The need for ATFM/CDM

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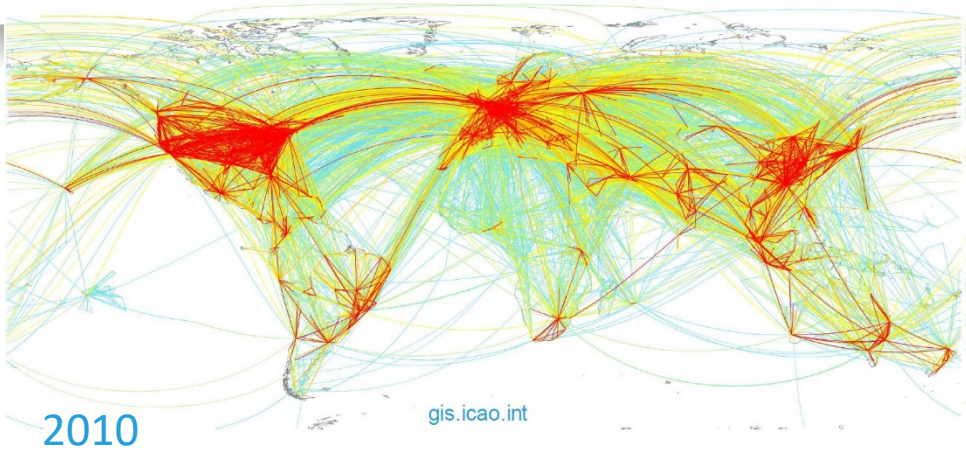
Outline

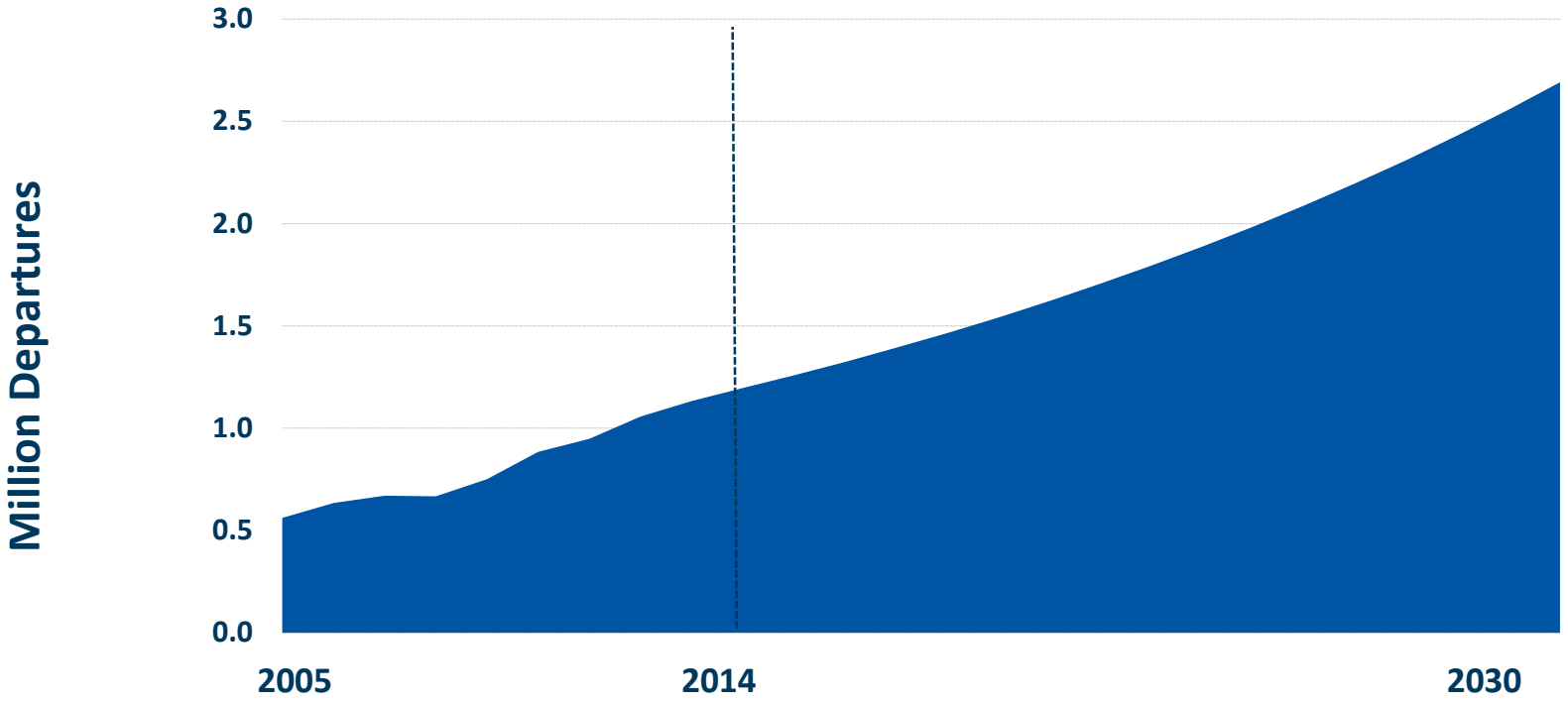
- Global Traffic Growth
- Traffic Growth in the MID Region
- What is ATFM/CDM
- ATFM Main Objectives
- ICAO Guidance Material
- Link to ASBU
- Regional developments

Traffic Growth

ICAO CAPACITY & EFFICIENCY



Middle East Aircraft Movements & Growth



What is ATFM?

What is ATFM (Cont'd)

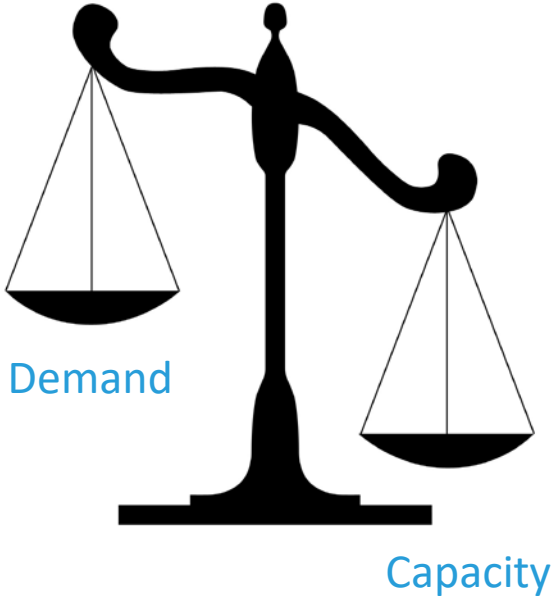
- ATFM is an enabler of air traffic management efficiency and effectiveness in a way that minimizes delays and maximizes/optimizes the use of the available airspace
- It contributes to the safety and environmental sustainability of an ATM system.
- Managing traffic flows means more than simply applying ATFM measures. ATFM solution is the combination of capacity optimization and ATFM measures

Global ATFM

Is a Long Term Objective

- Over time, local ATFM implementations conducted worldwide are going to shape a global ATFM
- Standardized ATFM processes will be implemented globally

ATFM is demand/capacity balancing



If demand exceeds the capacity, "flow" management is required

The objectives of ATFM/CDM

- Enhance safety
- Reduce workload
- Optimize the use of available airspace
- Improve operational benefits, predictability and efficiency
- Effective management of capacity and demand
- Increased situational awareness among stakeholders
- Provide for coordinated, collaborative development and execution of operational plans
- Reduce fuel burn and operating costs
- Support effective traffic management of irregular operations, Contingency, Emergency, and the recovery of such situation

Keys to successful implementation

- The CDM process is a key enabler of an ATFM
- Achieving a robust coordination among aviation stakeholders

  – All the stakeholders work together to improve the overall performance of the ATM system
  – Such coordination will take place within a FIR, between FIRs, and ultimately, between regions

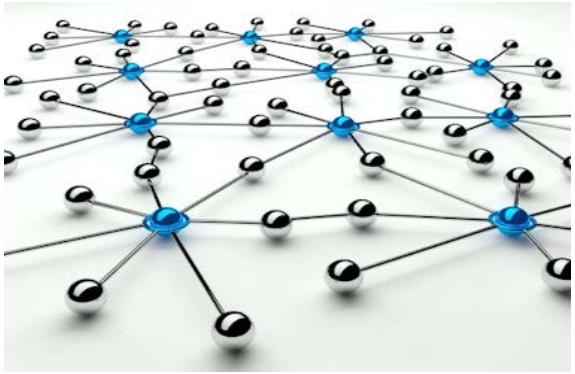
Keys to successful implementation

ATFM and its applications should *NOT* be restricted to one State or FIR

- Due to their far-reaching effects on the flow of traffic elsewhere
- PANS-ATM, Doc 4444 states that ATFM should be implemented on the basis of a regional air navigation agreement or, when appropriate, as a multilateral agreement

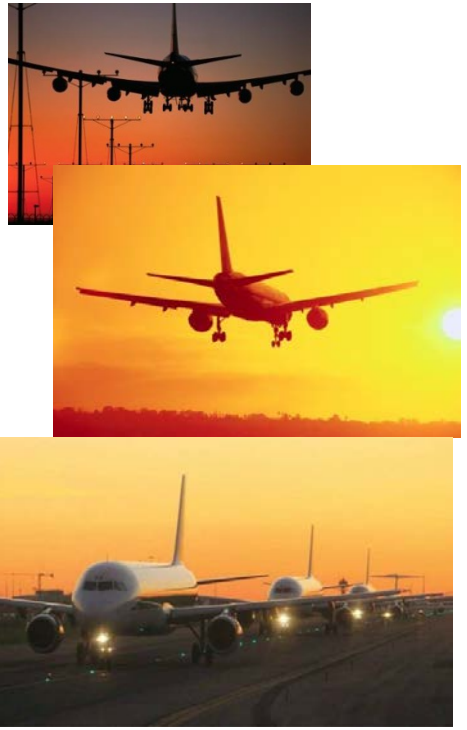
Drivers for the ATFM Guidance material

Traffic pressure



ATFM systems Interdependencies

Hub operations



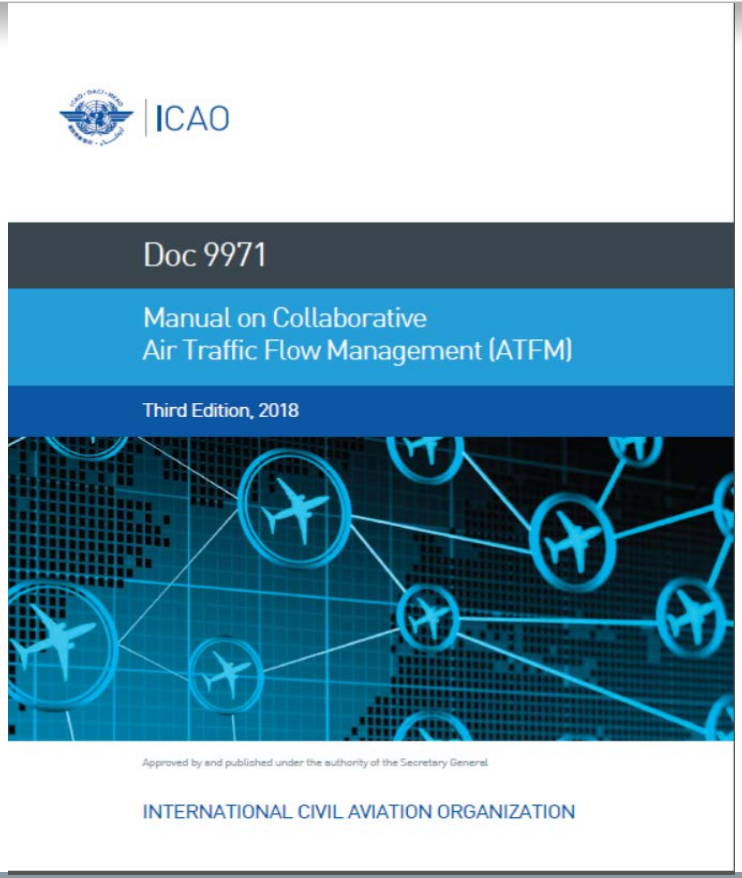
Doc 9971: Manual on…

Doc 9971 was published in 2012 (3rd Edition in 2018)

Part 1 – Collaborative Decision Making (CDM)

Part 2 – Air Traffic Flow Management (ATFM)

Part 3 – Airport CDM (A-CDM)



Doc 9971 (Cont'd)

PART I. COLLABORATIVE DECISION-MAKING (CDM)

Chapter 1. Introduction

Chapter 2. Description of collaborative decision-making (CDM)

Chapter 3. Role of information exchange

Chapter 4. Articulating a CDM process

PART II. AIR TRAFFIC FLOW MANAGEMENT (ATFM)

Chapter 1. Introduction

Chapter 2. The ATFM service

Chapter 3. Capacity determination

Chapter 4. ATFM phases and solutions

Chapter 5. ATFM service interfaces

Chapter 6. ATFM communication

Chapter 7. ATFM structure and organization

Chapter 8. ATFM implementation

Doc 9971 (Cont'd)

- Appendix II-A. Sample contingency plan
- Appendix II-B. Determining airport arrival rate
- Appendix II-C. Determining sector capacity
- Appendix II-D. Capacity planning and assessment process
- Appendix II-E. Sample letter ATM exchange agreements
- Appendix II-F. Sample international ATFM operations planning telephone conference format plan
- Appendix II-G. Sample LOA between FMU and ACC
- Appendix II-H. Template letter of agreement between ANSP on flow management

Doc 9971 (Cont'd)

PART III. AIRPORT COLLABORATIVE DECISION-MAKING

Chapter 1. What is A-CDM?

Chapter 2. Airport-CDM partners and stakeholders

Chapter 3. A-CDM methods and tools

Chapter 4. A-CDM implementation

Appendix III-A. Generic MOU between A-CDM partners and stakeholders

Appendix III-B. Template of generic aeronautical information publication (AIP) provided to EUROCONTROL States implementing A-CDM

Appendix III-C. Example of an MOU: FAA membership agreement for collaborative decision making (CDM) exchange of data

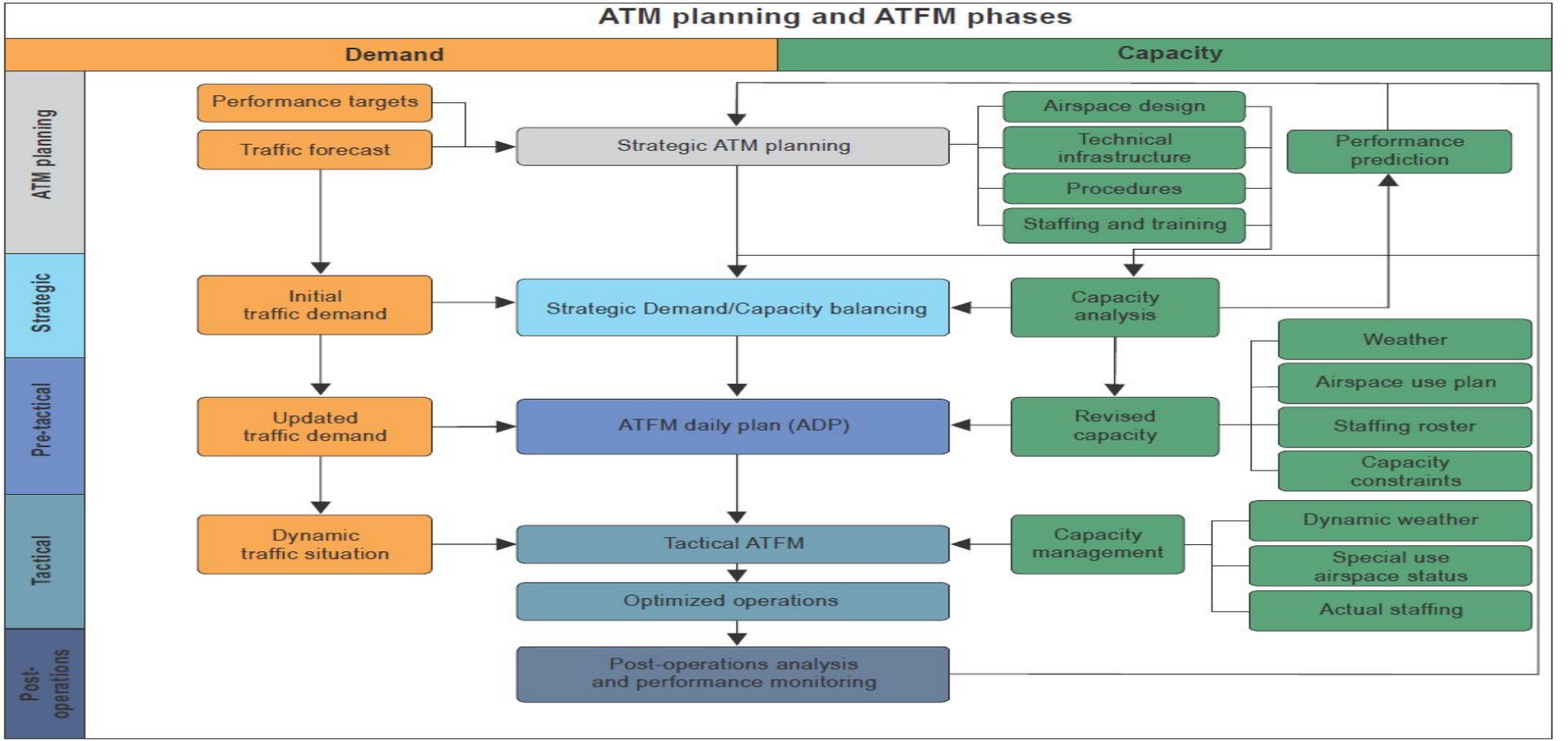
Appendix III-D. Examples of A-CDM KPI

Doc 9971 Stakeholders

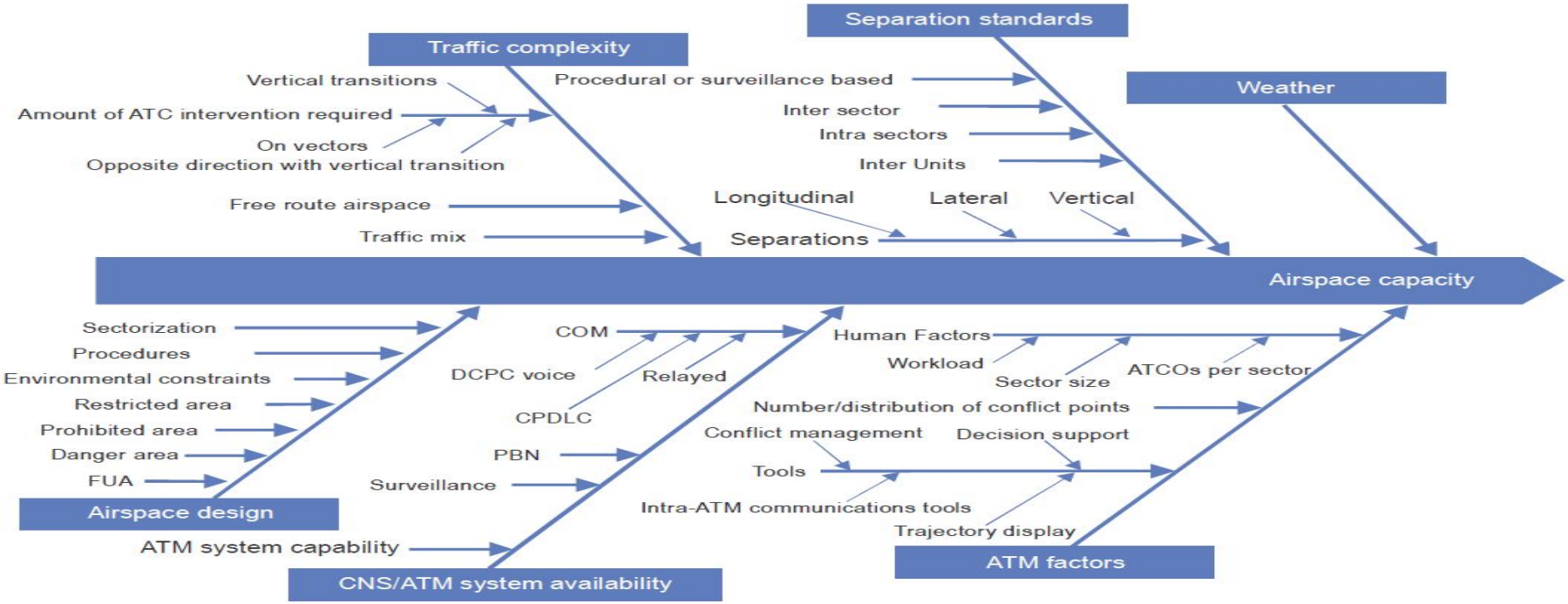
- Air navigation service providers
- Airspace users
- Airline operation centers
- Airport operators
- Airport ground handlers
- Airport slot coordinators
- Regulators
- Military authorities
- Meteorological agencies
- Others

Doc 9971 shows:

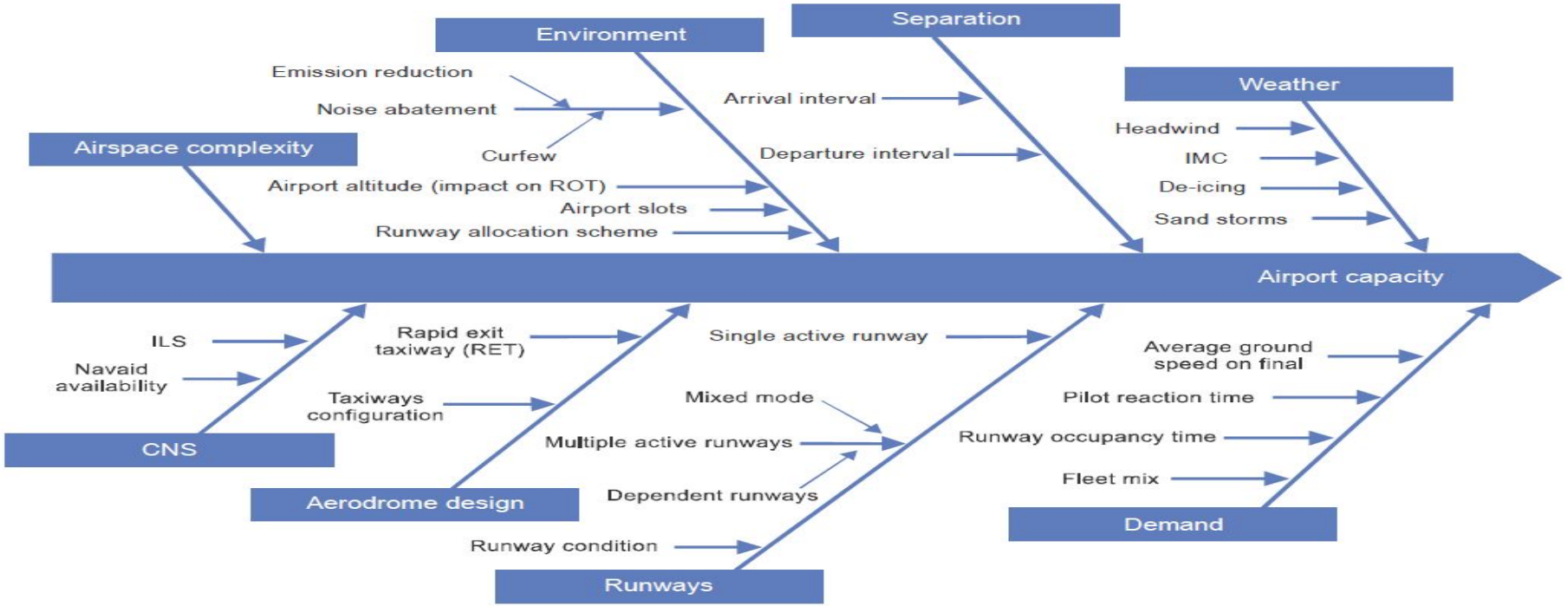
- What is the starting point regarding the development of an ATFM service?
- What are the foundational objectives and principles of ATFM?
- What are the benefits of implementing an ATFM service?
- How does an ATFM service operate?
- How is an ATFM service structured and organized?
- What are the roles and responsibilities of the stakeholders in the ATFM service?
- How is the capacity of an airspace sector and airport determined?
- How are ATFM processed applied in order to balance the demand and capacity within its area of responsibility?
- How is an ATFM service implemented?
- What are ATFM Measures and how are they established and applied?
- What data and information are exchanged in an ATFM service?
- What terminology/phraseology is used in ATFM?
- What resources are available to States regarding the various aspects of ATFM?


ATM planning and ATFM phases
Demand
Capacity
ATM planning
Strategic
Pre-tactical
Tactical
Post-operations
Performance targets
Traffic forecast
Strategic ATM planning
Airspace design
Technical infrastructure
Procedures
Staffing and training
Performance prediction
Initial traffic demand
Strategic Demand/Capacity balancing
Capacity analysis
Weather
Airspace use plan
Staffing roster
Capacity constraints
Updated traffic demand
ATFM daily plan (ADP)
Revised capacity
Dynamic traffic situation
Tactical ATFM
Capacity management
Dynamic weather
Special use airspace status
Actual staffing
Optimized operations
Post-operations analysis and performance monitoring

Factors Affecting Airspace Capacity



Factors Affecting Airport Capacity



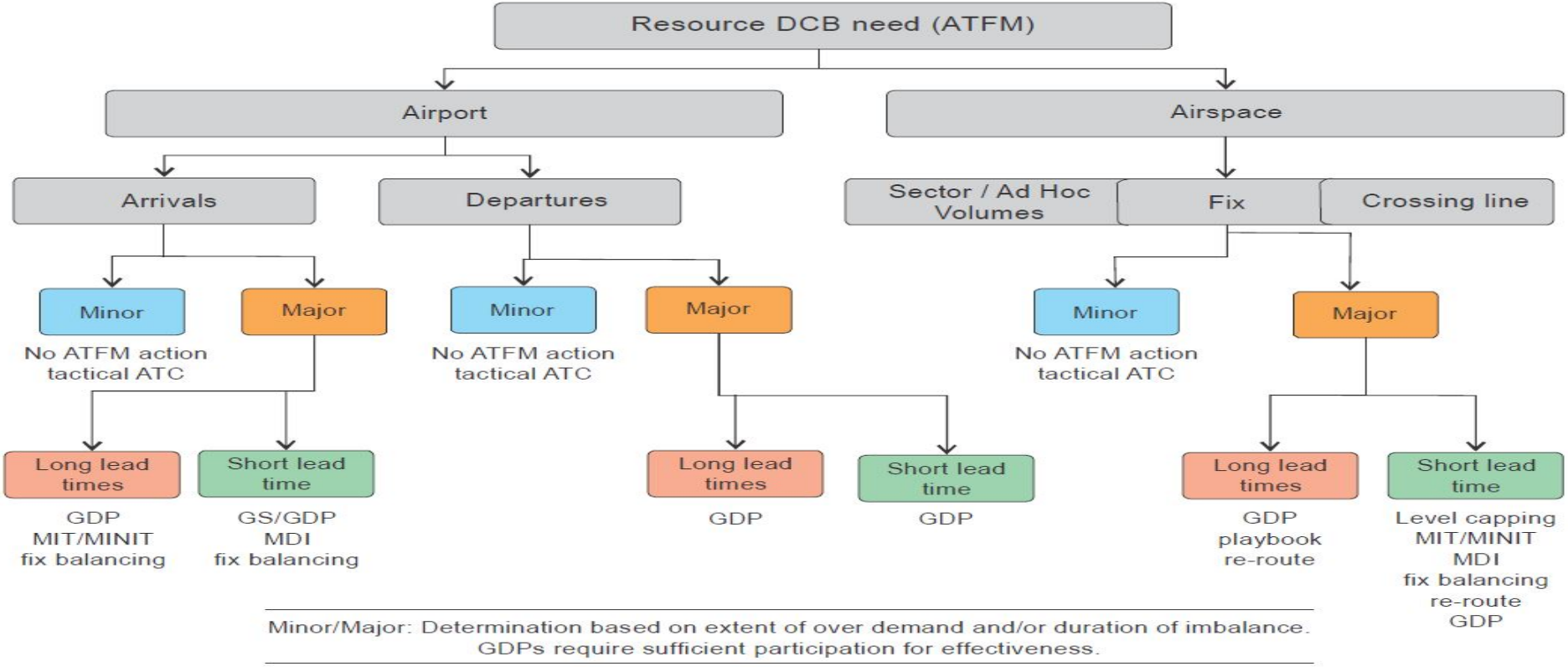
ATFM Measures

ATFM measure	Constraint			Control mechanism	Time frame	Requirements to be effective
	Airport arrivals	Airport departures	Airspace			
GDP	X	X	X	CTOT	Pre-tactical and tactical	Participation in percentage and distance
Re-route			X	Flight path change to avoid constraint	Pre-tactical and tactical	Access to airspace and published routes
Ground stop	X			Prevent departures from specific aerodromes to address existing tactical load on an arrival aerodrome	Tactical	
MIT/MINT	X		X	Time- or distance-based separation on a single stream of traffic	Tactical	
MDI	X		X	Time-based separation from departures from the same aerodrome	Tactical	
Fix balancing	X		X	Flight path change to avoid	Tactical	
Level capping			X	Flight path change to avoid	Tactical	

ATFM Measures (cont'd)

- ATFM measures are important initiatives for managing the flow of air traffic.
- They are very efficient when used to manage traffic demand.
- They can have a significant impact on Airspace Users, and should only be implemented and used when necessary to maintain the safety and efficiency of the ATM system, minimizing as much as possible the impact on flight OPS.
- Mitigation action could be taken by Airspace Users to minimize impact:
  - Re-routing
  - Slot Swapping
  - Airborne Holding

Selection process of ATFM Measures



Minor/Major: Determination based on extent of over demand and/or duration of imbalance.
GDPs require sufficient participation for effectiveness.

ATFM SERVICE AND ORGANIZATION STRUCTURE

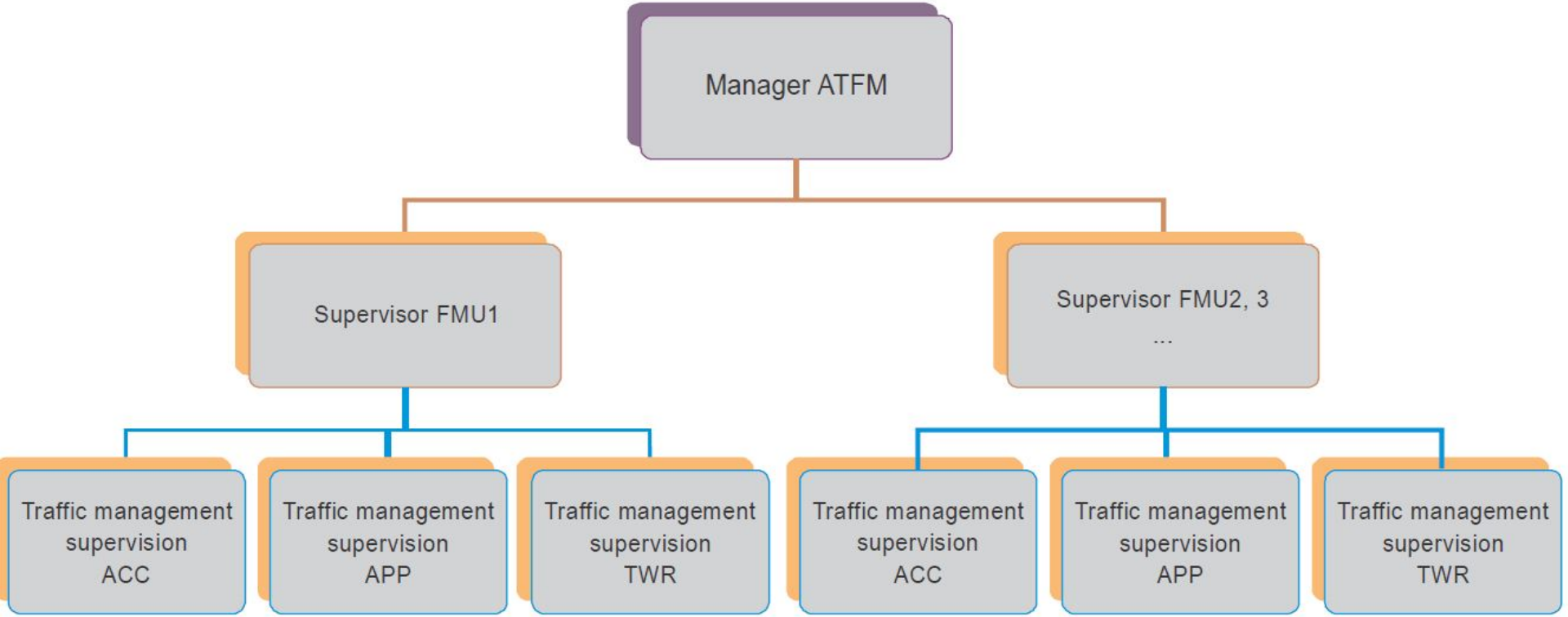
- State should ensure that an ATFM organizational structure which meets the needs of the aviation community is developed.

- This structure should, at a minimum, allow the management and oversight of the ATFM service and the coordination and exchange of information, both internally and externally.

- The structure should also ensure the existence of a line of authority for the implementation of decisions and compliance with the mission requirements assigned to the ATFM services.

- A line of authority to support the ATFM service should to include the following:
  a) an ATFM service manager;
  b) the flow management unit (FMU) that provides ATFM service for a specific set of ATS units; and
  c) flow management positions (FMPs) at specific ATS units responsible for the day-to-day ATFM activities

ATFM SERVICE AND ORGANIZATION STRUCTURE



ATFM TRAINING REQUIREMENTS (Chap 7.5)

- An ATFM service should be staffed by personnel with sufficient knowledge and understanding of the ATM system they are supporting and the potential effects that their work may have on the safety and efficiency of air navigation.
- To ensure this and in line with their training policies, States and ANSPs should establish core training plans to educate the ATFM service staff in the importance of the availability, continuity, accuracy and integrity levels required for the services provided.

In addition to the staff of the ATFM unit itself, other units/areas/entities where staff should be aware of and understand the 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 need training include:

a) ATC;

b) aircraft operators;

c) pilots;

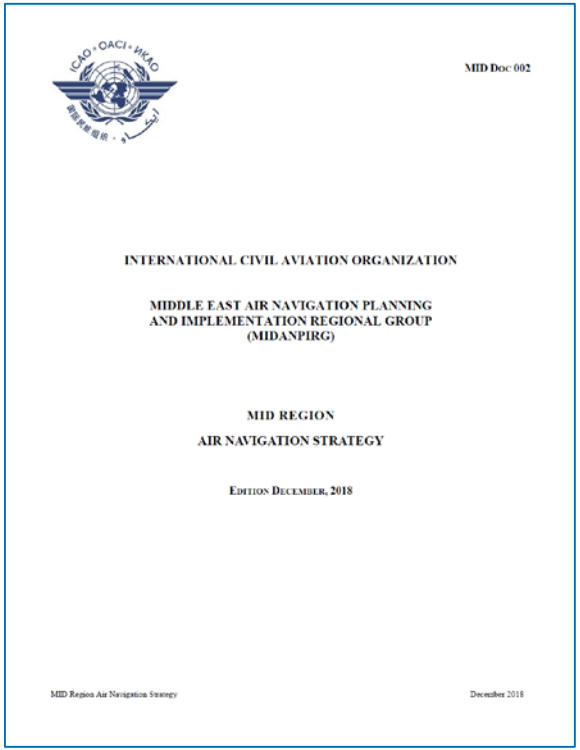
d) airport operators;

e) military, both service providers and users; and

f) regulatory bodies (CAAs and equivalent).

ATFM and ASBU in MID Region

- The MID Region Air Navigation Strategy was endorsed by MSG/4 meeting (Cairo, 24-26 November 2014), based on the outcome of the relevant MIDANPIRG subsidiary bodies and inputs received from stakeholders.
- The Strategy was further reviewed and updated by MIDANPIRG/15 (Bahrain, 8-11 June 2015), and endorsed as ICAO MID Doc 002, which is available on the MID Office website.
- Some additional amendments to the Strategy were approved by MIDANPIRG/16 (Kuwait, 13-16 February 2017).
- Latest version approved by MSG/6 meeting (Cairo, 3-5 December 2018)



MID Doc 002

INTERNATIONAL CIVIL AVIATION ORGANIZATION

MIDDLE EAST AIR NAVIGATION PLANNING AND IMPLEMENTATION REGIONAL GROUP (MIDANPIRG)

MID REGION

AIR NAVIGATION STRATEGY

EDITION DECEMBER, 2018

MID Region Air Navigation Strategy

December 2018

MID ASBU Block 0 Modules Prioritization

Performance Improvement Areas (PIA)	Module	Priority	Module Name
PIA 1: Airport Operations	APTA	1	Optimization of Approach Procedures including vertical guidance
	WAKE	2	Increased Runway Throughput through Optimized Wake Turbulence Separation
	RSEQ	2	Improved Traffic Flow through Sequencing (AMAN/DMAN)
	SURF	1	Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2)
	ACDM	1	Improved Airport Operations through Airport-CDM
PIA 2: Globally Interoperable Systems and Data - Through Globally Interoperable System Wide Information Management	FICE	1	Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration
	DATM	1	Service Improvement through Digital Aeronautical Information Management
	AMET	1	Meteorological information supporting enhanced operational efficiency and safety
PIA 3: Optimum Capacity and Flexible Flights – Through Global Collaborative ATM	FRTO	1	Improved Operations through Enhanced En-Route Trajectories
	NOPS	1	Improved Flow Performance through Planning based on a Network-Wide view
	ASUR	2	Initial Capability for Ground Surveillance
	ASEP	2	Air Traffic Situational Awareness (ATSA)
	OPFL	2	Improved access to Optimum Flight Levels through Climb/Descent Procedures using ADS-B
	ACAS	1	ACAS Improvements
	SNET	1	Increased Effectiveness of Ground-based Safety Nets
PIA 4: Efficient Flight Path – Through Trajectory-based Operations	CDO	1	Improved Flexibility and Efficiency in Descent Profiles (CDO)
	TBO	2	Improved Safety and Efficiency through the initial application of Data Link En-Route
	CCO	1	Improved Flexibility and Efficiency Departure Profiles - Continuous Climb Operations (CCO)

Air Navigation Performance Targets

B0 – ACDM: Improved Airport Operations through Airport-CDM			
Elements	**Applicability**	**Performance Indicators/Supporting Metrics**	**Targets**
A-CDM	OBBI, HECA, OIII, OKBK, OOMS, OTBD, OTHH, OEJN, OERK, OMDB, OMAA, OMDW	Indicator: % of applicable international aerodromes having implemented improved airport operations through airport-CDM Supporting metric: Number of applicable international aerodromes having implemented improved airport operations through airport-CDM	50% by Dec. 2018

B0 – NOPS: Improved Flow Performance through Planning based on a Network-Wide view				
Elements	**Applicability**	**Performance Indicators/Supporting Metrics**	**Targets**	**Timelines**
ATFM Measures implemented in collaborative manner	All States	Indicator: % of States that have established a mechanism for the implementation of ATFM Measures based on collaborative decision Supporting metric: number of States that have established a mechanism for the implementation of ATFM Measures based on collaborative decision	100%	Dec. 2018
ATFM Structure	All States	Indicator: % of States that have established an ATFM Structure Supporting metric: number of States that have established an ATFM Structure	100 %	Dec. 2019

Regional developments related to ATFM

- It was agreed to the implementation of Regional/sub-regional ATFM project under the framework of the MAEP in 2015, which was supported by MIDANPIRG, DGCA-MID, etc.
- ICAO ATFM Seminar was be held in Dubai, UAE, 13-15 December 2016
- ATFM Task Force was established by MIDANPIRG to develop a CONOPS for ATFM implementation in the MID Region
- ATFM TF/1 meeting was held in Muscat, Amman, 23-25 September 2018.
- ATFM Core Team meeting was held in Abu Dhabi, UAE, 22-24 January 2019

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THANK YOU