



International Civil Aviation Organization

NORTH AMERICAN, CENTRAL AMERICAN AND CARIBBEAN OFFICE

Regional North American/Caribbean (NAM/CAR) Air Traffic Management (ATM) Meeting

(Santo Domingo, Dominican Republic, 19-21 April 2006)

NAM/CAR ATM - WP/09

11/04/06

Agenda Item 2: Activities concerning the implementation of an air traffic flow management (ATFM) system.

AIR TRAFFIC FLOW MANAGEMENT (ATFM) IN THE NAM/CAR REGIONS

(Presented by the Secretariat)

SUMMARY

This Working paper presents up-to-date information on the development of ATFM service in the NAM and CAR Regions.

References:

- Report of the Second Meeting of North American, Central American and Caribbean Directors of Civil Aviation (NACC/DCA/2), (Tegucigalpa, Honduras, 11–14 October 2005)
- Report of the Thirteenth Meeting of the CAR/SAM Regional Planning and Implementation Group (GREPECAS/13), Santiago, Chile, 14 to 18 November 2005).
- Results of the NAM/CAR Air Traffic Flow Management (ATFM) Seminar (Tegucigalpa, Honduras, 27-31 March 2006)

1. Introduction

1.1 According to Annex 11, ATFM shall be implemented for airspace where air traffic demand at time exceeds, or is expected to exceed, the declared capacity of the air traffic control services concerned. ATFM should be implemented on the basis of regional air navigation agreements or through multilateral agreements. Doc 4444 indicates the phases that should be observed when implementing ATFM service.

1.2 The Second Meeting of North American, Central American and Caribbean Directors of Civil Aviation (NACC/DCA/2), in view of the increase of air operations, has considered the need for establishing a balance between demand and capacity, and agreed upon a regional strategy so that States, Territories and International Organizations of the NAM/CAR Regions begin coordination activities for the development of a NAM/CAR inter-regional ATFM system, and therefore it adopted the following conclusions:

Conclusion 2/18 - Implementation of Air Traffic Flow Management (ATFM) in the Central American FIR

Conclusion 2/19 – Implementation of the ATFM System in the NAM/CAR Regions

1.3 The Thirteenth Meeting of the CAR/SAM Regional Planning and Implementation Group (GREPECAS/13), formulated, among other, the following conclusions concerning the development of Air traffic flow management (ATFM):

- **Decision 13/64** - *Centralized ATFM Objectives, Principles and Functions and Requirements for its Implementation*
- **Decision 13/65** - *Model Action Plan for ATFM Implementation in the CAR/SAM Regions*
- **Conclusion 13/67** - *ATFM Events*
- **Decision 13/69** - *Efficiency in the Use of Fuel*

2 Discussion

2.1 In the event that traffic demand regularly exceeds capacity or when it becomes apparent that forecast traffic demand will exceed the available capacity the appropriate ATM units, in consultation with aircraft operators, should consider implementing steps aimed at improving the use of the existing system capacity, and developing plans to increase capacity to meet the current or forecast demand.

2.2 In several NAM/CAR Flight Information Regions in the past years, air operations saturation periods have occurred; in some airports there have been traffic increases up to 13%; it is foreseen that this problem will continue growing between traffic flows of the NAM Region from/to the Eastern Caribbean and of the Caribbean from/to Europe, which have kept a continuous growth of operations. Canada, Mexico, United States and other States have taken the initiative of implementing ATFM measures, therefore, it is necessary to update the information of Doc 7030.

2.3 Operators have expressed GREPECAS their concern for the high cost of fuel and since this crisis affects airlines, as well as the fuel savings campaign initiated by IATA, through which service ATS providers have been requested to adopt actions addressed to the achievement of the greatest possible efficiency in the use of fuel, which would undoubtedly help users to overcome the cost problem. GREPECAS has expressed its commitment of taking into account this situation in all its activities aimed at studying and developing new strategies and ATM implementation.

2.4 Air traffic flow management (ATFM) is a service addressed to ensure a balance between air traffic with the declared capabilities and helps air traffic control (ATC) to use to the maximum extent its capacity to serve service demand. In order to attain its objectives, the ATFM unit (FMU) monitors air traffic and, if applicable, issues management initiatives to keep a safe, orderly and timely movement of the air traffic flow.

2.5 The NACC/DCA/2 and the GREPECAS/13 Meetings concluded that the CAR Region, including Mexico, Central America, the Central Caribbean and the Eastern Caribbean are characterized as an homogeneous ATM area with similar operational features and needs, and therefore, as a potential scenario for ATFM implementation, in view that ATFM implementation will have an impact on all the FIRs of the CAR Region, the States, Territories and International Organizations of the NAM/CAR Regions should initiate ATFM coordination activities for balancing ATS demand and capacity.

2.6 The NACC/DCA/2 Meeting recognized that traffic growth in the NAM and CAR Regions represents new conquests and collaboration opportunities to achieve an interoperable regional ATM development. The States and Territories of should review the ATS organization and management allowing an optimization and better flexibility and use of airspace and airports for the benefit of users and service providers. Other aspects to be resolved in the short-term are the following:

- the harmonization of the States' aeronautical rules;
- the development of an ATFM operational procedures manual for its common application in all the regions, including specifications to determine the airport capacity and ATS capacity;
- the improvements regarding surveillance and automated systems for aircraft data processing as well as the development and co-ordination of ATFM messages;
- the effective planning of human resources and required training aspects;
- improvements of traffic forecast;
- improvements of random routes, as well route network programmes; and
- to encourage new operational agreements between ATS users and providers for ATFM implementations, especially in those areas where flow problems are already present caused by the traffic increase.

2.7 In order to improve the efficiency of air operations, the Meeting should foster the updating or establishment of operational agreements between ATS units in the short term and examine other agreements that might be necessary the mid-term. Therefore, the following Draft Conclusion is suggested for the Meeting's consideration:

DRAFT

CONCLUSION NAM/CAR ATM//X

ATFM OPERATIONAL AGREEMENTS

That NAM/CAR States/Territories encourage ATS providers to establish operational agreements among ATS units for ATFM service provision in the NAM and CAR Regions by **30 November 2007**.

2.8 ATFM implementation will facilitate the path towards a seamless global harmonized and inter-operable air traffic management (ATM) system, merging efforts, data, knowledge, ideas, and concepts, and will contribute with great financial benefits, an enhanced safety, an increased ATM system capacity, and effectiveness of air operations. ATFM planning should also take into account the guidelines of the ATM implementation road map of the ICAO Global Air Navigation Plan.

2.9 In order to meet these scheduled regional goals, the NACC Office convened an ATFM seminar in Tegucigalpa, Honduras. Its main purpose was to examine all the aspects related with ATM planning and implementation and to define specific actions for the development and implementation of an ATFM system in the CAR Region in harmony with other Regions. As a result of the seminar, the **Appendix A** includes the requirements for the development of an ATFM procedural manual, aspects to determine the airport capacity and for human resources and training planning.

2.10 The collaborative decision-making (CDM) process facilitates the planning, coordination and the dynamic application of ATFM initiatives for an efficient airspace and airports management, which results in an efficient use of resources and capacities in air operations, as well as in financial benefits for users and ATS providers. CDM also provides an equitable access to information, which in turn facilitates a better planning of air operations at the airports and accommodates the preferred routes of airspace users. CDM should be part of the planning, decision making, implementation and follow-up activities; **Appendix B** includes the basic characteristics of a CDM process.

3. Suggested action

3.1 Bearing in mind the foregoing background, the Meeting is invited to:

- a) note the information presented in this Working paper;
- b) adopt Draft Conclusion mentioned in paragraph 2.7;
- c) provide up-to-date information on the development of the national ATFM implementation plans;
- d) name the points of contact (POC) of the States and Territories who will serve as liaison for the studies of ATFM implementation in the NAM/CAR Regions;
- e) recommend specific actions for the implementation of Air Traffic Flow Management (ATFM) in the NAM/CAR Regions;
- f) recommend the appropriate actions to improve ATS management in the airspace and international aerodromes of the NAM/CAR Regions; and
- h) recommend other actions as appropriate.

APPENDIX A

AIR TRAFFIC FLOW MANAGEMENT TRAINING REQUIREMENTS

Human resources training for ATFM system is determined by the need for acquiring the skills in terms of collaborative decision making considering the ATFM procedures for the NAM/CAR Regionas and the technical and operational agreements.

ATFM Specialists

Supervisors

–ACC

–Tower

Air Traffic Controllers

–ACC

–Tower

Customers

–Airlines

–Air Taxi

–General Aviation

Military coordinator

Airport Authorities

Training material guidelines:

➤ATFM Procedures

➤Technical and Operational Agreements

➤Technology

–Communication systems

–Traffic forecasts (PROSAT)

–Flight Schedule Monitor

➤Technology

–ATFM messages

–Weather

–ETMS

•Sector alerts

•Airport alerts

•Flow Evaluation Areas

–Airspace structure

•High, Low sectors

–Route structure

–Unique factors

- Airport Information
 - Runway and taxiway
 - Airport Acceptance Rate
 - VFR
 - IFR

- Contingency Plans

- CDM process

➤ **Other training factors**

- Lessons learned, sharing and training experiences
- CD and DVD lessons
- ATFM Resources in web pages

HUMAN RESOURCES AND TRAINING PLANNING

- ATM
 - Air Traffic Controller - TWR
 - Air Traffic Controller - APP
 - Air Traffic Controller - Area
 - Air Traffic Controller – Radar/APP
 - Air Traffic Controller Radar/Area
 - ATC Operational Supervisor
 - ATFM coordinator
 - ATC/OJT Instructor
 - ATS airspace planning Officer
 - ATS regulations Officer
 - ATS Quality Assurance Officer
 - ATM Safety Officer
 - ATM internal auditor Officer
 - Search and Rescue (SAR) Officer for RCC or RSC

BASIC CRITERIA:

- AVERAGE OPERATIONS VOLUME
- SHORT AND MEDIUM TERMS (2010/2015)
- INCREMENTS DECREMENTS, AS REQUIRED ARE RECOMMENDED
- AVERAGE PERCENTAGE OF LAST 6 MONTHS
- INCREASE ONE ATCO WHEN THE TOTAL NUMBER IS HIGHER THAN 50%
- DETERMINING REQUIRED PERSONNEL TO COVER WEEK DAYS OFF, VACATION PERIODS AND OTHERS
- JUSTIFY CHANGES FOR OTHER FACTORS
- COVER POSITIONS IN ACCORDANCE WITH ATS UNIT PURPOSES
- TRAFFIC CONDITIONS, SPECIALLY PEACK TIME PERIODS
- AVOID TO AFFECT TRAFFIC
- EQUITY DISTRIBUTION OF WORKLOAD
- ATCOS AVAILABLE IN JOURNEY PERIOD TIME

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AVERAGE OPERATIONS THAT ATC PERSONNEL (ACC) MAY HANDLE IN ONE SHIFT (8 HRS)

E.g. RADAR DUTIES:

➤Tc	=	COMMUNICATION TRANSFER	30"
➤COM	=	COMMUNICATION (INSTRUCTIONS)	75"
➤C	=	SEPARATION	<u>45"</u>
			150"

$$C = \frac{3600}{TC+COM+S} = \frac{3600}{150} = 24 \text{ OPS/h}$$

$$24 \text{ OPS} \times 8 = 192$$

AVERAGE OF OPERATIONS THAT ATC PERSONNEL (ACC) MAY HANDLE IN ONE SHIFT (8 HRS)

NON RADAR DUTIES

■COR	=	COORDINATION
■CO	=	COMMUNICATION
■S	=	SEPARATION
■TCO	=	COMMUNICATION TRANSFER

$$C = \frac{3600}{COR+CO+S+TCO} = \frac{3600}{240} = 15 \text{ OPS/h} : 105$$

APPENDIX B

COLLABORATIVE DECISION MAKING (CDM) PROCESS (Doc 9854)

The purpose of Collaborative decision-making is satisfy the convened levels of capacity and efficient use of resources, and allows that all members of the ATM community, especially airspace users, to participate in ATM decision-making that affects them. The level of participation reflects the level to which the decision will affect them.

Collaborative decision-making applies to all layers of decisions, from longer-term planning activities through to real-time operations. It applies across all concept components of the ATM system and is an essential element to achieving an acceptable solution, which takes into account the needs of those involved. ; the rules for determining priorities for access to an ATM resource will have been collaboratively agreed in advance, applied both actively and, through agreed procedures, passively.

Effective information management and sharing will enable members of the ATM community to each be aware, in a timely manner, of the needs, constraints and priorities of other members in relation to a decision-making issue. Collaborative decision making can occur between airspace users directly, without any involvement of an ATM service provider. Any member of the ATM community can propose a solution

Where a service provider is involved in collaborative decision making because of a requirement of the ATM system, it is often the ATM service provider who will propose a solution for consideration of the airspace user, as the service provider is aware of the requirements of other users and service providers and the collaboratively agreed rules for resolving competing requests for an ATM resource. However, because it is an information rich environment where the airspace user may have access to the same information as the service provider, the airspace user will understand why the particular solution is proposed.

A user can propose an alternative solution that addresses a user's preference that is not known to the service provider. In the same way the service provider can reject the user's proposed solution because of an ATM requirement that the user is not aware of.

Information management

Information management aims at integrating the ATM network in the information sense, not just in the system sense, forms the basis for the migration from past one-to-one message exchange concept to the future many-to-many information distribution , to geographically dispersed sources which collaboratively updating the information, with many geographically dispersed destinations.

Information managing the quality, integrity and accessibility of this complex, growing web of distributed will ensure that the information needs of ATM stakeholders, both within as well as outside the ATM network, will be satisfied in a much more flexible and cost-effective manner than previously.

Decision-making is a normal operational process, but decisions will be of a better quality and engender greater confidence because accurate and validated information in the right form, in the right place and at the right time. An open systems environment and better information management will allow information sharing on a much wider basis than hitherto, and will support a permanent dialogue between the various partners, throughout all phases of flight.

Automated systems are big support for CDM and ATM en-route services. The aim of these systems are conformance and safety monitoring.

Phases of flight

Trough CDM in the departure and landing phase of flight, ATM service delivery management might ensure that flights can get to the runway in time for their take-off slot and at the same time to integrate them with all the other departing and arriving flights in order to ensure safety and to optimize the use of the parking locations, ramps, taxiways and runways. The ATM service delivery management will ensure that service providers are given access to real-time data on projected arrivals and departures, runway loading, airport congestion, parking locations and environmental considerations, in order to reduce the inefficiencies in aircraft and vehicle movements. Within the en-route phase of flight, ATM service delivery management will be involved in matching ATM service capabilities with demand — e.g. traffic flow characteristics — by a range of means, including, inter alia, dynamic re-sectorization in ATM service centres, changes to route structures or airspace organization, or changes to conflict management modes.

During the course of a flight — from its inception at a scheduling or planning stage, through its actual operation, to its completion at an arrival parking location

- a) planning — integration into the ATM environment to achieve a close match between user preferred trajectory and system delivered trajectory;
- b) ramp — moving of the aircraft in and out of the parking locations;
- c) surface-departures — moving aircraft from ramp to departure queue;
- d) departure — the departure queue and the runway are managed to launch aircraft from the queue into the airspace;
- e) dispersion — where aircraft get up and out of the terminal into the en-route structure;
- f) cruise — in which the aircraft is at altitude and moving towards its destination, but it is not yet subject to actions related to its arrival phase;
- g) collection — the state in which aircraft are sequenced and spaced to bring them into the terminal area for arrival;

- B3 -

- h) approach — in which aircraft are assigned to runways and onto the surface;
- i) surface-arrival — moving aircraft off runways and to the ramp; and, once again
- j) ramp — working the aircraft into the parking location.

- END -