International Civil Aviation Organization

MIDANPIRG Air Traffic Flow Management Task Force

First Meeting (ATFM TF/1)
 (Muscat, Oman, 23 – 25 September 2018)

Agenda Item 3: **Regional ATFM Framework**

STATUS OF IMPLEMENTATION OF A COLLABORATIVE ATFM IN THE UAE

(Presented by United Arab Emirates)

SUMMARY

The purpose of this Working Paper is to present the current status and considerations for the implementation of Collaborative Air Traffic Flow Management (ATFM) in the UAE. For the benefits of a larger audience, this knowledge is shared with the States in the region to assist in establishing similar measures in the region, when required. From these experience the UAE is suggesting a number of work packages to pave the way to a harmonised provision of ATFM services in the region.

Action: The Conference is invited to agree to the Conclusion as suggested in paragraph 3.1.

1. INTRODUCTION

1.1 The UAE has a long and successful history of cooperation across its aviation community. This cooperation has been achieved through the UAE National Airspace Advisory Committee (NASAC) where all stakeholders are represented. Various measures are initiated and coordinated through NASAC to respond to the demand of air traffic flow in the Emirates FIR.

1.2 A remarkable achievement of NASAC was the development and publication of the first edition of the UAE ATM Strategic Plan 2030, which has set the UAE ATM priorities and aligned the strategies of the UAE ATM stakeholders.

1.3 An important step in optimising the flow of air traffic in the UAE was the implementation of the UAE Airspace Restructuring Phase 3 in December 2017. The project delivered an increase of airspace capacity and improved the access to all UAE airports.

1.4 The Airspace Restructuring Project Phase 3 also included the assessment of en-route and CTA ATC sector capacities using historic and predicted traffic flow and their optimisation. This exercise determined the nominal capacities that are available in the UAE airspace.

1.5   Airspace capacity might be reduced as a result of environmental circumstances such as adverse weather or can be caused by regional events. Within the UAE, environmental circumstances are primarily affecting aerodrome capacity which in turn has an impact to the load in adjacent en-route sectors.

1.6   The UAE stakeholders understand that in order to improve traffic flow as a whole and to manage situations where demand exceeds the capacity requires close cooperation with the aviation community. Due to the fact that air traffic flow is dynamic and changes frequently the UAE aviation stakeholders have recognised that implementation of Collaborative Air Traffic Flow Management (ATFM) is a key enabler to achieve a smooth and efficient flow of air traffic. Hence, the major efforts of the UAE aviation community have been put into the coordinated and optimised use of constrained resources.

1.7   Building on the success of the current flow management services, the UAE is committed to implement enhanced and Collaborative ATFM to allow a holistic approach for balancing demand and capacity. The implementation will be based on the principles of:

> a) Involvement of aviation stakeholders like ATSUs, airspace users, airports and military.
>
> b) Network View – A holistic view of flights including the business assessment of the airspace users to support decision making.
>
> c) Predictability – Only high-quality real-time information allows for maximum efficiency and effectiveness of flow measures.
>
> d) Transparency – All stakeholders shall have access to the same set of information.
>
> e) Compliance Monitoring – to demonstrate the effectiveness and aiming for continuous improvements.
>
> f) Equity – All Airspace Users will be treated fairly and equally.

2.   DISCUSSION

2.1   The first phase of introducing Collaborative ATFM is the identification of the needs and realisation of the challenges that needs to be addressed. An analysis of the air traffic in the UAE reveals that the traffic is predominantly determined by the international airports in Dubai and Abu Dhabi with their major airlines.

2.2   Traffic demand in the Emirates FIR is distributed over the 24 hours with peak demand periods at 00:00 to 02:00, 04:00 to 07:00, 14:00 to 15:00, and 18:00 to 20:00 UTC. Due to the overall growing demand, the peak periods are extending more and more over time.
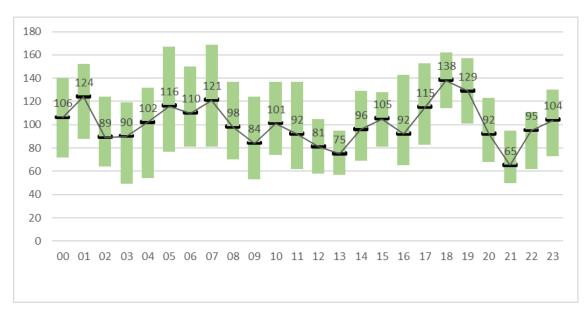
Figure 1: 24 Hours (UTC) Traffic Movements Profile in 2017 (minimum, maximum and average)

2.3   The air traffic flow challenges in the UAE are predominantly determined by international departures and arrivals at UAE airports. Together these constitute almost 80% of the traffic. During peak hours the traffic demand exceeds the arrival capacity on a daily basis while departing traffic needs to be restricted due to regional constrains not under the control of UAE. Environmental circumstances such as adverse weather, holiday seasons, and regional events may cause excessive overload situations and flow disruptions.
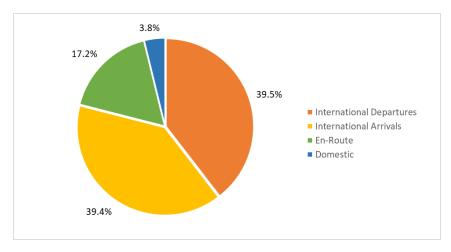

Figure 2: Flight Profile Distribution

2.4   As of today, two ATFM system components are available in the Emirates FIR to respond to excessive traffic demands for arriving and departing traffic. No ATFM measures are imposed to en-route traffic by the UAE.

2.5   Traffic departing from UAE airports are subject to quasi-permanent flow restrictions imposed to any traffic by certain FIRs adjacent to the Emirates FIR. To maximise the utilisation of the routes with limited capacity a Collaborative Departure Flow Management service named DFLOW has been introduced since 2010.

2.6   Based on a co-developed operational concept, technical requirements and managed under a joint governance the utilisation of limited route capacity was maximised and reached 98% of the theoretical value by June 2018. Thanks to an efficient on-ground coordination due to which CTOT compliance exceeded 82% considering a tight tolerance of ±2 minutes.

2.7   The traffic situation of flights arriving at UAE airports is monitored by the Emirates ACC using capacity load and demand prediction tools based on actual flight plans and flight progress information available to Sheikh Zayed Air Navigation Centre (Emirates ACC).

2.8   In order to manage disruptions of the traffic flows into UAE airports, since 2014 Emirates ACC employs procedures of temporarily stopping departures from specific regional airports destined for the affected airport(s) within the UAE. For this purpose three Traffic Zones are defined and appropriate procedures are published in UAE AIP

Traffic Zone	EET	Aerodromes
Zone 1	60 minutes or less	OBBI, OTBD, OTHH, OISL, OEDR, OIBK, OIKB, OIKQ, OISS, OOMS
Zone 2	60 to 90 minutes	OEDF, OERK, ORMM, OERY, OKBK, OOSA, OEAH
Zone 3	90 to 150 minutes	OEJN, OEMA, OIIE, OJAI, ORER, ORBI, OPKC

Figure 3: Traffic Zones

2.9   Looking onto the distribution of flight times for UAE arrivals it can be identified that more than 55% of all traffic has flight times between 3 and 6 hours. Also, more than 20% of the traffic have flight times exceeding 6 hours. Further enhancements for flow measures are to be developed to improve a smooth traffic flow, not only in cases of traffic disruptions.
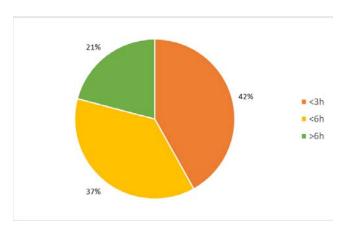

Figure 4: Total Flight Time for Traffic landing in the UAE

2.10   The focus of any Collaborative ATFM implementation for the UAE has to be on the optimisation of arrivals and departures and to maximize the utilisation of runway capacity at the hub airports. While airspace users recognise that delays are unavoidable if demand exceeds capacity, they expect minimal delays as well as predictability. Furthermore, they are keen to support the management of individual flights and their priorities at the destination on a per-case basis.

2.11   Understanding these needs, the UAE started discussions with aviation stakeholders in preparation of the development of an operational concept to collaboratively enhance the demand and capacity balancing in the UAE. This has to be the basis for any Collaborative ATFM implementation. This however shall not reduce what already has been achieved.

2.12   Airspace users express their interest to actively collaborate in balancing demand and capacity with strategic, pre-tactical and tactical decision as long as measures are transparent and equity is assured. Airspace users and airports furthermore express their interest to actively manage arriving flights following the principles of User Driven Prioritisation Process (UDPP). In this way, it is expected that delays in the UAE airspace can be further reduced and the target time of arrivals (TTA) can be introduced in preparation of future trajectory-based operation (TBO).

2.13   The UAE aviation community also understands that any successful implementation for ATFM that improves the situation must not only be limited to the use of 4D trajectories for ATFM and ATM automation but also has to assure that future concepts such as i4D to support TBO will become available on regional and ultimately global basis.

2.14   For this purpose, the newly contracted ATM system at Sheikh Zayed Air Navigation Centre will provide an Arrival Manager (AMAN) with extended horizon beyond the surveillance coverage to support UDPP integrated with the capability to support XMAN (Cross Border) Arrival Manager interface.

2.15   The UAE is currently in the process of enhancing its national infrastructure in preparation of the implementation of an enhanced Collaborative ATFM service. The availability of an Initial Flight Plan Processing functionality (IFPS) assuring valid flight plans are shared with all stakeholders and the SWIM capable flight object database containing consolidated real-time information for all flights are major building blocks to support this.

2.16   The SWIM capable platforms are ready to be integrated with Eurocontrol Network Manager and is prepared to integrate with any other system capable of exchanging Flight Objects (FO) in real time using open standards. These functionalities will go live in Emirates ACC operations as of 25th September 2018.

2.17   The following main elements form part of the ATFM strategic planning in the UAE:

   a) Enhance the collaborative decision making on a per-flight basis by using the integrated and consolidated real-time information supporting tactical decisions.

   b) Develop with all stakeholders overarching concepts to manage a mix of regional connections and long-haul flights in an integrated and balanced manner using a consolidated network view of flights in different phases.

   c) Asses the marked for advanced ATFM solutions that can be tailored to support dynamic balancing of demand and capacity as per agreed operational concepts.

d) Exploit the newly established SWIM platform to develop enhanced applications to support User Driven Prioritisation Process (UDPP) in combination with trajectory based operational concepts such as i4D to dynamically balance demand and capacity.

3. **ACTION TO THE MEETING**

3.1   The meeting is invited to:

a) note the information in this working paper and take action as appropriate;

b) encourage the States to work together with all stakeholders to understand their needs and challenges in the current and expected demand and capacity balance as well as to assess current measures for flow management;

c) encourage the States to work together to explore how advanced concepts and technologies in ATM can be used to optimise the utilisation of available capacity. The introduction of latest technologies such as the sharing of Flight Objects, Cross Border Arrival Managers, UDPP, i4D Trajectories, Trajectory Based Operation (TBO) have to be considered in line with ICAO ASBUs during the implementation of a regional Collaborative ATFM service;

d) encourage the States to work together to assess and elaborate how a regional ATFM service will cooperate with adjacent airspaces and regional areas with existing ATFM services; and

e) agree to the following Draft Conclusion:

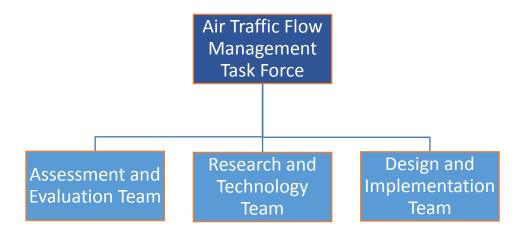| Why	The implementation of ATFM measures has to build upon what has been achieved already to deliver an improvement to the current operations.
What	The planning and development of a regional ATFM service will recognise the existing and predicted traffic demands and shall aim for the implementation of advanced Collaborative ATFM system that build upon existing national systems and has to embrace the advanced concepts such as XMAN, UDPP and TBO engaging ANSPs, airspace users and airports. This shall lead to a Collaborative ATFM service that contributes to the global air traffic management by addressing the needs of all stakeholders in the States.
Who	All States involved in the implementation of a regional ATFM service.
When	

DRAFT CONCLUSION

The meeting recognises that on national level some States have existing and effective collaborative Air Traffic Flow arrangements involving ANSPs, airports and airspace users. Building upon such expertise the States agree to establish the following expert teams that will work together to present their reports to the ATFM task force.

Expert Team 1 (Assessment and Evaluation Team): Collect the stakeholder's needs for ATFM, the demand and capacity profiles, and how existing ATFM services balance current demand and capacity in the region. Based on the collected information an overarching assessment of demand and capacity is to be collated and how a Collaborative ATFM service characteristics can improve the efficiency.

Expert Team 2 (Research and Technology Team): Identify how latest technologies in ATM and emerging concepts such as the sharing of Flight Objects, Cross Border Arrival Managers, UDPP, i4D Trajectories, Trajectory Based Operation that are currently emerging can be incorporated to increase efficiency and how this can be included in the implementation of a regional Collaborative ATFM service.

Expert Team 3 (Design and Implementation Team): Assess how a regional ATFM service will become part of a global air traffic system. This Expert Team would be expected to elaborate on how efficiency can be improved by inter-regional cooperation and as part of global air traffic flows.

```
                    ┌─────────────────────┐
                    │  Air Traffic Flow   │
                    │     Management      │
                    │     Task Force      │
                    └─────────────────────┘
                               │
          ┌────────────────────┼────────────────────┐
          │                    │                    │
┌─────────────────┐  ┌─────────────────┐  ┌─────────────────┐
│ Assessment and  │  │  Research and   │  │   Design and    │
│ Evaluation Team │  │   Technology    │  │ Implementation  │
│                 │  │      Team       │  │      Team       │
└─────────────────┘  └─────────────────┘  └─────────────────┘
```

- END -