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**International Civil Aviation Organization  
UNDP/ICAO Regional Project RLA/98/003  
Transition to CNS/ATM Systems in the CAR and SAM Regions**

**SECOND MEETING OF THE GREPECAS ATM/CNS SUBGROUP ATM COMMITTEE AIR  
TRAFFIC MANAGEMENT TASK FORCE – (ATFM/TF/2)**

(Bogotá, Colombia, 6 to 8 July 2006)

**Agenda Item 2: Caribbean/South American ATFM Concept of Operations (ATFM  
CAR/SAM CONOPS)**

**DRAFT THE ATFM OPERATIONAL CONCEPT FOR THE CAR/SAM REGIONS**

(Presented by the Secretariat)

**Summary**

This working paper presents a draft of the ATFM Operational Concept for the CAR/SAM Regions, as well as a schedule to complete the mentioned document.

**1. Introduction**

1.1 One of the tasks shown in the ATFM Task Force work programme of the ATM Committee is to prepare the necessary documentation on ATFM for the CAR/SAM Regions. Among the pertinent documents for homogeneous implementation in the CAR/SAM Regions, the ATFM Operational Concept has been identified, as well as a Manual or ATFM regional document as established by the PANS/ATM (Doc 4444) where the procedures ruling the provision of ATFM service would be prescribed.

## 2. **Analysis**

2.1 The CAR/SAM ATFM operational concept is a high-level document which has as main objective to define and regulate ATFM implementation in a homogeneous manner in the CAR/SAM Regions especially taking into account that while ATFM planning in both regions will be carried out jointly, the system implementation itself shall be carried out according to the own needs of each one of the regions involved.

2.2 In this connection, a unique ATFM operational concept for both regions shall enable a coherent harmonization to ensure an effective and equitable service, identifying and determining which shall be the objectives, principles, functions and minimum requirements in which the service implementation and ATFM Units required would be based.

2.3 Among other issues, the meeting could review the convenience to include the following issues within the ATFM Operational concept:

### 1. **Background information**

This chapter could make a brief summary since ICAO CNS/ATM Systems were supported by the Tenth Air Navigation Conference carried out in 1991 in ICAO Headquarters in Montreal, Canada, until the current activities of the CAR/SAM Regional Planning and Implementation Group (GREPECAS) towards the implementation of an CATFM system.

### 2. **Purpose of the document**

This Chapter should be addressed to explain the objective pursued with this document, making reference that the CATFM Caribbean and South American Regions (CAR/SAM) Operational Concept is a regional document which incorporates the scientific and technological aeronautical progress, as well as the operational experiences, in both CAR/SAM Regions as well as in other ICAO regions, which might affect CATFM concepts and procedures established in the same and which takes into consideration, as established in the ATM Operational Concept, the function to equilibrate the demand and capacity in order to protect the ATC from work overloads and have a better organization of air traffic flow as per the available resources and capacities.

### 3. **Trends and forecasts in the CAR/SAM Regions**

The information available in ICAO/UNDP Project RLA/98/003 would be taken as a reference as well as the information of the last ICAO Statistical Group carried out from 12 to 16 September, in Lima, Peru.

### 4. **Main traffic flows**

With regard to the main traffic flows, the 8 routing areas approved by GREPECAS would be included and then ratified by the CAR/SAM/3 Meeting and are shown in Table II-19 of the CAR/SAM ANP FASID.

## 5. Identification of areas and/or routes where air traffic congestion is produced

With regard to this chapter, in addition to the information which could be available within the scope of ICAO/UNDP Project RLA/98/003, States and International Organizations would have to provide information regarding areas in which air traffic congestions occur within the airspace as well as in airports, the reasons, year periods, peak hours and any other information available on this matter.

## 6. Objectives, Principles and Functions of a Centralized ATFM

The objectives, principles and functions of a centralized ATFM, as approved by GREPECAS/13 Meeting, would be included in this Chapter.

## 7. Equipment requirements and personnel for FMU/FMPs and CATFM Centralized

The minimum requirements of equipment and personnel for FMU/FMPs and Centralized CATFM would be included, taking as a basis the CAR/SAM Regions experience as well as in other ICAO Regions, including the corresponding automated systems. The CAR/SAM Regions implementation strategy is also presented.

## 8. Operational Procedures

- 8.1 Strategic phase
- 8.2 Pre-tactical phase
- 8.3 Tactical phase

This chapter would cover three ATFM phases and processes involved in each one of them, strategic phase, up to 48 hours before the day of the operation, pre-tactical phase, during 48 hours prior to the operation day and tactical phase, during the day of the operation.

## 9. Contingency plan

In case of a partial or total interruption of the flow management service and the capacity and/or support services, the ATFM and FMPs will have necessary contingency procedures in order to help to ensure safe and orderly air traffic movement. These procedures will have to be harmonized with the contingency plan/s agreed between operators and incorporated to the documents related with ATFM and FMP operational procedures.

2.4 Based on the above, **Appendix A** to this working paper presents a preliminary draft of CATFM Operational Concept (CATFM CONOPS) and **Appendix B** presents a chart with the chapters to be developed, and a column including the person/s responsible who would be in charge to review the referred document. Also, a work programme is presented which, if complied, shall enable the presentation of a first draft to the Fifth Meeting of the GREPECAS ATM/CNS Subgroup ATM Committee.

3. **Suggested action**

3.1 The meeting is invited to take note of the information presented in this working paper.

- a) review and issue comments on the CATFM CONOPS preliminary document shown in **Appendix A**; and
- b) if the meeting agrees, complete the table of **Appendix B** with the persons responsible in the finalization of each one of the chapters of the CATFM CONOPS as well as to define dates and work programme in order to finalize the document for onward presentation to the ATM/CNS/S/5 Meeting to be held in November 2006.

**APPENDIX A**



**INTERNATIONAL CIVIL AVIATION ORGANIZATION**

**Caribbean/South American Air Traffic Flow Management  
Concept of Operation**

**(CAR/SAM CONOPS ATFM)**

Version	Draft 0.0
Date	July 2006

## FOREWORD

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

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

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

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The present edition (Draft Version 0.0) includes all revisions and modifications until July 2006. Subsequent amendments and corrigenda will be indicated in the Record of Amendment and Corrigenda Table, according to the procedure established in page 3.



2. Due to this particularity, the ATFM CONOPS is also a dynamic document, in permanent progress and permeable in order to accept every modification originated by the constant improvement in the aeronautical disciplines and activities that enable its harmonious use in the CAR/SAM Regions, ensuring air operations safety.

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

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

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

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

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

*Italics* *for new or revised text;*

*Italics* *for editorial modification which does not alter the substance or meaning of the text; and*

Strikethrough ~~for deleted text.~~

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

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## GLOSARIO DE ACRÓNIMOS/ACRONYMS GLOSSARY

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

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

## Executive summary

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## History

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

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

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

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

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

## **Purpose of the document**

This document on CAR/SAM Air Traffic Flow Management Operations Concept (ATFM) is oriented towards the description of a high level on the service to be provided in the CAR/SAM Regions in a specific time horizon. It explains the current situation and which shall be the future situation to be progressively reached through a series of specific change stages.

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

## **Airlines passenger traffic forecasts and trends**

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

It is foreseen that the traffic growth will continue to improve gradually at mid term, at the same time than the economical activity. A growth of Regular CAR and SAM Regions airlines passengers' traffic of 6.2, 5.5 and 5.6% in 2005, 2006 and 2007, respectively is foreseen, as compared to the global growth forecast of 7.6, 6.5 and 6.2%, respectively.

## **Main traffic flows**

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

These routing areas and the respective traffic flows are described in the Table shown as **Appendix XX1** to this document.

## **Identification of areas and/or routes where traffic congestion is produced**

Currently, saturation periods have been identified in several airports and traffic flows of the Bahamas, Central America, Mexico, Miami, Piarco and Santo Domingo FIRs.

TBD .....

## **Objectives, principles and functions of a Centralized ATFM**

### **Objective of the Centralized ATFM**

As established in the PANS ATM (Doc 4444) air traffic flow management should be implemented within a region or within other defined area, as a centralized ATFM organization with the support of flow management posts established in each ACC within the region or area of application.

The objective of the Centralized ATFMs shall be to contribute so that the ATC use to the maximum possible extent its capacity and, as required, shall issue flow management initiatives to maintain a safe, orderly and expeditious air traffic circulation, assuring that the traffic volume is compatible with the declared capacities.

The Regional ATFM structure should be composed in such a manner that each CAR/SAM Region State/Territory and International Organization may accede to a corresponding Centralized ATFM through an organization adequate to its needs and developed as per the guides determined on this matter.

Consequently, and aware of their operational needs in agreement with its reality as regards ATC service, air traffic and airport problems, as well as air traffic volume, administrations should define whether a FMU is necessary, which in addition to communicating with the Centralized ATFM, may manage and coordinate the implemented FMP in ATC units which so require or adopt the direct communication process from these FMPs with the Centralized ATFM.

### **Principles in which ATFM will be based**

The Centralized ATFM, to comply with its objectives, should be based on the following principles:

- a) To be at disposal of all States/Territories and International Organizations in the region under their responsibility, considering the requirements of operators, airports, ATC units and other pertinent ATFM units.
- b) Use a common and permanently updated database.
- c) Take pertinent measures well in advance to prevent and/or minimize overloads.
- d) Keep close and continuous coordination with flow management units (FMUs) and/or flow management positions (FMPs), aircraft and airport

operators, corresponding ATC units and other pertinent Centralized ATFM units.

- e) Take measures that ensure that existing delays are equitably distributed among operators.
- f) Apply quality management to the services provided.
- g) Base the implementation of ATFM measures in the collaborative decision making (CMD) process.
- h) Favour, to the maximum possible, the use of the existing capacity without compromising safety.
- i) Contribute in the achievement of the global ATM objectives.
- j) Have the necessary flexibility to enable operators to change their arrival or departure schedules.

### **Functions of a Centralized ATFM**

To provide Air Traffic Flow Management (ATFM) service, the Centralized ATFM should comply with the following activities:

- a) Establish and maintain a data base in the region under its responsibility on:
  - the air navigation infrastructure, ATS units and registered aerodromes;
  - pertinent ATC and airport capacity; and
  - flight data foreseen.
- b) Establish a coherent chart of foreseen air traffic demand, a comparison with available capacity and determination of areas, and a time-frame of critical air traffic overloads foreseen;
- c) Make the necessary coordination to make every possible attempt to increase the capacity available, when necessary.
- d) When deficiencies in the capacity available matter may not be eliminated, determine and timely apply ATFM measures, as required, previously coordinated with aircraft operators and interested aerodromes.
- e) Carry out a follow-up on the result of measures adopted.

- f) Coordinate ATFM service with the other centralized ATFM units, when so required.

### **Equipment and Personnel Requirements for FMU/FMP and the Centralized ATFM**

The implementation of the ATFM shall require to identify and determine which would be the minimum requirements for the implementation of the service and the Centralized ATFM, FMU or Flow management position in each CAR/SAM Regions ATC unit.

*Note: A more detailed description of these requirements is shown in **Appendix XX2** to this document.*

Personnel performing in the Centralized ATFM as well as FMU/FMP functions shall require training and shall be qualified to provide an efficient flow management and capacity service.

### **Operational procedures**

The operational procedures of the Centralized ATFM as well as those for the FMUs and FMP should be developed in a separate document. These documents should describe the procedures applicable between the ATFM and all the FMU/FMPs. Changes in these procedures shall be first agreed upon and shall be published as amendments to operational procedures prior to consultation to all parties involved.

The purpose of these documents shall be to assist personnel from the Centralized ATFM and FMU/FMPs to establish a common understanding of the roles of each party interested in the effective provision of the flow management service and the capacity to the air traffic services control to aircraft operators.

ATFM measures should be addressed to traffic flows or flight series and to specific flights and days. To this end, planning, strategies development and day-to-day monitoring, should be made. With regard to the above, ATFM activities could be developed in three phases: strategic, up to 48 hours before the day of the operation, pre-tactical phase, during 48 hours prior to the operation day and tactical phase, during the day of the operation. During all ATFM phases, responsible units should maintain a close liaison with the ATC and with aircraft operators to ensure an effective and equitable service.

### **Strategic phase**

Strategic phase shall be initiated as soon as possible. At this stage, the balance between demand and capacity shall respond to fluctuations in schedules and demands, including air traffic increase, as well as annual changes in meteorological conditions, and the main meteorological phenomena. During collaboration decision-making, the available resources shall be optimized in order to have as much flow as possible, with which the basis to programme in advance flight schedules.

The strategic planning can be divided in a continuous data collection and interpretation process, and a systematic and regular review of procedures and measures and in an international coordination process to ensure the compatibility and efficiency of national and international requirements.

Strategic planning has two main objectives, on one hand to identify imbalances between demand and capacity in ATC systems, whether in sub-utilised or saturated areas and on the other to use said information to recommend measures leading to increased capacity or effective use of the existing capacity.

Regarding the above, a method that could be used for identifying imbalances between demand and capacity is comparing available traffic forecasts with known capacity data.

### **Pre-tactical phase**

At the pre-tactical stage, the demand and capacity balance will be achieved evaluating the assignment of the means and ATS services provider resources available, the airspace users and aerodrome operators, comparing them with foreseen demands. In order to mitigate any unbalance, whenever possible, through collaboration decision-making some adjustments will be incorporated to:

- Available means
- Assignment of resources
- Trajectories foreseen
- Airspace organization; and
- Assignment of entry and exit hours in aerodromes and in specific airspace volumes.

Basically, the pre-tactical phase comprises the study of the demand for the day of operation (starting 48 hours before), comparing it with the capacity available on that day, adjusting the Strategic Plan or finishing different measures when necessary. At the end of the process, the agreed measures should be disseminated in a bulletin (ATFM Reporting Message) containing the restrictions, and which can be distributed through the AFTN, SITA, etc.

### **Tactical phase**

In the tactical phase, the function of the demand and capacity balance shall focus more closely in the demand step to adjust any imbalance. The following shall be taken into consideration:

- Meteorological conditions
- Infrastructure status
- Assignment of resources
- Schedule disturbance that may cause any imbalance.

Through collaboration decision-making, the measures shall comprise dynamic adjustments of airspace organization to be in balance with capacity, dynamic changes of entry and exit hours in aerodromes and in specific airspace volumes and schedule adjustments by users.

The tactical activity is aimed at ensuring that the measures taken during the strategic and pre-tactical phases resolve the demand/capacity problems in the flows or areas of application, that the measures imposed are the minimum required and that the unnecessary measures have been eliminated, that ATC resources are properly used, and that maximum use is made of the existing capacity, without compromising safety.

It should also be noted that the existing delays are equitably distributed among operators.

In order to meet these objectives and comply with the above, the ATFM plan should be monitored in real time, in close contact with the ATC operation underway, where real-time access to data is critical.

In this tactical phase, the main ATFM measures being currently applied in this tactical phase are the use of SLOTS and en-routing application, trying to avoid significant penalties to operators.

#### **Centralized ATFM implementation strategy (ATFMC) in the CAR/SAM Regions**

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

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

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

It was considered that operational implementation should be carried out in phases, according to ICAO Doc 9854 – *Global air traffic management operational concept*, in order to permit a progressive implementation and acquire necessary capacities for an adequate implementation. Each phase should be implemented, based on operational configurations, descriptive documents of the operational models and systems, as per the established strategy, and taking into account the following sequence:

- a) strategic ATFM

- b) pre-tactical ATFM
- c) tactical ATFM

In order to harmonize the National Plans with the Regional CAR/SAM ATFM Regional Plan, it is necessary that the civil aviation administrations take the required measures and make a closer follow-up of the regional development of the ATFM and prepare a ATFM implementation programme where implementation needs are determined, the impact that will have in the national ATC system, air traffic services as well as in operations and airport services be analysed, and pertinent coordinations are established, which make it possible an integral regional, timely and harmonious implementation.

### **Contingency plan**

In case of a partial or total interruption of the flow management service and the capacity and/or support services, ATFM and FMU/FMPs will have the corresponding ATM contingency plans prepared as per GREPECAS guidelines, in order to help to ensure the safe and orderly movement of air traffic. These plans shall be incorporated to the documents related with operational procedures of the Centralized ATFM and FMU/FMPs.

## Appendix XX1

### Table

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

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

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

## Appendix XX2

### GENERAL CONSIDERATIONS FOR THE IMPLEMENTATION PROCESS OF A Centralized ATFM

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

- a) Access to the operational status of the air navigation infrastructure.
- b) Access to aeronautical information and cartography.
- c) Access to meteorological information.
- d) Database of:
  - aerodromes;
  - airport capacity;
  - ATC capacity
  - Air traffic demand
  - Airspace structure
  - Radio navigation aids
  - Aircraft performance; and
  - Utilization of airports and control sectors.
- e) Access to flight planning data (FPL, RPL, etc.).
- f) Flight plans processing.
- g) Access to surveillance data (SSR, ADS, etc.)
- h) Automated resources:
  - Processing and data visualization system for flow management, having, among other thing, the following sub-systems:
    - Flight data processing
    - Airspace and airports structure data;
    - Situation analysis (capacity and demand);
    - Presentation of air traffic situation;
    - Monitoring of the operational status of the infrastructure;
    - Support to collaborative decision making (ATC slots, alternate routes, etc.).
    - Database maintenance.

- i) Communication to coordinate with:
  - Other centralized ATFM's
  - Operators (airlines, general aviation, State, etc.);
  - Airport management;
  - FMUs and/or FMPs and/or ATS units;
  - Aeronautical meteorological units;
  - AIS units.
  
- j) Human resources
  - qualified personnel;
  - support personnel;
  - recurrent training.
  
- k) Use of adequate tools for statistics
  
- l) Infrastructure
  - buildings
  - equipment
  - electrical power
  - air conditioning
  - supplies
  - software
  
- m) Implementation of FMUs and/or FMPs, as required.
  
- n) Redundancy of critical systems.

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**APPENDIX B**

**Follow-up table and assignment of responsible persons for the revision of the CAR/SAM Regions  
ATFCM Operational Concept**

**Phase 1:      Deadline for coordination      21 July 2006**  
**Phase 2:      Document draft                    :      25 August 2006**  
**Phase 3:      Consolidated Document            29 September 2006**

<b>N° Chap.</b>	<b>Title Chapter</b>	<b>Development and revision in charge of</b>
-	Preface	Secretariat
-	Registry of amendments and corrigenda	Secretariat
-	Amendments to the Document	Secretariat
-	Content of the document	Secretariat
-	Acronyms	Secretariat
-	Executive summary	Secretariat
1	History	TBD
2	Purpose of the document	TBD
3	Trends and passengers air traffic forecasts	TBD
4	Main traffic flows	TBD
5	Identification of areas and/or routes where air traffic congestion is produced.	TBD
6	Objectives, Principles and functions of a Centralized ATFCM	TBD
7	Requirements of equipment and personnel for FMU/FMP and ATFCMC	TBD
8	Operational procedures - Strategic phase - Pre-tactical phase - Tactical phase - ATFCM operational implementation - Centralized ATFCM implementation strategy in the CAR/SAM Regions	TBD
9	Contingency plan	TBD
	Appendix X1	TBD
	Appendix X2	TBD

**Reference material**

Annex 11  
PANS ATM (Doc.4444)  
Doc. 9426  
Doc. 9854  
Doc. 9750 New Global Plan and the initiatives of the Global Plan Initiatives (GPI)  
ANP CAR/SAM