International Civil Aviation Organization

Eleventh Meeting of the Asia/Pacific Air Traffic Flow Management Steering Group (ATFM/SG/11)

Video Teleconference, 12 – 16 July 2021

Agenda Item 4: Review of Current CDM/ATFM Operations and Problem Areas

C-ATFM SYSTEM- FUTURE PLANS

(Presented by India)

SUMMARY

This paper presents a brief version of planned future upgradations of Central Air Traffic Flow Management System (C-ATFM) in India.

1. INTRODUCTION

1.1 Airport Authority of India (AAI) has implemented Central Air Traffic Flow Management (C- ATFM) system covering entire Indian airspace.

1.2 The C-ATFM system network architecture consists of a Central Command and control Center (CCC) and various Flow Management Positions (FMP) placed at ATC units of major airports across the country.

1.3 The CCC was established in 2017 at Delhi along with FMPs at six major ATC centers such as Delhi, Mumbai, Chennai, Kolkata, Bengaluru and Hyderabad. The C-ATFM system is now supported by additional 30 FMPs at various airports which also include eight defense airports The CCC is the nodal center for ATFM implementation in India and communicates with FMPs for ATFM measures implementation as and when necessary.

1.4 ATFM was planned to be implemented in phased manner in India with Central Command Centre (CCC), Delhi at the helm of affairs supported by Flow Management positions (FMPs) at designated Air Traffic Control Towers, Approach and Area Control Centers.

1.5 Phase-I implementation included activation of 36 Flow Management positions in different ATS units including eight (8) civil –military Airports and application of Ground Delay Program (GDP) and Ground Stop Program (GSP) to regulate traffic (resolve Demand Capacity imbalance) at constrained airports.

1.6 Phase –II implementation process included the integration of ATFM and Airport CDM of 4 major and 4 satellite Airports to increase the operation efficiency and situation awareness of all the stakeholders. Phase-II also includes addressing the demand capacity imbalance in Airspace through Airspace Flow Program such as Miles/Minutes in trail, Sequencing Programs (Arrival, Departure, En-route), Fix Balancing, Re-routing etc.

1.7 Phase III of implementation is planned to include capability for cross border ATFM, enhanced post ops analysis tools and capabilities and closer integration with Airspace Management. The following paragraphs describe the future plans of C-ATFM.

2. DISCUSSION

Preparing for Cross Border ATFM

2.1 The C-ATFM system has a flexible system interaction enabled through internet access provided to various categories of stakeholders. Thus, the system becomes scalable across the Indian airspace and beyond. AAI foresees the need to provide access to the C-ATFM information to adjacent States in future and the system design is well equipped for the same.

2.2 The C-ATFM system will be provided with capability of cross border multi-nodal ATFM information exchange in accordance with APAC AFTN/AMHS-based ICD for ATFM.

2.3 The Central Command Center (CCC) will act as the ATFM node for India in Cross Border ATFM process. All communications pertaining to Cross Border ATFM will be received at CCC and distributed to relevant stakeholders in India by CCC.

2.4 Currently, majority of the ATM Automation systems in India are not equipped to interpret ADEXP messages such as SAM, SRM and SLC messages directly. The CATFM system will interpret the ADEXP messages and in turn will disseminate the information to concerned stakeholders in India.

2.5 The cross border ATFM information will also be exchanged via the ATFM-ACDM or ATFM-AODB interchange mechanism. With planned implementation of ACDM systems at all International airports and subsequent integration of ACDM and ATFM systems, this will be the preferred ATFM information exchange mechanism with the airports and ATC.

2.6 It is also planned to include the ATFM information exchange and processing capability in all ATM automation systems upgrade in future, which will happen in a phased manner.

2.7 Cross border ATFM operations involving ATFM information sharing with ATFM centers of adjacent countries. – This will be dependent on establishment and operation of ATFM centers in South Asia countries such as Singapore, Thailand, and Hong Kong and also in Mid East Asia. AAI will be planning to facilitate ATFM information exchange for collaborative ATFM across the borders.

2.8 Currently C-ATFM system is receiving Space Based ADS-B surveillance data over the oceanic airspace through the ATM automation systems. In future, to facilitate long range ATFM, extended coverage of Space Based ADS-B data may also be considered.

Introduction of Initial Flight Plan Processing System (IFPS)

2.9 AAI is in the process to implement Integrated Initial Flight Plan Processing system (IFPS) & pan India ATS Message Handling System (AMHS) for filing the flight plan & disseminating and processing ATS messages. Currently the ATS messages are disseminated over AFTN network through an indigenous Automatic Message Switching System (AMSS).

2.10 The objective of IFPS is timely processing and distribution of flight data, adherence to the ICAO Standard Flight Plan format while avoiding the duplication of Flight Plan messages. It will provide feedback to the originator for the acceptance, modification or rejection of their Flight Plan and associated messages. A web portal for Flight Plan submission will also be provided for the Airline Operators who do not have the access to AFTN. This platform can be used to syntax check any flight plan.

2.11 It is foreseen that, after implementation of pan India AMHS and IFPS, the dissemination of ATS messages will need to be run in parallel for a suitable period of time before changing over from the present system of architecture of AFTN-AMSS to new system Architecture of IFPS-AMHS. The transition is a complex operational change and requires fully functional and stable integrated system. This gradual transition approach provides AAI a flexible and low–risk change management capability to meet any emerging challenges.

2.12 The proposed IFPS-AMHS system will also support B2B APIs. The AMHS/UAs/web Services of AMHS will be ADEXP compatible. The network architecture will form the basis for future SWIM services.

Introduction of FFICE

2.13 The ICAO standards for FF-ICE are currently under development and the ICAO provisions and implementation guidance are expected to be released in 2024. Presently Euro Control and the FAA are moving forward toward operational implementation of FF-ICE Release 1.

2.14 AAI plans to offer FFICE planning, filing and flight data request services as part of C-ATFM IFPS system in future. The FFICE services will be offered as additional services to Airspace Users having the FFICE capability. FFICE implementation will be a phased approach to ensure a smooth, harmonized transition.

Creating ATM Data Center

2.15 It is necessary for each ANSP to establish KPIs that will specifically help to identify the status and progression of CNS/ATM technologies identified in ICAO blocks. This will help ensure that the different CNS/ATM components are leveraged in an integrated fashion, and that specific CNS and ATM technology deployment is planned in that regard, in-line with ICAO and regional plans.

2.16 Current and future ATM operations will continue to become more data-intensive, as more information is exchanged between aircraft and ground systems as well distributed and consumed between ground systems. Additionally, analysis of data from different sources and within different contexts will be necessary. Better data will enable benefit assessment, give insights into operational effectiveness (e.g. performance relative to KPIs), and identify new opportunities for improvement (new operations, services, monitoring, enhanced use of data, etc).

2.17 Having a common, centralized information platform to obtain and marshal this data is a key aspect to its utility. At the very least, initial data analytics capability should support defining and monitoring the KPIs as noted previously while also providing input into operation.

2.18 C-ATFM system captures a vast range of data on airspace and air routes usage, flight data (planned and actual), CNS equipment, meteorological data, ATM sectors etc. Archiving of such data creates a valuable resource for ANSP for historical data analysis. AAI has created a central ANS data center using the valuable data archives from C-ATFM system.

ATFM-ACDM Integration

2.19 ASBU element ACDM-B1/1 describes the integration of ACDM with ATM network function. The element consists in feeding arrival information from the network into A-CDM and, at the same time, coordinate specific departure milestones. The involved stakeholders must, based on accurate operational data, achieve the agreed milestones.

2.20 The APAC Seamless ATM Plan v 3.0, recognizing the above ASBU elements, recommends (in Para 7.3 and in Para 7.14) implementation of ACDM at all international airports integrated with the ATM network by 2022.

2.21 AAI has integrated ACDM systems of eight airports - Mumbai, Kolkata, Chennai, Delhi, Ahmedabad, Jaipur, Trivandrum and Guwahati airports with the ATFM system.

2.22 AAI plans to pursue an aggressive ACDM implementation roadmap, enabling all international airports in India to become part of the ACDM-ATFM network, thus providing all CDM stakeholders with real time situational awareness

2.23 As envisaged in NOPS-B0/4, the first objective of the A-CDM integration with ATFM via exchanges of specific messages has been achieved. The second objective is to ensure ATFM slot adherence and limited ATFM slot swapping to meet airline demands in line with capacity declarations.

Full Integration of Airspace Management with Air Traffic Flow Management

2.24 India has established the Flexible Use of Airspace (FUA) process and improved data exchange between civil and military stakeholders to enable a more efficient use of airspace based on transparency and due regard to national security needs. ASBU modules FRTO-B0/2 and NOPS- B0/1 describe the process for enhancing the common situational awareness supporting optimum availability of airspace and ATC capacity to meet air traffic demands.

2.25 Accordingly, National Airspace Management Cell (NAMC) which oversees airspace reservation requests and coordinates with ATFM, has been established and is collocated with Central Command Center of CATFM since July 2020. A close coordination is being affected between ATFM and ASM to support the objective of FUA.

2.26 As is envisaged in the strategic ANS plan it is planned to proceed further towards full integration of ASM with ATFM. Further FRTO-B1/3 requires FUA and airspace management (ASM) to be enhanced with collaborative airspace data sharing between all ATM actors, negotiation procedures, system support and real time ASM data integration.

2.27 NOPS-B1/5 envisages a continuous, seamless and iterative airspace management and air traffic flow management approach. The full dynamic/rolling ASM/ATFM process focuses on improving airspace planning. ASM information (real-time Airspace Reservation status) is shared between different systems and Stakeholders and communicated to ATFM in the tactical phase. AAI plans to realize the full integration of ASM with ATFM in line with ASBU B1 modules in a collaborative manner with full cooperation of all stakeholders.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information contained in this paper; and

b) discuss any relevant matters as appropriate.

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