INTERNATIONAL CIVIL AVIATION ORGANIZATION

MIDDLE EAST OFFICE

SIXTH MEETING OF THE AIR TRAFFIC FLOW MANAGEMENT TASK FORCE

(ATFM TF/6)

(Virtual, 27 – 28 June 2022)

SUMMARY OF DISCUSSIONS

1. PLACE AND DURATION

1.1 The Sixth meeting of the Air Traffic Flow Management Task Force (ATFM TF/6) was held virtually on 27 and 28 June 2022, using MS Teams.

2. OPENING

2.1 The meeting was opened by Mr. Mohamed Smaoui, ICAO MID Deputy Regional Director, who welcomed all the participants and recalled the main tasks assigned to the ATFM Task Force. Mr. Smaoui highlighted the last version of the ICAO MID ATFM Plan (MID Doc. 014, Version 2); which was endorsed by MIDANPIRG/19 (Riyadh, Saudi Arabia, 14-17 February 2022), and invited MID States as well as international organizations to progress the work on the implementation of the plan on national level, in particular Phase 1A, within the agreed time frame by December 2023. He thanked all the participants for their attendance and wished the meeting every success in its deliberations.

3. ATTENDANCE

3.1 The meeting was attended by a total of eighty-one (81) participants from thirteen (13) States (Bahrain, Egypt, Iran, Iraq, Jordan, Kuwait, Oman, Qatar, Saudi Arabia, Sudan, UAE, USA/FAA and Yemen) and five (5) International Organizations (ACAO, AEROTHAI, CANSO, IATA and IFATCA). The list of participants is at **Attachment A**.

4. OFFICERS AND SECRETARIAT

4.1 The ATFM TF/6 meeting was chaired by Mr. Hamad Al Belushi, Senior Expert-Air Traffic Management, UAE General Civil Aviation Authority (GCAA), who extended appreciation to the participants for being part of the ATFM Task Force and for accepting the invitation to actively participate in the meeting and share their experiences and views, which would support the ATFM Task Force in achieving its objectives. He highlighted that the pace of the progress under the ATFM TF was slow due yield of priority of the FWC 2022.

4.2 Mr. Ahmad Amireh, Regional Officer, Air Traffic Management and Search and Rescue (RO/ATM/SAR) ICAO MID Office was the Secretary of the meeting, supported by Mr. Ahmad Kaveh, Regional Officer, Air Traffic Management (RO/ATM).

5. DISCUSSIONS

AGENDA ITEM 1: ADOPTION OF THE PROVISIONAL AGENDA

5.1 The meeting adopted the following Agenda:

Agenda Item 1: Adoption of the Provisional Agenda

Agenda Item 2: Global developments related to the ATFM

Agenda Item 3: Regional framework

- Follow-up on MIDANPIRG/19 outcomes
- Operational data exchange model
- National ATFM implementation steps
- States experience and challenges
- FIFA World Cup 2022 Framework:
  - FWC 2022 Operational Plan
  - Updated traffic forecast and expected challenges, and expectations

- ATFM Implementation Plan
- Flight planning system capabilities
- ATFM implementation Action plan: Training phase

Agenda Item 4: Future Work Programme

Agenda Item 5: Any other Business

5.2 The documentation and presentations delivered during the meeting are available on the ICAO MID Office website at: https://www.icao.int/MID/Pages/2022/ATFM%20TF6.aspx

AGENDA ITEM 2: GLOBAL DEVELOPMENTS RELATED TO THE ATFM

5.3 The subject was addressed in PPT/2, presented by Secretariat. The meeting was apprised with the developments related to ATFM on a Global level:

- CDM-ATM Simplified procedure: the objective of the procedure was to support effective collaboration for ANSPs to carry out cross-border coordination, taking into consideration the circumstances that would have an impact on international traffic flows. This includes going into or recovering from contingency situations.

- Introduction of new Standard in Annex 11: States shall ensure that an ATFM service is established with the objective of contributing to a safe, orderly, and expeditious flow of air traffic and to support cross-border collaboration.

- Introduction of New Recommendation in Annex 11: ATFM services should be implemented on the basis of multilateral agreements that should make provision for common procedures, common methods of capacity determination and common methods of information exchange.

- CDM/ATFM related updates: New Standard has been introduced to support the ATFM service, the appropriate ATS authority shall determine, disseminate, and periodically review the declared capacity for control areas, control sectors within a control area, and for controlled international aerodromes as determined by the State.

- Introduction of Operational Capacity, which is an update to the declared capacity based on prevailing circumstances, will be covered in PANS-ATM.

- FF-ICE and COMS updates:
  ICAO Doc 9965, Volume I was updated, and Volume II "Implementation Guidance" was added.

  ***Note 1**: ICAO Doc 9971 new chapter related to "Operational Handbook" was added.*
  ***Note 2**: The ICAO 11th Global ATFM Symposium is planned for Q3/Q4 2023.*

AGENDA ITEM 3: REGIONAL FRAMEWORK

Follow-up on MIDANPIRG/19 Outcomes

5.4 The subject was addressed in WP/3, presented by the Secretariat.

5.5 The meeting noted with appreciation the progress of the development of ICAO Doc 014: MID Region ATFM Plan V2.0, and encouraged States to implement MID ATFM Plan at National level and provide the ICAO MID with comments and feedback related to the implementation, by end of August 2022.

Operational Data Exchange Model

5.6 The subject was addressed in WP/4, presented by the Secretariat.

5.7 The meeting reviewed and amended the following operational documents extracted from the MID Doc. 014:

- ATFM LoA template at **Appendix A**;
- Quick reference to ATM Operational Data Exchange at **Appendix B**; and
- the proposed Checklist for ATFM service implementation assessment and monitoring at **Appendix C**.

5.8 Furthermore, the meeting noted that there are still areas of improvement to the documents and invited States to provide the MID Office with their comments/feedback related to Appendices A, B and C, not later than 15 August 2022, for consolidation and presentation in the upcoming ATM SG/8 meeting scheduled from 7 to 10 November 2022.

5.9 The meeting noted that many events are planned during the year 2022 (Hajj Season, FWC 2022, COP27), Accordingly, the meeting agreed to start on periodic basis the Operational Data Exchange (OPSDataEx) meetings; to support the ATM and ATC units planning during the period of increased traffic demand.

5.10 In this respect, the OPSDataEx meetings with MID States and Regional and International Organizations will be organized by ICAO MID Office in accordance with Agenda Item 4: Future Work Programme.

5.11 The initial phase of the OPSDataEx meetings will consist of the MID States. In later stages, additional stakeholders will be included. The meeting will be tasked to review the templates and ensure that the most compatible format would be used for gathering the data, based on Doc.014 and the current States capability to extract the data.

National ATFM Implementation Steps

5.12 The subject was addressed in WP/5, presented by the Secretariat.

5.13 Reference to the requirement of the new version of USOAP-CMA PQs, the meeting encouraged States to implement ICAO MID Doc. 014 Phase 1A (deadline December 2023) as indicated in part I chapter 5 of Doc. 014 and provide the MID Office with their comments/feedback on the plan, and progress/challenges on the implementation.

5.14 Additionally, the MID Office will explore the possibility to organize activities to support the States during Q3-Q4 of 2022 and Q1-Q2 of 2023.

States Experience and Challenges

Egypt

5.15 The subject was addressed in PPT/6A, presented by Egypt.

5.16 The meeting noted the efforts and challenges related to ATFM implementation in Egypt and the overlapping of the regional events that involve increased traffic demand: the 27th session of the 2022 United Nations Climate Change Conference (COP 27, 7 – 18 November 2022, Sharm El Sheikh, Egypt) and the Qatar FIFA World Cup 2022 (21 November – 18 December 2022) where measures are planned to support the traffic movements during the event.

5.17 The meeting encouraged Egypt to consider the experience from the Hajj season plan and FWC 2022 events and to consider the lessons learnt to address the expected challenges.

Saudi Arabia

5.18 The subject was addressed in PPT/6B, presented by Saudi Arabia.

5.19 The meeting noted the ATFM mechanism used in Saudi Arabia and the calculation methodology to monitor, predict and manage traffic demand during Hajj season 2022.

FIFA World Cup 2022 Framework

5.20 The meeting was apprised by Qatar regarding the status and progress of ATFM National regulations, and the measures planned to be implemented during the FWC 2022 Event.

5.21 The meeting was apprised with the establishment of QAT/FMU Service, installation of the ATFM Tool within Qatar ATC units and the recruitment and training of the required Staff; in preparation of the trial operations planned by 21 August 2022, and fully operational by 8 September 2022. In addition, the progress made related to the coordination and signature of the LoAs.

5.22 The meeting noted with appreciation the training conducted by Qatar CAA in Doha during the period of 27 – 30 March 2022; for the ATC units within the Region. The majority of the MID States attended the training (39 participants). Additionally, QCAA is planning another training for the remaining States who did not participate in the training due COVID-19 travel restrictions (mainly Egypt and Iran) prior the start of the trial period.

5.23 The meeting reiterated that the coordination with the airspace users is a fundamental element for ensuring the success of implementation of the changes required to effectively support the FWC 2022, and manage expectations from all parties, and ensure that the changes are adequately suitable for the airspace users, and where required to ensure the ability to comply with operational requirements to support the network. The meeting raised concerns related to the time available for engagement of airspace users, including data houses, and strongly urged QCAA to involve the users in the proposed plans of implementation and aeronautical publications.

5.24 IATA AME RO requested to organize a coordination meeting with QCAA, in preparation to the FWC 2022 ATFM implementation and stakeholders training.; In addition, IATA requested to plan a periodic operational call between the Users and the QCAA to monitor the operational plans. Furthermore, IATA stressed the need to ensure the publications are adequate/suitable for the correct interpretation by Flight Planning Systems, and Data Houses.

Flight Planning System Capabilities

5.25 The subject was addressed in WP/8, presented by the Secretariat, and complemented by the PPT presented by IATA at **Appendix D**.

5.26 The meeting was informed of the progress made related to the “Flight Planning System capabilities training and harmonize/standardize the ATFM related publications” organized by IATA for Oman. Accordingly, the meeting invited IATA to organize additional sessions for other States/ANSPs.

5.27 Based on the above, Egypt, Jordan, and Saudi Arabia expressed their willingness to participate in the training sessions with IATA.

MID ATFM Implementation Action Plan: Training phase

5.28 The subject was addressed in WP/9, presented by the Secretariat.

5.29 The meeting was informed about the status of key activities related to training and organizational structure in ATFM action plan. The meeting encouraged states to review Doc 014 Part I, **Appendix E** as well as proposed face-to-face workshop related to implementation of Doc 014 and calculation of Capacity in Q1 2023.

AGENDA ITEM 4: FUTURE WORK PROGRAMME

5.30 The meeting reviewed ATFM TF Terms of Reference, as at **Appendix F**.

5.31 The meeting reviewed and updated the MID ATFM and MID OPSData Exchange Focal Points list at **Appendix G**.

5.32 The meeting agreed that the ATFM TF/7 and TF/8 meetings be planned as follows:

- ATFM TF/7: be held virtual during the fourth quarter of 2022 before the ATM SG/8 meeting (7 – 10 November 2022).

- ATFM TF/8: be held before the MIDANPIRG/20 meeting (planned during May 2023).

5.33 The exact dates will be coordinated between the ICAO MID Office and the Chairperson of the ATFM Task Force according to the availability in the MID Office Work Programme.

5.34 The operational Data Exchange meetings to be organized on bi-weekly basis starting the end of July 2022.

AGENDA ITEM 5: ANY OTHER BUSINESS

5.35 Nothing has been discussed under this Agenda Item.

6. CLOSING

6.1 On behalf of the MID ATFM team, Mr. Hamad Al Belushi, the TF Chairperson, thanked all participants for their active participation, fruitful discussion, and valuable outcomes. He indicated that from his perspective, the tasks of the TF are progressing forward, in addition, the meeting itself is a suitable platform to share experience and practices related to ATFM among the States.

APPENDIX H - TEMPLATE FOR LETTER OF AGREEMENT (LOA)

ATFM LETTER OF AGREEMENT (LOA)

Effective date:

Subject: Air traffic flow management (ATFM) collaboration and coordination

~~ANSP1 and ANSP2 enter into this LoA to facilitate the safe and efficient movement of air traffic between and over both countries.~~

1. PURPOSE

The purpose of this LoA is to establish continuity of operations and ATFM procedures between unit 1 (FMU~~1~~)/ACC~~1~~ ~~the~~ flow management in (city/country) and unit 2 FMU~~2~~/ACC~~2~~ in (city/country). ~~This LoA is not intended to replace any local agreements between ANSP1 area control centres (ACCs) and ANSP2 ACCs.~~ This LoA will promote coordination and collaboration between FMU1/ACC1 and FMU2/ACC2 regarding traffic management measures and the routing of aircraft into and out of ~~ANSP1 and ANSP2~~those airspace. ~~FMU1/ACC1 and FMU2/ACC2 will be the primary points of contact for coordinating traffic management (TM) measures and operations between ANSP1 and ANSP2.~~

To achieve this objective, several layers of collaboration and coordination at national, cross border, multi-States and regional levels should be developed. The detail of the procedure is available in ICAO MID ATFM Plan (ICAO MID Doc 014), Part I, Appendix B.

2. SCOPE

The procedures outlined are for use by unit 1 FMU/ACC ~~FMU1/ACC1~~ and unit 2 FMU/ACC ~~FMU2/ACC2~~ to provide normal air traffic services (ATS).

3. BACKGROUND

a) ~~ANSP1~~ State 1 and ~~ANSP2~~ State 2 have established operational agreements creating cross-border communications and a seamless operational atmosphere. This agreement incorporates unit 1 FMU/ACC ~~FMU1/ACC1~~ and unit 2 FMU/ACC ~~FMU2/ACC2~~ operational procedures and practices.

b) traffic flow management continues to evolve as new procedures and technologies are developed. FIR 1 ~~ANSP1~~ TM measures may include departures from FIR 2 ~~ANSP2~~ airports. Likewise, FIR 2~~ANSP2~~ TM measures may include departures from FIR 1 ~~ANSP1~~ airports. The TM measures coordinated by either FMU/ACC may include MIT, MINIT, ground delay measures, ground stops and re-route initiatives.

Note: This list is not all-inclusive and other TM measures may be developed and coordinated to meet operational needs either between two adjacent FIRs or during regional coordination meeting.

4. RESPONSIBILITIES

a) Responsibilities of unit 1 FMU/ACC ~~FMU1/ACC1~~ Operations:

1) unit 1 FMU/ACC~~FMU1~~ is responsible for the flow management of traffic ~~to ANSP1 destinations and through ANSP1 airspace~~ in FIR 1 AoR as follows:

   i. unit 1 FMU/ACC ~~FMU1/ACC1~~ will coordinate with unit 2 FMU/ACC ~~FMU2/ACC2~~ before implementing TM measures that may impact ~~ANSP2~~ FIR 2 airspace and airports;

   ii. when FIR 2 ~~ANSP2~~ airspace and airports are included in a TM measure, advise unit 2 FMU/ACC~~FMU2/ACC2~~:

   – before implementing the TM measure;

   – what the TM parameters are; and

   – when the TM measure is cancelled;

   iii. unit 1 FMU/ACC ~~FMU1/ACC1~~ will coordinate with unit 2 FMU/ACC ~~FMU2/ACC2~~ before implementing aircraft reroutes affecting overflights and departures from FIR 2 ~~ANSP2~~ airports or airspace;

   iv. unit 1 FMU/ACC ~~FMU1/ACC1~~ must include unit 2 FMU/ACC ~~FMU2/ACC2~~ TM measures in the ATFM operations plan (OP) when it is likely that FIR 1 ~~ANSP1~~ stakeholders will be affected by these measures;

2) unit 1 FMU/ACC ~~FMU1~~ will ensure unit 2 FMU/ACC ~~FMU2~~ is informed of situations and conditions in ~~ANSP1~~ FIR 1 airspace that may require implementing TM measures affecting ~~ANSP2~~ FIR 2 traffic;

b) Responsibilities for unit 2 ~~FMU2~~ FMU/ACC Operations:

1) unit 2 FMU/ACC ~~FMU2~~ is responsible for traffic flow management of FIR 2 AoR ~~ANSP2 destinations and through ANSP2~~ airspace as follows;

   i. unit 2 FMU/ACC ~~FMU2~~ will coordinate with unit 1 FMU/ACC ~~FMU1~~ before implementing TM measures that impact departures from ~~ANSP1~~ FIR 1 airports;

   ii. when ~~ANSP1~~ FIR 1 airports are included in a TM measure, advise unit 1 FMU/ACC~~FMU1~~:

   – before implementing the TM measure;

   – what the TM parameters are; and

   – when the TM measure is cancelled;

   iii. unit 2 FMU/ACC ~~FMU2~~ must include unit 1 FMU/ACC ~~FMU1~~ TM measures in the ATFM OP when it is likely that ~~ANSP2~~ FIR 2 stakeholders will be affected by these measures;

   iv. unit 2 FMU/ACC ~~FMU2~~ must coordinate with unit 1 FMU/ACC~~FMU1~~ before implementing aircraft re-routes impacting departures from ~~ANSP1~~ FIR 1 airports or airspace;

2) unit 2 FMU/ACC ~~FMU2~~ will ensure unit 1 FMU/ACC ~~FMU1~~ is informed of situations and conditions, in ~~ANSP2~~ FIR 2 airspace that may require implementing TM measures affecting ~~ANSP1~~ FIR 1 traffic;

c) Responsibilities for unit 1 FMU/ACC ~~FMU1~~ and unit 2 FMU/ACC~~FMU2~~:

1) to streamline coordination, unit 2 FMU/ACC ~~FMU2~~ will be unit 1 FMU/ACC ~~FMU1's~~ sole point of contact within ~~ANSP2~~ FIR 2 and ~~FMU1~~ FIR 1 will be unit 2 FMU/ACC's ~~FMU2's~~ sole point of contact within ~~ANSP1~~ FIR 1 in regard to cross-border TM measures and routing of aircraft;

2) unit 1 FMU/ACC ~~FMU1~~ and unit 2 FMU/ACC ~~FMU2~~ will implement and manage TM measures, as necessary, to relieve congestion and to ensure the orderly flow of air traffic consistent with an equitable distribution of delays;

3) unit 1 FMU/ACC ~~FMU1~~ and unit 2 FMU/ACC ~~FMU2~~ will make every effort to limit the impact of TM measures on stakeholders and implement only those measures that will adequately address the system constraint;

4) the principal TM measures to be implemented will consist of MIT, MINIT, re-routes, en-route spacing measures, ground delay measures and ground stops;

Note: This list is not all-inclusive, and other TM measures may be developed and coordinated to meet operational needs.

5) unit 1 FMU/ACC ~~FMU1~~ and unit 2 FMU/ACC ~~FMU2~~ will collaborate on the design of preferred routes and severe weather avoidance routes that involve the use of both ~~ANSP1~~ FIR 1 and ~~ANSP2~~ FIR 2 airspace or resources; and

6) unit 1 FMU/ACC ~~FMU1~~ and unit 2 FMU/ACC ~~FMU2~~ will provide feedback and share data on the impact and assessment of joint TM measures, as required.

5. IMPLEMENTATION

The procedures outlined in this LoA will be implemented by operational personnel at unit 1 FMU/ACC ~~FMU1~~ and at unit 2 FMU/ACC~~FMU2~~. The means of communication ~~telephone numbers~~ for unit 1 FMU/ACC ~~FMU1~~ and unit 2 FMU/ACC ~~FMU2~~ personnel can be found in **Attachments** 1 and 2, respectively.

Since the real-time coordination is a backbone of CDM, an ATM/CDM Coordinator shall be appointed by the relevant states to lead the communication between all stakeholders at national level, who will also act as the point of contact for cross-border, multi-states, and regional coordination with the adjacent ANSPs/ACCs. The specification of the ATM/CDM Coordinator is available at ICAO MID Doc 014, Part I, Appendix B.

The ATM/CDM Coordinators from adjacent States should communicate together at least ---------- on a suitable time for both parties that ensure all matters related to operations as indicated in ICAO MID Doc 014, Part I, Appendix B are addressed in a timely manner.

Forms A, B, C and **D** presents a simplified ATM/CDM Telecom Templates to facilitate the daily discussions between adjacent ACCs or ATFM units to develop ATFM Daily Plan. The details and usage of each template is available at ICAO MID Doc 014, Part I, Appendix B.

6. REVIEW PERIOD

FMU1/ACC1 and FMU2/ACC2 agree to participate in a yearly review of this document.

Original signed by:

~~ANSP1~~State 1---------- ~~ANSP2~~ State 2 ----------

Date: ---------- **Date:** ----------

~~FMU1~~ANSP 1---------- ~~FMU2~~ ANSP 2 ----------

Date: ---------- **Date:** ----------

LOA-Attachment 1

The following are the primary and alternative points of contact for coordinating traffic management (TM) measures and operations between ANSP1 and ANSP2

(Name of the FMU/ACC) FMU/ACC Point of Contact – Main	
Name	
Position	
Email address – main	
Email address – alternate	
Telephone Number - work	
Telephone Number - mobile	
Other means	
(Name of the FMU/ACC)FMU/ACC Point of Contact – Standby	
Name	
Position	
Email address – main	
Email address – alternate	
Telephone Number - work	
Telephone Number - mobile	
Other means	

~~TELEPHONE NUMBERS FOR FMU1/ACC1~~

~~FMU1 Phone number(s): xxx xxx xxx~~

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LOA-Attachment 2

The following are the primary and alternative points of contact for coordinating traffic management (TM) measures and operations between ANSP1 and ANSP2

~~TELEPHONE NUMBERS FOR FMU1/ACC2~~

~~FMU1 Phone number(s): xxx xxx xxx~~

(Name of the FMU/ACC)FMU/ACC Point of Contact – Main	
Name	
Position	
Email address – main	
Email address – alternate	
Telephone Number - work	
Telephone Number - mobile	
Other means	
(Name of the FMU/ACC)FMU/ACC Point of Contact – Standby	
Name	
Position	
Email address – main	
Email address – alternate	
Telephone Number - work	
Telephone Number - mobile	
Other means	

Attachment 3- Template for Daily Teleconferences between States/ANSPs during COVID-19

	Telecom.	**Ref.**	**Date**	**Action/Remark**
1	Covering period (date and time)	From:	To:	*i.e. coming 12h, 24h, 5, 7 days*
2	Between State/ANSPs	State/ANSP A: [title] [Coordinator name] [email] [Telephone/mobile]	State/ANSP B: [title] [Coordinator name] [email] [Telephone/mobile]	
3	Greetings	---	----	
4	Brief Overview of the situation			
5	Describe the measures planned/implemented due COVID-19 and/or any changes to these measures that may have impact on traffic flow during the coming period. Consider airlines reported challenges/requirements			
6	Aerodromes specific issues affecting capacity such as VIP movements, special flights, infrastructure, weather, etc.			
7	En-route specific issues such ATM restrictions, Military operations, weather, status of CNS/ATM infrastructure, etc.			
8	Changes to Coordination Processes/Communication			
9	Preparation to the normalized situation:			
	a) ANSP readiness			
	b) Measures required during transition period			
	c) Inputs from airlines			
	d) Inputs from CCTs			
	e) Common Date of implementation and publication of NOTAM			
	f) other			
10	Other topics of mutual interest			
11	Required follow-up actions till next telecom			
12	Agreement what and who will report any relevant information or decisions to the relevant ICAO Regional Office and/or CCT			
13	Summary			

Attachment 4-Template for Daily Teleconferences between Adjacent ACCs or ATFM units

	Telecom #.			
1	Covering period (date and time)	From:	To:	*i.e. coming 12h, 24h, 5, 7 days*
2	Between State/ANSPs	State/ANSP A: [title] [Coordinator name] [email] [Telephone/mobile]	State/ANSP B: [title] [Coordinator name] [email] [Telephone/mobile]	
3	Greetings	---	----	
4	Brief Overview of the situation			
5	Describe the issues that may have impact on traffic flow during the coming period:			
	a) Weather: current or forecasted weather that would have impact on en-route or aerodrome operations such as reduced visibility, hurricanes, sandstorms, turbulence, thunderstorm activities, volcanic ash, etc.			
	b) Infrastructure (NAVAID outage, GNSS signal interference, planned maintenance, radar outage, direct COM issues, etc.) NOTAMed or planned to take place.			
	c) Military activities			
	d) Special movements			
	e) Special events			
	f) Pandemic-related issues			
	g) Others			

6	Aerodromes issues			
	a) Airport capacity			
	b) Projected terminal demand;			
	c) Anticipated ATFM measures (MDI, MIT, GSt, GDP, MINIT, etc.)			*Refer to Doc 9971 Chap 4 Section 4.5*
	d) Other			
7	En-route issues			
	a) Airspace capacity (Sector capacity)			
	b) Changes to traffic flow with highlight on relevant Entry/Exist Points.			
	c) ATS Routes status (available, closed, CDR, DCTs, etc.)			
	d) Anticipated ATFM measures (MDI, MIT, MINIT, Re-route, etc.)			*Refer to Doc 9971 Chap 4 Section 4.5*
	e) Other			
8	Coordination Process/Communication			
	a) Discuss changes to way of communication and exchange of info and coordination, of traffic between the 2 ATS units, if any. This would include, Direct Speech, OLDI/AIDC, AFTN Messages, etc.			
	b) Transfer of control points			
	c) Flight level restrictions at entry/exit points			
	d) Expected frequency changes in case of Sector opening/closure or combining sectors.			
	e) Other			
9	Other topics of mutual interest			
10	Required follow-up actions till next telecom			
11	Agreement what and who will report any relevant information or decisions to the relevant ICAO Regional Office and/or CCT			
12	Summary			

Attachment 5-Template for Daily traffic demand between Airspace users and ANSPs

No	Flt No.	DEP	ARR	ETD	ETA	Operating Days							FR1-FR2			FR2-FR3			FR3-FR4			FR4-FR5…			Priority/phase	Remarks
						Sundays	Mondays	Tuesdays	Wednesdays	Thursdays	Fridays	Saturdays	WP/Fix	Time	FL	WP/Fix	Time	FL	WP/Fix	Time	FL	WP/Fix	time	FL		
1	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
2	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
3	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
4	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
5	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
6	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
7	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
8	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
9	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
10	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
11	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
12	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
13	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
14	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
15	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
16	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
17	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_

Attachment 6-Template of the Hourly Distribution of traffic on Entry/Exit points FIR

Note	*Declared Capacity:*	*Defined number of traffic that could be accepted on each point taking into consideration the available FLs, separation, ATCO workload, airspace complexity, etc.*
	No. of traffic:	*Based on inputs received form airlines or FPLs (Appendix C)*
	The spreadsheet could also be used to analysis the distribution of traffic and impact of rerouted traffic due to contingency situation.	
	% columns and Total column are formulas based for automatic calculation	

No.	Way Points	E=Entry X=Exit B=both	0:00z			1:00z…		
			Declared Capacity	No. of Traffic	%	Declared Capacity	No. of Traffic	%
1								
2								
3								
4								
5								
6								
7								
8								
9								

Airspace/Aerodrome Users (AUs) demand

VS

Declared Capacity

- **Strategic** (ATFM PLAN-Phase 1A)
- **Pre tactical**
- **Tactical**

Demand exceeds than capacity?

No

No adverse effect on traffic flow in adjacent FIR(s)/Region(s)

Yes

Adverse effect on traffic flow in adjacent FIR(s)/Region(s)

Predictable?

- **National Level**
- **Cross border**
- **Multi-States**
- **Regional.**

Yes

In addition of the procedures lied down in the second part, Advance notification and coordination shall be done by the relevant state's coordinator in a timely manner.

No

- National CDM Committee (ATS, MET, AIS, CNS, SAR, PANS-OPS, regulator, AUs, airport operators, military, etc.) should be established
- Decision should be taken to optimize the airspace
- Committee should hold frequent (preferable daily) coordination meetings to address:
  - operational status
  - agree on the measures to be implemented
  - mitigate the associated challenges
- A-CDM will facilitate the work of the CDM Committee
- An ATM/CDM Coordinator should be appointed to lead the communication between all stakeholders at national, cross border, multi-states, and regional levels
- At cross-border level, coordinator should exchange the information among stakeholders on a real-time basis by any available means as indicated in LoA
- Based on LoA, the ATM/CDM Coordinators from States should communicate together at least once a day.
- For ATFM Daily Plan, **forms "A" & "B"** are to facilitate the daily discussions between adjacent ACCs or ATFM units
- ICAO MID Office consolidate the inputs received from relevant States or Group of States as well as those provided by the AUs and share it as required for regional/inter-regional consideration.
- ICAO MID Office should organize the weekly or bi-weekly basis teleconferences with States and Organizations concerned. During these regional discussions, the relevant ICAO State Letters as well as the matters reported by States and the challenges reported by AUs should be addressed.
- recovery plan, should be developed based on airlines and ANSPs data including:
  - IATA, by using **form "C",** provide plan/forecast flights for each FIR; and
  - **form "D"** could be used by ANSPs to count hourly distribution of traffic at each entry/exit point.

Note: detail information regarding each element is available in ICAO MID Doc 014, Version 2, Part II Chapter 5.

Checklist for ATFM service implementation assessment and monitoring						**State …….**
Row	Phase	Task	Subtask/parameters should be considered	Deadline/intervals	Applicable area	Status
1.	**IA**	ATFM Regulations		December 2023	States where traffic demand at times exceeds, or is expected to exceed declared capacity	
2.		Strategic Capacity and Demand Monitoring and Analysis	CNS systems;	A regular program of bi-annual strategic airport and airspace capacity and demand analysis	should be implemented for all international airports and associated terminal area airspace, and for all en-route ATC sectors. Where strategic analysis indicates that demand does not yet exceed capacity, preparation for the implementation of ATFM capability should be based on careful analysis of current traffic and expected growth in the next 5 years	
			ATC resources and capability;			
			ATC separation standards and techniques;			
			runway occupancy times;			
			seasonal schedules; and			
			historical traffic data and traffic growth forecasts.			
3.		Pre-Tactical Capacity and Demand Monitoring and Analysis	expected runway and airspace configurations;	Daily pre-tactical airport and airspace capacity and demand analysis should be conducted	all ATFM Program Airports and associated terminal area airspace, and for all en-route ATC sectors	
			forecast meteorological phenomena;			
			ATC resources, facilities and equipment;			
			other known or expected capacity constraints; and			
			updated flight schedule and flight plan information.			
4.		Pre-Tactical ATFM Execution	Web-based ATFM network; or	Daily basis	ATFM Daily Plan (ADP) for all ATFM Program Airports and associated terminal area airspace, including airport and airspace capacity declarations and related background information, should be	
			Web-pages hosted by each participating ANSP; or			
			c) Email distribution.			

					prepared and distributed to all relevant stakeholders.	
5.		Post-Operations Analysis		Daily basis	The accuracy and effectiveness of capacity and demand analyses and ADP preparation and distribution, including supporting information should be verified through comparison with operational outcomes observed, and rectification of discrepancies included in planning for system and process improvements.	
6.	**IB**	ATFM Systems	Operational FPL and ATS message distribution systems and processes should be analysed and, where necessary, modified to ensure that FPL, CHG, DEP, DLA and CNL messages are originated, distributed and processed.	December 2024	States where traffic demand at times exceeds, or is expected to exceed declared capacity	
			Requirements should be published in the State AIP, specifying that, except where necessary for operational or technical reasons, FPL should be submitted not less than 3 hours prior to EOBT.			
			A DLA message should be transmitted when the departure of an aircraft, for which basic flight plan data FPL has been sent, is delayed by more than 15 minutes after the estimated off-block time contained in the basic flight plan data.			
			Where the delay is the result of a GDP, the DLA message should be sent by the ATFMU responsible for the destination airport, addressed to the ATS unit serving the departure aerodrome for subsequent transmission			

			Appropriate procedures should be implemented to ensure that FPL are not discarded from other ATM systems as a consequence of ATFM delay.			
			ATFM, AMAN/DMAN and A-CDM systems should be integrated through the use of common fixes, terminology and communications protocols to ensure complementary operations.			
7.		Capacity Improvement	Airport and terminal airspace capacity should be increased through optimized ATC separation standards and techniques and reduced runway occupancy.	December 2024	all ATFM Program Airports and associated terminal area airspace, and for all en-route ATC sectors	
			using a performance-based approach, terminal area ATS route structure improvements including CCO/CDO should be implemented to reduce ATC and pilot workload and enable better use of aircraft capability to meet ATFM measures.			
8.		Strategic ATFM Execution	Implement strategic airport slot allocation, for periods where demand significantly exceeds the airport's capacity.	December 2024	at all international airports	
9.		Pre-Tactical Capacity and Demand Monitoring and Analysis	Pre-tactical modelling of expected airport and airspace configuration and traffic demand, and the effect of ATFM measures.	December 2024	all ATFM Program Airports and associated terminal area airspace, and for all en-route ATC sectors	
10.		Pre-Tactical ATFM Execution	CDM capability should be implemented, enabling the sharing of all relevant information with all stakeholders, providing continuous	Daily and ad-hoc ATFM conferences.	States where traffic demand at times exceeds, or is expected to exceed declared capacity	

			availability of information and common reference material.			
11.		Tactical Capacity and Demand Monitoring and Analysis	Dynamic update of airport and airspace capacity constraints, capacity calculation, demand information using schedule, flight plan and ATS messaging, and ATM system information and modelling of tactical ATFM programs should be implemented.	December 2024	all ATFM Program Airports and associated terminal area airspace, and for all en-route ATC sectors	
12.		Tactical ATFM Execution	Tactical ATFM at ATFM Program Airports should be implemented using Ground Delay Programs (CTOT), or Minutes in trail (MINIT) or miles in trail (MIT) or other ATFM measures.	December 2024	all ATFM Program Airports and associated terminal area airspace, and for all en-route ATC sectors	
			Implement local ATC procedures and, where available, CDM processes facilitating compliance with received CTOT		All States	
			CTOT for individual aircraft should, where necessary, be revised, cancelled, suspended or de-suspended.		all ATFM Program Airports and associated terminal area airspace, and for all en-route ATC sectors	
			Tactical ATFM should be implemented for operations through constrained airspace sectors, only during periods affected by the constraint.			
			As far as practicable, individual aircraft should not be subject to more than one tactical ATFM measure per flight.			
13.		Post-Operations Analysis	Procedures and agreements should be developed to ensure post-operational analysis of cross-border ATFM	December 2024		

			programs, including the canvassing and consideration of feedback from airspace users, airports operators, ATS and other ATFM units		all ATFM Program Airports and associated terminal area airspace, and for all en-route ATC sectors	
			Daily post-operations analysis conferences should be held, supplemented where necessary by ad-hoc conferences called to assess the outcomes of programs of ATFM measures responding to non-normal situations.			
			The results of post-operations analyses should be used for planning ATFM, airspace and ATS route improvements.			
14.	**II**	ATFM Systems	Distributed multi-nodal ATFM information distribution capability utilizing FIXM version 3.0 (or later) should be implemented, including: i. Sharing of ADP and dynamically updated demand and capacity data; ii. Slot allocation information for all flights subject to ATFM programs, including as a minimum CTOT, CTO and CLDT information; iii. Authorized user functions for slot amendment, cancellation or suspension (ATFMU), and slot-swapping (aircraft operator and ATFMU); and iv. Automated slot compliance monitoring and reporting, supplemented where necessary	December 2027	all ATFM Program Airports and associated terminal area airspace, and for all en-route ATC sectors.	

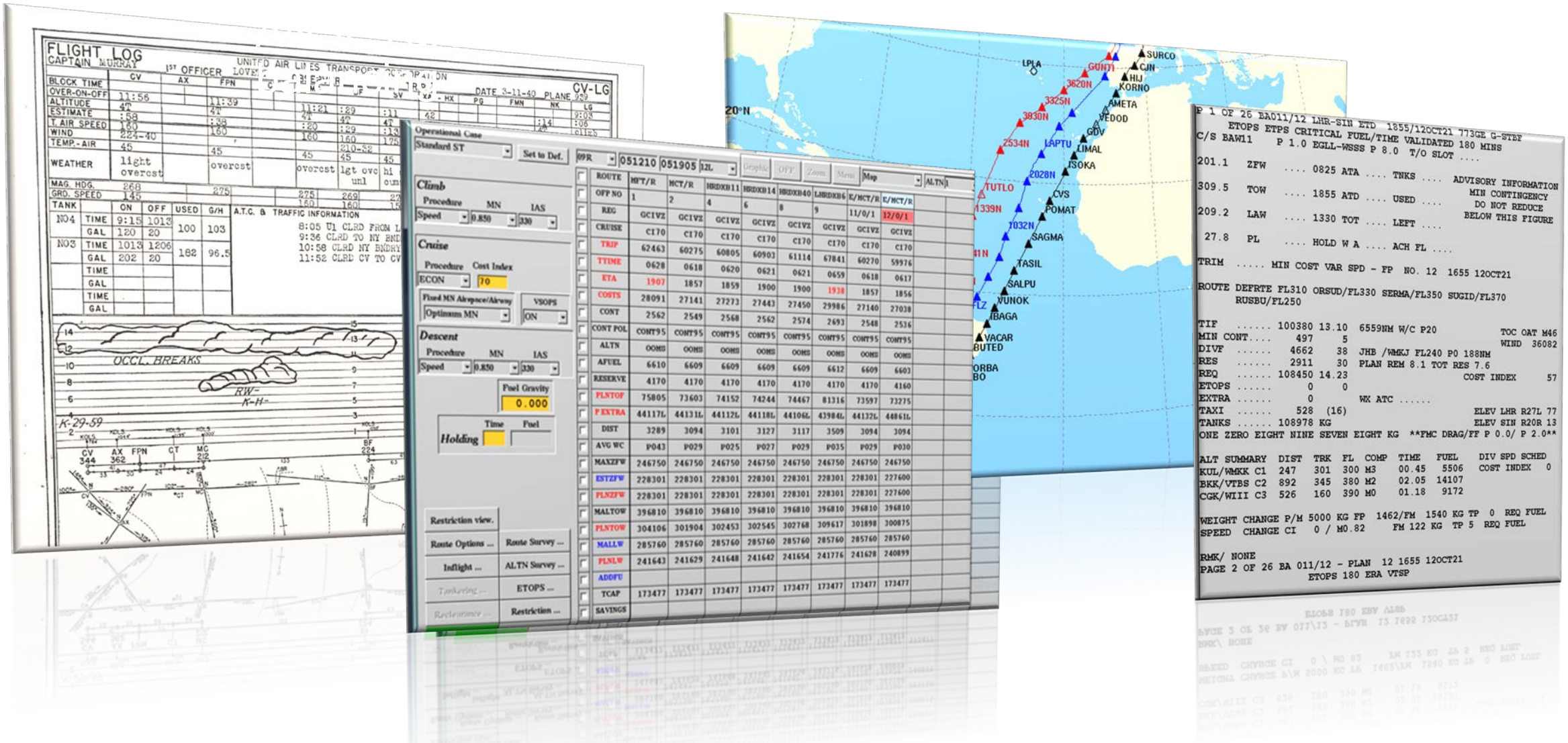
			by authorized inputs by ATFMU, ATSU or airspace operator.			
			Full interoperability of cross border ATFM, A-CDM, AMAN, DMAN, ATM automation and airspace user systems should be implemented, utilizing FIXM 3.0 (or later), to provide seamless gate-to-gate collaborative ATFM operations.			
15.		Pre-Tactical Capacity and Demand Monitoring and Analysis	Automated modelling of expected airport and airspace configuration and traffic demand, and the effect of ATFM measures, should be implemented.	December 2027	all ATFM Program Airports and associated terminal area airspace, and for all en-route ATC sectors.	
16.		Tactical Capacity and Demand Monitoring and Analysis	Meteorological services to support ATM in the terminal area (MSTA) should be implemented, including near-term or now-casting forecasts of convective weather activity.	December 2027	All ATFM Program Airports and associated instrument approach procedures, terminal area ATS routes and holding points and other significant locations.	
17.		Tactical ATFM Measures	ATFM measures including MIT, MINIT and, where necessary, CTO at AFIX or RFIX.	December 2027	should be applied in constrained airspace	
			Ground Delay Programs utilizing CTOT should be applied to: i. aircraft destined for constrained ATFM Program Airports, that have not yet departed; and ii. aircraft planned to operate through constrained airspace where tactical ATFM measure			

			CTO at RFIX or AFIX is in place, that have not yet departed.			
			ATFM systems should have the capability to take into account long haul flights.			
			Systems should be in place to ensure the timely update of estimate information for airborne aircraft.			

ATFM – TF
Flight Planning System Capability

Sharron Caunt
Regional Director Safety & Flight Operations
Africa & Middle East

Flight Dispatch


FLIGHT LOG
CAPTAIN MURRAY
1ST OFFICER
UNITED AIR LINES TRANSPORT
DATE 3-11-40 PLANE
CV-LG
BLOCK TIME
OVER-ON-OFF
ALTITUDE
ESTIMATE
T. AIR SPEED
WIND
TEMP.-AIR
WEATHER
MAG. HDG.
GRD. SPEED
TANK
A.T.C. & TRAFFIC INFORMATION
OCCL. BREAKS
RW-
K-H-
K-29-59
Operational Case
Standard ST
Set to Def.
Climb
Procedure
MN
IAS
Speed
0.850
330
Cruise
Procedure
Cost Index
ECON
70
Fixed MN Airspace/Airway
Optimum MN
VSOPS
ON
Descent
Fuel Gravity
0.000
Holding
Time
Fuel
Restriction view.
Route Options ...
Route Survey ...
Inflight ...
ALTN Survey ...
Tankering ...
ETOPS ...
Redispatch ...
Restriction ...
ROUTE
OFP NO
REG
CRUISE
TRIP
TTIME
ETA
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PLNTOW
MALLW
PLNLW
ADDFU
TCAP
SAVINGS
LPLA
SURCO
CJN
HIJ
KORNO
AMETA
VEDOD
GDV
LIMAL
ISOKA
CVS
POMAT
SAGMA
TASIL
SALPU
VUNOK
IBAGA
VACAR
BUTED
TUTLO
LAPTU
GUNJI
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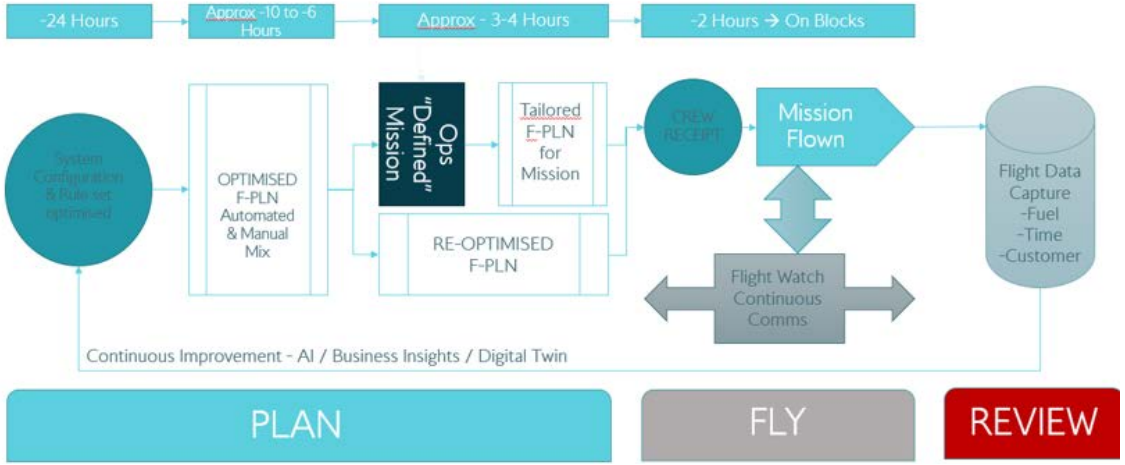
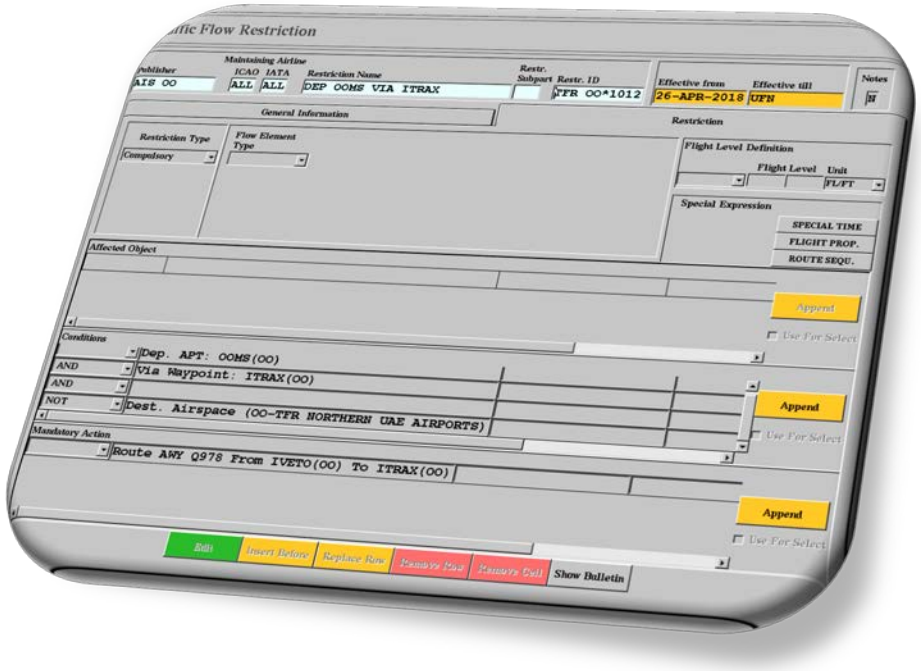
3325N
3830N
2534N
2028N
1339N
7032N
20°N
P 1 OF 26 BA011/12 LHR-SIN ETD 1855/12OCT21 773GE G-STBI
ETOPS ETPS CRITICAL FUEL/TIME VALIDATED 180 MINS
C/S BAW11 P 1.0 EGLL-WSSS P 8.0 T/O SLOT ....
ADVISORY INFORMATION
MIN CONTINGENCY
DO NOT REDUCE
BELOW THIS FIGURE
TRIM ..... MIN COST VAR SPD - FP NO. 12 1655 12OCT21
ROUTE DEPRTE FL310 ORSUD/FL330 SERMA/FL350 SUGID/FL370
RUSBU/FL250
TOC OAT M46
WIND 36082
JHB /WMKJ FL240 P0 188NM
PLAN REM 8.1 TOT RES 7.6
COST INDEX 57
WX ATC .....
ELEV LHR R27L 77
ELEV SIN R20R 13
ONE ZERO EIGHT NINE SEVEN EIGHT KG **FMC DRAG/FF P 0.0/ P 2.0**
ALT SUMMARY DIST TRK FL COMP TIME FUEL DIV SPD SCHED
KUL/WMKK C1 247 301 300 M3 00.45 5506 COST INDEX 0
BKK/VTBS C2 892 345 380 M2 02.05 14107
CGK/WIII C3 526 160 390 M0 01.18 9172
WEIGHT CHANGE P/M 5000 KG FP 1462/FM 1540 KG TP 0 REQ FUEL
SPEED CHANGE CI 0 / M0.82 FM 122 KG TP 5 REQ FUEL
RMK/ NONE
PAGE 2 OF 26 BA 011/12 - PLAN 12 1655 12OCT21
ETOPS 180 ERA VTSP

You’re Invited ……





Insight on the Planning, Considerations, Decision Making of Airlines in Route Planning

FPL SYS Capability Supporting Regional AT(F)M

Table of Contents

PART I – MID ATFM FRAMEWORK

PART I

MID ATFM FRAMEWORK

1. Scope of the Framework

Regional Air Traffic Flow Management

1.1 This MID Regional Air Traffic Flow Management (ATFM) framework was developed based on ICAO Doc 9971, ICAO MID Air Traffic Flow Management – Concept of Operation (MID Doc 014 V1.0) and the Asia/Pacific Regional ATFM framework.

1.2 In the respect of traffic operation in the MID Region, the airspace and main airports have the following characteristics:

a) MID airspace influenced by verity of overflight traffic mainly at the interface between Asia APAC and EUR/NAT;
b) Extensive operation of major/hub airports in the region;
c) Globally operation of MID famous airlines (those airlines have been ranked among the best top ten);
d) During Haj season, additional traffic operation/movement will be imposed to MID airspace and associated airports;
e) Except during COVID-19 pandemic crisis, the annual traffic growth in the region is more than 5%;
f) However, most of the concerned states have already implemented ICAO SARPs in line with global improvement and invested on new technologies/equipment to build and optimize the capacity at the airports and airspace to the maximum extent possible, some airspace and airports are already saturated;
g) Interest and ability of the MID states for being host of major global events;
h) Tourism attraction destinations in the region; and
i) Potential of contingency events and crises in the region and its interfaces.

1.3 The ICAO MID Air Navigation Strategy (MID Doc 002) provides a blueprint for coordinated Regional development, including capability improvements described in the ICAO Doc 9750 (Global Air Navigation Plan (GANP) - Sixth Edition) regarding ICAO Aviation System Block Upgrades (ASBU) roadmap. Air Traffic Flow Management (ATFM) taking a network view, is a key module in ASBU Blocks zero, one, two and three. B0/1-NOPS element – Initial integration of collaborative airspace management with air traffic flow management - has been identified by MIDANPIRG/18 as one of thirty-five priority 1 for the MID Region.

1.4 The need for MID regional ATFM framework focusing on Multi-Nodal solution. A key to the concept is that each State/ANSP would be responsible for implementing ATFM programs to airports and airspace within their area of responsibility according to the concept illustrated in this document. Information sharing between the ATFM systems would allow the users from any of the systems to have access to network-wide information multi-State implementation, was solution was endorsed by MAPANPIRG/18 through the following Conclusion:

MIDANPIRG CONCLUSION 18/28: MID REGION ATFM CONOPS

That, the MID Region ATFM CONOPS V1.0 is endorsed and be published as MID Doc 014 on the ICAO MID website.

1.5 A core concept of the Framework is the distributed multi-nodal ATFM network, envisaged as interconnected States and/or sub-Regional groups operating in an ATFM network without the need for any central, physical facility providing the network management function. In this regard the meeting also endorsed the ATM Operational Data Exchange process, which was developed by the ATFM TF and the secretariat based on ICAO ATM/CDM data exchange process. Accordingly, the meeting agreed to the following MIDANPIRG Conclusion:

MIDANPIRG CONCLUSION 18/29: ATM OPERATIONAL DATA EXCHANGE

That, in order to ensure better coordination between ANSPs and improve ATS planning:

a) The MID ATM Operational Data Exchange process at Appendix 5.2L, is endorsed.

b) Airspace users are invited to share with the ICAO MID Office the data related to their "Intention To Operate (ITO)" on monthly basis, for posting on the ICAO MID Office Secure Portal (Group "RO-MIDITO");

c) States be urged to nominate Focal Points/Coordinators for ATM data exchange; in order to be granted access to the ITO data available on ICAO MID secure portal;

d) ICAO MID Office to organize periodic coordination meetings for ANSPs to exchange ATM operational data; and

e) States ensure that the ITO and ATM Operational data are used solely for airspace management and ATC planning purposes during the recovery phase, and should not be shared outside the ATM community as it contains operational and financial sensitive data.

Note 1: The group was established in the ICAO MID Secure Portal and Group name was renamed to be OPSDataEX.

Note 2: The Framework will, in its future versions, be expanded and adjusted where necessary as the concept matures and experience is gained from operational implementation of cross-border, network-based ATFM and its supporting technology.

1.6 ICAO Doc 9971 states that in its initial application, ATFM need not involve complicated processes, procedures or tools. The goal is to collaborate with system stakeholders and to communicate operational information to airspace users, ANSPs, and to other stakeholders in a timely manner. Version 1.0 of the Framework includes near to medium term performance objectives to prepare and guide States in the implementation of collaborative, cross-border ATFM, providing for regionally harmonized ATFM concepts, communications and practices.

Framework Structure

1.7 The Framework, developed by the ICAO MID ATFM TF/6, will be reviewed by ATM SG/7 and will be presented to MIDANPIRG/19 for endorsement, as a part of regional ANP documents relevant to the ICAO MID Region.

1.8 Global vision and strategy perspectives are provided by the Global ATM Operational Concept (Doc 9854), Global Air Navigation Plan (GANP, Doc 9750 6th edition), and Global Aviation Safety Plan (GASP, Doc 10004). The GANP includes the Aviation System Block Upgrade (ASBU) framework, its Modules and its associated technology Roadmaps.

1.9 The Framework includes analysis of the current situation, a performance improvement plan, and considerations for research and future development.

1.10 The performance objectives of the Framework are expected to be implemented in Level aligned, with the ICAO MID Air Navigation Strategy (MID Doc 002). The MID Region ATFM framework is expected to be implemented in the following Levels:

- Level I, expected implementation by 31 December 2022 (aligned with MID Doc 002, priority 1);

- Level II, expected implementation by 31 December 2023 (aligned with MID Doc 002, priority 2 and further decision/update in MIDANPIRG/19); and

- Level III, expected implementation by 31 December 2025. (aligned with MID Doc 002, the rest of ASBU related Threads/Elements and further update in coming MIDANPIRG meeting)

1.11 None of the above Levels or any element of the Framework is binding on any State, and they should be considered as a planning framework. It is important to note that, the Framework's Level commencement dates are planning targets. They should not be treated as a 'hard' date such as the example of Reduced Vertical Separation Minimum (RVSM) implementation. In that case there was a potential major regional problem if all States did not implement at the same time by the specific agreed date, which is clearly not the case for the start of the Framework Levels.

1.12 In that regard, although it would be ideal if all States achieved capability on day one of Level I, this is probably not realistic. States should, however, consider the impact on stakeholders and on the needed improvements in cross-border ATFM and the ATM system overall that would result from not achieving target implementation dates. The Framework dates, were chosen as being an achievable target for the majority of States. However the dates were not designed to accommodate the least capable State, otherwise the region as a whole would fall behind the necessary urgent ATM improvements required by MIDANPIRG (regional level) and GANP (global level).

Document Review

1.13 The Framework is intended, as a minimum, to be reviewed by ATM SG and annual based thereafter. More frequent review and amendment will be conducted as recommended by ATFM TF that will be agreed by ATM SG and endorsed by MIDANPIRG.

2. Development and Objectives of the Framework

Framework Development

2.1 The MID Region ATFM/TF was formed by the MID ATM SG and established by MIDANPIRG to inter alia, develop a common Regional ATFM CONOPS and framework which addresses ATFM implementation and ATFM operational issues in the MID Region.

2.2 The Framework was developed by ICAO MID ATM ROs with contribution of ATFM TF Chairman, reviewed by MID State during ATFM TF/6 and ATM SG/7. The Framework was endorsed by the MIDANPIRG/19, Jeddah, Saudi Arabia, February 2022.

2.3 The Framework draws on relevant experience gained in MID Region States and other Regions particularly Asia/Pacific. Key concepts used or adapted in the Framework include:

- A distributed multi-nodal cross-border ATFM network rather than a regionally centralized facility;

- The MID ATM Operational Data Exchange process endorsed as a practical model for ATFM information exchange and coordination;

- Airspace users are invited to share with the ICAO MID Office the data related to their "Intention To Operate (ITO)" on monthly basis; for solely airspace management and ATS units planning purposes by posting them on the ICAO MID Office Secure Portal (Group "OPSDataEX");

- States nominated Focal Points/Coordinators for ATM data exchange; in order to be granted access to the ITO data available on ICAO MID secure portal; and

- ICAO MID Office to organize periodic coordination meetings for ANSPs to exchange ATM operational data. When it becomes operationally required.

2.4 The performance objectives of the Framework are, wherever practicable, aligned with the ATFM-related objectives and implementation timelines of the ICAO MID Air Navigation Strategy (MID Doc 002).

2.5 Further development of the Framework beyond this version will be guided by the concepts discussed in its Research and Future Development section, and by the experience gained in operational implementation and the maturing distributed multi-nodal ATFM network concept. ATFM and Collaborative Decision-Making.

ATFM Framework Objective

2.6 Having considered relevant documents such as the Global Air Navigation Plan (Doc 9750 6th edition), the ICAO MID Air Navigation Strategy (MID Doc 002) and the Manual on Collaborative Air Traffic Flow Management (Doc 9971), the objective of the Framework is to provide a regionally agreed framework for the harmonized implementation of networked, interoperable, multi-FIR, multi-State, cross-boundary collaborative ATFM capability.

2.7 The Framework provides information, guidance and performance objectives including:

- ATFM principles;
- ATFM-related Aviation System Block Upgrades (ASBU), and relevant performance objectives from the ICAO MID Air Navigation Strategy;
- Collaborative decision-making (CDM);
- ATFM phases;

- Airspace and airport capacity improvement, planning, assessment and declaration;
- ATFM daily plan;
- ATFM terminology, communications and information distribution;
- Meteorological information for ATFM;
- Distributed multi-nodal ATFM network concept;
- Training and competencies for ATFM personnel;
- Analysis of current ATFM capability in the Region;
- A performance improvement plan; and
- Considerations for research and future development.

The Need for a Regional Framework for Collaborative ATFM

2.8 The MID Region is well known for its attractive business, religious and pleasure destination. This area geographically located at interface between Asia APAC and EUR/NAT airspaces. The number of air traffic operation and airport movements are extremely high. The annual air traffic growth in the region, except during COVID-19, is still increasingly to more than 5%. Those outstanding factors, encouraged MID States to invest in aviation by developing state of the art airports, establishment of famous airlines, enhance level of ANS or combination of those elements.

2.9 While recognizing that the first response to increased demand should always be an increase in capacity, the growing demand/capacity imbalance in the Region has resulted in increasing congestion, delays, costs and potential safety risks.

2.10 The need for a regional, network-based response to the challenges of increasing demand was recommended in the ICAO ATFM Seminar (Dubai, UAE, from 13 to 15 December 2016). Consequently, MIDANPIRG/16, through Decision 16/16 endorsed to establish ATFM Task Force as follows:

MIDANPIRG DECISION 16/16: ATFM TASK FORCE

That,

a) an ATFM Task Force be established to develop an ATFM Concept of Operations for the MID Region;

b) the ATM SG/3 meeting develop the terms of reference of the ATFM Task Force; and

c) States support the ATFM Task Force through:

d) assignment of ATFM Focal Point to contribute to the work of the Task Force; and

e) provision of required data in timely manner, and in particular to the survey that will be carried out related to the airspace and sectors capacity, hot-spots, ATFM measures/system, etc.

Distributed Multi-Nodal ATFM Network Concept

2.11 The ATFM TF/2 proposed the Multi-Nodal Concept for the MID Region as a first Level, which would be evolved to a centralized ATFM system in the future. Accordingly, MIDANPIRG/17 agreed to the following Conclusion:

MIDANPIRG CONCLUSION 17/22: MULTI-NODAL ATFM Solution for the MID Region

That,

a) the Multi-Nodal Concept be implemented in the MID Region, as a first phase, which would be evolved to a centralized ATFM system in the future; and.

b) the ATFM Task Force develop the ATFM Concept of Operations for MID Region, accordingly, including the minimum flight data that should be exchanged by ATFM Units.

2.12 Also the MIDANPIRG/17 meeting highlighted that Asia Pacific Multi-Nodal documents including CONOPS, Regional Framework and Common Operating Procedures, would be used as basis for the development of the MID Region ATFM Documentation. In this regard, the meeting agreed to the following MIDANPIRG/17 Conclusion:

MIDANPIRG CONCLUSION 17/23: Action Plan for the Implementation of ATFM in the MID Region

That,

a) the Action Plan for the implementation of ATFM in the MID Region at Appendix 6.2J is endorsed; and

b) States and Stakeholders to support the work of the ATFM Task Force and implement the actions relevant to them.

2.13 The ATFM TF/4 proposed the draft of MID ATFM CONOPS version 1.1 to the MIDANPIRG/18 meeting. The draft was reviewed and endorsed by MIDANPIRG/18 meeting through the following Conclusion:

MIDANPIRG Conclusion 18/28: MID Region ATFM CONOPS

That,

the MID Region ATFM CONOPS V1.0 is endorsed and be published as MID Doc 014 on the ICAO MID website.

ATM Operational Data Exchange process is the Key

2.14 Accordingly, the MIDANPIRG/18 meeting reviewed and endorsed the ATM Operational Data Exchange process its Appendix 5.2L, which was developed by the ATFM TF/4 and the secretariat based on ICAO ATM/CDM data exchange process. In this respect, the meeting agreed to the following MIDANPIRG Conclusion:

MIDANPIRG Conclusion 18/29: ATM Operational Data Exchange

That, in order to ensure better coordination between ANSPs and improve ATS planning:

a) The MID ATM Operational Data Exchange process at Appendix 5.2L, is endorsed.

b) Airspace users are invited to share with the ICAO MID Office the data related to their "Intention To Operate (ITO)" on monthly basis, for posting on the ICAO MID Office Secure Portal (Group "RO-MIDITO");

c) States be urged to nominate Focal Points/Coordinators for ATM data exchange; in order to be granted access to the ITO data available on ICAO MID secure portal;

d) ICAO MID Office to organize periodic coordination meetings for ANSPs to exchange ATM operational data; and

e) States ensure that the ITO and ATM Operational data are used solely for

airspace management and ATC planning purposes during the recovery phase, and should not be shared outside the ATM community as it contains operational and financial sensitive data.

Note: The group was established in the ICAO MID Secure Portal and Group name was renamed to "OPSDataEX".

3. Background Information

ATFM Principles

3.1 The major areas of Collaborative ATFM principles are mainly aligned with those of the ICAO MID Air Navigation Strategy (MID Doc 002), MID ATFM CONOPS endorsed by MIDANPIRG 18/28, ATM Operational Data Exchange process agreed by MIDANPIRG 18/29 and MID ATFM Action Plan endorsed by MIDANPIRG 17/23 included at ***Appendix A.*** The action plan is continuously reviewed and updated by the ATFM TF.

ATFM-Related Aviation System Block Upgrades (ASBU)

Note: in this section, the valid and update reference for each element applicability area, performance indicators/supporting metrics and timeline is MID Air Navigation Strategy (MID Doc 002).

3.2 The ICAO ASBU threads and elements, detailed in Doc 9750 – Global Air Navigation Plan (GANP) 6th edition, describes a way to apply the concepts defined in Doc 9854 – Global Air Traffic Management Operational Concept (GATMOC), with the goal of implementing regional and global performance improvements. They are intended to provide a set of aviation system solutions or upgrades that exploit current aircraft equipage and capability, and to establish a transition plan enabling global interoperability. The ASBUs comprise a suite of modules organized into flexible and scalable building blocks where each module represents a specific, well-bounded improvement. The modules may be introduced and implemented in a State or region depending on the need and level of readiness. It is recognized that all the modules are not required in all airspaces.

3.3 Based on APAC experience to address the prerequisites of ATFM implementation from ASBU point of view (modules, threads & elements) and taking into account 35 elements of Blocks 0 and 1 that were considered as priority one in the MID Air Navigation Strategy (MID Doc 002) endorsed by MIDANPIRG/18, the following threads and elements have been identified as the most related factors to ATFM implementation Level I in the MID Region:

- NOPS B0/1 (Initial integration of collaborative airspace management with air traffic flow management);
- FICE B0/1 (Automated basic inter facility data exchange (AIDC/OLDI));
- FRTO B0/2 (Airspace planning and Flexible Use of Airspace (FUA)) & B0/4 (Basic conflict detection and conformance monitoring); and
- ASUR B0/1 (Automatic Dependent Surveillance – Broadcast (ADS-B)), B0/2 (Multilateration cooperative surveillance systems (MLAT)) & B0/3 (Cooperative Surveillance Radar Downlink of Aircraft Parameters (SSR-DAPS).

3.4 In line with Para 4.3, the following most related elements also considered as priority two for implementation of ATFM Level II in the MID Region:

- NOPS B0/2, B0/3, B0/4, B0/5, B1/1, B1/2, B1/3, B1/4, B1/5, B1/6, B1/7, B1/8, B1/9 & B1/10;
- FRTO B0/1, B0/3, B1/1, B1/2, B1/3, B1/4, B1/5, B1/6 & B1/7; and
- ASUR B1/1.

3.5 In the same vein and taking into account the rest of selected 35 elements (Blocks 0 and 1) that were considered as priority one in MID Air Navigation Strategy (MID Doc 002) endorsed by MIDANPIRG/18, the following threads and elements have been identified as the complementary factors to ATFM implementation Level I in the MID Region.

- ACDM B0/1 (Airport CDM Information Sharing (ACIS)), B0/2 (Integration with ATM Network function) & B1/1 (Airport Operations Plan (AOP));

- AMET B0/1 (Meteorological observations products), B0/2 (Meteorological forecast and warning products), B0/3 (Climatological and historical meteorological products) & B0/4 (Dissemination of meteorological products);
- APTA B0/4 (CDO (Basic)) & B0/5 (CCO (Basic));
- RSEQ B0/1 (Arrival Management); and
- SURF B0/1 (Basic ATCO tools to manage traffic during ground operations), B0/2 (Comprehensive situational awareness of surface operations) & B0/3 (Initial ATCO alerting service for surface operations).

3.6 In line with Para 4.7, the following complementary elements also considered as priority two for implementation of ATFM Level II in the MID Region.

- ACDM B1/2;
- AMET B1/1, B1/2, B1/3 & B1/4;
- APTA B1/4 & B1/5;
- RSEQ B0/2, B0/3 & B1/1; and
- SURF B1/1, B1/2, B1/3, B1/4 & B1/5.

3.7 Determination of related threads and elements for implementation of ATFM Level III is postponed to after completion of study/review of the implementation progress/lesson learned in Level I and take into consideration the outcome of new research and development by ATFM TF to make required proposal for further decision/conclusion by related MIDANPIRG meeting.

Collaborative Decision Making - ATM Operational Data Exchange process

3.8 ICAO Doc 9971 defines Collaborative Decision Making:

A process focused on how to decide on a course of action articulated between two or more community members. Through this process, ATM community members share information related to that decision and agree on and apply the decision-making approach and principles. The overall objective of the process is to improve the performance of the ATM system as a whole while balancing the needs of individual ATM community members.

3.9 The planning and implementation of cross-boundary, networked ATFM requires new levels of collaborative decision-making among multi-national stakeholders. While current ATFM CDM processes and ATFM systems are oriented towards local or national demand and capacity balancing, the maturing of ATFM systems and expansion across national boundaries will lead to a CDM environment of multilateral decision-making with complementary individual goals.

3.10 Cross-border ATFM should have the following characteristics:

- an inclusive process – Participation by States and other Stakeholders is the key;
- a transparent process – Simple business rules to ensure compliance and build trust will be necessary;
- allows Sharing of information between all partners through a common network to improved efficiency and operational decision making; and
- achieve common situational awareness for all partners, taking into account the data sharing capability of stakeholders.

3.11 Cross-border ATFM/CDM should provide opportunities for the efficient exchange of operational and strategic information for all stakeholders, ensuring strategic cooperation towards achieving the objectives of seamless ATM and optimization of traffic flows across the region.

3.12 CDM partners and stakeholders should include:

- States, establishing regulations and overseeing safety and compliance;

- ANSPs, implementing ATFM capability;
- International Organizations such as ACI, CANSO, IATA and IFATCA;
- International ATFM units (to share tactical flight data) i.e. CFMU, BOBCAT;
- Airport operators;
- CDM-participating airlines.

3.13 Each State will develop ATFM capability according to its needs and requirements, and the overarching goal of seamless ATM across the MID Region.

3.14 The Regional concept for cross border ATFM is based on ICAO ATM/CDM data exchange process. Under this concept each State and Stakeholder nominated Focal Point/Coordinator, will be tasked to participate collaboratively in national, cross-border and regional coordination meeting.

3.15 Based on all the above and take into consideration of ICAO ATM/CDM data exchange process, The MIDANPIRG/18 meeting in conclusion 18/29 endorsed the ATM Operational Data Exchange process. This process is a key element for implementation of ATFM collaboration in the MID region at Level I. the process is explained at this document, ***Appendix B***.

3.16 In this vein, and for harmonization in ATFM agreement between States, ICAO in Doc 9971 at ***Appendix G***, published a Template for Letter of Agreement (LOA) between ANSPs on flow management. In this regard and with consideration of MIDANPIRG/18 conclusion 18/29, this Template was aligned with MID Region ATM Operational Data Exchange process at ***Appendix H***.

ATFM Phases

3.17 ICAO Doc 9971 describes three phases of ATFM execution; strategic, pre-tactical and tactical, illustrated in Figure 1.

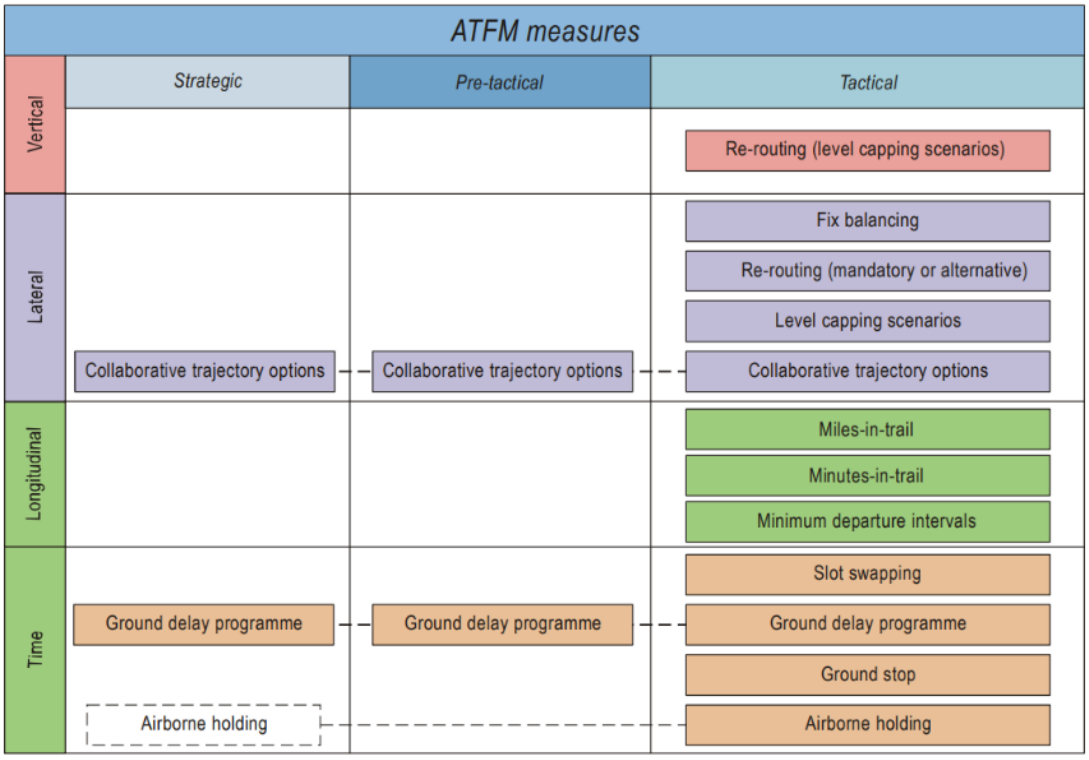


Figure 1: ATFM Operational Management and Phases

3.18 The Strategic ATFM phase encompasses measures taken more than one day prior to the day of operation. Much of this work is accomplished two months or more in advance. Strategic ATFM includes the planning and execution of long-term demand and capacity balancing including arrival slot allocation at Coordinated Airports.

3.19 The Pre-Tactical ATFM phase encompasses measures taken up to one day prior to operations, with the main objective of optimizing capacity through an effective, dynamic organization of resources. Effective Pre-Tactical ATFM is normally dependent on collaborative decision-making (CDM) processes established between all stakeholders. The necessary inter-State ATFM network capability in the MID Region is not established, but based on MIDANPIRG/18 conclusion 18/29, states agreed to develop the ATM Operational Data Exchange process for implementation of MID ATFM level 1.

3.20 Tactical ATFM measures are taken on the day of operation, managing traffic flows and capacities in real time. These are critical to the real-time operational response to demand/capacity imbalance, and the improvement and maintenance of safety in the management of operational situations where traffic demand exceeds capacity.

3.21 The timely application of measures in all three ATFM phases requires a fundamental understanding of airport and airspace capacity, and the continuous assessment of capacity and the factors that impact upon it.

Airspace and Airport Capacity Improvement

3.22 Increased capacity is the primary and central method for managing increasing demand. Capacity increases may be achieved by improvements in infrastructure, airspace and ATS route design, procedures and stakeholder behaviours.

3.23 Airspace capacity improvements may be achieved by:

- Improved ATS route design including segregation of inbound, outbound (SIDS and STARs) and overfly (transit) traffic flows and, where supported by a business case, mandating of PBN specifications for ATS routes;
- Civil-military cooperation, including increased use of FUA to replace SUA;
- Improved ATC sectorization to more evenly apportion workload, including the capability for dynamic sector configuration;
- ATM automation system enhancements including automated coordination and hand-off procedure between systems (AIDC/OLDI) and sectors, and transition from paper-based flight progress-strips to automated, integrated electronic displays and flight plan interfaces;
- Implementation or extension of ATS surveillance services, and surveillance based separations specified in ICAO Doc 4444 (PANS-ATM); and
- Optimization Longitudinal (in-trail) and Lateral Separation Minima.

3.24 Airport capacity improvements may be achieved by:

- Improved airport design including additional runways, taxiways and appropriately positioned rapid-exit taxiways;
- Harmonized AMAN, DMAN and A-CDM systems;
- Analysis and improvement of runway occupancy times through enhancement of procedures and associated pilot practices; and
- Implementation of precision approaches to all runways.

3.25 The following ICAO MID documents aimed to improve airspace and airport capacity in the MID Region:

- MID Air Navigation Strategy (MID Doc 002);
- MID Region ATM Contingency Plan (MID Doc 003);
- MID High Level Airspace Concept (MID Doc 004);
- MID Region AIDC/OLDI Implementation Guidance (MID Doc 006);
- MID Region PBN Implementation Plan (MID Doc 007);
- Guidance on GNSS Implementation in the MID Region (MID Doc 011);
- MID Region Surveillance Plan (MID Doc 013); and
- MID Air Traffic Flow Management - Concept of Operations (MID Doc 014).

3.26 The demand/capacity analysis identifies a number of factors that are extremely important for the efficient planning of the ATM system so as to ensure an optimum balance that will benefit the ATFM. In this regard at ***Attachment A***, ICAO SAM regional project report in 2009 provides some guidelines for ATM planners to improve system capacity.

Capacity Planning and Declaration

3.27 The Collaborative Decision Making (CDM) process, a key enabler of ATFM, allows all of its subscribing members, called CDM stakeholders, to participate in decisions that affect them after all relevant information has been made available to them. This applies to all types of decisions in the strategic, pre-tactical, and tactical phases.

Note 1: Caution must be taken the only outcome of the following methodologies is not enough for calculation of declared capacity. On other hand, the calculated value will give us maximum capacity and states need to take into account the outcome of daily/periodic MID ATM Operational Data Exchange meetings (National, cross border and regional levels) as complementary resource to determine precise Declared Capacity.

Note 2: Many elements have positive or negative impact on declared capacity. To avoid elimination of such critical factors, MIDANPIRG/18 on conclusion 18/29 endorsed the MID ATM Operational Data Exchange process (MIDANPIRG 18, Appendix 5.2L) and invited States, ANSPs and AUs to share useful operational data/information such as NOTAM, weather, Intention To Operate (ITO) with ICAO MID through secure portal, Group "OPSDataEX". Meanwhile this conclusion urged States to nominate Focal Points/Coordinators for ATM data exchange; in order to be granted access shared data/information and participate in ICAO MID periodic coordination meetings.

3.28 Annex 11 to the Convention on Civil Aviation (Air Traffic Services) defines declared capacity as a measure of the ability of the ATC system or any of its subsystems or operating positions to provide service to aircraft during normal activities. It is expressed as the number of aircraft entering a specified portion of airspace in a given period of time, taking due account of weather, ATC unit configuration, staff and equipment available, and any other factors that may affect the workload of the controller responsible for the airspace.

3.29 The capacity of an ATS system depends on many factors, including traffic density and complexity, the ATS route structure, the navigation accuracy and capability of the aircraft using the airspace, weather-related factors, controller equipment and workload. Every effort should be made to provide sufficient capacity to cater to both normal and peak traffic levels; however, in implementing any measures to increase capacity, the responsible ATS authority shall ensure safety levels are not jeopardized.

3.30 In case of particular events that have a negative impact on the declared capacity of an airspace or aerodrome, the capacity of the airspace or aerodrome concerned shall be reduced accordingly for the required time period. Whenever possible, the capacity pertaining to such events should be predetermined.

3.31 The primary areas of capacity assessment and declaration for ATFM are Airport

Acceptance Rate (AAR), Airport Departure Rate (ADR), and airspace sector capacity. AAR and ADR are usually expressed in terms of landings or departures per hour. Sector capacity may be expressed in terms of occupancy count and/or entry count.

3.32 The followings are the abstract and reference of global experiences for determination of capacity in different domain.

a) ICAO ATS planning manual, Doc 9426, specifically explained two techniques, implemented by the United Kingdom (DORA TASK) and Germany (MBB).

b) ICAO SAM regional office, had project in 2009 regarding implementation of ATFM in its own region. The outcome of the project is very valuable and comprehensive document have been published under their responsibility to introduce Model used in Brazil, Colombia and FAA for Trinidad y Tobago (ICAO NACC-20th E/CAR DCA-WP/21).

c) ICAO Manual on collaborative ATFM, Doc 9971, Part II, introduce two simplified methods related to determination of Airport Acceptance Rate (AAR) and Sector capacity.

d) Other models based on Simulation also developed by many States/Companies such as SIMMOD (FAA), RAMS (EUROCONTROL) and TAAM (Australia), these models do not measure capacity directly and more focus on delay.

3.33 Based on Para 4.31, also take into consideration of MID states capabilities, the following methodologies are recommended for calculation of Airport capacity:

Note 1: It may occur that the physical capacity of the aircraft parking Stand, the number of aircraft defining airport capacity in a given aerodrome, is less than the number of aircraft resulting from estimating the runway capacity for that given aerodrome; in such case, this would be the real constraint for that airport.

Note 2: Many different parameters should be considered for measuring airport capacity even in separate, but caution must be taken, normally the bottleneck factor, will determine the entire airport capacity.

a) Airport Acceptance Rate (AAR)

This is an example of a simplified methodology for determining the acceptance rate at an airport explained in ***Appendix C***. This methodology is based on the scientific process developed by the Federal Aviation Administration for establishing the acceptance rate, as outlined in FAA Order JO 7210.3X, Facility Operation and Administration. Chapter 10, Section 7.

Note: This method also explained in ICAO Manual on Collaborative ATFM, Doc 9971, Part II at ***Appendix C****.*

b) Steps to Estimate Runway Capacity in Brazil

In this model, the following sequence of events shall be followed to estimate runway physical capacity explained in ***Appendix D***:

- Step 1: Data collection
- Step 2: Estimating the runway occupancy time arithmetical mean
- Step 3: Estimating aircraft mix
- Step 4: Calculating Mean Runway Occupancy Time (MROT)
- Step 5: The physical capacity PER runway (PCR) shall be calculated for a one-hour

- Step 6: Aerodrome physical capacity calculation
- Step 7: Flight time between the OM and the THR (T)
- Step 8: Estimating the landing approach speed between the OM and the THR (V)
- Step 9: Mean speed in the final approach (MV)
- Step 10: Determination of safety separation (SS)
- Step 11: Determination of total separation between two consecutive landings(TS)
- Step 12: Calculation of the mean weighted time between two consecutive landings, taking into account total separation (MTTS)
- Step 13: Determination of the number of landings in a one-hour interval (P)
- Step 14: Determination of the number of take-offs in a one-hour interval (D)
- Step 15: Determination of theoretical runway capacity
- Step 16: Determining the declared capacity of the runway set (DCR)

3.34 Airport delays should not be considered in isolation. Capacity at a number of airports is limited and action is required to ensure that capacity is not exceeded by demand at a particular moment on the day of operations.

3.35 Maximum airside capacity is not solely reliant on runway capacity. Aprons and taxiways must be capable of maintaining sufficient traffic throughput to match runway capacity. Terminal area capacity, arrivals and departures, the terminal building, ATC staff levels, and equipment should not be neglected during the capacity declaration process.

3.36 In line with Para 4.31, also take into consideration of MID states capabilities, the following methodologies are recommended for calculation of Airspace capacity:

a) Determining Sector Capacity based on FAA methodology

This is an example of a simplified methodology for determining sector capacity at an ACC that explained in ***Appendix E***. This methodology is based on the scientific process developed by the Federal Aviation Administration for establishing the sector capacity.

Note: This method also explained in ICAO Manual on Collaborative ATFM, Doc 9971, Part II at ***Appendix*** *D.*

b) ATC Sector Capacity Calculation Model Used in Brazil

This method used to determine sector capacity takes into account the load borne by an ATCO in performing his/her tasks, and is based on the assessment of the tasks performed by the controller at times of high traffic volume, as seen in the DORATASK. This model was explained in this document at ***Appendix F***.

Capacity Assessment Process

3.37 Information developed by EUROCONTROL related to the ATFM capacity and planning assessment process is in ***Appendix G***.

3.38 Detailed, high quality assessments of ATC sector capacity may also be conducted using fast-time simulations to analyse relevant data and the effects on capacity of proposed ATS changes or improvements. Data inputs include static infrastructure data, traffic data, ATC logic, procedures and task definition, and aircraft performance data.

3.39 Steps in a sector capacity assessment methodology utilizing fast-time simulations include:

- Collect the necessary airspace and traffic data;
- Verify (with the support of local controllers) the traffic sample routes and the procedures used on a flow-by-flow basis;
- Correct, refine and insert the information into the model (done by the simulation experts). This includes the ATC procedures used in the sector, standard controller tasks, simulation parameters and aircraft performance parameters;
- Run an initial test-run of the model;
- Verify flight profiles. The knowledge of local controllers is used to adapt aircraft performance to local conditions, to define and verify sector specific controller tasks together with simulation parameters including conflict detection and resolution mechanisms;
- Consolidate a final model which is used to calculate results for all simulation scenarios, e.g. different sector configurations, different traffic samples, etc.; and
- Verify the simulation scenarios and the initial results, and if so required, do a fine-tuning of parameters.

3.40 A fast-time simulation capacity assessment methodology should use a simulation engine that reproduces the ATC environment, and should follow a reiterative process of validation involving licensed ATC staff currently active on the sector/s under assessment.

ATFM Daily Plan

3.41 ICAO Doc 9971 – Manual on Collaborative ATFM states that the organization and structure of the CDM process depends on the complexity of the ATFM system in place, and must be structured to ensure that the affected stakeholders, service providers and airspace users can discuss airspace, capacity and demand issues through regular meeting sessions and formulate plans that take all pertinent aspects and points of view into account.

3.42 Frequent tactical briefings and conferences can be used to provide an overview of the current ATM situation, discuss any issues and provide an outlook on operations for the coming period. They should occur at least daily but may also be scheduled more frequently depending on the traffic and capacity situation (e.g. an evolving meteorological event may require that the briefing frequency be increased). Participants should include involved ATFM and ATS units, chief or senior dispatchers, affected military authorities and airport authorities, as applicable.

Note: according to the approved MID ATM Operational Data Exchange process, States focal point is responsible to make required coordination at national level to cover all aforementioned aspects in Para 4.42 at cross-border and regional coordination meetings.

3.43 The output of these daily conferences should be the publication of an ATFM daily plan (ADP) and should include subsequent updates. The ADP should be a proposed set of tactical ATFM measures (e.g. activation of routing scenarios, miles-in-trail (MIT)) prepared by the ATFM unit and agreed upon by all partners concerned during the planning phase. The ADP should evolve throughout the day and be periodically updated and published.

Note: upon completion of regional MID ATM Operational Data Exchange meeting, ICAO MID office as the Secretariat is responsible to publish and share agreed ADP through ICAO MID Secure portal, Group OPSDataEX.

3.44 Feedback and review of the ADP received from ANSPs, AUs, and from the ATFM unit itself represent very important input for further improvement of the pre-tactical planning. This feedback helps the ATFM unit identify the reason(s) for ATFM measures and determine corrective actions to avoid reoccurrence. Systematic feedback from AUs should be gathered via specifically established links.

3.45 Feedback and review of the ADP received from ANSPs, AUs, and from the ATFM unit/ACCs itself represent very important input for further improvement of the pre-tactical planning. This feedback helps the ATFM coordination platform to identify the reason(s) for ATFM decision and determine corrective actions to avoid reoccurrence.

3.46 Templates for the ATFM daily plan are provided at **Form A** (template ATFM Daily Plan for after pandemic) of MID Region ATM Operational Data Exchange process which is available at this document, **Form B**.

3.47 An important component of the CDM process is post-operations analysis, including consideration of feedback from airspace users, airports operators, ATS and other ATFM units. Daily post-operations analysis conferences should be held, supplemented where necessary by conferences called to assess the outcomes of programs of ATFM measures responding to non-normal situation.

ATFM Terminology and Phraseology

3.48 Recognizing the lack of a current, globally standardized ATFM terminology, ICAO MID ATFM TF/6 and ATM SG/7 considered to use the terminologies developed by ICAO Asia/Pacific at ***Appendix I*** in ATFM communications.

3.49 ICAO MID ATFM TF/6 and ATM SG/7 ATFM considered to use the phrases at ***Appendix I*** for ATFM coordination, and in air-ground communications.

Note: The ATFM terms and phrases are for use as an interim procedure, pending development of globally standardized ATFM-related terminology and phraseology.

ATFM System Communications

3.50 Regional and Global interoperability of communications is critical to the implementation of effective, network-based cross-border ATFM.

3.51 Based on the last version of ICAO MID Air Navigation Strategy (ICAO MID Doc 002) endorsed by MIDANPIRG/18, the thread FICE, element B0/1 (Automated basic inter facility data exchange (AIDC/OLDI)) has been identified as the MID priority for implementation. In performing this objective, through MID Doc 002 at Attachment A, the list of MID Region AIDC/OLDI applicability area with priority 1 and 2 in ***Attachment B*** have been agreed.

Note: The current level of equipment and automation at the MID region is not mature enough to support ATFM interoperability requirement, further decision in this regard is pending future research and development.

ATFM Information Distribution

3.52 As endorsed in MIDANPIRG/18, conclusion 18/29, ICAO MID Secure portal, Group OPSDataEX is designated for distribution and sharing of ATFM data/information in the MID region.

Note 1: In addition of the above, States may have their own equipment for distribution of ATFM information based on bilateral/mutual agreement with their adjacent FIRs. In this regard ICAO MID recommend States to use the Template of Flow Management Letter of Agreement in ***Appendix H****.*

Note 2: Recognizing that States' needs for ATFM may vary, where necessary ATSUs may participate in collaborative ATFM without having the need for dedicated ATFM systems or terminals. The Aeronautical Fixed Service (AFS) may provide a suitable method for distribution of ADP and ATFM measure information to such ATSUs at level 1.

3.53 Considering the scope and performance objectives for level 2 ATFM in the MID region, Table 1 outlines the minimum items of ATFM information that ATFM systems and processes should share by using multi-nodal ATFM network concept.

Estimated	Calculated	Actual	Applicable
EOBT		AOBT	Terminal Gate
	CTOT	ATOT	Departure Runway
ETO	CTO	ATO	RFIX or AFIX
ELDT	CLDT	ALDT	Arrival Runway
Other			
ADP			

Meteorological Information for ATFM

3.54 The accuracy of pre-tactical and tactical demand and capacity assessment is reliant on the predictability of events that will impact capacity. In the case of weather-related constraints, the traditional Annex 3 services in support of aerodrome and En-route operations do not fully address the needs of ATFM. While globally, MET authorities are working steadily towards the institutional provision of Meteorological Services to support the Terminal Area (MSTA), there is a greater urgency for ATFM providers to collaborate closely with Met service providers to develop products that bridge the gap between the traditional information.

3.55 When predicting the capacity of an airport with regard to forecast meteorological conditions, it is important to not only consider the runway/s and immediate airport surroundings, which are covered by the Aerodrome Forecast (TAF) to a distance of 8km, but to also take into consideration the ability for air traffic to flow via the terminal area on the normal arrival routes and instrument approach procedures to that airport. In particular, weather affecting the airspace in the vicinity of the primary holding areas and initial approach fixes can have a significant impact on the delivery of flights into the approach airspace and onto the runway.

3.56 The current Annex 3 provisions do not include provisions for meteorological information that specifically support the determination of weather impact on capacity. OPMET information is typically pilot and/or tactical ATC oriented, with limited ATFM orientation. , and are largely produced in coded text format, which makes rapid interpretation difficult for ATM officers.

3.57 ICAO Annex 3 requires that each Contracting Sate shall determine the meteorological service which it will provide to meet the needs of international air navigation, and that this shall consist of the provision of meteorological information to users that is necessary for the performance of their respective functions. Therefore, to enable rational and quantifiable capacity determination, ANSPs and Meteorological service authorities should collaborate closely to define meteorological services to be provided to support ATM and ATFM decisions, based on specific impact to operations. Such targeted MET information should address key thresholds for various weather criteria which have a quantifiable impact on airport and terminal airspace capacity, such as headwind, crosswind, visibility, ceiling, wind shear, and convective weather at the initial approach fix (IAF) or in the vicinity of critical arrival fixes, holding points and sequencing areas preferably in the form of matrix that could be produced, with intuitive colour coding for quick recognition by ATM staff. In terms of the wider Terminal area, similar defined criteria, thresholds and colour coding can enable rapid interpretation of impact on operations.

3.58 When identifying criteria to be used in determining MET services, consideration should be given to thresholds for meteorological elements that result in a change of runway operating mode, such as:

- a change of runway dependency;
- a change of spacing between arriving aircraft;
- a change in nominal aircraft approach speeds;
- an exceedance of aircraft operating limitations for significant numbers of aircraft (e.g. maximum crosswind component);
- an inability to commence an approach via the IAF; or
- an inability to hold in the primary published holding areas, etc.

3.59 When considering the lead time requirements for such forecast products, it is necessary to strike a balance between the desired probability and accuracy and the target ATFM aircraft population.

3.60 Given the direction towards Regional ATFM through ground delay programs, it is therefore desirable that the forecast period cover at least 6-8 hours ahead to encompass the majority of regional length flights with notification of ATFM measures an acceptable time before estimated off blocks time (EOBT).

3.61 The current MID Air Navigation Strategy (MID Doc 002) identified the following AMET elements as priority one in the MID Region that can support ATFM Level I:

- AMET B0/1 (Meteorological observations products);
- AMET B0/2 (Meteorological forecast and warning products);
- AMET B0/3 (Climatological and historical meteorological products); and
- AMET B0/4 (Dissemination of meteorological products).

3.62 The following AMET elements also considered as priority two in the MID Region that would support ATFM Level II:

- AMET B1/1 (Meteorological observations information);
- AMET B1/2 (Meteorological forecast and warning information);
- AMET B1/3 (Climatological and historical meteorological information); and
- AMET B1/4 (Dissemination of meteorological information).

MID Region ATFM Implementation history and progress

3.63 So far, the following activates have been done by ICAO MID office in contribution and support of MID member States, international and regional organization (ACAO, IATA, CANSO, AEROTHAI, EUROCONTROL, MAAR and MIDRMA) and voluntary states out of the region (Brazil, India, Thailand and USA (FAA~~)) to~~)) to study ATFM implementation in the MID region:

- The ICAO MID ATM SG/1 (Cairo, Egypt, 9 – 12 June 2014):

  a) apprised, in accordance with the Questionnaire circulated to States on 7 March 2014, related to the application of ATFM in the MID Region, the majority of the MID States indicated willingness to participate in a regional ATFM service/system; and

  b) agreed to consider the implementation of Bilateral, Sub-regional or regional ATFM services in the initial MID Region High Level Airspace Concept.

- The ICAO MID MSG/4 (Cairo, Egypt, 24 - 26 November 2014) assigned ATM SG to develop the Draft Project Proposal addressing the necessity, feasibility, cost benefit analysis and timelines related to the eventual implementation of a regional/sub-regional ATFM system, to the MSC/2 meeting for consideration.

- The ICAO MIDANPIRG/15 (Bahrain, 8-11 June 2015):

a) recalled that ATFM has been identified as one of the global air navigation priorities;
b) agreed that the ASBU Block 0-NOPS be added to the list of priority 1 ASBU Block 0 Modules in the MID Region Air Navigation Strategy;
c) noted that the MAEP SC/1 (Dubai, UAE, 20-22 January 2015) agreed to include in the MAEP Master Plan a project related to a regional/sub-regional ATFM system; and
d) agreed on decision 15/16, Collaborative Air Traffic Flow Management (ATFM-CDM) that, the ATM Sub-Group develop a Preliminary Project Proposal addressing the necessity, feasibility, and timelines related to the eventual implementation of a regional/sub-regional ATFM system, for consideration by the MAEP Steering Committee.

- MAEP SC/2, (Cairo, Egypt, 11-13 April 2016) emphasized the importance of the project. However, it was agreed that the project implementation could be initiated after 2017, providing that all the enablers/prerequisites are implemented and taking into consideration the initiatives carried out by States.

- ICAO MID ATFM Seminar, (Dubai, UAE, 13-15 December 2016) recommended the following:

a) establishment of a ATFM TF/WG under the ATM SG;
b) development of ATFM CONOPS taking into consideration Asia Pacific and Europe experiences;
c) need to raise awareness about ATFM;
d) conduct training courses related to ATFM;
e) States to consider the establishment of ATFM Cell or National Operation Centre composed of all concerned Stakeholders;
f) carry out a survey to determine airspace and sector capacity, hotspots, ATFM systems/measures, etc.;
g) expedite MID IFPS project implementation; and
h) continue working on airspace improvements.

- ICAO MIDANPIRG/16 (Kuwait, 13 – 16 February 2017) encouraged States and Stakeholders to implement the Recommendations emanating from the ATFM Seminar. Accordingly, the meeting agreed to decision 16/16, ATFM Task Force.

- ICAO MID ATM SG/3 (Cairo, Egypt, 22 – 25 May 2017) agreed on the ATFM Task Force Terms of Reference (ToRs) and assigned the first quarter of 2018 for the ATFM TF/1 meeting. In this meeting, also India shared their experiences to establish Central ATFM.

- ICAO MID ATFM TF/1 (Muscat, Oman, 23 – 25 September 2018):

a) shared knowledge and experiences gained by India (C-ATFM), AEROTHAI (Distributed Multi-Nodal ATFM Project), CANSO (CADENA), EUROCONTROL (Network Manager) and UAE (SWIM Gateway); and

b) established the ATFM Core Team composed of experts from; Bahrain, India, Oman, Qatar, Saudi Arabia, UAE, USA, AEROTHAI, ACAO, CANSO, EUROCONTROL, IATA and ICAO to follow-up on the agreed actions by the ATFM TF.

- ICAO MID MSG/6 (Cairo, Egypt, 3 – 5 December 2018):

a) recalled that the ATFM TF Concept of Operations for the MID Region and requested India, USA, AEROTHAI, CANSO, EUROCONTROL, IATA, MAAR and MIDRMA to support the commitment of MID Region ATFM TF;

b) noted that the MID Office circulated a Questionnaire based on the one used in ASIA Pacific and the Americas, which would be considered as basis for the actions that will be undertaken by the ATFM TF; and

c) reviewed and endorsed the TORs of the ATFM TF by MSG decision 6/18.

- Joint ACAO/ICAO ATFM Workshop (Casablanca, Morocco, 17-18 March 2019):

a) recognized that:

- a regional solution to manage the traffic flow across the MID Region became a priority;
- collaboration between all stakeholders is a key success for effective development and implementation of regional framework for ATFM/CDM;
- development of ATFM Concept of Operations requires inputs/data from all stakeholders to ensure it meet the projected objectives; and
- sharing information is the most important enabler for ATFM/CDM.

b) Recommend States to:

- establish ATFM framework at the national level (regulations, organizational structure, functions, operating procedures, etc.);
- develop ATFM National Implementation Plan;
- ensure that ATFM personnel are trained and qualified to effectively carry out their tasks. ATFM Manager (decision maker) should have adequate ATC experience;
- carry out necessary studies to determine airspace and airports capacities;
- exhaust all measures that would increase capacity and continue working on the airspace improvements and the enhancement of the air navigation services within their relevant FIRs taking into consideration the airspace users' requirements;
- support the implementation of the IFPS at regional level;
- ensure the implementation of the Collaboration Decision Making (CDM) concept; and
- support flight data exchange between for the management and monitoring of air traffic flow at regional and inter-regional levels.

c) ATFM TF is invited to:

- develop a training programme template to be used by States;
- develop a Template for National ATFM Implementation Plan;
- support States in carrying out their airspace and sector capacity studies ACAO and ICAO, supported by ATFM experts as required, are invited to:
    i. organize workshops and training courses related to ATFM.
    ii. conduct visits to States to support the ATFM Implementation

- ICAO MID ATFM TF/2 meeting (Casablanca, Morocco, 19 – 20 March 2019) shared India Case Study toward Cross Border ATFM, Outcome of the First ATFM Core Team Meeting in (Abu Dhabi, UAE, 22 – 24 January 2019) and UAE Development related to ATFM.

- ICAO MIDANPIRG/17 meeting (Cairo, Egypt, 15 – 18 April 2019):

a) noted that the ATFM TF have been supported by Brazil, India, FAA, ACAO, AEROTHAI, CANSO, EUROCONTROL and IATA. The meeting encouraged States to implement the Recommendations emanating from the ACAO/ICAO ATFM

Workshop (Casablanca, Morocco, 17 – 18 March 2019);

b) agreed that the Recommendations should be considered during the development of the ATFM CONOPS;

c) based on the analysis of the survey results carried out by the ATFM TF, recognized that the MID Region is still in the first steps related to the establishment of ATFM capabilities. Accordingly, the meeting agreed that raising awareness related to ATFM and qualifying ATFM Specialists should be given high priority;

d) agreed with the ATFM TF/2 meeting and endorsed conclusion 17/22 that the Multi-Nodal Concept should be applied for the MID Region as a first phase, which would be evolved to a centralized ATFM system in the future;

e) the ATFM Task Force develop the ATFM Concept of Operations for MID Region, accordingly, including the minimum flight data that should be exchanged by ATFM Units; and

f) the Action Plan for the implementation of ATFM in the MID region endorsed by conclusion 17/23.

- ICAO ATM SG/5 meeting (Aqaba, Jordan, 1 – 4 December 2019):

a) noted the flight planning issues in processing some of the published ATS routing schemes and/or ATM restrictions, which are used as ATFM measures. Accordingly, the meeting encouraged IATA to coordinate with the States concerned for visits to discuss and rectify the situation;
b) agreed that the development of guidance for the harmonization and unifying of the publication of ATM measures and restrictions would support in rectifying the above reported issues;
c) invited IATA and ICAO to address the subject to the ATFM Task Force and AIM SG; and
d) urged States to take necessary measures to ensure the establishment of ATFM service at the national level.

- ICAO MIDANPIRG/18 meeting (Virtual, 15 – 22 Feb 2021) agreed with the ATFM TF/4 and endorsed:

a) conclusion 18/28 the MID ATFM CONOPS version 1.1; and
b) conclusion 18/29 the MID ATM Operational Data Exchange process.

- ICAO MID ATFM TF/5 meeting (Virtual, 25-27 May 2021):

a) agreed to develop MID ATFM Framework; and
b) conducted virtual breakout meeting to brief MID States focal points regarding ICAO MID Data Exchange process.

Training and Competencies for ATFM Personnel

3.64 An ATFM service must be staffed by personnel with sufficient knowledge and understanding of the ATM system they are supporting and the potential effects of their work on the safety and efficiency of air navigation. To ensure this and within the framework of their training policy, States and ANSPs should establish training plans to ensure that ATFM service staff are properly trained.

3.65 ICAO Doc 9971, Manual on Air Traffic Flow Management, recognizes the requirement for training all stakeholders in an ATFM service, i.e. those directly operation and ATFM function and all other ATFM stakeholders including airspace users and ATS personnel.

3.66 ***Appendix J*** provides generic guidance on ATFM training requirements, which States may consider for inclusion in any existing or planned ATFM training programs.

Note: *in addition of the above, States may consider EUROCONTROL training courses for Air Traffic Flow and Capacity Management (ATFCM) in the following link.*

EUROCONTROL Training Zone - ATFCM Basic [NMO-ATFCM-BASIC]

4. Current Situation

MID ATFM CORE TEAM - ACT/1

4.1 ICAO MID ATFM TF/1 (Muscat, Oman, 23 – 25 September 2018) made a decision to establish MID ATFM CORE TEAM. The first meeting (Abu Dhabi, UAE, 22 - 24 January 2019) reviewed the responses to the survey received from 10 MID States out of 15 as per the consolidated table at ***Attachment C***. It was recognized that the MID Region is still in the first steps related to the establishment of ATFM capabilities. Accordingly, supporting States with the qualification of experts in ATFM as well as raising awareness should be given high priority.

4.2 The meeting discussed all the scenarios for the implementation of ATFM at the regional level and agreed to consider only four scenarios to be presented to the ATFM TF/2 meeting.

4.3 The meeting agreed to a set of criteria to be used for the evaluation of the scenarios based on the severity of the challenge to achieve the criteria as well as its weight/importance on the success of the scenario. The scenarios and their evaluation results are at ***Attachment D***.

4.4 The meeting emphasized that establishing a centralized ATFM Unit would be the optimal solution followed by the scenario in having 2 Centres for 2 participating areas, then a centralized scenario through a third party providing the ATFM service and the last one would the Multi-Nodal. However, considering the challenges, feasibility and time and efforts required, the Multi Nodal Scenario achieved the highest Score.

4.5 The meeting noted that for Asia Pacific Multi Nodal project; three document have been prepared and agreed upon by the States: CONOPS, Regional Framework and Common Operating Procedures, which would be used as basis for the development of the MID Region Documentation.

4.6 The meeting agreed that in order to start working on the ATFM CONOPS a decision should be made related to the framework to be implemented. In this respect, the meeting agreed to the following high level outline to be considered during the development of the CONOPS:

Phase I- Building State's National ATFM Capabilities:

1- Raising awareness related to ATFM
2- Establishing the regulatory framework for ATFM at national level
3- Establishment of ATFM Services within the ATS organizational structure (FOC, FMP, FMU, etc.)
4- Human resources
5- Training
6- Operating Procedures
7- National ATFM Team to ensure Collaborative Decision Making (CDM)
8- Tools to be used
9- Determine and declare Airspace and airports capacity
10- Establishment of State's National ATFM CONOPS

Phase II – Establishment of Regional Framework

1- Setting up the concept/framework for Cross border ATFM in the MID Region
2- Define which ATFM Measures would be required including GDPs (where applicable to be defined by States)
3- Agreement on the Format of the ATFM Messages
4- Means to be used for Communication between adjacent States ATFM FOC

5- Development of Common Operating Procedure (COP)
6- Agreement on LoA template for ATFM (***Appendix H***)
7- Agreement on the coordination procedures
8- Signature of LoAs between adjacent ATFM FOC
9- Establishment of platform to be used for sharing of information

Note: ICAO MID ATFM CONOPS based on the Multi Nodal Scenario has been developed and endorsed by MIDANPIRG/18.

Phase III- Implementation of Cross border ATFM

1- Exchange of information through the established platform and/or periodic daily teleconferences
2- Sharing of the ATFM Daily Plan
3- Implementation of the ATFM/CDM process for regulating traffic when required (regional and later inter-regional)
4- Post Implementation Review
5- Research and future development

MID Regional Activities for Implementation of ATFM

4.7 ANSPs in the MID Region currently have limited ATFM/CDM procedures in place to manage the traffic flows within their Flight Information Regions (FIRs). There is also lack of regional agreement to manage traffic flows between ANSPs. Some MID States do have some tools and processes to monitor and predict resource utilization, but the predictions are not always accurate, automated, or cross-border shared.

4.8 Strategic balancing of capacity at airports in the MID Region is currently undertaken through the airport slot allocation process or the application of Minimum Departure Intervals (MDIs). During the pre-tactical and tactical ATFM phases1, balancing of arrival demand with the available capacity at airports is mostly reactive in nature. Planning ATFM measures ahead of time is difficult because the demand data are not generally accurately predicted and there is limited control of departures. As a result, most of the demand balancing is carried out by ANSPs within their own area of responsibility through tactical flow management in some FIRs with the support of arrival management systems (AMAN). This reactive management of demand often results in inefficient means of balancing flows, such as airborne holding and vectoring.

4.9 A challenge in terms of implementing an advanced ATFM system within the Region is the high percentage of international traffic. This characteristic poses a challenge to implementation due to the cross-border effect of ATFM measures such as Ground Delay Programs (GDPs) that assign flights with Calculated Take-Off Times (CTOTs) to comply with. Current, flights departing from airports outside of the ANSP's controlling authority operate as they originally intended, without absorbing all or even some of the delay. Accordingly, a new cross-FIR boundary concept is proposed to overcome this challenge and effectively apply ATFM measures to flights operating into constrained airports and airspace, while operating from airports or in the airspace of a different control authority.

4.10 There are, however, several ANSPs in the MID Region controlling significant domestic traffic, such as Egypt, Iran, Iraq and Saudi Arabia, where GDPs might be effective with only domestic traffic operating in accordance with assigned slots.

[1] Strategic, Pre-Tactical and Tactical ATFM Phases are defined in ICAO Doc 9971 – *Manual on Collaborative Air Traffic Flow Management*

4.11 Taking into consideration the advantages of the XMAN, the MIDANPIRG meeting urged States to support the implementation of the initiative in the Region, wherever it is possible.

Note: The Cross Border Arrival Management (XMAN) is a operational procedure utilized by Air Traffic Service Units of multiple States that aims to improve and optimize arrival management operations for major airports. XMAN reduces the drawbacks of pro-longed holding in stacks, such as, fuel burn, CO_2 emissions and noise. With XMAN procedure the holding time of an aircraft is cut by reducing their cruising speed during the final en-route phase of flight, several hundred miles away from the airport.

Status of Implementation of a Collaborative ATFM in the UAE

4.12 As it was reported to ATFM TF/1, 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.

4.13 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.

4.14 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.

Outcome of ICAO MID ATFM Survey

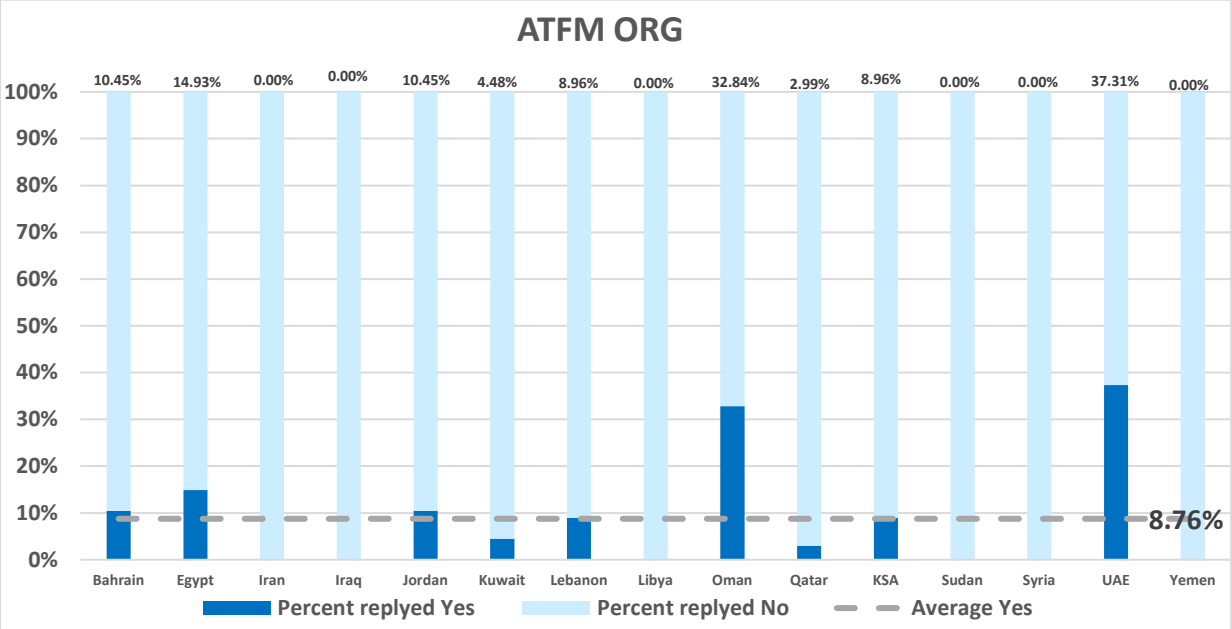
4.15 This survey has been done by ICAO MID office based on ICAO MID ATFM Seminar, (Dubai, UAE, 13-15 December 2016) recommendation. The outcome of survey, has explained the situation of ATFM in the MID region in the following aspects:

Note: 10 MID States including Bahrain, Egypt, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Sudan and UAE replied to ICAO MID Questioner.

a) ATFM Structure and Organization

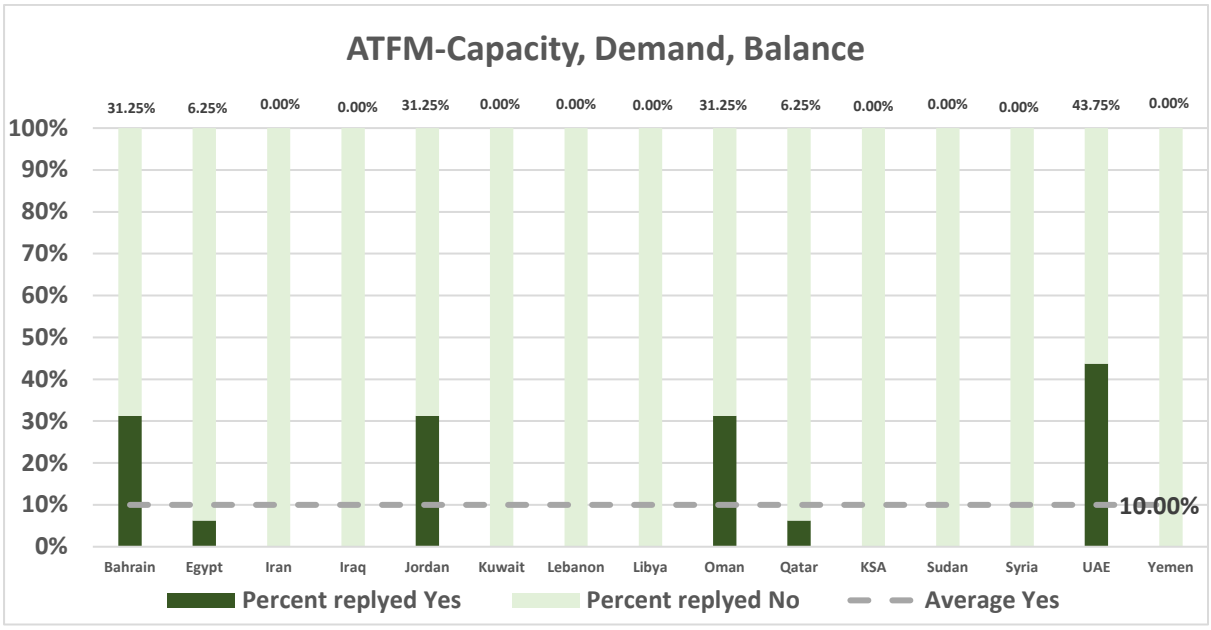
- 5 States implemented regulatory requirement for ATFM
- 6 States implemented operational requirement for ATFM
- 6 States implemented/planned to implement ATFM initiatives
- 3 States implemented/planned to implement organizational facilities for provision of ATFM services

- None of the MID States dedicated resources for ATFM function and position
- None of the MID States established Letter of Agreement with adjacent FIR(s) and Stakeholders regarding implementation of ATFM
- 3 States implemented/planned to implement CDM procedure among stakeholders
- 5 States implemented/planned to implement ATFM Daily Plan and collect, analyse, coordinate and dissemination of ATFM information.
- 4 States implemented/planned to implement CDM participation process through teleconference and web based interfaces to update flight plan intent information
- 2 States planned ATFM training for their relevant personal and stakeholders
- 2 States planned Electronic ATFM display system Shared with adjacent FIRs and stakeholders.



b) ATFM - Capacity, Demand, Balance

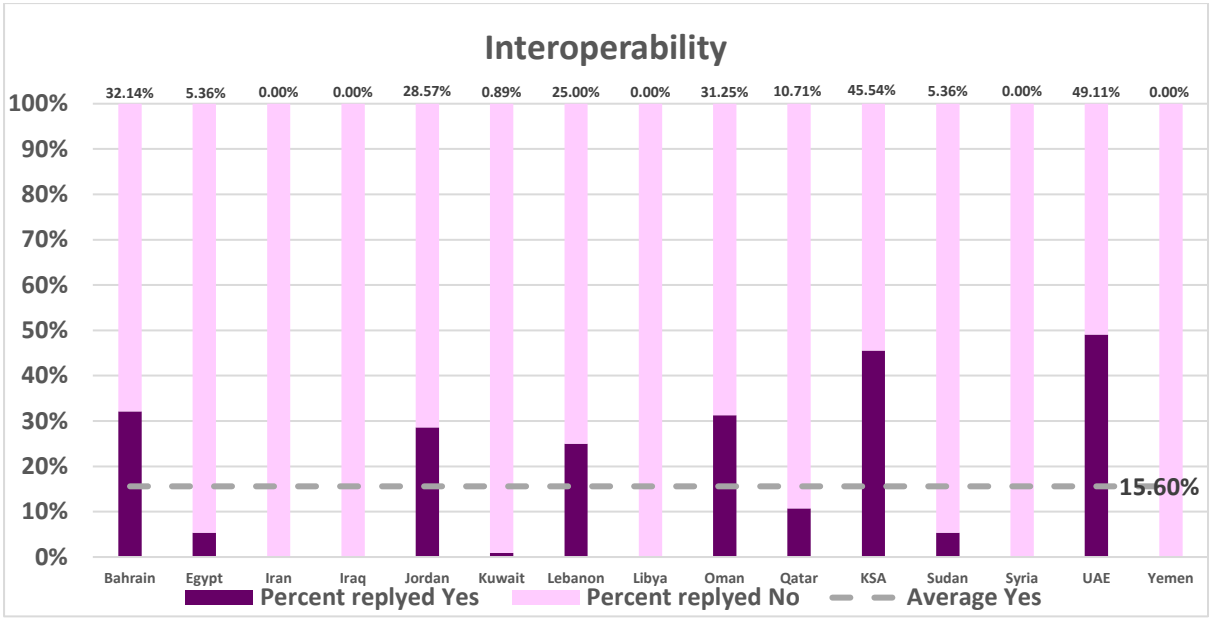
- 5 States declared/planned to declare ATC strategic capacity values for airspace, waypoint and airport
- 2 States determined declared capacity values
- 3 States have strategic airport arrival/departure slots
- 3 States have a methodology to balance demand and capacity in different phase of ATFM
- 5 States implemented/planned to implement procedures review and tools to identify available capacity, compare capacity to forecast demand and establish performance targets including airspace design review, ATFM support tools, procedure review, staffing resources to workload/traffic review, ATFM Training completed and forecast demand



c) Interoperability

- 9 States complete automated exchange of ATS messages (e.g. FPL, CHG, CNL, DEP, DLA, EST, ARR, CPL) with any, all adjacent FIRs or other non-adjacent FIRs.
- 8 States have plans to complete automated exchange of ATS messages with any or all adjacent FIRs or other non-adjacent FIRs.
- 2 States exchange Airport Acceptance Rate (AAR) information for primary airports with other FIRs.
- 1 State share adjacent sector capacity information with other FIRs.
- None of the State have automated Pre-tactical demand monitoring capability for airport, sector and ATS route.
- 1 State has automated Tactical demand monitoring capability for airport, sector, ATS route and arrival management.
- 2 States have Strategic, Pre-tactical and Tactical planning agreements with other FIRs.
- 4 States identified airports, sectors of airspace or routes which are regularly requiring ATFM Measures to balance demand and capacity.
- 9 States initiated/implemented the ATFM Measures internally
- 7 States determining ATFM measure based on demand exceed capacity, weather, military exercises, resource, maintenance/outage and VIP movement.
- None of the State declared that military airspace/activity cause the use of ATFM Measures
- 3 States declared that military airspace/activity included in strategic planning
- 4 States declared the effectiveness of ATFM Measure analyse
- 5 States declared airport, sector and ATS route capacity as primary demand-capacity imbalance reasons for the ATFM Measures.
- 6 States initiate the ATFM Measures with adjacent FIRs.
- 3 States/ANSPs carry out any post-operations analysis.
- 4 States ATFM Measures included in their LOAs.
- 6 State communicate ATFM Measures through automated or verbal communication with adjacent FIRs.

- 2 States have future ATFM initiatives planned with other FIRs.
- Until December 2018, the status of implementation of related ATFM ASBU threads in MID states is as follows:
  - 1 State implemented and 5 States planned to implement B0-A-CDM.
  - 1 State implemented and 4 States planned to implement B0-RSEQ (Improved Traffic Flow through Runway Sequencing (AMAN/DMAN)).
  - 1 State implemented and 5 States planned to implement B0-FICE (Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration).
  - 2 States implemented and 4 States planned to implement B0-DATM (Service Improvement through Digital Aeronautical Information Management).
  - 1 State implemented and 5 States planned to implement B0-FRTO (Improved operations through Enhanced En-Route Trajectories).
  - 5 States planned to implement B0-NOPS (Improved Flow Performance through Planning based on a Network-Wide view).
  - 3 States planned to implement B1- A-CDM (Optimized Airport Operations through A-CDM Total Airport Management).
  - 4 States planned to implement B1-RSEQ (Improved Airport operations through Departure, Surface and Arrival Management).
  - 4 States planned to implement B1-FICE (Increased Interoperability, Efficiency and Capacity through FF-ICE/1 application before Departure).
  - 4 States planned to implement B1-DATM (Service Improvement through Integration of all Digital ATM Information).
  - 4 States planned to implement B1-SWIM (Performance Improvement through the application of System Wide Information Management (SWIM)).
  - 4 States planned to implement B1-NOPS (Enhanced Flow Performance through Network Operational Planning).
  - 5 States planned to implement B1-AMET (Enhanced Operational Decisions through Integrated Meteorological Information).
  - 4 States planned to implement B1-TBO (Improved Traffic Synchronization and Initial Trajectory-Based Operation).



5. Performance Improvement Plan

Note: prior to implementation, ATFM systems and procedures should be verified by safety assessment under State Safety Management Systems.

Structure of the Performance Improvement Plan

5.1 Regional collaborative ATFM performance objectives are arranged in Regional ATFM Capability phases aligned, where practicable, with Priority I and II of the ICAO MID Strategy Plan (MID Doc 002).

Phase Priority I ~~–~~expected implementation ~~by 31 December 2022~~duration: Two years; and

Phase Priority II – expected implementation duration: Three years~~by 31 December 2024~~.

5.2 Recognizing the short lead time between the finalization of the Framework and Phase I, Regional ATFM Capability Phase I is divided into sub-phases A and B, with expected implementation ~~31 December 2021 and 31 December 2022 respectively~~duration one year for each.

5.3 Performance objectives are presented under the following general structure for each Regional ATFM Capability Phase, where relevant:

a) ATFM Regulations
b) ATFM Systems
c) Strategic, Pre-Tactical or Tactical ATFM
   - Capacity and Demand Monitoring and Analysis
   - Capacity Improvement
   - ATFM Execution
   - ATFM Measures
   - Post-Operations Analysis

ATFM Program Airports

5.4 ATFM Program Airports, referenced in the performance objectives, are:

a) The busiest MID Region aerodromes as defined in the MID Strategy plan (MID Doc 002);
b) Airports where strategic slot allocation is implemented under these performance objectives; and
c) All other airports designated by the relevant authority as requiring or potentially requiring ATFM implementation.

Note: prior to implementation, ATFM systems and procedures should be verified by safety assessment under State Safety Management Systems.

REGIONAL ATFM CAPABILITY PHASE IA (Expected implementation duration, 1 year)

ATFM Regulations

5.5 All States where air traffic demand at times exceeds, or is expected to exceed declared capacity, should enact regulations for the implementation of ATFM (Annex 11 to the Convention on Civil Aviation section 3.7.5 refers) as well as establishment of required organizational structure.

Strategic Capacity and Demand Monitoring and Analysis

5.6 A regular program of bi-annual strategic airport and airspace capacity and demand analysis should be implemented for all international airports and associated terminal area airspace, and for all en-route ATC sectors supporting the busiest MID city pairs, including consideration of:

a) CNS systems;
b) ATC resources and capability;
c) ATC separation standards and techniques;
d) runway occupancy times;
e) seasonal schedules; and
f) historical traffic data and traffic growth forecasts.

5.7 Where strategic analysis indicates that demand does not yet exceed capacity, preparation for the implementation of ATFM capability should be based on careful analysis of current traffic and expected growth in the next 5 years;

Pre-Tactical Capacity and Demand Monitoring and Analysis

5.8 Daily pre-tactical airport and airspace capacity and demand analysis should be conducted for all ATFM Program Airports and associated terminal area airspace, and for all en-route ATC sectors supporting the busiest MID city pairs, including consideration of:

a) expected runway and airspace configurations;
b) forecast meteorological phenomena;
c) ATC resources, facilities and equipment;
d) other known or expected capacity constraints; and
e) updated flight schedule and flight plan information.

Pre-Tactical ATFM Execution

5.9 ATFM Daily Plan (ADP) for all ATFM Program Airports and associated terminal area airspace, including airport and airspace capacity declarations and related background information, should be prepared and distributed to all relevant stakeholders. ADP should be distributed to stakeholders by either:

a) Web-based ATFM network; or
b) Web-pages hosted by each participating ANSP; or
c) Email distribution.

*Note: relevant stakeholders includ*e:

a) Neighbouring ATFMUs or, where not provided, ATSUs
b) ATSUs supported by the originating ATFMU;
c) Relevant airport operators; and
d) Participating aircraft operators.

5.10 ADP should be coordinated by the responsible ATFMU or ATSU and agreed with all relevant stakeholders, through chairing and/or participation in scheduled and, where necessitated by changes in airport or airspace capacity or other events, ad-hoc ATFM conferences for pre-tactical ATFM planning.

Post-Operations Analysis

5.11 The accuracy and effectiveness of capacity and demand analyses and ADP preparation and distribution, including supporting information listed ~~in paragraph 7.7~~above, should be verified through comparison with operational outcomes observed, and rectification of discrepancies included in planning for system and process improvements.

REGIONAL ATFM CAPABILITY PHASE IB (Expected implementation duration, 1 year).

ATFM Systems

5.12 Operational FPL and ATS message distribution systems and processes should be analysed and, where necessary, modified to ensure that FPL, CHG, DEP, DLA and CNL messages are originated, distributed and processed in accordance with the requirements specified in ICAO Doc. 4444 PANS-ATM.

5.13 Requirements should be published in all relevant State AIP, specifying that, except where necessary for operational or technical reasons, FPL should be submitted not less than 3 hours prior to EOBT.

5.14 A DLA message should be transmitted when the departure of an aircraft, for which basic flight plan data FPL has been sent, is delayed by more than 15 minutes after the estimated off-block time contained in the basic flight plan data.

5.15 Where the delay is the result of a GDP, the DLA message should be sent by the ATFMU responsible for the destination airport, addressed to the ATS unit serving the departure aerodrome for subsequent transmission in accordance with the provisions of ICAO Doc 4444 PANS-ATM.

5.16 Appropriate procedures should be implemented to ensure that FPL are not discarded from other ATM systems as a consequence of ATFM delay.

5.17 ATFM, AMAN/DMAN and A-CDM systems should be integrated through the use of common fixes, terminology and communications protocols to ensure complementary operations.

Note: FIXM version 3.0 or later, extended where necessary is the agreed format for exchange of ATFM information in the MID Region. Where full ATFM network communications capability is not yet established, ATFM messages conforming to ADEXP version 3.1 may be used for distribution of ATFM measures.

Capacity Improvement

5.18 Airport and terminal airspace capacity should be increased through optimized ATC separation standards and techniques and reduced runway occupancy at all ATFM Program Airports and in associated terminal area airspace.

5.19 Where necessitated by demand, and using a performance-based approach, terminal area ATS route structure improvements including CCO/CDO should be implemented to reduce ATC and pilot workload and enable better use of aircraft capability to meet ATFM measures.

Strategic ATFM Execution

5.20 Implement strategic airport slot allocation at all international airports, for periods where demand significantly exceeds the airport's capacity.

Pre-Tactical Capacity and Demand Monitoring and Analysis

5.21 Pre-tactical modelling of expected airport and airspace configuration and traffic

demand, and the effect of ATFM measures, should be implemented for all ATFM Program Airports and associated terminal area airspace.

Pre-Tactical ATFM Execution

5.22 CDM capability should be implemented, enabling the sharing of all relevant information with all stakeholders, providing continuous availability of information and common reference material for daily and ad-hoc ATFM conferences.

Tactical Capacity and Demand Monitoring and Analysis

5.23 Dynamic update of airport and airspace capacity constraints, capacity calculation, demand information using schedule, flight plan and ATS messaging, and ATM system information and modelling of tactical ATFM programs should be implemented.

Tactical ATFM Execution

5.24 Tactical ATFM at ATFM Program Airports should be implemented using:

i. Ground Delay Programs (CTOT), or

ii. Minutes in trail (MINIT) or miles in trail (MIT) or other ATFM measures specified in ICAO Doc 9971 – Manual for Collaborative ATFM.

5.25 All States should ensure that local ATC procedures and, where available, CDM processes facilitating compliance with received CTOT are implemented.

Note 1: At controlled aerodromes, CTOT compliance should be facilitated through the cooperation of the aircraft operator and the issuance of ATC clearances. As a minimum, CTOT should be made available to the relevant ATC tower and the aircraft operator;

Note 2: For flights departing aerodromes where an ATC service is not provided, CTOT information should be made available to the aircraft operator and the first ATS unit providing services to the flight.

Note 3: States planning to implement ground delay programs should ensure adequate time is provided for local procedure development and promulgation at aerodromes where CTOT will be applied.

5.26 CTOT for individual aircraft should, where necessary, be revised, cancelled, suspended or de-suspended.

5.27 Tactical ATFM should be implemented for operations through constrained airspace sectors, only during periods affected by the constraint.

5.28 As far as practicable, individual aircraft should not be subject to more than one tactical ATFM measure per flight.

Post-Operations Analysis

5.29 Procedures and agreements should be developed to ensure post-operational analysis of cross-border ATFM programs, including the canvassing and consideration of feedback from airspace users, airports operators, ATS and other ATFM units. Daily post-operations analysis conferences should be held, supplemented where necessary by ad-hoc conferences called to assess the outcomes of programs of ATFM measures responding to non-normal situations.

5.30 The results of post-operations analyses should be used for planning ATFM, airspace and ATS route improvements.

Note: ICAO Doc 9971 – Manual on Collaborative ATFM Part II-4-8 provides guidance on post operations analysis

REGIONAL ATFM CAPABILITY PHASE II (Expected implementation duration, 3 years).

ATFM Systems

5.31 Distributed multi-nodal ATFM information distribution capability utilizing FIXM version 3.0 (or later) should be implemented, including:

i. Sharing of ADP and dynamically updated demand and capacity data for all ATFM program airports, and for en-route airspace supporting the busiest city pairs and high density major traffic flows;

ii. Slot allocation information for all flights subject to ATFM programs, including as a minimum CTOT, CTO and CLDT information;

iii. Authorized user functions for slot amendment, cancellation or suspension (ATFMU), and slot-swapping (aircraft operator and ATFMU); and

iv. Automated slot compliance monitoring and reporting, supplemented where necessary by authorized inputs by ATFMU, ATSU or airspace operator.

5.32 Full interoperability of cross border ATFM, A-CDM, AMAN, DMAN, ATM automation and airspace user systems should be implemented, utilizing FIXM 3.0 (or later~~),),~~ to provide seamless gate-to-gate collaborative ATFM operations.

Pre-Tactical Capacity and Demand Monitoring and Analysis

5.33 Automated modelling of expected airport and airspace configuration and traffic demand, and the effect of ATFM measures, should be implemented for all ATFM Program Airports and associated terminal area airspace and, where possible, en-route airspace supporting the busiest MID Region city pairs and high density major traffic flows.

Tactical Capacity and Demand Monitoring and Analysis

5.34 Meteorological services to support ATM in the terminal area (MSTA) should be implemented, including near-term or now-casting forecasts of convective weather activity at or affecting ATFM Program Airports and associated instrument approach procedures, terminal area ATS routes and holding points and other significant locations.

Note: Annex 3 requires that States ensure the quality management of meteorological information.

Tactical ATFM Measures

5.35 ATFM measures including MIT, MINIT and, where necessary, CTO at AFIX or RFIX, should be applied to flights through constrained airspace.

5.36 Ground Delay Programs utilizing CTOT should be applied to:

i. aircraft destined for constrained ATFM Program Airports, that have not yet departed; and

ii. aircraft planned to operate through constrained airspace where tactical ATFM measure CTO at RFIX or AFIX is in place, that have not yet departed.

5.37 ATFM systems should have the capability to take into account long haul flights.

5.38 Systems should be in place to ensure the timely update of estimate information for airborne aircraft.

6. Research and Future Development Possibilities

Research and Development

6.1 Version 1.0 of the Regional Framework for Collaborative ATFM provides the initial framework for implementation of a distributed multi-nodal ATFM network, as envisaged in the Regional ATFM Concept of Operations. This concept will continue to develop as experience is gained through trials and subsequent operational implementation. The Framework is therefore iterative in ~~nature, and~~nature and will require regular update in the medium term.

6.2 Further research and development of the distributed multi-nodal ATFM network concept will largely be conducted by ATFM/TF participating States through their operations trial programs, consistent with Principle of the ICAO MID Strategy Plan (Doc 002). The outcomes of trials and lessons learned from operational deployment will be considered by ATFM/TF for the improvement and updating of the Framework.

ATFM Interface Control Document

6.3 The ATFM Core Team will develop an operational requirements document and an ICD for networked, cross-border multi-nodal ATFM information exchange, to be delivered to ATFM/TF for consideration before then being referred to the 7th Meeting of the ATM Sub-Group of MIDANPIRG (ATM/SG/7) in November 2021.

Collaborative ATFM Concept Developments

6.4 The following concepts should be researched, and developed, for implementation in the MID Region:

Delay Absorption Intent – included in the Regional ATFM Concept of Operations, provides aircraft operators with the flexibility to choose how to distribute the delay assigned by an ATFM measure to various phases of flight. Not yet included in the ATFM Performance Improvement Plan, this concept has the potential to improve outcomes by increasing the number of aircraft participating in the program, through the application of ATFM delays to longer distance flights that are currently exempt from ground delay programs. The development of this concept will be undertaken in trials before then being potentially included in the broader Framework.

FIXM Extension – may be required for implementation of any MID Region ATFM practices or procedures that are not covered in FIXM version 3.0 or later versions deployed by States.

Application of ATFM Measures to Long Range Flights – will improve equity in ATFM ~~processes, and~~processes and contribute to better outcomes in those ATC sectors where long range flights are currently exempt from all but minimal en-route delays. This will require further development of ATFM measures the CTO ATFM measure, and the formulation of regionally agreed limits on the total ATFM+AMAN delay that may be applied to long range and ultra-long range flights.

Interoperability of ATFM, AMAN/DMAN and A-CDM systems – will require ANSPs and airport operators to collaboratively develop their local operational letters-of-agreement to incorporate procedures and practices optimizing gate-to-gate flow management of flights.

Collaborative Trajectory Options – provide for flexible routing options that permit aircraft operators to elect to re-route flights via longer trajectories to avoid constrained airspace and take advantage of the reduction or removal of ground delay (or en-route delay, where implemented) that would be imposed if the flight continued through the constrained airspace. A collaborative trajectory options program would significantly improve the safety and efficiency of ATM in cases of ~~large~~ Large ~~scale~~ Scale ~~weather~~ Weather ~~deviations~~ Deviations

(LSWD) such as those experienced in the cyclonic weather season in the Gulf region, and contingency operations including the avoidance of airspace that is either unsafe (e.g. volcanic ash cloud) or unavailable. A collaborative trajectory options program would first require a full understanding of airspace capacity, which should be supported by a comprehensive study.

Note: The development of a collaborative trajectory options program in the MID Region will require a coordinated multi-partite effort to improve the regional ATS route network and ATS surveillance/communications infrastructure, and to provide sufficient ATS route options for the program. ATS route specification and implementation of surveillance and communications infrastructure are included in the ICAO MID Strategy Plan (Doc 002).

Network Collaborative Decision-Making – to provide mechanisms within the distributed multi-nodal ATFM network for the formulation of executive flow management decisions in the event of competing stakeholder priorities. This will require research and development of network suitable automated decision-support tools and associated business rules. Operational experience in the distributed multi-nodal ATFM network environment will be key to identifying the potential ~~challenges, and~~challenges and formulating and testing strategies.

Harmonization of Multiple Flow Management Programs – will ensure that all ATFM measures applied are collaboratively managed to ensure that individual flights are not unduly penalized by multiple measures in one flight, and that ATFM network outcomes are more predictable. Currently aircraft may be subject to independently applied en-route and airport ATFM delays, resulting in potentially unreasonable cumulative delay over the course of a flight. A significant amount of research is being conducted, and needs to be conducted, into the effects and harmonization of multiple flow programs in multiple FIRs.

7. Milestones, Timelines, Priorities and Actions

Milestones and Timelines

7.1 ***Section 6*** of this document (Performance Improvement Plan) provides milestones and timelines for a number of elements generally aligned with the ICAO MID Strategy Plan (Doc 002) Phase I and II.

7.2 States that have not yet implemented collaborative ~~ATFM, or~~ATFM or having implementations that are not in accordance with the provisions of this Framework, should commence planning from the date of its approval by MIDANPIRG.

7.3 It should be noted, however, that the ATFM capability outlined in the Framework should be implemented as early as possible. The Framework timelines should under no circumstances be interpreted as limiting or deferring ATFM implementation where there is a current or expected need for it in an earlier timeframe than outlined.

Priorities

7.4 While it is a matter for each State to determine priorities in accordance with its own economic, environmental, safety and administrative drivers, States should be aware of the MID Regional Priorities adopted by MIDANPIRG, including GANP (ASBU), and the Annex 11 requirement for States to implement ATFM where there is a current or expected imbalance of demand and capacity.

Actions

7.5 This Plan is iterative in ~~nature, and~~nature and will require further development as experience is gained in operational trials of the distributed multi-nodal ATFM network concept. ATFM/TF, under its terms of reference, should continue to oversee and coordinate the development of the concept and subsequent amendment of the Framework, facilitate the coordination and alignment of CDM/ATFM programs being conducted within the Region, and review the effectiveness of existing and planned ATFM programs. An important project being conducted by the ATFM/TF is the development of a Regional Interface Control Document (ICD) for ATFM, which is expected to be completed for consideration by ATM/SG, then presented to the MIDANPIRG in February 2022.

APPENDIX A - MID ATFM Action Plan

ACTION PLAN FOR IMPLEMENTATION OF ATFM IN THE MID REGION (DATE)

Last version

Key Activities	Action		Deliverable
	No	Description	
Key Activity 1 Agreement on the ATFM Regional Framework	**1.**	Recommending the best Scenario for a regional ATFM framework	Recommendation
	2.	Presentation to the ACAO ANC/40	Support
	3.	Preparing a Working Paper to MIDANPIRG/17	WP
	4.	Agreement on the regional ATFM framework by MIDANPIRG	MIDANPIRG Conclusion
	5.	Presentation to the ACAO Executive Council	For support
	6.	Notifying States about MIDANPIRG/17 Conclusion and that the development of ATFM CONOPS started	State Letter
Key Activity 2 Development of Draft CONOPS	**7.**	Development of a Draft ATFM CONOPS	Draft ATFM CONOPS
	8.	Circulating the Draft ATFM CONOPS to States	State Letter
	9.	Feedback form States on the Draft ATFM CONOPS	Feedback
	10.	Consolidation of the Draft ATFM CONOPS for presentation to the ATM SG/5 meeting	Consolidated version of ATFM CONOPS
	11.	Agreement on the Draft ATFM CONOPS	Draft ATFM CONOPS
	12.	Circulating the Draft ATFM CONOPS	State Letter
	13.	Presentation to DGCA-MID/5	For Info and Support
	14.	Presentation to ACAO Executive Council	For Info and Support

Key Activity 3 Development of ATFM Regional Framework and draft Common Operating Procedures based on the agreed CONOPS	**15.**	Development of Initial Draft ATFM Regional Framework and draft ATFM Common Operating Procedures	Initial Draft ATFM Regional Framework and draft Common Operating Procedures
	16.	Agreement on the Draft Regional Framework and draft Common Operating Procedures	Draft ATFM Regional Framework and draft Common Operating Procedures
	17.	Circulating the Draft Regional Framework and draft Common Operating Procedures to States	State Letter
	18.	Feedback form States on the Draft ATFM Regional Framework and draft Common Operating Procedures	Feedback
	19.	Consolidation of a Draft Regional Framework and draft Common Operating Procedures for presentation to the MSG/7 meeting	Consolidated version of Draft ATFM Regional Framework and draft Common Operating Procedures
	20.	Presentation to ACAO Executive Council	For Info and Support
	21.	Endorsement of the ATFM CONOPS, Regional Framework and Common Operating Procedures including agreement on a roadmap for the implementation	ATFM CONOPS, Regional Framework and Common Operating Procedures
	22.	Circulation of the CONOPS, Regional Framework and Common Operating Procedures and posting them on the ICAO MID Website	State Letter
	23.	Presentation to ACAO Executive Council	For Info and Support
Key Activity 4 Implementation of the MID ATFM Regional Framework and Common Operating Procedures based on the agreed CONOPS	**24.**	Implementation of the MID ATFM Regional Framework and Common Operating Procedures	Implementation of ATFM Regional Framework and Common Operating Procedures
	25.	Implementation of ATFM framework at national level	National ATFM framework
Key Activity 5 Post Implementation	**26.**	Post implementation review	Post Implementation review
	27.	Improvement of the ATFM Regional Framework and Common Operating Procedures	Proposal for improved ATFM Regional Framework and Common

Review of the MID ATFM Regional Framework			Operating Procedures
	28.	Review and continuous improvement of the ATFM Implementation in the MID Region with consideration of establishment of centralized ATFM system for the MID Region	Continuous improvement
Key Activity 6 Training and raising awareness related to ATFM	**1.**	Development of Training Programme Template for qualifying ATFM Specialist	Training Programme Template for ATFM Specialist
	2.	Development of working arrangement for the ATFM Visits to States that would include ATFM Workshop and/or training courses	working arrangement for the ATFM Visits
	3.	Organizing an ATFM Workshop with the planned A-CDM Workshop	A-CDM/ATFM Workshop
	4.	Organizing of ATFM Training Courses	ATFM Training Courses
	5.	Conduct ATFM Support visits to States	ATFM Support visits
	6.	Conduct familiarization visits to CADENA, Singapore, India, EUROCONTROL, FAA, etc.	ATFM Familiarization Visits

Note: The Action Plan will be periodically reviewed and updated by the ATFM TF, ATM SG, and reported to MIDANPIRG; including ~~time lines~~timelines, champion and status of each activity.

APPENDIX B - MID Region ATM Operational Data Exchange Process

INTRODUCTION

1. The intention of this Operational Data Exchange process is to provide effective process for Air Navigation Service Providers (ANSPs) in order to carry out cross-border coordination with their adjacent ANSPs. taking into consideration the circumstances that would have impact on traffic flows.

2. The main objective of the procedures, is to provide a better collaborative platform for the coordination and management of traffic. during events that might cause disruption of normal traffic flows. These procedures would also support a smooth and less challenging normal operations. In this regard, the templates at Appendices A and B were developed to support coordination between adjacent area control centers (ACCs).

3. The procedures are most suitable for those States that have not implemented or established an ATFM structure yet; as well as in the ICAO Regions where no regional/sub-regional ATFM solutions had been implemented. The well-established regional or sub-regional ATFM solutions would normally ensure collaboration between their members, however, it is recognized that coordination with their adjacent States/Regions might remain a challenge.

Note 1: The procedure is not intended to replace in any form the guidance in Manual on Collaborative Air Traffic Flow Management (Doc 9971) or provisions in other ICAO documentation related to ATFM/CDM or Regional ATFM/CDM plans or guidance.

4. The procedure outlined in this process requires several layers of collaboration and coordination as follows:

a. National Level.
b. Cross border between adjacent States.
c. Multi-States Collaboration (Optional).
d. Regional level.

National Level

5. At National level, where no ATFM system is in place, a National Collaborative Decision Making (CDM) Committee should be established to coordinate the ATM issues (en-route and terminal). The Committee should be composed of representatives from entities that have involvement/impact on ATM operations (ATS, MET, AIS, CNS, SAR, PANS-OPS, regulator, airspace users, airport operators, military authorities, etc.).

6. In cases where a State already have an established Committee or other mechanism is in place, measures should be taken to ensure that it addresses ATM operations-related issues and contingency planning as well as the optimization of airspace management.

7. The CDM Committee should hold frequent (preferable daily) coordination meetings/telecoms to address the operational status and agree on the measures that should be implemented to mitigate the associated challenges.

8. A-CDM, at the airports where it is implemented, will facilitate the work of the CDM Committee, as well as for effective optimization of flight operations at the airports and relevant terminal airspaces.

9. An ATM/CDM Coordinator should be appointed to lead the communication between all stakeholders at national level, including airports, who will also act as the point of contact for cross-border coordination with the adjacent ANSPs/ACCs. It is recommended that the coordinator is an active/dynamic en-route air traffic controller/supervisor knowledgeable of the airspace with high level tactical skills, able to discuss, coordinate and explore solutions to traffic flows. Where an ATFM structure is in place, the ATFM Manager would play this role.

Cross-border Coordination

10. The relevant communication and exchange of operational information among stakeholders on a real-time basis forms the backbone of CDM. This exchange may be accomplished by a variety of means including telephone calls, web conferences, e-mail messages, and electronic data exchange including, but not limited to web page displays. The purpose of the information exchange is to increase stakeholder situational awareness, improve operational decision-making, and enhance the efficiency of the ATM system.

11. It is a significant advantage if a tool is in place to exchange information between the adjacent ACCs. Nevertheless, operational issues for discussion could be coordinated by emails and discussed via telephone. In addition, the use of web-conference applications should be considered, which improve the exchange/sharing of information through view-my-screen options.

12. It is recommended that the OPSDataEx Coordinators from adjacent States communicate together at least once daily on a suitable time for both parties that ensure all matters related to operations are addressed in a timely manner. Timing of daily teleconference should be based on either traffic distribution of associated shift changes.

13. The objective of daily teleconferences between adjacent ACCs is mainly to address the operations outlook and any factor affecting normal operations so as to agree on ATM measures to overcome challenges impacting traffic flows and operational requirements agreed upon via the ATS Letters of Agreement (LoAs).

14. The sharing of information and coordination at national, cross-border and regional levels between stakeholders provides the following tangible and measurable operational benefits:

- reduction of unnecessary delays and airborne holding due to, better planning, increased situational awareness and solutions developed via the coordination process;
- reroute flights in collaboration with neighboring ANSPs, taking into account airspace user needs;
- fuel savings due to better-coordinated tactical air traffic management;
- communicating in a timely manner the impact of special events, contingency and crisis including weather, national disaster, disruption of services, etc.;
- advance planning for the events and for post-events recovery;
- top management kept briefed and informed; and
- optimized implementation of ATFM measures due to improved view of demand and capacity predictions.

15. The Table at ~~Form~~ **Forms ~~A~~ B** presents Template for Daily Teleconferences between Adjacent ACCs or ATFM ~~units~~Telecomunits Telecom Template to facilitate the daily discussions between adjacent ACCs or ATFM units ~~using Form A~~ and preparation for the resumption of normal operations. A more detailed Template for teleconferences during normal situation (after the pandemic) is provided at ~~Appendix~~ **Form ~~B~~A**. The Table Templates would form the basis for the development of ATFM Daily Plans.

Multi States Conference Calls:

16. Instead of having one-to-one daily conferences, several States may decide to organize joint teleconferences to address the topics outlined in ~~Appendices~~ **Forms** **A** or **B**. For better management of joint teleconferences, follow-up, monitoring and reporting, a lead State/ANSP would be nominated that will ensure communication between the States members of the joint teleconferences as well as communicating and reporting as deemed necessary to the relevant ICAO Regional Office/CCT.

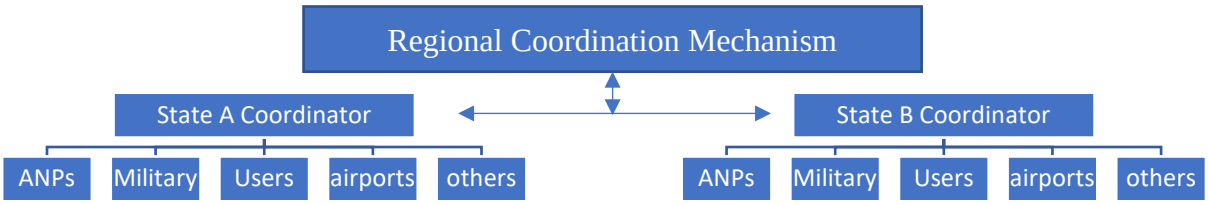
Regional Level

16. ICAO Regional Offices consolidate the inputs received from their relevant States or Group of States as well as those provided by the airspace users and share it as required for regional/inter-regional consideration through the CCT framework or any other mechanism for discussion and agreement on necessary ATM measures to mitigate the identified challenges.

17. Regional Offices organize periodic teleconferences, as deemed necessary, with States and Organizations concerned. During these regional discussions, the relevant ICAO State Letters as well as the matters reported by States and the challenges reported by airspace users should be addressed.

Note: A State could be assigned as a Collection Point for a group of States to consolidate the updates/inputs and provide them to the accredited ICAO Regional Office.

18. The chart below illustrates the coordination process:



19. The outcome of the process, is to have an idea about the expected traffic demand according to the collected data, **Forms** **C** **and D** is provides Hourly Distribution of traffic on Entry/Exit points FIR; that could be compared to the capacity.

20. reference is made to the following guidance materials related to ATFM and A-CDM and a regional cross-border initiative:
https://www.canso.org/implementing-air-traffic-flow-management-and-collaborative-decision-aking
https://www.canso.org/guidelines-airport-collaborative-decision-making-cdm-key-performance-measures
https://www.cadenaois.org/index.html

Appendix B - Form A

Template for Daily Teleconferences between States/ANSPs during COVID-19

	Telecom.	**Ref.**	**Date**	**Action/Remark**
1	Covering period (date and time)	From:	To:	*i.e. coming 12h, 24h, 5, 7 days*
2	Between State/ANSPs	State/ANSP A: [title] [Coordinator name] [email] [Telephone/mobile]	State/ANSP B: [title] [Coordinator name] [email] [Telephone/mobile]	
3	Greetings	---	----	
4	Brief Overview of the situation			
5	Describe the measures planned/implemented due COVID-19 and/or any changes to these measures that may have impact on traffic flow during the coming period. Consider airlines reported challenges/requirements			
6	Aerodromes specific issues affecting capacity such as VIP movements, special flights, infrastructure, weather, etc.			
7	En-route specific issues such ATM restrictions, Military operations, weather, status of CNS/ATM infrastructure, etc.			
8	Changes to Coordination Processes/Communication			
9	Preparation to the normalized situation:			
	a) ANSP readiness			
	b) Measures required during transition period			
	c) Inputs from airlines			
	d) Inputs from CCTs			
	e) Common Date of implementation and publication of NOTAM			
	f) other			
10	Other topics of mutual interest			
11	Required follow-up actions till next telecom			
12	Agreement what and who will report any relevant information or decisions to the relevant ICAO Regional Office and/or CCT			
13	Summary			

Appendix B - Form B

Template for Daily Teleconferences between Adjacent ACCs or ATFM units

	Telecom #.			
1	Covering period (date and time)	From:	To:	*i.e. coming 12h, 24h, 5, 7 days*
2	Between State/ANSPs	State/ANSP A: [title] [Coordinator name] [email] [Telephone/mobile]	State/ANSP B: [title] [Coordinator name] [email] [Telephone/mobile]	
3	Greetings	---	----	
4	Brief Overview of the situation			
5	Describe the issues that may have impact on traffic flow during the coming period:			
	a) Weather: current or forecasted weather that would have impact on en-route or aerodrome operations such as reduced visibility, hurricanes, sandstorms, turbulence, thunderstorm activities, volcanic ash, etc.			
	b) Infrastructure (NAVAID outage, GNSS signal interference, planned maintenance, radar outage, direct COM issues, etc.) NOTAMed or planned to take place.			
	c) Military activities			
	d) Special movements			
	e) Special events			
	f) Pandemic-related issues			
	g) Others			
6	Aerodromes issues			

	a) Airport capacity			
	b) Projected terminal demand;			
	c) Anticipated ATFM measures (MDI, MIT, GSt, GDP, MINIT, etc.)			*Refer to Doc 9971 Chap 4 Section 4.5*
	d) Other			
7	En-route issues			
	a) Airspace capacity (Sector capacity)			
	b) Changes to traffic flow with highlight on relevant Entry/Exist Points.			
	c) ATS Routes status (available, closed, CDR, DCTs, etc.)			
	d) Anticipated ATFM measures (MDI, MIT, MINIT, Re-route, etc.)			*Refer to Doc 9971 Chap 4 Section 4.5*
	e) Other			
8	Coordination Process/Communication			
	a) Discuss changes to way of communication and exchange of info and coordination, of traffic between the 2 ATS units, if any. This would include, Direct Speech, AIDC/OLDI, AFTN Messages, etc.			
	b) Transfer of control points			
	c) Flight level restrictions at entry/exit points			
	d) Expected frequency changes in case of Sector opening/closure or combining sectors.			
	e) Other			
9	Other topics of mutual interest			
10	Required follow-up actions till next telecom			
11	Agreement what and who will report any relevant information or decisions to the relevant ICAO Regional Office and/or CCT			
12	Summary			

Appendix B - Form ~~B~~C

Template for Daily traffic demand between Airspace users and ANSPs

No	Flt No.	DEP	ARR	ETD	ETA	Operating Days							FR1-FR2			FR2-FR3			FR3-FR4			FR4-FR5…			Priority/phase	Remarks
						Sundays	Mondays	Tuesdays	Wednesdays	Thursdays	Fridays	Saturdays	WP/Fix	Time	FL	WP/Fix	Time	FL	WP/Fix	Time	FL	WP/Fix	time	FL		
1																										
2																										
3																										
4																										
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16																										
17																										

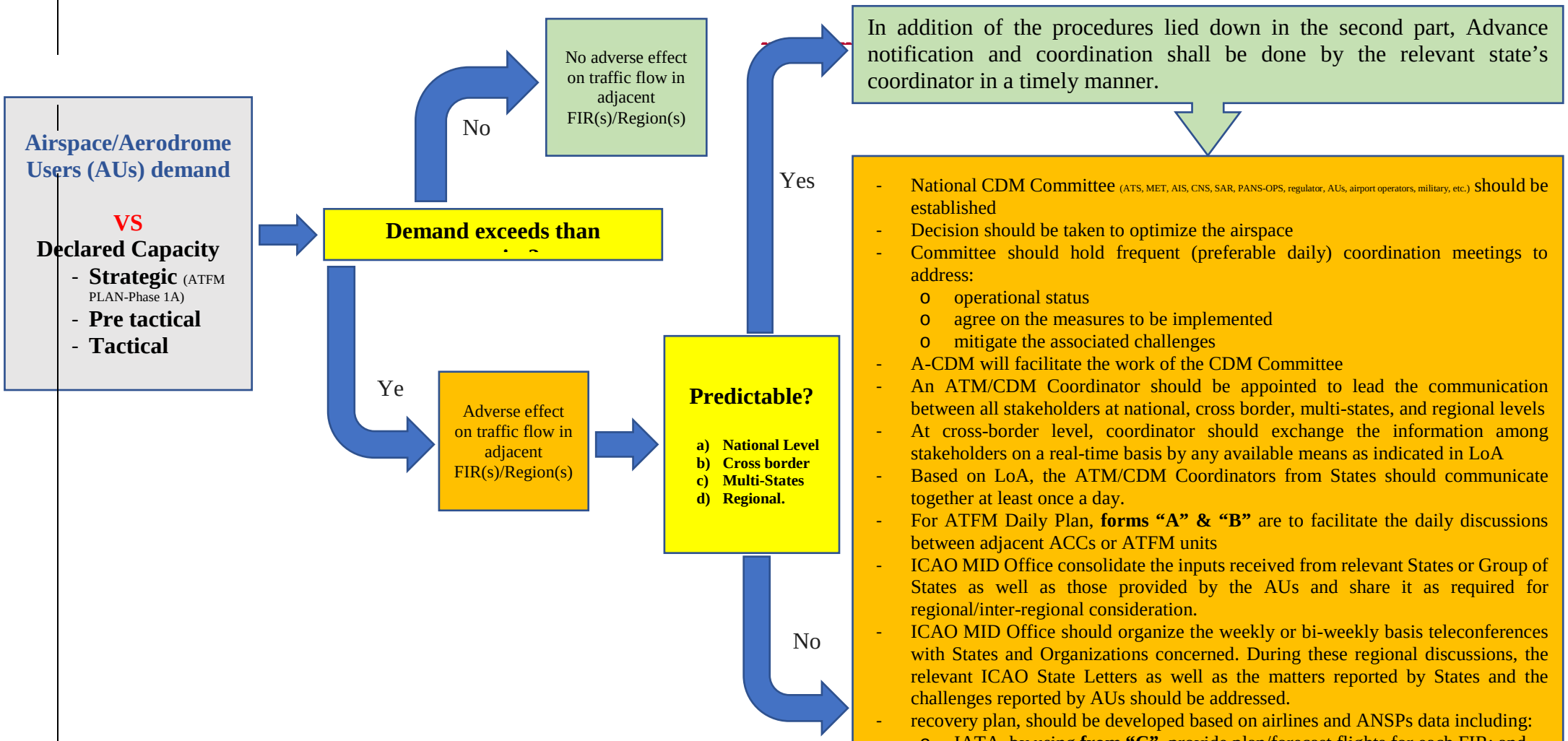
Appendix B - Form ~~C~~D

Hourly Distribution of traffic on Entry/Exit points FIR

Note	*Declared Capacity:*	*Defined number of traffic that could be accepted on each point taking into consideration the available FLs, separation, ATCO workload, airspace complexity, etc.*
	No. of traffic:	*Based on inputs received form airlines or FPLs (Appendix C)*
	The spreadsheet could also be used to analysis the distribution of traffic and impact of rerouted traffic due to contingency situation.	
	% columns and Total column are formulas based for automatic calculation	

No.	Way Points	E=Entry X=Exit B=both	0:00z			1:00z…		
			Declared Capacity	No. of Traffic	%	Declared Capacity	No. of Traffic	%
1								
2								
3								
4								
5								
6								
7								
8								
9								

Appendix B – Flowchart
Data exchange coordination flowchart



APPENDIX C - Calculation of the Aerodrome Acceptance Rate (AAR) used by the FAA

Administrative considerations

a) identify the organization responsible for the establishment and implementation of AARs at select airports;
b) establish optimal AARs for the airports identified; and
c) review and validate the airport primary runway configurations and associated AARs at least once each year.

Determining AARs

Calculate optimal AAR values for each airport runway configuration for the following weather conditions:

a) visual meteorological conditions (VMC): weather allows vectoring for visual approaches;
b) marginal VMC: weather does not allow vectoring for visual approaches, but visual separation on final is possible;
c) instrument meteorological conditions (IMC): visual approaches and visual separation on final are not possible; and
d) low IMC: weather dictates Category II or III operations.

Calculate the optimal AAR as follows:

a) determine the average ground speed crossing the runway threshold and the spacing interval required between successive arrivals;
b) divide the groundspeed by the spacing interval to determine the optimum AAR;
c) formula: ground speed in knots at the runway threshold divided by spacing interval at the runway threshold in miles.

Note: When the quotient is a fraction, round down to the next whole number, as shown in the example below, or use Table II-App C-1.

Example:

130 kt/3.25 NM = 40 Optimum AAR = 40 arrivals per hour
125 kt/3.0 NM = 41.66 round down to 41
Optimum AAR = 41 arrivals per hour

Table II-App C.1. Optimum AAR

	NM between aircraft at the runway threshold									
	3	**3.5**	**4**	**4.5**	**5**	**6**	**7**	**8**	**9**	**10**
Ground speed at the runway threshold	Potential AAR									
140 kt	46	40	35	31	28	23	20	17	15	14
130 kt	43	37	32	28	26	21	18	16	14	13
120 kt	40	34	30	26	24	20	17	15	13	12
110 kt	36	31	27	24	22	18	15	13	12	11

Identify any conditions that may reduce the optimum AAR, including:

a) intersecting arrival and departure runways;
b) lateral distance between arrival runways;
c) dual use runways — runways that share arrivals and departures;
d) land and hold short operations;
e) availability of high-speed taxiways;
f) airspace limitations and constraints;
g) procedural limitations (noise abatement, missed approach procedures);

h) taxiway layouts; and
i) meteorological conditions.

Determine the adjusted AAR using the factors listed above for each runway used in an airport configuration:

a) add the adjusted AARs for all runways used in an airport configuration to determine the optimal AAR for that runway configuration;
b) real-time factors may require dynamic adjustments to the optimal AAR, including:
    1) aircraft type and fleet mix on final;
    2) runway conditions;
    3) runway/taxiway construction;
    4) equipment outages; and
    5) approach control constraints;
c) formula: potential AAR – adjustment factors = actual AAR, expressed as shown in Table II-App C-2

Table II-App C-2. Example of actual AAR

Runway configuration	AAR for VMC	ARR for marginal VMC	ARR for IMC
RWY 13	24	21	19
RWY 31	23	20	17

APPENDIX D - Steps to Estimate Runway Capacity in Brazil

CALCULATING RUNWAY PHYSICAL CAPACITY

The following sequence of events shall be followed to estimate runway physical capacity:

Step 1: Data collection:

Runway occupancy time (ROT):
Recording in specific forms, constant values in Tables 1 and 2, respectively, Runway Occupancy Time during Take-Off (ROTT) data collection form, and Runway Occupancy Time during Landing (ROTL) data collection form, the runway occupancy times during take-off and landing operations distributed in their respective categories:

TABLE 1				
COLLECTION OF RUNWAY OCCUPANCY TIMES DURING TAKE-OFF (ROTT)				
SITE:	**DATE:**		**RUNWAY:**	
REGISTARY	**TYPE**	**CAT**	**TIME**	**REMARKS**

TABLE 2				
COLLECTION OF RUNWAY OCCUPANCY TIMES DURING LANDING (ROTL)				
SITE:	**DATE:**		**RUNWAY:**	
REGISTARY	**TYPE**	**CAT**	**TIME**	**REMARKS**

Note 1: These data shall be collected next to the control tower or ATS unit of the aerodrome under study.
Note 2: The "remarks" column shall contain any data relevant to the validation of the collected data. For example: through which TWY has the aircraft cleared the runway after landing; or how long has the aircraft remained aligned after being cleared for take-off.

Step 2: Estimating the runway occupancy time arithmetical mean: Each of the thresholds of the aerodrome shall be taken into account by inserting the referred data in Table 3 (Form to Calculate the Mean Runway Occupancy Times (ARR/DEP) by Aircraft Category). After collecting runway occupancy times, the arithmetical mean, inter alia, is estimated by aircraft category:

<table>
<tr><td colspan="3">TABLE 3</td></tr>
<tr><td colspan="3">ARITHMETICAL MEAN OF RUNWAY OCCUPANCY TIMES DURING LANDING (MROTL), BY AIRCRAFT CATEGORY</td></tr>
<tr><td>AERODROME</td><td colspan="2">RUNWAY</td></tr>
<tr><td rowspan="6">∑ ROTL_{CATX}/ N^o ACFT_{CATX}</td><td>CAT</td><td>TIME (sec)</td></tr>
<tr><td>A</td><td></td></tr>
<tr><td>B</td><td></td></tr>
<tr><td>C</td><td></td></tr>
<tr><td>D</td><td></td></tr>
<tr><td>E</td><td></td></tr>
<tr><td colspan="3">ARITHMETICAL MEAN OF RUNWAY OCCUPANCY TIMES DURING TAKE OFF (MROTT), BY AIRCRAFT CATEGORY</td></tr>
<tr><td rowspan="6">∑ ROTT_{CATX}/ #ACFT_{CATX}</td><td>CAT</td><td>TIME (sec)</td></tr>
<tr><td>A</td><td></td></tr>
<tr><td>B</td><td></td></tr>
<tr><td>C</td><td></td></tr>
<tr><td>D</td><td></td></tr>
<tr><td>E</td><td></td></tr>
<tr><td colspan="3">ARITHMETICAL MEAN OF RUNWAY OCCUPANCY TIMES (AMROT), BY AIRCRAFT CATEGORY</td></tr>
<tr><td>AERODROME</td><td colspan="2">RUNWAY</td></tr>
<tr><td rowspan="6">(∑ MROTL + ∑ MROTT)/2</td><td>CAT</td><td>TIME (sec)</td></tr>
<tr><td>A</td><td>AMTOTA</td></tr>
<tr><td>B</td><td>AMTOTB</td></tr>
<tr><td>C</td><td>AMTOTC</td></tr>
<tr><td>D</td><td>AMTOTD</td></tr>
<tr><td>E</td><td>AMTOTE</td></tr>
<tr><td>AMROTA= $\frac{\mathbf{MROTTA+MROTLA}}{\mathbf{2}}$</td><td colspan="2">AMROTB= $\frac{\mathbf{MROTTB+MROTLB}}{\mathbf{2}}$</td></tr>
<tr><td>AMROTC= $\frac{\mathbf{MROTTC+MROTLC}}{\mathbf{2}}$</td><td colspan="2">AMROTD= $\frac{\mathbf{MROTTD+MROTLD}}{\mathbf{2}}$</td></tr>
<tr><td colspan="3">AMROTE= $\frac{\mathbf{MROTTE+MROTLE}}{\mathbf{2}}$</td></tr>
</table>

Step 3: Estimating aircraft mix Based on total daily movement records obtained from any recognised statistical source that truly reflects the total movement of aircraft at the aerodrome, a weekly sample is obtained for estimating aircraft mix, and the resulting values are inserted in Table 4 (Form for Collecting Airport Percentage Utilisation Data by Aircraft Category - Mix).

TABLE 4			
AERODROME PERCENTAGE UTILIZATION BY AIRCRAFT CATEGORY (MIX)			
AERODROME:			
MONDAY		**TUESDAY**	
CAT	**# Aircraft (%)**	**CAT**	**# Aircraft (%)**
A		**A**	
B		**B**	
C		**C**	
D		**D**	
E		**E**	
WEDNESDAY		**THURSDAY**	
CAT	**# Aircraft (%)**	**CAT**	**# Aircraft (%)**
A		**A**	
B		**B**	
C		**C**	
D		**D**	
E		**E**	
FRIDAY			
CAT	**# Aircraft (%)**		
A			
B			
C			
D			
E			

TABLE 4 (CONT.)		
	MIX	
	CAT	**# Aircraft (%)**
	A	
$\sum$#ACFT$_{CATX}$/#DAYS	**B**	
	C	
	D	
	E	

The value of the mix shall be determined by comparing the percentages, by day of the week, of the total number of aircraft in the respective day and the total number of aircraft in each category.

The following table illustrates aircraft mix calculation:

	MONDAY		**TUESDAY**		**WEDNESDAY**		**THURSDAY**		**FRIDAY**	
CAT	**ACFT**	**%**	**ACFT**	**%**	**ACFT**	**%**	**ACFT**	**%**	**ACFT**	**%**
A	32	8.42%	29	7.63%	25	6.51%	39	9.86%	25	6.31%
B	55	14.47%	57	15.00%	61	15.89%	73	18.11%	66	16.67%
C	283	74.47%	283	74.47%	286	74.48%	282	69.98%	297	75.00%
D	6	1.58%	11	2.89%	11	2.86%	8	1.99%	8	2.02%
E	4	1.05%	0	0.00%	1	0.26%	1	0.25%	0	0.00%
Total	**380**	**100%**	**380**	**100%**	**384**	**100%**	**403**	**100%**	**396**	**100%**

Arithmetical	
CAT	**MIX**
A	7.71%
B	16.03%
C	73.68%
D	2.27%
E	0.31%
TOTAL	**100%**

Step 4: Calculating Mean Runway Occupancy Time (MROT) The values corresponding to runway occupancy times, by aircraft category, the constant values in Table 3, and the respective constant mix in Table 4 shall be taken to Table 5 (Calculating Mean Runway Occupancy Time), where the mean runway occupancy time (MROT) will be estimated using the weighted arithmetical mean.

TABLE 5					
Calculating mean runway occupancy time (MROT)					
Aerodrome					**Runway**
AMROT			**MIX**		**MROT**
CAT	**TIME (sec)**		**CAT**	**#ACFT (%)**	**TIME (sec)**
A			**A**		
B		**X**	**B**		**=**
C			**C**		
D			**D**		
E			**E**		
MROT=∑ (AMROT $_{CATX}$ **. MIX** $_{CATX}$ **) / 100**					

Step 5: The physical capacity PER runway (PCR) shall be calculated for a one-hour period, taking into account each threshold, by dividing the cited interval, translated to seconds (3600 sec), by the mean runway occupancy time, expressed in seconds.

PCR = 3600 / MROT

Step 6: Aerodrome physical capacity calculation
It shall be based on the mean annual utilization of each runway, in terms of percentage, together with data on total monthly movements obtained from any recognized statistical source, which truly reflect the total movement of aircraft at the aerodrome from which the desired sampling will be obtained.

Runway utilization percentage (UP):
An index calculated from the total monthly movement, obtained from a sampling containing data fora one-year period. Percentages are weighted against the capacity of each runway, the end result being a single value. The following tables illustrate how to calculate runway utilization percentages:

MONTHLY MOVEMENT OF AIRCRAFT			
MONTH	**RWY A**	**RWY B**	**MONTHLY MOVEMENT**
JAN	7622	2631	10253
FEB	6364	3229	9593
MAR	9239	2409	11648
APR	9965	1184	11149
MAY	10811	896	11707
JUN	11280	291	11571
JUL	11637	620	12257
AUG	12145	263	12408
SEP	11687	273	11960
OCT	9177	2184	11361
NOV	7765	2936	10701
DEC	7487	3665	11152
TOTAL	115179		

RWY	**% UTILIZATION (UP)**
A	86
B	14
TOTAL	**100**

The mean annual percentage values per runway and the respective physical capacity values are weighted in order to obtain the physical capacity of the aerodrome, as defined in Table 6.

TABLE 6				
AERODROME PHYSICAL CAPACITY (APC) CALCULATION				
PCR	**X**	**% OF RWY UTILISATION**	**=**	**AERODROME PHYSICAL CAPACITY**
RWY A		**% RWY A**		
RWY B		**% RWY B**		
APC = ∑ (PCR $_{RWYX}$. %UTIL $_{RWYX}$) / 100				

THEORETICAL RUNWAY CAPACITY CALCULATION

Theoretical runway capacity is calculated for a sixty-minute interval, based on the mean runway occupancy time, taking into account ***regulatory aircraft separation, as well as the planning factors and landing and take-off operational factors*** of the aerodrome under study:

Runway occupancy times, aircraft mix, mean runway occupancy time, and annual runway utilization percentage, will be used to calculate aerodrome and runway physical capacity, constant values in Tables 1 to 6.

Step 7: Flight time between the OM and the THR (T)

Flight times between the OM and the THR of the runway under study shall be collected and inserted in Table 7A (flight time between the OM and the THR), taking into account the various aircraft categories operating in the aerodrome. After calculating the respective mean values, they must be inserted in Table 7B (mean flight time between the OM and the THR), so as to calculate the mean speeds in the final approach for all thresholds.

TABLE 7A				
FLIGHT TIME BETWEEN THE OM AND THE THR…….(T)				
OM/THR DISTANCE……				
REGISTRY	**TYPE**	**CAT**	**TIME (SEC)**	**TIME (MIN)**

TABLE 7B		
MEAN FLIGHT TIME BETWEEN THE OM AND THE THR……..(MT)		
OM/THR DISTANCE…….		
CAT	**TIME (SEC)**	**TIME (MIN)**
A		
B		
C		
D		
E		
MT = ∑ T CAT X . /# AIRCRAFT CAT X		

Note 1: Time is measured from the moment the aircraft crosses the outer marker until it crosses the runway threshold, or, in the absence of an outer marker, from the start of the final approach segment until crossing the runway threshold.

Note 2: Consider the distance between the OM and the THR, in NM.

Note 3: If there is no OM, we must select a point of a known distance in the final approach that determines the impossibility for any other aircraft to enter the runway while the landing aircraft is crossing it or is in any other segment between the referred point and the threshold under study.

Step 8: Estimating the landing approach speed between the OM and the THR (V)

With the data obtained from Tables 7A and 7B, we can estimate, for each runway, the landing approach speeds between the OM and the threshold and the final approach segment (FAS)—taking into account each aircraft category--and record the values found in Table 8 (mean speed between the OM and the THR).

Note: This speed is obtained by dividing the length of the final approach segment by the mean flight time, by aircraft category, between the outer marker and the runway threshold (MT).

AVA= $\frac{\text{FAS}}{\text{MTA}}$	**AVB=** $\frac{\text{FAS}}{\text{MTB}}$	**AVC=** $\frac{\text{FAS}}{\text{MTC}}$	**AVD=** $\frac{\text{FAS}}{\text{MTD}}$	**AVE=** $\frac{\text{FAS}}{\text{MTE}}$
TABLE 8				
MEAN SPEED BETWEEN THE OM AND THR……				
CAT		**SPEED (KT)**	**SPEED (NM/MIN)**	**SPEED (NM/SEC)**
A				
B				
C				
D				
E				
SPEED (KT) = DIST (NM)/T FLIGHT OM/THR (H) **SPEED (NM/MIN) = DIST (NM)/T FLIGHT OM/THR (MIN)** **SPEED (NM/SEC) = DIST (NM) / T FLIGHT OM/THR (SEC)**				

Step 9, Mean speed in the final approach (MV):

The weighted mean of final approach speeds, taking into account the aircraft mix.

$$\mathbf{MV} = \frac{\mathbf{MIXA} * \mathbf{AVA} + \mathbf{MIXB} * \mathbf{AVB} + \mathbf{MIXC} * \mathbf{AVC} + \mathbf{MIXD} * \mathbf{AVD} + \mathbf{MIXE} * \mathbf{AVE}}{\mathbf{100}}$$

Step 10, Determination of safety separation (SS):

The study foresees the possibility of having a take-off between two consecutive landings, but without affecting the regulatory separation minima (RSM) between incoming and outgoing aircraft that, in Brazil, are established in ICA 100-12. This requires the calculation of a safety distance to be added to the regulatory separation minima between aircraft in the approach phase in order to allow an aircraft to take off after the first has landed, without compromising its regulatory separation with the second aircraft in the approach phase.

By estimating the distance flown by the second aircraft in the final approach while the first aircraft is on the runway, and by adding the calculated distance to the adopted regulatory separation minima, we obtain the separation required between two consecutive landings.

This flown distance is obtained by multiplying the mean speed in the final approach by the mean weighted runway occupancy time.

$$\mathbf{SS = MV * MROT}$$

Step 11, Determination of total separation between two consecutive landings (TS):

The total separation is obtained by adding the safety separation and the regulatory separation minimum. Thus:

$$\mathbf{TS = SS + RSM}$$

There are cases in which SS can be left out. Normally, this can happen at airports that have two or more runways, where operation dynamics can be enhanced by leaving an aircraft aligned on the runway while waiting for another aircraft to land on the other runway.

Step 12, Calculation of the mean weighted time between two consecutive landings, taking into account total separation (MTTS).

The mean weighted time it takes to cover the total separation between two consecutive landings is obtained by dividing this distance by the mean weighted speed of the aircraft mix.

$$\mathbf{MTTS = TS/MV}$$

Note: The mean time must be calculated for each threshold in the aerodrome, based on the different taxiway configurations for each threshold in use.

Step 13, Determination of the number of landings in a one-hour interval (P):

The resulting mean weighted time it takes to cover the total separation between two consecutive landings, in seconds, shall be the denominator for the number of seconds contained in an hour (3600 sec). The result will be the number of possible landings with the separation proposed for the threshold under study, according to Table 9.

TABLE 9
NUMBER OF POSSIBLE LANDING
3600 / MTTS = NUMBER OF LANDINGS
P = 1 hour / MTTS

Step 14, Determination of the number of take-offs in a one-hour interval (D):

Based on the total separation obtained, it is possible to insert a take-off between two consecutive landings. By subtracting one aircraft from the total number of landings, we obtain the possible number of take-offs within the time interval under study, according to Table10.

TABLE 10
NUMBER OF POSSIBLE TAKE-OFFS
NUMBER OF LANDINGS - 1 = NUMBER OF TAKE-OFFS
D = P - 1

Step 15, Determination of theoretical runway capacity:

Add the resulting number of landings and take-offs in the sixty-minute interval for each threshold to obtain the theoretical operational capacity for the respective threshold, according to Table 11.

TABLE 11
THEORETICAL RUNWAY CAPACITY (TRC)
THEORETICAL RUNWAY CAPACITY = NUMBER OF LANDINGS + NUMBER OF TAKE-OFFS
TRC = Landings + Take-offs

CALCULATION OF THE DECLARED RUNWAY CAPACITY

The declared capacity is estimated taking into account the percentage annual utilisation of each runway, the same as the constant value in Table 6.

Step 16, Determining the declared capacity of the runway set (DCR)

The declared capacity of the runway set is the capacity that is fully sustainable from the operational point of view, taking into account the percentage annual utilisation of each runway.

Accordingly, the weighted arithmetical mean between the utilisation percentage and the respective theoretical runway capacities is estimated.

Thus:

$$\mathbf{DCR} = \frac{\mathbf{UPA} * \mathbf{TRCA} + \mathbf{UPB} * \mathbf{TRCB} + \ldots\ldots\ \mathbf{UPN} * \mathbf{TRCN}}{\mathbf{UPA} + \mathbf{UPB} \ldots\ldots\ldots \mathbf{UPN}}$$

Note: It should be noted that, as stipulated in DOC 9426, an ATC unit can not operate at full capacity throughout the whole operating shift, since there are several variables that significantly reduce capacity at certain times. Therefore, it is advisable to adopt percentages between 80% and 90%, thus giving more flexibility to capacity values, that is, an ideal interval that preserves the safety of air operations.

CONCLUSION

In order to maintain air traffic flow close to optimum conditions, avoiding possible system overloads, the CGNA has conducted studies to standardize the methods for estimating runway capacity, in the hope of analyzing demand/capacity evolution at each airport, and to make recommendations to the airports involved for the sake of operational harmony.

The method presented herein is intended to show the use of the runway capacity calculation model in a general and simplified manner, and does not contemplate the many peculiarities of the aerodromes where it will be applied. Therefore, when conducting studies to determine aerodrome runway capacity, all factors that might affect the indices should be taken into account.

APPENDIX E - Determining Sector Capacity based on FAA Methodology

Sector capacity is determined using the average sector flight time in minutes from 7 a.m. to 7 p.m., Monday through Friday, for any 15-minute time period.

The formula used to determine sector capacity is:

$$\frac{(\textbf{average sector flight time in minutes}) * (\textbf{60 } \boldsymbol{seconds})}{\textbf{36 seconds}} = \boldsymbol{sector\ capacity\ value\ optimum}$$

The steps to follow are:

a) manually monitor each sector, observe and record the average flight time in minutes;
b) after that time is determined:
    1) multiply that value by 60 seconds in order to compute the average sector flight time in seconds;
    2) then divide by 36 seconds because each flight takes 36 seconds of a controller's work time; and
    3) the result is the sector capacity value (optimum).

Example:

a) 20 flights are observed in the sector in 15 minutes;
b) Add the flights individual sector times together 120 minutes;
c) Divide 120 minutes by the 20 flights to obtain the average 120 minutes = 6 minutes / flight;
d) The quotient is the average sector flight time, in minutes 6 minutes;
e) Next, multiply the average sector flight time by 60 seconds (6 minutes / flight) X (60 seconds) = 360 seconds / flight. The product is the average sector flight time, in seconds;
f) Next, divide the average sector flight time, in seconds, by 36 seconds;
Note: 36 seconds is a value established for use in the United States by human factor experts. It represents the average time a controller interacts with a flight while it is in the sector.
g) The average sector flight time from above is 360 seconds per flight;
h) Divide 360 seconds per flight by 36 seconds (the time a controller interacts with a flight) 360 seconds per flight = 10 flights
i) The quotient, 10, is the optimum sector capacity value for the 15 minute period.

Adjustments:

The optimum value for a sector is then adjusted for factors such as:

a) airway structure;
b) airspace volume (vertically and laterally);
c) complexity;
d) climbing and descending traffic;
e) terrain, if applicable;
f) number of adjoining sectors that require interaction;
g) military operations; or h) use Table II-App D-1.

OPTIMUM SECTOR CAPACITY VALUE plus/minus +/- ADJUSTMENT FACTORS equals SECTOR CAPACITY VALUE

Table II-App D-1. Simplified method	
Average sector flight time (in minutes)	**Optimum sector capacity value (aircraft count)**
3	5
4	7
5	8
6	10
7	12
8	13
9	15
10	17
11	18
12 or more	18

APPENDIX F - ATC Sector Capacity Calculation Model Used in Brazil

This methodology consists in obtaining a value based on a mathematical formula. The basic data for such formula are derived from an investigation carried out by a special working group at the ATC unit, taking into account a busy period in which controller actions and availability to manage control sector traffic are observed and timed; this provides a data sample to be used in the ATC sector capacity calculation methodology.

The number of aircraft that can be controlled simultaneously by a single controller (N) in a given sector is estimated using the following formula:

$$N = \Phi * \delta * (\eta * \tau_m * V_m)^{-1}$$

Factors directly proportional to ATC capacity:

Φ (availability factor):

The controller availability factor, defined as the percentage of time available for planning aircraft separation procedures;

Based on this model, controller workload is the summation of times spent on:

1) communication (transmission/reception);
2) manual activities (filling out flight progress strips) and coordination; and
3) traffic planning and distribution.

This availability factor normally falls between a minimum value of 40% of ATCO time for non-radar control, and 60% for radar control (ICA 100-30). It is thus clear that efforts need to focus on increasing the "availability factor" φ.

The latter can only be achieved by applying measures to reduce the level of controller intervention in the activities mentioned in 1 and 2 above.

The percentage accounted for by this φ factor could increase if the "Man/Machine Interface –MMI" is enhanced; that is, when increasing the level of automation in some tasks.

δ (average distance):

Average distance flown by aircraft in the sector, which is a function of the paths and en route or terminal procedures established for each sector;

Factors inversely proportional to ATC capacity:

η (number of communication):

Number of communications for each aircraft in the sector, which must be limited to the least possible number required for an understanding between the pilot and the controller. This number can be minimized by issuing a complete clearance sufficiently in advance for flight planning;

τm (mean communication duration):

mean duration of each message. This factor can be minimized by issuing messages objectively, without long explanations that are detrimental for an understanding between the pilot and the controller; and

νm : mean speed of aircraft in the sector.

If δ and νm are replaced with the average flight time of the aircraft in the sector (T), this formula can be replaced with a simpler version:

$$\mathbf{N = \Phi * T * (\eta * \tau_m)^{-1}}$$

It is advisable to make at least 30 observations of each parameter (δ, η, τm and νm) for each controller, during peak traffic, respecting the minimum number of controllers specified by the sampling technique used.

Example:

Consider **T** (average flight time in sector) = 12 minutes, **τm** (mean communication duration) = 9 seconds which is required to express in minutes 9/60=0/15 , **φ** (availability factor) = 60%, **η** (average number of communication for aircraft) = 6, which gives a number of aircraft **N** = 8 simultaneously controlled by the controller in the given sector. In other words, in this sector and under these conditions, a controller would simultaneously control 8 aircraft.

N = 60%*12* (6*9/60) = 8

APPENDIX G - Capacity Planning and Assessment Process

1. A PERFORMANCE-DRIVEN PROCESS

1.1 The overriding objective is to develop a capacity assessment process that contributes to the requirement to: "provide sufficient capacity to accommodate the demand in typical busy hour periods without imposing significant operational, economic or environmental penalties under normal circumstances."

1.2 To address this, an annual capacity planning and assessment process — a cyclical process that identifies and quantifies the capacity requirements for the short- and medium-term — should be put in place.

1.3 To effectively determine future capacity requirements, it is necessary to monitor current capacity performance using the following indicators:

a) *average ATFM delay per flight:* the average ATFM delay per flight is the ratio between the total ATFM delay and the number of flights in a defined area over a defined period of time; and

The ATFM delay is described as the duration between the last take-off time requested by the aircraft operator and the take-off slot allocated by the ATFM function, in relation to an airport (airport delay) or sector (en-route delay) location; and

b) *effective capacity:* effective capacity is defined as the traffic volume that the ATM system in the area concerned could handle with one minute per flight average en-route ATFM delay. This capacity indicator is derived from a linear relationship between delay variation and traffic variation.

2. METHODOLOGY TO ASSESS FUTURE CAPACITY REQUIREMENTS

2.1 The objective of a medium-term planning and assessment exercise is to provide predictions of the capacity requirement for the ATM system. This can be done in different ways, but preferably through the use of a future ATM profile (FAP) involving a combination of different modelling and analysis tools (see Figure II-App E-1).

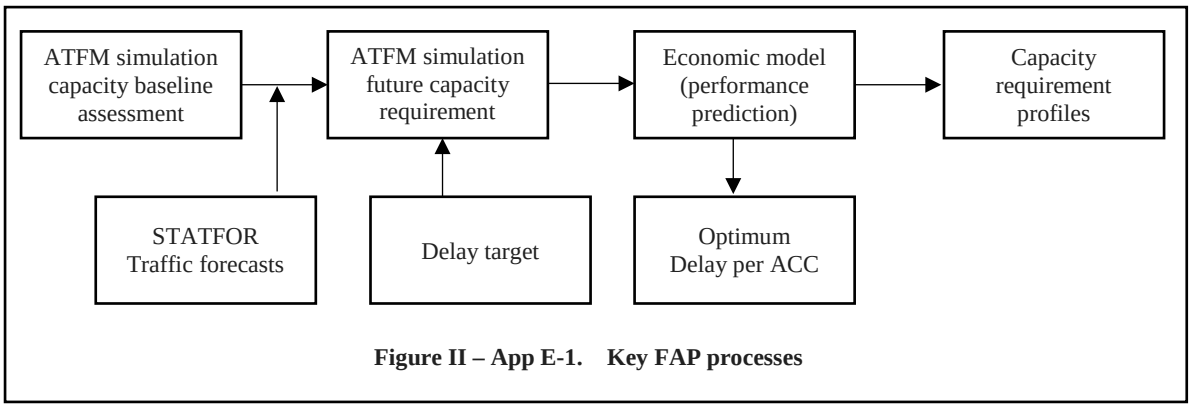


Figure II – App E-1. Key FAP processes

2.2 FAP comprises ATFM simulation facilities as well as spreadsheet and macro-based analysis and reporting tools that assess and quantify how much capacity is delivered by specific airspace volumes within the current ATM system, and evaluate the current and future capacity requirements at ACC and sector group levels. This is done according to the following steps:

Step 1: In order to provide an accurate prediction of the capacity requirements of the concerned area, it is necessary to know the **current capacity offered**. FAP should establish a **capacity baseline** for each ACC and defined sector group.

Step 2: The next task is to provide a **prediction of the future demand** on each ACC (and defined sector group) over the next 5 years, according to the expected traffic growth and distribution over the future route network.

Step 3: FAP should carry out **an economic analysis**, balancing the cost of capacity provision and the cost of delay, on the assumption that each ACC is operating at or close to its economical optimum, and that the target level of delay has been achieved.

Step 4: FAP should then produce, for each ACC in the area concerned (if more than one) and each of the defined sector groups, a **5-year capacity requirement profile**. Percentage increases with respect to the measured capacity baseline are provided.

3. EXPECTED DEMAND ON THE FUTURE ROUTE NETWORK

Medium-term capacity requirements

3.1 Medium-term capacity requirements at the ACC or sector group level can only be assessed once one has an idea of the expected traffic volume and distribution over the future route network in the area concerned. The expected demand at the ACC or sector group level should be assessed by the FAP tool from:

a) the forecast traffic growth;
b) the future route network evolution and traffic distribution, simulated by an airspace modelling tool; and
c) airport capacity constraints, assessed from information gathered from various sources on current and planned airport capacities.

Future route network evolution and traffic distribution

3.2 The capacity requirement for an ACC or sector group is clearly dependent on the distribution of traffic over the network in the area concerned, horizontally and vertically. The demand to be accommodated in the future is determined taking into account the desire of users to fly the most direct routes and optimum vertical profiles, in the context of the anticipated evolution of the route network.

3.3 Changes to the route network and traffic distribution can induce significant changes in terms of the demand (and therefore the required capacity) at individual ACCs, even during periods of reduced traffic growth.

3.4 It is assumed that aircraft will follow the shortest routes available on the network between city pairs according to the future route network, on essentially unconstrained vertical profiles. Nevertheless, some existing structural traffic distribution scenarios are retained. There is no “dispersion” of flights between equivalent routes between city pairs.

3.5 Traffic flows respecting these assumptions should be simulated by the appropriate tools and serve as an input to the FAP simulations. The result of these simulations should be a horizontal and vertical traffic distribution over the future route network, allowing the determination of the unconstrained demand in each ACC.

4. COST DATA AND ECONOMIC MODELLING

4.1 Capacity has a cost, but insufficient capacity, which in turn generates delay, has an even larger cost. Both capacity and delay costs are borne by AUs. It is therefore necessary to determine the level of ATC capacity which can be justified from a cost point of view, i.e. the optimum trade-off between delay and cost of ATC capacity.

4.2 The cost of capacity and the cost of delay are regional parameters depending on:

a) total capacity provided;
b) marginal capacity cost (ATC complexity, price index, equipment, etc.);
c) total delay generated;
d) delay sensitivity (network effects, hourly traffic distribution); and
e) cost per minute of delay (traffic mix).

4.3 Consequently, each ACC has its own capacity cost and delay cost curves. These curves interrelate as network effects within the area concerned change according to changes in capacity offered at other ACCs.

4.4 The total cost curve (the sum of the delay cost and the capacity cost) determines the optimum cost model capacity for each ACC for the current traffic demand. However, to assess capacity requirements for the future, it is necessary to incorporate the future demand into the model in an updated total cost curve for each ACC.

4.5 After the economic analysis or cost optimization for the future traffic demand is carried out, the final step in the process takes place. FAP carries out another iterative ATFM simulation by increasing capacity at the ACC offering the best return on investment (ROI), until the overall delay target is reached (see Figure II-App E-2).

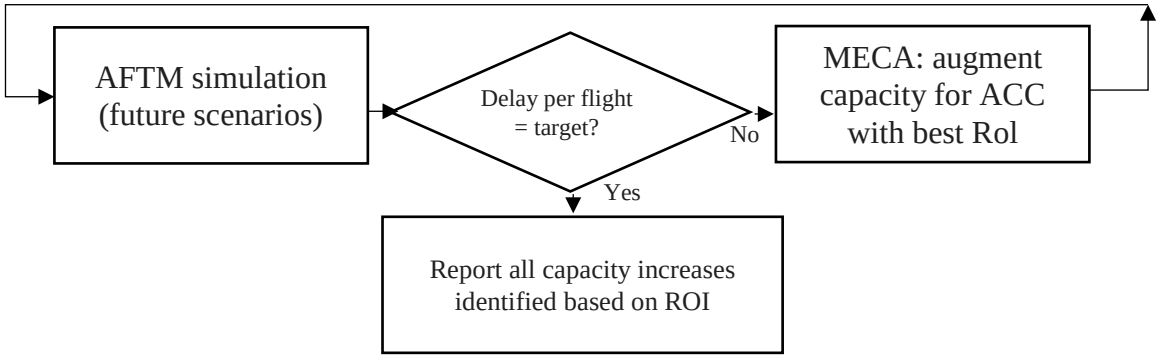


Figure II-App E-2. Iterative ATFM network simulations with best ROI to achieve target delay

4.6 When the agreed target delay is reached, the capacity target for each ACC is expressed in terms of the capacity increase that was necessary in order for the convergence to be achieved. Simulations are carried out for the final year of the planning cycle and for any

year that there are changes to ACC or sector group configurations. Capacity levels are interpolated for intermediate years.

4.7 The capacity target level corresponds to the cost optimum delay for the ACC to meet the overall delay target adopted by the appropriate authority and represents the ACC capacity required to cover:

a) the expected demand; and (if appropriate)
b) the current capacity shortfall, i.e. the difference between the optimum capacity and the current capacity (as described in section 2 of this appendix)).

4.8 Figure II-App E-3 shows an ACC with an optimum capacity (green), an ACC with a capacity shortfall (red) and an ACC with a surplus capacity (blue). For the ACC with optimum capacity, the requirement is only to cover the forecast traffic increase. For the ACC with a capacity shortfall, the requirement is to cover both the shortfall and the traffic increase, and for the one with a surplus, the requirement is to achieve the optimum capacity in the medium term, without costly over-provision.

4.9 If the network delay is close to the target delay, the optimum delay at ACC level is an effective tool to identify areas that still have a capacity gap.

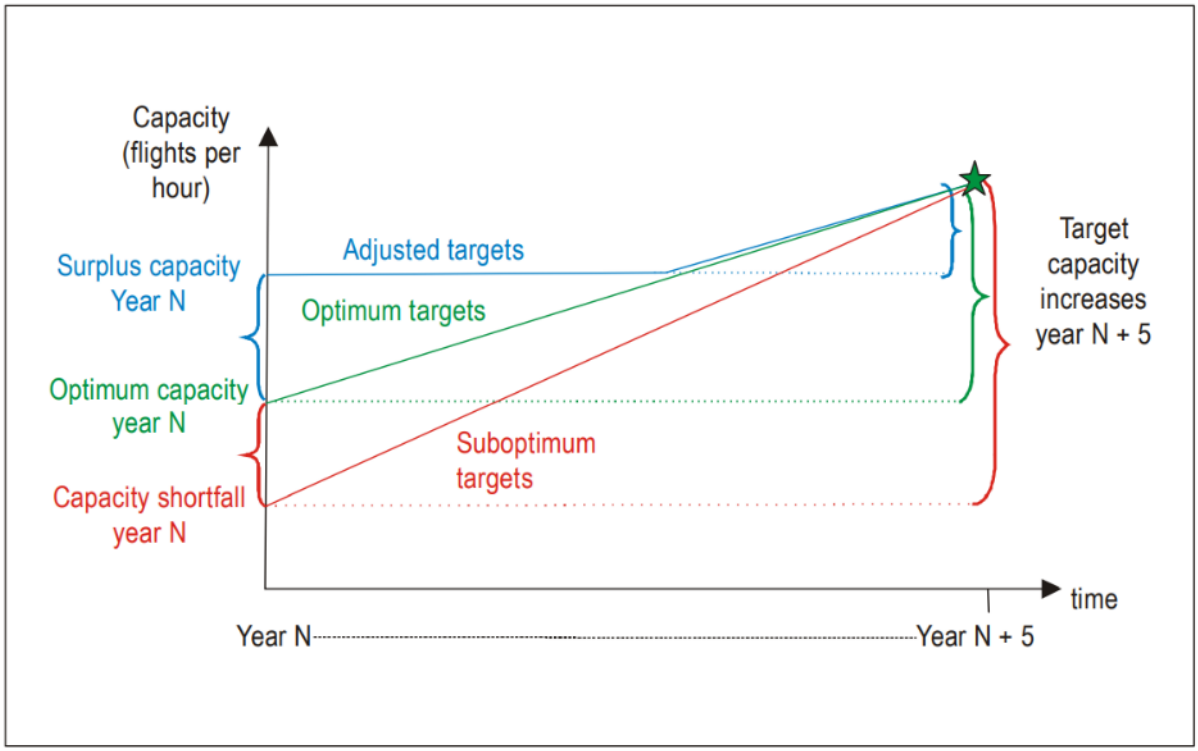


Figure II-App E-3. ACC current versus target capacity

5. THE CAPACITY PLANNING WORK PROGRAMME

5.1 Table II-App E-1 describes the different phases of the annual work programme and lists the required actions and responsibilities.

Table II-E-1. Actions, deadlines and responsibilities

Date/Event	Action ATFM function	Action ANSPs
October–December Capacity planning meetings for the short- and medium-term	Provide all relevant data to enable the ANSP to prepare a first draft of the local capacity plan: – as data becomes available; and – at least 2 weeks before the meeting	Prepare the draft capacity plan prior to the meeting with capacity enhancement function (CEF).
		Ensure the participation of both planning and operational staff at the meeting.
November–December Completion of the capacity plan	Complete the capacity chapter: – by end of December	Finalize the capacity plan: – by end of November
November–February ATFM and capacity report for previous year	Coordinate and agree with ANSPs on the content with respect to the analysis of ACC performance: – by end of January Finalize report: – by end of February	Review and agree on the ACC performance analysis content provided by ATFM function: – by end of January
January Agreement and development of the medium-term capacity profile scenarios	Prepare the airspace scenario data for profile calculation following coordination with ANSPs: – by end of February	Provide ATFM function with details of configuration changes (planned or proposed) during the 5-year planning cycle for ACCs and requested sector groups: – by end of January
February Release of short- and medium-term traffic forecasts	Convene meetings and provide the forum for all relevant information to be included in the short- and medium-term forecast: – during the calendar year Provide the new medium-term traffic forecast: – by end of February Merge the short- and the medium-term traffic forecasts.	Attend the user group meetings to ensure that all information relevant to the traffic forecast is provided to the ATFM function: – by the end of December
March Calculation of medium-term capacity profiles (including optimum delay per ACC)	Calculate the optimum delay for each ACC: – by mid-March Calculate the capacity requirement profiles for ACCs and requested sector groups: – by mid-March	Agree on the capacity profiles and optimum delay per ACC for use as a basis for the local capacity plan: – by end of April
March Calculation of the delay forecast for the coming vacation season and next 2 years	Make the delay forecast for the coming vacation season and the next 2 years: – by mid-March	Ensure that the local capacity plan is up to date and accurate and communicate any changes to the ATFM function: – before mid-February
March The annual meeting of a capacity planning task force	Organize the task force meeting, invite contributions, compile the agenda and write the report.	Attend the meeting with the appropriate planning and operational participation and be prepared to share best practice capacity planning.
April Publication of the operations plan for the coming vacation season	Incorporate the vacation capacity plans into the plans: – by mid-March	Ensure that up-to-date capacity information for the coming vacation season is made available

	Release the first version of the vacation plan: – by mid-March	and that any changes are communicated to the ATFM function for inclusion in the plan: – by end of February – as they occur, throughout the vacation season
May Coordination and agreement of medium-term capacity profiles	Coordinate bilaterally with ANSPs and agree on the profiles that will be used as the basis for local capacity planning in the medium term: – by end of March Present the capacity profiles to the next meeting of the appropriate authorities for approval: – May meeting	
June Publication of the medium-term ATM capacity plan	Collect and consolidate all the local medium-term capacity plans and complete an analysis of the expected situation at network and local levels: – by end of April	
July ACC capacity requirement profiles published	Release document: – by end of July	
July–August ACC/sector group capacity baseline assessment period	Inform ANSPs of the reference dates and request confirmation of data quality: – by end of June Calculate the baselines for ACCs and requested sector groups according to the airspace structure scenarios defined for the capacity profiles: – by end of August In addition to the baseline assessment, calculate the capacity baselines using appropriate simulation and calculation tools: – by end of August	Confirm that fully accurate sector capacity and opening scheme data will be provided to the ATFM function: – 1 week before the reference period Ensure that the sector capacity and opening scheme data are sufficiently accurate for the baseline assessment: – two AIRAC cycles before the start of the AIRAC containing the measurement period
September–October ACC capacity baselines coordinated with the ANSPs	Communicate the baseline results to ANSPs on a bilateral basis for discussion and agreement: – by mid-September Present the agreed ACC baselines to the next meeting of the appropriate authorities – at October meeting	Agree on the capacity baselines for the next planning cycle: – prior to meeting of the appropriate authorities

Capacity planning meetings

5.2 Once per year, the ATFM function should visit the majority of ANSPs in the area concerned to collect information on capacity plans for the next 5 years and the coming vacation season. It is essential to the improvement of ATM capacity at the overall network level for each ACC to have a robust capacity planning process and a realistic capacity plan.

5.3 ANSP capacity plans for each ACC should be published in a local implementation plan, together with other relevant capacity information (e.g. capacity delivered during the previous vacation

season, future capacity requirements, expected performance in the medium term and the current and expected capacity of major airports).

5.4 Prior to each meeting, the ATFM function provides the ANSP with a set of data to enable them to prepare the preliminary capacity plan, tailored to local conditions. The data set should include the following:

a) a report and analysis of capacity delivered during the previous vacation season;
b) the value of the (vacation) capacity baseline indicator for each ACC and requested sector group;
c) the optimum delay for each ACC to meet the network target delay;
d) a set of 5-year ACC capacity requirement profiles for high, low and medium traffic growth (shortest available routes over the future route network) and for the current route network;
e) similar capacity requirement profiles for requested sector groups;
f) detailed medium-term traffic forecast;
g) the latest short-term traffic forecast per State;
h) short- and medium-term delay forecast for each ACC;
i) differences in demand between current routes and shortest routes, and current routes and cheapest route scenarios; and
j) other relevant capacity information.

5.5 ANSPs prepare a first draft of the capacity plan for the meeting, which is discussed and updated in an interactive session, using appropriate simulation and calculation tools. To facilitate the discussion and ensure a realistic capacity plan, ANSPs should ensure the presence of both planning and operational staff.

5.6 The plan should detail the capacity enhancement actions planned each year of the capacity planning cycle, together with a realistic assessment of the contribution of these initiatives to the overall annual capacity increase.

APPENDIX H - TEMPLATE FOR LETTER OF AGREEMENT (LOA)

ATFM LETTER OF AGREEMENT (LOA)

Effective date:

Subject: Air traffic flow management (ATFM) collaboration and coordination

~~ANSP1 and ANSP2 enter into this LoA to facilitate the safe and efficient movement of air traffic between and over both countries.~~

1. PURPOSE

The purpose of this LoA is to establish continuity of operations and ATFM procedures between unit 1 ~~the~~ FMU/ACC flow management ~~unit 1 (FMU1)/ACC1~~ in (city/country) and unit 2 FMU~~2~~/ACC~~2~~ in (city/country). ~~This LoA is not intended to replace any local agreements between ANSP1 area control centres (ACCs) and ANSP2 ACCs.~~ This LoA will promote coordination and collaboration between FMU1/ACC1 and FMU2/ACC2 regarding traffic management measures and the routing of aircraft into and out of ~~ANSP1 and ANSP2~~those airspace. ~~FMU1/ACC1 and FMU2/ACC2 will be the primary points of contact for coordinating traffic management (TM) measures and operations between ANSP1 and ANSP2.~~

To achieve this objective, several layers of collaboration and coordination at national, cross border, multi-States and regional levels should be developed. The detail of the procedure is available in ICAO MID ATFM Plan (ICAO MID Doc 014), Part I, Appendix B.

2. SCOPE

The procedures outlined are for use by unit 1 FMU/ACC ~~FMU1/ACC1~~ and unit 2 FMU/ACC ~~FMU2/ACC2~~ to provide normal air traffic services (ATS).

3. BACKGROUND

a) ~~ANSP1~~ State 1 and ~~ANSP2~~ State 2 have established operational agreements creating cross-border communications and a seamless operational atmosphere. This agreement incorporates unit 1 FMU/ACC ~~FMU1/ACC1~~ and unit 2 FMU/ACC ~~FMU2/ACC2~~ operational procedures and practices.

b) traffic flow management continues to evolve as new procedures and technologies are developed. ~~ANSP1~~ FIR 1 TM measures may include departures from ~~ANSP2~~ FIR 2 airports. Likewise, ~~ANSP2~~ FIR 2 TM measures may include departures from ~~ANSP1~~ FIR 1 airports. The TM measures coordinated by either FMU/ACC may include MIT, MINIT, ground delay measures, ground stops and re-route initiatives.

Note: This list is not all-inclusive and other TM measures may be developed and coordinated to meet operational needs either between two adjacent FIRs or during regional coordination meeting.

4. RESPONSIBILITIES

a) Responsibilities of unit 1 FMU/ACC ~~FMU1/ACC1~~ Operations:

1) unit 1 FMU/ACC~~FMU1~~ is responsible for the flow management of traffic ~~to ANSP1 destinations and through ANSP1 airspace~~in FIR 1 AoR as follows:

i. unit 1 FMU/ACC ~~FMU1/ACC1~~ will coordinate with unit 2 FMU/ACC ~~FMU2/ACC2~~ before implementing TM measures that may impact ~~ANSP2~~ FIR 2 airspace and airports;

ii. when ~~ANSP2~~ FIR 2 airspace and airports are included in a TM measure, advise unit 2 FMU/ACC~~FMU2/ACC2~~:

– before implementing the TM measure;

– what the TM parameters are; and

– when the TM measure is cancelled;

iii. unit 1 FMU/ACC ~~FMU1/ACC1~~ will coordinate with unit 2 FMU/ACC ~~FMU2/ACC2~~ before implementing aircraft reroutes affecting overflights and departures from ~~ANSP2~~ FIR 2 airports or airspace;

iv. unit 1 FMU/ACC ~~FMU1/ACC1~~ must include unit 2 FMU/ACC ~~FMU2/ACC2~~ TM measures in the ATFM operations plan (OP) when it is likely that ~~ANSP1~~ FIR 1 stakeholders will be affected by these measures;

2) unit 1 FMU/ACC~~FMU1~~ will ensure unit 2 FMU/ACC~~FMU2~~ is informed of situations and conditions in ~~ANSP1~~ FIR 1 airspace that may require implementing TM measures affecting ~~ANSP2~~ FIR 2 traffic;

b) Responsibilities for unit 2 FMU/ACC ~~FMU2~~ Operations:

1) unit 2 FMU/ACC ~~FMU2~~ is responsible for traffic flow management of ~~ANSP2~~ FIR 2 AoR ~~destinations and through ANSP2~~ airspace as follows;

i. unit 2 FMU/ACC ~~FMU2~~ will coordinate with unit 1 FMU/ACC ~~FMU1~~ before implementing TM measures that impact departures from ~~ANSP1~~ FIR 1 airports;

ii. when ~~ANSP1~~ FIR 1 airports are included in a TM measure, advise unit 1 FMU/ACC~~FMU1~~:

– before implementing the TM measure;

– what the TM parameters are; and

– when the TM measure is cancelled;

iii. unit 2 FMU/ACC ~~FMU2~~ must include unit 1 FMU/ACC ~~FMU1~~ TM measures in the ATFM OP when it is likely that ~~ANSP2~~ FIR 2 stakeholders will be affected by these measures;

iv. unit 1 FMU/ACC ~~FMU2~~ must coordinate with unit 1 FMU/ACC ~~FMU1~~ before implementing aircraft re-routes impacting departures from ~~ANSP1~~ FIR 1 airports or airspace;

2) unit 2 FMU/ACC ~~FMU2~~ will ensure unit 1 FMU/ACC ~~FMU1~~ is informed of situations and conditions, in ~~ANSP2~~ FIR 2 airspace that may require implementing TM measures affecting ~~ANSP1~~ FIR 1 traffic;

c) Responsibilities for unit 1 FMU/ACC ~~FMU1~~ and unit 2 FMU/ACC~~FMU2~~:

1) to streamline coordination, unit 2 FMU/ACC ~~FMU2~~ will be unit 1 FMU/ACC ~~FMU1's~~ sole point of contact with ~~ANSP2~~ FIR 2 and ~~FMU1~~ FIR 1 will be unit 2 FMU/ACC ~~FMU2's~~ sole point of contact within ~~ANSP1~~ FIR 1 in regard to cross-border TM measures and routing of aircraft;

2) unit 1 FMU/ACC ~~FMU1~~ and unit 2 FMU/ACC ~~FMU2~~ will implement and manage TM measures, as necessary, to relieve congestion and to ensure the orderly flow of air traffic consistent with an equitable distribution of delays;

3) unit 1 FMU/ACC ~~FMU1~~ and unit 2 FMU/ACC ~~FMU2~~ will make every effort to limit the impact of TM measures on stakeholders and implement only those measures that will adequately address the system constraint;

4) the principal TM measures to be implemented will consist of MIT, MINIT, re-routes, en-route spacing measures, ground delay measures and ground stops;

Note: This list is not all-inclusive, and other TM measures may be developed and coordinated to meet operational needs.

5) unit 1 FMU/ACC ~~FMU1~~ and unit 2 FMU/ACC ~~FMU2~~ will collaborate on the design of preferred routes and severe weather avoidance routes that involve the use of both ~~ANSP1~~ FIR 1 and ~~ANSP2~~ FIR 2 airspace or resources; and

6) unit 1 FMU/ACC ~~FMU1~~ and unit 2 FMU/ACC ~~FMU2~~ will provide feedback and share data on the impact and assessment of joint TM measures, as required.

5. IMPLEMENTATION

The procedures outlined in this LoA will be implemented by operational personnel at unit 1 FMU/ACC ~~FMU1~~ and at unit 2 FMU/ACC~~FMU2~~. The ~~telephone numbers~~means of communication for unit 1 FMU/ACC ~~FMU1~~ and unit 2 FMU/ACC ~~FMU2~~ personnel can be found in **Attachments** 1 and 2, respectively.

Since the real-time coordination is a backbone of CDM, an ATM/CDM Coordinator shall be appointed by the relevant states to lead the communication between all stakeholders at national level, who will also act as the point of contact for cross-border, multi-states, and regional coordination with the adjacent ANSPs/ACCs. The specification of the ATM/CDM Coordinator is available at ICAO MID Doc 014, Part I, Appendix B.

The ATM/CDM Coordinators from adjacent States should communicate together at least ---------- on a suitable time for both parties that ensure all matters related to operations as indicated in ICAO MID Doc 014, Part I, Appendix B are addressed in a timely manner.

Forms A, B, C and **D** presents in this template at attachments 3-6 as well as simplified ATM/CDM Telecom Templates are to facilitate the daily discussions between adjacent ACCs or ATFM units to develop ATFM Daily Plan. The details and usage of each template is available at ICAO MID Doc 014, Part I, Appendix B.

6. REVIEW PERIOD

FMU1/ACC1 and FMU2/ACC2 agree to participate in a yearly review of this document.

Original signed by:

~~ANSP1~~State 1---------- **State 2~~ANSP2~~** ----------

Date: ----------

Date: ----------

~~**FMU1**~~**ANSP 1**----------

ANSP 2~~**FMU2**~~ ----------

Date: ----------

Date: ----------

Appendix H - LOA-Attachment 1

The following are the primary and alternative points of contact for coordinating traffic management (TM) measures and operations between ANSP1 and ANSP2

(Name of the FMU/ACC) FMU/ACC Point of Contact – Main	
Name	
Position	
Email address – main	
Email address – alternate	
Telephone Number - work	
Telephone Number - mobile	
Other means	
(Name of the FMU/ACC)FMU/ACC Point of Contact – Standby	
Name	
Position	
Email address – main	
Email address – alternate	
Telephone Number - work	
Telephone Number - mobile	
Other means	

~~TELEPHONE NUMBERS FOR FMU1/ACC1~~

~~FMU1 Phone number(s): xxx xxx xxx~~

Appendix H - LOA-Attachment 2

The following are the primary and alternative points of contact for coordinating traffic management (TM) measures and operations between ANSP1 and ANSP2

~~TELEPHONE NUMBERS FOR FMU1/ACC2~~

~~FMU1 Phone number(s): xxx xxx xxx~~

(Name of the FMU/ACC)FMU/ACC Point of Contact – Main	
Name	
Position	
Email address – main	
Email address – alternate	
Telephone Number - work	
Telephone Number - mobile	
Other means	
(Name of the FMU/ACC)FMU/ACC Point of Contact – Standby	
Name	
Position	
Email address – main	
Email address – alternate	
Telephone Number - work	
Telephone Number - mobile	
Other means	

Appendix H - Attachment 3- Template for Daily Teleconferences between States/ANSPs during COVID-19

	Telecom.	**Ref.**	**Date**	**Action/Remark**
14	Covering period (date and time)	From:	To:	*i.e. coming 12h, 24h, 5, 7 days*
15	Between State/ANSPs	State/ANSP A: [title] [Coordinator name] [email] [Telephone/mobile]	State/ANSP B: [title] [Coordinator name] [email] [Telephone/mobile]	
16	Greetings	---	----	
17	Brief Overview of the situation			
18	Describe the measures planned/implemented due COVID-19 and/or any changes to these measures that may have impact on traffic flow during the coming period. Consider airlines reported challenges/requirements			
19	Aerodromes specific issues affecting capacity such as VIP movements, special flights, infrastructure, weather, etc.			
20	En-route specific issues such ATM restrictions, Military operations, weather, status of CNS/ATM infrastructure, etc.			
21	Changes to Coordination Processes/Communication			
22	Preparation to the normalized situation:			
	g) ANSP readiness			
	h) Measures required during transition period			
	i) Inputs from airlines			
	j) Inputs from CCTs			
	k) Common Date of implementation and publication of NOTAM			
	l) other			
23	Other topics of mutual interest			
24	Required follow-up actions till next telecom			
25	Agreement what and who will report any relevant information or decisions to the relevant ICAO Regional Office and/or CCT			
26	Summary			

Appendix H - Attachment 4-Template for Daily Teleconferences between Adjacent ACCs or ATFM units

	Telecom #.			
13	Covering period (date and time)	From:	To:	*i.e. coming 12h, 24h, 5, 7 days*
14	Between State/ANSPs	State/ANSP A: [title] [Coordinator name] [email] [Telephone/mobile]	State/ANSP B: [title] [Coordinator name] [email] [Telephone/mobile]	
15	Greetings	---	----	
16	Brief Overview of the situation			
17	Describe the issues that may have impact on traffic flow during the coming period:			
	h) Weather: current or forecasted weather that would have impact on en-route or aerodrome operations such as reduced visibility, hurricanes, sandstorms, turbulence, thunderstorm activities, volcanic ash, etc.			
	i) Infrastructure (NAVAID outage, GNSS signal interference, planned maintenance, radar outage, direct COM issues, etc.) NOTAMed or planned to take place.			
	j) Military activities			
	k) Special movements			
	l) Special events			
	m) Pandemic-related issues			
	n) Others			

18	Aerodromes issues			
	e) Airport capacity			
	f) Projected terminal demand;			
	g) Anticipated ATFM measures (MDI, MIT, GSt, GDP, MINIT, etc.)			*Refer to Doc 9971 Chap 4 Section 4.5*
	h) Other			
19	En-route issues			
	f) Airspace capacity (Sector capacity)			
	g) Changes to traffic flow with highlight on relevant Entry/Exist Points.			
	h) ATS Routes status (available, closed, CDR, DCTs, etc.)			
	i) Anticipated ATFM measures (MDI, MIT, MINIT, Re-route, etc.)			*Refer to Doc 9971 Chap 4 Section 4.5*
	j) Other			
20	Coordination Process/Communication			
	f) Discuss changes to way of communication and exchange of info and coordination, of traffic between the 2 ATS units, if any. This would include, Direct Speech, OLDI/AIDC, AFTN Messages, etc.			
	g) Transfer of control points			
	h) Flight level restrictions at entry/exit points			
	i) Expected frequency changes in case of Sector opening/closure or combining sectors.			
	j) Other			
21	Other topics of mutual interest			
22	Required follow-up actions till next telecom			
23	Agreement what and who will report any relevant information or decisions to the relevant ICAO Regional Office and/or CCT			
24	Summary			

Appendix H - Attachment 5-Template for Daily traffic demand between Airspace users and ANSPs

No	Flt No.	DEP	ARR	ETD	ETA	Operating Days							FR1-FR2			FR2-FR3			FR3-FR4			FR4-FR5…			Priority/phase	Remarks
						Sundays	Mondays	Tuesdays	Wednesdays	Thursdays	Fridays	Saturdays	WP/Fix	Time	FL	WP/Fix	Time	FL	WP/Fix	Time	FL	WP/Fix	time	FL		
1	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
2	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
3	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
4	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
5	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
6	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
7	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
8	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
9	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
10	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
11	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
12	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
13	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
14	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
15	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
16	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
17	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_

Appendix H - Attachment 6-Template of the Hourly Distribution of traffic on Entry/Exit points FIR

Note	*Declared Capacity:*	*Defined number of traffic that could be accepted on each point taking into consideration the available FLs, separation, ATCO workload, airspace complexity, etc.*
	No. of traffic:	*Based on inputs received form airlines or FPLs (Appendix C)*
	The spreadsheet could also be used to analysis the distribution of traffic and impact of rerouted traffic due to contingency situation.	
	% columns and Total column are formulas based for automatic calculation	

No.	Way Points	E=Entry X=Exit B=both	0:00z			1:00z…		
			Declared Capacity	No. of Traffic	%	Declared Capacity	No. of Traffic	%
1								
2								
3								
4								
5								
6								
7								
8								
9								

APPENDIX I - ATFM Terminology and Phraseology

ATFM Terminology – General

Acronym	Term	Definition
AAR	Airport Acceptance Rate	Arrival capacity of an airport normally expressed in movements per hour
ADR	Airport Departure Rate	Departure Capacity of an airport normally expressed in movements per hour
ASD	Aircraft Situation Display	ATC Aircraft/Traffic Situation Display
AFIX	Arrival Fix	A waypoint during the arrival phase of a flight. In the context of ATFM it could a waypoint where an ATFM Measure may be applied
CDM	Collaborative Decision-Making	Process which allows decisions to be taken by amalgamating all pertinent and accurate sources of information, ensuring that the data best reflects the situation as known, and ensuring that all concerned stakeholders are given the opportunity to influence the decision. This in turn enables decisions to best meet the operational requirements of all concerned.
CDR	Conditional Route	ATS route that is available for flight planning and use under specific conditions
DFIX	Departure Fix	The first published fix/waypoint used after departure of a flight.
DMAN	Departure Manager	A planning system to improve the departure flows at an airport by calculating the Target Take-Off Time (TTOT) and Target Startup Approval Time (TSAT) for each flight, taking multiple constraints and preferences into account
FCA	Flow Constrained Area	An sector of airspace where normal flows of traffic are constrained, which could be caused by weather, military exercise etc.
FMP	Flow Management Position	A position in any ATCC that monitors traffic flows and implements or requests ATFM measures to be implemented"
GDP	Ground Delay Program	ATFM process where aircraft are held on the ground in order to manage capacity and demand in a specific volume of airspace or at a specific airport. In the process departure times are assigned and correspond to available entry slots into the constrained airspace or arrival slots into the constrained airport
GS	Ground Stop	A tactical ATFM measure where some selected aircraft remain on the ground
MINIT	Minutes in Trail	A tactical ATFM measure expressed as the number of minutes required between successive aircraft. It is normally used in airspace without air traffic surveillance or when transitioning from surveillance to nonsurveillance airspace, or even when the spacing interval is such that it would be difficult for a sector controller to measure it in terms of miles
MIT	Miles in Trail	A tactical ATFM measure expressed as the number of miles required between aircraft (in

		addition to the minimum longitudinal requirements) to meet a specific criterion which may be separation, airport, fix, altitude, sector or route specific. MIT is used to organize traffic into manageable flows as well as to provide space to accommodate additional traffic (merging or departing) in the existing traffic flows. It will never be less than the separation minima.
RFIX	En-route Fix	A waypoint during the en-route phase of a flight. In the context of ATFM it could a waypoint where an ATFM Measure may be applied
SUB	Slot Swapping	The ability to swap departure slots gives AUs the possibility to change the order of flight departures that should fly in a constrained area
-	ATFM Measure	ATFM Measure which will balance demand against capacity or assist in the safe expeditious flow of traffic

ATFM Terminology – Phase of Flight

Acronym	Term	Definition
SOBT	Scheduled off Block Time	The time that an aircraft is scheduled to depart from the parking position
EOBT	Estimated Off Block Time	The estimated time that an aircraft will start movement associated with departure
TOBT	Target Off - Block Time	The time that an aircraft Operator or Ground handler estimates that an aircraft will be ready to startup/pushback immediately upon reception of clearance from the tower.
TSAT	Target Start Up Approval Time	The time provided by ATC taking into account TOBT, CTOT and/or the traffic situation that an aircraft can expect start up/push back approval
COBT	Calculated Off Block Time	A time calculated and issued by ATFM Unit, as a result of tactical slot allocation, at which a flight is expected to pushes back / vacates parking position so as to meet a CTOT taking into account start and taxi time.
AOBT	Actual Off Block Time	The time the aircraft pushes back / vacates parking position (Equivalent to Airline / Handlers ATD – Actual Time of Departure & ACARS=OUT)
STOT	Scheduled Take Off Time	The estimated take off time derived from an aircraft operators schedule, typically based on a standard taxi-out time
PTOT	Planned Take Off Time	Time aircraft is expected to take off derived from the flight plan.
TTOT	Target Take Off Time	The Target Take off Time taking into account the TOBT/TSAT plus Estimated Taxi-Out Time
CTOT	Calculated Take off Time	A time calculated and issued by ATFM Unit, as a result of tactical slot allocation, at which a flight is expected become airborne
ETOT	Estimated Take Off Time	The Estimated take off time taking into account EOBT plus Estimated Taxi-Out Time
ATOT	Actual Take Off time	The time that an aircraft takes off from the runway (Equivalent to ATC ATD–Actual Time of Departure, ACARS = OFF)
SEET	Scheduled Estimated En-route Time	The estimated elapsed time of a flight derived from the aircraft operators schedule

ETO	Estimated Time Over	Estimated time at which an aircraft would be over a fix, waypoint or particular location typically where air traffic congestion is expected
CTO	Calculated Time Over	Time calculated and issued by ATFM Unit, as a result of tactical slot allocation, at which flight is expected to be over a fix, waypoint or particular location typically where air traffic congestion is expected (referred to in FIXM 2.0 as "Airspace Entry Time - Controlled")
PLDT	Planned Landing Time	The expected landing time of a flight derived from the flight plan
SLDT	Scheduled Landing Time	Scheduled time aircraft is expected to land on a runway, typically based on Scheduled In Block Time (SIBT) and a standard taxi-in time
TLDT	Target Landing Time	Targeted Time from the Arrival Management process at the Threshold, taking runway sequence and constraints into account; Progressively refined planning time used to coordinate between arrival and departure management processes
CLDT	Calculated Landing Time	A landing time calculated and issued by ATFM unit, as a result of tactical slot allocation at which a flight is expected to land on a runway
ELDT	Estimated Landing Time	The estimated time that an aircraft will touch-down on the runway (equivalent to ETA)
ALDT	Actual Landing Time	Actual time an aircraft lands on a runway (Equivalent to ATC ATA –Actual Time of Arrival = landing, ACARS=ON)
SIBT	Scheduled In Block Time	The Time that an aircraft is scheduled to arrive at its first parking position.
CIBT	Calculated In Block Time	An in block time calculated and issued by ATFM unit, as a result of tactical slot allocation at which a flight is expected to be at its first parking position.
AIBT	Actual in block time	The time that an aircraft arrives in-blocks (Equivalent to Airline/Handler ATA –Actual Time of Arrival, ACARS = IN)

ATFM Terminology Map

Phase of flight	Scheduled	Flight plan	Target (Airline)	Target (ANSP)	ATFM Measure	Estimated	Actual
Off-Block Time (OBT)	SOBT	EOBT	TOBT	TSAT	COBT		AOBT
Take-off Time (TOT)	STOT			TTOT	CTOT	ETOT	ATOT
Time Over (TO)					CTO	ETO	ATO
Landing Time (LDT)	SLDT			TLTD	CLTD	ELTD	ALTD
In-Block Time (IBT)	SIBT				CIBT		AIBT

ATFM Phraseology

Circumstance	Phraseology
Calculated take-off time (CTOT) delivery resulting from a slot allocation. The CTOT shall be communicated to the pilot at the first contact with ATC.	SLOT (time)
Change to CTOT resulting from a Slot Revision.	REVISED SLOT (time)
CTOT cancellation resulting from a Slot Cancellation	SLOT CANCELLED, REPORT READY
Flight suspension until further notice.	FLIGHT SUSPENDED UNTIL FURTHER NOTICE, DUE (reason)
Flight de-suspension.	SUSPENSION CANCELLED, REPORT READY
Start-up requested too late to comply with the given CTOT.	SLOT EXPIRED, REQUEST A NEW SLOT
Denial of Start-up when requested too late to comply with the given CTOT. (Where supported by State regulation or procedure)	UNABLE TO APPROVE START-UP CLEARANCE DUE SLOT EXPIRED, REQUEST A NEW SLOT
Start-up requested too early to comply with the given CTOT.	REQUEST A NEW SLOT
Denial of Start-up when requested too early to comply with the given CTOT. (Where supported by State regulation or procedure)	UNABLE TO APPROVE START-UP CLEARANCE DUE SLOT (time), REQUEST START-UP AT (time)

APPENDIX J - ATFM Training Requirement

General

Air traffic Flow Management is an enabler of Air Traffic Management efficiency and effectiveness contributing to the safety, efficiency, cost effectiveness and environmental sustainability of an ATM system. ATFM aims at enhancing safety by ensuring the delivery of safe densities of traffic and by minimising traffic surges. Its purpose is to balance traffic demand and available capacity.

As traffic grows, an increasing number of States are moving towards the implementation of an ATFM service. Although this is a positive development, it also generates another challenge. Because of its effect on neighbouring airspaces, ATFM needs to be coordinated between States. ATFM systems therefore need to be compatible and interoperable. In this respect, the development of coordinated and harmonised training requirements is a first step in ensuring a harmonised application of ATFM.

Once demand start to reach the levels of available ATC capacity, a functioning ATFM service becomes a vital component of safe and efficient provision of Air Traffic Control services. Therefore this service needs to be staffed by personnel with sufficient knowledge and understanding of the ATM system they are supporting and the potential effects of their work on the safety and efficiency of air navigation.

To ensure this and in the frame of their training policy, States and ANSPs should establish training plans to ensure that ATFM service staff are properly trained in order to ensure the availability, continuity, accuracy and integrity levels requested for the service provided.

ICAO Doc 9971, Manual on Air Traffic Flow Management recognizes the requirement for training all stakeholders in an ATFM service, i.e. both those directly operation and ATFM function and all other ATFM stakeholders including airspace users and ATS personnel (ref. Doc 9971 section 3.3).

Due to the complexity of the issues at hand when setting out to balance demand against available implementation options, the provision of an efficient ATFM service requires that training is approached in a systematic manner.

This document addresses the need to provide for a set of training requirements to be introduced in support of a harmonised and effective ATFM function. The document describes the requirement for training for staff having responsibilities with regard to the ATFM function. It addresses the requirement for the various levels of staff in an ATFM Unit, as well as those stakeholders affected by ATFM measures. The proposed training requirements are designed to support local application of ATFM at the same time as it prepares States for a regional application of ATFM.

It is assumed that each State and/or ANSP that will set out to train ATFM service staff will have to consider the type of equipment used in their area of operation. The material in this document is made very general when it comes to training required to operate the system that is used, and will have to be detailed based on the tools used in that particular area in support of ATFM services.

ICAO and EUROCONTROL sources were consulted for the development of the training concepts and methodology presented herein. The proposed training syllabus is derived with the support of in-depth ATFM service expertise.

Background

Regional networked Air Traffic Flow Management forms a major part of the ICAO ASBU framework since Block 0 (2013) through B0-NOPS. In support of the B0-NOPS module, ICAO enlisted a group of experts from States, ANSPs, and International Organizations with ATFM experience (ATFM Manual Coordination Team) to develop the ICAO Manual on Collaborative ATFM (Doc 9971), providing

guidance on Collaborative ATFM implementation (published 2014).

Meanwhile, ICAO MID developed MID Air Navigation Strategy (ICAO MID Doc 002), kept it up to date along with ICAO GANP changes including the 6th edition which was endorsed by MIDANPIRG/18 for the propose of CDM/ATFM development to support Seamless ATM Operations in the region.

Purpose and Scope of the Document

The purpose of this document is to define a training process and specify training guidelines in order to have a common level of training for staff that operate and/or "experience" ATFM services.

In many cases an individual may already possess the required competence and experience in a particular domain and may not need to follow a formal training course on this subject. Nevertheless a process of confirm the individuals competence should still be followed. The document addresses the following:

- Who is to be trained?
- What pre-requisite skills are required or can be obtained?
- What are the job responsibilities and required competencies?
- What is the required content of ATFM training?
- What is the level of training depending on the level of responsibilities to be exercised?

Structure of the Document

The ATFM Training Requirement Guidelines consist of 5 Chapters, and 2 Appendices:

Chapter 1: Introduction
Chapter 2: ATFM Training Structure
Chapter 3: From job responsibilities via competencies to training requirements
Chapter 4: Ab-Initio ATFM Training
Chapter 5: Basic training
Appendix A: Glossary (to be included)
Appendix B: List of Abbreviations (to be included)

ATFM TRAINING STRUCTURE

A model of ATFM training

By means of ATFM training, it is expected that staff of an ATFM unit will obtain the appropriate skills to operate and maintain an ATFM function in an appropriate manner and consequently provide harmonised, homogenous and consistent ATFM services in the entire region.

In addition to the staff of the ATFMU itself, there are several other units/areas/entities where staff needs to be aware of ATFM services provided and the specific roles and responsibilities they carry in this process. Units where ATFM is exercised or directly experienced and where staff therefore needs training include:

- ATC
- Aircraft Operators
- Pilots
- Airport Operators
- Military, both service providers and users

- Regulatory bodies (CAAs and equivalent)

An ATFM service is provided at different levels, each with its own training requirements. The different levels of ATFM responsibilities considered include the operations management and supervision levels, planning and execution of the service and essential support staff. In addition, there are different support functions, CDM partners and general ATM personnel that need to be considered when developing training requirements.

This guidance document proposes a six level (taxonomy levels) set of training objectives for each ATFM population grouping depending on the level of responsibility to be exercised by each group.

Level 0: To be aware of

Level 1: A basic knowledge of the subject. It is the ability to remember essential points, to memorise data and retrieve it.

Level 2: The ability to understand and to discuss the subject matter intelligently in order to represent and act upon certain objects and events.

Level 3: A thorough knowledge of the subject and the ability to apply it with accuracy. The ability to make use of the repertoire of knowledge to develop plans and activate them.

Level 4: The ability to establish a line of action within a unit of known applications following the correct chronology and the adequate method to resolve a problem situation. This involves the integration of known applications in a familiar situation.

Level 5: The ability to analyse new situations in order to elaborate and apply one or other relevant strategy to solve a complex problem. The defining feature is that the situation is qualitatively different to those previous

(Source: EUROCONTROL Specification for the ATCO Common Core Content Initial Training).

This guidance proposes that a matrix should be constructed to determine the level of training and competency required for each group in the ATFM population. A partial matrix template is shown below. This is developed further in the document. The levels are shown for illustrative purposes only.

	Operation management	Supervision	Planner	Execution	Support	CDM partner	General ATM personnel
Subject							
ATM	2	2	2	2	2	1	1
ATFM	2	3	4	3	2	2	1
ATC	2	2	2	1	1	1	1
Airport operations	2	2	2	2	1	1	1
Aircraft operations	2	2	2	2	1	1	1
Meteorology	2	2	3	3	2	1	1
ICAO	3	2	2	2	2	1	1
ATFM tools	2	2	3	3	3	2	1
Capacity assessment	2	2	2	1	1	1	1
Airspace design	2	2	2	1	1	1	1

Phases of ATFM training

General

ATFM training can be divided into a number of phases. This document concentrate on training requirements for Ab-Initio and Basic training, other phases are only discussed briefly.

Ab-Initio Training

Ab-initio training is intended to ensure that new ATFM staff possesses the necessary contextual knowledge in order to follow the more detailed job related training. In many cases staff may already possess this knowledge (e.g. ATC staff will possess the necessary ATC knowledge, Airline operations personnel the necessary aircraft operations knowledge). The possession of the necessary ab-initio subject knowledge should be assessed upon recruitment / assignment. In cases where staff possess the necessary contextual knowledge these staff may be exempted in whole or part from elements of ab-initio training.

Basic Training

Basic training is the main phase where the core ATFM and associated operational topics are covered in a comprehensive fashion. Basic training also covers more detailed knowledge of subjects related to ATFM than in ab-initio training. At the successful completion of basic training the staff member should have all the relevant knowledge to proceed to on the job training before performing his role in the ATFM operation.

On the Job Training

ATFM, in common with many other operational occupations requires a substantial amount of practical application of the occupation under appropriate supervision in order to ensure that the acquired knowledge from the basic training course(s) can be applied in an autonomous manner. The purpose is to reinforce formal training and support the achievement of competency standards. If appropriate, OJT phases can also follow advanced or refresher training.

Advanced Training

As ATFM functions develop, a number of advanced ATFM analysis and application techniques are used. Secondly some staff involved in the execution of ATFM will require a higher level of skills and advance training modules will be required for both such cases. The purpose of advanced training is to augment the skills and knowledge of ATFM personnel in dealing with either more specific, complex problems or a wider breadth of issues.

Recurrent/Refresher Training

It is essential that ATFM personnel update his or her competencies in accordance with the latest operational requirements, and new methodology/technologies applied. Regular recurrent training should therefore be planned. It is important to maintain the current skills of ATFM personnel. Some ATFM techniques are applied only in very rare situations (contingency, exceptional events). ATFM personnel can be absent from their core operational function for extended lengths of time. For these three reasons recurrent/refresher training modules will be required.

Training requirements for ATFM instructors

To ensure efficient training, the trainers have to be in possession of the necessary skills. Apart from a thorough knowledge of the subject to be taught, the trainers also need to demonstrate the ability to convey the knowledge in a pedagogic and structured way. It is recommended that the trainers have attended Classroom Techniques training courses. In cases where a State is implementing an ATFM

service for the first time, and thereby do not have the expertise needed to perform the training available in their country, different solutions could be considered. In cases where a system is procured to support the application of ATFM, the inclusion of a package for training of the trainers should be considered. For more in-depth knowledge of the procedures and processes involved, it may be necessary to send the staff responsible for the training to attend courses given by trainers having the experience required to train staff on the application of ATFM.

FROM JOB RESPONSIBILITIES VIA COMPETENCIES TO TRAINING REQUIREMENTS

General

Introduction

The first steps in the process of designing detailed training requirements, are to:

- Identify job responsibilities and associated performance and measurement criteria;
- Identify the competencies required to meet these job responsibilities and performance.

With full understanding of job responsibilities, it is possible to determine what the competencies are of a fully competent staff member. Items that may be needed to perform this analysis include:

- the specific job or position description or summary;
- specific ATFM organization performance requirements or competencies; and
- standard operating procedures that apply to an individual's position or responsibilities.

When the pre-requisites described above are identified and analysed, it is possible to design the training required to address the gaps through the development of the learning objectives for each competency that needs to be addressed. Based on the identification of the learning objectives, a curriculum can then be designed.

The link between ATC and ATFM

Before looking at the details of the job responsibilities of an ATFM Unit, there is a requirement to understand its links with ATC. ATFM is a cross-domain activity, and even if the focus have shifted from the early task of protecting ATC from overload to a more comprehensive demand/capacity balancing activity, there are still very strong links between ATC and an ATFM service.

The ATC Supervisor is accountable for the provision of ATC services for enroute and TMA operations within the FIR`s for which this service is being provided. As part of that responsibility, he/she is normally also accountable for all strategic and tactical ATFM decisions. In a smaller ACC the supervisor may keep that responsibility, but in a larger ACC this is often delegated to an "Airspace Manager", either being the Flow Management Position (FMP) in the ACC or the ATFM Unit (ATFMU) Supervisor.

To be able to take strategic and tactical decisions related to the application of ATFM, there is a requirement for a large measure of ATC knowledge, and when the responsibility to take these decisions is delegated to an FMP and/or ATFMU Supervisor it normally requires that the staff manning these positions have an ATC background. As management knowledge is passed on and complexity issues in sectors and at airports are documented and understood by the ATFMU, there may not be a need for this pre-requisite. However, it is important that the training provided is such that the FMP and/or supervisor of the ATFMU are able to fully understand and discuss ATC operations so that the expected outcomes can be achieved.

Over time, the objective should be to develop the ATFMU to become an integral part of ATC so that it

is seen as the manager of the airspace, ensuring the delivery of the right amount of demand in the right shape to achieve maximum capacity.

Tasks and Competencies

Main tasks for an ATFM Unit

The objective when defining the tasks of an ATFM Unit should be to ensure that the ATFMU become the focus for an effective management of airspace availability and capacity. The ATFMU should manage and coordinate actions associated with optimising demand against the capacity of the airspace, ensuring that the complexity of traffic does not exceed the capability of the control service.

The ATFMU should maintain a strategic and tactical overview of the network (airspaces and airports within and adjacent to its area of responsibility), being responsible for the development of tactical ATFM strategies, and for managing network responses to demand and capacity issues.

The main tasks of a service provided by an ATFM unit include:

- Receive and analyse all ATFM data and associated parameters;
- Plan and coordinate capacity adjustment for next day's operation;
- Plan and coordinate ATFM Daily Plan for the next day's operation;
- Manage proper execution of ATFM Measures on day of operation based on ATFM Daily Plan;
- Coordinate tactical capacity adjustment on ATM resources with the local ATC Supervisors;
- Monitor and execute ATFM Measures on day of operation as required based on ATFM Daily Plan;
- Ensure proper integration of traffic demand inputs;
- Ensure proper configuration of ATFM automation support systems;
- Ensure optimisation of resources through an efficient CDM process;
- Provide focus and specialist expertise for planning, coordinating and implementing measures for capacity management and contingency operations;
- Conduct post operations analysis of previous days ATFM operation.

Competencies for staff executing ATFM

To perform ATFM tasks, staff needs to be trained to possess a number of competencies. They need to have full knowledge of the FIR and/or airports for which the service is applied. They also need to understand the factors that impact on the capacities for the various parts of airspace and airports, and they need to be fully aware of the impact on the provision of ATC that the different actions they propose to implement may have. In order to be effective, the ATFMU needs to coordinate and cooperate closely with ATC, airports and civil and military airspace users.

The required competencies include the ability to:

- Determine an accurate picture of air traffic demand;
- Receive, verify, evaluate, enter and store all relevant ATFM data;
- Monitor the evolution of demand versus capacity identifying all shortfalls and opportunities for optimisation;
- Determine the need for ATFM measures in all phases of ATFM;
- Draw up and publish ATFM plans and any changes to the plan (understand what Information to be published);
- Create, maintain, monitor and adjust all relevant ATFM scenarios and measures;

- Ensure that AOs are provided with advice and guidance for minimising delays and disruption;
- Know and adhere to all relevant operational instructions, operations manuals and letters of agreement (actively locate, read and follow instructions).

ATFMU Operational Staff Job Descriptions

General

The job descriptions of staff operating an ATFM facility will depend on the chosen organization. For the purposes of this document the following job descriptions are proposed. Depending on the local organization responsibilities may be delegated or not, and functions may be combined or subdivided.

- ATFM Unit Operations Manager
- ATFM Unit Supervisor
- ATFM Unit Planner
- ATFM Unit Office (executive)
- ATFMU Support Assistant
- ATFMU CDM partner

ATFM Unit Operations Manager Job description

Each ATFM unit should have a clearly designated line manager directly responsible for the overall operation of the unit. He is the immediate hierarchical superior of the ATFMU supervisors. Although not normally involved in the direct execution of ATFM it is recommended that the Operations Manager be subject to an appropriate form of training and competency assessment.

The job description of the Operations Manager is not defined in this document as this will vary according to the organization management structure. However it is strongly recommended that the Operations Manager acquire and maintain level 2 (ability to understand and to discuss the subject matter intelligently in order to represent and act upon certain objects and events) competence in all the subjects contained in the basic training content.

ATFMU Supervisor Staff Job Descriptions

The duties of the supervisor/manager of an ATFM service function include:

- Ensure self-briefing and that all ATFM staff are fully briefed on all aspects of the operation;
- Plan and coordinate with ATC supervisor capacity adjustment for next day's operation;
- Plan and coordinate ATFM Daily Plan for the next day's operation;
- In coordination with local ATC supervisor manage local and network resources to optimise capacity and minimise delays within their areas;
- Supervise the proper execution of ATFM Measures on day of operation based on ATFM Daily Plan;
- Organize, chair and conduct all necessary CDM conferences;
- Proactively use their experience and authority in an appropriate manner, be creative and use initiative in the resolution of problems that may arise using an inclusive collaborative process;
- Execute all appropriate staff management duties fairly and transparently in accordance with local procedures and processes;
- Manage disruption and contingency procedures and ensure appropriate escalation;
- Ensure ATFMU management is aware of all significant events;
- Ensure accurate log keeping and recording of all significant occurrence.

ATFMU Planner Staff Job Descriptions

The duties of the planning function of an ATFM service include:

- Manage and execute the short term strategic and pre-tactical operational processes and post operational evaluation;
- Maintain a good level of coordination with the ATC Supervisor in order to negotiate the best possible pre-tactical solutions including negotiating improved capacity, applying ATFM regulations where necessary and proposing & implementing the optimum ATFM measures for the network;
- Create and continuously adapt plans and to propose new solutions taking into consideration ever changing circumstances;
- Proactively provide all reasonable assistance to the airspace users in order to facilitate them to optimise their operations;
- Endeavour to maintain the principles of network optimisation and collaborative decision making during all ATFM processes;
- Coordinate ATFM solutions with other operational functions (tactical, AMC, Flight Planning);
- Ensure that the ATFM network plan and all changes are fully communicated with Aircraft Operators, Airports and Air Traffic Control Centres;
- Evaluate execution of the ATFM plan in order to determine lessons learnt and issues for future attention.

ATFMU Officer Job Descriptions

The duties of the ATFM Officer function of an ATFM service include:

- Execute the tactical flow management operational process from a network perspective;
- Constantly monitor traffic loads on all ATFM resources;
- Monitor any potential and actual changes in capacity (e.g. staffing, weather, airport infrastructure, etc.) and implement appropriate measures;
- Maintain a good level of co-ordination with the ACC/airport in order to negotiate the best possible tactical solutions including negotiating improved capacity, applying measures where necessary and proposing & implementing re-routing scenarios;
- Continuously adapt plans and to propose new solutions taking into consideration ever changing circumstances;
- Proactively provide all reasonable assistance to the airspace users and air navigation service providers in order to allow them to optimize their operations;
- Endeavour to maintain the principles of network optimization and collaborative decision making during all relevant ATFCM processes;
- Coordinate tactical capacity adjustment on ATM resources;
- Ensure the promulgation of all measures taken.

ATFMU Support Assistant Job Description

The duties of the ATFM Support Assistant function of an ATFM service include:

- Coordination with external clients (airspace users, ATS units, military) under the supervision of planning and executive staff;
- Reception, validation and input of ATFM data;
- Ensure proper integration of traffic demand inputs;
- Maintenance of operational documentation;

- Responding to routine queries from external clients, providing standard information and referring issues to planner and officer where appropriate.

Note: The duties of the Support Assistant function will depend on which executive position the support function is assigned to. It is suggested that the same basic training curriculum is followed for support and executive staff, but that the level of knowledge and competency required be at a lower level.

CDM partner Job Description

The duties of CDM partners are not defined in this document. It is suggested that the training authority selects the appropriate subject and competency levels for each CDM partner group based on the detailed training requirements below.

Ab initio ATFM training

Ab-initio training is intended to ensure that new ATFM staff possesses the necessary contextual knowledge in order to follow the more detailed job related training. In many cases staff may already possess this knowledge (e.g. ATC staff will possess the necessary ATC knowledge, Airline operations personnel the necessary aircraft operations knowledge).

Basic Requirements

The possession of the necessary ab-initio subject knowledge should be assessed upon recruitment / assignment. In cases where staff possess the necessary contextual knowledge these staff may be exempted in whole or part from elements of ab-initio training.

There are several basic requirements or pre-requisites for the successful conduct of ATFM training. These include:

- Pre-requisite skills and experience (e.g. experience in ATM, aircraft, airport operations)
- Complementary skills (IT skills, written and oral communication skills, operations analysis, statistics experience)
- Medical requirements
- Language requirements

Normally these competences and requirements form part of the recruitment requirements. The definition of these general requirements is beyond the scope of this document. However, material is readily available in the public domain from other ATM related functions that can assist those responsible for recruitment and training to draw up appropriate general competency and experience requirements.

ATFM Ab-initio training content

The subjects contained in the modules below need to be covered in the Ab-Initio Training phase. It is recommended that the appropriate taxonomy level for ab-initio training is between level 1 (basic knowledge) and 2 (understand and discuss).

> **Level 1:** A basic knowledge of the subject. It is the ability to remember essential points, to memorise data and retrieve it.
>
> **Level 2:** The ability to understand and to discuss the subject matter intelligently in order to represent and act upon certain objects and events.

ATFM as described by ICAO is a collaborative process between ATC and the Airspace User facilitated

by the ATFM units. Airport operations authorities are also an essential ATFM partner. It is therefore suggested that these partners should be closely associated with the training content development and delivery. The ab-initio training should include facilitated visits of the operations units of these stakeholders.

The modules that need to be covered during the Ab-Initio Training Phase can be found at Attachment A to this guidance.

Basic ATFM Training

Basic training is the main phase where the core ATFM and associated operational topics are covered in a comprehensive fashion. At the successful completion of the class room training part of the basic training the staff member should be fully prepared to begin his/her period of OJT in the pre-tactical and/or tactical area. He/she should have achieved all the relevant knowledge and skills and be able to understand the concept of ATFM, the operating procedures in place and the use of related equipment. The start of the training should be preceded by an information session providing the training aims and the overall planning for the entire training. As part of the informative session, trainees would be informed about the design of the training modules, and their expected involvement during the training. Depending on the background of the trainees, it may be beneficial to consider involving the participants in a workshop style environment, encouraging them to develop their own ideas and to motivate them into thinking how the role of the ATFMU can be developed to support the overall objectives of the ATFMU.

The following modules need to be covered during the Basic Training phase:

1. Foundational objectives and principles of ATFM
2. ATFM Institutional and Regulatory background
3. The CDM Process in the context of ATFM
4. ATM Planning
5. ATFM Phases
6. ATFM Demand
7. ATFM Measures (Traffic Management Initiatives)
8. ATFM Contingency Procedures
9. ATFM Data and Tools

This document does not provide a detailed curriculum for ATFM training since this has to be individually prepared based on the pre-requisites for that particular training course. When deciding on training content for a specific Basic Training course, it is important to consider:

- the position that the trainees are going to be trained for, i.e. the job responsibilities;
- the competencies required to carry out the tasks; and
- the background of the trainees, i.e. the competency level.

Based on those three criteria and the training requirements they indicate, the content of the modules described at Attachment B to this guidance can be adapted to fit the needs of a specific course. At Attachment C is a description of how one State (Japan) has organized its training for ATFM positions. The attachment includes a sheet where the details of what needs to be covered during the OJT period is listed, items against which the trainee has to demonstrate an acceptable level of knowledge and understanding.

APPENDIX J – ATTACHMENT A: Modules to be covered during the Ab-Initio training phase

Aviation Law and Institutional Background

Phase	Ab-Initio
Subject	Aviation Law and Institutional Background
Objective	**Understand** national and international regulatory context of ATM in general and ATFM.

Content	Reference Documents
• International Aviation Structure and Organization	Chicago Convention, Annex 11, Local legislation and role, Doc 4444, Doc 9971
• National Aviation Structure	
• National Aviation regulations	
• Structure on ANS and ATS	
• Institutional international and national background of ATFM	
• Safety Management Principles	

Air Traffic Management

Phase	Ab-Initio
Subject	Air Traffic Management
Objective	Learners shall **understand** the basic principles of Air Traffic Management and be able to **discuss** basic operational procedures.

Content	Reference Documents
• Air Traffic Control Service (Aerodrome, Approach, En-route, Oceanic)	Annex 11, Doc 4444, Doc 9971, Doc 7030, ATFM Manuals introduction Local ASM rules Annex 2, Doc 7910 local rules
• Flight Information Service and Advisory service	
• Alerting Service	
• Structure on ANS and ATS	
• ATFM Introduction	
• Airspace Management	
• Altimetry and Level allocation	
• Separations	
• ATM Data o ICAO designators o Other designators	
• Flight Plan processing	

Air Traffic Flow Management

Phase	Ab-Initio
Subject	Air Traffic Flow Management
Objective	Learners shall **understand** the basic principles and origin of air traffic flow management and be able to **discuss** basic operational procedures.

Content	Reference Documents
• Objectives of ATFM	Doc 9971
• Benefits of ATFM	
• Principles of ATFM	

Aircraft and Flight Efficiency

Phase	Ab-Initio
Subject	Aircraft

Objective	Learners shall **understand** the basic principles of the theory of flight and aircraft characteristics and how these influence ATS and ATFM operations.

Content	Reference Documents
• Principles of flight	Local airline SOP Doc 4444, EUROCONTROL ERNIP (flight efficiency section)
• Aircraft Engines	
• Aircraft Systems and Instruments	
• Aircraft categories	
• Factors affecting aircraft performance	
• Aircraft performance data	
• Flight efficiency concepts (economic, environmental)	

ATM Equipment and Systems

Phase	Ab-Initio
Subject	ATM Equipment and Systems
Objective	Learners shall **understand** the basic working principles of equipment that is in general use in ATC;

Content	Reference Documents
• Radio communications	Local ATM System Manuals
• Radar, Primary, secondary, mode S, CPDLC	
• ADS	
• AFTN, AIDC/OLDI,	
• AMAN, DMAN, ASMGS	

Airport Operations

Phase	Ab-Initio
Subject	Airport Operations
Objective	Learners shall understand the operations related functions carried out at airports.

Content	Reference Documents
• Aerodrome infrastructure	IATA Slot allocation guidelines Local Airport documentation
• Airport capacity	
• Airport scheduling, coordination. Airport slot allocation	
• Management of maintenance	
• Management of disruptive events	

Airline Operations

Phase	Ab-Initio
Subject	Airline Operations
Objective	Learners shall understand the ATM operations related functions carried out by aircraft operators.

Content	Reference Documents
• Airspace Users operating models (hub, point to point, major carriers, low fare sector…)	Local Airline Operations Manuals
• The airlines operations Centre	
• Airspace Users (scheduled, non-scheduled, business, general aviation, military)	

ATFM and CDM

Phase	Ab-Initio
Subject	ATFM and CDM

Objective	Learners shall **understand** the fundamental CDM concepts underlying effective ATFM

Content	Reference Documents
• ATC v ATFM	Doc 9971
• ATFM; bridging the gap between ATC and airline operations	
• CDM competencies	
• CDM skills	

Meteorology

Phase	Ab-Initio
Subject	Meteorology
Objective	Learners shall **understand** how meteorology affects ATS operations and aircraft performance and limits ATFM capacity.

Content	Reference Documents
• Basic introduction to meteorological phenomena	Local MET Manuals
• Aviation meteorological forecasts and observations	
• Understand the meteorological hazards to aviation	
• Weather and capacity	

APPENDIX J – ATTACHMENT B: Modules to be covered during the Basic Training phase

Foundational objectives and principles of ATFM

Phase	Basic
Subject	Foundational objectives and principles of ATFM
Objective	• understand the philosophy of air traffic flow management, including the objectives and principles of ATFM; • know how the ATFM service operates; • know the terms and definitions used; • know the structure and organization of the ATFM service function, including the roles and responsibilities of the stakeholders in the ATFM service; • understand the training requirements for stakeholders in the ATFM service.

Content	Reference Documents
• Objectives and principles • Benefits of ATFM • How the ATFM service operates • Systems, processes and operational data that supports the application of ATFM • Basics of a CDM process • Link to ASM, Civ/Mil coordination • Organizational structure • Roles and responsibilities	• ICAO Doc 4444, • ICAO Doc 9971, • Local ATFM doc.

Role	**Operations management**	**Supervision**	**Planner**	**Execution**	**Support**	**CDM partner**
Level	2	5	5	4	3	2

ATFM Institutional and Regulatory Background

Phase	Basic
Subject	ATFM Institutional and Regulatory background
Objective	• know the regulatory background, both global and local, for the application of an ATFM service.

Content	Reference Documents
• ICAO standards and recommended practices (Annex 11, Annex 15) • ICAO procedures (Doc 4444, doc 7030) • Local rules and procedures (AIP, Letters of Agreement, local procedures, Start-up procedures, departure sequence)	• ICAO Annex 11 and 15 • Doc 4444 • AIP and other local documentation

Role	**Operations management**	**Supervision**	**Planner**	**Execution**	**Support**	**CDM partner**
Level	2	5	5	4	3	2

The CDM Process in the context of ATFM

Phase	Basic
Subject	The CDM Process in the context of ATFM
Objective	• Full knowledge of the process to communicate and exchange operational information among stakeholders on a real-time basis. • Understanding of how the CDM process allow decisions to be taken to best meet the operational requirements of all concerned.

Content	Reference Documents

• CDM organization and structure o Support to ATFM stakeholders
• Means of communication o Communications in tactical operations; e-conf, tele-conf etc.
• Stakeholder roles and responsibilities
• understanding of the interaction with other stakeholders at the various stages of the process
  o ATFM Operations and airports o ATFM Operations and aircraft operations
  o ATFM Operations and meteorology
• CDM requirements and benefits
• Link to A-CDM
	• Doc 4444
	• Doc 9971
	• Local ATFM documentation

Role	**Operations management**	**Supervision**	**Planner**	**Execution**	**Support**	**CDM partner**
Level	2	5	5	4	3	2

ATM Planning

Phase	Basic
Subject	ATM Planning
Objective	• understand the process to optimize available capacity, and how to use other available capacities; • be aware of factors impacting capacity.

Content	Reference Documents

• ATM Planning
  o Quantify imbalance between demand and capacity
  o How to address the imbalance at the strategic phase
• Capacity assessment models
  o Monitoring values
  o Intervention values
• ATC Capacity
• Staffing schedules and opening schemes of the component ATC Units
• Capacity optimisation
• Factors reducing capacity
• Coordination with ASM
	• ICAO Doc 4444
	• ICAO Doc 9971
	• Local ATFM doc

Role	**Operations management**	**Supervision**	**Planner**	**Execution**	**Support**	**CDM partner**
Level	2	5	5	4	3	2

ATFM Phases

Phase	Basic
Subject	ATFM Phases
Objective	understand the main principles for how the ATFM processes are applied during the different phases in order to balance demand and capacity within a given area.

Content	Reference Documents

• Strategic Phase
  o Strategic to pre-tactical
• Pre-tactical Phase
  o Pre-tactical processes
  o Building a pre-tactical plan
  o The concept of a rolling plan
  o Airport role during pre-tactical
  o Aircraft operator role during pre-tactical
  o Special events planning
  o Slot allocation process, incl. principles, computer assisted or manual allocation process, and change process
• Tactical Phase
  o Re-routing flights
  o Manual actions on a flight
  o Tactical management of the daily plan
• Post-Ops
  o Requirements for a good post-ops analysis
  o Feedback and evaluation
  o Operational feedback
  o Incident reporting
	• Doc 4444
	• Doc 9971
	• Local ATFM documentation

Role	**Operations management**	**Supervision**	**Planner**	**Execution**	**Support**	**CDM partner**
Level	2	5	5	4	3	2

ATFM Demand

Phase	Basic
Subject	ATFM Demand
Objective	• know the process of organizing demand into traffic volumes based on particular reference locations; understand the configurations used and the establishment of pre-defined scenarios; • understand how traffic demand, the tactical traffic situation and met forecasts can be used to optimise capacity; and • understand issues related to occupancy.

Content	Reference Documents

• Establishing demand
  o Establishing demand for a sector/airport
  o Establishing demand along predefined major traffic flows
• Determining Traffic Volumes based on defined demand
  o Determine reference locations
  o Occupancy counts/duration
  o Define major traffic flows in a traffic volume
• Implementation and management of pre-defined scenarios
• Set up and run simulations
• Forecasts
• Schedules and flight plans, including missing flight plans
• Airport slots
• Flight positions
	• Local ATFM doc

Role	**Operations management**	**Supervision**	**Planner**	**Execution**	**Support**	**CDM partner**
Level	2	4	5	4	3	2

ATFM Measures

Phase	Basic
Subject	ATFM Measures (Traffic management Initiatives)
Objective	• know the different measures available and how to apply them in the ATFM service; • understand the role of the stakeholders in the process

Content	Reference Documents
• Apply, modify and cancel ATFM measures • Capacity Optimisation measures (sector/airport management, complexity reduction) • Demand distribution measures (routing scenarios, level capping, advancing traffic, balancing arrivals/departures, Ground delay) • Demand regulation/reduction measures(Airborne delay/holding, minimum departure intervals, miles in trail, policy, out of area traffic, adherence) • Exemptions and exclusions (compliance monitoring, reporting) • Slot adherence • Slot swapping and slot extensions, policy • Delay causes and attribution • Use tools to support the processes • Compliance monitoring	• Doc 4444 • Doc 9971 • Local ATFM doc

Role	**Operations management**	**Supervision**	**Planner**	**Execution**	**Support**	**CDM partner**
Level	2	5	5	4	3	2

ATFM Contingency procedures

Phase	Basic
Subject	ATFM Contingency procedures
Objective	Full understanding of procedures to be applied in the case of a contingency.

Content	Reference Documents

• Contingency procedures
  o Management of industrial actions
  o Non-availability of airspace/airports
• Adverse weather situations
  o Convective weather
  o Low visibility
  o De-icing conditions
	• Local ATFM documentation

Role	**Operations management**	**Supervision**	**Planner**	**Execution**	**Support**	**CDM partner**
Level	2	5	5	4	3	2

ATFM data and tools

Phase	Basic
Subject	ATFM Data and Tools
Objective	• ensure full knowledge of the function and use of tools providing support to the application of ATFM; and • understanding of the need for sharing of data.

Content	Reference Documents

• ATFM Support tools
  o Main functionalities of tools used
  o Pre-tactical tools used
  o Building a plan in a pre-tactical tool
• Environmental data in ATFM support tools
  o Static, semi-static and dynamic data
• Flight data in ATFM support tools
  o Traffic load monitoring (types of traffic counts)
  o Flight activation monitoring
  o Data exchange and sharing
	• ICAO Doc 9971
	• Local ATFM documentation

Role	**Operations management**	**Supervision**	**Planner**	**Execution**	**Support**	**CDM partner**
Level	2	4	5	4	3	1

APPENDIX J – ATTACHMENT C: ATFM Training for ATM Officers in Japan

The Air Traffic Management Center (ATMC), is the organization of Japan Civil Aviation Bureau (JCAB) providing ATFM services to the aircraft flying Fukuoka FIR. As soon as transferring into ATMC, a rookie ATM officer starts initial training for an assistant position. The training course includes, but are not limited to:

- Concept of Air Traffic Management
- Organizational structure and regulatory bases of ATMC
- Outline of ATM services (i.e. ASM, ATFM, Oceanic ATM, and CDM)
- Knowledge and understanding of the present ATM environment (i.e. FIRs, Sectors of ACCs, TMAs, ATS routes, Training/Restricted areas, Navigational aids, Operations and performances of aircraft, Information processing system/tool/network related to ATM services, Communication procedures, etc.)

The special training for ATFM positions is scheduled following the above-mentioned initial training. The ATFM training consists of two parts. The first part is classroom lectures and practical simulator trainings. The second part is on-the-job trainings.

The ATFM training starts from the classroom lectures and practical simulator trainings, which are typically programmed as follows:

Day 1: ATFM system and other associated equipment (management and coordination procedures of standard routes and alternative routes)

Day 2: Capacity value calculation procedures (weather and ATFM)

Day 3: Monitoring and prediction of traffic volume (flow control procedures)

Day 4: Algorithm of Expected Departure Clearance Time (EDCT) calculation (handling procedures related to diversions at major airports)

Day 5: Cross border ATFM (characteristics of traffic flow and ATC operating procedures in ACC sectors)

Day 6: Specifications of airports/aerodromes and ATC operating procedure (ATM operations plan (OP) and CDM) (simulator: extracting relevant information/lists, setting capacities)

Day 7: Regulations and agreements on ATFM (simulator: flow management of ACC sectors)

Day 8: In-house operating procedures (simulator: flow management of RJTT/RJAA)

Day 9: Recently introduced/amended procedures (simulator: flow management of international ATS routes)

Day 10: Case studies (final checks).

The on-the-job training (OJT) is phased and standardized. The trainee and the training supervisors are supposed to use “OJT check sheet” so that the trainee can master a required skill for ATFM services systematically. The check sheet used in Japan is described below:

OJT check sheet				Phase A B C		Month			Starting date of the phase A				B				C		
ATFM		Crew		Graduating Class	Name	Number of mark "4" earned by previous month	Date Hour SV	Date Hour SV	Date Hour SV	Date Hour SV	Date Hour SV	Date Hour SV	Date Hour SV	Date Hour SV	Date Hour SV	Date Hour SV	Date Hour SV	Date Hour SV	Date Hour SV	Date Hour SV	Date Hour SV
phase						4	d1	d2	d3	d4	d5	d6	d7	d8	d9	d10	d11	d12	d13
Monitoring traffic volume																			
A			able to manipulate FMW and display necessary information timely																
A			able to calculate workload value of sectors per aircraft																
A			able to extract relevant departure flight plans for flow control initiatives																
A			able to evaluate EDCT flow controls before starting/ending the initiatives																
	B		able to evaluate EDCT flow controls including a ground stop																
	B		able to evaluate flow controls thru assignment of departure intervals																
	B		able to evaluate flow controls thru assignment of inflow intervals																
	B		able to except particular aircraft from flow controls or demand tallying process before/during initiatives																
	B		able to monitor airports/sectors with traffic flow characteristics taken into account																
	B		able to analyze flight plans correctly																
	B		checking combine/decombine status of sectors and conditions of inflight aircraft by manipulating FPVD																
	B		able to plan and input the pre-tactical operation of variable sectors																
		C	able to perceive RWY operation patterns of RJTT/RJAA and input correctly																
		C	able to input capacity values correctly in accordance with present MET conditions or RWY in use																
		C	able to change capacity values in accordance with expected scenarios																
		C	able to predict the change of traffic demand graph and cope with it when traffic is surged against prediction																
		C	able to evaluate intended flow controls with the initiatives planned in the other ATFM position taken into account																
		C	able to cope with the unexpected, such as RWY closure																

			Flow control procedures														
A			able to figure out and input FROM-TO of EDCT flow controls														
A			able to figure out and input START-END of EDCT flow controls														
	B		able to coordinate about the start of flow controls with related ATC facilities														
	B		Conveying just enough information (i.e. flow controlled area, measure, start time, end time, FROM-TO, max demand value, capacity value) to an ATM supervisor before starting initiatives timely														
	B		able to make flow controls on inflight aircraft (i.e. assigning inflow intervals, specifying airspeed/altitude/route, assigning airborne holding)														
	B		able to make flow controls on departures by assigning departure intervals														
	B		able to figure out appropriate FROM-TO of flow controls on airports														
	B		able to figure out appropriate FROM-TO of flow controls on sectors														
	B		able to figure out appropriate FROM-TO of flow controls on ATS routes														
	B		able to adjust EDCT appropriately as needed														
	B		balancing the amount of delay of EDCT and arising no reverse in departure sequence in the respective airports														
	B		able to evaluate and decide the end time of flow controls appropriately														
	B		able to coordinate about the end of flow controls with related ATC facilities														
	B		able to cope with the change in ending time of flow controls (including input timing of "TO")														
	B		able to cope with EDCT exceeding the ending time of flow controls														
		C	able to cope with reversed departure sequence arisen by the capacity change during EDCT flow controls														
		C	able to make flow controls on departures by using the ground stop feature														
		C	able to conduct time frame coordination														
		C	able to make a judgement on whether ongoing ATC restrictions should be changed to ATFM initiatives, and able to cope with the change														

[Marks] 1: incapable/unknowing 2: lack of skill/understanding 3: barely able 4: able 5: well enough
The mark "4" indicates 70-80%, and "5" indicates beyond 80%, which are acceptable level.
When marking "5", the training supervisors should fill in own initials to the right colomn. The "5" marked training items will be exempted in the subsequent OJT
The training items rarely happen can be substituted by oral tests in the OJT. The mark through oral tests shall be expressed by an encircled number.

Acquiring "4" three times or more, or acquiring "5" can complete the training item. After completing all the training items of the phase, the OJT moves on to the next phase

[Abbreviations] FMW: Flow Management Workstation, EDCT: Expected Departure Clearance Time, FPVD: Flow Plan View Display
CCW: Traffic Control Condition Supervised Workstation, SSW: Strategic Statistics Workstation, SAW: Statistic Analysis Management Workstation

ATFM

phase				4	d1	d2	d3	d4	d5	d6	d7	d8	d9	d10	d11	d12	d13
			Cross Border ATFM														
A			able to extract aircraft groups bound for particular destination via particular ATS route														
	B		able to adequately communicate with foreign ANSPs														
	B		able to make a judgement on whether the ATFM initiatives are consistent with the stipulations of LOA (i.e. flow controlled airport, reason, lead time for coordination, measure)														
	B		able to coordinate with related ATC facilities about the flow controls on G585 (SAPRA) requested from Incheon ACC														
	B		able to coordinate with related ATC facilities about the flow controls requested from Taipei ACC														
		C	able to cope with the unexpected or any change in ATFM initiatives requested by foreign ANSPs														
			Operating procedures for handling diversions														
A			able to notify facilities concerned without omission in accordance with the phase of diversions														
A			able to input start/end to CCW														
A			able to display number of spots available all day in the phase 1														
	B		able to allocate airports for diversion appropriately in response to requests														
	B		able to manage the case when aircraft request diversion to RJOO														
	B		able to manage the case when the width or length of diverting aircraft is unclear (including A346, B777, B773, B77W, etc)														
	B		able to manage the case when aircraft request diversion to RJTY or RODN														
		C	able to manage the case when aircraft request diversion to airports not registered in CCW														
		C	able to manipulate CCW when aircraft canceled diversion														
		C	able to make a judgement and coordination about ending respective phases of diversion														

			Acquiring/providing adequate information																	
A			able to extract necessary NOTAMs quickly																	
A			able to display MET data of particular airports																	
	B		Keeping good watch on the situations being faced in the other ATFM positions																	
	B		able to get information about restricted areas, training/testing areas, etc.																	
		C	able to make flow controls on inflight aircraft (i.e. assigning inflow intervals, specifying airspeed/altitude/route, assigning airborne holding)																	
			Handling SAW/SSW																	
	B		able to manipulate SSW and get daily statistical information																	
		C	able to make coordination with AO thru SSW about flight planned routes for the next day																	
		C	able to confirm and input the information about the cancellation of a flight thru SSW																	
			Miscellaneous																	
	B		able to take over the ongoing ATFM services accurately																	
		C	able to handle rarely happened situations																	

[Marks] 1: incapable/unknowing 2: lack of skill/understanding 3: barely able 4: able 5: well enough
The mark "4" indicates 70-80%, and "5" indicates beyond 80%, which are acceptable level.
When marking "5", the training supervisors should fill in own initials to the right colomn. The "5" marked training items will be exempted in the subsequent OJT
The training items rarely happen can be substituted by oral tests in the OJT. The mark through oral tests shall be expressed by an encircled number.

Acquiring "4" three times or more, or acquiring "5" can complete the training item. After completing all the training items of the phase, the OJT moves on to the next phase

[Abbreviations] FMW: Flow Management Workstation, EDCT: Expected Departure Clearance Time, FPVD: Flow Plan View Display
CCW: Traffic Control Condition Supervised Workstation, SSW: Strategic Statistics Workstation, SAW: Statistic Analysis Management Workstation

APPENDIX K - Collaborative ATFM Principles

General Principles

1. Increased capacity is the primary and central method for management of increasing demand.

2. FIR boundaries should not limit the delivery of ATFM messages and the coordination and application of ATFM measures.

3. Collaborative Decision-Making (CDM) to achieve optimum ATFM network outcomes while taking into account stakeholder goals.

4. An emphasis on delivery of ATFM services based where practicable on CNS capability, resulting in flexible, dynamic systems delivering optimal ATFM network outcomes while providing equity of access.

5. Regional distributed multi-nodal network model of inter-connected sub-regional ATFM networks or State ATFM systems, based on system-wide CDM, serving the busiest terminal airspace and major sub-Regional traffic flows.

6. Harmonized regional ATFM rules and guidelines based on the ICAO Manual on Collaborative Air Traffic Flow Management (Doc 9971).

People: Aviation Regulations, Standards and Procedures

7. Regionally harmonized methodology for the continuous monitoring and declaration of airport and airspace demand and capacity, the dynamic updating and sharing of capacity information, and for daily post-operations analysis.

8. Prioritization of ATFM implementation for high density airports and the busiest city pairs and FIRs.

9. Demand and Capacity inputs from automated data feeds including ATM automation systems, ATN/AFTN, and from FMPs and FOCs using web-based manual ATFM interfaces.

10. The minimum necessary ATFM Measures applied, for the shortest necessary time period and only to operations at or in capacity constrained airports or airspace.

11. Pre-tactical and tactical coordination of airport and airspace capacity constraints and proposed ATFM programs and measures with all affected Stakeholder organizations, before the independent execution of the program or measure in the ATFM system of the responsible ANSP.

12. Participation by at least 70% of aircraft operating in or to the constrained resource.

13. Aircraft operator options for delay absorption through the flexible distribution of total ATFM measure delay per aircraft to gate hold, surface hold and/or airborne delay.

14. Except in the case of flexible aircraft operator options for absorption of delay, separate ATFM measures should not be cumulatively applied to a flight.

15. Harmonized ATFM, runway sequencing (AMAN/DMAN) and A-CDM processes using common reference points and information exchange.

16. Exemption from ATFM measures of emergency, humanitarian, declared medical evacuation, search and rescue, and Head-of-State flights, and other flights as determined by the State authority.

17. Direct coordination between aircraft operator and airport operator to determine maximum gate delay and surface delay.

18. Direct input of delay absorption intent into the ATFM system by aircraft operators.

19. Pilot-in-command responsibility for adherence to operational procedure for requesting speed, route or level changes where flexible delay option is exercised.

20. Continuous monitoring of compliance with ATFM measures, supported by procedures for the real-time and post-operational management of non-compliance.

21. Bi-lateral or multilateral agreements where necessary to support common business rules for departure, destination and en-route ANSPs and airport operators.

22. Development of manual processes and skills to promote practical knowledge and understanding of ATFM before implementing technology based solutions, and as a contingency response capability.

23. The use of high-fidelity simulators to train controllers and ATFM personnel in ATFM procedures and techniques.

ATM Coordination

24. The prioritization of integrated AIDC/OLDI systems for timely ATM and ATFM system updates of trajectory data, including preferred implementation of advanced AIDC/OLDI messaging and configuration of systems for early delivery of AIDC/OLDI messages.

Facilities: Aerodromes

25. Encouragement for aerodrome operators to actively participate in ATM coordination in respect of A-CDM development and operational planning, including aerodrome complexity and capacity.

ATFM Systems

26. Collaboration by ANSPs for evaluation and planning of harmonized ATFM facilities.

27. Optimization of ATFM facilities through automated, networked, central flow management centres and units or equivalent virtual platforms.

28. Independent FMP/ATFM systems operated by each ANSP, connected to the sub-regional or regional ATFM network.

29. Continuous supervision, operation, adjustment, monitoring and executive control of ATFM systems and their output by dedicated ATFM or designated ATC personnel.

30. ATFM communications via existing internet/telecommunications networks.

31. Preference for relevant ATFM data and notifications from each ANSP, including slot assignments, distributed to stakeholders via web interfaces.

32. Collaborative development of A-CDM, ATFM, AMAN and DMAN capability.

33. Encourage the real-time sharing of dynamic air traffic data relating to flights operating or intending to operate in civil-controlled airspace, between military ATM systems and civil ATM/ATFM systems.

ATM Modernization Projects

34. Inter-regional and sub-regional cooperation (‘clustering’) for the research, development and implementation of ATFM projects.

APPENDIX L - CDM/ATFM Trial Tiered Participation Levels

Air Navigation Service Providers

Note: Outside ATFM Ops Trial ANSPs may already have been asked to support ATFM Operations through Minimum Departure Intervals between flights or providing longitudinal separation between flights such as Miles-in-Trial or Minutes-in-Trail

Level 1 – Observe Trial

- Participate in CDM/ATFM Meetings
- Participate in Operational Trial Planning process

Level 2 – Facilitate CTOT for Departures (includes Level 1)

- Receive CTOT for departure to other Demand-Capacity imbalance airports
- Facilitate airline operator CTOT compliance for departing flights

Level 3 – Demand-Capacity Balancing Capability (includes Levels 1 and 2)

- Evaluate Traffic Demand
- Evaluate and update Airport Acceptance Rate (AAR)
- Distribute CTOT to airline operators and ANSPs

Aircraft Operators

Level 1 – Participate in the Trial

- Receive CTOT for departure to other Demand-Capacity imbalance airports
- Manage flight operations and coordinate with ATCs and Airport Operators to achieve CTOT compliance for departures
- Participate in the ATFM / CDM Operational Trial Project and Focus Group meetings
- Participate in the Operational Trial planning process

Level 2 – Slot Swapping and CTOT User Inputs (includes Level 1)

- Optimize flight operations through slot swapping and CDM process
- Provide CTOT User to ATFM portal (advanced Operational Trial – later phase)
- Evaluate and update on outcomes of ATFM measures
- Refine CDM process for optimized flight operations

APPENDIX M - ATFM Daily Plan Sample Template

ATFM Daily Plan	**[Name of ATFM Unit]**		**[UTC DATE] [APPLICABLE TIME]**
CAPACITY and CONSTRAINTS			
Location (AD or SECT)	**Applicable Period**	**AAR (landings per hour)**	**CONSTRAINT/REMARK**
ATFM MEASURES			
Location (AD or SECT)	**Applicable Period**	**MEASURE REMARKS**	
POSSIBLE/DEVELOPING ISSUES			
Location (AD or SECT)	**Applicable Period**	**MEASURE REMARKS**	

EXAMPLE ATFM DAILY PLAN:

ATFM Daily Plan	RJJJ		1504022000-1504031959
CAPACITY and CONSTRAINTS			
Location (AD or SECT)	**Applicable Period**	**AAR (landings per hour)**	**CONSTRAINT/REMARK**
RJCC	2100-2300	04-06	LVP
RJTT	0200-0300	10	RWY34L/16R CLSD 0200 – 0245 CONST
RJTT	0300-0500	14	FLTCK RWY22 ILS
SECT 1	0130-UFN	-	Developing CB
ATFM MEASURES			
Location (AD or SECT)	**Applicable Period**	**MEASURE REMARKS**	
RJTT	2330-0140	CTOT DEST RJCC	
SECT 12	2300-0005	3 MINIT DEP RJAA/RJTT	
SECT 12	0130-UFN	G585 8 MINIT AT [WAYPOINT] WB FOR ZMUB REGARDLESS OF FL	
POSSIBLE/DEVELOPING ISSUES			
Location (AD or SECT)	**Applicable Period**	**MEASURE REMARKS**	
RJAA	0300-0500	15 MIT, 250KT AT [WAYPOINT] [WAYPOINT]	
RJTT	0300-0500	CTOT	

APPENDIX N - State ATFM Capability Monitoring and Reporting Form

ATFM PERFORMANCE INDICATORS

The following indicators are based on the Performance Improvement Plan of the MID Regional Framework for Collaborative ATFM, which should be read in conjunction with this form. The information provided will be used by the relevant Regional bodies to assess individual Administration and overall regional compliance with the Framework, and may be used by Administrations to internally evaluate their implementation status.

INSTRUCTIONS

A	If your administration **is expected, or intends, to implement and distribute cross-border ATFM measures** under the terms of the Performance Improvement Plan of the Asia/Pacific Regional Framework for Collaborative ATFM: **Answer Questions 1 to 32**

B	If your Administration **is not expected to implement and distribute cross-border ATFM** as described above, answer questions 33 to 48. **Answer Questions 33 to 48**

A. Administrations Distributing ATFM Measures *Indicate whether your administration has:*		
1	Enacted regulations for the implementation of ATFM	0
2	Ensured the origination, distribution and processing of FPL and ATS messages in accordance with ICAO Doc 4444 PANS-ATM and the Regional Framework for Collaborative ATFM	0
3	Implemented common fixes, terminology and communications in ATFM, AMAN/DMAN and A-CDM systems	0
4	Implemented meteorological services to support ATM in the terminal area (e.g. Meteorological Service in Terminal Area - MSTA)	0
5	Established ATFM capability with appropriately trained staff and operating procedures	0
6	Implemented local procedures for ATFM operations and communication, including phraseology and terminology for ATFM Units, ATS Units, airspace users, and airport operators, drawn from ICAO Doc. 9971	0
7	Performaned an analysis of current traffic demand and expected growth for the next 5 years (rolling)	0
8	Implemented a program of bi-annual strategic airport and airspace capacity, and strategic demand analysis	0
9	Commenced daily pre-tactical airport and airspace capacity-demand analysis for ATFM Program airports and associated terminal airspace as well as enroute ATC sectors supporting the busiest Asia/Pacific city pairs	0
10	Implemented pre-tactical modelling of airport and airspace configuration and traffic demand, and the effect of ATFM measures	0
11	Implemented dynamic updating of airport and airspace capacity constraints, capacity calculations and demand information	0
12	Implemented strategic airport slot allocation at all international airports where demand significantly exceeds airport capacity	0
13	Made arrangements for relevant ATFMU to chair and/or participate in daily ATFM conferences for pre-tactical ATFM planning	0
14	Commenced daily preparation of an ATFM Daily Plan (ADP) for all ATFM Program airports and associated terminal airspace	0
15	Enabled sharing of relevant information between all stakeholders through implementation of CDM capability	0
16	Developed procedures for ATFMU, ATS Units, airspace users, and airport operators when ATFM program is active	0
17	Implemented tactical ATFM measures for flights inbound to ATFM program airports	0
18	Implemented tactical ATFM measures for flights inbound to constrained airspace	0
19	Promulgated procedures for tactical management of ATFM measures, including revision, cancellation, suspension, de-suspension, where necessary	0
20	Ensured tactical ATFM measures for are only applied during periods of constraint	0
21	Promulgated procedures to avoid subjecting individual flights to more than one tactical ATFM measure	0
22	Implemented local ATC procedures and, where available, CDM processes facilitating compliance with received CTOT	0
23	Implemented distributed multi-nodal ATFM information distribution capability	0
24	Ensured interoperability of implemented ATFM, A-CDM, AMAN, DMAN, ATM automation systems and airspace user systems, where operational interfaces exist or are planned, using FIXM.	0
25	Ensured ATFM systems take long haul flights into account in demand predictions	0
26	Ensured ATM and ATFM systems provide timely update of estimate information for airborne aircraft	0
27	Commenced ATFM post-operations analysis and rectification, taking guidance from the Regional Framework as starting point	0
28	Developed procedures and agreements for post-operational analysis of cross-border ATFM with stakeholders	0
29	Ensured post-operations analyses are used for planning ATFM, airspace and ATS route improvements	0
30	Implemented ATS route structure improvements including CCO/CDO to reduce ATC workload and use aircraft capability to meet ATFM measures	0
31	Optimized ATC separation and reduced runway occupancy times at all ATFM program airports and in associated terminal airspace	0

B. States/Administrations Facilitating ATFM Measures (but not expected to implement and distribute cross-border ATFM) **Indicate whether your administration has:**		
32	Ensured the origination, distribution and processing of FPL and ATS messages in accordance with ICAO Doc 4444 PANS-ATM and the Regional Framework for Collaborative ATFM	0
33	Implemented local procedure with regards to ATFM operations and communication, including phraseologies, among ATFMU, ATS Units, airspace users, and airport operators	0
34	Educated ATM staff and stakeholders on the basic of ATFM and its connection with ATS	0
35	Made arrangements for relevant personnel from ATSU to participate in daily ATFM conferences for pre-tactical ATFM planning	0
36	Enabled sharing of relevant information between all stakeholders through implementation of CDM capability	0
37	Developed procedures for ATS units, airspace users, and airport operators when ATFM program is active	0
38	Developed procedures for ATS units, airspace users, and airport operators when ATFM program is active	0
39	Ensured local stakeholders are able to access CTOT information readily, either directly from the ATFMU distributing it or through local dissemination	0
40	Ensured ATM systems provide timely update of estimate information for airborne aircraft	0
41	Developed ATFM post-operations analysis workflow among ATFMU, ATS units, airspace users, and airport operators to ensure proper and timely feedback mechanism can be distributed to ATFMU originating the ATFM measures	0
42	Developed procedures and agreements for post-operational analysis of cross-border ATFM with stakeholders	0
43	Ensured post-operations analyses are used for planning ATFM, airspace, and ATS route improvements	0
44	Implemented ATS route structure improvements including CCO/CDO to reduce ATC workload and use aircraft capability to meet ATFM measures	0
45	Optimized ATC separation and reduced runway occupancy times at all ATFM program airports and in associated terminal airspace	0
46	Performed an analysis of current traffic demand and expected growth for the next 5 years (rolling)	0
47	Implemented a program of bi-annual strategic airport and airspace capacity, and strategic demand analysis	0

ATTACHMENT A - Guidelines for Improving Capacity

1. In order to improve the capacity of the system as a whole, it is advisable to analyse and identify the factors that may result in a reduction of airport and ATC sector capacity. Each factor has a weight in the capacity value, which varies according to the specific characteristics of the airport under study.

2. Some of the factors--not all factors are present in all systems--that may contribute to a reduction in capacity are as follows:

Longitudinal and Lateral Aircraft Separation Minima

3. Separation is established for safety reasons, both to avoid collisions and to prevent an aircraft from entering the wake turbulence of another aircraft, which is usually more critical when close to landing or during take-off, due to the low speeds applied. Runway configuration--the relative position and distance between runways--determines the interference that movements in one runway have on the other airport runways.

Procedures and Practices in Use

- Most airports are designed to serve the most common operation based on prevailing winds.
- Taxiways and parking aprons are built to serve the primary operation of the airport.
- Approach and departure procedures are designed to serve the primary operation of the airport
- Changes in the runway-in-use during traffic peaks may cause congestion.
- Changes in runways may create disadvantages for certain instrument departure or arrival procedures.

Weather conditions

4. Under adverse weather conditions (low ceiling and visibility), pilots and controllers work “more cautiously” and separations are extended, resulting in reduced capacity.

Aircraft Mix

5. Aircraft category and performance determine the time between two consecutive operations. It has been shown that the interval between the landing of a heavy aircraft and the landing of a light aircraft is much greater if the heavy aircraft lands first. This fact suggests the possibility of having an optimum sequencing of the aircraft waiting to land at a given airport. The aircraft sequencing problem is typically formulated as an issue of restricted optimisation, with a view to finding sequences that maximise the runway service ratio without excessively penalising some types of aircraft.

Typical demand (take-off and landing mix)

- Large concentrations of take-offs or landings can upset airport traffic flow.
- Delays in take-off can cause taxiway occupancy and approach problems.
- Landing sequencing may be affected by runway and taxiway configuration.

Type of operation (landing/take-off ratio)

6. The spacing between movements depends on the types of operations covered; that is, a landing performed following a take-off requires a different spacing compared to a take-off performed following another take-off. Capacity varies according to landing-to-take-off ratio. Consequently, a

single capacity indication makes no sense, in contrast with a capacity indication based on the operation mix.

Quality and performance of navigation, surveillance, and control systems

7. Reliable and precise systems allow for a reduction in aircraft spacing, thus increasing capacity. The use of decision-support software to assist the controller, for instance, to foresee the optimum sequencing for aircraft approaching a given airport, provides for safe and rational operations.

Controller and pilot performance

8. More experienced controllers and pilots make for more agile operations. A good example is the Congonhas airport, where controllers use the two runways for landings and take-offs; pilots conduct take-offs without stopping at the runway threshold (immediate take-off); pilots in slower aircraft try to maintain speeds that are consistent with those of commercial aircraft; etc.

Location and types of runway exits

9. Landing runway exits, when properly located, allow pilots to leave the landing runway towards the taxiway system as soon as they have slowed down enough. If the exit is a fast exit, that is, at an angle of less than 90º with the landing runway, there is no need to reduce speed too much, thus reducing runway occupancy time.

Environment

10. Noise can restrict operations on certain inhabited areas or fauna protection areas, generating additional restrictions to be considered when determining exit routes.

Restricted, prohibited, and dangerous areas

11. The existence of many restricted, prohibited and dangerous areas close to airports that do not apply procedures for coordination and flexible use of airspace constitutes an additional restriction to aircraft departure capacity.

12. Some of these factors may be of a temporary or permanent nature, depending on conditions. If they are considered permanent, they must be included in capacity calculations. Temporary factors, such as atmospheric conditions that can have a temporary impact on ATC sector capacity or airport operation, are managed by the ATC entity.

13. All these factors have an impact on the methodology used to determine capacity, and thus the importance of conducting a delay analysis.

14. This activity considers the available data coming from the recurrent delay monitoring process, but a more in-depth analysis of local circumstances is performed. The following is considered:

- Historical evaluation of delays;
- Actual reason(s) for delays;
- What is meant by ATC/Aerodrome delays?
- Who is involved in the capacity declaration process and is there a buy-in from all the stakeholders (the capacity declaration should reflect ATC/Aerodrome limits)?
- What are the reasons for additional traffic over and above the capacity declaration?
- How is extra traffic such as General Aviation accommodated?
- How many off-slot operations are experienced and how these are dealt with?
- Is there an (efficient) slot monitoring committee?

15. Airport delays should not be considered in isolation. Capacity at a number of airports is limited and action is required to ensure that capacity is not exceeded by demand at a particular moment on the day of operations.

16. Maximum airside capacity is not solely reliant on runway capacity. Aprons and taxiways must be capable of maintaining sufficient traffic throughput to match runway capacity. Terminal area capacity, arrivals and departures, the terminal building, ATC staff levels, and equipment should not be neglected during the capacity declaration process.

17. The demand-to-capacity ratio provides insight into the potential for delays at an airport. Together with the demand-to-capacity ratio used for defining traffic levels, medium-term annual demand data, based on airport-specific high, baseline and low forecasts for each of the selected airports are considered in this activity.

18. Some airports publish detailed demand and capacity analyses, taking into account hourly and seasonal variations, while others only publish an overall declared hourly capacity.

19. As general guidance, a plan to optimise capacity could include the following steps:

Step 1 – Establish a capacity baseline;

Step 2 – Determine future demand;

Step 3 – Determine if there will be a capacity reduction;

Step 4 – Identify all limitations that affect capacity;

Step 5 – Quantify the impact of limitations;

Step 6 – Identify possible corrective actions and best practices;

Step 7 – Identify the impact and cost of corrective actions;

Step 8 – Establish priorities; and

Step 9 – Develop the capacity improvement plan.

ATTACHMENT B - MID Region AIDC/OLDI Applicability Area

(Priority 1 and 2 for Implementation)

MID Region AIDC/OLDI Applicability Area (Priority 1 and 2 for Implementation)
As of July 2018

ACC	Adjacent ACCs						
Amman	Cairo (1)	Baghdad (2)	Damascus (2)	Jeddah (1)	Tel Aviv (2)		
Baghdad	Amman (2)	Ankara (1)	Damascus (2)	Jeddah (2)	Tehran (2)	Kuwait (1)	
Bahrain	Doha (1)	Emirates (1)	Jeddah (1)	Kuwait (1)	Riyadh (1)	Tehran (2) AFTN MSG	Dammam (2)
Beirut	Damascus (2)		Nicosia (1)				
Cairo	Amman (1)	Athena (2)	Jeddah (1)	Khartoum (1)	Nicosia (1)	Tel Aviv (2)	Tripoli (2)
Damascus	Amman (2)	Ankara (2)	Baghdad (2)	Beirut (2)	Nicosia (2)		
Doha*	Bahrain (1)	Emirates (1)	Jeddah (2)	Riyadh (2)			
Emiratis	Bahrain (1)	Doha (1)	Jeddah (1)	Muscat (1)	Tehran (2) AFTN MSG		
Jeddah	Amman (1)	Asmara (2)	Baghdad (2)	Bahrain (1)	Cairo (1)	Doha (2)	Emirates (1)
	Khartoum (1)	Kuwait (2)	Muscat (1)	Riyadh (1)		Sana'a (2)	
Riyadh	Bahrain (1)	Doha (2)	Kuwait (2)	Jeddah (1)			
Khartoum	Addis (1)	Asmara (2)	Brazzaville (2)	Cairo (1)	Entebbe (2)	Jeddah (1)	Juba (1)
	Kinshasa (2)	N'Djamena (2)	Nairobi (2)	Tripoli (2)			
Kuwait	Baghdad (1)	Bahrain (1)	Jeddah (2)	Tehran (2)			
Muscat	Emirates (1)	Jeddah (1)	Karachi (2)	Mumbai (1)	Sana'a (2)	Tehran (1)	
Sana'a	Addis Ababa (2)	Asmara (2)	Jeddah (2)	Mogadishu (2)	Mumbai (2)	Muscat (2)	
Tehran	Ankara (1)	Ashgabat (2)	Baghdad (2)	Bahrain (1)	Baku (2)	Emirates (2) AFTN MSG	Kabul (2)
	Karachi (1)	Kuwait (2)	Muscat (1)	Yerevan (2)			
Tripoli	Algiers (2)	Cairo (2)	Khartoum (2)	Malta (2)	N'Djamena (2)	Niamey (2)	Tunis (2)

(1) = Priority 1 for implementation based on the number of traffic movements and/or operational needs (green color means already implemented)
(2) = Priority 2 for implementation based on the number of traffic movements or if other solution is in place such as exchange of information via AFTN

ATTACHMENT C - Consolidated MID States Response to ICAO MID ATFM Questionnaire

Note: this report was presented in ATFM Core Team meeting - ACT/1 Summery of Discussion Appendix A.

Responses of the ATFM Questionnaire (November 2018)

Question			Bahrain	Egypt	Jordan	Kuwait	Lebanon	Oman	Qatar	Saudi Arabia	Sudan	UAE
ATFM Structure and Organization												
1. Does your State have a regulatory requirement for ATFM to be implemented in your Flight Information Region (FIR)?			YES	YES	NO	YES	NO	YES	NO	YES	NO	NO
2. Does your State have an operational requirement (e.g. demand exceeding capacity) for ATFM in your FIR?			YES	HECA, HEGA. HESH& ACC Sectors	NO	NO	NO	YES. Operational LoA with UAE ACC, Appendix G : Air Traffic Flow Management	YES	YES	NO	YES
3. Does your State have future plans or initiatives for ATFM in your FIR?			YES	YES. Aerodromes TFC LOAD MONITOR &AMAN	NO	NO	Waiting for regional initiatives	YES. The CONOPS has not been developed.	YES	YES	NO	YES
4. Does your State have an organizational structure including the following facilities and/or working positions? If future organizational structure is planned, please include date.	ATFM Services		NO	YES	NO	NO	NO		NO	Q4/2019	NO	YES
	ATFM Operational Manager		NO	YES	NO	NO	NO	Dec-19	NO	2019 - 2020	NO	YES
	ATFM positions located in the following	National ATFM center	NO	YES CANC	NO	NO	NO		NO	2021-2022	Not Answer	Q4 2022
		Area control center(s)	NO	YES. CHMI EUROCONTROL	NO		NO	Dec-19	NO	Q4/2019	NO	YES
		Approach control(s)	NO	NO	NO	NO	NO		NO	Q1/2020	NO	NO
		Control tower(s)	NO	NOPs EUROCONTROL	NO	NO	NO		NO	Q1/2020	NO	NO

Question			Bahrain	Egypt	Jordan	Kuwait	Lebanon	Oman	Qatar	Saudi Arabia	Sudan	UAE
ATFM Structure and Organization												
5. If there is existing ATFM functions performed, are there dedicated resources for these ATFM functions/positions or are these functions provided by another operational position? If provided by another operational position, please identify in the comments section.	Dedicated resource		NA		NO	Not answered	NO			Currently, there is no dedicated resources for ATFM	Not Answered	Flow Operator (Departure)
	Another Operational Position		NA	Delegated to ATC units	NO	Not answered	Receive CTOT from NM for traffic departing to EUR	Muscat ACC Planner controller			Not Answered	
6. Does your State have Letters of Agreement (LOA) that include ATFM with any of the following stakeholders? If so, please provide a copy or relevant excerpt of the LOA(s) with the survey response:	1. FIR(s)		OMAE & OEJD	NO	NO	NO	YES. Nicosia	OMAE	NO	Muscat, Bahrain, Cairo, Jordan, Khartoum, Sanaa and Doha Center	NO	YES. OOMM, OBBB, OEJD
	2. Stakeholders	- Airport Operators	NO	NO	NO	NO	NO		NO	Jeddah Airport within hajj season	NO	NO
		- Aircraft Operators	NO	NO	NO	NO	NO		NO	NO	NO	NO
		- Military	NO	YES. MIL reservation	NO	NO	NO		NO	AirForce within hajj season	NO	NO
		- General Aviation	NO	NO	NO	NO	NO		NO	NO	NO	NO
		- ATFM Units	NO	YES.	NO	NO	NO		NO	NO	NO	NO
		- National ATFM center	NO	NO	NO	NO	NO		NO	NO	NO	NO
		- Area control center	NO	NO	NO	NO	NO		NO	Q4/2019	NO	NO
		- Approach control	YES- DOHA	NO	NO	NO	NO		NO	Q1/2020	NO	YES. OMDB, OMAA, OMRK, OMFJ
		- Control tower	NO	NO	NO	NO	NO		NO	Q1/2020	NO	NO
		Comments						Operational LoA with UAE ACC, Appendix G : Air Traffic Flow				
7. Does your State have existing CDM procedures (planned or Ad-Hoc Teleconferences,) and/or tools with the following stakeholders? If future CDM procedures and/or tools are planned, please add the date.	Airport Operators		YES		NO	YES. Close coordiantion by system	NO	Oman airports by 2020	NO	NO	NO	NO
	Aircraft Operators		NO		NO		NO		NO	NO	NO	YES. UAE, ETD, FDB, ABY
	Military		NO		NO		NO		NO	NO	NO	NO
	General Aviation		NO		NO		NO		NO	NO	NO	NO
	Area control center		NO		NO	YES. Close coordiantion by system	NO		NO	NO	NO	Yes. OMAE
	Approach control		NO		NO		NO		NO	NO	NO	YES. OMAA, OMDB, OMRK, OMFJ
	Control tower		NO		NO		NO		NO	NO	NO	YES. OMSJ, OMRK, OMFJ
	Other ANSP ATFM Units		NO		NO		NO		NO	NO	NO	NO
	Other ANSP ATC		NO		NO		NO		NO	NO	NO	NO

Question			Bahrain	Egypt	Jordan	Kuwait	Lebanon	Oman	Qatar	Saudi Arabia	Sudan	UAE
ATFM Structure and Organization												
8. Does your State's ATFM unit(s) perform the following tasks? If future implementation planned, please add the date.	1. Create and distribute an ATFM daily plan		NA	Planned 2020	NO	NO	NO	NO	NO	2021-2022		Q4 2022
	2. Collect the following relevant information	- meteorological conditions	NA	Planned 2020	NO	NO	NO	YES	NO	Q4/2019		YES
		- capacity constraints	NA	Planned 2020	NO	NO	NO	YES	NO	Q4/2019		Q4 2022
		- equipment outages	NA	Planned 2020	NO	NO	YES	YES	NO	Q4/2019		YES
		- runway closures	NA	Planned 2020	NO	NO	YES	YES	NO	Q4/2019		YES
		- procedural issues	NA	Planned 2020	NO	NO	NO	YES	NO	Q4/2019		YES
	3. Analyze and distribute relevant information		NA	Planned 2020	NO	NO	NO	YES	NO	Q4/2019		YES
	4.Coordination procedures with stakeholders (indicate method(e.g., voice meetings, email) and frequency) in the comments section		NA	Planned 2020	NO	NO	YES. In case of special events coordination is carried out with all stakeholders	YES. Voice meetings	NO	TBD		YES
	5. Structured information dissemination process, i.e. website		NA	Planned 2020	NO	NO	Via letters/aeronautical publication	NO	NO	2019-2020		YES
		- ATFM Units	NO	YES.	NO	NO	NO		NO	NO	NO	NO
		- National ATFM center	NO	NO	NO	NO	NO		NO	NO	NO	NO
		- Area control center	NO	NO	NO	NO	NO		NO	Q4/2019	NO	NO
		- Approach control	YES- DOHA	NO	NO	NO	NO		NO	Q1/2020	NO	YES. OMDB, OMAA, OMRK, OMFJ
		- Control tower	NO	NO	NO	NO	NO		NO	Q1/2020	NO	NO
		Comments						Operational LoA with UAE ACC, Appendix G : Air Traffic Flow				
9. Are the following CDM elements included as part of your stakeholder's participation in the ATFM process?	1.Provide updated flight plan intent information (e.g., plans, changes, delays) provided by:	- Aircraft Operators	NO		YES	NO	NO	YES	NO	NO	NO	FPL, CHG, DLA, CNL
		- Military	NO		YES	NO	NO	YES	NO	NO	NO	FPL
		- General Aviation	NO		YES	NO	NO	YES	NO	NO	NO	FPL, CHG, DLA, CNL
	2.Telephone conferences	- Airport	NO		YES	NO	NO	YES	NO	NO	NO	OMAA, OMDB, OMSJ, OMRK, OMFJ
		- Military	NO		YES	NO	NO	YES	NO	NO	NO	NO
		- Aircraft Operators	NO		YES	NO	NO	YES	NO	NO	NO	UAE, ETD, FDB, ABY
		- General Aviation	NO		NO	NO	NO	YES	NO	NO	NO	NO
		- ATFM Units	NO		NO	NO	NO	NO	NO	NO	NO	NO
		- Other FIR ANSP's	NO		NO	NO	NO	YES	NO	NO	NO	NO
	3.Web based interfaces	- Airport	NO		YES	NO	NO	NO	NO	NO	NO	OMAA, OMDB, OMSJ, OMRK, OMFJ
		- Military	NO		NO	NO	NO	NO	NO	NO	NO	NO
		- Aircraft Operators	NO		NO	NO	NO	NO	NO	NO	NO	ETD, UAE, FDB, ABY
		- General Aviation	NO		NO	NO	NO	NO	NO	NO	NO	NO
		- ATFM Units	NO		NO	NO	NO	NO	NO	NO	NO	NO
		- Other FIR ANSP's	NO		NO	NO	NO	NO	NO	NO	NO	NO
	Comments									We are developing working measures and procedures for ATFM to be introduced ATFM system by Q4 -2019		

Question			Bahrain	Egypt	Jordan	Kuwait	Lebanon	Oman	Qatar	Saudi Arabia	Sudan	UAE
ATFM Structure and Organization												
10. Does your State provide standardized and recurrent ATFM training for the following personnel and stakeholders? If standardized training is planned, please add date.	1. Personnel performing ATFM functions	- National ATFM center	NO	NO	NO	NO	NO	2020	NO	NO	NO	Q4 2022
		- Area control center	NO	NO	NO	NO	NO	2020	NO	NO	NO	NO
		- Approach control	NO	NO	NO	NO	NO	2020	NO	NO	NO	NO
		- Control tower	NO	NO	NO	NO	NO	2020	NO	NO	NO	NO
	2. Stakeholders	- Airports	NO	NO	NO	NO	NO	2020	NO	NO	NO	NO
		- Aircraft Operators	NO	NO	NO	NO	NO	2020	NO	NO	NO	NO
		- Military	NO	NO	NO	NO	NO	2020	NO	NO	NO	NO
		- General Aviation	NO	NO	NO	NO	NO	2020	NO	NO	NO	NO
	Comments									SANS Staff in charge of ATFM (ATFCM section under ATM department) are scheduled in specialized training on ATFM and it's expected that all Staff will end the training by 2020-2021		
11. Does your State have an electronic ATFM system that displays airborne traffic? Is this system shared? If not, what is the planned date (if any) for sharing this system?	Electronic ATFM display system Shared with:	1. FIR(s)	YES AMAN not shared	NO		NO	NO	YES	NO		NO	Q4 2022
	2. Stakeholders	- Airport Operators	NO	NO	NO	NO		2020	NO		NO	Q4 2022
		- Aircraft Operators	NO	NO	NO	NO		2020	NO		NO	Q4 2022
		- Military	NO	NO	NO	NO		2020	NO		NO	Q4 2022
		- General Aviation	NO	NO	NO	NO		2020	NO		NO	Q4 2022
	Comments									Long Term Planned but not finalized yet		

Question			Bahrain	Egypt	Jordan	Kuwait	Lebanon	Oman	Qatar	Saudi Arabia	Sudan	UAE
ATFM - Capacity, Demand, Balance												
12. Does your State declare ATC strategic capacity values for the following resources? If capacity value declarations are planned to be completed, please add date.	1.Airspace sectors		YES	YES	YES	NO	NO	2020	NO	Q2/2019	NO	NO
	2.Waypoint(s) or boundaries		NO	NO	YES	NO	NO	2020	NO	Q1/2020	NO	NO
	3.Airport acceptance rate(s) (arrival and departure)		NO		NO	NO	NO	2020	NO	Q1/2020	NO	NO
	Comments									We are validating the ACC sector capacity and then we will move to airport acceptance rate		
13. How are the declared capacity values determined?			Determined by Operations using capacity management studies		Staffing methodology and manning level and procedures (ATM)		NA	Capacity values are not determined		Refer to questionnaire	Not answered	Not Declared
14. Does your State have strategic airport arrival/departure slots? If planned, please indicate the dates:	Airport	Planned date	NA		OJAI & OJAQ (NO-Pending)			OOMS, OOSA 2020			No slots	OMAA, OMDB
	Arrival	Planned date	NA		-						NA	OMAA, OMDB
	Departure	Planned date	NA		-						NA	OMAA, OMDB
15. Does your State have a methodology to balance demand and capacity in the following time frames?	Strategic (more than 1 day before operation)		NO	NO	NO	NO		NO	NO	NO	No methodology	NO
	Pre-tactical (1 day before operation)		NO	NO	NO	NO		NO	NO	NO	No methodology	NO
	Tactical (day of operation)		YES. Tactical oversight of sector volume	NO	NO	NO		YES	NO	NO	No methodology	YES

Question			Bahrain	Egypt	Jordan	Kuwait	Lebanon	Oman	Qatar	Saudi Arabia	Sudan	UAE
ATFM - Capacity, Demand, Balance												
16. Has your administration (and/or State) implemented procedures, review, and tools to identify available capacity, compare capacity to forecast demand and establish performance targets including. If initiatives are planned, please add date							Not answered			NO	NO	
	1.Airspace design review		Yes. Early 2019	NO	NO	NO		NO 2019	Early 2019	NO		YES
	2.ATFM support tools		YES	NO	YES. Statistical tool			YES	NO	NO		Q4 2022
	3.Procedures review		YES	NO	NO	NO		NO 2019	Mid 2019	NO		YES
	4.Staffing resources to workload / traffic review		YES	NO	YES. ATM Procedures	NO		YES	Mid 2019	NO		YES
	5.ATFM Training completed		NO	NO	NO			NO 2020	NO	NO		Q4 2022
	6.Forecast demand		NO	NO	NO			YES	YES	NO		Q4 2022
	Comments									Currently we evaluate the statistical report and compare the last three years to define the traffic growth percentage and defined the peak hour as well to have an image how is the traffic demand will increase and take the initiative to implement flow management		

Question			Bahrain	Egypt	Jordan	Kuwait	Lebanon	Oman	Qatar	Saudi Arabia	Sudan	UAE
Interoperability												
17. Does your State complete automated exchange of ATS messages (e.g. FPL, CHG, CNL, DEP, DLA, EST, ARR, CPL) with any or all adjacent Flight Information Regions (FIRs) or other non-adjacent FIRs?			OMAE-OLDI OIXX-AFTN EST MSGs	LGGG-OLDI	YES. OSTT, OEJN, HECC, LLLL, ORBB	YES. OBBB, ORBB,OEJN, OIXX, OTBD	YES. All	ONLY WITH OMAE: ABI Advanced Boundary Information Message (including revised ABI's) ACT Activate Message LAM Logical Acknowledgement Message PAC Preliminary Activate Message	NO	SANS is implementing an IFPS that will be ready for operation during 2019. A transition roadmap is under development. The NEW ATM System is sharing the information throw OLDI	Yes (All)	**OOMM:** FPL, CHG, CNL, DEP, DLA **OBBB:** FPL, CHG, CNL, DEP, DLA, EST **OEJD:** FPL, CHG, CNL, DEP, DLA **OIXX:** FPL, CHG, CNL, DEP, DLA, EST
18. Does your State have plans to complete automated exchange of ATS messages with any or all adjacent Flight Information Regions (FIRs) or other non-adjacent FIRs?			OKAC-Early 2019-OLDI OEJN-MID 2019-OLDI Doha Approach - OLDI, early 2019; Dammam Approach in conjunction with OEJD	BY 2020 AIDC with all except LCCC-OLDI	*Estimate Over Border OSTT, OEJN, HECC, LLLL, ORBB*		Yes. Nicosia and Damascus	Planned 2019: **Mumbai:** AIDC messages : ABI, PAC, CDN, CPL, ACP, REJ, MAC, LAM, and LRM will be established between Muscat ACC and Mumbai OCC **Jeddah:** ABI Advanced Boundary Information Message (including revised ABI's) ACT Activate Message LAM Logical Acknowledgement Message PAC Preliminary Activate Message	YES. OBBB, OEJN, OMAE date TBD	OJAC by 03/2019 Type X AMHS/SITA BY 2020 with OBBB, OKAC, OOMM	Yes	

Question			Bahrain	Egypt	Jordan	Kuwait	Lebanon	Oman	Qatar	Saudi Arabia	Sudan	UAE
Interoperability												
19. Does your State exchange Airport Acceptance Rate (AAR) information for primary airports with other FIRs? If there are plans to exchange AAR information, please provide date.			NO	Yes. EURO CONTROL	NA	NO	NO	2020 with all adjacent FIRs	NO	NO	NO	NO
20. Does your State share adjacent sector capacity information with other FIRs? If there are plans to exchange sector capacity information, please provide date.			NO		NA	NO	NO	2020 with all adjacent FIRs	NO	NO	NO	NO
21. Does your State have automated Pre-tactical (day prior to the operation) demand monitoring capability? If yes, is the information shared with other			NO		NA	NO	NO	NO	NO	NO		NO
	Airport Demand						NO	NO	NO	NO	NO	NO
	Sector Demand						NO	NO	NO	NO	NO	NO
	Route/Airway Demand						NO	NO	NO	NO	NO	NO
22. Does your State have automated Tactical (day of the operation) demand monitoring capability? If yes, is the information shared with other FIRs?			NO		NA	NO	NO	NO	NO	NO		YES
	Airport Demand						NO	NO	NO	NO	NO	YES
	Sector Demand						NO	NO	NO	NO	NO	YES
	Route/Airway Demand						NO	NO	NO	NO	NO	YES
	Arrival Management						NO	NO	NO	NO	NO	YES

Question			Bahrain	Egypt	Jordan	Kuwait	Lebanon	Oman	Qatar	Saudi Arabia	Sudan	UAE
Interoperability												
23. Does your State have Strategic, Pre-tactical and Tactical planning agreements with other FIRs?			NO	NO	NO	NO	NO	Only tactical ATFM operations is implemented between Muscat and UAE FIRs. These take the form of a traffic acceptance rate through affected waypoints, based on take-off times. A figure of 3 (three) flights every 10 minutes per waypoint is used and the 10 minute period will start from the imposition of the flow procedures.	NO	NO	NO	NO
24. Are there plans to initiate these agreements?			NO	NO	NO		NO	NO	Yes at the outcome of the ATFM/TF and for future regional event planning.	After implementation of IFPS, we will implement ATFM procedures with Bahrain FIR with progressive introduction of ATFCM operation covering Jeddah FIR as initial phase. The implementation of ATFM measures cane be extended to adjacent FIRs	NO	NO

Question			Bahrain	Egypt	Jordan	Kuwait	Lebanon	Oman	Qatar	Saudi Arabia	Sudan	UAE
Interoperability												
25. Has your State identified airports, sectors of airspace or routes which are regularly requiring ATFM Measures to balance demand and capacity? If yes, list them			YES Created High/Low splits to manage volume (East High/East Low, Central High/Central, North/North Low)		NO	NO	NO	Yes . OOMS airport.		YES. Refer to questionnaire	NO	OMDB, ACCE, ACCY, ACCR, ACCW, ACCN
26. Does your State initiated/implemented the following Air Traffic Management Measures (ATFM Measures) internally?						NO	YES			YES	Yes	
	Miles-in-trail (MIT)		YES LATSI LoA	NO	YES	NO	YES	YES	YES	NO	NO	YES
	Minutes-in-trail (MINIT)		NO	NO	YES	NO	YES	YES	NO	YES	NO	NO
	Speed restrictions		YES LoA	YES	YES	NO	YES	YES	YES	YES	YES	YES
	Airborne Holding		YES	YES	NO	NO	YES	YES	YES	YES	YES	YES
	Fix balancing		NO	NO	NO	NO	NO	NO	NO	NO		NO
	Altitude/Flight Level capping		YES-AIP	YES	NO	NO	NO	NO	YES	NO		NO
	Tactical alternative routing options		NO	NO	YES	NO	NO	YES	YES	YES		YES
	Fix crossing times		NO	NO	NO	NO	YES	YES	NO	YES	YES	YES
	Airport slot		NO	NO	NO	NO	NO	YES	NO	NO	NO	YES
	Minimum departure intervals (MDIs)		NO	YES	NO	NO	YES	YES	NO	NO	NO	YES
	Published, pre-defined alternative routes		NO	NO	NO	NO	NO	NO	NO	YES	NO	YES
	Ground delay program (GDP) – airport arrival constraint		NO	NO	NO	NO	NO	NO	NO	NO	NO	YES
	Ground delay program (GDP) – airspace constraint (also known as airspace flow program: AFP)		YES- 5 min departure spacing implemented tactically	NO	NO	NO	NO	NO	NO	NO	NO	YES
27. When determining an ATFM Measure, are the following factors considered?	Demand exceeds capacity		YES		NO		YES	YES	YES	YES		
	Weather		YES		YES		YES	YES	NO	YES		YES
	Military exercises		YES		YES		YES	NO	NO	YES		YES
	Resources		YES		YES		YES	YES	NO	YES		YES
	Maintenance / outages		YES		YES		YES	YES	NO	YES		YES
	VIP movements		YES		YES		YES	YES	NO	YES		YES

Question			Bahrain	Egypt	Jordan	Kuwait	Lebanon	Oman	Qatar	Saudi Arabia	Sudan	UAE
Interoperability												
28. Does military airspace/activity cause the use of ATFM Measures? If yes, please explain.			NO		NO	NO	YES	NO	NO	In general, yes, because when Reserved Military Airspace is active, the available airspace for civil flights is impacted leading to apply ATFM measures	NO	NO
29. Is the military airspace/activity included in strategic planning?			YES		YES		NA	NO	NO	Yes, it's included, and the civil military coordination section is working on flow management measure initiatives through Joint-committee		NO
30. How is the effectiveness of the ATFM Measure analyzed?			Periodic procedures review		NA		NA	The use of flexible statistical tools to effectively analyze and report on the metrics	NA	By measuring the degree of implementation		□ Departures: o Monthly DST Compliance and Ground delay □ Arrivals: o Runway throughput and airborne delay

Question			Bahrain	Egypt	Jordan	Kuwait	Lebanon	Oman	Qatar	Saudi Arabia	Sudan	UAE
Interoperability												
31. What are the primary demand-capacity imbalance reasons for the ATFM Measures?	Airport capacity				NO			OOMS		OEJN, OERK, OEMA, OEDF and OEAB		OMDB
	Sector capacity		East High, Central, North - demand exceeds capacity;		YES			Central sector	YES	ACC-West, ACC-northeast upper and lower		
	Route/Airway capacity				NO			TONVO A777 NADSO and LALDO B525 NADSO	YES	L604, L677, L550& UL768		
	Other				NO							
	Comments				procedure includes the formula							
32. Does your State initiate the following ATFM Measures with adjacent FIRs?	Miles-in-trail (MIT)		OMAE		YES	NO	YES	OMAE	NO	YES		OOMM, OIIX, OBBB
	Minutes-in-trail (MINIT)		NO		YES	NO	YES	OMAE	NO	YES. Muscat, Bahrain, Cairo, Jordan, Khartoum, Sanaa and		OEJD
	Speed restrictions		NO		YES	NO	YES	OMAE	NO	YES		OOMM, OIIX, OBBB, OEJD
	Airborne Holding		NO		NO	NO	YES		NO	YES		OOMM, OIIX, OBBB, OEJD
	Fix balancing		NO		NO	NO	NO		NO	NO		OOMM, OIIX, OBBB, OEJD
	Altitude/Flight Level capping		OMAE, OKAC		NO	NO	NO		NO	YES. AMMAN, DOHA, BAHRAIN, KUWAIT & CAIRO		OIIX, OOMM
	Alternative routing		NO		NO	NO	NO	OMAE	NO	YES		OBBB, OEJD,
	Fix crossing times		NO		NO	NO	YES	OMAE	NO	YES		OOMM, OEJD
	Airport slot		NO		NO	NO	NO		NO	YES		NO
	Minimum departure intervals (MDIs)		NO		NO	NO	YES		NO	YES		OOMM, OIIX
	Published, pre-defined alternative routes		NO		NO	NO			NO	YES		NO
	Ground delay program (GDP) – airport arrival constraint		NO		NO	NO			NO	YES		OOMM, OEJD
	Ground stop (GSt)		OMAE, OEJD, OKAC		NO	NO			NO	YES		OOMM, OIIX, OBBB, OEJD
	Ground delay program (GDP) – airspace constraint (also known as airspace flow program: AFP)		NO		NO	NO			NO	YES		NO
33. What is taken into consideration when an ATFM Measure is implemented			Volume and sector capacity, weather, outages		Delay action/holding/miles in trail/minutes in trail			ATCO workload, traffic demand/sector capacity, Airspace complexity and weather.	Capacity overload	• Reduction of ATCOs workload to ensure the safe provision of ATS; • Reduction of congestion and operating costs		Demand Exceeds capacity, Weather, Military Exercises, Resources, Maintenance/ Outages, Vip movements

Question			Bahrain	Egypt	Jordan	Kuwait	Lebanon	Oman	Qatar	Saudi Arabia	Sudan	UAE
Interoperability												
34. How is the duration of the selected ATFM Measure determined?			Tactical decision based on real-time information		Regional coordination.			The duration of the selected ATFM Measure is determined based on extent of over demand	By traffic levels	Declared capacity will be the main factor that is considered in the application of ATFM measures. When the capacity is reached, ATFM measures are applied until the capacity is exceeding the demand by at least 10%. Therefore, the timing will vary demanding on the level of traffic		Sector and aerodrome forecast, as well as duration requirements by accepting unit
35. Does your ANSP carry out any post-operations analysis?			NO		NA			PACA carry out any post-operations analysis using the flexible statistical tools to generate report on the metrics	NO	SANS are using the post-analysis to determine the bottleneck, Peak hour, congested airway, waypoint and congested aerodrome. This practice will improve enhance with the implementation of activation of ATCFM section		YES

Question			Bahrain	Egypt	Jordan	Kuwait	Lebanon	Oman	Qatar	Saudi Arabia	Sudan	UAE
Interoperability												
36. How is the effectiveness of the ATFM Measure analyzed?			NA		NO			The use of flexible statistical tools to effectively analyze and report on the metrics	Unknown	Refer to question number 30		Departures: o Monthly DST Compliance and Ground delay □ Arrivals: o Runway throughput and airborne delay
37. Are the ATFM Measures included in LOAs?			YES		NO	NO	YES	Operational LoA with UAE ACC, Appendix G : Air Traffic Flow Management	NO	No, it will be included in the ATM operation manual and later on LoA		YES
38. Does your State communicate ATFM Measures through automated or verbal communication with adjacent FIRs?	Miles in trail		Automated and verbal with OKAC, OEJD, OMAE		Verbal		Verbal	Verbal OMAE		Verbal: Muscat, Bahrain, Cairo, Jordan, Khartoum,		Verbal
	Speed restrictions				Verbal		Verbal	Verbal OMAE				Verbal
	Holding				Verbal		Verbal			Verbal: Muscat, Bahrain, Cairo, Jordan, Khartoum, Kuwait,		Verbal
	Altitude				Verbal		Verbal	Verbal OMAE		Verbal: Muscat, Bahrain, Cairo, Jordan, Khartoum, Kuwait,		Verbal
	Fix crossing times				Verbal		Verbal	Verbal OMAE		Verbal: Muscat, Bahrain, Cairo, Jordan, Khartoum, Kuwait,		Verbal
	Airport arrival times				Verbal					Verbal: Muscat, Bahrain, Cairo, Jordan, Khartoum, Kuwait,		Verbal
	Ground delay programs – airport arrival constraint				Verbal					Verbal: Muscat, Bahrain, Cairo, Jordan, Khartoum, Kuwait,		Verbal
	Ground stops		Verbal		Verbal					Verbal: Muscat, Bahrain, Cairo, Jordan, Khartoum, Kuwait,		Verbal
	Ground delay program – airspace constraint				Verbal					Verbal: Muscat, Bahrain, Cairo, Jordan, Khartoum, Kuwait,		Verbal
	Comments		Miles in trail by NOT AM		Verbal							

Question			Bahrain	Egypt	Jordan	Kuwait	Lebanon	Oman	Qatar	Saudi Arabia	Sudan	UAE
Interoperability												
39. If your State have future ATFM initiatives planned **with other FIRs** please list them below.			NA		NA							
	Initiative Title							Regional ATFM Implementation with MID Member States			Waiting for regional initiatives	Cross Border Arrival Management (X-MAN)
	Primary Functions											Absorb delay en-route
	Status (Planning, Approved, Implementation, Testing)							Planning				Planning
	Initial Operational Capability Date							TBD				Q2 2019
	Full Operational capability Date							TBD				Q2 2021
	Initiative Title											
	Primary Functions											
	Status (Planning, Approved, Implementation, Testing)											
	Initial Operational Capability Date											
	Full Operational capability Date											
	Initiative Title											
	Primary Functions											
	Status (Planning, Approved, Implementation, Testing)											
	Initial Operational Capability Date											
	Full Operational capability Date											

Question			Bahrain	Egypt	Jordan	Kuwait	Lebanon	Oman	Qatar	Saudi Arabia	Sudan	UAE
Interoperability												
40. If your State have future ATFM initiatives planned, please list them below.					NO							
	Initiative Title							CDM EXCHANGE OF DATA with UAE		SFAC-ATFCM Saudi future airspace concept project and air traffic flow and capacity management system	Waiting for regional initiatives	Airport CDM and Departure Manager
	Primary Functions									Re-structuration of the whole airspace and implementation of ATFM system		Collaborative Departure Sequencing
	Status (Planning, Approved, Implementation, Testing)							Planning		Planning/Tendering		Testing
	Initial Operational Capability Date									2022		Q4 2018
	Full Operational capability Date									2023		Q2 2021
	Comments		Bahrain is in the process of building a new FIC and implementing a new ATM system which will include integration of ATFM functionality such as SWIM capabilities, AMAN/DMAN. Est. completion mid 2020.									
					NO							
	Initiative Title							CDM EXCHANGE OF DATA with UAE		IFPS initial flight plan processing system	Waiting for regional initiatives	
	Primary Functions									Exchange ATS service massages and FPL		
	Status (Planning, Approved, Implementation, Testing)							Planning		In progress, designing phase		
	Initial Operational Capability Date									Q4/2019		
	Full Operational capability Date									Q2/2020		

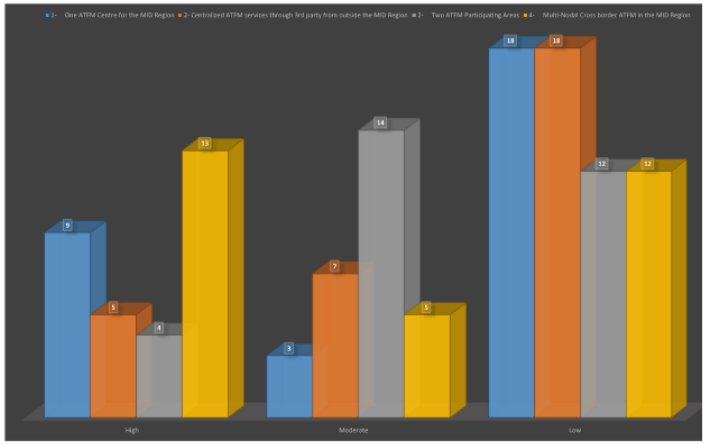
Question			Bahrain	Egypt	Jordan	Kuwait	Lebanon	Oman	Qatar	Saudi Arabia	Sudan	UAE
Interoperability												
41. ICAO has identified various ATFM and CDM initiatives in the Aviation System Block Upgrades (ASBU) process (Block 0 and Block 1 to be implemented by 2018). Please identify which of the following have been implemented or are planned to be implemented:												
	B0- A-CDM *Improved Airport Operations through Airport-CDM*		End 2019 Planning/Coordination completed. Design/config. In progress		Implemented		Planned	2019	Mid 2019	TBD		Q4 2020
	B0-RSEQ *Improved Traffic Flow through Runway Sequencing (AMAN/DMAN)*		Partially Full by 2020		Not Implemented			2019	Mid 2019	Q3-2019		Implemented
	B0-FICE *Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration*		Partially Full by 2021		Planning no date		Planned	2019		End of 2019 AMHS capability End of 2019 AIDC/ OLDI capability end 2019		Implemented
	B0-DATM *Service Improvement through Digital Aeronautical Information Management*		Implemented		in the process		Planned	2020		Ongoing. Ref questionnaire		Implemented
	B0-FRTO *Improved Operations through Enhanced En-Route Trajectories*		Partially Full by 2020 Current status: Pre Tactical basis		Implemented		Planned	2019		Ongoing. Ref questionnaire		Q4 2020

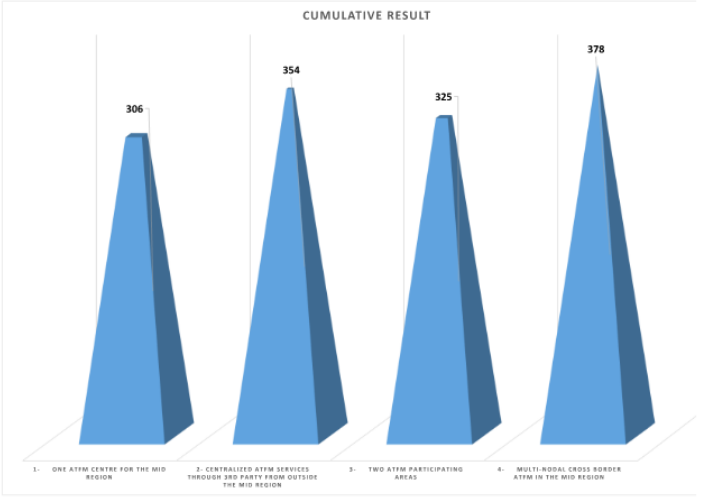
	B0-NOPS *Improved Flow Performance through Planning based on a Network-Wide view*		Partially Established ATFM measures		NO		Planned	2020		2022		Q4 2022
	B1- A-CDM *Optimized Airport Operations through A-CDM Total Airport Management*		End 2019		NO			2020		TBD		Q2 2021
	B1-RSEQ *Improved Airport operations through Departure, Surface and Arrival Management*		Partially full by 2020		NO			2019		2021		Q2 2021
	B1-FICE *Increased Interoperability, Efficiency and Capacity through FF-ICE/1 application before Departure*		Partially Full by 2020		NO			2019		2020		Q2 2021
	B1-DATM *Service Improvement through Integration of all Digital ATM Information*		Partially Full by 2020		NO			2020		2021		Q2 2021
	B1-SWIM *Performance Improvement through the application of System Wide Information Management (SWIM)*		2020		NO			2022		Q4 2020		Q2 2019
	B1-NOPS *Enhanced Flow Performance through Network Operational Planning*		Dependent on Regional agreement Planning phase		NO			2022		2022		Q4 2022
	B1-AMET *Enhanced Operational Decisions through Integrated Meteorological Information*		2020		Ongoing			2022		Q4 2020		Q4 2020
	B1-TBO *Improved Traffic Synchronization and Initial Trajectory-Based Operation*		Partially by 2020		NO			2022		Q4 2020		Q4 2020

ATTACHMENT D - Evaluation of possible MID ATFM Scenarios and their results

	Criteria/Advantages/Challenges	1- One ATFM Centre for the MID Region	2- Centralized ATFM services through 3rd party from outside the MID Region	3- Two ATFM Participating Areas	4- Multi-Nodal Cross border ATFM
1	Institutional Framework (legal, financial, funding mechanism, etc.)	3	3	4	5
2	Time required for the States to join the project (legal, Financial, etc.)	1	2	3	5
3	Political issues	1	1	3	5
4	Agreement on the Location	1	5	3	5
5	Funds required as a regional project (Centre) (cost)	3	1	2	5
6	Manpower (Centre)	3	5	1	5
7	Harmonized ATFM National procedures	5	3	4	3
8	Centralized Decision Making	5	5	4	2
9	Regional and cross regional coordination	5	5	4	2
10	Data Consistency/availability	5	5	4	3
11	Time needed for establishing the ATFM Framework	2	5	3	5
12	Third party could provide the service	5	5	5	0
13	Single system supplier and maintonance	5	2	3	0
14	Evolution process	5	3	4	3
15	Concentrated Team	5	5	3	2
16	Crisis management	5	5	4	4
17	Effective Airspace Management	5	5	3	2
18	Integration with regional IFPS	5	5	4	2
19	Stakeholders simplicity	5	5	3	2
20	Data collection that would be used by States	5	5	4	2
21	Centralized Post Assessment process	5	5	4	2
22	Support optimization of the use of the MID Region available airspace	5	3	4	3
23	Research and Development at regional level	5	5	5	2
24	States' willingness for Data Sharing with the ATFM Regional Centre(s) including Military Flights	2	2	2	5
25	Contingency Operations	1	5	5	5
26	local customization and integration systems	1	3	2	5
27	Common ATFM Messages Format	5	5	4	2
28	Compliance with ATFM Measures	5	5	3	2
29	Possibility of successful implementation	1	2	3	5
30	Timeframe to start operation	1	3	3	4
		306	354	325	378
	Legend :	*Rating from 0 to 5 (5 is the best)*			
		Challenge			

Weight (1 to 6)	1- One ATFM Centre for the MID Region	2- Centralized ATFM services through 3rd party from outside the MID Region	3- Two ATFM Participating Areas	4- Multi-Nodal Cross border ATFM
6	18	18	24	30
6	6	12	18	30
6	6	6	18	30
6	6	30	18	30
6	18	6	12	30
4	12	20	4	20
3	15	9	12	9
3	15	15	12	6
3	15	15	12	6
3	15	15	12	9
4	8	20	12	20
2	10	10	10	0
2	10	4	6	0
2	10	6	8	6
2	10	10	6	4
2	10	10	8	8
2	10	10	6	4
2	10	10	8	4
3	15	15	9	6
2	10	10	8	4
2	10	10	8	4
2	10	6	8	6
2	10	10	10	4
6	12	12	12	30
3	3	15	15	15
1	1	3	2	5
2	10	10	8	4
2	10	10	6	4
6	6	12	18	30
5	5	15	15	20
100	306	354	325	378





TERMS OF REFERENCE (TOR) OF THE MIDANPIRG AIR TRAFFIC FLOW MANAGEMENT TASK FORCE (ATFM TF)

I. TERMS OF REFERENCE

1.1 Perform a joint assessment and confirmation of the Pre-requisites for a regional ATFM solution, This shall include:

a) Assessment of the performance objectives of the individual participating States and definition of common performance objectives for a regional ATFM service.

b) Perform a data collection and analysis to identify hot-spot areas and critical times in a regional ATFM service area where demand consistently exceeds capacity. The reasons and contributing factors for unbalanced demand and capacity are to be identified.

c) Analysis of air traffic flows within the designated area of the regional ATFM service that is causing unbalanced demand and capacity. The analysis shall identify the traffic fractions that due to their uniformity are candidates for effective ATFM measures to increase the efficiency without violating the equity principle.

1.2 Develop an ATFM Concept of Operations and a Framework which addresses ATFM minimum requirements for the implementation of ATFM in the ICAO MID Region.

1.3 Agree on a mechanism to support the phased implementation of ATFM measures in the MID Region, when and where required.

1.4 Identify, research and recommend appropriate guidance regarding:

a) Aerodromes and Airspace capacity under the normal circumstances and adjustment factors affecting the capacity;

b) regular review for all aerodromes and ATC sectors where traffic demand is expected to reach capacity, or is resulting in traffic congestion;

c) regular review of the implemented ATFM measures and the related publications; to support implementation of the required mesures and reflection by the data houses (such as: Flight Planning Systems) and compliance of the airspace users;

d) mechanisms for ATFM data gathering, and exchanging operational data related to airspaces/aerdromes availablility and air operation data between States, ANSPs, Airspace users, Organizations and ICAO, which may include:

i. adjusted aerodromes and enroute capacity due to factors affecting capacity such as:

- Amid and after crisis management measures (mainly related to ANS Business Continouty Plans and recovery);
- special use airspace status, runway closures; or
- weather phenominas.

ii. traffic demand information which may include flight schedules, flight plan data, repetitive flight plan data as well as associated surveillance updates of flight status; and

iii. ATFM Daily Plan.

e) measure compliance of airspace users with the applicable ATFM measures; and

f) any other guidance relevant to the Regional ATFM Framework.

1.5 Consider existing and planned ATFM initiative in the Region, and make specific recommendations to ensure their alignment.

1.6 Ensure inter-regional ATFM harmonization with adjacent ICAO Regions.

1.7 Recommend appropriate inputs related to the implementations of ASBU Elements / Threads relevant to ATFM such as NOPS, A-CDM, etc.

1.8 Report to the ATM SG.

1.9 Review periodically its Terms of Reference and propose amendments as necessary.

Coordinate as deemed necessary with the relevant MIDANPIRG Sub-Groups and the Regional initiatives, metters of mutual interest.

II. COMPOSITION

2.1 The Task Force is composed of MID ATFM focal points and experts from:

a) MIDANPIRG Member States;

b) India, FAA, AACO, ACAO, AEROTHAI, CANSO, EUROCONTROL, IATA, and ICAO (Bangkok, Cairo, Paris Offices and HQ); and

c) other representatives from provider States and Industry may be invited on ad hoc basis, as observers, when required.

2.2 The Task Force shall elect a Chairperson to act as the point of contact on behalf the Task Force.

2.3 ICAO MID Office will act as the Secretary of the ATFM Task Force meetings.

III. WORKING ARRANGMENTS

3.1 The Chairperson, in close co-operation with the Secretary, shall make all necessary arrangements for the most efficient working of the Task Force. The Task Force shall at all times conduct its activities in the most efficient manner possible with a minimum of formality and paper work (paperless meetings). Permanent contact shall be maintained between the Chairpeson, Secretary and Members of the Task Force to advance the work. Best advantage should be taken of modern communications facilities, particularly video-conferencing (Virtual Meetings) and e-mails.

3.2 Face-to-face meetings will be conducted when it is necessary to do so.

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