



## INTERNATIONAL CIVIL AVIATION ORGANIZATION

**TWENTY-SECOND MEETING OF THE  
ASIA/PACIFIC AIR NAVIGATION PLANNING AND  
IMPLEMENTATION REGIONAL GROUP (APANPIRG/22)**
**Bangkok, Thailand, 5-9 September 2011**
**Agenda Item 3: Performance Framework for Regional Air Navigation Planning  
and Implementation**
**3.2 ATM/AIS/SAR**
**AIR TRAFFIC FLOW MANAGEMENT –  
INDIA’S INITIATIVE WITH GLOBAL PERSPECTIVE**

(Presented by India)

**SUMMARY**

This paper relates to India’s perspective in establishing ATFM in the State, the various guidelines and principles of ATFM stipulated by ICAO on ATFM and the need for the States to ultimately adopt an integrated ATFM (I-ATFM) enabling seamless airspace and harmonized gate-to-gate operations.

**Strategic Objectives:**

*A: Safety – Enhance global civil aviation safety*

*B: Environmental Protection and Sustainable Development of Air Transport – Foster harmonized and economically viable development of international civil aviation that does not unduly harm the environment*

**Global Plan Initiatives:**

GPI-6 Air Traffic Flow Management

**1. INTRODUCTION**

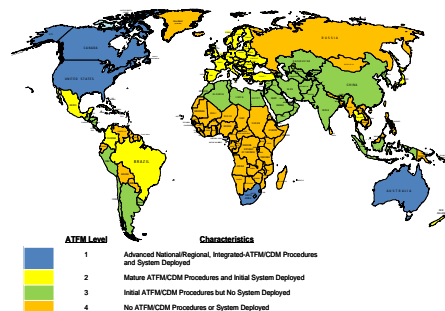
1.1. The strong economic development in India offers challenges and opportunities to the organizations involved in offering the infrastructure to guarantee expansion and growth of air traffic today and in the future. Airports Authority of India (AAI) is a key player in offering, supporting and facilitating the technical and process infrastructure for this economic development. Where the technology upgrade process is underway, focusing on bringing optimization and efficiency gains to the Indian and Regional Aviation System and the core stakeholders is of vital importance.

1.2. India is the 9th largest aviation market in the world. Opportunities in the Indian airports infrastructure modernization and development market, finds that the number of air travel passengers are expected to increase from 102.73 million in 2008 to 290.19 million by 2014, at an annual growth rate of 15%. International passenger volume alone is expected to reach 50 million by 2015. With the strong growth in the International and Domestic aviation markets, the need for I-

ATFM is felt on a daily basis. Passenger delays and unnecessary holding in the airline operation leads to dissatisfaction and excessive cost and an unnecessary impact on the environment, both in time and cost efficiency and a large carbon footprint.

## 2. ATFM -GLOBAL PERSPECTIVE

The world market is shifting towards the adoption of I-ATFM based on Collaborative Decision Making (CDM) principles. The level of ATFM and the characteristics range from absence of ATFM/CDM procedures to system deployed through initial, mature, and advanced procedures and system deployment. The Global Map shows that there are many countries still do not have the ATFM procedures in place and some of the states have the procedures but no ATFM System is deployed.



## 3. ATFM -INDIA'S PERSPECTIVE

### 3.1.1. THE NEED FOR ATFM IN INDIA

3.1.2. Air Traffic Management (ATM) is an integrated and collaborative process involving the fundamental processes of ATM: (1) provision of Air Traffic Services (ATS); (2) Airspace Management (AM); and (3) Air Traffic Flow Management. Within India today, ATM's emphasis has been on provision of ATS and Airspace Management. India is increasing its capabilities and capacity of the air traffic system and paying increasingly more attention towards the ATFM component.

3.1.3. India needs to satisfy this increased demand while operating under difficult weather constraints (e.g., extensive and long-lived fog, turbulence and convective weather associated with monsoons and the occasional cyclonic storms), and living within the national security constraints that result from the extensive airspace used exclusively by the Indian military.

3.1.4. The current air transportation situation in India experiences periods of significant delay associated with high demand routes (e.g., Mumbai-Delhi). Excessive airborne holding is routine occurrence resulting in increased controller/pilot workload with the associated increase in fuel consumption and emissions. These bottlenecks will be eliminated with the application of existing and proven solution into the next optimization of C-ATFM for the entire system in India. The proposed C-ATFM System will balance demand and capacity in Indian airspace and airports for most efficient operations that will include both international and domestic traffic.

3.1.5. Today, the primary method for long-term balancing demand with system capacity is to restrict demand by allocating a fixed number of arrival/departure slots to scheduled aircraft operating into and out of India's major, congested airports. Slot allocations are made on a quarterly basis, with the numbers adjusted for seasonal weather and traffic conditions. The slots equitably distribute the restricted airport and airspace capacity to aircraft operators. Short-term (e.g., during a flight day) balancing is accomplished by air traffic control (ATC) imposing delays on aircraft and airlines' decisions to divert to alternate airports during periods of weather-restricted capacity. Weather information and airport capacity information is not made available to ATC and flights through an integrated system. Each party makes independent decisions about how to restrict and manage flights during problem periods. This often results in less than optimal utilization of available airspace, airports, and aircraft resources.

### 3.2. ATFM OPERATIONS-IMPLEMENTATION PLAN

3.2.1. The proposed C-ATFM System would provide ANSP and Aircraft Operators with a decision support capability to safely, efficiently, and predictably manage demand when it exceeds capacity at constrained resources within the ANSP area of responsibility. Capacity/Demand imbalances can be identified and addressed in the Strategic, Pre-Tactical, and Tactical phases of ATFM.

3.2.2. **Stage 1:** The C-ATFM Baseline would be in place by end of 2011. This would provide AAI and Aircraft Operator Users with significant capabilities to perform strategic, pre-tactical, and tactical ATFM and CDM associated with sectors demand of Indian Airspace and arrivals into grade:1 and 2 airports [six (6) airports]: *Chhatrapati Shivaji International Airport in Mumbai, Indira Gandhi International Airport in New Delhi, Chennai International Airport, Netaji Subhash Chandra Bose International Airport in Kolkata, Bangalore International Airport, and Rajiv Gandhi International Airport in Hyderabad.* With access to aircraft operator schedule data via the Official Airline Guide (OAG) and/or directly from the aircraft operators and operational flight data from AAI's ATC Automation System, strategic and pre-tactical demand predictions are provided to AAI to determine periods of excess demand compared to the available capacity. C-ATFM for ANSP provides capabilities to model and implement Traffic Management Initiatives (TMIs) to smooth the demand to the available capacity via Ground Delay Programs. TMIs are shared with aircraft operators as an integral part of the CDM process. For periods of significant, unexpected capacity reductions, Ground Stop TMIs can also be modeled and implemented. Once a TMI is implemented, C-ATFM for ANSP will provide updated demand predictions to monitor TMI performance. Updated predictions are driven by tactical flight data updates from AAI as well as flight specific updates provided by aircraft operators. Aircraft Operators are provided capabilities to perform schedule management adjustments (e.g., slot substitutions) to optimize their operations consistent with the available capacity determined by AAI and the constraints of the TMI. C-ATFM for ANSP provides a web-based interface for Aircraft Operators in addition to the Enhanced Substitution Module interface for advanced scheduled management functions. C-ATFM for ANSP provides real-time and post operational reports to help AAI and their stakeholders evaluate system performance and lessons learned. In addition to the operational capabilities, C-ATFM for ANSP provides System Administration and Adaptation Management functions to monitor and control the operational system and support the preparation and validation of system reference data.

3.2.3. **Stage 2:** Nationwide ATFM System covering grade: 3, 4 and 5 airports would be a fully operational architecture and an expanded use of C-ATFM for ANSP to support ATFM/CDM for airspace programs and arrivals into airports throughout India. Future functionality is driven by customer needs and advances in ATFM, hence some key functional enhancements for including departure programs of additional airport and airspace flow programs to complement the proposed airport arrival programs in phase 1.

3.3. **Stage 3:** The specific functionality will be defined in collaboration with the international ANSP necessary to support the international ATFM integration identified by AAI. These integrations can be thought in several ways. In case an adjacent FIR of another country is not controlled by an ATFM System, this FIR can be included in AAI's C-ATFM System. In the case adjacent FIRs or countries would have their own ATFM System, a system to system integration can be provided to improve efficiencies across both ATFM Systems. There is no specific time line planned to introduce this phase.

3.3.1. Development of ATFM capability in India will be consistent with guidance issued by the International Civil Aviation Organization (ICAO) in the document entitled "Demand and Capacity Balancing". The total aircraft movement (Arrivals & Departures) in Airports per day is around 5200. The ATFM service must take measures to ensure a balance exists between air traffic demand and the declared capacities and help ATC to use, to the maximum extent possible, its capacity.

3.3.2. A key part of the future ATFM concept is Collaborative Decision Making (CDM) which helps ATC achieve its goal of managing the ATC System and the operators achieve their goal of managing their schedules. The result of CDM is a shared situational awareness and collaborative resolutions for “win-win” solutions for both ATC and stakeholders. Collaboration leads to enhanced options, resulting in improved decision making, stakeholder acceptance and support, and increase service performance.

#### **4. ORGANISATIONAL STRUCTURE OF ATFM**

4.1. The positions, units namely **Central Command Centre, Area Control Centre Traffic Management Unit (ACC TMU), Terminal (Approach) Traffic Management Unit (APP TMU), Airport ATC Tower Traffic Flow Management Unit (TWR TMU)** and facilities engaged in ATFM in air traffic operation facilities around the country will fulfill their responsibilities as a part of the nationwide ATFM system.

#### **5. AGENCIES RELATED TO ATFM**

5.1. **Regulation and Policy Makers of Civil ATFM:** Ministry of Civil Aviation and Director General of Civil Aviation.

5.2. **Airlines and Other Aviation Service Providers:** Air Traffic Operations Coordination Positions inside their AOCs and other aviation service providers are to collaboratively coordinate air traffic issues with the ATS provider.

5.3. **Airports:** Air Traffic Operations Coordination Position of an airport located inside the airport operations control centre is a contact point for airport operation control units which would directly contact ATM facilities.

5.4. **Military:** The Air Traffic Operations Coordination Position of the military is located within the military to communicate with civil aviation and feedback information required by civil aviation and advises civil aviation of relevant flights of military aviation, and their airspace use.

5.5. **Neighbouring Countries and Countries Having Close Aviation Contact with India:** There should be a fixed contact system between India and its neighbouring countries, as well as countries and regions having close aviation contact with India for better communication and coordination on international flow problems and ATFM methods for achieving international CDM and solving cross-border ATFM problems effectively.

#### **6. USER BENEFITS**

The anticipated benefits of C-ATFM when implemented in six Metro Airports calculated based on the recent data collected on Air/ground delays:

- Substantial reductions in Air/ground delays in 5 metro airports per year would be 142845 minutes;
- 6 million kilogram of fuel savings annually;
- 18 million kilograms of reduction in carbon dioxide emissions per year; and
- 9 million USD of airline costs savings annually.

**7. ACTION BY THE MEETING:**

The meeting is invited to:

- a) note the concept of ATFM operations presented by India;
- b) reate a point of contact by the neighbouring states to keep close communication and coordination on international flow solutions with India ATFM; and
- c) Actively consider implementing C-ATFM, in a fully coordinated manner to reap the benefits for all its stakeholders and to achieve international CDM and solve cross-border ATFM problems effectively and further allow a better flow of traffic from east to west and vice versa across the region.

— END —