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Transition to the CNS/ATM Systems in the CAR and SAM Regions

Tenth Meeting/workshop of Air Traffic Management (ATM) Authorities and Planners of the CAR and SAM Regions (AP/ATM/10)

(Lima, Peru, 10 to 14 May 2005)

Agenda Item 5: ATFM Implementation in CAR/SAM Regions

Air Traffic Flow Management (ATFM)

(Presented by Brazil)

Summary

This working paper presents the already installed Air Traffic Flow capacity at the Air Navigation Management Center (CGNA) in São José dos Campos, Brazil, after Phase 1 of its implementation process was concluded, aiming at giving support to the Air Traffic Flow Management of CAR/SAM Regions.

References:

1. Report on ICAO's Eleventh Air Navigation Conference, Montreal, September 2003;
2. ICAO's Annex 11, Air Traffic Services
3. ICAO's PANS/ATM Doc. 4444, Air Traffic Management;
4. ICAO's Doc. 9426, Manual of Air Traffic Services Planning;
5. Air Navigation Plan (ANP) of CAR/SAM Regions;
6. CAR/SAM Regional Plan for the implementation of CNS/ATM Systems;

1. Introduction

1.1. The need for implementation of a Centralized Air Traffic Flow Management System in Brazil appeared in the middle of the 90's, right after the verification of excessive air traffic movements, compared to the existing capacity in some portions of the airspace and, in particular, in the most important Brazilian domestic airports, localized in the country's southeast region, such as: São Paulo/Congonhas, Belo Horizonte/Pampulha and Rio de Janeiro/Santos Dumont Airports.

1.2. In March, 1996, a working group was created to start the discussions about the implementation of the Centralized Air Traffic Management in Brazil; at that occasion some no systematized flow management measures were systematized and, from then on, they have been used in some specific ATFM operations and in season events of great air traffic flow, such as: Carnival, Celebration of the 500th anniversary of Brazil's discovery, Presidential inauguration, etc. In 1998, the Brazilian ATFM Core was created; it is a specific building for specific activities of Air Traffic Flow Management in events of great flow.

1.3. Based on the accumulated experience, it has been possible to develop the Operational Concept of the Air Navigation Management Center, which increased the ATFM Core attributions, including other functions, such as Airspace Management, Air Navigation Services Operation Monitoring and Safety Monitoring. It has been established the basis for the automation of every process, using a specific software. At that moment, it has been very important the FAA's support, including some visits to the Air Traffic Control System Command Center (ATCSCC) and consultation to FAA's several pertinent documents. Besides, it has also taken place a visit to EUROCONTROL's Flow Management Central Unit (CFMU).

1.4. As from 1999, a software prototype has been developed to be used at the CGNA, based on the requirements established in the Brazilian ATM Operational Concept, beginning the process automation.

1.5. After going through a long development process, that software, as from the second semester 2004, the Operational System of the CGNA, named SYNCROMAX, already encloses some tools which allow its operational use, with a few limitations, considering that tools to support the decision making process are still in a development phase. Nevertheless, the operational application of the system, besides of allowing some air traffic flow management measures, that will be described next in this working paper, represents an indispensable stage to its own validation and to the improvement of the specifications for new functionalities.

2. General Aspects of the Brazilian ATM Operational Concept

2.1 In general, the Brazilian ATM Operational Concept foresees that the CGNA shall be able to accomplish the following activities:

a) Make a follow-up of Air Navigation Services provided by the Department of Airspace Control (DECEA);
b) Evaluate the operational impact of outages on the aeronautical and airport infrastructures capacity.
c) Adopt coordination operational measures in order to adjust air traffic movements to the aeronautical and airport infrastructures capacity.
d) Verify the air traffic flow management measures;
e) Adopt measures addressed to the flexible use of airspace, including the necessary coordination to activate airspaces of special use.
f) Conduct the Collaborative Decision Making process to the providers and aircraft operators;
g) Coordinate the reestablishment of aeronautical and airport infrastructure elements, considering the operational criteria.
h) Monitor safety in new structures of airspace, according to ICAO standards.
i) Coordinate the establishment of capacity values related to the aeronautical and airport infrastructures.
j) Analyze the proposed regular flights, evaluating their impact on the established capacities.

2.2 The Brazilian ATM Operational Concept preconizes that the operational implementation be accomplished by Phases taking into consideration all CGNA activities. Nevertheless, it considers the following capacitation sequence:

a) 1st. Priority - Acquire Capacity of Air Traffic Flow Management;
b) 2nd. Priority - Acquire Capacity of Airspace Management; and
c) 3rd. Priority - Acquire Capacity of Safety Operational Monitoring

2.3 The Brazilian ATM Operational Concept indicates that each phase will be implemented based on Technical Configurations, Descriptive Documents of Operational Models and Systems set up as required to materialize the established strategy.

2.4 In general, the Phases were established as follows:

a) Phase 1 – To make it possible to adjust air traffic movements to the available infrastructure capacity;
b) Phase 2 – To make it possible to attend the demand of air movements by means of improving capacity.

3. Already installed capacity at the CGNA

3.1 Phase 1 of CGNA's implementation, that should be concluded in June 2005, has involved the following activities:

a) Civil Constructions in the Building;
b) Installation of energy, air conditioning and communications;
c) Definition of functional "Lay-Out";
d) "Hardware" Installation (CGNA and CARSAMMA);
e) Networks definition and installation (operational and administrative);
f) Implementation of the Slot Integrated Central (SIS) with the referred support system (ASIS) Airport Slot Integrated System);
g) Implementation of the Repetitive Flight Plans Central (RPLC);
h) Implementation of Flow Management Cells (FMC) at Curitiba and Brasilia ACCs and at Belo Horizonte, São Paulo and Rio de Janeiro APPs;
i) Implementation of the Visualization and Treatment System for Air Navigation Management, named "SYNCROMAX", composed by the following Subsystems:
    - Flight Intention Data Treatment Subsystem – FPS;
    - Airport and Geographic Data Subsystem – GDS;
    - Situation Analysis Subsystem – SAS;
    - HOTRAN Management Subsystem – HMS;
    - Outages Management Subsystem – SGI;
    - System General Parameters;
    - Regulated Elements; and
    - Aircraft Performance;
j) "Software" Validation with National Radar Synthesis Visualization (ASD module);
k) SISNOTAM Integration;
l) Delivery of the "Software" Documentation
m) Personnel Training and assisted operation.

3.2 Operational Capacity after implementation of phase 1:

3.2.1 Once the implementation of the functionalities and systems mentioned in item 3.1 is concluded, the following services can be provided:

a) Routine analysis of Air Traffic Demand and Aeronautical Infrastructure Capacity, comprising their several elements, allowing to know, strategically and all over the country, the impacts caused by air traffic movements on airports and on control sectors. Then, it will be possible to determine when, where and how airspace users can operate and to estimate the eventual restrictions to the operations in a specific portion of airspace or airport.
b) Use of anticipated information about the load in the system, scenario situation and available resources, viabilizing efficient air traffic flow management, being this the first step to implement the collaborative decision making processes. (CDM).
c) In specific cases, by the previous knowledge of capacity and demand, it will be possible to increase the capacity of a critical element to attend the demand.
d) Users affected by situations in which the system has no sufficient capacity to attend the demand will be warned with a minimum anticipation of 3 hours, including in this information details about the restrictions to be applied.
e) There will be a continuous register of reasons that originated flow control, as well as an evaluation of the impacts occurred, in order to provide due information for necessary actions, avoiding this event keeps occurring indefinitely. Besides that, it will be possible, as from the radar synthesis visualization, the verification of the quality related to the services provided and of the adopted flow measures efficacy.
f) From the available data on airport and aeronautical infrastructure elements, it will be possible to execute the System Operational Monitoring, aiming at evaluating the unavailability impact, partial or total, of any of these elements on the airport and aeronautical infrastructure capacity.

4. General Aspects of CGNA implementation - Phase 2

4.1 The requirements specification of CGNA implementation – Phase 2 has already been initiated based on the knowledge acquired in Phase 1 and shall be improved based on the operational experience derived from the supply of the services mentioned on item 3.2.1. The new requirements established for the CGNA, so far, and that will be gradually implemented till 2008 are:

a) Integration of the Air Situation Presentation System to SYNCROMAX.
b) Centralized initial processing of flight plans.
c) Integration of the Control Tower Management System (CTMS) to SYNCROMAX.
d) Automation and integration of the Flow Management Cells (FLMC) to SYNCROMAX.
e) Monitoring of the system operation through the identification and control of outages.
f) Implementation of the military operation coordination cell, aiming at a flexible use of airspace.
g) Integration of meteorological information to SYNCROMAX, including the definition of the meteorological information recollection means, the evaluation of the impact caused by meteorological phenomena in the Airport and Aeronautical infrastructure capacity.
h) Development and integration of new tools designed for Airspace Management.
i) Development and integration of new tools designed for air operations safety monitoring.
j) Integration of the Slot System to SINCROMAX.

5. Suggested Actions

5.1 The meeting is invited to take note of the information provided on this Working Paper and to consider the present situation of the Air Navigation Management Center development within the Centralized ATFM Strategy at CAR/SAM Regions.