INTERNATIONAL CIVIL AVIATION ORGANIZATION

FINAL REPORT

THIRD MEETING OF THE GREPECAS ATM/CNS SUBGROUP ATM COMMITTEE AIR TRAFFIC FLOW MANAGEMENT (ATFM) TASK FORCE

(ATFM/TF/3)

(San Andrés Island, Colombia, 19 to 22 June 2007)

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HISTORY OF THE MEETING

ii-1 PLACE AND DURATION OF THE MEETING

According to the work programme of the GREPECAS ATM/CNS Subgroup ATM Committee, the Third Meeting of the ATFM Task Force (ATFM/TF/3) was held in San Andres Island, Colombia, from 19 to 22 June 2007. The meeting was held after the Second Seminar on Air Traffic Flow Management in the CAR/SAM Regions, carried out in San Andres Island, Colombia, on 18 June 2007.

ii-2 OPENING CEREMONY AND OTHER MATTERS

On behalf of the ICAO Regional Offices, Mr. Jorge Fernández thanked the Unidad Administrativa Especial de Aeronáutica Civil, Colombia for their permanent support of the activities carried out in the Region which are oriented towards the improvement of international air navigation. He highlighted the proficiency shown by the members of the ATFM Task Force in the development of documentation and requirements for a progressive implementation of air traffic flow management.

Mr. Fernando Augusto Sanclemente, Director General of UAEAC Colombia, expressed his deepest appreciation for the delegates contributions to the construction of future scenarios in air traffic flow management and expressed a warm welcome in receiving the participants to the archipelago of San Andrés.

Attention was called to the importance of the role of ICAO Regional Offices, which facilitates the development of physical and services infrastructure, in a harmonious manner, in order to meet the future challenges that arise from the accelerated growth of air traffic. The role of the ICAO Regional Offices is also guided by the framework of the air navigation global plan and by the development of new technologies generated by the air transport industry in all fields related to civil aviation. The ICAO Regional Offices add expertise and value to the processes required to coordinate technical cooperation, evaluate new tools, develop procedures, and implement new technologies.

He also welcomed the representatives from the aircraft operators and expressed that ATFM will only function with the support and commitment of all actors in the aeronautical community. Their assistance and contribution to the planning, development, utilization, regulation, operation and maintenance of this system shall be welcome. Within this framework, he encouraged the delegations of States experts and encouraged them to: continue constructing this scheme; reach agreements on existing flow management national plans; define the documentation and data banks that may be shared to this end; structure the action plan models; improve the operations of aerodromes; and establish ATFM guidelines.

Then, he opened both events and offered the kind cooperation of Colombia in the forthcoming meeting of the ATFM Task Force.

The activities of the week were initiated with an ATFM Seminar. The first presentation made by Mr. Jorge Fernández, ATM/SAR Regional Officer of the ICAO South American Office, examined matters such as the CAR/SAM ATFM Concept of Operations prepared by the Task Force and approved by GREPECAS/14. Also, Mr. Bernal Mesen, ATM Officer of the Mexico Regional Office, presented the ICAO documentation which serves as the framework for ATFM implementation.

The Task Force Rapporteur, Mr. Joe Hof, and Mr. Ricardo Torres Muela, Head of the Mexico Flow Control Center, presented the experiences and lessons learned during ATFM implementation between SENEAM and the FAA and showed the process carried out to improve the traffic flow in North America. Also, Mr. Joe Hof presented a model to determine the airport acceptance rate used by FAA. Mr. Harlen Mejía, Head of the Colombian Delegation, made a presentation on the experience of Colombia and lessons learned in the initial implementation process of flow management for Bogota/Eldorado airport. Mr. Ary Bertolino, Head of the Operational Division of the Air Navigation Management Center (CGNA) Brazil, and Mr. Franklin Gouveia made presentations on the experiences, processes and means of air traffic flow management in Brazil. They also discussed Brazil's ATFM implementation phases and CGNA's procedures for determining airport and runway capacity. Mr. Fabián García Gómez, Head of Capacity and Air Traffic Flow Division in Madrid (Spain) made three presentations which showed the tools used in Spain for the definition and estimation of acceptable ATC workload. During the first presentation, he referred to Norvase, and demonstrated how this tool is used to determine the capacity and management of control sectors in Spain.

Mr. García also presented the Capacity Integrated Model, known as MICA, which studies ATC capacity from the point of view of the management and organization of human and technical resources. He also made a presentation on the European air navigation system of the future and showed the development of this program.

During the closing ceremony, Mr. Joe Hof, from the Delegation of United States and ATFM Task Force Rapporteur, expressed his optimism on the activities addressed towards the ATFM implementation in the CAR/SAM Regions. Mr. Jorge Fernández, ICAO ATM/SAR Regional Officer, Lima, on behalf of ICAO, also thanked Mr. Joe Hof, ATFM Task Force Rapporteur, for the excellent work carried out, to all speakers of the Seminar, and to the States which permitted the participation on these events. He particularly emphasized the support of Spain, State which does not belong to the Region but strongly supports the CAR/SAM Regions activities, enabling the presence of Mr. Fabián García Gómez, Head of the Flow Management Division, AENA, Spain, and thanking him for his valuable contribution and experiences shown during the different agenda items.

Finally, Mr. Javier Danilo Pinilla, Operational Systems Secretary, UAEAC Colombia, thanked the presence of the participants, highlighted the work carried out during the meeting and closed the Second ATFM seminar and the GREPECAS ATM/CNS Subgroup ATM Committee Third Meeting of the ATFM Task Force.

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

The Meeting agreed to hold its sessions from 0900 to 1600 hours, with appropriate breaks. The work was done with the Meeting as a Single Committee, Working Groups and Ad-hoc Groups.

Mr. Joe Hof, delegate from United States, served as Chairman of the Meeting and Rapporteur of the ATM Committee Air Traffic Flow Management Task Force.

Mr. Jorge Fernández Demarco, RO/ATM/SAR Regional Office, Lima, acted as Secretary, and was assisted by Mr. Bernal Mesen, RO/ATM/SAR, Regional Office, Mexico.

ii-4 WORKING LANGUAGES

The working languages of the Meeting were Spanish and English. and its relevant documentation was presented in both languages.

ii-5 AGENDA

The following agenda was adopted:

Agenda Item 1: ATFM Existent National Plans in the CAR/SAM Regions

Agenda Item 2: Necessary documentation on ATFM for the CAR/SAM Regions

Agenda Item 3: Model Action Plan to improve Aerodrome Operations (AO) and the corresponding ATFM guidance material for FMU or FMP implementation

Agenda Item 4: ATFM data bank

Agenda Item 5: Review of ATFM/TF Terms of Reference and Work Programme

Agenda Item 6: Other matters

ii-6 **ATTENDANCE**

The meeting was attended by 55 participants from 4 States of the CAR Region, 9 States of the SAM Region, and 3 Organizations (AENA, COCESNA and IFALPA) The list of participants is shown in pages iii-1 to iii-9.

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Agenda Item 1: ATFM existent national Plans in the CAR/SAM Regions

Aerodrome Capacity

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

1.2 The information analyzed during the meeting was based on years of work conducted by the Federal Aviation Administration and on the practical application of this model at aerodromes across the United States. This methodology has been successfully employed and has proven very useful and beneficial for traffic managers.

1.3 The meeting was of the opinion that the model procedures presented by FAA for the estimation of aerodrome acceptance rate, as well as the adjustment factors used, would be very useful for ATS planners in the estimating their own aerodrome acceptance rates. In this regard, the meeting considered that the study presented by the FAA could be used as reference material and it is included as **Appendix A** to this part of the report.

1.4 The meeting also took note of the process carried out by the ATM Procedures Group from Colombia UAEAC for the determination of the airport capacity of Eldorado. This task was carried out through the application of Advisory Circular (AC) 150/5060-5, Change 2, "Airport Capacity and Delay." This method is derived from the computer models used by the FAA to analyze airport capacity, can be used to verify the theoretical estimates with the actual airport operations, and produces values similar to those previously obtained. The information presented by Colombia is shown as **Appendix B** to this part of the Report.

1.5 The meeting was of the opinion that the model presented by FAA is very practical but does not include several factors involved in estimating the acceptance rate for an airport. It would seem reasonable to use this method, but it should be evaluated in the light of other experiences and other known methods in order to obtain guidelines and a common methodology for the CAR/SAM Regions. Also, a request was made to the Rapporteur about the possibility of clarifying some points of the AC 150 150/5060-5 in order to consider this document in the evaluation of the common methodology. The meeting also took into account the information on methodology for the estimation of the airport capacity used in Brazil and the information provided by Spain regarding tools and available methodologies on this matter.

1.6 An aspect highlighted by most of the States and International Organizations was the inadequate infrastructure available in some airports of the Region which can produce bottlenecks in the system. Specifically mentioned were: runway and taxiway layout; and, limited availability of parking spaces and platforms on the ramp. They also expressed that ATFM is not a system that may be able to resolve problems of this nature. The meeting also considered it appropriate that airport services providers, together with aeronautical authorities, review these situations. The meeting was of the opinion that unless measures are adopted to solve these deficiencies, coordinated airports may not be available in the regions and that to solve this problem, the organizations or units that approve air operations should develop a flight planning and programming culture adequate to airports capacity.

1.7 The meeting considered that a definition on airport capacity should be made for clarification purposes within the context of ATFM meetings, and therefore agreed on the following: **Airport Capacity (AC)**: "The maximum number of operations (departures and landings) that may be supported by airport infrastructure services, in a specific period".

Creation of a Task Force on Airport Capacity (AC) and ATC Capacity (ATFM AC/WG)

1.8 After taking note of the information provided and a fruitful exchange of opinions and analysis of the different points of view on this matter and recognizing the need to have a common model of application to the CAR/SAM Regions, the meeting agreed to create a working group which will have the goal to prepare a Model for the Estimation of the Airport Capacity to be used by CAR/SAM States/Territories/International Organizations. The meeting also considered that the same working group should evaluate existing methods for the estimation of ATC sector capacity and provide guidance material for a harmonized regional application. The terms of reference, work program and composition of the Group are shown in Appendix B to Agenda Item 5 of the report.

1.9 The work of this group will be carried out using electronic means as well as through participation in a monthly teleconference in order to review the progress of the work being done.

Implementation Experiences of Flow Management Position (FMP)

1.10 In accordance with the CAR/SAM ATFM Concept of Operations, the operational procedures applied to the Centralized ATFM Facility and FMU´s/FMP´s should be developed in separated documents. These documents should describe the procedures applicable between the Centralized ATFM Facility and all the FMUs/FMPs. Changes in these procedures shall be first agreed upon and shall be published as amendments to operational procedures after consultation with all parties involved. Also, the purpose of these documents shall be to assist personnel from the Centralized ATFM Facility and FMUs/FMPs to establish a common understanding of the roles and responsibilities of each party involved in the effective provision of air traffic flow management services. These documents will also help define the integration of ATFM with air traffic control services and customer operations.

1.11 The FMP should have the responsibility to supply the FMU with the following: information concerning air traffic demand; sector capacity of the ATS units; required technical support and infra-structure; meteorological phenomena which affect air navigation; and the application of the ATFM measures established by the FMU. The flow manager at an FMP should coordinate directly with the FMU.

1.12 In view of the above, and based on the experience obtained regarding the attributes and needs of the FMU, the Meeting took into account the information provided by Brazil as shown in **Appendix C** to this part of the report. This information may be used as reference for the preparation of the guidance material for the implementation of FMP or FMU in the CAR/SAM Regions.

CGNA Brazil Implementation of Phase 2 and 3

1.13 Under this part of the agenda item, the meeting was provided information concerning the Air Navigation Management Centre (CGNA) Implementation phases 2 and 3.

1.14 It was noted that the proposal of the CGNA regarding the management of air traffic imbalance is to centralize the national information and distribute it to the ATC units aiming to establish ATFM measures in advance.. Therefore, it will be necessary to: establish and define the processes for attaining applicable information; integrate the systems that distribute the data; and ensure that the information is available in real time so that operational decisions are taken on time, in a planned way, and in accordance with the needs of airspace users.. The meeting was of the opinion that the information provided by CGNA could be considered as a valuable reference for the preparation of guidelines for Centralized ATFM implementation in the CAR/SAM Regions. The meeting therefore agreed to include the new functional characteristics as **Appendix D** to this part of the report for use when developing the mentioned guidelines.

Lessons learned in ATFM implementation in North America

1.15 The meeting noted the excellent work and ATFM development carried out to date by the Air Traffic Control System Command Center (ATCSCC), the NAVCANADA National Operations Centre (NOC), and the Mexico Flow Control Center (CCFMEX). The meeting also acknowledged the operational benefits provided by ATFM so far in the NAM Region. The meeting requested to include the presented material as **Appendix E** to this part of the report in order to adopt it as reference material.

Air traffic Flow Management Service Regulation Model

1.16 The *Unidad Administrativa Especial de Aeronáutica Civil (UAEAC) Colombia,* has prepared an model regulation concerning air traffic flow management service, but it has not yet been published. This model contains information regarding: how ATFM service will be provided; the area of responsibility of the ATFM unit; the implementation and application stages of the FMU/FMP functions and services; and some of the procedures to be applied in Colombia.

1.17 The meeting thanked the delegation of Colombia for the presentation of this model regulation and requested that it be included as **Appendix F** to this part of the report so that CAR/SAM States/Territories/International Organizations may adopt it as reference material for the development of their own regulations.

APPENDIX A

Procedures to estimate the aerodrome acceptance rate (AAR)

a. **Aerodrome Acceptance Rate (AAR):** The number of arrival aircraft that an aerodrome -- in conjunction with weather conditions, terminal airspace, ramp space, parking space, and facilities -- can accept per hour.

b. **Aerodrome Primary Runway Configuration**: Each aerodrome configuration which handles 3 percent or more of the annual operations.

c. **Potential AAR**: The theoretical acceptance rate at the runway threshold – before taking other factors into consideration.

d. **Actual AAR**: The Potential AAR at the runway threshold adjusted for other factors.
For any runway configuration, the Potential AAR minus Adjustment Factors equals the Actual AAR:

POTENTIAL AAR
-- ADJUSTMENT FACTORS

ACTUAL AAR

e. **Adjustment factors**: The factors that must be considered when establishing the Actual AAR. These include, but are not limited to:
1. Weather conditions
2. Runway conditions
3. Taxiway layout
4. Ramp space
5. Facilities

Establishing the Actual AAR.

a. Establish Actual AAR values for each aerodrome runway configuration for the following weather conditions:

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

2. Marginal VMC - weather does not allow vectoring for visual approaches, but visual separation on final is possible.

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

Calculate the Actual AAR as follows:

a. First, calculate the Potential AAR.

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

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

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

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

4. Example 1: 130 KTS / 5 nm = 26
Potential AAR = 26 arrivals per hour

5. Example 2: 120 KTS / 7 nm = 17.14
round down to 17

Potential AAR = 17 arrivals per hour

6. Or, use the TABLE METHOD to determine the Potential AAR.

Table: Potential AAR

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

b. Next, identify any conditions that may reduce the Potential AAR. Conditions include:

1. Intersecting arrival and departure runways

2. Lateral distance between arrival runways

3. Dual use runways – runways that share arrivals and departures

4. Land and Hold Short operations

5. Availability of high speed taxiways

6. Airspace limitations and constraints

7. Procedural limitations (noise abatement, missed approach procedures)

8. Taxiway layouts

9. Meteorological conditions

c. Finally, subtract the adjustments from the Potential AAR to determine the Actual AAR for each runway used in an aerodrome configuration.

POTENTIAL AAR
-- ADJUSTMENT FACTORS

ACTUAL AAR

d. Example

Table: EXAMPLE OF AN ACTUAL AAR TABLE

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

Administrative considerations:

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

b. Establish a table of Actual AARs for the aerodromes identified by each State/Territory.

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

APPENDIX B

DEMAND/CAPACITY ANALYSIS – "ELDORADO" AIRPORT

1. INTRODUCTION

Every airport has a limited number of aircraft operations its runway and taxiway system are capable of accommodating. This limit is known as aerodrome capacity. Aerodrome capacity is evaluated in hourly periods for the runway/taxiway system. Demand/Capacity analysis seeks to identify aerodrome capacity and to define any improvements, if such exist, to meet the future demand.

There are several empirical, analytical, queue and manual methods or models to determine airport capacity.

Colombia's demand/capacity analysis is based on the standard FAA method.

2. DEMAND/CAPACITY ANALYSIS – "ELDORADO" AIRP0RT

The Standard FAA method for determining airport capacity and delay, for long-term planning purposes, can be found in Advisory Circular (AC) 150/5060-5, Change 2, entitled "Airport Capacity and Delay." This method is derived from the computer models used by the FAA to analyse airport capacity.

The variation in airport capacity and the hourly capacity of its components due to constant changes in runway configuration, the fleet mix operating on those runways, and ATC regulations, etc. made it necessary to carry out the calculations described in the cited methodology in order to determine the hourly runway capacity.

Several different factors described below were taken into account in the analysis to determine airport runway capacity:

2.1. AERODROME CHARACTERISTICS

It was necessary to identify some aerodrome operational and characteristic conditions in order to make the FAA capacity analysis correctly. The elements that affect aerodrome capacity are:

- Runway configuration;
- Index of aircraft mix;
- Taxiway configuration;
- Operational characteristics; and
- Meteorological conditions

The joint analysis of those elements produced the bases for establishing airport operational capacity. Afterwards, each of the characteristics was evaluated in terms of "Eldorado" airport.

2.1.1. RUNWAY CONFIGURATION

The aerodrome's configuration includes two 3800 m long parallel runways with a 1400 m separation, a 1300 m grading and a NW/SW orientation.

This analysis is based on a "runway" that includes the landing surface and also the various approach path segments used in common by all aircraft.

2.1.2. INDEX OF AIRCRAFT MIX

Knowing the mix of the fleet operating in the airport by using statistics taken from the UAEAC's P.I.S.T.A. system made it possible to establish the index of aircraft mix required to calculate the aerodrome's capacity according to the FAA method. The calculation of the aircraft mix is based on the relative percentage of operations carried out by each of the four classes of aircraft (A, B, C, D) according to their MTOWs.

The following table sets out the physical aspects of the four classes of aircraft and their relationship to the standards in terms of their wake turbulence classification.

AIRCRAFT CLASS	CERTIFIED MAXIMUM WEIGHT FOR TAKE-OFF	NUMBER OF ENGINES	WAKE TURBULENCE CLASSIFICATION
A	12.500 lbs or less 7000 kg or less	Single engine	S (Small) L (Light)
B		Multiple engines	
C	12.500 – 300.000 lbs 7000 kg – 136000 kg	Multiple engines	L (Large) M (Medium)
D	Over 300.000lbs Over 136000 kg	Multiple engines	H (Heavy) H (Heavy)

The formula used in the FAA method to calculate the index of aircraft mix is:

$$\%(C + 3D)$$

Where:

C is the percentage of C category aircraft and

D is the percentage of D category aircraft.

Note: *A and B category aircraft do not count in the calculation of the index of aircraft mix.*

The index of aircraft mix was calculated by entering the data requested in the following tables as shown below:

AIRCRAFT		MIX IN VFR		MIX IN IFR	
DESCRIPTION	**CLASS**	**No. ops**	**% ops**	**No. Ops**	**% ops**
SINGLE ENGINE	**A**	**3**	**9**	**3**	**9**
LIGHT TWO-ENGINE	**B**	**3**	**9**	**3**	**9**
TRANSPORT TYPE	**C**	**24**	**76**	**24**	**76**
WIDE-BODY	**D**	**2**	**6**	**2**	**6**
TOTALS (No. Ops and % ops)		**32**	**100**	**32**	**100**

Rwy 13L

AIRCRAFT		MIX IN VFR		MIX IN IFR	
DESCRIPTION	**CLASS**	**No. ops**	**% ops**	**No. Ops**	**% ops**
SINGLE-ENGINE	**A**	**1**	**3**	**1**	**3**
LIGHT TWO-ENGINE	**B**	**2**	**7**	**2**	**7**
TRANSPORT TYPE	**C**	**24**	**80**	**24**	**80**
WIDE-BODY	**D**	**3**	**10**	**3**	**10**
TOTALS (No. Ops and % ops)		**30**	**100**	**30**	**100**

Rwy 13R

The index of aircraft mix determined for "Eldorado" airport is:

Runway 13L

$$\% (76+3(6)) = \mathbf{94}$$

Runway 13R

$$\% (80+3(10)) = \mathbf{110}$$

Note: *It may be noted that with a rising index of aircraft mix, aerodrome capacity will gradually decline. The reason for this is that ATC must provide a larger separation between C and D category aircraft than between the others because of the wake turbulence produced by the larger aircraft.*

2.1.3. TAXIWAY CONFIGURATION

According to the FAA criterion for appropriately located take-off taxiways, the take-off factor is maximised when a runway has four take-off taxiways within a given range determined by the aircraft using the runway. For an index of aircraft mix of 81 to 120, and in keeping with the aerodrome's elevation, this range is between 2377 m and 3328 m from the landing threshold.

Based on the FAA criterion, runway 13L has an exit runway and runway 13R has two exit runways within the arrivals range.

2.1.4. OPERATIONAL CHARACTERISTICS

The operational characteristics that could significantly affect aerodrome capacity include the percentage of arrivals and the percentage of touch-downs and take-offs (T&T), or runway training.

2.1.4.1. Percentage of arrivals

Percentage of arrivals is the ratio of landing operations to total operations at the airport.

This percentage is considered because an aircraft approaching an airport to land needs a longer runway occupation period than an aircraft that is taking off. The FAA methodology applied here provides an arrival figure with percentages of 40, 50, or 60 for calculating aerodrome capacity.

$$\text{\% of arrivals} = \frac{\text{(A + ½ (T\&T))}}{\text{A + DA + (T\&T)}} \times 100$$

Where:

A = No. of arriving aircraft during the hour.
DA = No. of departing aircraft during the hour.
T&T = No. of T & T during the hour.

It was determined that the percentage of arrivals at “Eldorado” airport, based on the statistical data, is the following:

Runway 13L.

$$\text{\% of arrivals} = \frac{\text{(15 + ½ (0))}}{\text{15 + 17 + (0)}} \times 100$$

$$\text{\% of arrivals} = 47$$

Runway 13R.

$$\text{\% of arrivals} = \frac{\text{(14 + ½ (0))}}{\text{14 + 16 + (0)}} \times 100$$

$$\text{\% of arrivals} = 47$$

2.1.4.2. Percentage of touch-downs and take-offs (T&T)

The percentage of touch-downs and take-offs plays a key role in determining airport capacity.

The touch-downs and take-offs are counted as a landing and a take-off (two operations) and are normally associated with runway training.

*There is no runway training at “Eldorado” airport.

2.1.5. DEMAND – “ELDORADO” AIRP0RT

In order to obtain the data needed to carry out the FAA method, an analysis was made of the demand for operations at “Eldorado” airport and their pattern over the past 2 years.

In addition, the growth in demand and its characteristics were studied. This made it possible to identify future capacity problems and the processes to be implemented to keep the capacity in balance with the demand.

Over the past two years, there has a 10% increase in demand for operations, with a base demand value of 62 operations being used for this analysis.

2.1.6. METEOROLOGICAL CONDITIONS

Meteorological conditions, namely wind and other related conditions, influence an aerodrome’s operational configuration and can, therefore, affect its capacity. Runway use is generally determined by wind conditions, while visibility determines the required spacing between approaching aircraft.

Based on the statistical data, Runways 13R and 13L receive approximately 89% of the total annual operations (take-offs and landings) because the prevailing wind over most of the year blows in a SE/NW direction. It should be added that runway 13R has ILS CAT II approach minima.

The FAA recognises three cloud ceiling and visibility measurements for calculating airport capacity, as follows:

- (VFR) – cloud ceiling at over 1,000 ft AGL and visibility of 3 sm (4837m) or more.
- (IFR) – cloud ceiling at 500 ft AGL or more, but less than 1,000 ft AGL and/or visibility of 1 sm (1609m) or more, but less than 3 sm (4837m).
- (PVC) – Reduced visibility and cloud ceiling – cloud ceiling at below 500 ft AGL and/or visibility of less than 1 sm (1609m).

3. AERODROME CAPACITY ANALYSIS

The aerodrome characteristics cited above were used, together with the methodology developed by the FAA, to determine the aerodrome’s capacity. As mentioned above, the FAA methodology produces the hourly runway capacity.

4. HOURLY RUNWAY CAPACITY

Hourly runway capacity measures the maximum number of aircraft that can be accommodated by an airport's runway configuration over a one hour period. The hourly runway capacity was calculated by analyzing appropriate VFR and IFR figures for an airport runway configuration, in accordance with the FAA methodology. The index of aircraft mix and the percentage of arrivals were used to calculate the base hourly capacity. In addition, a T&T factor was determined, based on the percentage of T&T operations combined with the index of aircraft mix.

*The T&T factor at "Eldorado" airport is 1, because no runway training is carried out there.

These figures also consider the departure factor.

The hourly runway capacity was calculated for both VFR and IFR conditions by multiplying the base hourly capacity, the T&T factor, and the departure factor. The following equation was used:

Hourly capacity = C* x T x E

Where:

C* = base hourly capacity,
T = T&T factor, and
E = departure factor.

An airport's index of aircraft mix can substantially change the value of the base hourly capacity in the FAA capacity tables.

The capacity figures used in the FAA manual that correspond to "Eldorado" airport's runways are the following:

VFR **Fig. 3-3**
IFR **Fig. 3-43**

5. RESULTS OF THE DEMAND/CAPACITY ANALYSIS

MET	RUNWAY CONFIG		FIG. CAP.	AIRCRAFT MIX				%(C+3D)	% ARR	% T&T	RWY EXT (00 m)			BASE HOURLY CAPACITY (C*)	T&T FACTOR (T)	DEPARTURES FACTOR (E)	HOURLY CAPACITY (C*T*E)
	DIAG.	No		%A	%B	%C	%D				LOC.		No				
13L VFR	———	1	3-3	9	9	76	6	94	47	0	26		1	56	1	0,89	50
13L IFR	———	1	3-43	9	9	76	6	94	47	0	26		1	51	1	0,89	45
13R VFR	———	1	3-3	3	7	80	10	110	47	0	25	31	2	57	1	0,93	53
13R IFR	———	1	3-43	3	7	80	10	110	47	0	25	31	2	51	1	0,94	48

6. CONCLUSION

"ELDORADO" AIRPORT HOURLY CAPACITY OPS/HR		
RUNWAY	**VFR**	**IFR**
13L	**50**	**45**
13R	**53**	**48**

Once the hourly runway capacities have been determined, a yield factor of between 0.6 and 0.9 should be applied to take into account factors that affect capacity and are difficult to measure and control.

7. OBSERVATIONS

After having analysed the demand, determined the hourly capacity and followed up on the operation after ATFM service implementation for "Eldorado" airport:

- During particular periods of operation at "Eldorado" airport, successive demands exceed capacity and produce unacceptable delays.

- During particular periods of operation at "Eldorado" airport, demands inferior to the hourly capacity produce delays at intervals during the hour when demand exceeds capacity.

- Demand programming by operators is relatively unrestricted in relation to the hourly capacity and by hourly intervals.

APPENDIX C

IMPLEMENTATION OF PHASES 2 AND 3 OF THE CGNA BRAZIL

CGNA Implementation – Phase 2

The following new functionalities, foreseen for Phase 2, which incorporate functions that allow the fast analysis of the situation and the support to the decision for the generation of strategic and tactic measures, in collaborative decision with all parties involved, will be implemented:

a) The Initial and Centralized Flight Data Processing System;
b) Automation and integration of the FMC to the CGNA,
c) Implantation of the cell of military operations;
d) Automation of the processes regarding with meteorology;
e) Means of safety monitoring of the air navigation;
f) Support to the decision;
g) Monitoring of the capacity of operation;
h) Integration of the ASD (Air Situation Display).

CGNA Implementation – Phase 3

For the Phase 3, the following functionalities will be considered:

a) Data Interchange Procedure with other management centers, mainly with ATFM Regional, the CFMU and ATCSCC.
b) Simulation and modeling systems bounded for ASM unit to support the analysis activities of the air navigation procedures for en route aircraft operation and in TMA, with purpose to identify its impact in the air traffic flow.
c) The meteorological information received in graphic form and sent by the satellites and meteorological radars shall be presented in composition with graphic images and visualized by the ATFM unit in the ASD subsystem.
d) Militar Cell;
e) Ground Delay Programme (GDP).

Note: 1 – The Ground Delay Programme (GDP) is a tactic ATFM measure which consists in the attribution of “ATFM slots of departure” to manage the balance of the demand and capacity in specific regulated elements, when the information of impacts in the air traffic flow result in significant delays.

Note: 2 – The aircraft which receive the SLOT, coming from a GDP, must not be subjected to the other delays, except the measures of sequence (miles on trail) approved by the CGNA. The departure time is calculated with base in the flight route time and the possible delays equitable to the several users of the system.

APPENDIX D

REFERENCE MATERIAL FOR THE PREPARATION OF GUIDELINES FOR FMP OR FMU IMPLEMENTATION IN THE CAR/SAM REGIONS

1. Attributions:

- Identify the situations of congestions and saturations of regulated elements localized in its jurisdiction area;
- To coordinate applicable ATFM measures with the ATC Units, users and responsible for the airport infrastructure ;
- To know the unavailability of the infrastructure installed and the meteorological phenomena that cause impact in the air traffic flow;
- To inquire ATFM measures to balance the demand with the capacity, assuring the maximum efficiency of the air traffic flow;
- To accomplish the coordination among the FMU and the ATC Units;
- To assist the ATC supervisor, including his “briefing” participation of each operational team, informing the projections of the air traffic flow;
- To operate as link with the Aerodrome Administration for subjects that involves the ATFM;
- To communicate to the FMU any demand change caused by non regular seasonal events;
- To notice and register the procedures adopted by the ATC, for adjustment of the air traffic flow;
- To take part in the teleconferences, as responsible for the operation of the FMU;
- To identify, the special use airspaces and the respective impact in the air traffic flow;
- To assume the function of “interface” among the meteorological Units and the FMU;
- To identify and send to the FMU: names, telephones and other contacts for the population of the data base; and
- To Maintain the FMU permanently informed on the effects of the measures applied to the traffic flow.
- To elaborate statistics reports, pointing out the schedule divergences occurred in the AD in its area of jurisdiction, using the available means and send them to FMU aiming an attendance of the situation installed in the AD.

2. Needs:

- It should be implemented in the own installations of the ATC units, preferably, next to the Supervisor position, and make use of the infrastructures existent of electric power stabilized, acclimatization, maintenance for the equipments and consumption material;
- It should have branch lines of telephony, Intraer and Internet access dedicated and enlacement of data with the FMU; and
- It should have monitors in wide screen to visualize the local radar presentation.
- It should possess the software of Air Traffic Management needed.

APPENDIX E

LESSONS LEARNED AND OPERATIONAL BENEFITS OBTAINED IN THE IMPLEMENTATION OF THE ATFM IN NORTH AMERICA

Lessons learned

1.1 The primary lessons learned during the development and implementation of ATFM between CCFMEX, NOC, and ATCSCC include:

a. Involve the customers, airport authorities, and other system stakeholders very early in the ATFM development process.

This is the essence of the Collaborative Decision Making.

For example, the ACC's, customers and airport authorities have contributed numerous ideas and suggestions regarding the management of flights into congested airports such as Cancun and Los Cabos. By considering their input, we have been able to minimize delays and maximize airport throughput.

b. Utilize a common suite of ATFM tools to evaluate air traffic flows, weather conditions, demand, and capacity.

As traffic managers in the NAM region, we have come to rely very heavily on the Enhanced Traffic Management System (ETMS). Based on input from system stakeholders, ETMS has developed into a very comprehensive tool that accepts an array of flight plan messages, applies aircraft performance information, displays weather information, and models demand/capacity information.

Customers that participate in the Collaborative Decision Making (CDM) process have direct access to ETMS through an interface designed specifically for them known as the Common Constraint System Display (CCSD).

c. Develop ATFM with the neighboring States first. Then develop a regional approach to ATFM.

We have learned that the greatest traffic flow challenges exist with the first-tier (neighboring) States. As a result, it is important to develop, coordinate, test, and implement procedures for managing these traffic flows. These procedures then become the basis for bilateral ATFM Letters of Agreement with the first-tier States.

This tier-based approach to ATFM allows States the flexibility they need to address specific traffic flow issues and to develop the procedures needed to manage the traffic.

d. Allow flexible timeframes in which to implement the various aspects of ATFM.

We have learned that the development of ATFM is not always a linear process. What looks good in theory is not always feasible in practice. For example, what seemed to be a simple process of flowing traffic smoothly to airports in first-tier States has been impacted by both State regulations and airport management requirements. Consequently, customer concerns and airport management issues had to be evaluated and addressed before flow solutions could be reached.

2. Operational Benefits

2.1 The ATFM system in the NAM region has realized a number of operational benefits. These include:

a. Increased information flow to customers regarding system constraints, route options, and terminal delays.

b. Reduced operating costs for customers through fuel savings and crew scheduling due to the type and amount of ATFM information available on a real-time basis.

c. Increased situational awareness by the ATFM Command Centers and Flow Management Units regarding air traffic flows and weather conditions. This has contributed significantly to enhancing system safety.

d. Increased operational communication and coordination between the ATFM Command Centers in the NAM region. This has contributed to a more efficient use of airspace and the reduction of operational delays.

e. Enhanced management of cross-border flows of air traffic, especially during periods of convective activity or periods of reduced terminal capacity.

3. This document follows the same content format as the ATFM/TF/2 CAR/SAM ATFM CONOPS which includes sections on:

1. **Objectives of a Centralized ATFM Command Center;**
2. **Principles in Which ATFM Will Be Based;**
3. **Functions of a Centralized ATFM Command Center;**
4. **Equipment and Personnel Requirements for Flow Management Unit/Flow Management Position (FMU/FMP) and the Centralized ATFM;** and
5. **Operational Procedures**.

Each section of the Appendix contains information on the key elements of lessons learned in the NAM region and draws on the experience of the coordination between CCFMEX, NOC, and ATCSCC.

1. Objectives of a Centralized ATFM Command Center

1.1 From the perspective of ATFM developments in the NAM region:
The purpose of the ATFM system is to enhance air traffic safety by balancing demand with capacity and ensuring efficient utilization of the ATC system.

The objective of a centralized ATFM Command Center is to produce a safe, orderly, and expeditious flow of air traffic while making every effort to minimize delays. This is fostered through continual analysis, coordination, communication, and dynamic use of traffic management initiatives and programs.

2. Principles in Which ATFM Will Be Based

2.1 From the perspective of ATFM developments in the NAM region:

One of the primary foundations of ATFM in the NAM region is the Collaborative Decision Making (CDM) process.

CDM definition

CDM is sponsored by the Air Transport Association and is an operational philosophy – along with associated technologies -- that enable the Air Traffic Service Providers and aviation industry to respond collaboratively to real-time operational constraints in the National Airspace System.

CDM structure

CDM Stakeholder Group
Oversees the general direction and mission of CDM

Provides prioritization and tasking on possible technology and communication tools for attaining system efficiencies.

Establishes work groups as needed

CDM work groups
Completes specific tasks
Provides recommendations for technology, communication tools, etc.

ATFM system stakeholders include:
En-route Centers, Terminal Approach Controls, Control Towers
Customers
Air Carriers
Air Taxi
General Aviation
Military
Airport Authorities
NOTE: This list is not all inclusive

ATFM uses automated tools that provide common air traffic and weather situational awareness to all system stakeholders.

ATFM facilities are accountable to the system stakeholders.
The ATFM system in the FAA is under constant review for quality management purposes with a goal of continuous improvement. The quality assurance function includes an analysis of sector demand, sector flows, sector loading points, normal initiatives

necessary to prevent sector saturation, alternatives to prevent sector saturation and relieve congestion points.

3. Functions of a Centralized ATFM Command Center

3.1 From the perspective of ATFM developments in the NAM region:

By directives (FAA Order 7210.3 for example), the ATFM national Command Centers are given the authority to monitor, direct, and manage the daily flows of air traffic through their national airspace.

The ATFM national Command Centers work in conjunction with system stakeholders to:

Monitor and analyze weather patterns for system impact.

Implement national traffic management programs.

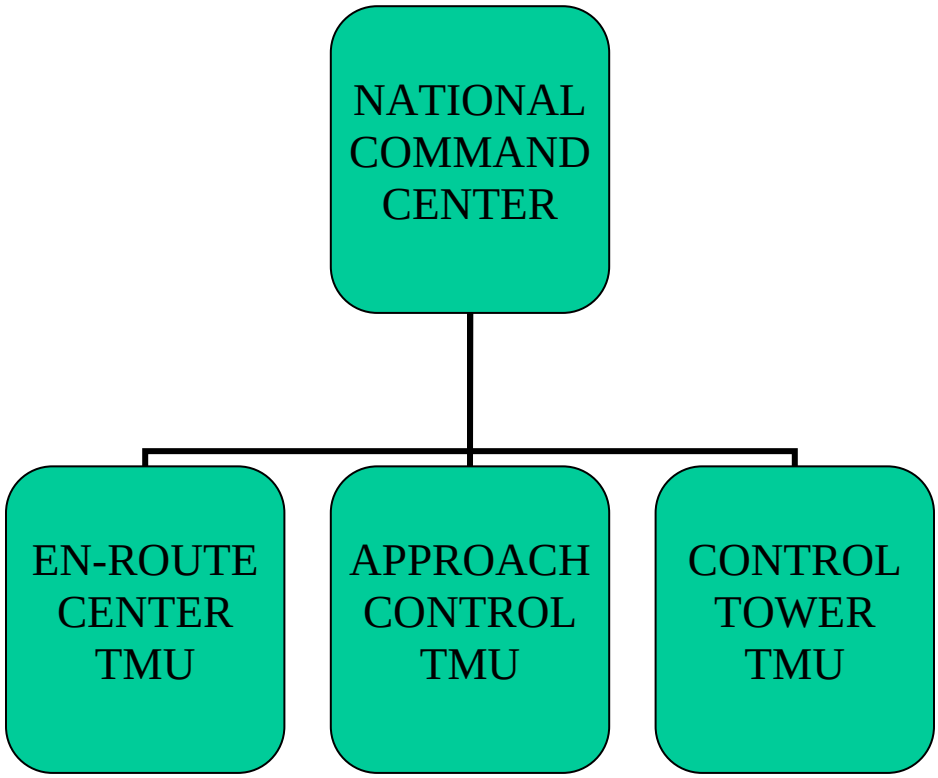
Determine when national airspace capacity is, or will likely be, reduced to the extent that implementation of national traffic management initiatives will be required.

Implement national traffic management initiatives, when necessary, to ensure an orderly flow of traffic throughout the national airspace.

Monitor traffic management initiatives issued throughout the system for effectiveness and take action to modify or cancel traffic management initiatives, when appropriate.

Serve as the final approving authority for all inter-facility traffic management initiatives

All field traffic management units (TMUs) report to and assist the national Command Centers with ensuring system safety, efficiency, and effectiveness.

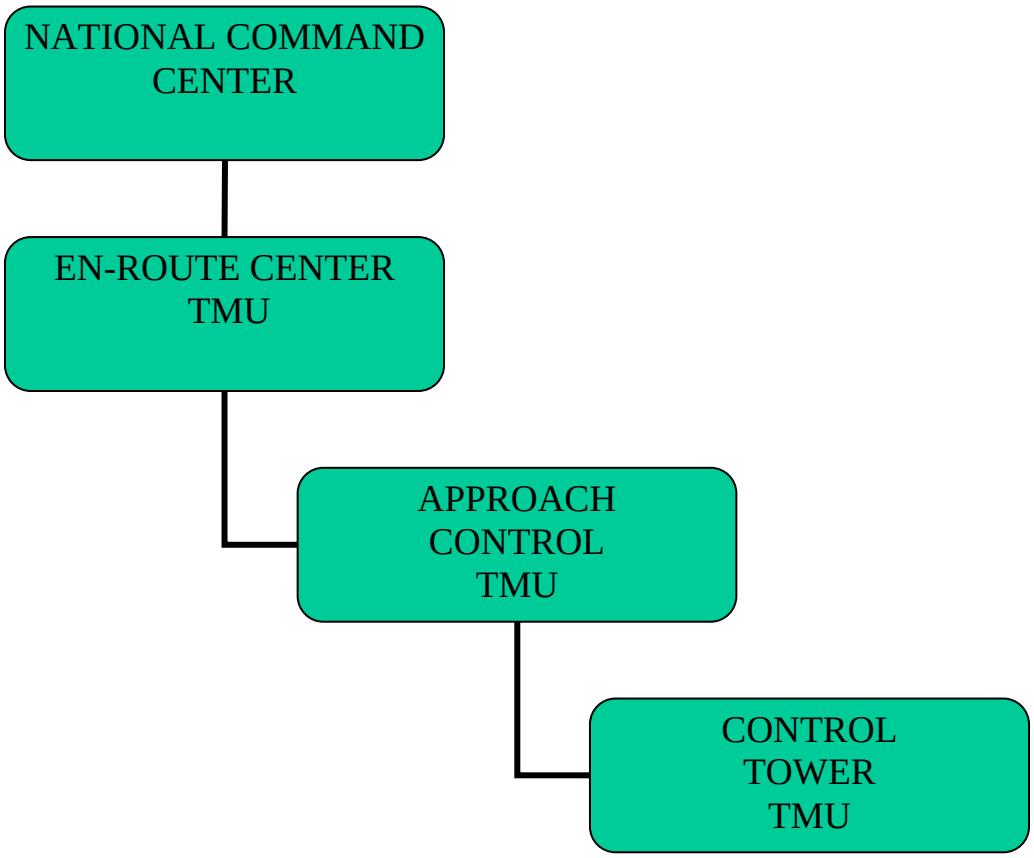

NATIONAL COMMAND CENTER
EN-ROUTE CENTER TMU
APPROACH CONTROL TMU
CONTROL TOWER TMU

In day-to-day operations, and in most circumstances:

En-route Center TMUs coordinate through the national Command Center to implement traffic management initiatives that impact adjoining enroute centers.

Approach Control TMUs coordinate traffic management initiatives through the overlying En-route Center.

Control Tower TMUs coordinate traffic management initiatives through the overlying Approach Control TMU.



The national Command Center, however, has the authority to coordinate directly with the TMUs at En-route Centers, Approach Controls, and Control Towers.

Based on a bilateral agreement with NAV CANADA, the NOC serves as the sole point of contact with the ATCSCC for the coordination of cross-border ATFM initiatives between Canada and the United States.

Based on a bilateral agreement with SENEAM, the CCFMEX serves as the sole point of contact with the ATCSCC for the coordination of cross-border ATFM initiatives between Mexico and the United States.

4. Equipment and Personnel Requirements for FMU/FMP and the Centralized ATFM

4.1 From the perspective of ATFM developments in the NAM region, the equipment and personnel requirements include:

National ATFM Command Center (**CCFMEX)**

Equipment: Enhanced Traffic Management System (ETMS), Flight Schedule Monitor (FSM), conference phone system, access to the internet.

Operational personnel: ATFM Supervisor -- responsible for oversight of the entire ATFM operation. Staffed day and evening shifts.

En-route Center Traffic Management Unit (**NAV CANADA and FAA**)

Equipment: ETMS, FSM, operational phone system, access to the internet, access to live radar data.

Operational personnel: ATFM Supervisor -- responsible for the oversight of the traffic management unit operations and interface with the national Command Center. Traffic Management Coordinator -- interfaces with the operational control room and with delegated approach control TMUs.

Approach Control and Control Tower TMUs (**NAV CANADA and FAA**)

Equipment: ETMS, FSM, operational phone system, access to the internet, access to live radar data.

Operational personnel: ATFM Supervisor -- responsible for the oversight of the traffic management unit operations and interface with the national Command Center. Traffic Management Coordinator -- interfaces with the operational control room and with delegated control tower TMUs.

5. Operational procedures

5.1 Although the NAM region air traffic service providers have varying levels of ATFM implementation, the following provides an example of operational procedures in use:

All facility TMUs:

Assist the national Command Center, as directed, to ensure air traffic system efficiency and effectiveness without compromising safety.
Develop directives that address standard operating procedures regarding internal and inter-facility traffic management procedures.
Ensure the TMU is operated during the hours of peak traffic periods and the associated time to complete the logging and reporting requirements.
Coordinate and communicate traffic management initiatives with adjacent TMUs through the national Command Center.
Enter a full description of all traffic management initiatives and actions in the TMU log.
Ensure air traffic delays are reported in accordance with national directives.

Report all known equipment outages that could have an impact on the national system.

En-route Center TMUs

Actively utilize the Traffic Situation Display and the monitor and alert function of ETMS to adjust en-route sector traffic flows on a proactive basis.

In conjunction with Terminal TMUs, develop arrival strategies and deliver arrival aircraft to achieve the aerodrome acceptance rate (AAR).

Designate a traffic management representative to serve as a liaison with the facility Weather Service Unit.

Establish an analysis and quality assurance function.

Approach Control and Control Tower TMUs

Balance the arrival flow and tower en-route flow by coordinating with the En-route Center TMU and any adjoining Approach Control TMUs to ensure that demand does not exceed capacity.

Establish the AAR and coordinate with the En-route Center TMU and any adjoining Approach Control TMUs to meet the rate.

Manage departure fix balancing to ensure sector efficiency entering the next facility's airspace.

Implement gate hold procedures as required to manage airport surface congestion.

Analyze and review traffic management procedures to ensure effectiveness and adherence to national programs.

APPENDIX F

AIR TRAFFIC FLOW MANAGEMENT (ATFM) SERVICE IMPLEMENTATION MODEL

1.1. ATFM service seeks basically to improve the balance between the demand for and capacity of the country's most congested airspaces, using the Bogotá TMA arrivals sector and Bogotá's Eldorado international airport as the starting point.

2. PROVISION OF ATFM SERVICE IN COLOMBIA

2.1. ATFM service will be provided by an ATS unit known as the COLOMBIA CENTRAL FLOW MANAGEMENT UNIT (COLOMBIA CFMU), whose headquarters are in Bogotá.

2.2. COLOMBIA CFMU'S area of responsibility is the airspace delimited by the lateral and vertical boundaries of the BOGOTA and BARRANQUILLA FIRs, as defined in the COLOMBIA AIP.

COLOMBIA CFMU

ELDORADO INTERNATIONAL AIRPORT
NATIONAL AIR NAVIGATION CENTRE (CNA)
Avenida Eldorado No. 112 – 09

BOGOTA CONTROL CENTRE
AFTN Address: ZKEDZDZX
TELEPHONE: 571 – 266 35 73

2.3. The COLOMBIA CFMU will comprise different FLOW MANAGEMENT POSITIONS (FMPs), which will be implemented as ATFM service is reinforced and computer resources are developed.

2.4. The area of responsibility of the BOGOTA FMP, known as BOGOTA FLOW, is the airspaces delimited by the lateral and vertical boundaries of the BOGOTA FIR, as defined in the COLOMBIA AIP.

BOGOTA FMP

ELDORADO INTERNATIONAL AIRPORT
NATIONAL AIR NAVIGATION CENTRE (CNA)
Avenida Eldorado No. 112 – 09

BOGOTA CONTROL CENTRE
AFTN Address: ZKEDCBJF
TELEPHONE: 571 – 266 39 13
fmp.bogota@aerocivil.gov.co

2.5. The area of responsibility of the BARRANQULLA FMP is the airspace delimited by the lateral and vertical boundaries of the BARRANQUILLA FIR, as defined in the COLOMBIA AIP. This airspace will be under the responsibility of the BOGOTA FMP up until the moment the BARRANQUILLA FIR enters into service.

3. IMPLEMENTATION STAGES

3.1. The BOGOTA FMP which starting operating last 15 December 2005 will be officially put into AFTM service through the pertinent AIC, for the main purpose of regulating IFR traffic planning to land at the Eldorado international or Guaymaral airports.

3.2. The BOGOTA FMP will extend ATFM service to the IFR traffic planning to leave the Eldorado international and Guaymaral airports.

3.3. The BOGOTA FMP will extend ATFM service to the northern and southern sectors of the BOGOTA TMA, in order to regulate the IFR traffic that evolves within those sectors.

3.4. The BOGOTA FMP will extend ATFM service to the sectors in the upper level of the BOGOTA TMA, in order to regulate the IFR traffic that evolves within those sectors.

3.5. The BOGOTA FMP may in the future extend ATFM service to the different airspaces and airports located inside the BOGOTA FIR, in the degree to which the demand for traffic or the airport infrastructure justifies it.

3.6. The BARRANQUILLA FMP will start operating for the purpose of regulating the traffic that evolves inside the upper level sectors of the BARRANQUILLA FIR.

3.7. The BARRANQUILLA FMP may in the future extend ATFM service to the different airspaces and airports located inside the BARRANQUILLA FIR. in the degree to which the demand for traffic or airport infrastructure justifies it.

3.8. The ATFM (CFMU and FMP) service schedule will be from1100 UTC to 0500 UTC.

4. ATFM SERVICE FIELD OF APPLICATION

4.1. ATFM service provided by the BOGOTA FMP will apply to:

4.1.1. All international flights operating with FPLs or RPLs, originating in any aerodrome inside the ADJACENT FIRs, with Bogotá's Eldorado international airport as their destination, and whose registered flying time is equal to or less than ninety (90) minutes, such to be recorded in the letters of agreement, respectively.

4.1.2. All national flights with Eldorado international or Guaymaral airports (SKGY) as their destination and that:

4.1.2.1. Operate using RPL.

4.1.2.2. Have entered any of the following letters in box 8 of their FPL:

a. I for IFR flights.

b. Z for flights that are initially VFR and then IFR.

4.1.3. All national or international flights that plan to take off from Eldorado international airport and that:

4.1.3.1. Operate using RPL.

4.1.3.2. Have entered any of the following letters in box 8 of the FPL:

a. I for IFR flights.

b. Y for flights that are initially IFR and then VFR.

4.2. ATFM service is NOT applicable to flights that plan to take off from Eldorado international airport and that have inserted the letter V in box 8 of their FPLP or that, having presented an FPL or RPL under IFR rules, asked to use VFR.

4.3. Some flights could benefit from special treatment by the ATFM service, in which case they should use a status indicator (STS). These indicators, which are recognized by both flight planning offices and the CFMU, should be noted in box 18 of their FPLs.

4.4. A flight using any of the STS/SAR, STS/HEAD, STS/VIP 1, STS/HOSP, STS/OP or STS/VIP 2 designators will automatically be exempt from ATFM measures. Inasmuch as these aircraft will not receive CTOTs, other aircraft may be re-accommodated.

4.5. A flight using an STS/HUM designator, although subject to ATFM measures, will receive special treatment, without this signifying a TOTAL REDUCCION of ATFM measures.

4.6. A flight using an STS/STATE designator will be subject to ATFM measures.

4.7. Designators indicating exemptions must be used for a real purpose. Inappropriate use of these designators to avoid ATFM measures is considered a serious violation of Colombia CFMU standards, rules and regulations and as such may be investigated and sanctioned.

5. CENTRAL FLOW MANAGEMENT UNIT (CFMU)

5.1. ATFM is a service that is in favour of ATS services and of AOs conceived in such a way that they allow CFMUs to:

5.1.1. Develop and maintain the highest quality level of ATS service within their area of responsibility, in favour of the ATC units and AOs, within the agreed ATFM policies and principles.

5.1.2. Maintain and improve the efficiency of their operations by increasing their level of automation, taking advantage of technological advances.

5.1.3. Adapt their procedures and systems to the evolution of their operating environments.

5.1.4. Maintain a high level of alertness to the various proposals for perfecting the system presented by the ATS or the AOs.

5.2. The COLOMBIA CFMU is headed by an air traffic controller known as the ATFM COORDINATOR, completely familiarised with ATFM philosophy, who is appointed by the Director of Air Navigation Services.

5.3. The COLOMBIA CFMU will consist of personnel with wide knowledge of ATC/ATFM, so that they can fulfil their prescribed functions fully.

5.4. FUNCTIONS OF THE COLOMBIA CFMU

5.4.1. Plan, co-ordinate, publish and implement, within its area of responsibility, ATFM measures, bearing in mind the different phases involved.

5.4.2. Periodically evaluate, declare and examine ATC capacity in regard to the control areas or control sectors within its area of responsibility.

5.4.3. Receive, process and keep the RPLs of flights planning to operate within its area of responsibility.

5.4.4. Generate FMPs and FPLs for the different RPLs at least twenty-four (24) hours before the EOBT.

5.4.5. Provide reports and statistics about ATFM operations, delays and all other information concerning ATC and AOs.

5.4.6. Provide reports and statistics about ATFM operations and delays for operational and administrative purposes.

5.4.7. Prepare, for each regulated airspace or airport, the SLOT allocation list (SAL) and transmit it duly in advance to the FMP.

5.4.8. Keep in permanent contact with FMP SUPERVISORS through meetings or by electronic mail or telephone.

5.4.9. Provide the FMP, if appropriate, with the ADPs (Daily ATFM plan) and AIMs (ATFM information messages).

5.4.10. Receive and process ATFM incident reports.

6. FLOW MANAGEMENT POSITION (FMP)

6.1. FMP is a working position established in appropriate ATS units to ensure the necessary interface between local ATFM partners, such as the ATC, the AOs and airports, and the CFMU in regard to the provision of ATFM service.

6.2. An FMP will be established in each of the Republic of Colombia’s ACCs and they will all have the same status.

6.3. Each FMP should have an appointed person to guide all ATFM activities in the ACC within its area of responsibility. This person, known as the FLOW SUPERVISOR, will act as the direct contact, for all administrative and organisational matters, with the COLOMBIA CFMU. Unless otherwise decided administratively, the APPROACH SUPERVISOR will assume the functions of FLOW SUPERVISOR.

6.4. FUNCTIONES OF THE BOGOTA FMP WITH RESPECT TO THE ATS UNITS AND THE AOs

6.4.1. Receive the CTOT request from the different ATS units or AOs at the aerodrome of departure for aircraft requiring it, in keeping with the "FIRST PROJECTED – FIRST SERVED" principle."

6.4.2. Calculate and assign the corresponding CTOTs to the ATS units and/or AOs.

6.4.3. Recalculate CTOTs and duly notify ATS units and/or AOs about new CTOTs in cases of flight cancellations, the arrival of new flights with special status, and unforeseen delays or their reduction.

6.4.4. In the case of operations under unusual circumstances, the FMP should assign ATS units and AOs a provisional CTOT, which should be confirmed to them as rapidly as possible. If that confirmation is not made at least 30 minutes in advance, ATS units and AOs will give the flight the usual treatment.

Unusual circumstances are:

- Low visibility procedures (LVP)
- Short term aerodrome close-downs (flight diversion)
- Long term aerodrome close-downs (flight suspensions)
- Airspace closings
- Unforeseen changes in aerodrome operational configuration

6.4.5. Monitor aerodrome meteorological conditions within its area of responsibility, notifying the COLOMBIA CFMU of their possible impact on aerodrome capacity.

6.5. ATS units and AOs will be notified about the CTOT through an AFTN message or by direct communication and given any further information affecting flight departure.

7. RESPONSIBILITY VIS-A-VIS THE CTOT

7.1. AIRCRAFT OPERATORS

7.1.1. AOs should, on their own, inform themselves about and commit themselves to general ATFM procedures, as well as any measures the ATFM adopts.

7.1.2. AOs, whether or NOT subject to ATFM measures, should precisely maintain the EOBTs of each and every flight. ICAO standards stipulate that delays of more than thirty (30) minutes should be reported (this requirement is compulsory).

7.1.3. AOs should refrain from filing bogus or duplicate flight plans, a bogus plan being a flight plan for a flight that is not made and which the originator fails to cancel. There should be only one flight plan for a single flight at a given moment. It is absolutely essential that the party originating a flight plan

cancel it as soon as it is learned that the flight will not be made, or before presenting a flight plan to replace the previous one for the same flight.

7.2. ATS UNITS

7.2.1. The ATC is responsible for monitoring compliance with the CTOT at the controlled aerodromes of departure. The precise procedures to be following will depend upon how the ATSs are organized in each aerodrome. ATCs will be given a window of –5 minutes to up to +10 minutes to optimise the aerodrome departure sequence. A window of -5 minutes to up to +10 minutes will be applied to flights originating inside ADJACENT FIRs with Bogotá's Eldorado international (SKBO) airport as their destination and whose registered flight time is equal to or less than ninety (90) minutes.

8. CTOT REQUEST PROCEDURE

8.1. REGULAR PASSENGER COMPANIES, CARGO COMPANIES AND AIR TAXIS

8.1.1. The COLOMBIA CFMU will implement a CTOT request procedure for operators of regular passenger companies and operators of cargo and air taxi companies consisting of the presentation of departure itineraries a prescribed period in advance of the starting date of pre-established annual periods. This will make it possible to assign a CTOT to each planned flight and to inform operators duly in advance of the starting date of the cited periods.

8.1.2. In addition, the Colombia CFMU will implement procedures for making changes or for requesting the cancellation and presentation of the FPLs within the time limits imposed based on the date of the specific operation.

8.1.3. The COLOMBIA CFMU may continuously monitor AOs and constant non-compliance with the itineraries filed, which will constitute a valid reason for the suspension of this procedure for AOs for a minimum of three (03) and maximum of six (06) months. A reasonable percentage of non-compliance of itineraries, without their being cancelled or modified within the set periods, is 10%.

8.2. OTHER AIRCRAFT

8.2.1. The COLOMBIA CFMU will implement a CTOT request procedure for AOs obliged to file flight plans, as well as military and general aviation AOs, with a prescribed period for filing in advance of the EOBT.

8.2.2. The FMP will assign a CTOT to each planned flight and will so inform the AOs referred to under this numeral, through the pertinent ATS unit.

9. SLOT (CTOT) ASSIGNMENT PROCEDURE

9.1. GENERAL INFORMATION

9.1.1. The COLOMBIA CFMU and the corresponding FMPs will assign the different CTOTs with total impartiality and equity. Even so, the assignment of CTOTs to the traffic operated by Eldorado international airport will be based on the length of time in advance the request is filed and the type of operator involved. In other words, a SLOT request filed longer in advance has priority over one filed later, considering that:

a. By definition, an airport is a prepared area for the landing, takeoff and ground movement of aircraft, which is endowed with the necessary facilities for the embarkation and disembarkation of passengers, equipment and cargo.

b. Eldorado international airport is one of the region's largest sources of income and contributes to the national budget.

c. The region's exports and imports of goods and passengers have increased considerably.

9.2. ASSIGNMENT ORDER

9.2.1. The COLOMBIA CFMU will assign the different CTOTs to the AOs in the exact following order:

9.2.2. Regular passenger AOs, whose itineraries were filed duly in advance and coincide relatively with the RPLs presented to the Air Transport Office.

9.2.3. Cargo and air taxi AOs that have filed their itineraries duly in advance.

9.2.4. AOs that file their FPLs with the pertinent ARO office. Aircraft with a registered STS with the FPL will, if appropriate, enjoy a preference in SLOT assignment.

10. ATFM MESSAGES

10.1. The COLOMBIA CFMU /FMP may, depending upon the requirements of the AOs, send ATFM messages to a single centralised address or to an office representing users of the aerodrome of departure or to a managing agent in the aerodrome of departure or to both.

10.2. The COLOMBIA CFMU /FMP will send the ATS units involved all messages concerning ATFM regulations, as well as those having to do with the CTOTs.

10.3. Until such a time as the AOs' technical resources allow, the COLOMBIA CFMU/FMP will communicate its ATFM intentions through the ATS units and/or the AIS.

11. ATFM INCIDENT REPORTING

11.1. The purpose of the ATFM incident reporting system is to establish procedures for:

11.1.1. Ensuring that all reports and data required for their analysis are collected as rapidly as possible.

11.1.2. Ensure that all incidents are thoroughly analysed and that corrective action is taken in order to avoid reincidence.

11.1.3. Obtain the pertinent verbal and written reports, as well as the other data specified in the ATFM incident reporting form.

Agenda Item 2: Necessary documentation on ATFM for the CAR/SAM Regions

Caribbean/South American ATFM Concept of Operations (CAR/SAM CONOPS ATFM)

2.1 The meeting recalled that the Caribbean/South American ATFM Concept of Operations (CAR/SAM CONOPS ATFM) is a high-level document, which main objective is to define and regulate ATFM implementation in a homogeneous manner in the CAR/SAM Regions. Taking into account that, while ATFM planning in both regions will be carried out jointly, the implementation of the system itself shall be carried out according to the needs of each one of the regions involved.

2.2 In this connection, GREPECAS considered that a unique ATFM operational concept for both regions shall enable a harmonized implementation in the regions and shall ensure an effective and equitable service. Operational concepts shall establish functions and minimum requirements on which the service implementation and required ATFM Units would be based.

2.3 GREPECAS/14 analyzed the draft CAR/SAM ATM Operational Concept presented by the ATM/CNS Subgroup ATM Committee and considered that such document could be adopted by the CAR/SAM Regions, with the understanding that it is an evolutionary document that could be amended as necessary. Therefore, GREPECAS/14 formulated Conclusion 14/49 which encourages CAR/SAM States/Territories to, based on harmonized regional developments, adopt the CAR/SAM ATFM Operational Concept (CONOPS ATFM CAR/SAM) and establish a work programme to enable its implementation.

2.4 GREPECAS/14 also took into consideration the main lessons learned during the ATFM development and implementation by the Federal Aviation Administration Air Traffic Control System Command Center (ATCSCC), the NAVCANADA Operations National Center (NOC) and the Mexico Flow Control Center (CCFMEX). GREPECAS/14 agreed that the ATM Committee should: take into account the operational benefits reached in ATFM implementation in the NAM Region and in other States when evaluating the CAR/SAM ATFM CONOPS; give consideration to the lessons learned in the fields related to the objectives and functions of ATFM Centralized, the principles in which ATFM will be based, the team and personnel required for the Flow Management Unit/Flow Management Position (FMU/FMP), and the ATFM centralized and operational procedures.

2.5 In order to comply with the above, the United States presented to the meeting its experiences in ATFM implementation. These were then analysed by an ad-hoc committee which had the task to review the Caribbean/South American ATFM Concept of Operations (CAR/SAM CONOPS ATFM) in the light of the information presented by the FAA and in light of the ATFM experience of other States/Territories/International Organizations. In view of the above, some modifications were made to Concept of Operations which significantly improve the document and the Secretariat was requested to present to GREPECAS, through pertinent channels, the CAR/SAM ATFM Concept of Operations with the amendments introduced and shown as **Appendix A** to this part of the report.

Common Air Traffic Flow Management Terminology

2.6 The meeting recognized that as collaboration efforts increase between the States and Territories, effective communications are essential. A key element in removing language barriers is establishing common terms and phrases. Terminology and phraseology differences in air traffic flow management (ATFM) could be a potential source of confusion during communications among international Traffic Management Units.

2.7 The terminology will be an essential element in developing definitive, clear, and concise communication between international ATFM units. Likewise, the phraseology will be a technical pattern of communication to exchange standardized and harmonized messages between international ATFM units. This work should be combined with an ICAO effort to standardize ATFM terms.

2.8 The meeting took note that the "Phraseology for the Exchange of ATFM Messages Handbook" dated February 2003, by the Multi-Agency Air Traffic Services Procedures Coordination Group (MAPCOG) ATFM Task Force, which is a joint effort between EUROCONTROL, NAVCANADA and the FAA. It also draws on the work accomplished between the ATCSCC and the Japan Civil Aviation Bureau Air Traffic Management Center (ATMC).

2.9 Terminology and phraseology for air traffic control are both standardized and documented to ensure that communications between air traffic controllers and pilots are brief, complete, accurate and understood. Terminology and phraseology for the exchange of ATFM messages, however, have been neither standardized nor documented.

2.10 The evolution of ATFM has brought about more robust and complex systems, but the use of plain language is still evident. Additionally, the transparency of current ATFM systems and the inclusion of non-ATC users contribute to the use of plain language.

2.11 As ATFM becomes more global in nature, regional providers of ATFM service may need to consider which plain language words and phrases are best suited for the exchange of ATFM messages. This is especially important when linking adjacent ATFM systems or introducing ATFM in areas where it presently does not exist.

2.12 The attached document shown as **Appendix B** to this part of the report contains terminology and phraseology for the exchange of ATFM messages between air traffic management centers. The terminology and phraseology are not intended to be a requirement for ATFM communications, but may be used as a guideline for the exchange of ATFM messages. It also contains those ATFM related abbreviations normally used by that are not defined in the ICAO Doc 8400 (PANS-ABC).

Creation of a Task Force on ATFM Documentation (ATFM DOC/WG)

2.13 The Meeting took note that other documents should be developed, such as operational procedures manuals to be used by FMU/FMP, draft plans and ATFM training material, and ATFM policies. For this reason, it was deemed pertinent to create a working group in order to evaluate the documentation required for the initial ATFM implementation, and at the same time, to begin work on the manual related to common terminology. The terms of reference, work program, and composition of the working group are shown as Appendix C to Agenda Item 5. The tasks of this working group shall be carried out using the electronic means as well as through teleconferences in order to review the progress of the work being done.

APPENDIX A

INTERNATIONAL CIVIL AVIATION ORGANIZATION

Caribbean/South American Air Traffic Flow Management Concept of Operation

(CAR/SAM ATFM CONOPS)

Version	1.2
Date	June 2007

FOREWORD

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

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

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

ICAO NORTH AMERICAN, CARIBBEAN, AND CENTRAL AMERICAN OFFICE

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

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

RECORD OF AMENDMENTS AND CORRIGENDA

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

CORRIGENDA			
No.	Date applicable	Date entered	Entered by

AMENDMENTS TO THE DOCUMENT

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

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

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

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

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

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

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

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

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

Page

Document content

GLOSARIO DE ACRÓNIMOS/ACRONYMS GLOSSARY

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

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

Explanation of terms and expressions

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Executive summary

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

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

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

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

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

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

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

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

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

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

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

1. History

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

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

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

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

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

2. Purpose of the document

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

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

3. Actors involved in ATFM

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

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

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

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

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

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

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

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

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

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

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

5. Main traffic flows

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

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

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

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

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

Objective of the Centralized ATFM Facility

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

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

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

Principles in which ATFM will be based

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

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

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

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

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

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

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

f) Apply quality management to the services provided.

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

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

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

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

Functions of a Centralized ATFM Facility

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

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

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

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

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

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

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

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

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

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

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

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

10. Operational procedures

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

10.2 The purpose of these documents shall be to:

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

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

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

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

11. ATFM Implementation Strategy

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

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

Airports

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

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

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

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

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

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

Airspace

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

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

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

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

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

Centralized ATFM Facility implementation strategy in the CAR/SAM Regions

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

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

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

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

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

12 Special flights exempt from application of ATFM measures

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

13 Contingency plan

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

APPENDIX A

Table

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

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

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

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

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APPENDIX B

General Considerations for the implementation process of a Centralized ATFM

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

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

b) Access to aeronautical information and cartography.

c) Access to meteorological information.

d) Database of:

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

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

f) Flight plans processing.

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

h) Automated resources:

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

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

i) Communication to coordinate with:

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

j) Human resources

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

k) Use of adequate tools for statistics

l) Infrastructure

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

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

n) Redundancy of critical systems.

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APPENDIX B

INTERIM GUIDELINE FOR ATFM COMMUNICATION

Version 1.0

October 2006

FOREWORD

Centralized traffic management facilities are best able to communicate their national system's ability to accept traffic from adjacent international air traffic service (ATS) providers. As coordination and collaboration efforts intensify between the countries, effective communications are essential. A key element in removing language barriers is establishing common terms and phrases. Terminology and phraseology differences in air traffic flow management (ATFM) could be a potential source of confusion during communications among the Japan Civil Aviation Bureau (JCAB) Air Traffic Management Center (ATMC) and the Federal Aviation Administration (FAA) David J. Hurley Air Traffic Control System Command Center (ATCSCC).

IPACG/21 discussions resulted in a recommendation to develop the common terms of reference for ATFM communications. IPACG/22 supported the formation of a Task Force to address this issue. The operation of the Task Force was outlined at IPACG/23. The ATCSCC and ATMC established a process to examine the ATFM common terminology and phraseology at IPACG/24. This document was submitted by the Task Force at IPACG/25. The bilateral effort herein should be combined with an ICAO effort to standardize ATFM terms in the future.

The terminology will be an essential element in developing definitive, clear, and concise communication between international ATFM units. Likewise, the phraseology will be a technical pattern of communication to exchange standardized and harmonized messages between international ATFM units. These terminology and phraseology are not intended to be a requirement for ATFM communications, but may be used as a guideline for the exchange of ATFM messages.

This guideline is largely based on the "Phraseology for the Exchange of ATFM Messages Handbook" dated February 2003, by the Multi-Agency Air Traffic Services Procedures Coordination Group (MAPCOG) ATFM Task Force, which is a joint effort between EUROCONTROL, NAV CANADA and the FAA.

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1. General

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

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

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

1) Who: The ATFM service unit being contacted followed by the ATFM service unit that is initiating the contact.
2) What: The ATFM objective to be achieved.
3) Where: The location of the ATFM objective to be achieved.
4) When: The time and/or duration of the ATFM objective to be achieved.
5) Why: The reason for the ATFM objective.

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

1.5 Below are the examples of possible ATFM messages:

- ATCSCC, this is ATMC…We need 100 miles interval regardless of altitude on R220, R580 and all the PACOTS tracks for traffic landing at Narita airport estimated FIR boundary from 0100 UTC until 0500 UTC due to severe weather.
- ATMC, this is ATCSCC…Information maybe developed into ATFM… Los Angeles has started flow control for all aircraft landing at Los Angeles airport due to earthquake. They are requesting ground stops for arrivals until further notice.

2. ATFM Message Components

2.1 The use of a modular and structured ATFM message provides for consistent ATFM message design and delivery. Each of the ATFM message's five components can contain plain language elements that when combined provide a complete ATFM message. The harmonization achieved lies in the delivery of an ATFM message that has all of the required components in a structured format while making allowances for different plain language elements. This is of particular benefit for ATFM service providers that use different ATFM terminology or for ATFM service providers that do not use English for their intra-ATFM coordination.

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

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

- ATMC, this is ATCSCC…
- ATCSCC, this is ATMC…

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

I/WE NEED…

- (X) MILES/MINUTES INTERVAL AT THE SAME ALTITUDE…
- (X) MILES/MINUTES INTERVAL REGARDLESS OF ALTITUDE…
- A RATE OF (X) AIRCRAFT PER HOUR…
- (X) MILES-IN-TRAIL AT (specified altitude(s))…
- (X) MINUTES-IN-TRAIL AT (specified altitude(s))…
- TO BLOCK (specified altitude(s))
- TO LIMIT THE ACCEPTABLE ALTITUDE TO (specified altitude(s))
- TO SUSPEND THE FIR ENTRY…

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

Examples of there where clause:

- …OVER NIPPI…
- …NARITA AIRPORT…
- …ANCHORAGE APPROACH…
- …ON A337…
- …WESTBOUND ON PACOTS TRACK C…
- …EAST FLOW ON A590…
- …INBOUND ON G344…
- …ON PACOTS TRACK 2 LANDING AT SAN FRANCISCO AIRPORT…
- …ON PACOTS TRACK E BELOW FLIGHT LEVEL (X)…
- …ABOVE FLIGHT LEVEL (X)…
- …INBOUND TO TOKYO ACC…
- …INBOUND TO OCEANIC SECTOR 5…
- ... (compass direction) OF (a significant point/airway/location)…

Examples of the modifying clause:

- …FOR TURBOJET TRAFFIC…
- …FOR ALL AIRCRAFT…
- …FOR TRAFFIC GREATER THAN (X) KNOTS…
- …FOR HEAVY AIRCRAFT…
- …FOR TRAFFIC LANDING…
- …FOR AIRCRAFT DEPARTING…
- …FOR TRAFFIC OVERFLYING…
- …FOR AIRCRAFT PASSING…

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

- …FROM 0300 UTC UNTIL 0600 UTC…
- …FROM NOW UNTIL 0600 UTC…
- …FROM 2300 UTC UNTIL FURTHER NOTICE…
- …UNTIL FURTHER NOTICE…
- …FOR THE NEXT (X) HOURS…

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

DUE TO/FOR…

- RUNWAY CLOSURE
- (SEVERE) WEATHER
- COMMUNICATION SYSTEM OUTAGE
- RADAR FAILURE
- (significant event)
- (natural disturbance such as FIRE or VOLCANIC ASH)
- STATE ACTIVITY
- MILITARY ACTIVITY
- EQUIPMENT OUTAGE
- EMERGENCY
- ADJACENT ATFM MEASURES

3. ATFM Message Types

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

- INFORMATION MAY BE DEVELOPED INTO ATFM
- CAPACITY RELATED INFORMATION

3.2 Examples of messages sent prior to invoking ATFM restrictions follow:

- ATCSCC, this is ATMC…Information may be developed into ATFM… Narita airport has closed one of the runways and started snow removal.
- ATCSCC, this is ATMC…Capacity related information…Narita airport has entered the storm zone of the typhoon.

3.3 **ATFM Initiative Message**: ATFM initiatives communicate air traffic restrictions from one nation to another. They follow the five component structure described earlier:

1) Who: The ATFM service unit being contacted followed by the ATFM service unit that is initiating the contact.
2) What: The ATFM objective to be achieved.
3) Where: The location of the ATFM objective to be achieved.
4) When: The time and/or duration of the ATFM objective to be achieved.
5) Why: The reason for the ATFM objective.

3.4 Examples of ATFM initiatives follow:

- ATMC, this is ATCSCC…I need a 30 minute interval at the same altitude for all aircraft landing at Chicago airport from 0800 UTC until further notice due to state activities.
- ATCSCC, this is ATMC…We need to block FL350 and below for aircraft overflying Japanese domestic airspace for the next 12 hours due to emergency.

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

- REQUEST EXEMPTION FROM ATFM
- COORDINATION OF ATFM EXEMPTION

3.6 The following types of aircraft may be exempted from the flow control restrictions:

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

3.7 Examples of messages requesting ATFM exemption follow:

- ATMC, this is ATCSCC…Request exemption from ATFM…UAL123 is carrying a patient who needs urgent treatment.
- UAL123…Exemption is approved.
- ATCSCC, this is ATMC…Coordination of ATFM exemption… JA501A is operating for search and rescue missions.

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

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

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

- ATMC, this is ATCSCC…I need a 30 minute interval regardless of altitude for all aircraft on PACOTS track 8 from 1000 UTC until further notice due to military activity. I will call you again in 60 minutes.

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

- CHANGE
- AMEND
- REDUCE
- INCREASE
- DECREASE

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

- ATCSCC, this is ATMC…We have changed the restriction on traffic flying PACOTS tracks C, E and F for Narita airport. We now need 20 minutes intervals at the same altitude on PACOTS tracks C, E and F for traffic landing at Narita airport from now until 0900 UTC.
- ATMC, this is ATCSCC…We have increased the inbound rate from 5 aircraft per hour to 10 aircraft per hour for traffic beyond Oakland FIR until further notice.

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

- CANCEL
- RESUME
- RESUME NORMAL
- RELEASE

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

- ATCSCC, this is ATMC…We have **canceled** the restriction on traffic beyond the Fukuoka FIR at this time. **Resume normal** traffic flow.

4. Abbreviations

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

4.2 The non-common abbreviations are deemed inappropriate for the inter-facility ATFM communication between ATCSCC and ATMC.

Table of Abbreviations

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

	ATCSCC	ATMC
AAR	Airport Acceptance Rate	
ACID	Aircraft Identification	
ADL	Aggregate Demand List	
ADR	Airport Departure Rate	
ADZY	Advisory	
AIM	Aeronautical Information Manual	
ALTRV	Altitude Reservation	Altitude Reservation
ANP	Air Navigation Plan	
AOA	Office of the Administrator	
AOC	Airline Operations Center	
AP	Air Patrol	
APREQ	Approval Request	Approval Request
APVL	Approval	Approval
ARINC	Aeronautical Radio Incorporated	
ARO	Airport Reservation Office	
ARTCC	Air Route Traffic Control Center	Air Route Traffic Control Center
ARU	Airspace Reservation Unit (Canada)	
ASM		Airspace Management
AT	Air Traffic	
ATCSCC	Air Traffic Control System Command Center	Air Traffic Control System Command Center
ATMC	Air Traffic Management Center	Air Traffic Management Center
ATMetC		Air Traffic Meteorological Center
ATO	Air Traffic Operations Program	
AUTODIN	Automatic Digital Network	
CARF	Central Altitude Reservation Function	
CCFP	Collaborative Collective Forecast Product	
CCWSU	Command Center Weather Service Unit	
CDM	Collaborative Decision Making	Collaborative Decision Making

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

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

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

Agenda Item 3: Model Action Plan to improve Aerodrome Operations (AO) and the corresponding ATFM guidance material for FMU or FMP implementation

Model Action Plan for ATFM progressive implementation

3.1. In order that States, Territories and International Organizations take the necessary actions to initiate progressive implementation of ATFM, an action plan model to improve aerodrome operations was presented, as established by the CAR/SAM ATFM CONOPS. Basically, the action plan model is proposing strategic and tactical actions, taking into consideration the ATFM implementation concepts included in the CAR/SAM ATFM CONOPS.

3.2. The meeting examined the model presented, exchanged opinions regarding the changes deemed pertinent, and approved the model shown as **Appendix A** to this part of the Report. The CAR/SAM States/Territories/International Organizations, as well as ATFM Task Force Working Groups, may use it as a reference for the initiation of the ATFM implementation process.

APPENDIX A

Model Action Plan for ATFM progressive implementation

Stage 1 – Model Action Plan for the implementation of airport strategic measures – GPI 06			
Task description	**Start**	**End**	**Responsible party (designate person or office in charge)**
1. Analysis of system capacity	**Sep 2007**	**Jun 2008**	
1.1 Develop methodology proposal for estimating airport capacity	Sep 2007	Dec 2007	ATFM/AC/WG
1.2 Establish/adopt methodology for estimating airport capacity	Sep 2007	Feb 2008	States, Territories and International Organizations (S/T/IO)
1.3 Define data collection plans for flight intentions (RPL, Official Airline Guide (OAG), Flight Forms, etc)	Sep 2007	Feb 2008	S/T/IO
1.4 Identify airports in which periods exist where the demand is greater than the capacity and estimate capacity of these airports	Sep 2007	Jun 2008	S/T/IO
1.5 Determine operational factors affecting demand and capacity to optimize utilization of existing capacity, including simulations, if necessary	Sep 2007	Jun 2008	S/T/IO
2. Coordinate with industry, national and international organizations	**Sep 2007**	**Jun 2008**	S/T/IO
2.1 Coordinate applicable procedures with users, including implementation date	Sep 2007	Jun 2008	S/T/IO
2.2 Report to the ATFM Task Force	N/A	ATMC/6	S/T/IO
3. Infrastructure and database	**Sep 2007**	**Sep 2008**	S/T/IO
3.1 Evaluate data base requirements and if such were the case, harmonize the same	Sep 2007	Apr 2008	SI/WG
3.2 Determine information technology and infrastructure tools required	Sep 2007	Dec 2007	S/T/IO
3.3 Implement the required information technology and infrastructure tools	Dec 2007	Sep 2008	S/T/IO

4. Policies, standards, and procedures	**Sep 2007**	**Sep 2008**	S/T/IO
4.1 Develop ATFM policies, including those related to procedures for the distribution of airport slots to operators conducting regular flights, based on airport saturation/congestion forecasts, and taking into account the objectives and principles established in Caribbean/South American ATFM Concept of Operations (CAR/SAM CONOPS ATFM).	Sep 2007	Jun 2008	S/T/IO
4.2 Develop the FMU or FMP procedural manual model	Sep 2007	Dec 2007	DOC/WG
4.3 Develop the FMU or FMP procedural manual	Jun 2008	Sep 2008	S/T/IO
4.4 Develop the AIC/NOTAM Supplement model	Sep 2007	Jun 2008	ATFM/TF
4.5 Publish the necessary AIP Supplements/NOTAMs	Jun 2008	Sep 2008	S/T/IO
5. Training	**Sep 2007**	**Dec 2008**	S/T/IO
5.1 Develop ATFM training material model	Sep 2007	Mar 2008	DOC/WG
5.2 Prepare plans and ATFM training material	Sep 2007	Jun 2008	S/T/IO
5.3 Provide training to the personnel involved	Jun 2008	Dec 2008	S/T/IO
6. Final implementation decision	**N/A**	**Dec 2009**	S/T/IO
6.1 Review the factors affecting the implementation decision	N/A	Sep 2008	S/T/IO
6.2 Declare the pre-operational implementation within the defined area	N/A	Sep 2008	S/T/IO
6.3 Declare the definitive pre-operational implementation within a defined area	N/A	Dec 2009	S/T/IO
7. Monitor system performance	**Sep 2008**	**Dec 2009**	S/T/IO
7.1 Prepare the program for post-implementation follow-up of airport strategic ATFM	Sep 2008	Dec 2008	S/T/IO
7.2 Implement the program for post-implementation follow-up of airport strategic	Dec 2008	Dec 2009	S/T/IO
			S/T/IO
Tentative date for pre-operational implementation	N/A	Dec 2008	S/T/IO
Tentative date for definitive implementation	N/A	Dec 2009	

Model Action Plan for Airport Tactical measures implementation – GPI 06			
Task description	**Start**	**End**	**Responsible party (designate person or office in charge**
1. System capacity analysis	**Sep 2008**	**Jun 2009**	
1.1 Establish/adopt airport capacity estimating methodology, in case it was not defined in the implementation phase of airport strategic measures	Sep 2008	Dec 2008	States, Territories and International Organizations (S/T/IO)
1.2 Define data collection plans for flight intentions (RPL, Official Airline Guide (OAG), Flight Forms, etc)	Sep 2008	Dec 2008	S/T/IO
1.3 Identify airports in which there are periods where demand is greater than the capacity and strategic management is inadequate (airports with significant demand for non-scheduled flights), and estimate the capacity of these airports	Sep 2008	Jun 2009	S/T/IO
1.4 Determine operational factors affecting demand and capacity to optimize utilization of existing capacity, including simulations, if necessary	Sep 2008	Jun 2009	S/T/IO
2. Coordinate with industry, national and international organisations	**Sep 2008**	**Jun 2009**	S/T/IO
2.1 Coordinate applicable procedures with users, including implementation date	Sep 2008	Jun 2009	S/T/IO
2.2 Report to the ATFM Task Force	N/A	ATMC/6	S/T/IO
3. Infrastructure and database	**Sep 2008**	**Sep 2009**	S/T/IO
3.1 Determine required information technology and infrastructure tools	Sep 2008	Dec 2008	S/T/IO
3.2 Implement required information technology and infrastructure tools	Dec 2008	Sep 2009	S/T/IO
3.3 Coordinate at a regional level the data base forms applied, with a view to facilitating its use in the Centralized ATFM.	Dec 2008	Sep 2009	S/T/IO
4. Policies, standards, and procedures	**Sep 2008**	**Sep 2009**	S/T/IO
4.1 Develop ATFM policies, including those related to procedures for the distribution of airport slots to operators conducting scheduled and non-scheduled flights, based on airport saturation/congestion forecasts, and taking into account the objectives and principles established in Caribbean/South American ATFM Concept of Operations (CAR/SAM CONOPS ATFM).	Sep 2008	Jun 2009	S/T/IO

4.2 Identify necessary changes, and if needed, modify the FMU or FMP procedures manual model	Sep 2008	Sep 2009	DOC/WG
4.3 Insert the necessary changes in the FMU or FMP procedural manual	Sep 2008	Jun 2009	S/T/IO
4.4 Develop the AIC/NOTAM Supplement model	Sep 2008	Jun 2009	ATFM-WG
4.5 Publish the necessary AIP Supplements/NOTAMs	Jun 2009	Sep 2009	S/T/IO
5. Training	**Sep 2008**	**Dec 2009**	S/T/IO
5.1 Identify necessary changes, and if needed, modify the ATFM training material model	Sep 2008	Mar 2009	DOC/WG
5.2 Insert necessary changes in the ATFM training material	Sep 2008	Jun 2009	S/T/IO
5.3 Prepare ATFM training plans and material	Sep 2008	Jun 2009	S/T/IO
5.4 Provide training to the personnel involved	Jun 2009	Dec 2009	S/T/IO
6. Final implementation decision	**N/A**	**Dec 2010**	S/T/IO
6.1 Review the factors that affect the implementation decision	**N/A**	Sep 2009	S/T/IO
6.2 Declare the pre-operational implementation within the defined area	**N/A**	Sep 2009	S/T/IO
6.3 Declare the definitive operational implementation within the defined area	**N/A**	Dec 2010	S/T/IO
7. Monitor system performance	**Sep 2009**	**Dec 2010**	S/T/IO
7.1 Prepare the program for post-implementation follow-up of airport tactical measures	Sep 2009	Dec 2009	S/T/IO
7.2 Implement the program for post-implementation follow-up of airport tactical measures	Dec 2009	Dec 2010	S/T/IO
Tentative date for pre-operational implementation	**N/A**	**Dec 2009**	
Tentative date for definitive implementation	**N/A**	**Dec 2010**	

Note:

S/T/OI States, Territories and International Organizations
ATFM/AC/WG Work Group on Airport Capacity and ATC Capacity
ATFM/DOC/WG Work Group on Documentation
ATFM/TF ATFM Task Force
ATFM/SI/WG Work Group on Information Systems

Agenda Item 4: ATFM data bank

4.1 The meeting took note of the information and experience obtained by Brazil and Colombia regarding this agenda item. Thus, information was obtained on the Brazilian Aerodrome Movement Data Processing System (STDMA) which contains a rapid process for providing information based on the comparison of data from the Forms of Aircraft Movement in Aerodrome (generated by the Control Tower Management System), with the information of Time of Air Transport (HOTRAN), RPL, as well as SLOT, when the aerodrome is in the Monitored and/or Coordinated mode. This makes it possible to visualize the relation among the number of effective flights accomplished by the air carriers and the number of these flights foreseen in HOTRAN, RPL, and SLOT files, according to the case.

4.2 The System includes the Statistics Position (SGTC) of CGNA which receives data electronically from the Air Traffic Control Units, from the daily Forms of Aircraft Movements in Aerodrome, or from the capacity of each sector involved. Currently, the CGNA database is composed of 32 of the 107 aerodromes of the Brazilian SGTC net.

4.3 The data, after it is processed by STDMA, is presented in sheet and graphic forms, and provides information such as:

a) Quantity of arrivals and departures of a period (day, week and month);

b) Percent relation among flights of air carrier, air taxi, general aviation and military (airplanes and helicopters);

c) Information about the SLOT solicitation:

d) HOTRAN Information;

e) RPL Information;

f) Flights operating without SLOT, RPL, HOTRAN;

g) Percent relation of the effective utilization of the RPL, SLOT, HOTRAN;

h) Statistics with or without consideration of helicopters and/or military;

i) Data export.

4.4 With regard to the experience of Colombia, the meeting was briefed regarding the information systems available to Colombian Civil Aeronautics that back up the institution’s mission work and that, in the future, will serve as an input for ATFM implementation in Colombia. These systems provide tools that facilitate the work of each office and provide timely and reliable information for collaboration decision making. They are supported by state-of-the-art technological platforms and by appropriate backup mechanisms, support and audit, which convert them into reliable and safe systems. These systems are:

a) ALDIA (Aeronautics Information On-line Automation) Information System,
b) PISTA, (Air Traffic Services Integration Project) Information System,
c) SIGMA, (Aeronautical Information Management Maintenance System)
d) GIS (Geographic Information System),
e) Air Transport Statistics Information System,
f) Radar data systems, including radar data exchange, FPL and Technical Requirements,
g) Meteorological data banks
   - WAFS (Wide Area File Service) System) which processes information in global forecast centers,
   - GVAR (GOES Variable) which obtains information from the geostationary system GOES 12,
   - System, AFTN Data Base,

Note: A detailed description of these systems is shown in **Appendix A** to this part of the report.

4.5 The information provided by Colombia in the working paper was made through an electronic presentation. The presentation highlighted Colombia's ability to develop technical and infrastructure aspects that are being used to advance ATFM implementation.

4.6 The meeting noted that through statistics provided by the above-mentioned systems, air traffic demand and airport configuration changes can be detected, and a follow-up can be made on maintenance scheduling of communications, navigation and surveillance (CNS) equipment maintenance programming. All of this enables Colombia to determine global capacity problems for subsequent evaluation within ATFM phases. The systems provide and additional benefit through the development of airport improvement and airspace projects in terms that allow Colombia to improve capacity in keeping with the global rate of the traffic demand.

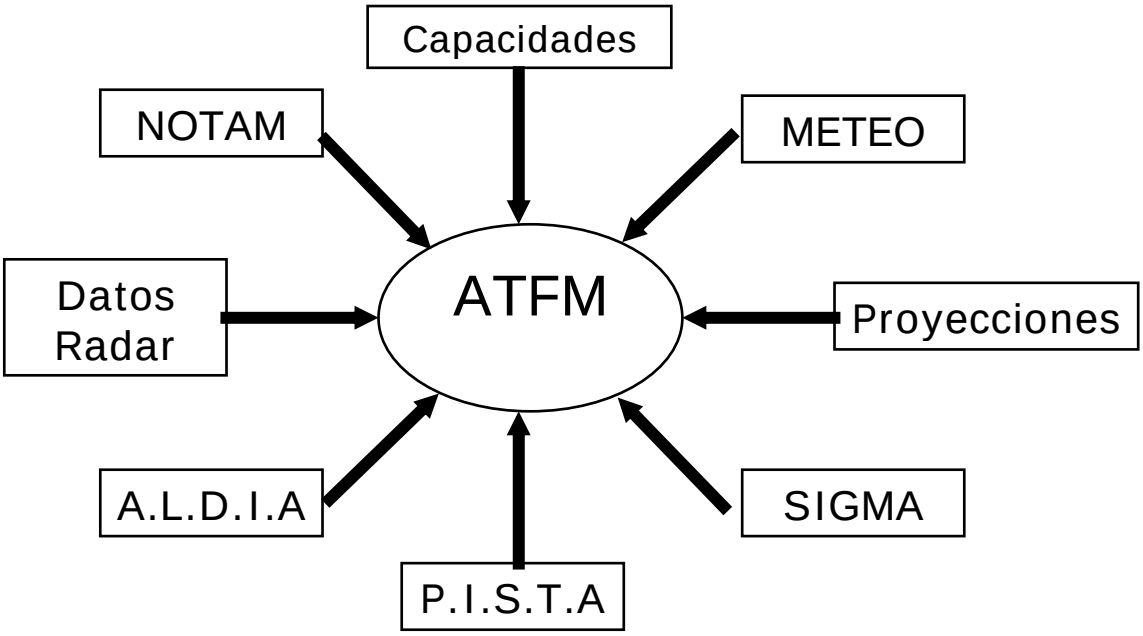
4.7 Also, the meeting agreed to create a Work Group called "Information Systems for ATFM implementation in the CAR/SAM Regions," whose objective shall be to support CAR/SAM States/Territories/International Organizations in the development and implementation of ATFM and which shall base its work in the existing information systems and the operational need defined by the ATFM Task Force. The Terms of Reference and Work Programme of the ATFM-SI WG are shown as **Appendix D** to agenda item 5.

APÉNDICE / APPENDIX A

Sistemas de información de apoyo al ATFM Colombia

Dentro de la estrategia de implementación del sistema ATFM en el territorio Nacional de Colombia, el grupo multidisciplinario ha identificado diversos sistemas de información que apoyarían la implantación automatizada de la FMU y FMP de Colombia.

Los sistemas identificados a la fecha, se resumen en el siguiente gráfico:

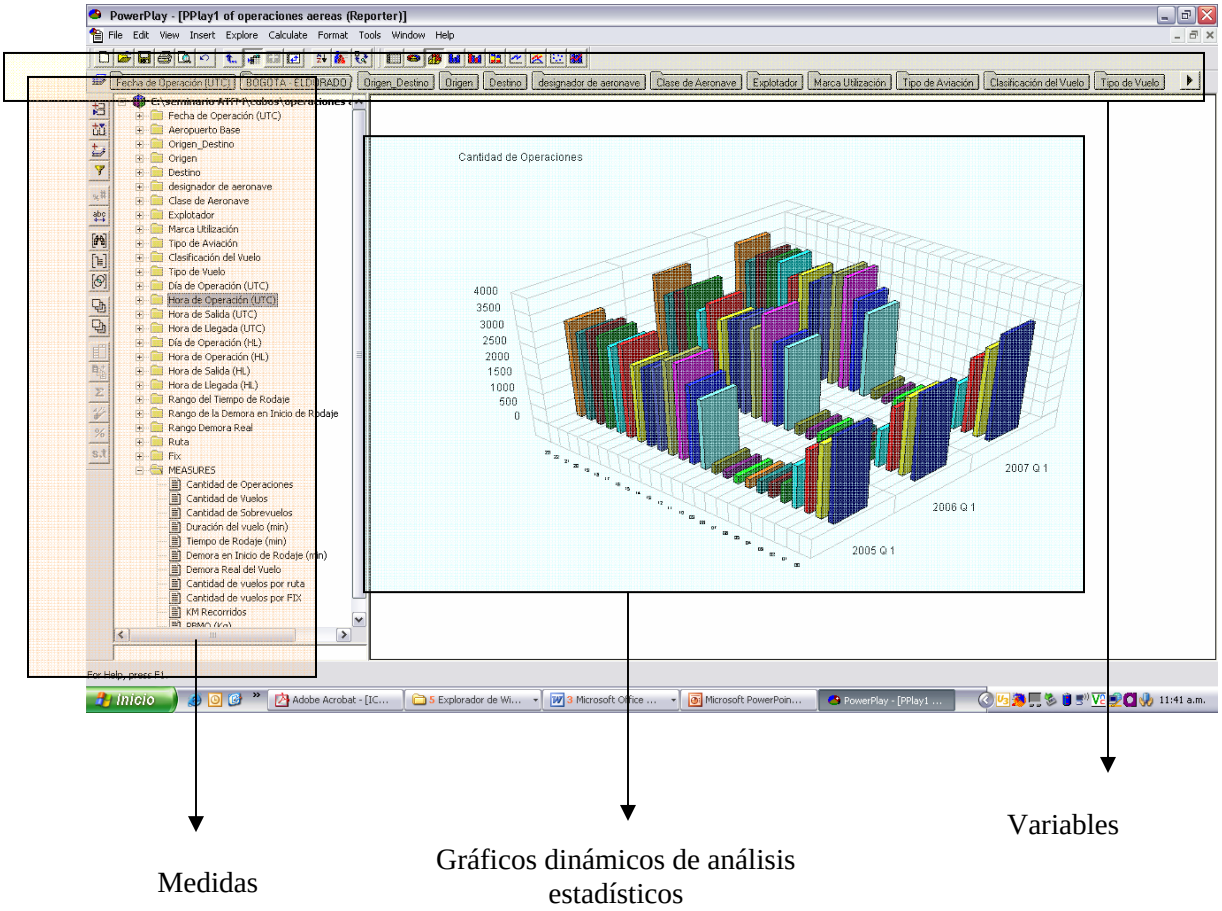


El detalle de cada uno es el siguiente:

Sistema de información A.L.D.I.A. (Automatización en Línea De Información Aeronáutica). Mantiene información de matrículas de Aeronaves, Licencias, Empresas, Medicina de aviación, Aeronavegabilidad, Pistas y Helipuertos.

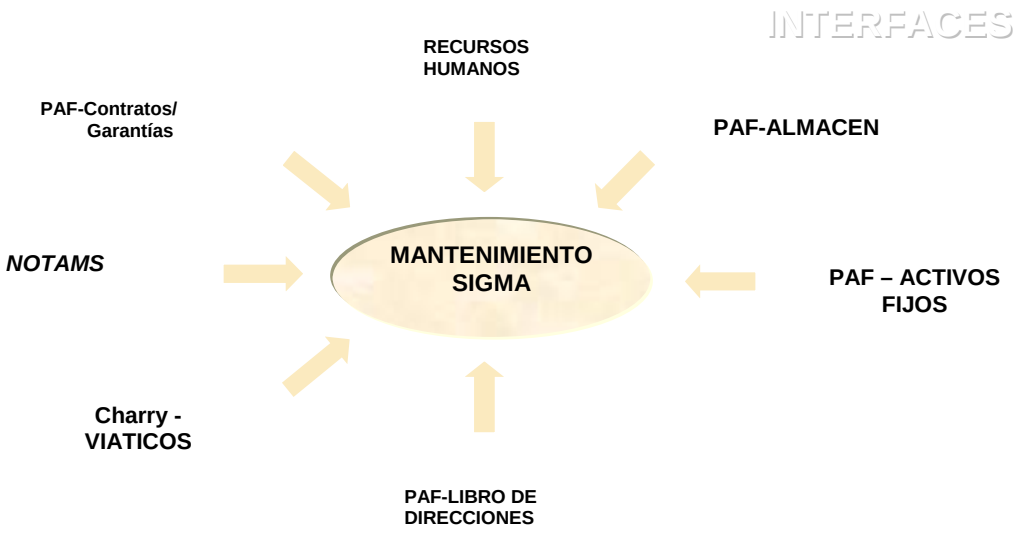
Sistema de información P.I.S.T.A. (Proyecto de Integración de los Servicios de Tránsito Aéreo). herramienta de software que facilite la planeación, organización y optimización de los Servicios de Tránsito Aéreo. Está conformado por los módulos de Itinerarios, Permisos especiales, AIS, Planes de vuelo, RPL

Sistema Estadístico de Información Aeronáutica: Basado en herramientas de inteligencia de negocios el sistema estadístico cruza información respecto a: Orígenes, destinos, tipos de aeronaves, explotadores, marcas de utilización, días y horas de operación, tiempos de rodaje, demoras, rutas, fix, entre otros, que permiten realizar análisis de capacidades y gestionar la planificación del tráfico aéreo. La siguiente grafica muestra la estructura general del sistema de estadísticas.



Sistema S.I.G.M.A (Sistema de Información para la Gestión del Mantenimiento Aeronáutico). Aplicativo que soportar para el mantenimiento de los equipos aeronáuticos. Está constituido por los módulos de Seguimiento de órdenes de trabajo, registros de mantenimiento preventivo, información detallada sobre distribuidores, fabricantes y otras empresas, números de equipo e información correspondiente, planes de trabajo, mano de obra, entre otros.

La siguiente gráfica ilustra la interrelación del sistema con otras bases de datos que le permiten mantener una actualización constante del mismo:

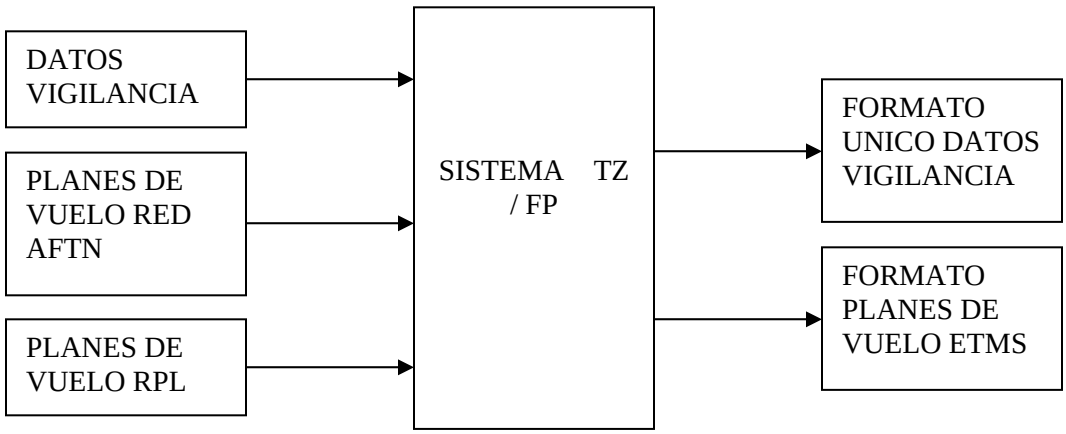


Sistema de Información Geográfico (GIS). permite el Diseño de Procedimientos de Tránsito Aéreo, Producción y mantenimiento de Cartas Aeronáuticas, Producción y mantenimiento del Manual AIP, análisis "Radar Track Analisys", Simulaciones de Desempeño de Radioayudas y/ electromagnéticos y simulaciones de impacto de ruido, permitiendo la generacion de productos como El Manual AIP, Cartas Aeronáuticas, Procedimientos de Transito Aéreo.

Sistemas Datos Vigilancia. El sistema de vigilancia basado en datos radar Colombiano está compuesto actualmente por 13 radares civiles y 5 militares, que le permiten la vigilancia de casi todo el territorio Nacional. Debido a la variedad de protocolos de los sensores radar dentro del territorio nacional, el cual se resume en la siguiente tabla:

FABRICANTE	PROTOCOLO CAPA FISICA	PROTOCOLO DE ENLACE	PROTOCOLO DE APLICACION
Alenia	RS-232	HDLC	ASTERIX
Thales	RS-232	N/A	AIRCAT 500
Lockheed Martin	RS-232	HDLC	ASTERIX
Westing House	RS-232	N/A	CD-2

Para unificar el formato de los datos radar, la Entidad realizó el programa TZ-COL el cual captura la información radar de la red Ethernet del Centro de Control instalado en Bogotá, la procesa y adapta al formato requerido por el sistema ETMS (denominado TZ). De forma adicional tiene herramientas gráficas de monitoreo, estadísticas y control de los radares y su desempeño. Como resultado de este aplicativo la UAEAC está en capacidad de entregar cualquier otro protocolo estándar para el intercambio de datos radar, que pueda ser establecido en el desarrollo del ATFM. La siguiente gráfica ilustra la funcionalidad del sistema TZ y FP Col:



Bases de Datos Meteorológicos Satelitales

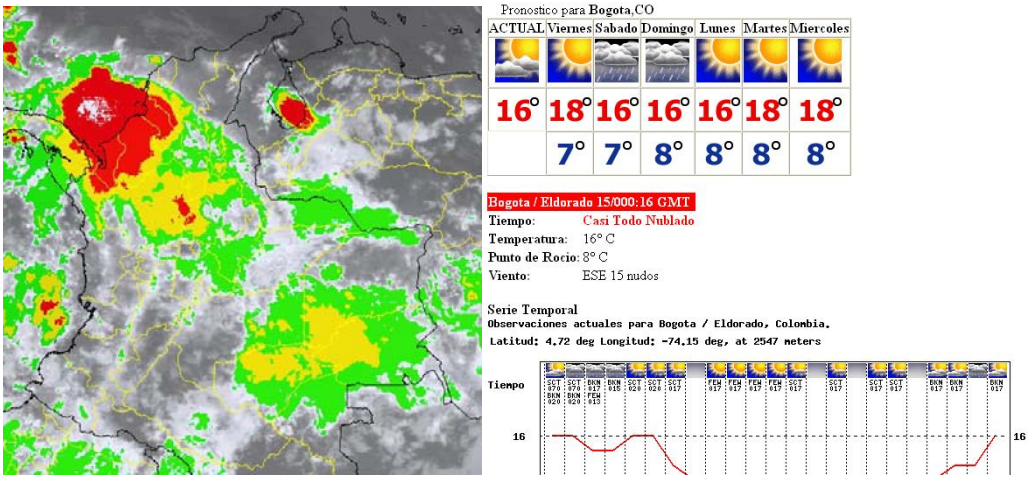
Sistema WAFS (Servicio de Archivos de área extendida). Es el conjunto de equipos que cumplen con la función de recibir información satelital procedente de los centros mundiales de pronóstico y procesarla; dicha información es transmitida vía red interna a las estaciones de trabajo ubicadas en la oficina de información Aeronáutica y externamente mediante la página Web.

Productos: El sistema puede ofrecer los siguientes tipos de productos:
a) Datos de Observación: TAF, METAR, SYNOP, WARNING
b) Datos de modelos numéricos MRF, FAX CHARTS, BUFR FAX, GFS Global Forward Skater

Sistema GVAR (Variable GOES). Esencialmente son los equipos que se conectan con el satélite geoestacionario GOES 12, el cual transmite imágenes como el visible, infrarrojo y vapor de agua; esta información es procesada en el servidor del GVAR el cual genera las imágenes y productos que son transmitidos al servidor de WAFS que publica dicha información.

Productos: El servidor del GVAR genera los productos de Composición y Superposición, estos son publicados en la Web y en las estaciones de trabajo

La siguiente gráfica ilustra las salidas de los sistemas meteorológicos satelitales:



NOTAS:

- Dentro de la estrategia ATM en Colombia el comité está analizando la integración del AMHS dentro del proyecto de actualización de la red AFTN a la red AMHS actualmente en desarrollo.

Agenda Item 5: Review of ATFM/TF Terms of Reference and Work Programme

Terms of Reference and Work Programme of the ATFM Task Force

5.1 The Meeting recalled that matters related with ATFM were analyzed during the GREPECAS CNS/ATM Subgroup, ATM/COMM/5 Meeting, and some important agreements regarding CAR/SAM ATFM implementation were reached. Several aspects which have direct relationship with such implementation were examined and some amendments to the ATFM Task Force Work Program were considered.

5.2 The meeting reviewed these terms of reference and the work program and considered that they did not require any modification. See **Appendix A** to this part of the report.

5.3 Also, as reported in agenda items 1, 2 and 4, the meeting deemed it pertinent to create 3 Working Groups, in order to advance in several specific tasks which shall permit a harmonious development of the ATFM system.

5.4 The Terms of Reference, Work Program and Composition of the aforementioned Working Groups are shown in this part of the report as Appendices B (Airport Capacity – ACR); Appendix C (Documentation); and Appendix D (Information Systems for ATFM implementation in the CAR and SAM Regions).

APPENDIX A

TERMS OF REFERENCE AND WORK PROGRAM OF THE ATFM TASK FORCE

1. Terms of reference

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

2. Work Program

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

3. Composition

Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, El Salvador, Haiti, Jamaica, Mexico, Panama, Paraguay, Peru, Trinidad and Tobago, United States, Uruguay, Venezuela, COCESNA, IATA and IFALPA.

4. Rapporteur

Joe Hof

APPENDIX B

WORKING GROUP ON AIRPORT CAPACITY (AC) AND ATC CAPACITY (ATFM - AC/WG)

1. Terms of Reference

a) Assist and guide CAR/SAM States/Territories/International Organizations on the different methodologies available for the determination of airport capacity and ATC capacity, according to the characteristics of the CAR and SAM Regions and propose a model to the ATFM Task Force.

b) Analyse, propose and follow-up the model project for the determination of the airport capacity and ATC capacity, which permit to optimize the Airspace Organization and Management (AOM), Air Traffic Services, (ATS) and Air Traffic Flow Management (ATFM) in the CAR/SAM Regions, in order to comply with ICAO Strategic Objectives, keeping in mind the Global Planning Initiatives (GPI).

2. Work Programme

Number	Task Description	Priority	DATE	
			START	END
GENERAL				
Task ATFM – 4	Gather information about airport capacity methodologies (AAR, FAA, Brazil, Colombia, AVIANCA, PICAP, AENA, etc.)	A	28/06/07	01/09/07
Task ATFM – 4.1	a) Analyse airport capacity (AC) methodologies, and b) define the terms of reference for the development of ATC capacity models (Task ATFM/5). This task is foreseen to be carried out in finalizing the sessions of the SAM Region Contingency Plans Meeting (Lima, Peru, 17 to 21 September 2007)	A	17/09/07	21/09/07
Task ATFM – 4.2	Definition and adoption of the airport capacity (AC) estimation model for the CAR and SAM Regions.	A	21/09/07	31/12/07

Definition of airport capacity (AC): The maximum number of operations (departures and landings) that may be supported by airport infrastructure services, in a specific period.

3. **Composition of the Group**

Argentina, Brazil, COCESNA, Colombia, Dominican Republic, Avianca.
Rapporteurs: Joy Carmel Caballero Bernal,
Víctor Marcelo de Virgilio

4. **Rapporteurs**

VICTOR MARCELO DE VIRGILIO (ARGENTINA)
JOY CARMEL CABALLERO BERNAL (COLOMBIA)

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  frankleon100@gmail.com

AVIANCA

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  Cel: 3002696119

APPENDIX C

WORKING GROUP ON DOCUMENTATION (ATFM DOC/WG)

1. Terms of Reference

a) Collect, analyze, define and propose the structure of the FMP, FMU operational manuals , for the CAR/SAM Regions
b) Analyze the ATFM communications common terms manual for the information and exchange of ATFM messages
c) Prepare training plans.

2. Work programme

Number	Task Description	Priority	Date	
			Start	End
Task ATFM-1	Development of FMP, FMU operational manuals for the CAR/SAM Regions Ref WP/04, Appendix A	**A**	**2007**	**2008**
	Collect material and background information for the formulation of the ATFM procedures manuals structure.		21/06/07	21/07/07
	Analysis and proposal of the structure of ATFM manuals by members of the group.		21/07/07	21/08/07
	Preparation of the contents on the basis of agreements regarding approved structure		21/08/07	21/12/07
	Final review and approval of the work presented by the group.		21/12/07	21/03/08
Task ATFM 2	**ATFM communications common terms manual for the information and exchange of ATFM messages** (WP/02, Appendix A)	**A**	**2007**	**2007**
	Collect material and background information for the formulation of the ATFM communication common terminology		21/06/07	21/07/07
	Evaluate manual and insert additional information if applicable		21/07/07	21/08/07
	Prepare draft version of the draft ATFM communications common terms manual and present it to the ATFM/TF		21/08/07	21/12/07
Task ATFM-3	**Prepare plans and guidance material for training.** (WP/07, Appendix A- 4.1).	**A**	**2007**	**2008**
	Collect material and background information for the formulation of curricular plans on the basis of the structure of the ATFM procedures manuals.		21/12/07	21/01/08
	Develop and prepare training guidance material and present it to the ATFM/TF		21/01/08	21/03/08

3. Composition

Brazil, Colombia, Chile and Costa Rica.
Rapporteur: Miguel Ángel Perea Rodríguez, Colombia

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APPENDIX D

WORKING GROUP ON INFORMATION SYSTEMS FOR THE ATFM IMPLEMENTATION IN THE CAR AND SAM REGIONS (ATFM – SI WG)

1. Terms of Reference

a) Support in the development of ATFM implementation in the CAR and SAM Regions from the point of view of technical structure, based on the existing information systems and the operational needs defined by the ATFM Task Force
b) Collect, analyze, define and propose structure of the information systems for ATFM Implementation of the CAR and SAM Regions.
c) Assist and guide the ATFM group on the different information systems available for ATFM implementation in the CAR and SAM Regions.
d) Analyze, propose and follow-up the ATFM project as regards technical information systems, in order to comply with ICAO Strategic Objectives.

2. Work Programme

Number	Task Description	Priority	Date	
			Start	End
GENERAL				
Task ATFM – 3.1	Prepare the information acquisition form which enables the determination of the status of each State.	A	01/07/07	01/08/07
Task ATFM – 3.2	Identify current status of current information systems in CAR/SAM States	A	01/08/07	01/11/07
Task ATFM – 3.3	Identify common points in information systems	A	01/11/07	01/12/07
Task ATFM – 3.3	Projectar report of the status of the information systems in the CAR/SAM Regions	A	01/12/07	01/02/08
Task ATFM – 3.4	Define possible information systems required and their interaction within ATFM in the CAR/SAM Regions	A	01/02/08	01/04/08

2. **Composition of the Group**

Brazil, Colombia, Paraguay
Rapporteur: Mr. Enrique Espinoza Castro, Paraguay.

3. Contact Points

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• IVONNE MARITZA FLECHAS	TEL : 57-1-2663251 FAX : 57-1-2663573 Email: ivonne.vergara@aerocivil.gov.co
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PARAGUAY

• ENRIQUE ESPINOZA CASTRO	TEL: 595-21-2005 365 Email: enrique.espinoza@gmail.com

Agenda Item 6: Other matters

Proposal to update flight operation procedures for hurricanes hunter aircraft

6.1 The United States made a proposal to establish flight procedures for aircraft conducting hunting hurricanes missions using continuous IFR rules. The proposal is based on safety concerns and due to the fact that the Caribbean, Central American, North America, Gulf of Mexico, and some South American States are included within the aircraft operations area.

6.2 So that hurricane hunter aircraft can achieve safe operational conditions, the following approach was proposed:

a) Maintaining IFR Clearance with an ATC Center

b) Providing flexibility to change the delay area as hurricane changes

c) De-conflicting with other air traffic

d) Operating between 2 different ATC centers (with appropriate coordination).

6.3 The meeting took note of the proposal presented, considered that this matter had a great relevance but required a thorough study, and kept in mind that it is a new issue within the ATM system and that no experts were available at this meeting to evaluate this matter. It also agreed to include the United States presentation as **Appendix A** to this part of the report.

Forthcoming ATFM/TF/4 Meeting

6.4 The meeting also took note and thanked the proposals of Brazil and Colombia, who offered to host the forthcoming ATFM Task Force Meeting. The Secretariat shall coordinate with both States the date and site of the meeting.

Teleconferences

6.5 It was agreed to hold teleconferences with the ATFM/TF Working Groups. The dates proposed are as follows:

First Teleconference, Thursday, 26 July 2007

ATFM AC/WG	16:00 to 16:30 hours
ATFM DOC/WG	16:30 to 17:00 hours

Second Teleconference, Friday, 24 August 2007

ATFM AC/WG	16:00 to 16:30 hours
ATFM DOC/WG	16:30 to 17:00 hours

6.6 As of the month of September, the teleconferences will be held during the first Wednesday of each month.

ATFM AC/WG	16:00 to 16:30 hours
ATFM DOC/WG	16:30 to 17:00 hours

6.7 The telephone number for the teleconferences is: 001 703 92 55387, and the PIN number is 2555#.

- - - - - - -

APÉNDICE / APPENDIX A

The Hurricane Hunters
Flight Operations

53rd Weather Reconnaissance Squadron

Prepared by:
Lt Col Dave Borsi
"Teal 27"

Integrity - Service - Excellence

Missions

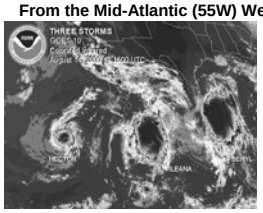
Tropical Storm/Hurricane Ops
Low Level Investigation Flights
Research Missions

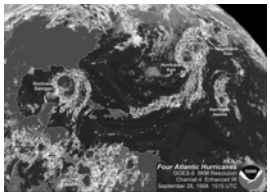
High Altitude Synoptic Tracks
Sea State Buoy Deployments

Search and Rescue Missions
Airlift – Disaster Relief Supplies

Area of Operations

From the Mid-Atlantic (55W) West to the International Dateline



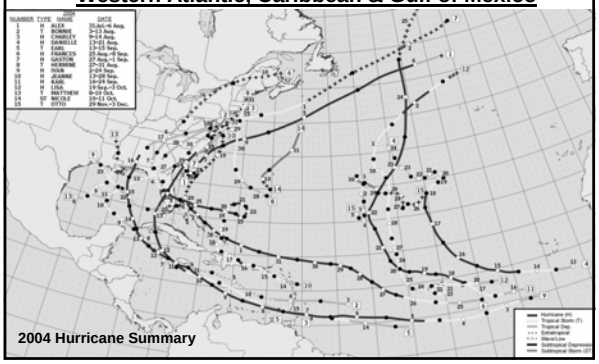


Central & Eastern Pacific **Caribbean Sea & Gulf of Mexico** **Western Atlantic**

Today there is still no substitute for the onsite data collected and sent by the Aircraft to the National Hurricane Center.
Max Mayfield, Director NHC (retired)

Area of Operations

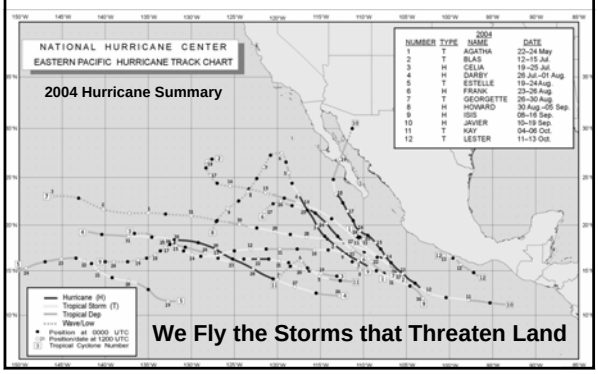
Western Atlantic, Caribbean & Gulf of Mexico



2004 Hurricane Summary

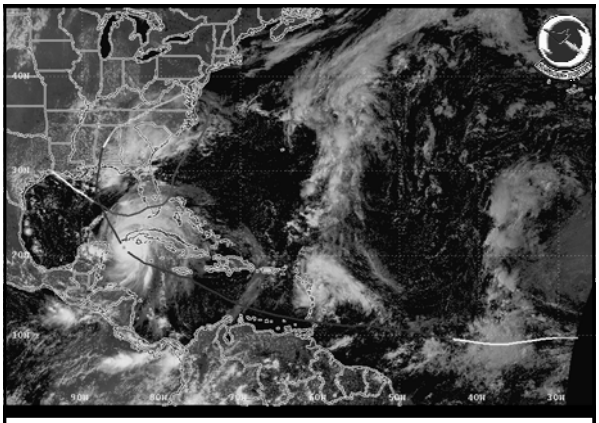
Area of Operations

Central & Eastern Pacific



2004 Hurricane Summary

We Fly the Storms that Threaten Land

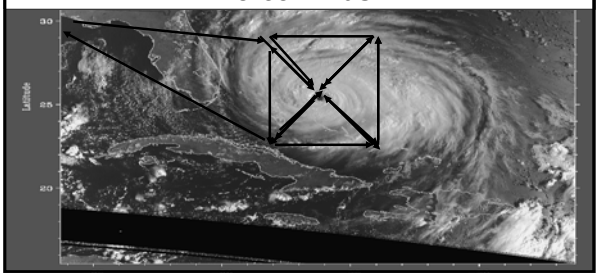


Hurricane Ivan (2 – 24 September 2004)

Tropical Storm & Hurricane Ops

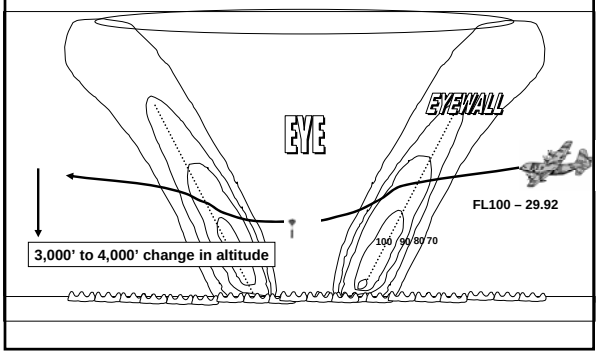
Delay Area

6 - 9 hours in the Storm
Mapping extent of Hurricane & Tropical Storm force winds



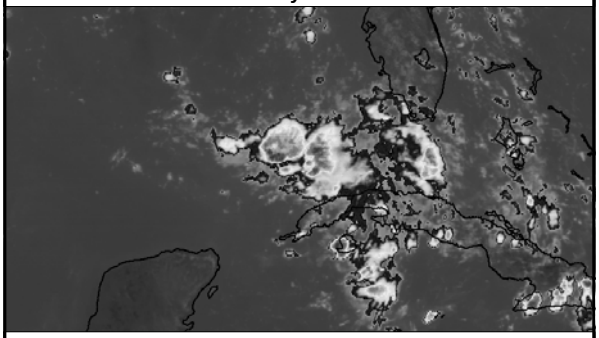
Block Altitude Required

FL120 and Below



Low Level Invest

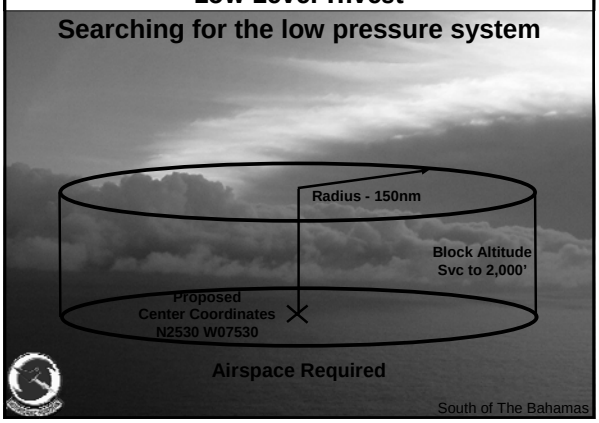
Delay Area



Low Pressure System or a Wave?

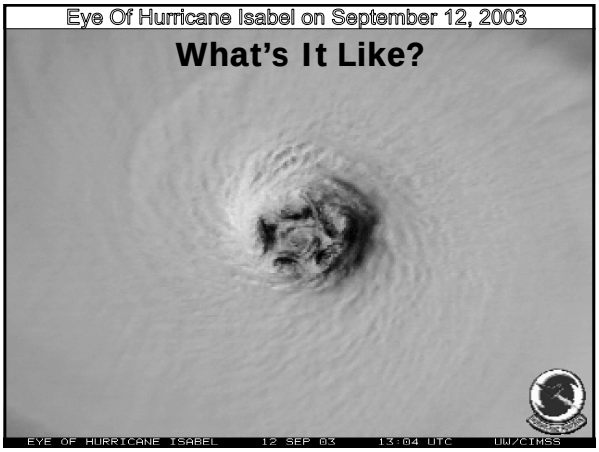
Low Level Invest

Searching for the low pressure system



Eye Of Hurricane Isabel on September 12, 2003

What's It Like?



Challenges to Safe Flight Operations

Maintaining IFR Clearance with ATC Center

Flexibility to Change Delay Area as Storm Changes

De-conflicting with other Air Traffic (Planes & UAV)

Operating in "Warning" or "Restricted" Areas

Operating between 2 different Center's Airspace

IFR Operations

Cannot fly “Due Regard/Operational” anymore

Maintain continuous IFR operations in:
- -Controlled Airspace (Class A – E)
- -Uncontrolled Airspace (Class F or G)
- -Night or Day (24/7 ops)
- -IMC or VMC
- -En route or in Delay Area

Normal ATC Services

Normal IFR Separation from “Other” Aircraft and Traffic Advisories
- -En route and Descent into Delay Area
- -During Delay Operations
- -Recovery and Climb out of Delay Area

Description of Delay Area

Defined by
- -Center Coordinates
- -Block Altitude
- -Radius

Operation between 2 ARTCCs

Operating Procedures in Delay Area

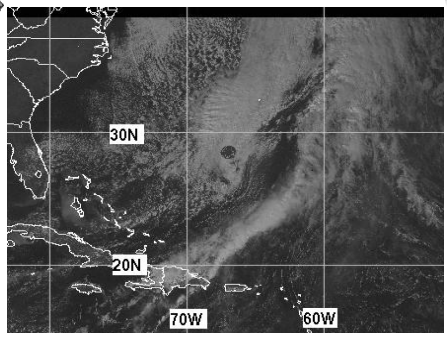
Flexibility to Change or Move Delay Area
- Center Coordinates
- Block Altitude

Receive ATC Clearance to Change Delay Area

No Position Reports but “Ops Normal” calls

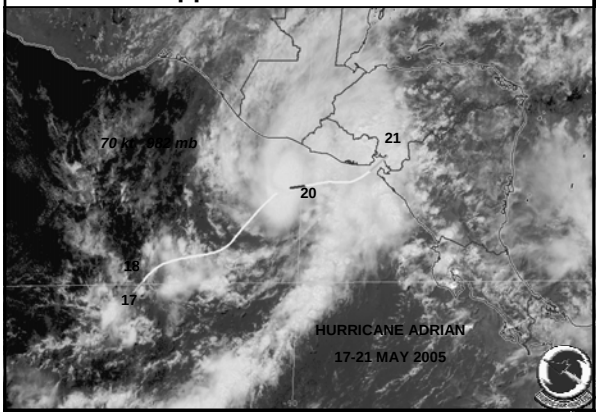
Aircrews are responsible for Obstacle Clearance when below Minimum IFR Altitude (MIA)

Where’s the Hurricane?

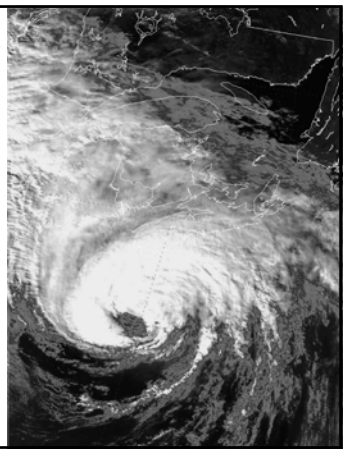


We were in quite a bit of clouds when we made the fix, with no view of the surface.

was never supposed to turn into a Hurricane



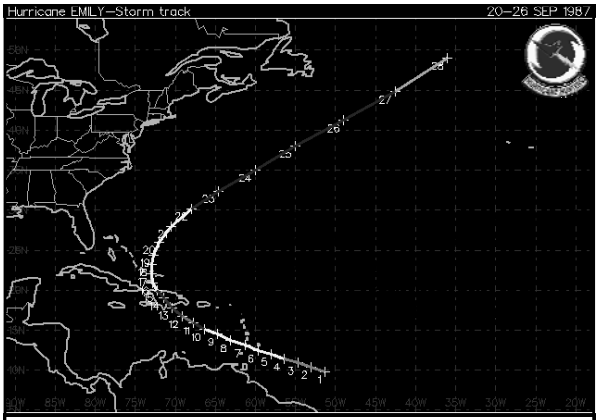
Hurricane Hortense, Nova Scotia, Sept 15, 1996



Normal leg lengths are 105nm from the eye.

Every Storm is different

In HORTENSE we went over 200nm to the NE looking for the end of HURRICANE force winds.



Hurricane Emily (20-26 September 1987)

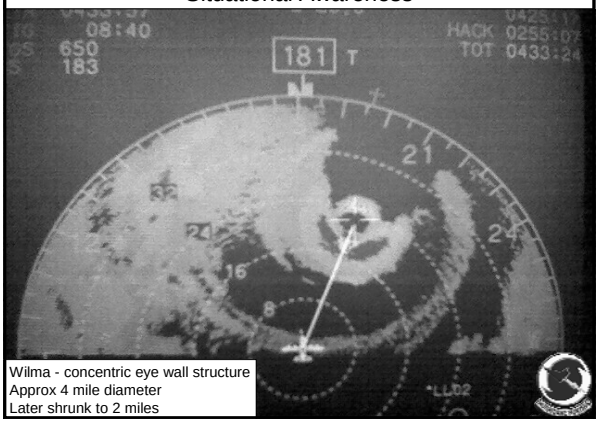
Operating Procedures in Delay Area

Flexibility to Change Delay Area
- Center Coordinates
- Block Altitude

TEAL and NOAA aircraft will
- Provide own separation from each other while in the Delay Area

Aircraft Separation between
- TEAL or NOAA aircraft and
- "Other" aircraft

Situational Awareness



Wilma - concentric eye wall structure
Approx 4 mile diameter
Later shrunk to 2 miles

Communication with ATC

Before Flight – Filing Flight Plan

Before Flight – Coordination with “Warning” or “Restricted” Area Control Agencies

With ARTCCs while in Delay Area
- “Ops Normal” Calls
- VHF or Sat Phone
- HF direct or ARINC relay

With “Other” Aircraft transiting Delay Area

Hazards to Safe Flight Operations

“Other” Aircraft transiting Delay Area

“Warning” or “Restricted” Areas

Helicopter Operations around Oil Platforms

Goals:

Continuous IFR Operations
- **-Maintaining Active IFR flight plan**
- **-Operating between 2 different Center's Airspace (ex. Merida & CENAMER)**

Continuous Communications with ATC
- **-VHF, Sat Phone, HF direct or ARINC relay**

Flexibility to Change Delay Area
- **-Location, Radius, & Block Altitude**

Reduce Hazards to Safe Flight operations
- **-De-conflicting with other Air Traffic**
  - **-Helicopter Operations (PEMEX)**
  - **-Warning & Restricted Areas**
  - **-Airways & Airports**