International Civil Aviation Organization

MIDANPIRG ATM Sub Group

First Meeting (ATM SG/1)
(Cairo, Egypt, 9 - 12 June 2014)

Agenda Item 4: Airspace Management Issues

AIR TRAFFIC FLOW MANAGEMENT

(Presented by the Secretariat)

SUMMARY

This paper presents the latest developments related to Air Traffic Flow Management.

Action by the meeting is at paragraph 3.

REFERENCES

- DOC 9971
- GANP DOC 9750

1. INTRODUCTION

1.1 Air traffic flow management (ATFM) is used to manage the flow of traffic in a way that minimizes delays and maximizes the use of the entire airspace. ATFM can regulate traffic flows involving departure slots, smooth flows and manage rates of entry into airspace along traffic axes, manage arrival time at waypoints or flight information region (FIR)/sector boundaries and re-route traffic to avoid saturated areas. ATFM may also be used to address system disruptions including a crisis caused by human or natural phenomena.

1.2 The meeting may wish to note that the Second Edition of the Manual on Collaborative Air Traffic Flow Management - Doc 9971 was released. The Manual is divided into two Parts as follows:

- Part I presents the CDM concept as a means to reach the performance objectives of the processes, the concept supports in a consistent and harmonized manner.

- Part II contains information on how ATFM should be implemented and applied by using CDM processes in order to balance capacity and demand within different volumes of airspace and airport environments. It highlights the need for close cooperation among different stakeholders by providing flexibility in the use of the airspace and airport resources.

2. DISCUSSION

2.1 The meeting may wish to recall that ATFM/CDM was considered among the Global Priority for air navigation. Accordingly, the monitoring of ATFM implementation was included in the

air navigation dashboard.

2.2 The meeting may wish to note that ATFM measures are techniques used to manage air traffic demand according to system capacity. Below is a list of some type of ATFM Measures, more details are contained in Doc 9971, Chapter 6:

- Miles-in-trail (MIT);
- Minutes-in-trail (MINIT);
- Fix balancing;
- Rerouting;
- Mandatory Rerouting scenarios;
- Level capping scenarios;
- Alternative or advisory routing scenarios;
- Minimum Departure Intervals (MDIs);
- Slot Swapping;
- Collaborative Trajectory Options;
- Ground delay program (GDP);
- Ground stop (GS); and
- Airborne Holding;

2.3 It is to be highlighted that in order to harmonize and facilitate the implementation of ATFM the following Templates, Samples and Guidance have been provided in the Doc 9971:

a) Appendix A: Sample international ATFM operations planning telephone conference format;
b) Appendix B: Sample air traffic management (ATM) data exchange agreement;
c) Appendix C: Determining airport acceptance rate (AAR);
d) Appendix D: Determining sector capacity;
e) Appendix E: Capacity planning and assessment process;
f) Appendix F: Sample letter of agreement (LoA) between a flow management unit (FMU) and an area control centre (ACC); and
g) Appendix G: Template for letter of agreement (LoA) between air navigation services providers (ANSPs) on flow management

2.4 The meeting may wish to note that at regional level ATFM was not considered as priority for implementation in the MID Region. However, the majority of the MID States are implementing different ATFM Measures, as reflected in the replies received from Bahrain, Egypt, Lebanon, Oman, Saudi Arabia and UAE, at **Appendix A**, to the questionnaire circulated to States on 7 March 2014, related to the application of ATFM. In addition, all the mentioned above States indicated willingness to participate in a regional ATFM service.

2.5 It is to be noted that ATFM and its applications should not be restricted to one State or FIR because of their far-reaching effects on the flow of traffic elsewhere. The *Procedures for Air Navigation Services — Air Traffic Management* (PANS-ATM, Doc 4444) recognizes this important fact, stating that ATFM should be implemented on the basis of a regional air navigation agreement or, when appropriate, a multilateral agreement.

2.6 It is to be highlighted that Bahrain and Saudi Arabia are actively working on the establishment of a joint Integrated Flight Plan Processing System (IFPS)/ATFM unit/centre, as an initial phase of the establishment of a regional project under the framework of the Arab Civil Aviation Commission (ACAC). In this regard, it will be highly appreciated if the concerned States provide the meeting with an update on the project.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) encourage States to use the Guidance provided in Doc 9971 when implementing ATFM Measures; and

b) initiate discussions related to the implementation of a regional or sub-regional ATFM service/system.

MID Region Air Traffic Flow Management (ATFM) Questionnaire

State**: Bahrain** Date: 18/03/2014

Table 1. ATFM Service

Question	Please answer with relevant details	If not available provide Action Plan and the tentative date of implementation
Does your State have properly designed and implemented ATFM Service to enable the Air Navigation Service Provider(s) (ANSP) to effectively provide the required service? Or indicate if some ATFM is used in your FIR?	No	No current action plan or implementation plan
Describe the ATFM Unit established in your State indicating the involved Stakeholders? *(Members from the ANSP, Aerodromes, ATC, Airlines, MET, Military, etc.)*	None	N/A
Provide the automated tool(s) used to enable and enhance the effective application of ATFM, if any?	None	N/A
Indicate if any ATFM Measures, from Table 2 below, have been utilized by ACC(s) in your FIR? Please fill Table 2 accordingly.	See table 2 responses	
Collaborative decision-making (CDM) in the context of ATFM is a key enabler of an ATFM strategy allowing the sharing of all relevant information between the parties involved in making decisions and supporting an on-going dialogue between the various stakeholders throughout all phases of flight. This enables the various organisations to update each other continuously on events from the strategic level to real-time. **Provide if CDM has been utilized to manage flows of traffic through all components of the ATM system?**		
In accordance with (PANS-ATM, Doc 4444) does your State have any plan (willingness) to implement ATFM on the basis of a regional air navigation agreement or, when appropriate, as a multilateral agreement?	No Plan	Unit is willing to participate in a regional process
Others		

Table 2. Implemented ATFM Measures

ATFM Measures	ACC(s) and ATS Units	Description
Miles-in-trail (MIT) A tactical ATFM measure. It is expressed as the number of miles required between aircraft (in addition to the minimum longitudinal requirements), to meet a specific criterion. The criteria may be separation, airport, fix, altitude, sector, or route specific. MIT are 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.	Bahrain and Kuwait Firs	Kuwait regularly implies 40NM for UL602 traffic through Baghdad FIR due Baghdad Radar outages
Minutes-in-trail (MINIT) A tactical ATFM measure. It is 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 non-surveillance 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.	All surrounding FIRs (Jeddah / UAE / Tehran and Kuwait)	**5 MINUTES:** Means 15 minutes longitudinal separation, at the same altitude/level. **FLOW 5:** 5 minutes separation is required between all aircraft that will cross the CCB, regardless of altitude/level. **FLOW 10:** 10 minutes longitudinal separation is required between all aircraft that will cross the CCB, regardless of altitude/level.
Fix balancing A tactical ATFM measure, aiming at distributing demand and avoiding delays. The aircraft is assigned a different arrival or departure fix than the one indicated in the flight plan. This can also be used, for example, during periods of convective weather where a standard instrument arrival (STAR) or a standard instrument departure (SID) is unusable.	None	
Rerouting A tactical ATFM measure. It consists of an ATC-assigned routing different from the one indicated in the filed flight plan. Rerouting can take a variety of forms, depending on the tactical situation.	None	
Mandatory Rerouting scenarios Mandatory diversion of flows to offload traffic from constrained areas.	None	
Level capping scenarios Carried out by means of flight level restrictions (e.g., flights from London to Paris TMA shall file below FL285, with departures limited to FL 245 until they exit the TMA).	City Pair restrictions	FL250/FL260 (BAH-UAE) & FL270 Kuwait to Bahrain

Alternative or advisory routing scenarios Routes which are made available to Airspace Users on an optional basis to offload traffic from certain areas. A rerouting is normally issued to: a) ensure that aircraft operate along with a required flow of traffic; b) remain clear of airspace under restrictions or reservations; c) avoid excessively congested airspace; and d) avoid areas of known meteorological conditions of such nature that aircraft have to circumvent it.	None	
Minimum Departure Intervals (MDIs) A tactical ATFM measure. It is carried out when ATC sets a departure flow rate of, for example, 3 minutes between successive departures. MDIs are typically applied for no more than 30 minutes at a time and are typically applied when a departure sector becomes excessively busy or when capacity is suddenly reduced (e.g., equipment failure, meteorological conditions, etc.).	Yes	5 minute departure interval is used for Doha departures toward Baghdad FIR when Kuwait imposes extra MIT restrictions toward Baghdad FIR
Slot Swapping A tactical ATFM measure. It can be applied either manually or via automated means. The ability to swap departure slots gives Airspace Users the possibility to change the order of departure of the flights that should fly in a constrained area. This measure provides Airspace Users with the ability to manage and adapt their business model in a constrained environment.	None	
Collaborative Trajectory Options A strategic, pre-tactical, or tactical ATFM measure. It is composed of a set of collaboratively developed, published, pre-defined routes to address reoccurring route scenarios. The set of options is an assistance tool that allows efficient route coordination to be held during periods of system constraint.	None	
Ground delay programme (GDP) A strategic, pre-tactical, or tactical ATFM measure. A GDP is an air traffic management 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. They correspond to available entry slots into the constrained airspace or arrival slots into the constrained airport. A GDP aims at, among others, minimizing airborne holding. It is a flexible programme, and its forms may vary depending on the needs of the air traffic management system. GDPs are developed in a collaborative manner and are typically administered and managed by a FMU or a national/international ATFM centre. When a GDP is scheduled to last for several hours, slots might have to be revised because of changing conditions. There must therefore be a system in place to advise pilots of departure slots and of any changes to the GDP. ***Example Calculated Take Off Time (CTOT) Imposed locally or from external service provider(s) (i.e. CFMU)***	None	
Ground stop (GS) A tactical ATFM measure. Some selected aircraft remain on the ground. Due to the impact of a Ground Stops (GS) on Airspace Users, alternative ATFM measures should be explored and implemented prior to a GS, time and circumstances permitting.	Yes	Block start up cancellations are used for adjacent airports or FIR's for airport closures or occasional VVIP activities which might limit airport operations

Airborne Holding A tactical ATFM measure that has been designed strategically. It is a process that requires aircraft to hold at a waypoint in a pre-defined standard holding pattern. It is generally used to cope with short notice demand and capacity imbalances. It can also allow establishing an inventory of aircraft that would be in a position to take advantage of short notice, temporary increases in capacity such as the ones that occur during certain types of meteorological events.	Yes	Holding fixes are available at the BAH TMA boundary for holding during exceptional traffic periods. These have not been used for over one year. Holding is regularly used for Doha but that is managed within Doha TMA
Others		

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MID Region Air Traffic Flow Management (ATFM) Questionnaire

State**: Egypt** Date: 11/03/2014

Table 1. ATFM Service

Question	Please answer with relevant details	If not available provide Action Plan and the tentative date of implementation
Does your State have properly designed and implemented ATFM Service to enable the Air Navigation Service Provider(s) (ANSP) to effectively provide the required service? Or indicate if some ATFM is used in your FIR?		State approved to send letter of intent for EUROCONTROLto integrate in CFMU area of operation.(2017)
Describe the ATFM Unit established in your State indicating the involved Stakeholders? *(Members from the ANSP, Aerodromes, ATC, Airlines, MET, Military, etc.)*	Flow management position (Cairo FMP) Co-operating unit with EUROCONTROL CFMU.	
Provide the automated tool(s) used to enable and enhance the effective application of ATFM, if any?	CFMU human machine interface (CHMI and NOP)	
Indicate if any ATFM Measures, from Table 2 below, have been utilized by ACC(s) in your FIR? Please fill Table 2 accordingly.	Some measures are utilized when necessary,	
Collaborative decision-making (CDM) in the context of ATFM is a key enabler of an ATFM strategy allowing the sharing of all relevant information between the parties involved in making decisions and supporting an on-going dialogue between the various stakeholders throughout all phases of flight. This enables the various organisations to update each other continuously on events from the strategic level to real-time. **Provide if CDM has been utilized to manage flows of traffic through all components of the ATM system?**	Ready messages,co-ordination with central Flow and the airports.	
In accordance with (PANS-ATM, Doc 4444) does your State have any plan (willingness) to implement ATFM on the basis of a regional air navigation agreement or, when appropriate, as a multilateral agreement?	Yes, in contact with CFMU of EUROCONTROL for integration in CFMU Area of operation (DNM)	
Others		

Table 2. Implemented ATFM Measures

ATFM Measures	ACC(s) and ATS Units	Description
Miles-in-trail (MIT) A tactical ATFM measure. It is expressed as the number of miles required between aircraft (in addition to the minimum longitudinal requirements), to meet a specific criterion. The criteria may be separation, airport, fix, altitude, sector, or route specific. MIT are 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.	Sometimes	
Minutes-in-trail (MINIT) A tactical ATFM measure. It is 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 non-surveillance 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.	Rarely	
Fix balancing A tactical ATFM measure, aiming at distributing demand and avoiding delays. The aircraft is assigned a different arrival or departure fix than the one indicated in the flight plan. This can also be used, for example, during periods of convective weather where a standard instrument arrival (STAR) or a standard instrument departure (SID) is unusable.	When necessary	
Rerouting A tactical ATFM measure. It consists of an ATC-assigned routing different from the one indicated in the filed flight plan. Rerouting can take a variety of forms, depending on the tactical situation.	Sometimes	
Mandatory Rerouting scenarios Mandatory diversion of flows to offload traffic from constrained areas.	Not applied	
Level capping scenarios Carried out by means of flight level restrictions (e.g., flights from London to Paris TMA shall file below FL285, with departures limited to FL 245 until they exit the TMA).	Not applied	
Alternative or advisory routing scenarios Routes which are made available to Airspace Users on an optional basis to offload traffic from certain areas. A rerouting is normally issued to: a) ensure that aircraft operate along with a required flow of traffic; b) remain clear of airspace under restrictions or reservations; c) avoid excessively congested airspace; and d) avoid areas of known meteorological conditions of such nature that aircraft have to circumvent it.	Applied	
Minimum Departure Intervals (MDIs) A tactical ATFM measure. It is carried out when ATC sets a departure flow rate of, for example, 3 minutes between successive departures. MDIs are typically applied for no more than 30 minutes at a time and are typically applied when a departure sector becomes excessively busy or when capacity is suddenly reduced (e.g., equipment failure, meteorological conditions, etc.).	Rarely	

Slot Swapping A tactical ATFM measure. It can be applied either manually or via automated means. The ability to swap departure slots gives Airspace Users the possibility to change the order of departure of the flights that should fly in a constrained area. This measure provides Airspace Users with the ability to manage and adapt their business model in a constrained environment.	Partially applied on the TFC departing to the European airspace.	
Collaborative Trajectory Options A strategic, pre-tactical, or tactical ATFM measure. It is composed of a set of collaboratively developed, published, pre-defined routes to address reoccurring route scenarios. The set of options is an assistance tool that allows efficient route coordination to be held during periods of system constraint.	Not available now.	
Ground delay programme (GDP) A strategic, pre-tactical, or tactical ATFM measure. A GDP is an air traffic management 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. They correspond to available entry slots into the constrained airspace or arrival slots into the constrained airport. A GDP aims at, among others, minimizing airborne holding. It is a flexible programme, and its forms may vary depending on the needs of the air traffic management system. GDPs are developed in a collaborative manner and are typically administered and managed by a FMU or a national/international ATFM centre. When a GDP is scheduled to last for several hours, slots might have to be revised because of changing conditions. There must therefore be a system in place to advise pilots of departure slots and of any changes to the GDP. ***Example Calculated Take Off Time (CTOT) Imposed locally or from external service provider(s) (i.e. CFMU)***	CTOT only available for The TFC departing to Europe.	
Ground stop (GS) A tactical ATFM measure. Some selected aircraft remain on the ground. Due to the impact of a Ground Stops (GS) on Airspace Users, alternative ATFM measures should be explored and implemented prior to a GS, time and circumstances permitting.	Not applied	
Airborne Holding A tactical ATFM measure that has been designed strategically. It is a process that requires aircraft to hold at a waypoint in a pre-defined standard holding pattern. It is generally used to cope with short notice demand and capacity imbalances. It can also allow establishing an inventory of aircraft that would be in a position to take advantage of short notice, temporary increases in capacity such as the ones that occur during certain types of meteorological events.	Not applied	
Others		

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MID Region Air Traffic Flow Management (ATFM) Questionnaire

State**: Lebanon** Date: 27/03/2014

Table 1. ATFM Service

Question	Please answer with relevant details	If not available provide Action Plan and the tentative date of implementation
Does your State have properly designed and implemented ATFM Service to enable the Air Navigation Service Provider(s) (ANSP) to effectively provide the required service? Or indicate if some ATFM is used in your FIR?	A slot coordination committee has been established in Beirut Rafic Harriri Int. Airport	
Describe the ATFM Unit established in your State indicating the involved Stakeholders? *(Members from the ANSP, Aerodromes, ATC, Airlines, MET, Military, etc.)*	It's a committee to improve and adjust performance commensurate with available capacity in the Airport to provide services for passengers and aircraft movements consisting of the following members: -Airport manager -ATS department -Meteo -Security authority -National Airline company -handling companies.	
Provide the automated tool(s) used to enable and enhance the effective application of ATFM, if any?	Terminal position "calculated take off time implemented" (imposed by Euro control)	
Indicate if any ATFM Measures, from Table 2 below, have been utilized by ACC(s) in your FIR? Please fill Table 2 accordingly.	-slot swapping -ground delay program -airborne holding	
Collaborative decision-making (CDM) in the context of ATFM is a key enabler of an ATFM strategy allowing the sharing of all relevant information between the parties involved in making decisions and supporting an on-going dialogue between the various stakeholders throughout all phases of flight. This enables the various organisations to update each other continuously on events from the strategic level to real-time. **Provide if CDM has been utilized to manage flows of traffic through all components of the ATM system?**		

In accordance with (PANS-ATM, Doc 4444) does your State have any plan (willingness) to implement ATFM on the basis of a regional air navigation agreement or, when appropriate, as a multilateral agreement?	yes	It will be subject to regional political circumstances
Others		

Table 2. Implemented ATFM Measures

ATFM Measures	ACC(s) and ATS Units	Description
Miles-in-trail (MIT) A tactical ATFM measure. It is expressed as the number of miles required between aircraft (in addition to the minimum longitudinal requirements), to meet a specific criterion. The criteria may be separation, airport, fix, altitude, sector, or route specific. MIT are 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.	none	
Minutes-in-trail (MINIT) A tactical ATFM measure. It is 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 non-surveillance 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.	none	
Fix balancing A tactical ATFM measure, aiming at distributing demand and avoiding delays. The aircraft is assigned a different arrival or departure fix than the one indicated in the flight plan. This can also be used, for example, during periods of convective weather where a standard instrument arrival (STAR) or a standard instrument departure (SID) is unusable.	none	
Rerouting A tactical ATFM measure. It consists of an ATC-assigned routing different from the one indicated in the filed flight plan. Rerouting can take a variety of forms, depending on the tactical situation.	none	
Mandatory Rerouting scenarios Mandatory diversion of flows to offload traffic from constrained areas.	none	
Level capping scenarios Carried out by means of flight level restrictions (e.g., flights from London to Paris TMA shall file below FL285, with departures limited to FL 245 until they exit the TMA).	none	
Alternative or advisory routing scenarios Routes which are made available to Airspace Users on an optional basis to offload traffic from certain areas. A rerouting is normally issued to: a) ensure that aircraft operate along with a required flow of traffic; b) remain clear of airspace under restrictions or reservations; c) avoid excessively congested airspace; and d) Avoid areas of known meteorological conditions of such nature that aircraft have to circumvent it.	none	

Minimum Departure Intervals (MDIs) A tactical ATFM measure. It is carried out when ATC sets a departure flow rate of, for example, 3 minutes between successive departures. MDIs are typically applied for no more than 30 minutes at a time and are typically applied when a departure sector becomes excessively busy or when capacity is suddenly reduced (e.g., equipment failure, meteorological conditions, etc.).	none	
Slot Swapping A tactical ATFM measure. It can be applied either manually or via automated means. The ability to swap departure slots gives Airspace Users the possibility to change the order of departure of the flights that should fly in a constrained area. This measure provides Airspace Users with the ability to manage and adapt their business model in a constrained environment.	yes	Manually according to company request and the Euro control CFMU approval
Collaborative Trajectory Options A strategic, pre-tactical, or tactical ATFM measure. It is composed of a set of collaboratively developed, published, pre-defined routes to address reoccurring route scenarios. The set of options is an assistance tool that allows efficient route coordination to be held during periods of system constraint.	none	
Ground delay program (GDP) A strategic, pre-tactical, or tactical ATFM measure. A GDP is an air traffic management 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. They correspond to available entry slots into the constrained airspace or arrival slots into the constrained airport. A GDP aims at, among others, minimizing airborne holding. It is a flexible program, and its forms may vary depending on the needs of the air traffic management system. GDPs are developed in a collaborative manner and are typically administered and managed by a FMU or a national/international ATFM centre. When a GDP is scheduled to last for several hours, slots might have to be revised because of changing conditions. There must therefore be a system in place to advice pilots of departure slots and of any changes to the GDP. ***Example Calculated Take Off Time (CTOT) Imposed locally or from external service provider(s) (i.e. CFMU)***	yes	Calculated take off time imposed from EUROCONTROL central flights management unit (CFMU)
Ground stop (GS) A tactical ATFM measure. Some selected aircraft remain on the ground. Due to the impact of a Ground Stops (GS) on Airspace Users, alternative ATFM measures should be explored and implemented prior to a GS, time and circumstances permitting.	none	
Airborne Holding A tactical ATFM measure that has been designed strategically. It is a process that requires aircraft to hold at a waypoint in a pre-defined standard holding pattern. It is generally used to cope with short notice demand and capacity imbalances. It can also allow establishing an inventory of aircraft that would be in a position to take advantage of short notice, temporary increases in capacity such as the ones that occur during certain types of meteorological events.	Yes -2 VOR: KAD and CAK -3 initial approach fixes: ZALKA for RWY 16 RAMLA for RWY 03 BYBLO for RWY 17	In case of VIP movement or Weather circumstances
Others		

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MID Region Air Traffic Flow Management (ATFM) Questionnaire

State**: Oman** Date: 23/03/2014

Table 1. ATFM Service

Question	Please answer with relevant details	If not available provide Action Plan and the tentative date of implementation
Does your State have properly designed and implemented ATFM Service to enable the Air Navigation Service Provider(s) (ANSP) to effectively provide the required service? Or indicate if some ATFM is used in your FIR?	**We have some flow measure in place to flatten some flows and reduce air traffic complexity.**	**Tentatively 2017**
Describe the ATFM Unit established in your State indicating the involved Stakeholders? *(Members from the ANSP, Aerodromes, ATC, Airlines, MET, Military, etc.)*	**No ATFM unit available.**	**Tentatively 2017**
Provide the automated tool(s) used to enable and enhance the effective application of ATFM, if any?	**No automated tools available, it is an agreement based on acceptance flow rate.**	**Tentatively 2017**
Indicate if any ATFM Measures, from Table 2 below, have been utilized by ACC(s) in your FIR? Please fill Table 2 accordingly.	**Minutes-in-trail (MINIT)**	**2010**
Collaborative decision-making (CDM) in the context of ATFM is a key enabler of an ATFM strategy allowing the sharing of all relevant information between the parties involved in making decisions and supporting an on-going dialogue between the various stakeholders throughout all phases of flight. This enables the various organisations to update each other continuously on events from the strategic level to real-time. **Provide if CDM has been utilized to manage flows of traffic through all components of the ATM system?**	**CDM not utilized yet.**	**Not Determined**
In accordance with (PANS-ATM, Doc 4444) does your State have any plan (willingness) to implement ATFM on the basis of a regional air navigation agreement or, when appropriate, as a multilateral agreement?	**Yes, if Appropriate regional ATFM plan is established.**	
Others		

Table 2. Implemented ATFM Measures

ATFM Measures	ACC(s) and ATS Units	Description
Miles-in-trail (MIT) A tactical ATFM measure. It is expressed as the number of miles required between aircraft (in addition to the minimum longitudinal requirements), to meet a specific criterion. The criteria may be separation, airport, fix, altitude, sector, or route specific. MIT are 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.	**Muscat ACC**	**Occasionally with adjacent FIRs due to weather conditions or CNS serviceability.**
Minutes-in-trail (MINIT) A tactical ATFM measure. It is 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 non-surveillance 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.	**Muscat ACC, Area Control**	**Applied with UAE FIR during peak traffic periods.**
Fix balancing A tactical ATFM measure, aiming at distributing demand and avoiding delays. The aircraft is assigned a different arrival or departure fix than the one indicated in the flight plan. This can also be used, for example, during periods of convective weather where a standard instrument arrival (STAR) or a standard instrument departure (SID) is unusable.	**N/A**	**N/A**
Rerouting A tactical ATFM measure. It consists of an ATC-assigned routing different from the one indicated in the filed flight plan. Rerouting can take a variety of forms, depending on the tactical situation.	**Muscat ACC**	**Alternating Traffic between two arrival gates with UAE ACC.**
Mandatory Rerouting scenarios Mandatory diversion of flows to offload traffic from constrained areas.	**Muscat ACC**	**Route allocation to specific destinations is specified In the Muscat AIP,**
Level capping scenarios Carried out by means of flight level restrictions (e.g., flights from London to Paris TMA shall file below FL285, with departures limited to FL 245 until they exit the TMA).	**Muscat ACC.**	**Applied between Muscat & UAE ACCs for departure and arrivals.**
Alternative or advisory routing scenarios Routes which are made available to Airspace Users on an optional basis to offload traffic from certain areas. A rerouting is normally issued to: a) ensure that aircraft operate along with a required flow of traffic; b) remain clear of airspace under restrictions or reservations; c) avoid excessively congested airspace; and d) avoid areas of known meteorological conditions of such nature that aircraft have to circumvent it.	**Muscat ACC**	**As per the AIP**

Minimum Departure Intervals (MDIs) A tactical ATFM measure. It is carried out when ATC sets a departure flow rate of, for example, 3 minutes between successive departures. MDIs are typically applied for no more than 30 minutes at a time and are typically applied when a departure sector becomes excessively busy or when capacity is suddenly reduced (e.g., equipment failure, meteorological conditions, etc.).	**Muscat ACC**	**Applied as an agreed flow rate Due to traffic density and the complexity associated with a particular sector. We also have plans to add more sectors.**
Slot Swapping A tactical ATFM measure. It can be applied either manually or via automated means. The ability to swap departure slots gives Airspace Users the possibility to change the order of departure of the flights that should fly in a constrained area. This measure provides Airspace Users with the ability to manage and adapt their business model in a constrained environment.	**N/A**	
Collaborative Trajectory Options A strategic, pre-tactical, or tactical ATFM measure. It is composed of a set of collaboratively developed, published, pre-defined routes to address reoccurring route scenarios. The set of options is an assistance tool that allows efficient route coordination to be held during periods of system constraint.	**N/A**	
Ground delay programme (GDP) A strategic, pre-tactical, or tactical ATFM measure. A GDP is an air traffic management 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. They correspond to available entry slots into the constrained airspace or arrival slots into the constrained airport. A GDP aims at, among others, minimizing airborne holding. It is a flexible programme, and its forms may vary depending on the needs of the air traffic management system. GDPs are developed in a collaborative manner and are typically administered and managed by a FMU or a national/international ATFM centre. When a GDP is scheduled to last for several hours, slots might have to be revised because of changing conditions. There must therefore be a system in place to advise pilots of departure slots and of any changes to the GDP. ***Example Calculated Take Off Time (CTOT) Imposed locally or from external service provider(s) (i.e. CFMU)***	**N/A**	
Ground stop (GS) A tactical ATFM measure. Some selected aircraft remain on the ground. Due to the impact of a Ground Stops (GS) on Airspace Users, alternative ATFM measures should be explored and implemented prior to a GS, time and circumstances permitting.	**Muscat ACC**	**Internal procedures for Muscat FIR departures. LOA with UAE**
Airborne Holding A tactical ATFM measure that has been designed strategically. It is a process that requires aircraft to hold at a waypoint in a pre-defined standard holding pattern. It is generally used to cope with short notice demand and capacity imbalances. It can also allow establishing an inventory of aircraft that would be in a position to take advantage of short notice, temporary increases in capacity such as the ones that occur during certain types of meteorological events.	**N/A**	

Others		

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MID Region Air Traffic Flow Management (ATFM) Questionnaire

State: Kingdom of Saudi Arabia **Date:** 15/03/2014

Table 1. ATFM Service

Question	Please answer with relevant details	If not available provide Action Plan and the tentative date of implementation
Does your State have properly designed and implemented ATFM Service to enable the Air Navigation Service Provider(s) (ANSP) to effectively provide the required service? Or indicate if some ATFM is used in your FIR?	All current LoAs with adjacent FIRs contain Flow Control arrangement	GACA is planning to develop a local ATFM Service that can be progressively extended to provide Regional ATFM services.
Describe the ATFM Unit established in your State indicating the involved Stakeholders? *(Members from the ANSP, Aerodromes, ATC, Airlines, MET, Military, etc.)*		GACA is planning to develop a local ATFM Service that can be progressively extended to provide Regional ATFM services.
Provide the automated tool(s) used to enable and enhance the effective application of ATFM, if any?	Currently, GACA is using EUROCAT X for the provision of ATS services. The monitoring of Traffic is performed through specific functions that allow the supervisor to know the number of flight with a specific period of time. The ATM system Eurococat X will be replaced by January 2015 by new ATM system with has advanced ATFM functions allowing all ATS Units to visualize the traffic levels in the near future. The parameters of these functions are flexible and can be adjusted to meet the specific requirements of each ATS Unit.	GACA will deploy new ATM System, (COMSOFT MSTS/PRISMA), which will include ATFM and AMAN & DMAN features.
Indicate if any ATFM Measures, from Table 2 below, have been utilized by ACC(s) in your FIR? Please fill Table 2 accordingly.		
Collaborative decision-making (CDM) in the context of ATFM is a key enabler of an ATFM strategy allowing the sharing of all relevant information between the	Currently the level of traffic is not required major adjustment and application of formal ATFM measures	- In the near future, CDM system will be introduced at King Abdulaziz International Airport at Jeddah to allow affective and

parties involved in making decisions and supporting an on-going dialogue between the various stakeholders throughout all phases of flight. This enables the various organisations to update each other continuously on events from the strategic level to real-time. **Provide if CDM has been utilized to manage flows of traffic through all components of the ATM system?**	except for HAJJ flights where specifc measures are taken in the planning phases to authorize flights considering the available capacity. Specific AIP supplement is published for HAJJ which describes the flow management.	efficient flow management of the traffic serving this airport. The project is in final phase of planning and it is estimated to be operational by the end of 2015. .
In accordance with (PANS-ATM, Doc 4444) does your State have any plan (willingness) to implement ATFM on the basis of a regional air navigation agreement or, when appropriate, as a multilateral agreement?	- The decision taken for the establishment of an Arab ATFM unit has been endorsed by the ACAC Executive Council meeting number 25 - EC/26), which stated that the Executive Council approved the establishment of the Arab ATFM Unit in Riyadh (Saudi Arabia). - The General Assembly of ACAC has endorsed the decision of the Executive Council by its resolutuion no 26 - GA /8, for the establishment of the ATFM unit in Riyadh. - ACAC is coordinating closely with Erocontrol to develop a detailed work program and to set all required arrangements. -	GACA is acting actively to establish a regional Arab ATFM unit/center in Riyadh.
Others		

Table 2. Implemented ATFM Measures

ATFM Measures	ACC(s) and ATS Units	Description
Miles-in-trail (MIT) A tactical ATFM measure. It is expressed as the number of miles required between aircraft (in addition to the minimum longitudinal requirements), to meet a specific criterion. The criteria may be separation, airport, fix, altitude, sector, or route specific. MIT are 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.	Jeddah& Riyadh ACCs	All current LoAs with neighboring FIRs include flow time & / or distances for traffic spacing
Minutes-in-trail (MINIT) A tactical ATFM measure. It is 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 non-surveillance 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.	Jeddah& Riyadh ACCs	All current LoAs with neighboring FIRs include flow time &/ or distances for traffic spacing
Fix balancing A tactical ATFM measure, aiming at distributing demand and avoiding delays. The aircraft is assigned a different arrival or departure fix than the one indicated in the flight plan. This can also be used, for example, during periods of convective weather where a standard instrument arrival (STAR) or a standard instrument departure (SID) is unusable.	Jeddah& Riyadh ACCs	This capability will be available in the new ATM system (MSTS/PRISMA) that will be implrmrnted by January 2015.
Rerouting A tactical ATFM measure. It consists of an ATC-assigned routing different from the one indicated in the filed flight plan. Rerouting can take a variety of forms, depending on the tactical situation.	Jeddah& Riyadh ACCs	Tactical ATC measures are used to ensure adequate rerouting of traffic (usually assignment of direct routes), if required. This measures intend to avoid conflicts and make adequate distribution of the traffic.
Mandatory Rerouting scenarios Mandatory diversion of flows to offload traffic from constrained areas.		Within Jeddah FIR, there is no mandatory rerouting of the traffic.
Level capping scenarios Carried out by means of flight level restrictions (e.g., flights from London to Paris TMA shall file below FL285, with departures limited to FL 245 until they exit the TMA).	All ATC Units are affected	There are flight level allocation scheme which makes restrictions on some major routes in Jeddah FIR, to meet operational requirements and ensure safe ATS services

Alternative or advisory routing scenarios Routes which are made available to Airspace Users on an optional basis to offload traffic from certain areas. A rerouting is normally issued to: a) ensure that aircraft operate along with a required flow of traffic; b) remain clear of airspace under restrictions or reservations; c) avoid excessively congested airspace; and d) avoid areas of known meteorological conditions of such nature that aircraft have to circumvent it.	Jeddah& Riyadh ACCs	To be applied with the implementation of local ATFM services.
Minimum Departure Intervals (MDIs) A tactical ATFM measure. It is carried out when ATC sets a departure flow rate of, for example, 3 minutes between successive departures. MDIs are typically applied for no more than 30 minutes at a time and are typically applied when a departure sector becomes excessively busy or when capacity is suddenly reduced (e.g., equipment failure, meteorological conditions, etc.).	Jeddah, Riyadh & future ATFM Unit	To be applied with the implementation of local ATFM services.
Slot Swapping A tactical ATFM measure. It can be applied either manually or via automated means. The ability to swap departure slots gives Airspace Users the possibility to change the order of departure of the flights that should fly in a constrained area. This measure provides Airspace Users with the ability to manage and adapt their business model in a constrained environment.	Jeddah, Riyadh & future ATFM Unit	To be applied with the implementation of local ATFM services.
Collaborative Trajectory Options A strategic, pre-tactical, or tactical ATFM measure. It is composed of a set of collaboratively developed, published, pre-defined routes to address reoccurring route scenarios. The set of options is an assistance tool that allows efficient route coordination to be held during periods of system constraint.	Jeddah, Riyadh & future ATFM Unit	To be applied with the implementation of local ATFM services.
Ground delay programme (GDP) A strategic, pre-tactical, or tactical ATFM measure. A GDP is an air traffic management 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. They correspond to available entry slots into the constrained airspace or arrival slots into the constrained airport. A GDP aims at, among others, minimizing airborne holding. It is a flexible programme, and its forms may vary depending on the needs of the air traffic management system. GDPs are developed in a collaborative manner and are typically administered and managed by a FMU or a national/international ATFM center. When a GDP is scheduled to last for several hours, slots might have to be revised because of changing conditions. There must therefore be a system in place to advise pilots of departure slots and of any changes to the GDP. ***Example Calculated Take Off Time (CTOT) Imposed locally or from external service provider(s) (i.e. CFMU)***	Jeddah, Riyadh & future ATFM Unit	To be applied with the implementation of local ATFM services. It is expected that will the introduction of the new A-CDM at KAIA a GDP will be applied as one of the main ATFM measures.
Ground stop (GS) A tactical ATFM measure. Some selected aircraft remain on the ground. Due to the impact of a Ground Stops (GS) on Airspace Users, alternative ATFM measures should be explored and implemented prior to a GS, time and circumstances permitting.	Jeddah, Riyadh & future ATFM Unit	Not used & not expected to be required in future

Airborne Holding A tactical ATFM measure that has been designed strategically. It is a process that requires aircraft to hold at a waypoint in a pre-defined standard holding pattern. It is generally used to cope with short notice demand and capacity imbalances. It can also allow establishing an inventory of aircraft that would be in a position to take advantage of short notice, temporary increases in capacity such as the ones that occur during certain types of meteorological events.	Jeddah & Riyadh	Currently and in the future, only IFPs holdings are used and will be used to de-conflict the traffic and arrange appropriate sequencing.
Others	Jeddah ACC	Internal arrangements are under development to ensure appropriate handling of traffic during HAJJ period 2014. Simulations will be used to validate the scenarios and options that will be adopted

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MID Region Air Traffic Flow Management (ATFM) Questionnaire

State**: UAE** Date: 6/04/2014

Table 1. ATFM Service

Question	Please answer with relevant details	If not available provide Action Plan and the tentative date of implementation
Does your State have properly designed and implemented ATFM Service to enable the Air Navigation Service Provider(s) (ANSP) to effectively provide the required service? Or indicate if some ATFM is used in your FIR?	Yes. Currently a Departure Flow system is implemented and is being enhanced. Arrival Manager is also deployed for Dubai Intl Airport	
Describe the ATFM Unit established in your State indicating the involved Stakeholders? *(Members from the ANSP, Aerodromes, ATC, Airlines, MET, Military, etc.)*	The ATFM unit is the Sheikh Zayed Area Navigation Centre and involves UAE Airports and is being enhanced to involve airlines.	
Provide the automated tool(s) used to enable and enhance the effective application of ATFM, if any?	DFLOW by COMSOFT	
Indicate if any ATFM Measures, from Table 2 below, have been utilized by ACC(s) in your FIR? Please fill Table 2 accordingly.	MIT, MINIT, Fix Balancing, Rerouting, Level capping, MDIs, Slot Swapping, GDP, GS and Airborne Holding.	
Collaborative decision-making (CDM) in the context of ATFM is a key enabler of an ATFM strategy allowing the sharing of all relevant information between the parties involved in making decisions and supporting an on-going dialogue between the various stakeholders throughout all phases of flight. This enables the various organisations to update each other continuously on events from the strategic level to real-time. **Provide if CDM has been utilized to manage flows of traffic through all components of the ATM system?**		A-CDM is currently being studied by Abu Dhabi and Dubai airports with SZC in many respects and occasions with a view to implement in the near future
In accordance with (PANS-ATM, Doc 4444) does your State have any plan (willingness) to implement ATFM on the basis of a regional air navigation agreement or, when appropriate, as a multilateral agreement?	Yes, providing that all pre-implementation requirements are in place (CNS and ATM upgrades)	
Others		

Table 2. Implemented ATFM Measures

ATFM Measures	ACC(s) and ATS Units	Description
Miles-in-trail (MIT) A tactical ATFM measure. It is expressed as the number of miles required between aircraft (in addition to the minimum longitudinal requirements), to meet a specific criterion. The criteria may be separation, airport, fix, altitude, sector, or route specific. MIT are 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.	Dubai App, UAE ACC and Muscat ACC	Muscat ACC requires 20 NM in trail separation at waypoint LALDO during certain periods
Minutes-in-trail (MINIT) A tactical ATFM measure. It is 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 non-surveillance 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.	Abu Dhabi app, Dubai App, UAE ACC and Muscat ACC	Muscat ACC requires 5 minutes in trail separation at TARDI and LABRI.
Fix balancing A tactical ATFM measure, aiming at distributing demand and avoiding delays. The aircraft is assigned a different arrival or departure fix than the one indicated in the flight plan. This can also be used, for example, during periods of convective weather where a standard instrument arrival (STAR) or a standard instrument departure (SID) is unusable.	UAE ACC and Dubai App	Dubai arrivals are instructed to use different fixes in case of imbalanced holding scenarios where one fix is saturated and another is empty
Rerouting A tactical ATFM measure. It consists of an ATC-assigned routing different from the one indicated in the filed flight plan. Rerouting can take a variety of forms, depending on the tactical situation.	UAE ACC and Dubai APP	Typically used for M318 traffic in case of required delay
Mandatory Rerouting scenarios Mandatory diversion of flows to offload traffic from constrained areas.	N/A	N/A
Level capping scenarios Carried out by means of flight level restrictions (e.g., flights from London to Paris TMA shall file below FL285, with departures limited to FL 245 until they exit the TMA).	Bahrain ACC, Doha app, Abu Dhabi app, Dubai App, Muscat ACC, Tehran ACC	Multiple city pairs level capping in force.
Alternative or advisory routing scenarios Routes which are made available to Airspace Users on an optional basis to offload traffic from certain areas. A rerouting is normally issued to: a) ensure that aircraft operate along with a required flow of traffic; b) remain clear of airspace under restrictions or reservations; c) avoid excessively congested airspace; and d) avoid areas of known meteorological conditions of such nature that aircraft have to circumvent it.	N/A	N/A
Minimum Departure Intervals (MDIs) A tactical ATFM measure. It is carried out when ATC sets a departure flow rate of, for example, 3 minutes between successive departures. MDIs are typically applied for no more than 30 minutes at a time and are typically applied when a departure sector becomes excessively busy or when capacity is suddenly reduced (e.g., equipment failure, meteorological conditions, etc.).	Abu Dhabi App, Dubai App and UAE ACC	Typically used for DARAX as the lack of a RADAR hand off agreement with Tehran causes this waypoint departure intervals to be controlled.

Slot Swapping A tactical ATFM measure. It can be applied either manually or via automated means. The ability to swap departure slots gives Airspace Users the possibility to change the order of departure of the flights that should fly in a constrained area. This measure provides Airspace Users with the ability to manage and adapt their business model in a constrained environment.	UAE ACC, UAE Airports	This is used in case of a gap in the departure sequence caused by an aircraft's inability to meet its departure Slot
Collaborative Trajectory Options A strategic, pre-tactical, or tactical ATFM measure. It is composed of a set of collaboratively developed, published, pre-defined routes to address reoccurring route scenarios. The set of options is an assistance tool that allows efficient route coordination to be held during periods of system constraint.	N/A	N/A
Ground delay programme (GDP) A strategic, pre-tactical, or tactical ATFM measure. A GDP is an air traffic management 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. They correspond to available entry slots into the constrained airspace or arrival slots into the constrained airport. A GDP aims at, among others, minimizing airborne holding. It is a flexible programme, and its forms may vary depending on the needs of the air traffic management system. GDPs are developed in a collaborative manner and are typically administered and managed by a FMU or a national/international ATFM centre. When a GDP is scheduled to last for several hours, slots might have to be revised because of changing conditions. There must therefore be a system in place to advise pilots of departure slots and of any changes to the GDP. ***Example Calculated Take Off Time (CTOT) Imposed locally or from external service provider(s) (i.e. CFMU)***	Abu Dhabi app, Dubai App, Jeddah ACC and UAE ACC	Used to delay traffic using TARDI, LABRI and KITAP in order to achieve the required flow/separation.
Ground stop (GS) A tactical ATFM measure. Some selected aircraft remain on the ground. Due to the impact of a Ground Stops (GS) on Airspace Users, alternative ATFM measures should be explored and implemented prior to a GS, time and circumstances permitting.	Bahrain ACC, Doha App, Abu Dhabi App, Dubai APP, Fujairah, Ras Al Khaima, Muscat ACC and Tehran ACC	Ultimately used to control over capacity of airspace and Holding patterns until capacity is brought down
Airborne Holding A tactical ATFM measure that has been designed strategically. It is a process that requires aircraft to hold at a waypoint in a pre-defined standard holding pattern. It is generally used to cope with short notice demand and capacity imbalances. It can also allow establishing an inventory of aircraft that would be in a position to take advantage of short notice, temporary increases in capacity such as the ones that occur during certain types of meteorological events.	Abu Dhabi app, Dubai App and UAE ACC	Regularly used as an effective spacing method for inbounds to UAE airports if demand is higher than capacity
Others		

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