International Civil Aviation Organization
Fourteenth Meeting of the CAR/SAM Regional Planning and Implementation Group (GREPECAS)
San Jose, Costa Rica, 16-20 April 2007

Agenda Item 2: Analysis of global, inter- and intra-regional activities

2.1: Interregional and intra-regional CNS/ATM activities and coordination

NORTH AMERICAN AIR TRAFFIC FLOW MANAGEMENT

(Presented by the United States of America)

SUMMARY

A primary objective of this paper is to recognize the excellent work accomplished by the ATFM Task Force in preparing the Caribbean/South American ATFM Concept of Operations (CAR/SAM ATFM CONOPS). The Task Force identified and organized the vast majority of elements that form an ATFM system. This paper strives to build on the Task Force's work by highlighting the fact that many of these ATFM elements have been developed, tested, and implemented in other States and regions. Both Air Traffic Service Providers and customers in the CAR/SAM regions can now take advantage of the ATFM development work and lessons learned that have already been accomplished in other States and regions.

The **Appendix** to this paper follows the same content format as the ATFM/TF/2 CAR/SAM ATFM CONOPS which includes sections on: **Objectives of a Centralized ATFM Command Center; Principles in Which ATFM Will Be Based; Functions of a Centralized ATFM Command Center; Equipment and Personnel Requirements for Flow Management Unit/Flow Management Position (FMU/FMP) and the Centralized ATFM;** and **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 the Federal Aviation Administration (FAA), NAVCANADA National Operations Centre (NOC), and Centro de Control de Flujo de Mexico (CCFMEX).

1 Introduction

1.1 At the second meeting of the ATFM Task Force of the GREPECAS ATM/CNS Subgroup, ATM Committee, the group prepared a draft Caribbean/South American ATFM Concept of Operations (CAR/SAM ATFM CONOPS). The document was then presented as a Working Paper in November 2006 at the ATM/CNS/SG5 Meeting in Lima, Peru. The Draft CAR/SAM ATFM CONOPS is a high-level document that will assist and guide planners in the design and development of ATFM in the CAR/SAM regions.

1.2 This paper endeavors to build on the Task Force's excellent work by highlighting the fact that many elements of ATFM have been developed, tested, and implemented in other States and regions. Air Traffic Service Providers, customers, and other system stakeholders in the CAR/SAM regions can now benefit from the ATFM development work and lessons learned by other States and regions. Some of these key lessons learned, as well as some of the significant operational benefits, are listed below. This information is drawn from the ATFM work and coordination accomplished to date by the Federal Aviation Administration Air Traffic Control System Command Center (ATCSCC), NAVCANADA National Operations Centre (NOC), and Centro de Control de Flujo de Mexico (CCFMEX).

1.3 Again, this paper highlights the important "lessons learned" and also notes the operational benefits that have been realized, to date, by other States and regions.

2 Lessons learned

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

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

   We have learned the hard way that excluding these participants in the early stages of ATFM development results in an inferior product. The ideas and insights that the various stakeholders bring to the table are enormous and valuable.

   For example, our customers have contributed numerous ideas and suggestions regarding the management of transcontinental flights. Early in the development process, FAA air traffic managers provided customers with very limited options for transcontinental routes. But based on their input over the years regarding wind issues and fuel concerns, customers now have the flexibility to file best wind routes for these long-haul flights.

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 Process (CDM) 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 slot issues had to be evaluated and addressed before flow solutions could be reached.

3 Operational Benefits

3.1 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.

4 Conclusion

4.1 The ATFM Task Force/2 created a comprehensive draft CAR/SAM ATFM CONOPS. The Task Force identified and organized the vast majority of elements that form an ATFM system. An important next step is to recognize the fact that many of these ATFM elements have been developed, tested, and implemented in other States and regions. Air Traffic Service Providers and customers in the CAR/SAM regions can take advantage of the ATFM development work and lessons learned that have already been accomplished in other regions.

5. Recommendation

5.1 The Meeting is invited to:

a. review the draft CAR/SAM ATFM CONOPS taking due note of:

1) the ATFM lessons learned; and

2) operational benefits already realized by other regions; and

b. consider using a flexible time frame for the various development steps contained in the draft CAR/SAM ATFM CONOPS.

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APPENDIX

The Appendix to this paper 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 the Federal Aviation Administration (FAA), NAVCANADA National Operations Centre (NOC), and Centro de Control de Flujo de Mexico (CCFMEX).

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 FAA 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:
ARTCCs, TRACONs, ATCTs
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 FAA directive (FAA Order 7210.3), the ATCSCC is given the authority to monitor, direct, and manage the daily flows of air traffic through the National Airspace System.

The ATCSCC works in conjunction with system stakeholders to:

Monitor and analyze weather patterns for system impact.

Implement national traffic management programs.

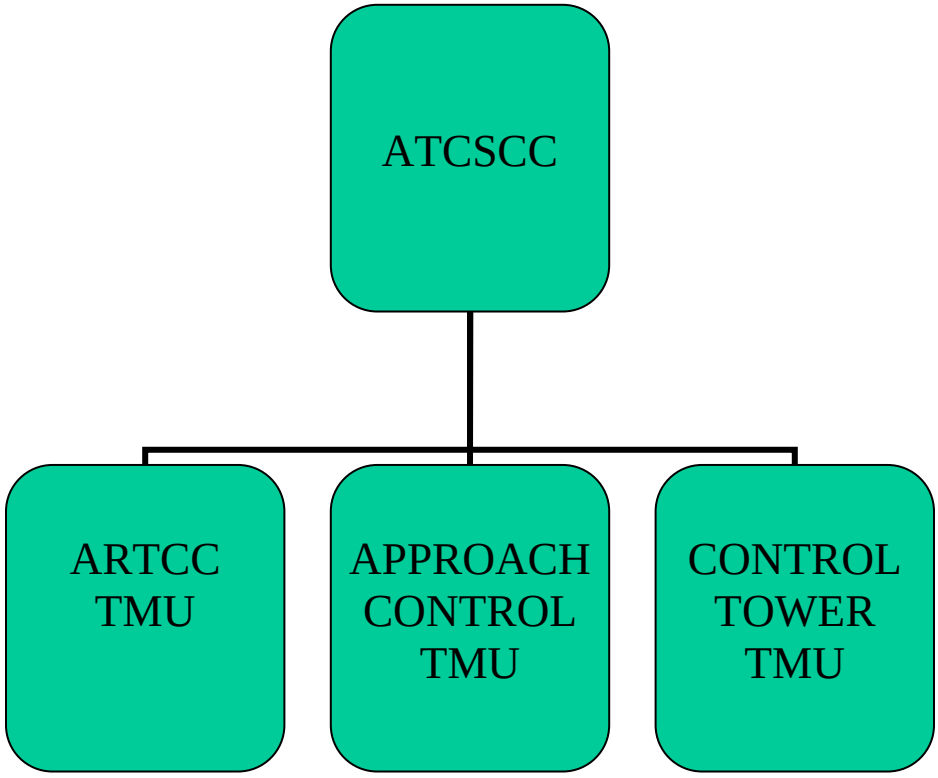
Determine when national airspace capacity is, or will likely be, reduced to the extent that implementation of national traffic management initiatives will be required.

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 ATCSCC with ensuring system safety, efficiency, and effectiveness.

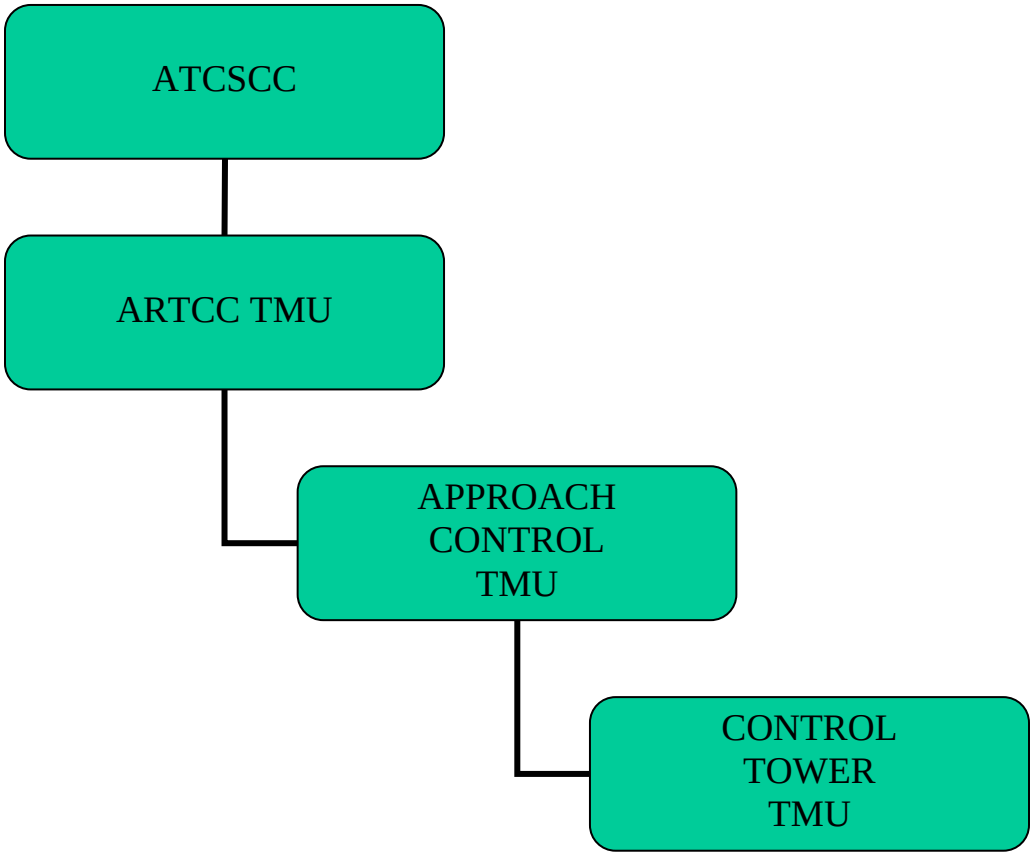


In day-to-day operations, and in most circumstances:

ARTCC TMUs coordinate through the ATCSCC to implement traffic management initiatives that impact adjoining ARTCCs.

Approach Control TMUs coordinate traffic management initiatives through the overlying ARTCC.

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



The ATCSCC, however, has the authority to coordinate directly with the TMUs at ARTCCs, Approach Controls, and Towers.

Based on a bilateral agreement with NAVCANADA, 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:

ATCSCC

Equipment: Enhanced Traffic Management System (ETMS), Flight Schedule Monitor (FSM), Traffic Situation Display (TSD) monitor and alert function, Route Management Tool (RMT), Traffic Situation Display (TSD) weather products, Collaborative Convective Forecast Product (CCFP), conference phone system, Operational Information System (OIS web page)

Operational personnel: National Operations Manager (responsible for oversight of the entire operation, per shift); National Traffic Management Officer (the operational supervisor); and Traffic Management Specialist (interfaces with the field traffic management units); Customer Liason; Weather Specialist; NOTAM Specialist; Military Liason; Flight Check Coordinator; Technical Operations Coordinator.

ARTCC Enroute Traffic Management Unit

Equipment: ETMS, FSM, TSD monitor and alert function, RMT, TSD weather products, CCFP, operational phone system, access to www, access to live radar data

Operational personnel: Supervisory Traffic Management Coordinator (responsible for the oversight of the traffic management unit operations and interfaces with the ATCSCC), Traffic Management Coordinator (interfaces with the operational control room and with delegated airport traffic control towers)

Terminal Traffic Management Unit (Approach Control and Tower TMUs)

Equipment: ETMS, TSD monitor and alert function, TSD weather products, CCFP, operational phone system, access to live radar data

Operational personnel: Supervisory Traffic Management Coordinator (responsible for the oversight of the traffic management unit operations and interfaces with the ATCSCC), Traffic Management Coordinator (interfaces with the operational control room and with delegated airport traffic control towers)

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 FAA 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.

Enroute facility TMUs

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

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

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

Establish an analysis and quality assurance function.

Terminal facility TMUs

Balance the arrival flow and tower enroute flow by coordinating with the Enroute facility TMU and any adjoining Terminal facility TMUs to ensure that demand does not exceed capacity.

Establish the AAR and coordinate with the Enroute facility TMU and any adjoining Terminal facility 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.

- END –