



ICAO

International Civil Aviation Organization
North American, Central American and Caribbean Office

WORKING PAPER

ANI/WG/4 — WP/17
10/08/18

Fourth NAM/CAR Air Navigation Implementation Working Group Meeting (ANI/WG/4)
Miami, United States, 21 – 24 August 2018

Agenda Item 3: Global and Regional Air Navigation Plans
3.4 Other Global/Regional Air Navigation Developments

**PROPOSAL TO AMEND THE CARIBBEAN/SOUTH AMERICAN AIR TRAFFIC FLOW MANAGEMENT
CONCEPT OF OPERATION (CAR/SAM ATFM CONOPS)**

(Presented by the Secretariat)

EXECUTIVE SUMMARY

This Working Paper presents a draft proposal to amend the CAR/SAM ATFM CONOPS in order to update the interregional ATFM implementation strategy according to the actual context and reality. This proposes a shift from a centralized ATFM implementation and functioning towards a multi-nodal cross border ATFM concept.

Action:	The suggested actions are presented in Section 6.
Strategic Objectives:	<ul style="list-style-type: none">• Safety• Air Navigation Capacity and Efficiency• Economic Development of Air Transport• Environmental Protection
References:	<ul style="list-style-type: none">• <i>2016-2030 Global Air Navigation Plan</i>, ICAO Doc 9750-AN/963• <i>Manual on Collaborative Air Traffic Flow Management</i>, ICAO Doc 9971• Caribbean/South American Air Traffic Flow Management Concept of Operation (CAR/SAM ATFM CONOPS)

1. Introduction

1.1 Air Traffic Flow Management (ATFM) is one of ICAO Global priorities as explained in the GANP, considering that ATFM is an enabler of air traffic management (ATM) efficiency and effectiveness, contributing to the safety, environmental sustainability, efficiency and cost-effectiveness of an ATM system. ATFM aims at enhancing safety by ensuring the delivery of safe densities of traffic and by minimizing traffic surges. Its purpose is, when needed, to balance traffic demand and available capacity.

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

1.3 In order to achieve that, for the CAR and SAM Regions, GREPECAS approved the Caribbean/South American Air Traffic Flow Management Concept of Operation (CAR/SAM ATFM CONOPS), describing the ATFM interregional operational concept, which reflects the expected order of events which might occur and should assist and guide the planners in the design and gradual development of ATFM systems, 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.

2. Background

2.1 GREPECAS correctly anticipated the need to plan and implement procedures to manage the flow of air traffic based on a broad vision, coherent with the need to analyse the possible implementation from an interregional point of view, covering both the Caribbean and South America Regions. Being contiguous regions, it is evident that the flow of traffic must be managed in a harmonized way according with the context in which both regions interact.

2.2 Consequently, in 2007, the CAR/SAM ATFM CONOPS was approved, establishing a high-level description of the services to be provided in terms of ATFM in the CAR/SAM Regions, describing the current traffic situation and future alternatives based on to the transition through different stages.

2.3 The CONOPS considered that, as established in the PANS ATM (Doc 4444), air traffic flow management should be implemented within a region, or other defined area, as a Centralized ATFM Facility with the support of flow management positions (FMP) established in each ACC within the region or area of application. Consequently, States, Territories, and International Organizations should define whether a Flow Management Unit, and the associated Flow Management Positions, should be established in the interim phase before the implementation of the Centralized ATFM Facility can be accomplished.

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

3. Current Situation

3.1 Despite the fact that GREPECAS anticipated and planned ATFM implementation so early in the process, the regional progress for ATFM implementation did not succeed as expected.

3.2 Political and operational considerations made the establishment of a single ATFM facility for each region not feasible. The decision of where and by whom this centralized facility will be placed and managed proved to put a considerable restraint to the ATFM implementation process.

3.3 The CONOPS was conceived as a document that should be updated according to the circumstances and the operational development of both regions. However, although it was evident that the centralized regional implementation was not feasible, and that the trend in other regions pointed to a different scheme, the CONOPS has never been updated, in order to reflect and provide the necessary guide to lead the process of implementation and operation of the ATFM.

4. Proposal to amend the CAR/SAM ATFM CONOPS

4.1 This version of the CAR/SAM CONOPS makes emphasis on a multi-nodal cross border ATFM concept. The implementation would be initiated with the application of basic ATFM procedures in airports, terminal and en-route airspaces, in an evolutionary manner to reach more complex phases, without the immediate need for a regional ATFM centre.

4.2 This change will lead the regional efforts for ATFM implementation, promoting the establishment and strengthening of FMP/FMU with resources and trained personnel to coordinate with the ATS the application of traffic management initiatives to balance demand with capacity.

4.3 Regardless of the fact that the proposed version of the CAR/SAM ATFM CONOPS emphasizes on a multimodal and decentralized implementation of the ATFM, experience in other regions proves that this approach is not totally free of challenges. Although, in principle, the multimodal approach may seem an appropriate option for the implementation and development of basic capacities by States and ANSPs, the reality is that at a certain point it is necessary to be able to make decisions from a regional perspective, and not individually. Therefore, in due time, measures should be taken to determine how these decisions would be made, whether through regional agreements or the implementation of a centralized decision-making system.

4.4 The leadership of ICAO is crucial to allow this to happen and guide both the CAR and SAM regions to a harmonized interaction, including also the NAM Region.

5. Conclusion

5.1 The ANI/WG endorsement to this initiative is a positive impulse to ATFM regional planning and implementation, putting the main actors in motion in a harmonized way towards goals clearly established by the global and regional ICAO plans, ensuring that we can maintain the leadership role and provide our stakeholders with solutions appropriate to their expectations.

6. Suggested Actions

6.1 The Meeting is invited to:

- a) Review the proposed amendment to the CAR/SAM ATFM CONOPS included in the appendix to this working paper; and
- b) Endorse the proposed amendment to the CAR/SAM ATFM CONOPS, and send it to GREPECAS with the request for final approval.



INTERNATIONAL CIVIL AVIATION ORGANIZATION

Caribbean/South American Air Traffic Flow Management Concept of Operation

(CAR/SAM ATFM CONOPS)

Version	2.0
Date	January October February 2017

FOREWORD

The Caribbean/South American ATFM Concept of Operations (CAR/SAM ATFM CONOPS) is published by the B1 Project (IMPROVE DEMAND AND CAPACITY BALANCING (DCB) of the Caribbean/South American Regional Planning and Implementation Group (GREPECAS). The Caribbean/South American ATFM Concept of Operations (CAR/SAM ATFM CONOPS) is published by the ATM/CNS Subgroup of the Caribbean/South American Regional Planning and Implementation Group (GREPECAS). It describes an air traffic flow management operational concept to be applied in both regions.

Comment [EM1]: Who will have the responsibility for the publication and maintenance up to date of the CONOPS

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

Comment [EM2]: See note EM1

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

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AMENDMENTS TO THE DOCUMENT

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

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

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

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

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

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

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

<i>Italics</i>	<i>for new or revised text;</i>
<i>Italics</i>	<i>for editorial modification which does not alter the substance or meaning of the text; and</i>
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).

Comment [EM4]: No ATM/CNS subgroup in the current GREPECAS structure

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Comment [EM5]: Suggest to maintain a complete document version update mechanism

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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 Autoridad de aviación civil Civil aviation authority
CAR/SAM	Regiones Caribe y Sudamérica Caribbean and South America 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

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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 control area
TWR	Torre de control Control Tower
WWW	Red informática mundial World Wide Web

Explanation of terms and expressions

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Air Traffic Management.

The dynamic, integrated management of air traffic and airspace including air traffic services, airspace management and air traffic flow management — safely, economically and efficiently — through the provision of facilities and seamless services in collaboration with all parties and involving airborne and ground-based functions. The aggregation of the airborne functions and ground-based functions (air traffic services, airspace management and air traffic flow management) required to ensure the safe and efficient movement of aircraft during all phases of operations.

Comment [EM6]: Revised per *Air Traffic Management (PANS-ATM) definition for harmonization.*

Flow Flight Management Position Unit (—FMP/FMU). A ~~position or~~ working unit established in an appropriate air traffic control ~~facility~~ unit to ensure the necessary ~~interphase interface~~ between the local FMU and neighbouring FMUs ~~ATFM and a centralized ATFM units related to~~ with respect to air traffic flow management ~~—ATFM.~~

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Flow Management Position (FMP). A position established in an appropriate FMU or air traffic control facility to ensure the necessary interface between the local FMU and neighbouring FMUs with respect to air traffic flow management.

Comment [EM7]: Responsibilities? Doc 9971

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

Executive summary

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

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

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

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From the analysis of the statistics it may be noted that during the period ~~1994-2004~~2005-2017~~6~~, the passengers regular traffic (in PKP) of airlines in the Latin American and Caribbean Region grew at an average annual rate of ~~3.3~~__% (in comparison to the ~~5.1~~__% annual rate of global growth, foreseeing that air traffic growth continues to gradually improve at mid term, at the same time that the economical activity.

The total of operations of the main airports of the CAR Region in the period ~~2002~~2005 to ~~2005~~2017~~6~~ reflected a positive trend of ~~1.92~~__%. ~~However, in the same period, the trend in the SAM Region was negative -0.56 __%, being the global trend positive 0.66% for both regions.~~

Comment [EM8]: Get ICAO Statistics for the CAR and SAM Regions

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

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The purpose of ATFM is to balance demand and capacity, providing the framework to take collaborative decisions to make an efficient use of available resources for the provision of air traffic services. Air operators and other stakeholders expect the ANSPs take appropriate measures to ensure safety in air operations, while guaranteeing the best possible use of the airspace and movement areas.

ANSPs should be aware on the impact their traffic management initiatives have in the efficiency and safety of air transport.

The initial regional ATFM implementation principle for the CAR/SAM Regions was to establish two centralized ATFM Facilities, one for each Region, with the support of flow management positions (FMPs) established in each ACC within the Region of application. Consequently, States, Territories, and International Organizations may define whether a Flow Management Unit, and the associated Flow Management Positions, should be established in the interim phase before the implementation of the Centralized ATFM Facility can be accomplished. This is what we may consider as the ideal scenario for regional ATFM implementation.

However, the establishment of a single ATFM organization for each region was not feasible due to political and institutional considerations, which resulted in a considerable delay in the expected implementation of ATFM in the CAR and SAM Regions.

In response to these circumstances, the CAR/SAM CONOPS makes emphasis on a multi-nodal cross border ATFM concept.

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

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

In the current operational concept, GREPECAS establishes a simple implementation strategy through the development in phases in order to ensure maximum utilisation of available capacity and permit all parties concerned to obtain sufficient experience. The implementation will ~~would~~ be initiated with the application of basic ATFM procedures in airports, terminal and enroute airspaces, and in an evolutionary manner to reach more complex phases, without the immediate need for a regional ATFM centre, ~~since its implementation would demand further studies to define operational concepts, systems requirements and institutional aspects for its implementation.~~

Despite the fact that this version of the CAR/SAM ATFM CONOPS emphasizes on a multimodal and decentralized implementation of the ATFM, experience in other regions proves that this approach is not totally free of challenges. Although, in principle, the multimodal approach may seem an appropriate option for the implementation and development of basic capacities by States and ANSPs, the reality is that at a certain point it is necessary to be able to make decisions from a regional perspective, and not individually. Therefore, in due time, measures should be taken to determine how these decisions would be made, whether through regional agreements or the implementation of a centralized decision-making system.

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

1. History

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

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

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

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

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

2. Purpose of the document

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

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

3. Actors involved in ATFM

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

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

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

3.4 **Airspace users.** Refers to airline, military, and general aviation aircraft operators and pilots ~~mainly to airlines and pilots~~.

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

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

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

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

4.1 During the period ~~1994-2004~~2005 - 2017~~6~~, the Latin American and Caribbean Region's airlines passengers' regular traffic (in PKP) grew at an annual average of ~~3.3~~ 3.3 % (in comparison to the global annual average growth rate of ~~5.1~~ 5.1 %). ~~Until year 2000~~The privatisation of national carriers, fusions and inter-regional alliances, together with a wide rationalization of fleets and routes, ~~contributed to counted among~~ the measures that enabled airlines of the CAR/SAM ~~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 2017~~6~~~~95~~ registered scopes of up to ~~13~~ 13 %.

Comment [EM9]: In line with comment EM8

4.2 Aircraft movement in the main airports in the period ~~2002-2005~~2005-2016 would indicate that, in the CAR Region, the total operations reflect a positive trend of ~~1.92~~ 1.92 % ~~observing that in some States particularly, positive trends are reflected that vary from 2.42% to 6.41%.~~ In the SAM Region, the total of operations reflected a ~~negative~~ trend of ~~0.56~~ 0.56 % ~~between years 20022005 to 20052016-observing that some States particularly reflect positive trends which vary from 0.85% to 4.79%.~~

4.3 Making a balance of the previous information, it is observed that during years ~~20022005~~ to ~~2005~~ 2016, the ~~globaloverall~~ trend in the CAR/SAM Regions ~~is~~ reflected in a positive ~~growth of 0.66~~ 0.66 %. ~~It is foreseen that the traffic growth continues to gradually improve at mid-term at the same time than economical activity.~~

5. Main traffic flows

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

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

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

6.1 Currently, saturation periods have been identified in several airports and traffic flows in some portions of the CAR/SAM Flight Information Regions (FIRs). In view of this, it is necessary that CAR/SAM States, Territories, and International Organizations determine the capacity of the airspace and / or airports for which they are responsible, and maintain and disseminate to all interested parties a list of the saturation periods where demand exceeds the capacity of their respective airports, terminal areas and traffic flows.

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7. Objectives, principles and functions of a ~~Centralized ATFM Facility~~ Flow Management Unit ~~Air Traffic Flow Management.~~

According to ICAO Manual on Collaborative Air Traffic Flow Management, Doc 9971, the objectives of ATFM consist of:

- a) enhancing the safety of the ATM system by ensuring the delivery of safe traffic densities and minimizing traffic surges;
- b) ensuring an optimum flow of air traffic throughout all phases of the operation of a flight by balancing demand and capacity;
- c) facilitating collaboration among system stakeholders to achieve an efficient flow of air traffic through multiple volumes of airspace in a timely and flexible manner that supports the achievement of the business or mission objectives of AUs and provides optimum operational choices;
- d) balancing the legitimate, but sometimes conflicting, requirements of all AUs, thus promoting equitable treatment;
- e) reconciling ATM system resource constraints with economic and environmental priorities;
- f) facilitating, by collaborating with all stakeholders, the management of constraints, inefficiencies, and unforeseen events that affect system capacity in order to minimize negative impacts of disruptions and changing conditions; and
- g) facilitating the achievement of a seamless and harmonized ATM system while ensuring compatibility with international developments.

Objective of the ~~Centralized ATFM Facility~~ Flow Management Unit

7.1 As established in the Manual on Collaborative Air Traffic Flow Management (Doc 9971), ~~PANS ATM (Doc 4444), each State shall ensure that an air traffic flow management structure is developed that meets the needs of the aviation community. should be implemented within a region, or other defined area,~~ as a ~~Centralized ATFM Facility~~ with the support of flow management positions (FMP) established in each ACC within the region or area of application.

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

7.3 Consequently, States, Territories, and International Organizations ~~should~~ shall ~~establish a~~ may ~~define whether a~~ Flow Management Unit, and the associated Flow Management Positions, in their

~~respective organizations;~~ should be established in the interim phase before the implementation of the Centralized ATFM Facility can be accomplished.

Principles in which ATFM will be based

7.4 ~~Regional An~~ ATFM structure should be developed in accordance with Doc 9971, ~~according to agreed upon guidelines as stated herein and in such a manner that each State/Territory and International Organization of the CAR/SAM Regions has access to a Centralized ATFM Facility.~~

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

- a) optimize available airport and airspace capacity without compromising safety;
- b) maximize operational benefits and global efficiency while maintaining agreed safety levels;
- c) promote timely and effective coordination with all affected parties;
- d) foster international collaboration leading to an optimal, seamless ATM environment;
- e) recognize that airspace is a common resource for all users and ensure equity and transparency, while taking into account security and defense needs;
- f) support the introduction of new technologies and procedures that enhance system capacity and efficiency;
- g) enhance system predictability, help to maximize aviation economic efficiencies and returns, and support other economic sectors such as business, tourism and cargo; and
- h) evolve constantly to support an ever-changing aviation environment.
- ~~a) Be at the disposal of all States/Territories and International Organizations in the region under their responsibility, taking into consideration the requirements of ATFM community members.~~
- ~~b) Use a common, comprehensive, and permanently updated database.~~
- ~~e) Take appropriate measures well in advance to accomplish demand and capacity balancing.~~
- ~~d) Maintain close and continuous coordination with FMUs and/or FMPs, aircraft and airport operators, and other pertinent Centralized ATFM Facilities.~~
- ~~e) Take measures to ensure that restrictions and delays are equitably balanced among the airspace users.~~
- ~~f) Apply quality management to the services provided.~~
- ~~g) Use the collaborative decision making (CDM) process as the basis for developing and implementing ATFM measures.~~
- ~~h) Favor, to the maximum possible, the use of the existing capacity without compromising safety.~~
- ~~i) Contribute to the achievement of the global plan initiatives (GPIs).~~

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

Functions of a ~~Centralized ATFM Facility~~ Flow Management Unit

7.6 To provide ATFM service, the ~~Centralized ATFM Facility~~ Flow Management Unit should:

- a) Establish and maintain a ~~regional~~ database that includes:
 - the air navigation infrastructure, ATS units and registered aerodromes;
 - pertinent ATC sector and airport capacity;
 - forecast flight data.
- b) Establish a method for displaying:
 - a chart of forecast air traffic demand;
 - a comparison of demand and available capacity for pre-determined areas; and
 - the time-frame of forecast air traffic overloads.
- c) Make the appropriate coordination to attempt to increase available capacity, when necessary.
- d) When demand will exceed available capacity, coordinate, communicate, and apply ~~ATFM~~ traffic management measures in a timely manner.
- e) Carry out a follow-up on the result of traffic management measures ~~used~~ adopted.
- f) Coordinate traffic management ~~ATFM~~ measures with neighboring FMUs ~~the other Centralized ATFM Facilities~~, when so required.

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8. Equipment requirements for a Flow Management Unit~~FMU/FMP and Centralized ATFM Facility~~

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

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

9. Human resource planning ~~and training~~ requirements for a Flow Management Unit~~FMU/FMP and Centralized ATFM Facility~~

9.1 Establishment of an Centralized ATFM Facility, FMU, and associated~~or~~ FMP(s), requires careful human resource planning ~~and training~~.

9.2 FMU Structure



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~~ATFM training shall be designed to include segments regarding techniques to balance demand and capacity, traffic synchronization, benefits of optimizing traffic flows and creating operational efficiency, techniques for managing change in the operational environment, and the process for ensuring high levels of service to the customers.~~

Figure 1: FMU Structure

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9.3 DUTIES AND RESPONSIBILITIES: FMU MANAGER/CHIEF

9.3.1 TITLE OF THE POSITION

FMU Manager/Chief

9.3.2 JOB NATURE AND MISSION

Responsible for the planning, execution, and management of functions related to the operational activities in the FMU. Ensures that efficient and effective traffic management is applied within the geographic area of responsibility. Maintains an understanding of the technical aspects of the FMU and effectively manages human resources.

9.3.3 ORGANIZATIONAL LOCATION AND DIRECT REPORT

FMU Location: Area Control Center (ACC)

FMU Manager/Chief reports directly to: Air Traffic Services Manager

Supervises directly: Traffic Management Officer (TMO)/Supervisor

9.3.4 COLLABORATIVE LIAISON

The FMU Manager/Chief ensures that the FMU staff maintains an effective and collaborative liaison with internal and external organizations.

Internal organizations can include, but are not limited to:

- ACC staff
- Underlying Terminal Management Areas (TMAs)
- Airport Traffic Control Towers (ATCTs)
- CNS/Technical Operations staff
- Search and Rescue (SAR) Office
- Air Aeronautical Reporting and Reservation Office (ARO)
- NOTAM Office

External organizations can include, but are not limited to:

- Adjacent ACCs and FMUs
- Stakeholders: airlines, general aviation, military
- Government agencies

9.3.5 RESPONSIBILITIES

FMU Manager/Chief responsibilities include:

- Collaborates and communicates with operational stakeholders.
- Ensures the FMU monitors:
 - air traffic flows
 - air traffic demand and capacity
 - conditions that impact demand and capacity
- Ensures the FMU staff:
 - delivers information regarding the status of the infrastructure of air navigation services. For example, NAVAIDS, airports, facilities, etc.
 - prepares, delivers and briefs reports concerning the capacity and demand of ATC sectors, airport acceptance rates (AAR), and airport departure rates (ADR)

- o plans, coordinates, briefs, implements, monitors, revises, and cancels traffic management measures (TMMs)
- o maintains an awareness of activities in special use airspace
- o coordinates and relays information related to NOTAMs

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9.4 DUTIES AND RESPONSIBILITIES: TRAFFIC MANAGEMENT OFFICER (TMO)/SUPERVISOR

9.4.1 TITLE OF THE POSITION

FMU Traffic Management Officer (TMO)/Supervisor

9.4.2 JOB NATURE AND MISSION

Serves as supervisor on-duty for Traffic Management Coordinators (TMCs) in an FMU. Ensures that efficient and effective traffic management is applied by the TMCs within the geographic area of responsibility.

9.4.3 LOCATION AND DIRECT REPORT

FMU Location: Area Control Center (ACC)
FMU TMO/Supervisor reports directly to: FMU Manager/Chief
Supervises directly: Traffic Management Coordinators

9.4.4 RESPONSIBILITIES

- Provides supervision to a staff of TMCs
- Ensures that traffic instructions/restrictions are initiated in accordance with established procedures to maintain a safe and expeditious flow of traffic and minimize the impact of heavy traffic demand
- Provides training, coaching and guidance to subordinates and facilitates team building throughout area(s) of responsibilities
- Assigns and reviews work
- Plans work and sets priorities and schedules
- Approves leave
- Prepares schedules for completion of work
- Assigns work to subordinates based on priorities
- Evaluates work performance of subordinates, ensuring equity of performance standards and ratings
- Adjusts staffing levels and work procedures to accommodate resource decisions made at higher management levels

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9.5 DUTIES AND RESPONSIBILITIES: TRAFFIC MANAGEMENT COORDINATOR (TMC)

9.5.1 TITLE OF THE POSITION

FMU Traffic Management Coordinator (TMC)

9.5.2 JOB NATURE AND MISSION

Performs technical level of responsibilities of considerable difficulty. Responsible for distributing collecting and monitoring data and for overseeing the ATFM activities within the respective Flight Information Region (FIR). This ensures that all stakeholders have timely and efficient access to applicable ATFM information applicable ATFM. Utilizes equipment and aeronautical tools suitable for maintaining the balance of air traffic demand and capacity in Air Traffic Control (ATC) sectors and at airports. Coordinates directly with adjacent FIR's/ACC's and any other overseas/international organizations.

9.5.3 LOCATION AND DIRECT REPORT

FMU Location: Area Control Center (ACC)

FMU TMO/Supervisor reports directly to: FMU TMO/Supervisor

Supervises directly: None.

9.5.4 RESPONSIBILITIES

- Constantly monitors the flow of air traffic, the state of the infrastructure of air navigation services, the conditions of different airports, the weather conditions and the projected air traffic demand to ensure acceptable levels of traffic are maintained
- Monitors weather conditions and collaborates with aviation stakeholders to avoid flight routes into undesirable weather conditions
- Ensures that all stakeholders have timely and efficient access to applicable ATFM information
- Utilizes equipment and aeronautical tools suitable for balancing air traffic demand and capacity in ATC sectors and at applicable airports
- Plans, coordinates, implements, revises, and cancels traffic management measures to balance demand and capacity in ATCS sectors and at applicable airports
- When air traffic delays are anticipated or known to exist, establishes plans to reduce delays
- Collects, distributes, and monitors aeronautical information pertinent to the ATFM activities within the FIR
- Ensures that the instructions and restrictions are applied in accordance with the established procedures to maintain a safely, orderly and expeditious flow of air traffic, in order to minimize the impact of high demand periods.
- Coordinates directly with adjacent ACC FMUs and other overseas and international organization, as required.
- Serves as a Military Liaison and coordinates all military exercises and activities within the designated FIR

10. Operational procedures

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

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10.2 The purpose of ~~these~~ this documents shall be to:

- *establish the functions and responsibilities of personnel working in the ~~Centralized ATFM Facility~~, FMUs and FMPs in regard to implementing the ATFM flow management service.*
- *describe the procedures to be used between ~~the Centralized ATFM Facility, FMUs, and FMPs~~.*
- *describe the ~~air traffic flow~~ traffic management initiatives ~~measures and messages~~ that may be applied.*

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

11. ATFM Implementation Strategy

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

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

Airports

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

~~11.4~~11.3 The implementation process of ATFM in the CAR/SAM Regions related to airports should start with the establishment of the a common methodology of calculating airport capacity which would enable identification of airports where periods exist in which demand is higher than capacity. With that identification, traffic management measures can be planned ~~could be adopted~~ with a view to optimise the utilisation of the existing capacity.

~~11.5~~11.4 ATFM strategic measures at airports may ~~include be limited to~~ the use of Airport Slots with the objective of achieving the balance between the demand of regularly scheduled flights and airport capacity. The application of slots can help ~~would~~ ensure a smooth hourly distribution of ~~these~~ flights at these airports.

~~11.6~~11.5 The necessary capacity for other airspace users (non-regular flights) should also be kept in mind when developing airport slot allocation procedures.

~~11.7~~11.6 The evolution of ~~ATFM-traffic management~~ measures ~~infor~~ airports should evolve towards tactical applications and the inclusion of non-regular flights in balancing procedures between demand and capacity. ~~The adoption of ATFM tactical measures in airports would be still of low complexity. However, it would demand an increase in the data collection program for non-regular flights in order to include these FPLs. Also, in addition to the use of automation tools and efficient communications means between with aircraft operators which perform non-regular flights must be established in order to tactically balance demand and capacity.~~

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

Airspace

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

11.7 Given that the fundamental purpose of ATFM is to be able to balance demand with capacity, it is understood that a realistic implementation is based on the determination of the capacity of the ATS system. The Manual on Collaborative Air Traffic Flow Management provides basic guidance for this determination.

~~11.10~~11.8 It is expected~~may be possible~~ that strategic ATFM-traffic management measures in the airspace ~~are~~will be sufficient to prevent overload of ~~control-ATC~~ sectors, ~~mainly in those airspaces in which there is a significant excess demand.~~

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

~~11.12~~11.9 It is expected that airspace tactical ATFM be implemented only in States/Territories and International Organizations where there is a clear operational requirement, keeping in mind that the complexity of the application of tactical measures in airspace implies a significant investment in automated systems, data bases, telecommunications system and human resources training.

~~11.13~~11.10 States/Territories and International Organizations who decide to implement airspace tactical ATFM-traffic management measures should develop standards ,and operational procedures and operational manuals applicable to ATFMthis service.

Centralized ATFM Facility implementation strategy in the CAR/SAM Regions

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

~~11.15 In order to maximise its efficiency, it was considered that the Centralized ATFM Facility should have the responsibility for providing service to the maximum extension of airspace possible, provided that this is homogeneous. In accordance with ATFM planning in the CAR and SAM Regions, it will have at least two Centralized ATFM Facilities one for each region. It was also considered necessary that the procedures during all the implementation process be developed in a harmonious manner among the ATFM Facilities to avoid risking operational safety. This entails establishing a regional and~~

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~~interregional strategy to facilitate and harmonize all the implementation process. The ATFM Task Force will accomplish these planning and harmonization objectives. For implementation, two scenarios will be established depending on the individual operational needs and features of the CAR and SAM Region. The activation of two ATFM Implementation Groups was considered, one for each Region.~~

~~11.16 — It was considered that operational implementation should be carried out in phases, according to ICAO Doc 9854 — Global Air Traffic Management Operational Concept, in order to permit a progressive implementation and acquire necessary expertise for an adequate implementation.~~

~~11.17 — In order to harmonize the National Plans with the Regional CAR/SAM ATFM Regional Plan, it is highly recommended that the States, Territories and International Organizations take the following required measures: make a closer follow-up of the regional development of the ATFM, prepare an ATFM implementation program, asses the impact that ATFM will have in the national ATM system, and establish pertinent coordinations to accomplish a regionally harmonized implementation.~~

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12 Special flights exempt from application of ATFM measures

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

13 Contingency plan

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

APPENDIX A

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

-1- Routing Area (AR)	-2- Traffic flows	-3- FIRs involved	-4- Type of area	-5- Remarks
Caribbean/South American Regions (CAR/SAM)				
AR 1	▲ Buenos Aires-Santiago de Chile	Ezeiza, Mendoza, Santiago	Low density Continental	SAM intra-regional traffic flow
	Buenos Aires-Sao Paulo/Río de Janeiro	Ezeiza, Montevideo, Curitiba, Brasilia	Low density Continental	SAM intra regional traffic flow
	Santiago de Chile-Sao Paulo/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/AF/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

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-1- Routing Area (AR)	-2- Traffic flows	-3- FIRS involved	-4- Type of area	-5- Remarks
	Buenos Aires - New York	Ezeiza, Resistencia, Asunción, La Paz, Porto Velho, Manaus, Maiquetía, Curacao, Santo Domingo, Miami (New York)	Continental / Low density Oceanic	CAR/SAM/NAM/NAT NAM inter- and intra-regional traffic flow
	Buenos Aires - Miami	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
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

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

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APPENDIX B

General Considerations for the implementation process of a Centralized ATFM Flow Management Unit

The implementation of the Centralized ATFM Flow Management Unit 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 sector 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~~ FMUs
 - 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.
