



International Civil Aviation Organization

MIDANPIRG/22 & RASG-MID/12 Meetings

(Doha, Qatar, 4 – 8 May 2025)

Agenda Item 5.3: ANS (AIM, PBN, AGA-AOP, ATM-SAR, CNS and MET)

**AIR TRAFFIC FLOW AND CAPACITY MANAGEMENT (ATFCM) IMPLEMENTATION
INITIATIVES OF OMAN**

(Presented by Sultanate of Oman)

SUMMARY

This Working Paper presents Oman's planned initiatives for the implementation of ATFCM as a regional obligation and in response to projected air traffic growth in the Middle East Region, with the aim of ensuring safe, efficient, and predictable ATM operations within and across the Muscat FIR. It outlines the expected benefits of ATFCM, identifies anticipated challenges, and proposes mitigation strategies, emphasizing the importance of collaboration with ICAO, regional States, and industry partners.

Action by the meeting is at paragraph 3.

REFERENCE

- MIDANPIRG/19 and RASG-MID/9 Meetings Report (Riyadh, Saudi Arabia, 14 – 17 February 2022)
- ICAO MID Doc 014: MID ATFM Plan (V2.0)
- ICAO Doc 9971 – Manual on Collaborative Air Traffic Flow Management (ATFM)
- ICAO Doc 4444 – Procedures for Air Navigation Services- Air Traffic Management (PANS-ATM)
- ICAO Annex 11 – Air Traffic Services
- ASBU Framework
- ICAO MID eANP, Volume II

1. INTRODUCTION

1.1 Passenger traffic in the Middle East Region is forecasted to grow at a Compound Annual Growth Rate (CAGR) of 4.4% in Revenue Passenger Kilometers (RPK) from 2025 to 2040, with international traffic expected to grow faster at 4.8%, compared to domestic traffic at 2.8% over the same period. The average daily aircraft movements across the FIR were recorded at 1,587 in 2023, 1,770 in 2024, and 1,827 in the first quarter of 2025, indicating continued growth in the coming years.

1.2 Consequently, given its strategic location as a crucial aviation corridor between Europe and the Asia-Pacific, Muscat FIR is expected to experience significant challenges by this forecasted traffic growth, necessitating the implementation of a robust, structured, and collaborative Air Traffic Flow and Capacity Management (ATFCM) framework to ensure safe, efficient, and predictable ATM operations.

1.3 Recognizing this, Oman has developed a phased ATFCM implementation strategy aligned with ICAO Doc 9971 and the Aviation System Block Upgrades (ASBU) framework, ensuring readiness to accommodate the region's future air traffic expansion.

2. DISCUSSION

2.1 In line with MIDANPIRG Conclusion 19/16, Oman is fully committed to the establishment of Air Traffic Flow and Capacity Management (ATFCM) services in alignment with the MID Region ATFM Plan.

2.2 Due to current technical and institutional limitations, a plan has been devised to initiate a basic form of ATFCM as a practical foundation, with the long-term goal of transitioning to a fully integrated Multi-Nodal ATFCM framework through a phased approach.

2.3 Existing real-time data analysis mechanism and playback systems, which are currently used for operational and safety monitoring, will be employed to analyze the sector performance and air traffic flow status and identify implementing appropriate flow measures on pre-tactical basis.

2.4 Building on this foundation, a basic yet dedicated ATFCM unit will be established to manage daily flow coordination, analyze capacity constraints, support operational decision-making, and advise Muscat ACC on timely flow management measures.

2.5 The planned ATFCM CONOPS comprises the four phases- Strategic, Pre-Tactical, Tactical, and Post-Operations. This structured approach supports effective planning, real-time flow management, and continuous performance improvement.

2.6 ATFCM implementation relies on coordinated engagement among ANSPs, regulators, airlines, airports, military, and MET services to ensure efficient flow management and regional interoperability.

2.7 ATFCM implementation will apply key flow management measures such as GDPs, MIT/MINIT, level capping, and holding/rerouting to ensure safe and efficient traffic flow during periods of Demand-Capacity imbalance.

2.8 ATFCM performance will be measured through key indicators focusing on delay reduction, sector load balancing, compliance, predictability, and stakeholder satisfaction to ensure efficient and collaborative traffic flow management.

2.9 To accelerate implementation, Oman is pursuing technical collaborations with industry partners and States experienced in ATFCM, while also seeking ICAO's support to enhance future readiness for integration into the regional Multi-Node ATFM network.

ATFCM Implementation Roadmap

2.10 ATFCM implementation will be carried out through a well-defined roadmap, following a phased approach as outlined below:

- Phase 0. Development & Training (Months 0–3) - Building foundational knowledge and prepare human resources before system implementation.
- Phase 1. Planning & Design (Months 4–9) - Establishing a regulatory, operational, and collaborative framework.
- Phase 2. Initial ATFM Deployment (Months 10–15) - Deploying systems and conduct real-time trials.
- Phase 3. Full Operational Capability (Months 16–27) - Achieving full capability with additional and enhanced ATFM measures and continuous performance monitoring.

Expected Benefits

2.11 The implementation of ATFCM supports the safe, efficient, and sustainable management of air traffic by ensuring demand is aligned with available capacity. Key benefits include:

- Enhanced air traffic flow efficiency and increased capacity
- Balanced air traffic demand with available capacity
- Maintained safety and operational efficiency
- Reduced flight delays and network inefficiencies
- Lower fuel consumption and CO₂ emissions
- Optimized use of airspace with increased safety
- Balanced airport and sector workload distribution

Anticipated challenges

2.12 As ATFCM implementation is relatively new in both Oman and the Region, several challenges may arise during the execution of the ATFCM. Some of the anticipated challenges include:

- Time-consuming approval processes, differing ANSP procedures, and challenges in reaching data-sharing agreements or finalizing LOAs/MOUs can cause significant project delays.
- System integration may expose cybersecurity risks and data format mismatches. Not all stakeholders can support platforms like SWIM, and AI tools may be unreliable without sufficient historical data.
- Reluctance to change, lack of experience and awareness in new roles, and inconsistent procedures between adjacent ANSPs can hinder smooth implementation and compliance.
- Extensive training, conflicting stakeholder priorities, and limited resources can delay or compromise implementation success.
- Weather unpredictability, rising traffic demand, and geopolitical tensions can disrupt operations and regional coordination, requiring flexible systems and strong contingency plans.

Mitigation strategies

2.13 The following mitigation strategies may be adopted to effectively address the challenges encountered during ATFCM implementation:

- Implement a well-defined roadmap, engaging regulators and key stakeholders well in advance through joint workshops, meetings, seminars.
- Establish ATFCM LOAs or MOUs, and data-sharing agreements to streamline coordination across ANSPs.
- Use international standards and best practices (SWIM, FIXM), conduct pre-deployment tests, ensure strong cybersecurity protocols, and provide technical support.
- Raise awareness, involving operational staff, and adopt phased transitions. Provide training, simulations, and establish mechanisms for consistent cross-border procedures.
- Introduce tiered, simulation-based training and stakeholder workshops.
- Align expectations through CDM and reduce costs via partnerships and shared funding.
- Use real-time weather and AI tools for dynamic rerouting. Build scalable systems and maintain coordination through ICAO guidance and neutral regional centers.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) note the information contained in this paper;
- b) acknowledge Oman's initiatives in implementing ATFCM;
- c) encourage knowledge, experience, and information sharing related to ATFCM implementation; and
- d) discuss any other relevant matters, as appropriate.