



International Civil Aviation Organization

MIDANPIRG Air Traffic Management Sub-Group

Third Meeting (ATM SG/3)
(Cairo, Egypt, 22 - 25 May 2017)

Agenda Item 3: Global and Regional Developments related to ATM and SAR

CAPACITY AND EFFICIENCY INITIATIVES IN INDIA

(Presented by Airports Authority of India)

SUMMARY

This paper presents a brief summary of some of the initiatives being undertaken in India for capacity enhancement and efficiency. The proposals for new routes in oceanic airspace of Mumbai FIR are also presented in the paper for consideration by the meeting.

Action by the meeting is at paragraph 3.

1. INTRODUCTION

1.1 The Indian aviation industry has seen tremendous growth and has undergone significant transformation in last decade. The Government of India and Airports Authority of India have launched series of initiatives to meet the growing demand and aspirations of aviation industry.

1.2 A few of such initiatives that may interest the ANSPs of ICAO's MID region are presented through this paper.

2. DISCUSSION

Flexible Use of Airspace

2.1 The proposal for implementation for flexible use of airspace was formally approved by Government of India in March 2013 and National High Level Airspace Policy Body (NHLAPB) and National Airspace Management Advisory Committee (NAMAC) were established to realize the objectives of FUA. Rapid strides have been made by INDIA in implementation of FUA. The first version of Manual on Flexible Use of Airspace was released on 28th August 2014 which is the guidance material and reference document for implementation of FUA in India. The Indian FUA manual is available at www.aai.aero/public_notices/FUA_Manual_v1_230315.pdf.

2.2 Five NHAPLB and eleven NAMAC meetings have been held so far. Joint airspace review and design workshops are being conducted at regular intervals. More than 300 senior military personnel and 400 senior civil ATC personnel have been trained on FUA as on date. India has planned establishment of an Airspace Management Cell at national level and four AMCs at regional levels. The trial operation of Delhi AMC which is expected to function as N-AMC and R-AMC was conducted from 28 Feb to 10 Mar 2017. Other R-AMCs will be established in a phased manner.

2.3 Twenty eight Temporary Segregated Areas (TSA)/ Temporary Reserved Areas (TRA) have been established for use by the military. 10 conditional Routes have also been established. The process of reviewing existing permanent Danger (D) and Restricted (R) Areas of the military is underway so that unused D/R areas can be denotified and many D/R areas can be converted into TSA/TRA or AMC manageable D/R areas.

2.4 AAI has shared surveillance data from many of its RADARs with IAF ATC and Air Defense units for improved situational awareness. The pilot project of sharing of surveillance data from military RADARs will be implemented by 31st July 2017 at two airports.

2.5 ICAO APAC office has recognized the efforts of India and benchmarked the Indian FUA manual by sharing the template of the Indian Manual on FUA for the benefit of other member states. The template is available at [http://www2010.icao.int/PAC/Documents/edocs/Flexible Use of Airspace \(FUA\) Manual Template.docx](http://www2010.icao.int/PAC/Documents/edocs/Flexible%20Use%20of%20Airspace%20(FUA)%20Manual%20Template.docx).

Enhancement in Route Structure and Reduced Horizontal Separations

2.6 Airports Authority of India has taken several significant steps to improve efficiency of flight operations in oceanic airspace. Reduced Longitudinal Separation of 50 NM was introduced on 18 RNP-10 routes for suitably equipped aircraft in 2011, User Preferred Route (UPR) Geographic Zone in Chennai and Mumbai FIR was established in 2013, Reduced Longitudinal Separation of 30 NM was introduced on 4 ATS ROUTES N571, P574, M300 and P570 between suitably equipped (RNP-4) aircraft in 2014.

2.7 The percentage wise growth of India's domestic passenger market has been highest in the world for last few years. PBN initiatives like SIDs and STARs, city pair RNAV routes and RNP routes have been undertaken by AAI to meet the growing traffic. As on date 16 RNAV-5 ATS routes have been established. RNAV-2 city pair routes between Mumbai and Kolkata have been introduced from 17th September 2015. RNP 2 City pair routes between Delhi-Chennai and Bengaluru-Hyderabad were introduced in July 2016. RNP-2 city pair routes between Delhi & Mumbai are planned to be implemented from December 2017.

2.8 Following three proposals for RNP routes in oceanic airspace have been initiated by AAI.

Proposal 1: Establishment of RNP10 International ATS Route parallel to G450

PfA to BANP submitted to ICAO APAC on 12th November, 2015.

International traffic between Mogadishu/Sana FIR and Mumbai is on the rise and the existing route G450 is not able to meet the requirements. To enhance and optimize the routes it is proposed to establish four RNP10 international routes in Mumbai FIR.

- a) Restrict G450 upper limit to FL280 to accommodate non-RNP10/ non-RVSM aircraft.
- b) Create a new RNP10 ATS Route, N634, overlaying G450 between ORLID and Mumbai with vertical limit as FL290/FL460.
- c) Create a new RNP10 ATS route, M507, parallel and 50NM north of G450 between NABIL and WP LIMGA [183418N 0701230E] joining P751 to Mumbai.
- d) Somalia (Mogadishu) agreed to the proposal and proposed that the ATS route segment between NABIL and EKBAS be designated as UT381 with a reporting point at Mogadishu/Sana FIR boundary.

India and Somalia (Mogadishu) agreed to the proposal. Comments from Yemen on the proposal are awaited. Endorsement of the proposal by Yemen and ICAO/MID office is requested.

Proposal 2: Conversion of upper airspace (FL290 and above) of International ATS Route B459 & UL425 as RNP10

PfA to BANP submitted to ICAO APAC on 15th March, 2016

It is proposed to establish an RNP10 international route overlaying B459 in Mumbai FIR with a vertical limit of FL290/FL460.

Comments from Yemen on the proposal are awaited. Endorsement of the proposal by Yemen and ICAO/MID office is requested.

Proposal 3: Establishment of new Conditional Route RASKI-Ahmadabad under FUA

PfA to BANP submitted to ICAO APAC on 27th, March, 2017.

In 2013 IATA made a proposal for establishment of an International Route between Ahmadabad and RASKI (Mumbai-Muscat FIR Boundary). The proposed route facilitates connectivity for aircraft from / to Ahmadabad Middle East and overflying traffic between Far East Asia to Middle East. As per IATA the route will save 80NM/ 9 minutes/ 765Kg of fuel/ 2409Kg of CO2 per flight. The route is listed in the ICAO – APAC Route Catalogue as IND10. The proposed route is through IAF Restricted Areas. The proposal was taken up as a priority route by AAI under Flexible Use of Airspace (FUA) and IAF has concurred to establish the route as CDR 2.

The proposal has been accepted by Muscat.

C-ATFM and A-CDM

2.9 AAI is implementing Central ATFM (C-ATFM) system covering entire Indian airspace. The system is primarily meant to address the balancing of capacity against demand to achieve optimum utilisation of the major resources viz. Airport, Airspace and Aircraft where there is capacity constraint. AAI conducted three operational trials in past four months and thereafter has commenced regular operations for Phase I on 26th April 2017. The C-ATFM system network architecture consists of a Central Command and Control Centre (CCC) and the Flow Management Positions (FMP). The main and fall back CCC has been established at New Delhi. The CCC is supported currently by six FMPs (Delhi, Mumbai, Chennai, Kolkata, Bengaluru and Hyderabad) and will soon be expanded to 6 more FMPs and will be gradually expanded to 36 FMPs by October 2017 at various ACCs, APP centres and Towers across the country. The C-ATFM provides capabilities to model and implement Traffic Management Initiatives (TMIs) to smoothen the demand with the available capacity via Ground Delay and Ground Stop programs. CTOTs generated by the system are shared through email with FMPs and aircraft operators. The trials and operations so far have brought out issues related to information sharing, stakeholder awareness, flight plans and lack of discipline. The issues would be addressed by developing procedures for collecting FPL information in advance, coordination with Military ATC, coordination with MET, agreements for Common Business Rules, phasing out the RPLs, and procedures to deal with ATFM system outages. The experiences of the implementation process have also indicated that a close coordination with the top management of all stake holders is essential for successful “buy-in” of the ATFM concept.

2.10 In the latter stages AAI will be keen to participate in any cross border ATFM network. In fact AAI has been participating in Cross Border ATFM workshops in APAC region and had also hosted one in New Delhi two years ago. AAI will be keenly looking forward to ATFM developments in MID region from where more than 600 flights enter Indian airspace every day. The cross border ATFM may help to manage traffic flows during cyclonic activities in Arabian sea, ever increasing traffic during the periods of “HAJ” and also help long haul flights to plan and fly fuel efficient levels.

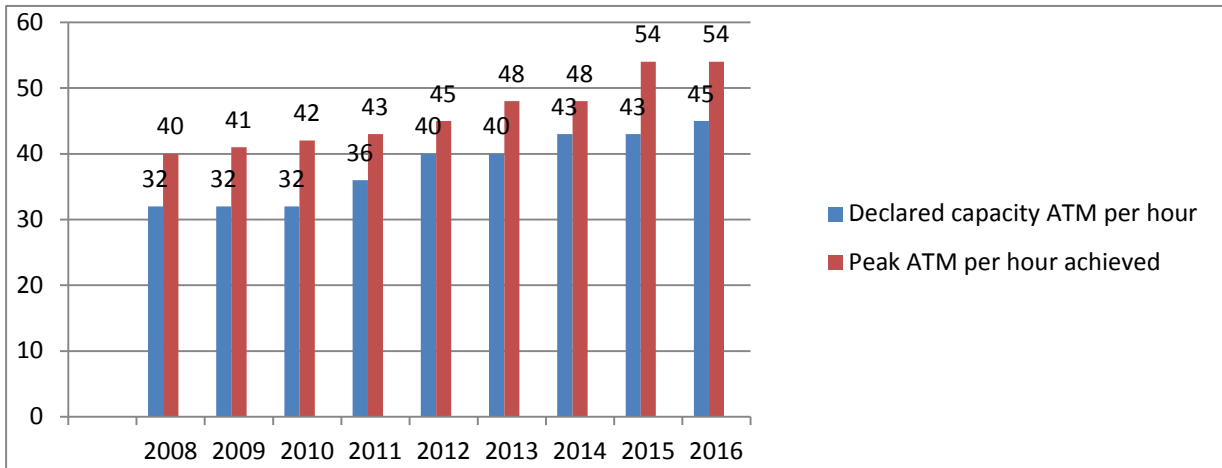
2.11 AAI has also implemented Airport Collaborative Decision Making Systems at Mumbai and Delhi. The A-CDM system at Mumbai has been developed in house by ATC officers of AAI. The system generates TSAT for flights based on current and predicted traffic data and stakeholder input. The pushback/start-up based on TSAT helps airlines to improve efficiency and also optimizes ground taxi times and holding times reducing fuel burns and carbon emissions. The A-CDM system will soon be integrated with the C-ATFM system to derive greater benefit from both the systems.

2.12 The A-CAAI is now developing A-CDM systems for Kolkata and Chennai.

Airport Capacity Enhancement

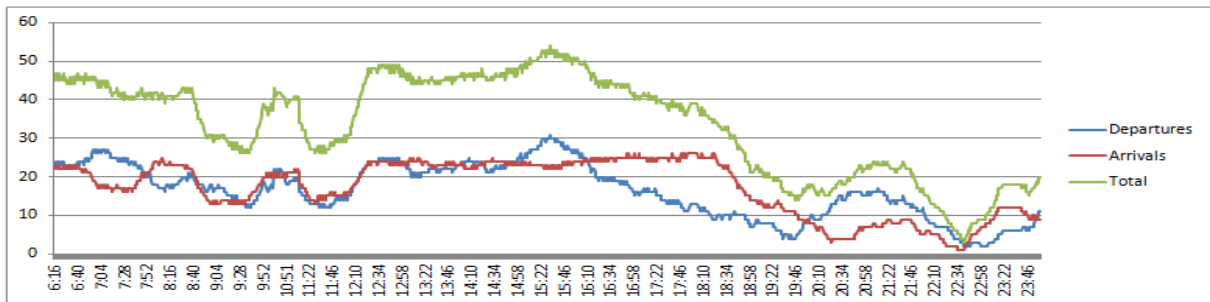
2.13 AAI has achieved significant success in enhancing the capacity of its two busiest airports i.e. Mumbai and Delhi. The capacity enhancement at Mumbai Airport is presented as an example here.

2.14 Sixty percent improvement in capacity has been achieved at Mumbai Airport through slew of initiatives involving all the stakeholders. The initiatives like ROT Mapping and sharing through Runway Utilisation Improvement Group, Improved R/T procedures, intensive training of ATM personnel, Uniform speed control, ASMGCS, A-CDM, Time Based Spacing have enabled Mumbai to achieve a world high for single runway operations of 45 million passengers per annum.

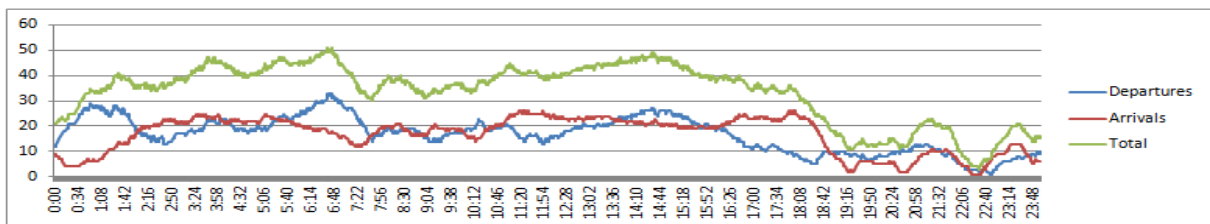


Minute by minute movement:

Date: 04.09.2015 . (Friday) Max: 54 between 1432-1531 UTC.



Date: 05.09.2015 . (Saturday) Max: 51 between 0540-0639 UTC.



Time Based Spacing

2.15 Traditionally, RADAR controllers use distance based spacing between successive arrivals to achieve the desired landing rate. The tools available on RADAR systems allow ATC to judge and apply desired distance based spacing between successive arrivals. The ground speed reduction in headwind conditions results in the increase in the time spacing between each arrival pair for distance based separations. In Mumbai controllers use ASMGCS feature called “Time to Threshold” to assess spacing that would deliver a time interval of 130 seconds in which one departure is accommodated in between. The objective is to achieve one aircraft movement every 65 seconds. Thus if the successive arrivals and the departure are CAT C aircraft a spacing of 130 seconds is provided but if any one or more aircraft are CAT D/E/F then they a spacing of 140/150 seconds is provided. The Time Based spacing has been a vital enabler for capacity enhancement.

Regional Connectivity Scheme

2.16 Government of India has issued a National Civil Aviation Policy. Salient points of the policy are:

A) Vision: To create an eco-system to make flying affordable for the masses and to enable 30 crore domestic ticketing by 2022 and 50 crore by 2027, and international ticketing to increase to 20 crore by 2027. Similarly, cargo volumes should increase to 10 million tonnes by 2027.

B) The Policy: NCAP 2016 covers many policy areas; the salient features of one such policy “Regional Connectivity Scheme” are presented through this paper.

2.17 The scheme is also termed as “UDAAN: Ude Desh ka Aam Nagrik” in national language Hindi (the translation would mean Flight: Enabling Common Citizens to fly). As the name suggests the scheme is envisioned to enable common citizens of the nation to use flights to commute. The scheme will not only connect regional airports with one another but also some of the regional airports with Metro Airports.

2.18 Ministry of Civil Aviation (MoCA) has targeted an indicative airfare of Rs 2500 per passenger approximately, indexed to inflation, for a significant part of the capacity of the aircraft for a distance of 500kms to 600 kms on RCS routes (equivalent to about one hour of flight). The cap for helicopters under RCS will be higher. The scheme will offer a flexible menu of options to the interested scheduled airline operators.

2.19 In the first phase 45 unserved/underserved airports are planned to be revived by September, 2017.

2.20 RCS will be implemented by way of:

- i) Revival of un-served or under-served airports/ routes;
- ii) Concessions by different stakeholders; and
- iii) Viability Gap Funding (VGF) for operators under RCS.

3. CONCLUSION

3.1 The meeting is invited to:

- a) note the information in this paper about some of the initiatives in civil aviation;
- b) endorse the route proposals and discuss suggestions, if any;
- c) note that AAI will be willing to share experience in capacity initiatives, C-ATFM, A-CDM and Regional Connectivity Scheme; and
- d) discuss any other points as appropriate.

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