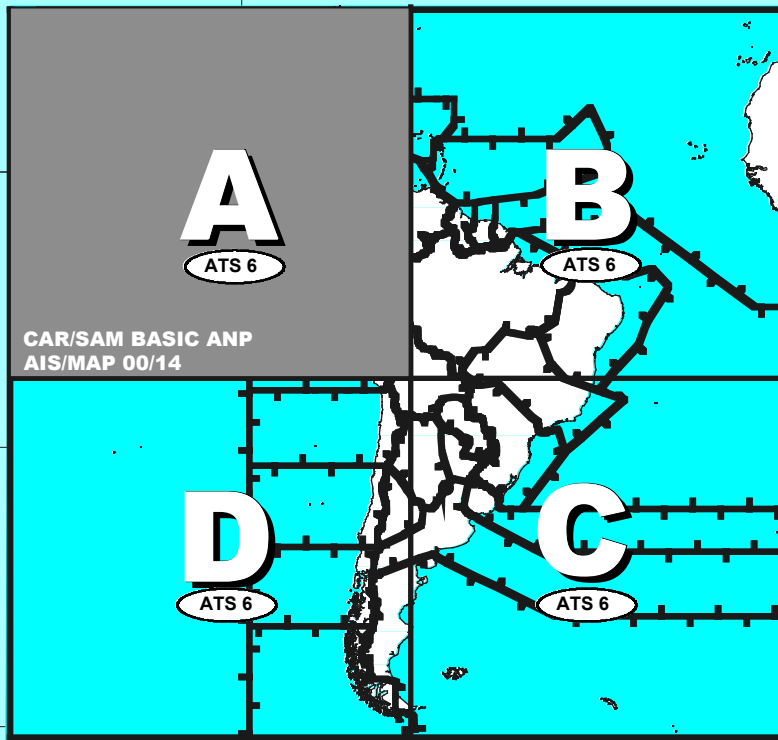
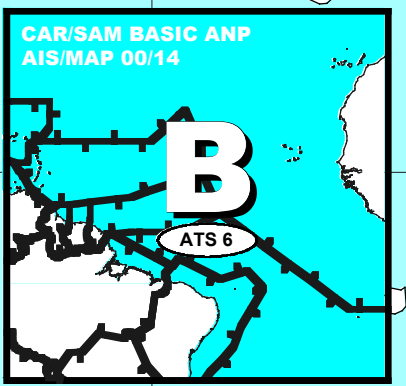
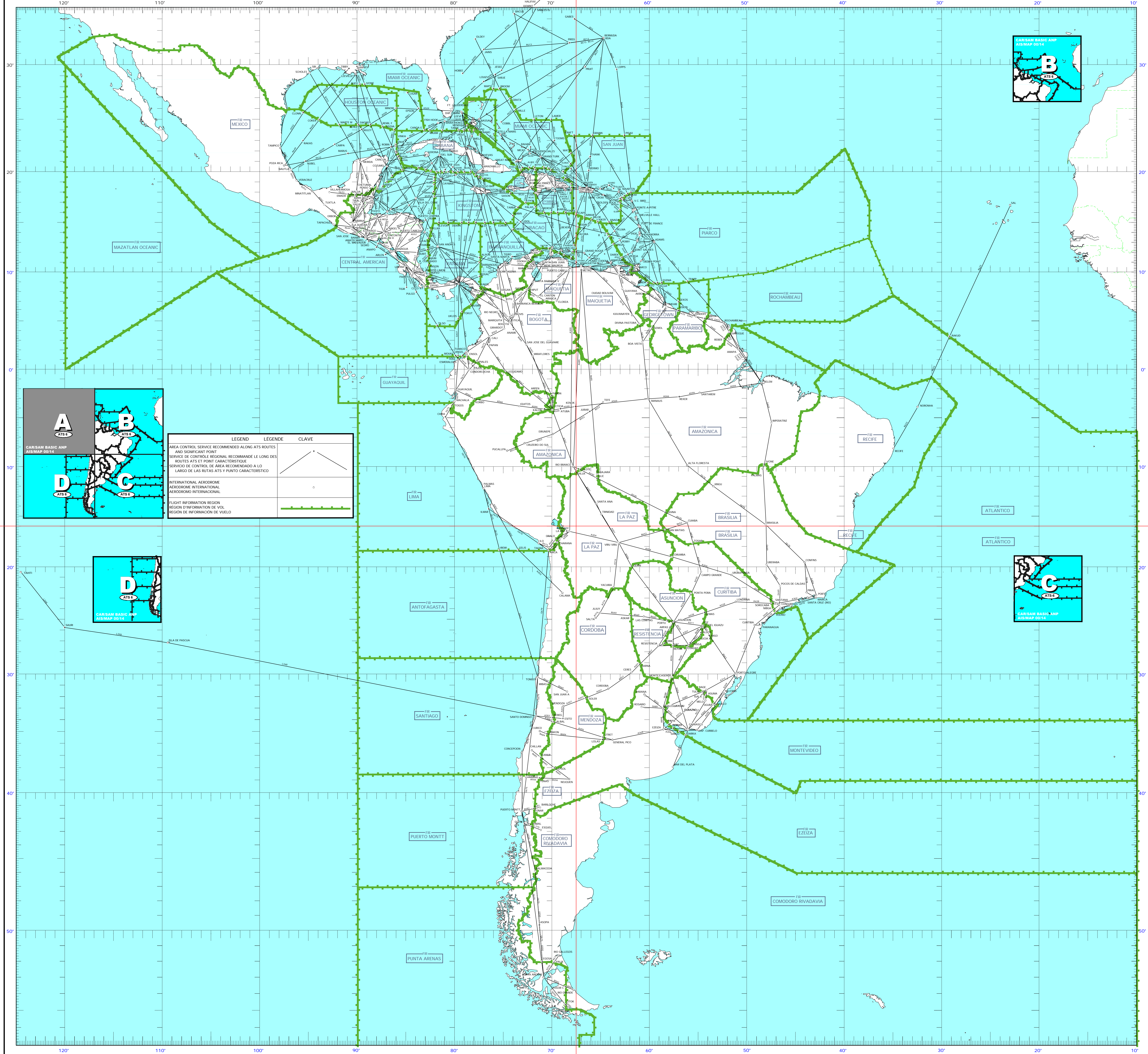
IN THE REMAINDER OF THE CAR/SAM AREA, THE ESTABLISHMENT OF CONTROL AREAS  
WAS LEFT TO THE STATES CONCERNED AND IS MONITORED BY THE REGIONAL OFFICE.  
AILLEURS DANS LA REGION CAR/SAM, LA CREATION DE RÉGIONS DE CONTRÔLE EST  
CONFIEE AUX ÉTATS ET SUIVIE PAR LE BUREAU RÉGIONAL.

EN EL RESTO DEL ÁREA CAR/SAM, EL ESTABLECIMIENTO DE ÁREAS DE CONTROL SE  
DEJÓ A CARGO DE LOS ESTADOS INTERESADOS Y SE VIGILA POR LA OFICINA REGIONAL.

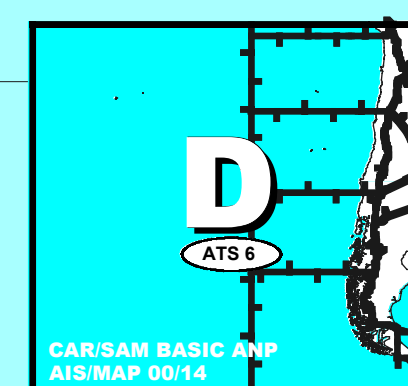
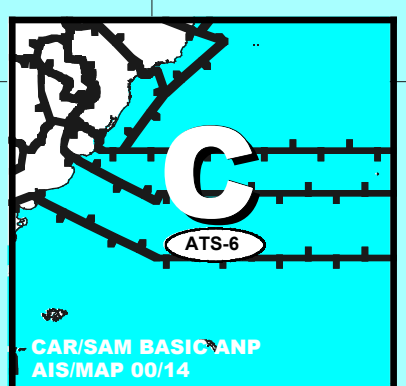


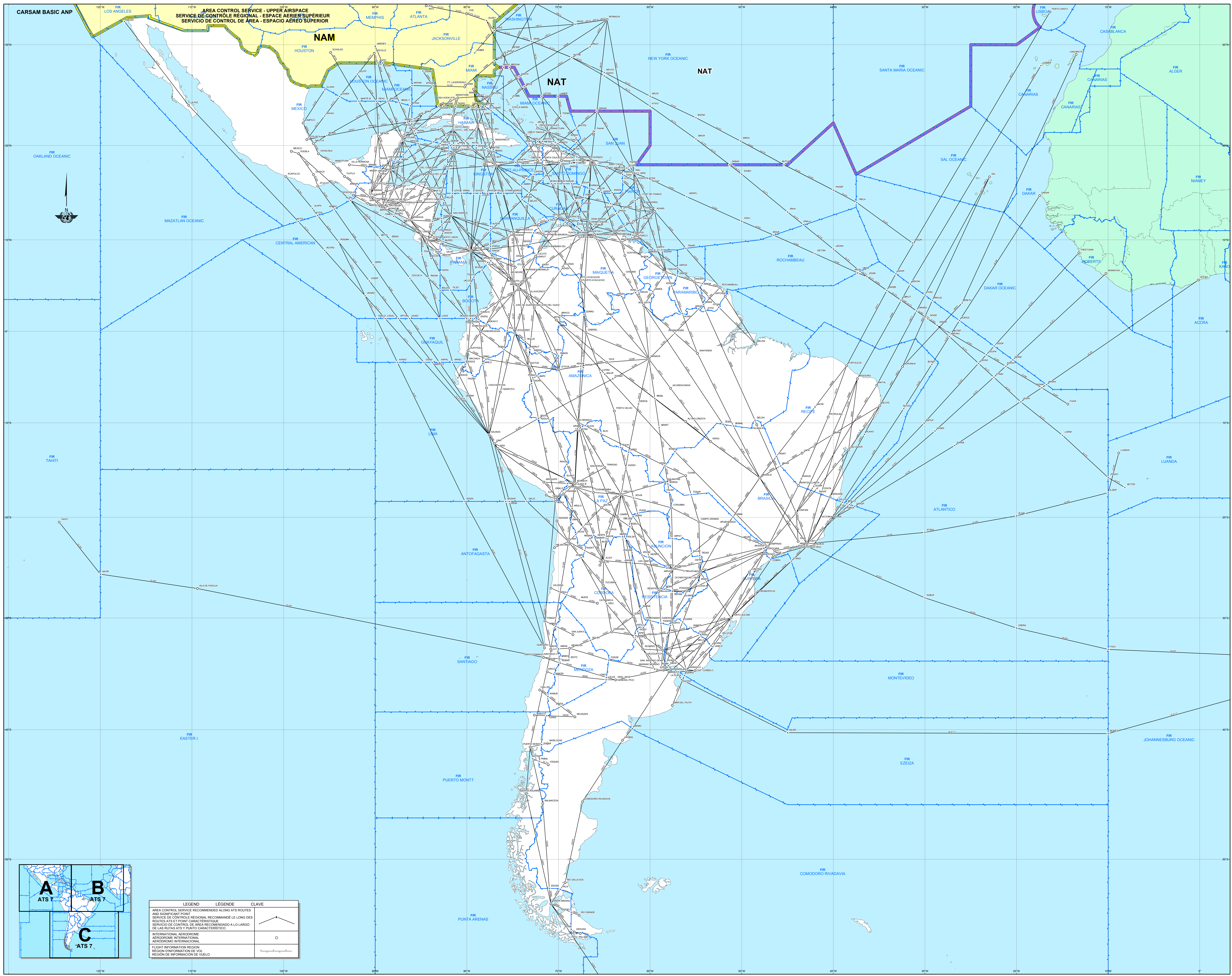
EXTENDING SOUTH ALONG MERIDIAN 90°W TO THE SOUTH POLE.  
 S'ÉTENDANT VERS LE SUD LE LONG DU MÉRIDIEN 90°W JUSQU'AU PÔLE SUD.  
 SE EXTIENDE HACIA EL SUR A LO LARGO DEL MERIDIANO 90°W HASTA EL POLO SUR.

EXTENDING SOUTH ALONG MERIDIAN 10°W TO THE SOUTH POLE.  
 S'ÉTENDANT VERS LE SUD LE LONG DU MÉRIDIEN 10°W JUSQU'AU PÔLE SUD.  
 SE EXTIENDE HACIA EL SUR A LO LARGO DEL MERIDIANO 10°W HASTA EL POLO SUR.



LEGEND	LEGENDE	CLAVE
AREA CONTROL SERVICE RECOMMENDED ALONG ATS ROUTES AND SIGNIFICANT POINT SERVICE DE CONTRÔLE REGIONAL RECOMMANDE LE LONG DES ROUTES ATS ET POINT CARACTERISTIQUE SERVICIO DE CONTROL DE AREA RECOMENDADO A LO LARGO DE LAS RUTAS ATS Y PUNTO CARACTERISTICO		
INTERNATIONAL AERODROME AERODROME INTERNATIONAL AERODROMO INTERNACIONAL		
FLIGHT INFORMATION REGION REGION D'INFORMATION DE VOL REGION DE INFORMACION DE VUELO		



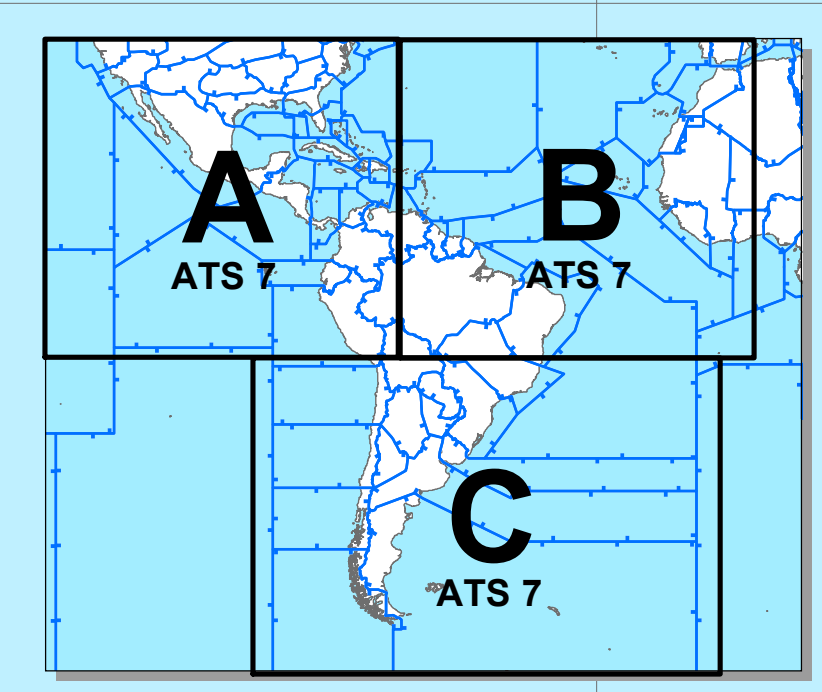
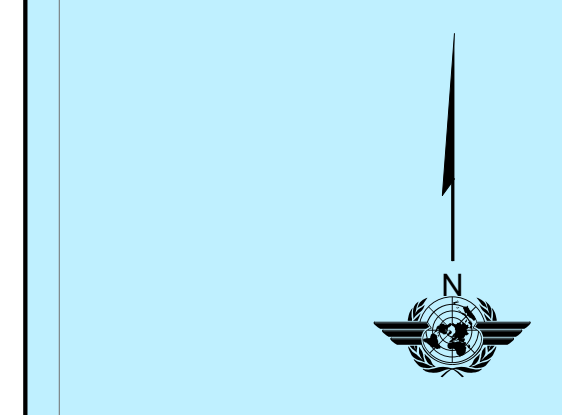


CARSAM BASIC ANP

AREA CONTROL SERVICE - UPPER AIRSPACE  
 SERVICE DE CONTROL REGIONAL - ESPACE AERIEN SUPERIEUR  
 SERVICIO DE CONTROL DE AREA - ESPACIO AEREO SUPERIOR

**NAM**

**NAT**



LEGEND	LEGENDE	CLAVE
AREA CONTROL SERVICE RECOMMENDED ALONG ATS ROUTES AND SIGNIFICANT POINTS SERVICE DE CONTROL REGIONAL RECOMMANDE LE LONG DES ROUTES ATS ET POINTS CARACTERISTIQUES SERVICIO DE CONTROL DE AREA RECOMENDADO A LO LARGO DE LAS RUTAS ATS Y PUNTO CARACTERISTICO		
INTERNATIONAL AERODROME AERODROME INTERNACIONAL AERODROMO INTERNACIONAL		
FLIGHT INFORMATION REGION REGION D'INFORMATION DE VOL REGION DE INFORMACION DE VUELO		



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Dynamic accommodation of user-preferred flight profiles									To be developed								
Reduced vertical separation																	
Reduced horizontal separation (longitudinal/lateral)																	
Independent IFR approaches to closely spaced runways									To be developed (see Note 2)								
RNAV SIDs and STARs																	
Curved and segmented approaches									To be developed								
Arrival metering, sequencing and spacing (see Note 1)									To be developed								
A-SMGCS (see Note 1)									To be developed								
ATS inter-facility data communications (AIDC)																	
Application of data link (PDC, D-ATIS, etc.)																	
<b>Air traffic flow management (see Note 3)</b>																	
Centralized ATFM																	To be developed
Inter-regional cooperative ATFM																	
Establishment of ATFM databases																	
Application of strategic ATFM planning																	
Application of pre-tactical ATFM planning																	
Application of tactical ATFM planning																	

Notes.—

1. Emerging concept or technology-consensus still to be reached.
2. Implementation according to existence of requirement for operation of closely spaced runways.
3. Non-automated air traffic flow management procedures being applied in some ATS units.

## Part VI

# METEOROLOGY (MET)

### INTRODUCTION

1. This part of the Caribbean and South American Basic Air Navigation Plan contains elements of the existing planning system and introduces the basic planning principles, operational requirements and planning criteria related to aeronautical meteorology (MET) as developed for the CAR/SAM regions and considered to be the minimum necessary for effective planning of MET facilities and services. A detailed description/list of the facilities and/or services to be provided by States in order to fulfill the requirements of the Basic ANP is contained in the CAR/SAM Facilities and Services Implementation Document (FASID). During the transition and pending full implementation of the future CNS/ATM systems, it is expected that the existing requirements will gradually be replaced by the new CNS/ATM related requirements. Further, it is expected that some elements of the CNS/ATM systems will be subject to amendment, as necessary, on the basis of experience gained in their implementation.

2. The Standards, Recommended Practices and Procedures to be applied are contained in Annex 3 — *Meteorological Service for International Air Navigation*.

3. Background information of importance in the understanding and effective application of the plan is contained in the *Report of the Second Caribbean/South American Regional Air Navigation Meeting* (Doc 9543) and in the *Report of the Third Caribbean/South American Regional Air Navigation Meeting* (Doc 9749), supplemented by information appropriate to the CAR/SAM regions which is contained in the Reports of the other Regional Air Navigation Meetings listed in the Preface.

4. RAN meeting recommendations or conclusions and CAR/SAM Regional Planning and Implementation Group (GREPECAS) conclusions shown in brackets below a heading indicate the origin of all paragraphs following that

heading. RAN meeting recommendations or conclusions and GREPECAS conclusions shown in brackets below a paragraph indicate the origin of that particular paragraph.

### METEOROLOGICAL SERVICE REQUIRED AT AERODROMES AND REQUIREMENTS FOR METEOROLOGICAL WATCH OFFICES

(FASID Tables MET 1A and MET 1B).

5. The service to be provided at international aerodromes listed in the Appendix to Part III of the Basic CAR/SAM ANP is set out in Table MET 1A of the FASID. (CAR/SAM/3, Rec 7/7)

6. The service to be provided for flight information regions (FIR), upper flight information regions (UIR), control areas (CTA) and search and rescue regions (SRRs) is set out in Table MET 1B. (CAR/SAM/3, Rec 7/7)

7. Meteorological service should be provided on a 24-hour basis, except as otherwise agreed between the meteorological authority, the air traffic services authority and the operators concerned. (CAR/SAM/3, Rec 7/7)

8. At aerodromes with limited hours of operation, routine reports and forecasts should be issued sufficiently early to meet pre-flight and in-flight planning requirements for flights due to arrive at the aerodrome concerned as soon as it is opened for use. Furthermore, aerodrome forecasts should be issued with adequate periods of validity so that, collectively, they cover the entire period during which the aerodrome is open for use. (CAR/SAM/3, Rec 7/7)

9. When a meteorological office is without forecasters, the required aerodrome forecasts should be prepared and kept

up-to-date by another meteorological office by arrangement with the meteorological authority concerned.

⌚CAR/SAM/3, Rec 7/7⌋

10. When a meteorological watch office (MWO) is temporarily not functioning or is not able to meet all its obligations, its responsibilities should be transferred to another MWO and a NOTAM should be issued to indicate such a transfer and the period during which the office is unable to fulfil all its obligations.

⌚CAR/SAM/3, Rec 7/7⌋

11. Details of the service provided should be indicated in Aeronautical Information Publications in accordance with the provisions of Annex 15.

⌚CAR/SAM/3, Rec 7/7⌋

12. As far as possible, English should be among the languages used in meteorological briefing and consultation.

⌚CAR/SAM/3, Rec 7/7⌋

13. Tables MET 1A and MET 1B should be implemented as soon as possible, in the understanding that only those parts of the briefing and documentation called for in column 7 of Table MET 1A that are required for current operations need to be available, and that the implementation of new MWO or changes to the area served by existing MWO indicated in Table MET 1B, columns 1 and 3 respectively, should take place coincidentally with the implementation of, or changes to, the FIR/UIR/CTA/SRR concerned.

⌚CAR/SAM/3, Rec 7/7⌋

### METEOROLOGICAL OBSERVATIONS AND REPORTS

14. Hourly observations with selected special reports should be made at all aeronautical meteorological stations.

⌚CAR/SAM/3, Rec 7/7⌋

15. Routine observations should be made throughout the 24 hours of each day, except as otherwise agreed between operators, air traffic services units and the meteorological authority concerned.

⌚CAR/SAM/3, Rec 7/7⌋

16. The air temperature, dew point temperature and the QNH value should be included in routine, special and selected special reports.

⌚CAR/SAM/3, Rec 7/7⌋

### AIRCRAFT OBSERVATIONS AND REPORTS

17. The meteorological authority should adopt the approved list of ATS/MET reporting points, as it relates to points located within and on the boundaries of the FIR for which the State is responsible. Those ATS/MET reporting points should be published in the Aeronautical Information Publication (AIP), under GEN 3.5.6 — *Aircraft reports*, of the State concerned.

[CAR/SAM/3 Rec. 7/13]

*Note.* — *The approved list of ATS/MET reporting points is published and kept up to date by the ICAO Regional Offices concerned, on the basis of consultations with ATS and MET authorities in each State and the provisions of Annex 3 in this respect.*

18. The meteorological watch office (MWO) designated as the collecting centre for air-reports received by voice communications within the FIR/UIR for which they are responsible, is shown in Table MET 1B, Column 1.

[CAR/SAM/3 Rec. 7/13]

19. Each MWO should arrange for the transmission of routine air-reports received by voice communications to all meteorological offices within its associated FIR. Special air-reports which do not warrant the issuance of a SIGMET should be disseminated by MWO in the same way as SIGMET messages, in accordance with Table MET 2A.

[CAR/SAM/3 Rec. 7/13]

*Note.* — *Additional requirements for the dissemination of air-reports by MWOs are stipulated in Annex 3, 5.8.2, 5.8.3 and 5.8.4.*

### FORECASTS

20. Aerodrome forecasts should normally be issued at intervals of 6 hours, with the period of validity beginning at one of the main synoptic hours (00, 06, 12, 18 UTC). The period of validity should be of at least 18 or of 24 hours' duration, to meet the requirements indicated in Table MET 1A. The filing time of the forecasts should be approximately two hours before the start of the period of validity.

⌚CAR/SAM/3, Rec 7/7⌋

21. The period of validity for aerodrome forecasts given on request should commence one hour before the estimated time of arrival or earlier if so requested, and

should cover a period up to the estimated time of arrival of the farthest alternate plus two hours.

⌈CAR/SAM/3, Rec 7/7⌋

22. Aerodrome forecasts and amended aerodrome forecasts should be issued and exchanged in the TAF code.

⌈CAR/SAM/3, Rec 7/7⌋

23. The group TT<sub>F</sub>T<sub>F</sub>/G<sub>F</sub>G<sub>F</sub>Z should be included in aerodrome forecasts for certain stations as agreed between the meteorological authorities and the operators concerned.

⌈CAR/SAM/3, Rec 7/7⌋

24. The groups 6I<sub>c</sub>h<sub>t</sub>L and 5Bh<sub>B</sub>t<sub>L</sub> should not be included in aerodrome forecasts.

⌈CAR/SAM/3, Rec 7/7⌋

25. Trend-type landing forecasts should be provided at the aerodromes as indicated in Table MET 1A.

⌈CAR/SAM/3, Rec 7/7⌋

### SIGMET AND AIRMET INFORMATION

(FASID Tables MET 3, Parts I and II)

26. The period of validity of SIGMET messages should not exceed 4 hours. In the special case of SIGMET messages for volcanic ash cloud and tropical cyclones, the validity period should be extended up to 6 hours and an outlook should be added giving information for an additional period of up to 12 hours, concerning the trajectory of the volcanic ash cloud and positions of the centre of the tropical cyclone respectively.

⌈CAR/SAM/3, Rec 7/7⌋

27. In order to assist MWOs in the preparation of the outlook included in SIGMET messages for tropical cyclones, tropical cyclone advisory centre (TCAC) Miami has been designated to prepare the required advisory information and send it to the MWOs concerned in the CAR/SAM regions. Table MET 3, Part I, sets out the area of responsibility of the TCAC and the MWOs to which the advisory information should be sent. Advisory information should be issued for those tropical cyclones in which the surface wind speed averaged over 10 minutes is expected to equal or exceed 63 km/h (34 kt).

⌈CAR/SAM/3, Rec 7/7⌋

28. In order to assist MWOs in the preparation of the outlook included in SIGMET messages for volcanic ash, volcanic ash advisory centres (VAACs) Buenos Aires and

Washington have been designated to prepare the required advisory information and disseminate it to MWOs and ACCs concerned in the CAR/SAM regions following notification/detection of the ash cloud. Table MET 3, Part II sets out the area of responsibility of the VAACs, the MWOs and ACCs to which the advisory information should be sent.

⌈CAR/SAM/3, Rec 7/7⌋

29. In order for the VAACs to initiate the monitoring of volcanic ash from satellite data and the forecast of volcanic ash trajectories, MWOs should notify the relevant VAAC immediately on receipt of information that a volcanic eruption has occurred or volcanic ash has been observed in the FIR for which they are responsible. In particular, any special air-reports of pre-eruption volcanic activity, a volcanic eruption or volcanic ash cloud, received by MWOs should be transmitted without delay to the VAAC concerned.

⌈CAR/SAM/3, Rec 7/7⌋

30. Each MWO should arrange for the transmission to all aerodrome meteorological offices within its associated FIR of its own SIGMET messages and relevant SIGMET messages for other FIRs, as required for briefing and, where appropriate, for flight documentation.

⌈CAR/SAM/3, Rec 7/7⌋

31. Each MWO should arrange for the transmission to its associated ACC/FIC of SIGMET messages and special air-reports received from other MWOs.

⌈CAR/SAM/3, Rec 7/7⌋

*Note.— The receipt of SIGMET messages and special air-reports from other MWOs is controlled by the exchange requirements indicated in Table MET 2A which has been based on paragraph 93 of the Statement of Basic Operational Requirements.*

32. AIRMET messages are not required to be issued by MWOs.

⌈CAR/SAM/3, Rec 7/7⌋

### EXCHANGE OF OPERATIONAL METEOROLOGICAL INFORMATION

(FASID Tables MET 2 and 2A)

#### *International OPMET data banks*

33. The Washington International OPMET data bank and the Brasilia International OPMET data bank have been

designated to serve States in the CAR and SAM regions, respectively.

[CAR/SAM/3, Rec. 8/3]

34. The response time for requests to data banks should be less than 15 minutes. AFTN messages containing requests to data banks and replies from data banks should achieve transit times of less than 5 minutes.

[CAR/SAM/3, Rec. 8/3]

*Note.—A list of the OPMET information available at the international OPMET data banks designated to serve the CAR and SAM regions, together with the addressee indicators to be used by States when sending OPMET information for storage to data banks and the procedures to be used in requesting OPMET information from the data banks are contained in the “Catalogue of international OPMET data available at the OPMET data bank of Brasilia” and “Catalogue of international OPMET data available at the OPMET data bank of Washington” published by the ICAO SAM and NACC Regional Offices, respectively.*

#### **Exchange of OPMET information in the METAR, SPECI and TAF code forms**

35. The operational meteorological information in the METAR, SPECI and TAF code forms which should be available at meteorological offices, area control centres and flight information centres is contained in Table MET 2. This table should be updated, as necessary, by the ICAO Regional Offices on the basis of changes in the pattern of aircraft operations and in accordance with the Statement of Basic Operational Requirements and Planning Criteria, in consultation with those States and international organizations directly concerned.

[CAR/SAM/3, Rec. 8/3]

36. The exchanges indicated in Table MET 2 should be implemented as soon as possible to meet the requirements of current aircraft operations. The availability at meteorological offices of the required OPMET information should be reviewed continuously. Any changes in this respect (i.e. additional OPMET information needed or OPMET information no longer required) should be notified to the corresponding meteorological authority which, in turn, should amend its corresponding address lists and inform the ICAO Regional Offices.

[CAR/SAM/3, Rec. 8/3]

37. The information specified in the table should be

exchanged amongst ground stations using aeronautical fixed service (AFS) channels. States should establish local procedures for the relay of OPMET information to their own aerodromes or locations requiring them and to the international OPMET data banks designated to serve the CAR/SAM regions.

[CAR/SAM/3, Rec. 8/3]

38. Regular exchanges of reports in the METAR/SPECI code forms and aerodrome forecasts, and amendments thereto, in the TAF code form should be made when required by five or more flights per week; hence non-regular exchanges should be arranged for fewer than five flights per week and they should be made through the international OPMET data banks designated to serve the CAR/SAM regions. When OPMET information required to be available by regular exchange is not received, the information should be requested from the relevant international OPMET data bank.

[CAR/SAM/3, Rec. 8/3]

#### **Exchange of SIGMET information and special air-reports**

39. The exchange requirements for SIGMETs and special air-reports are contained in Table MET 2A. This table should be updated, as necessary, by the ICAO Regional Offices on the basis of changes in the pattern of aircraft operations and in accordance with the Statement of Basic Operational Requirements and Planning Criteria, in consultation with those States and international organizations directly concerned.

[CAR/SAM/3, Rec. 8/3]

#### **WORLD AREA FORECAST SYSTEM (WAFS)**

(FASID Tables MET 5, MET 6 and MET 7)

40. Table MET 5 sets out the CAR/SAM regions requirements for WAFS products: upper wind and temperature and significant weather (SIGWX) charts, and the gridded binary (GRIB) data, and abbreviated plain language SIGWX, to be provided by WAFC Washington.

[CAR/SAM/3, Rec. 8/5]

41. All the WAFS products should be prepared by WAFC Washington for fixed valid times of 00, 06, 12 and 18 UTC.

[CAR/SAM/3, Rec. 8/5]

42. The level for which upper air and SIGWX charts are to be provided by the WAFC Washington and the areas to be covered by these charts and the GRIB data are indicated in Table MET 5.

[CAR/SAM/3, Rec. 8/5]

43. Table MET 6 sets out the WAFC responsibility for the production of SIGWX forecasts and upper wind and temperature charts for the areas of coverage indicated, and GRIB data. Each WAFC is responsible for the routine production, and dissemination by satellite broadcast, of charts for the areas of coverage listed. For back-up purposes, each WAFC should have the capability to produce SIGWX forecasts for all areas of coverage.

[CAR/SAM/3, Rec.7/10]

*Note.— The responsibilities of RAFCs Brasilia, Buenos Aires, Dakar, Las Palmas, Melbourne, Nairobi, New Delhi, Tokyo and Wellington will be progressively transferred to the WAFC London and WAFC Washington in accordance with AFI/7 Recommendation 7/10, ASIA/PAC Air Navigation Planning and Implementation Regional Group (APANPIRG) Recommendation 7/19 and CAR/SAM Regional Planning and Implementation Group (GREPECAS) Conclusion 8/24.*

44. The projection of the charts and their areas of

coverage should be as indicated in Charts MET 4, MET 5 and MET 6 associated with Table MET 6; their scale should be  $1:20 \times 10^6$ , true at  $22.5^\circ$  in the case of charts in the Mercator projection, and true at  $60^\circ$  in the case of charts in the polar stereographic projection.

[CAR/SAM/3, Rec. 7/10]

45. WAFS products should be disseminated by WAFC Washington using the international satellite communications system (ISCS1) covering the reception area shown in Chart COM 7. To fulfil the requirements of long distance flights, transmission of WAFS products should be completed not later than 11 hours before validity time.

[CAR/SAM/3, Rec. 7/10]

46. The amendment service to the WAFS products issued by WAFC Washington should be by means of abbreviated plain language messages disseminated through ISCS1.

[CAR/SAM/3, Rec. 7/10]

47. Each State should make the necessary arrangements to receive and make full operational use of WAFS products issued by WAFC Washington. Table MET 7 provides the status of authorized access by ISCS1 users to the satellite broadcast and location of the operational VSATs.

[CAR/SAM/3, Rec. 7/10]

## Part VII

# SEARCH AND RESCUE (SAR) SERVICES

### INTRODUCTION

1. This part of the Caribbean and South American Basic Air Navigation Plan contains elements and procedures of the existing planning methods and systems and introduces the basic operational requirements and planning criteria (BORPC) related to search and rescue (SAR) services, as developed for the Caribbean/South American (CAR/SAM) regions.

2. As a complement to the Statement of Basic Operational Requirements and Planning Criteria set out in Part I of the Basic ANP, Part VII constitutes the stable guidance material considered to be the minimum necessary for effective planning of SAR facilities and services in the Caribbean and South American regions. This guidance material has been developed through the ICAO regional planning processes which, in the case of the CAR/SAM regions, is based largely on the work of the CAR/SAM Regional Planning and Implementation Group (GREPECAS) and CAR/SAM regional air navigation meetings. Background information of importance in the understanding and effective application of this part of the plan is contained in the *Report of the Third Caribbean/South American Regional Air Navigation Meeting* (Doc 9749) on Agenda Item 6.

3. The Standards, Recommended Practices and Procedures to be applied and related guidance material are contained in:

- a) Annex 12 — *Search and Rescue*;
- b) *Regional Supplementary Procedures* (Doc 7030), Part 1 — Rules of the Air, Air Traffic Services and Search and Rescue; and
- c) *International Aeronautical and Maritime Search and*

*Rescue (IAMSAR) Manual* (Doc 9731).

4. The elements of guidance referred to above are presented in the following paragraphs with appropriate cross-references to CAR/SAM RAN meeting recommendations.

### PLAN OF SEARCH AND RESCUE REGIONS (SRR)

5. The plan for search and rescue regions (SRR) is shown on Chart SAR 1.

### SEARCH AND RESCUE SERVICES

#### Organization and facilities

6. States should establish and/or maintain the appropriate rescue coordination centres (RCCs) listed in the Facilities and Services Implementation Document (FASID) Table SAR 1 and ensure the availability of services and facilities on a 24-hour basis.  
[CAR/SAM/3, Rec.6/2]

7. To ensure compatibility between aeronautical and maritime search and rescue regions (SRRs), aeronautical SAR authorities in States should maintain close liaison with their maritime counterparts and the International Maritime Organization (IMO) and consider the possibility of establishing joint aeronautical/maritime rescue coordination centres or equivalent arrangements.  
[CAR/SAM/3 Rec. 6/3]

8. States should take the steps necessary and practicable to ensure the availability of effective aeronautical SAR services throughout the CAR/SAM regions by:

- a) identifying aeronautical SAR authorities in legislation and high-level national SAR plans, and make provisions to support those authorities as necessary;
- b) adopting and implementing, to the fullest extent practicable, the guidance material contained in the three-volume IAMSAR Manual for establishing effective domestic and regional services for aeronautical search and rescue;
- c) establishing domestic and international SAR agreements where such agreements may improve SAR services and to coordinate efforts among entities that provide or support SAR services;
- d) ensuring that a robust communications network, which takes into account any technologies commonly used by aircraft and RCCs, is in place to receive a voice or data distress alert from aircraft via terrestrial and satellite systems that may commonly be used for that purpose, and to enable acknowledgement of that alert and coordination of the SAR response;
- e) ensuring that RCCs know how to obtain data, as appropriate, from the AMVER ship reporting system to identify ships at sea that can provide assistance to aircraft and persons in distress;
- f) ensuring that civil aviation authorities arrange with the appropriate national maritime authorities in order to encourage ships to voluntarily participate in the AMVER system; and
- g) ensuring that all RCC personnel have an effective working knowledge of the English language.

[CAR/SAM/3, Rec. 6/12]

9. In order to provide a more efficient SAR service and to reduce the costs associated with providing SAR facilities, States should consider establishing joint facilities where possible.

[CAR/SAM/3, Rec. 6/11]

10. States which rely on military authorities or other sources for the provision of SAR facilities should ensure that adequate arrangements are in place for coordination of SAR activities between all entities involved.

[CAR/SAM/3, Rec. 6/8 a)]

11. States should consider the establishment of SAR committees as recommended in the IAMSAR Manual.

[CAR/SAM/3 Rec. 6/8 b)]

12. States should:

- a) take appropriate action to reduce the number of false alarms on 121.5 MHz caused by inadvertent activation of emergency locator transmitters and eliminate unauthorized use of those frequencies;
- b) encourage the carriage of ELTs transmitting on 406 MHz by all aircraft and establish a register of such ELTs; and
- c) make available information as to how ELT registration information can be obtained rapidly by rescue coordination centres (RCCs) of other States.

[CAR/SAM/3, Rec. 6/4 a), b) and c)]

13. To achieve the early implementation in the CAR/SAM regions of future global mandatory provisions, all aircraft required to carry emergency locator transmitters (ELTs) in accordance with Annex 6 should carry automatic ELTs operating on 406 MHz, and on 121.5 MHz for homing.

[CAR/SAM/3, Rec. 6/6]

### SEARCH AND RESCUE OPERATIONS

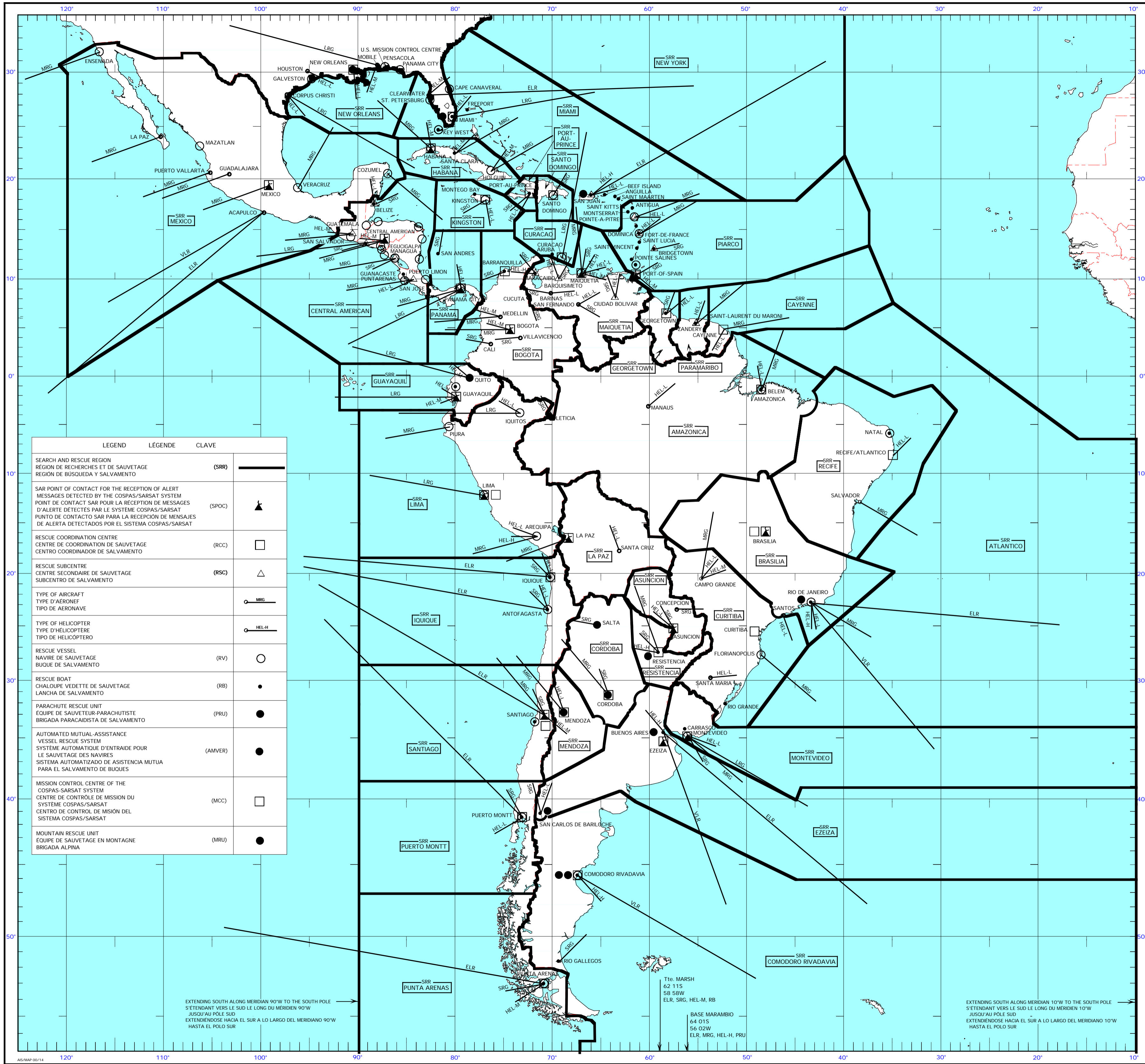
14. States should take measures to ensure that the operating plans of RCC contain provisions for rapid response times, and that RCCs have readily available the required response times of primary search and rescue facilities.

[CAR/SAM/3, Rec. 6/7]

15. States should:

- a) when considered feasible, make arrangements for joint SAR exercises between their SAR units and those of other States and with operators, at regular intervals and, if possible, at least once a year;
- b) invite observers from other interested States and organizations to participate in such exercises; and
- c) grant fellowships to SAR personnel to enable them to attend training courses in this field, after provision of adequate information from interested States to ICAO concerning the type of training to be received.

[CAR/SAM/2, Rec. 7/12]



LEGEND	LÉGENDE	CLAVE
SEARCH AND RESCUE REGION REGION DE RECHERCHES ET DE SAUVETAGE REGION DE BÚSQUEDA Y SALVAMENTO		(SRR)
SAR POINT OF CONTACT FOR THE RECEPTION OF ALERT MESSAGES DETECTED BY THE COSPAS/SARSAT SYSTEM POINT DE CONTACT SAR POUR LA RECEPTION DE MESSAGES D'ALERTE DETECTES PAR LE SYSTEME COSPAS/SARSAT PUNTO DE CONTACTO SAR PARA LA RECEPCIÓN DE MENSAJES DE ALERTA DETECTADOS POR EL SISTEMA COSPAS/SARSAT		(SPOC)
RESCUE COORDINATION CENTRE CENTRE DE COORDINATION DE SAUVETAGE CENTRO COORDINADOR DE SALVAMENTO		(RCC)
RESCUE SUBCENTRE CENTRE SECONDAIRE DE SAUVETAGE SUBCENTRO DE SALVAMENTO		(RSC)
TYPE OF AIRCRAFT TYPE D'AERONEF TIPO DE AERONAVE		MRG
TYPE OF HELICOPTER TYPE D'HELICOPTERE TIPO DE HELICOPTERO		HEL-H
RESCUE VESSEL NAVIRE DE SAUVETAGE BUQUE DE SALVAMENTO		(RV)
RESCUE BOAT CHALOUPE VEDETTE DE SAUVETAGE LANCHA DE SALVAMENTO		(RB)
PARACHUTE RESCUE UNIT EQUIPE DE SAUVETEUR-PARACHUTISTE BRIGADA PARACAIDISTA DE SALVAMENTO		(PRU)
AUTOMATED MUTUAL-ASSISTANCE VESSEL RESCUE SYSTEM SYSTEME AUTOMATIQUE D'ENTRAIDE POUR LE SAUVETAGE DES NAVIRES SISTEMA AUTOMATIZADO DE ASISTENCIA MUTUA PARA EL SALVAMENTO DE BUQUES		(AMVER)
MISSION CONTROL CENTRE OF THE COSPAS-SARSAT SYSTEM CENTRE DE CONTROL DE MISION DU SYSTEME COSPAS/SARSAT CENTRO DE CONTROL DE MISION DEL SISTEMA COSPAS/SARSAT		(MCC)
MOUNTAIN RESCUE UNIT EQUIPE DE SAUVETAGE EN MONTAGNE BRIGADA ALPINA		(MRU)

EXTENDING SOUTH ALONG MERIDIAN 90°W TO THE SOUTH POLE  
S'ETENDANT VERS LE SUD LE LONG DU MERIDIEN 90°W  
JUSQU'AU POLE SUD  
EXTENDIÉNDOSE HACIA EL SUR A LO LARGO DEL MERIDIANO 90°W  
HASTA EL POLO SUR

Tte. MARSH  
62 11S  
58 58W  
ELR, SRG, HEL-M, RB

BASE MARAMBIO  
64 01S  
56 02W  
ELR, MRG, HEL-H, PRU

EXTENDING SOUTH ALONG MERIDIAN 10°W TO THE SOUTH POLE  
S'ETENDANT VERS LE SUD LE LONG DU MERIDIEN 10°W  
JUSQU'AU POLE SUD  
EXTENDIÉNDOSE HACIA EL SUR A LO LARGO DEL MERIDIANO 10°W  
HASTA EL POLO SUR

## Part VIII

# AERONAUTICAL INFORMATION SERVICES AND CHARTS (AIS/MAP)

### INTRODUCTION

[CAR/SAM/3, Rec 12/1]

1. This part of the Caribbean and South American Basic Air Navigation Plan contains basic planning principles, operational requirements and planning criteria, implementation guidelines and stable material related to aeronautical information services and charts (AIS/MAP) considered to be the minimum necessary for effective planning of AIS and MAP facilities and services in the CAR/SAM regions. A detailed description/list of the facilities and/or services to be provided by States in order to fulfil the requirements of the Basic ANP is contained in the CAR/SAM Facilities and Services Implementation Document (FASID), as agreed between the provider and the user States concerned. During the transition and pending full implementation of the future CNS/ATM system, it is expected that the existing requirements would gradually be replaced by new CNS/ATM related requirements. Subsequently, it is expected that some elements of the CNS/ATM systems will be subject to amendment, as necessary, on the basis of experience gained in their implementation.

2. The Standards, Recommended Practices and Procedures to be applied, and related guidance material are contained in the following ICAO documentation:

- a) Annex 4 — *Aeronautical Charts*;
- b) Annex 15 — *Aeronautical Information Services*;
- c) Annex 11 — *Air Traffic Services*;
- d) Annex 14 — *Aerodromes*, Volume I — *Aerodrome Design and Operations* and Volume II — *Heliports*;
- e) *Aeronautical Information Services Manual* (Doc 8126);

f) *Aeronautical Charts Manual* (Doc 8697);

g) *ICAO Abbreviations and Codes* (PANS-ABC, Doc 8400); and

h) *World Geodetic System — 1984* (WGS-84), (Doc 9674).

3. Background information of importance in the understanding and effective application of the plan is contained in the *Report of the Caribbean/South American Regional Air Navigation Meeting* (Doc 9194) and the Reports of the Second and Third Caribbean/South American Regional Air Navigation Meetings (Doc 9543 and Doc 9749, respectively).

4. Regional air navigation meeting recommendations shown in brackets below a heading indicate the origin of all paragraphs following that heading. A recommendation shown in brackets below a paragraph indicates the origin of that particular paragraph.

### GENERAL PROCEDURES

#### Introduction

5. The major objective of aeronautical information services is to ensure the flow of information necessary for the safety, regularity and efficiency of international civil aviation. To support the CNS/ATM systems, the aeronautical information services and charts (AIS/MAP) should be directed towards the real-time provision of electronic aeronautical information/data that would ensure quality and integrity of the information provided.

6. In the CNS/ATM systems, the future users'

requirement will be to access, on a global basis, quality aeronautical information by all users at all times. To achieve this high-level requirement, aeronautical information must be provided electronically, based on a commonly agreed and standardized data model. Strict quality assurance principles should be put in place in order to ensure that aeronautical data is of the required quality (accuracy, resolution and integrity), verified and validated before it is provided to the users. This will give users the required confidence in the quality of information that is critical to flight safety.

7. To support the CNS/ATM systems, the following basic AIS/MAP requirements should be satisfied in the future:

- a) real-time provision and exchange of electronic aeronautical information/data, through a system that guarantees the quality and integrity of the information provided;
- b) provision and exchange of aeronautical information/data through modern communication means including data link that would allow interrogation of aeronautical data bases on the ground from the aircraft; and
- c) harmonization of AIS and MET information/data to support combined automated pre-flight and in-flight briefing facilities.

### **Quality system**

8. The aeronautical services involved in the provision and maintenance of aeronautical data should be organized in such a manner that the quality system be introduced in all the functional stages of the aeronautical data process, from the data origination to the distribution/provision of data. The established quality system should be in conformity with the International Organization for Standardization (ISO) 9000 series of quality assurance standards and the system should be certified by an approved organization.

### **Support for the AIS and MAP services**

9. To enable the AIS/MAP services to function efficiently and in accordance with the defined requirements, sufficient funds should be allocated by States in their budgets that will ensure that all the administrative and operational requirements of AIS/MAP are met including the availability

of sufficient and properly qualified personnel with all the required facilities, equipment and material.

10. The highest priority should be established and ascertained to the requirements for printing of AIS documentation including charts. Where practicable, printing facilities should be placed under the direct control of the AIS Headquarters.

11. The personnel working for aeronautical information and charts services should possess the skills and competence required to perform specific assigned functions. The required skills and competencies should be demonstrated by the AIS/MAP personnel through initial and periodic assessments on which basis the corresponding certificate of competence equal to an AIS licence may be accorded.

12. AIS and MAP personnel should be accorded the status comparable to that assigned to technical personnel of other air navigation services.

### **Coordination between AIS and other technical services**

13. Coordination/liaison on a permanent basis should be established between AIS/MAP and other technical services responsible for planning and operating air navigation facilities and services. At least one person from those services should be assigned and be responsible for maintaining continuous liaison with AIS/MAP.

14. Technical services responsible for origination of the raw aeronautical information should be acquainted with the requirements for promulgation and advance notification of changes that are operationally significant as established in Annexes 11 and 14 and other relevant ICAO documentation.

15. Appropriate AIS/MAP personnel should be included in the air navigation planning processes. This should ensure the timely preparation of appropriate AIS documentation and that the effective dates for changes to the air navigation system and procedures are satisfied.

### **Training of AIS and MAP personnel**

16. Within the context of the quality system implemented, the AIS and MAP training programme should

ensure that AIS and MAP personnel are appropriately trained according to the skills and competences required to perform specific assigned functions.

17. AIS personnel should receive professional training commensurate with the most recent technological developments requiring high level of knowledge and skills. AIS personnel should have, as an essential part of their training, sufficient knowledge of aeronautical cartography to permit them to verify information that is published on charts. In addition, AIS personnel should possess sufficient background in automation and knowledge of the English language as are necessary for the performance of their duties.

18. In addition to the conventional cartographic and geography training programme, knowledge of the following elements should also be taken into account when developing a training programme for MAP personnel:

- a) hardware—scanners, plotters, computers, soft proofing devices (CRTs), image setters, and digital memory systems;
- b) local area networks and worldwide area networks;
- c) software — programming familiarity, flow chart usage and creation, operating systems, communication formats, digital code systems, and documentation skills; and
- d) cartographic equipment and software operations skills (developed through “hands on” experience).

19. AIS and MAP personnel should be able to demonstrate that they possess the skills and competencies required to perform assigned specific functions. Periodical checks should be undertaken to ensure that the personnel continue to meet the required standards and if shortfalls in knowledge, skills or competence are detected, corrective measures should be taken.

## ORGANIZATION OF AERONAUTICAL INFORMATION SERVICES

### Aerodrome AIS Units (FASID Table AIS-1)

20. The aerodrome AIS units to be provided at

international aerodromes listed in the Appendix to Part III of the CAR/SAM Basic ANP are set out in Table AIS 1 of the FASID.

21. The aeronautical information to be made available at international aerodromes listed in the Appendix to Part III of the CAR/SAM Basic ANP is set out in Table AIS 2 of the FASID.

22. The exchange of aeronautical information documentation and availability of such documentation from international aerodromes listed in the Appendix to Part III of the CAR/SAM Basic ANP is set out in Table AIS 4 of the FASID.

23. Aeronautical information service at aerodromes should be provided on a 24-hour basis, except as otherwise agreed between the AIS authority, the air traffic services authority and the operators concerned. Agreed operational hours of the aerodrome AIS units and details of the service provided should be indicated in the Aeronautical Information Publication in accordance with Annex 15.

24. English should be among the languages used in aeronautical information briefings and consultations.

25. The aerodrome AIS unit should provide full pre-flight information/briefing service to flight operations personnel and aircrew, for the entire coverage zone. The coverage zone for pre-flight information service at each aerodrome AIS unit should be determined taking into account the final destination of aircraft departing from the aerodrome concerned. This should be done in consultation with aircraft operators and be reviewed from time to time and/or when the air traffic pattern is expected to change.

26. The aerodrome AIS units should be adequately staffed and properly equipped for the provision of effective pre-flight information service. Installation of systems for the automated processing (storage, retrieval and preparation of pre-flight information bulletins (PIB)) should be considered at an early stage.

27. Aerodrome AIS units that provide pre-flight information services should be established at locations conveniently accessible to flight operations personnel at the airports, preferably on the ground floor (apron level) of airport terminal buildings.

28. Arrangements should be made between the

aerodrome AIS unit, airline operations personnel (including flight crews) and air traffic services for an effective cooperation, coordination and reporting of post-flight information on inadequacies in the status and operation of air navigation facilities. To ensure submission of post-flight reports to aerodrome AIS units without delay, arrangements should be made at airports that a suitable form like the one provided at Appendix B of the ICAO *Aeronautical Information Services Manual* (Doc 8126) be made available to ATS, airline operations offices and aerodrome AIS units.

29. Tables AIS 1 and AIS 2 of the FASID should be implemented as soon as possible.

#### **International NOTAM Offices (NOFs)** (FASID Table AIS 3)

30. The International NOTAM Offices to be provided in the CAR/SAM regions are set out in Table AIS 3 of the FASID.

31. International NOTAM Offices should be adequately staffed and properly equipped for the provision of effective 24-hour service.

32. Table AIS 3 of the FASID should be implemented as soon as possible.

### **INTEGRATED AERONAUTICAL INFORMATION PACKAGE**

#### **Aeronautical Information Publication (AIP)**

33. States that have not already done so should, as a matter of urgency, prepare and publish in the new, restructured format their Aeronautical Information Publication (AIP), either individually or collectively. The format is prescribed by ICAO Annex 15 and the guidance material is provided in the *Aeronautical Information Services Manual* (Doc 8126), Appendix H.

34. Information contained in the AIP should be complete and thoroughly checked for correctness before it is provided to the users. To ensure consistency throughout the AIP, changes to the AIP should be made in such a way that information of the same facility, service, procedure, etc. affecting one part be changed in the other part(s), if applicable.

35. The differences between the national regulations and practices and the corresponding ICAO SARPs should be provided in the appropriate part of the AIP.

#### **AIP Amendments**

36. In view of the vital importance to the safety of air navigation of the aeronautical information contained in the AIP, this information should be kept up to date. This should be done by publishing AIP Amendments on specific publication dates or in accordance with a publication schedule based on regular intervals.

37. AIP Amendments should be issued at least once every 6 months.

#### **AIP Supplements**

38. Information in the AIP Supplement appropriate for inclusion in the AIP should be incorporated therein with a minimum of delay.

39. Information in the AIP Supplement that is still valid at the end of six months should be re-issued with a new number indicating clearly that the new Supplement is a replacement and that the information it contains remained unchanged from the one previously issued.

40. Aeronautical information of operational significance, requiring substantive amendments to flight documentation (e.g. promulgation of new and/or revised instrument approach procedures) promulgated by an AIRAC AIP Supplement, should be accompanied by charts or diagrams, as appropriate, to aid interpretation.

41. To enable users of aeronautical information to keep records of current information, checklists of AIP Supplements in force should be provided regularly through the monthly printed summary of NOTAM.

#### **Aeronautical Information Circulars (AIC)**

42. Aeronautical Information Circulars (AIC) should be used to promulgate aeronautical information strictly in accordance with Chapter 7 of Annex 15.

#### **Use and validity of NOTAM**

43. NOTAM should be mainly used for promulgation of information of a temporary nature and of short duration. Temporary information promulgated by NOTAM should not remain in force longer than three months. In exceptional cases, if temporary information promulgated by NOTAM remains in force for longer than three months, a replacement NOTAM should be issued.

44. Use of the abbreviations WIE (“with immediate effect”) and UFN (“until further notice”) in the NOTAM format under Items B and C respectively, must be avoided and instead, a ten-figure group giving year, month, day, hours and minutes in UTC should be used when originating NOTAM. When information on timing is uncertain, a ten-figure date-time group should be followed by an EST to indicate the approximate duration of information.

#### AIRAC system

45. States that have not yet done so, should implement the AIRAC system in accordance with the requirements of Annex 15, with the minimum of delay.

46. Successful implementation of the AIRAC system depends directly on the level of coordination established among the relevant technical services and the AIS. To ensure a high level of coordination, States should prepare their national regulations so that they well define the duties and responsibilities of those technical services that provide raw AIRAC information to AIS for publication. The technical services involved should be familiar with the AIRAC system and comply with it in accordance with specifications provided in Annexes 11, 14 (both volumes) and 15.

47. To ensure that aeronautical information of operational significance reaches users at least 28 days in advance of the AIRAC effective date, measures should be taken to ensure that:

- a) information/data prepared in hard copy format be issued and distributed at least 56 days in advance of the effective date; and
- b) information/data provided in electronic format be distributed at least 35 days in advance of the effective date.

48. A schedule of AIRAC effective dates, publication dates and cut-off dates for the receipt by AIS of the raw

information to be promulgated through the AIRAC system should be issued once a year and distributed to all services and agencies responsible for the origination of the raw information.

49. Changes to the information promulgated by the AIRAC system should be avoided by all means, especially during the first 28 days.

## WORLD GEODETIC SYSTEM — 1984 (WGS-84)

### Introduction

50. In order to support implementation of the future CNS/ATM systems, States should make every effort to implement WGS-84 and provide geographical coordinates referenced to this system. A detailed description/list of the WGS-84 coordinate data to be provided by States in order to fulfill the requirements of the Basic ANP is contained in the CAR/SAM Facilities and Services Implementation Document (FASID).

51. The Standards, Recommended Practices and Procedures (SARPs) to be applied in respect of WGS-84 are contained in the following ICAO documents:

- a) for the accuracy of the field work (surveying):
  - 1) Annex 11 — *Air Traffic Services*; and
  - 2) Annex 14, *Aerodromes*, Volume I — *Aerodrome Design and Operations* and Volume II — *Heliports*; and
- b) for the charting and publication resolution, respectively:
  - 1) Annex 4 — *Aeronautical Charts*; and
  - 2) Annex 15 — *Aeronautical Information Services*.

52. To assist States in the uniform implementation of the WGS-84 related SARPs, the guidance material on the provision of geographical coordinates referenced to the WGS-84 datum is provided in the *World Geodetic System — 1984 (WGS-84) Manual* (Doc 9674). Background infor-

mation on the importance and understanding and effective application of the Plan is contained in the Appendices 2E and 2F of the GREPECAS/6 Report, as amended by Conclusion 7/11 and Appendix 4E of the Seventh Meeting of GREPECAS.

**WGS-84 Requirements**  
(FASID Table AIS 5)

53. Table AIS 5 sets out the requirements for geographical coordinates referenced to the WGS-84 datum at international aerodromes, in flight information regions (FIR), en route and in terminal areas.

54. States which have not done so should make the necessary arrangements to develop a national WGS-84 implementation plan and such a plan should contain a timetable for implementation. When developing a national WGS-84 plan, States should establish a committee composed of personnel from the appropriate aeronautical as well as from the geographic/geodetic departments of the State. Such a committee should be tasked with the management of the WGS-84 implementation plan.

55. States in a position to do so should provide assistance in the implementation of WGS-84 to other States that need such assistance.

56. Before the geographical coordinates based on WGS-84 are published in the Aeronautical Information Publication (AIP) and on charts, every effort must be made to validate and verify them.

57. States which have common boundary points should coordinate WGS-84 data for those points prior to publication of this information in their respective AIPs.

58. In order to ensure that quality (accuracy, resolution and integrity) and traceability requirements for the WGS-84-related geographical coordinate data are met, States must take measures to develop and introduce a quality system programme. This programme containing procedures, processes and resources should be in conformity with the International Organization for Standardization (ISO) 9000 series of quality assurance standards.

**AERONAUTICAL CHARTS**

**Aeronautical charting programme**  
(FASID Table AIS 6)

59. States, individually or collectively, should include in their AIP derived from their aeronautical chart production programmes at least the following types of charts:

- a) Aerodrome Obstacle Chart — ICAO Type A;
- b) Aerodrome Obstacle Chart — ICAO Type C;
- c) Precision Approach Terrain Chart — ICAO;
- d) Enroute Chart — ICAO;
- e) Area Chart — ICAO;
- f) Standard Departure Chart Instrument (SID) — ICAO;
- g) Standard Arrival Chart Instrument (STAR) — ICAO;
- h) Aerodrome/Heliport Chart — ICAO;
- i) Instrument Approach Chart — ICAO;
- j) Visual Approach Chart;
- k) World Aeronautical Chart — ICAO 1:1 000 000.

*Note.— In the production of Aerodrome Obstacle Charts — ICAO Type A, Aerodrome Obstacle Charts — ICAO Type C, Instrument Approach Charts — ICAO, Aerodrome/Heliport Charts — ICAO and Precision Approach Terrain Charts — ICAO, States shall take into account ICAO Annex 4 requirements and Table AOP 1.*

60. The detailed aeronautical chart requirements are set out in Table AIS 6.

**Production responsibility for sheets  
of the World Aeronautical Charts —  
ICAO 1:1 000 000**  
(FASID Table AIS 7)

61. States which have not yet produced the World Aeronautical Chart — ICAO 1:1 000 000, in accordance with the sheet distribution shown in Table AIS 7, should take the necessary measures to ensure the preparation of the sheets for which they are responsible, either through individual effort or with the collaboration of other States or specialized cartographic agencies.

62. The production responsibility for sheets of the World Aeronautical Chart — ICAO 1:1 000 000 are set out in Table AIS 7 and illustrated on Chart AIS 2.

63. Where the agency producing the charts is not under the control of the aviation administration, States should ensure good liaison between them, and accord the necessary priority in their national chart production programmes to the production of the required aeronautical charts.

### **Aeronautical chart production**

64. States which have not produced the aeronautical charts specified hereunder should produce them as soon as possible.

- 1) Aerodrome Obstacle Chart — ICAO Type A;
- 2) Aerodrome Obstacle Chart — ICAO Type C;
- 3) Precision Approach Terrain Chart — ICAO;
- 4) Enroute Chart — ICAO;
- 5) Instrument Approach Chart — ICAO;
- 6) Aerodrome/Heliport Chart — ICAO;
- 7) World Aeronautical Chart — ICAO 1:1 000 000.

### **AUTOMATION IN AIS**

65. Automation in AIS should be introduced with the objective of improving the overall speed, accuracy, efficiency, and cost-effectiveness of the aeronautical information service in the region.

66. AIS automation should offer a service to meet the individual requirements of the various categories of users. This goes beyond the provision of pre-processed data and the pre-flight bulletin types traditionally provided manually or by early automated systems. For reasons of cost effectiveness, such a service should strike a balance between the degrees of complexity of the system required and the sophistication of the products provided.

67. The development of automation within AIS should be based on an integrated CAR/SAM regional automated AIS system concept, in order to obtain a general standardization of procedures, products and services to users and to avoid potential divergencies, incompatibilities and duplication of effort.

68. The implementation of such a system should permit a cost-effective evolution of the regional system, taking account of the present and future technical possibilities and should be governed by the following principles:

- a) participating national AIS System Centres (NASCS) should closely cooperate in adopting the different elements that will make up the integrated CAR/SAM region automated AIS system, taking into account their current and planned degree of development;
- b) States that have not yet done so should initially automate NOTAM service within their own AIS while taking into account the users' requirements;
- c) certain NASCS should cooperate with other not-yet-automated AIS systems, carrying out agreed functions to improve the efficiency and the quality of processing of basic aeronautical information and of its distribution both within an agreed area of the system and externally;
- d) optimum use should be made of available communication and public networks as well as of new communication technology for the dissemination, exchange and retrieval of aeronautical information, particularly NOTAM;
- e) the ICAO NOTAM format containing the necessary qualifiers to facilitate the sorting and retrieval of NOTAM information in accordance with users' requirements should be used exclusively;
- f) a system interrogation capability which takes account of the different categories of systems users should exist;
- g) common "user friendly" query procedures for the interrogation of AIS or NOTAM databases should be used. These procedures should be in accordance with the different levels of user requirements;
- h) States must establish quality systems and procedures which will ensure that the available aeronautical infor-

mation is of appropriate quality (accuracy, resolution, integrity and timeliness);

- i) A State which decides not to automate its AIS may arrange, in the interest of improved efficiency, on the basis of bilateral or multilateral agreements between States or other non-governmental organizations, for the provision of automated services on its behalf. The arrangement must take into account the non-transferable responsibility of a State for the provision of aeronautical

information as well as other technical and administrative aspects associated with such agreement.

69. The development of the integrated CAR/SAM region automated AIS system should take into account provisions of Annex 15 for the use of World Geodetic System — 1984 (WGS-84), the adopted common geodetic reference system, when aeronautical geographical coordinates are provided.

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## Attachment

# CONCEPT FOR AN INTEGRATED AUTOMATED AIS SYSTEM FOR THE CAR/SAM REGIONS

### SYSTEM CONFIGURATION

1. The system should be based on the facilities of participating States with the following structure:

- a) automated AIS systems of States, providing national service (NASC);
- b) automated AIS systems of States providing, on the basis of bilateral or multilateral agreements, service to other State(s) in addition to national service; and
- c) non-automated AIS.

### AREA TO BE SERVED

2. The system should have the capacity of holding aeronautical information covering those parts of the world to fulfil the operational requirements for AIS pre-flight information service for flights from point of origin to final destination.

### SYSTEM SERVICE

3. The system overall should provide a service that is capable of satisfying the users' operational requirements, as detailed in 17 to 25 below.

#### National service

4. The primary role of a NASC should be to provide aeronautical information to users in a given State, either in

accordance with predetermined arrangements, or by computer interrogation. NASC should collect appropriate aeronautical information from national sources, process it, produce it in the form of a NOTAM, store it in the NASC database and make it available within the State, the integrated regional system as well as worldwide in accordance with predetermined arrangements.

5. Conversely, the required aeronautical information relative to other States should be received in the NOTAM format for direct input into the NASC database or for further processing, if required, so that specific requirements for international aeronautical information can also be carried out by NASC.

6. NASC should be able to provide service to users in another participating State that does not have an automated AIS system as well as for any other State for which the service is provided in accordance with pre-arranged agreements. States not having an automated AIS system but participating in the regional system would have the option, resulting from bilateral agreement, to be linked with a NASC via an intelligent or non-intelligent remote terminal.

### SYSTEM FUNCTIONS

7. A number of system functions should be performed at regional and national levels.

### COMMUNICATION

8. The Aeronautical Fixed Service (AFS) should satisfy the communication requirements at an international level. Optimum use should be made of available communication

networks for the dissemination, exchange and retrieval of aeronautical information, particularly NOTAM.

9. The selection for the various means for the retrieval of data at a national level should be at the discretion of the individual State and should be largely dependent on the availability and cost of the various services, communication links available and user requirements.

#### **SYSTEM RELIABILITY AND REDUNDANCY**

10. The system configuration should assure adequate reliability and redundancy.

#### **FALL BACK PROCEDURES**

11. In the case of a system failure, the service within the related service area should be continued in accordance with the pre-arranged and established procedure for each service area, which should also cover the necessary communications arrangements.

#### **RESPONSE TIME**

12. With the features provided by the system, the use of modern computer techniques and means of communication, short response times should be assured.

#### **PLANNING AND IMPLEMENTATION**

13. The planning and implementation of the system should be guided and adjusted by considerations related to efficiency, cost-effectiveness and experience.

14. Relevant bilateral or multilateral agreements should aim at minimizing costs by leading to work and equipment savings beneficial to all participants.

15. A planning/implementation regional group should coordinate the general development of the system and the activities required of States and should monitor the overall situation for the purpose of detecting in advance divergencies in developments that could lead to later incompatibilities.

#### **SYSTEM MANAGEMENT**

16. The strategic operation of the system should be closely monitored by States to permit speedy reaction to problems encountered and to shortcomings identified. An appropriate form of system management should be developed by the CAR/SAM Regional Planning and Implementation Group (GREPECAS).

#### **USER REQUIREMENTS IN AN AUTOMATED AIS SYSTEM**

17. The latest pre-flight information bulletin of the specific type needed (i.e. route, area or aerodrome) should be available.

18. Information on specific items for given areas required by flight planning services, ATS, AIS or other users, should be provided.

19. A list of NOTAM entered into the system after a specific date-time group, to facilitate briefing, should be obtainable.

20. Immediate notification capability of items which are of urgent operational significance should be provided.

#### **TYPE OF INFORMATION TO BE PROVIDED**

21. The system should provide NOTAM covering the area of service.

22. The system should additionally provide the following pre-flight information bulletins and lists:

- a) route type bulletin containing NOTAM relevant to aerodrome of departure, the planned route based on FIR crossed, aerodrome of destination, and alternate aerodromes;
- b) area type bulletin containing NOTAM relevant to FIR or State;
- c) aerodrome type bulletin containing NOTAM concerning any aerodrome or group of aerodromes;
- d) immediate notification items;
- e) checklists of NOTAM by State, FIR, aerodrome; and

- f) list of NOTAM for a specific period or NOTAM entered into the system after a specific date-time group.

23. The updating of pre-flight information bulletins should be covered by system products listed in 22 d), e) and f), or by request for a new pre-flight information bulletin.

24. The system features described in 28 to 37 below should permit pre-flight information bulletins to be tailored to the needs of the users and should provide flexible options of information content ranging from full system data coverage to data of urgent operational significance.

25. Pre-flight information bulletins should be provided in a standard format and ascending sequence of information.

### **MULTI-ACCESS TERMINALS**

26. AIS terminals should ultimately be capable of providing OPMET information relating to pre-flight bulletins.

27. AIS terminals should ultimately be capable of being used for the filing of a flight plan.

### **SYSTEM FEATURES**

#### **Notam**

28. The NOTAM, in standard ICAO NOTAM format, should constitute the basic data exchange source in the system.

29. The NOTAM should be prepared only once, at the entry into the system.

30. The system should provide for automatic exchange of the NOTAM between NASC and NASC.

#### **Common set of qualifiers (Field Q)**

31. A common set of qualifiers, forming an integral part of the ICAO NOTAM format (Field Q) should be used to assure compatibility in data exchange and to permit the

production of standard system output products.

#### **Decoded NOTAM text**

32. The NOTAM text (Field E) of the ICAO NOTAM format should be prepared by use of the significations/uniform abbreviated phraseology assigned to the ICAO NOTAM Code, complemented by ICAO abbreviations, indicators, identifiers, designators, call signs, frequencies, figures and plain language.

#### **NOTAM selection criteria**

33. The NOTAM code contained in PANS-ABC (Doc 8400) is the most comprehensive description of information requiring NOTAM promulgation and should, therefore, constitute criteria for:

- a) the storage and retrieval of information;
- b) the decision as to whether a particular item is of operational significance;
- c) the decision as to the relevance of particular items for various types of flight operations; and
- d) the selection of items of operational significance which require immediate notification.

34. Consequently, the NOTAM code should constitute the basis for the determination of the qualifiers for TRAFFIC, PURPOSE and SCOPE.

#### **Geographical reference qualifier**

35. Sufficient flexibility and tailoring of information for the first set up of automation in AIS is achieved by the use of the geographical reference qualifier. This qualifier consists of latitude and longitude to one minute resolution and referenced to the World Geodetic System — 1984 (WGS-84) geodetic datum accurate to one minute and a three-digit distance figure giving radius of influence.

36. The provision of more flexible and referred data retrievals can be satisfied by the application of a geographical reference system which may be required for the expansion of the overall system in order to meet future requirements. These requirements may derive from the introduction of RNAV operations, the expansion of automation within the air traffic services and the users' systems.

37. Consequently, in the evolution of the regional system the geographical reference system based on LAT/LONG coordinates of the World Geodetic Reference system (WGS-84) must be used as a standard.

#### **SYSTEM QUERY PROCEDURES**

38. The system should provide a common set of query

procedures.

39. The common set of query procedures should make the best use of the database management system applied in order to give rapid response to simple and short requests.

40. The query procedures should also provide user friendly access to the system without assistance of AIS personnel to obtain the required information.

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## Appendix

### SUMMARY OF AMENDMENTS TO THE BASIC ANP

*Approved by the President on behalf of the Council*

*5 November 2003*

ATM Addition of the requirements for ATS routes  
UL375, UL435 and UL695 (South Africa, United  
States and Members of the South Atlantic Group  
(SAT) — SAM 03/01-ATM/AIS)

## Apéndice

### RESUMEN DE ENMIENDAS DEL ANP BÁSICO

*Aprobado por el Presidente en nombre del Consejo*

*5 de noviembre de 2003*

ATM Adición de los requisitos para las rutas ATS  
UL375, UL435 y UL695 [Estados Unidos,  
Sudáfrica y miembros del grupo Atlántico  
meridional (SAT) — SAM 03/01-ATM/AIS]