Sections of the Framework

- Scope
  - Regional ATFM
  - Document Review

- Background Information

Sections of the Framework

- Current Situation

- Performance Improvement Plan

- Research and Future Development Possibilities

Sections of the Framework

- Appendices:
  - A : Collaborative ATFM Principles
  - B : CDM/ATFM Trial Tiered Participation Levels
  - C : ATFM Daily Plan Sample Template
  - D : ATFM Terminology and Communications
  - E : ATFM Training Requirements

Sections of the Framework

- Scope
  - Regional ATFM
  - Document Review

- Background Information

Regional ATFM

- **Need for Regional ATFM Framework**
  - Focusing on sub-regional multi-State implementation

Conclusion 24/15: Asia/Pacific ATFM Steering Group

That, States participate in, and support the Asia/Pacific ATFM Steering Group to develop a common Regional ATFM framework, which addresses ATFM implementation and ATFM operational issues in the Asia/Pacific region

Regional ATFM

- Core Concept is <u>Distributed Multi-Nodal ATFM Network</u>
    - Referenced to Draft Regional ATFM Concept of Operations
- Virtual ATFM Platform of interconnected States and/or sub-Regional groups operating ATFM network
- No need for any central, physical facility providing network management*

*Region not yet ready to consider the concept of central facility

Document Review

- First Review in 2016

- Thereafter every 3 years
  - Coincide with planned and regular reviews of Seamless ATM Plan

- ATFM/SG could recommend earlier or more frequent reviews and amendments
  - Through ATM Sub-group →APANPIRG

Sections of the Framework

- Scope
  - Regional ATFM
  - Document Review
- Background Information

Topics

- ATFM Principles

- Collaborative Decision Making

- ATFM Phases

- Airspace and Airport Capacity Improvement

- Capacity planning, Assessment and Declaration

- ATFM Daily Plan

Topics (Con't)

- ATFM Terminology
- ATFM System Communication
- ATFM Information Distribution
- Meteorological Products for ATFM
- Asia/Pacific Region ATFM Operational Concept
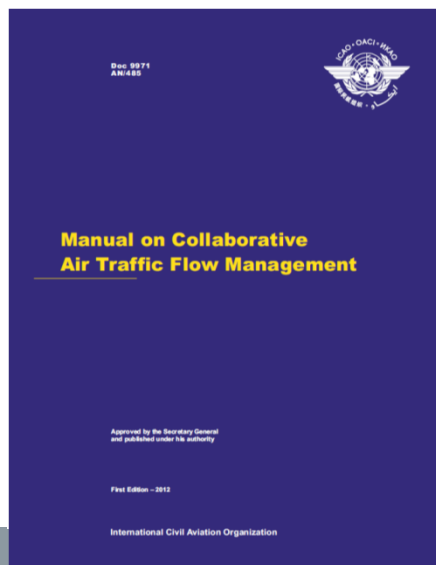- Training and Competencies for ATFM Personnel

ATFM Principles

- Major areas of Collaborative ATFM principles are aligned with those of Asia/Pacific Seamless ATFM plan:

    – People (human performance)

    – Facilities (physical equipment)

    – Technology and Information

- 35 Principles agreed by ATFM/SG (Appendix A)

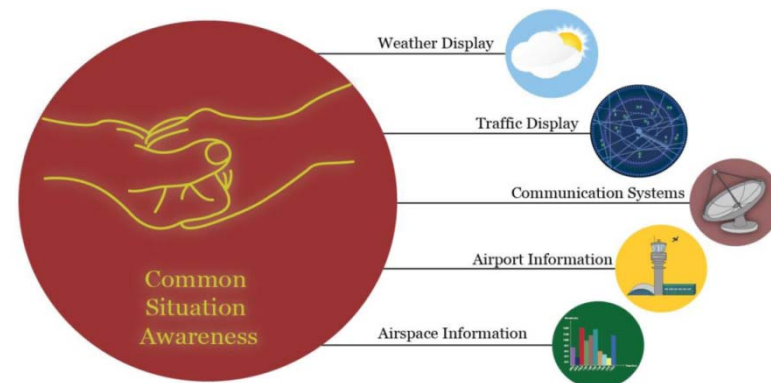# Manual on Collaborative Air Traffic Flow Management (Doc 9971)

Doc 9971

- Part 1 – Collaborative Decision Making (CDM)
- Part 2 – Air Traffic Flow Management (ATFM)
- Part 3* – Airport CDM (A-CDM)

*To be published in near future

Weather Display

Traffic Display

Communication Systems

Airport Information

Airspace Information

Common Situation Awareness

Collaborative Decision Making (CDM)

- Current ATFM/CDM processes and ATFM systems are oriented towards
  - Local or national demand
  - Capacity balancing
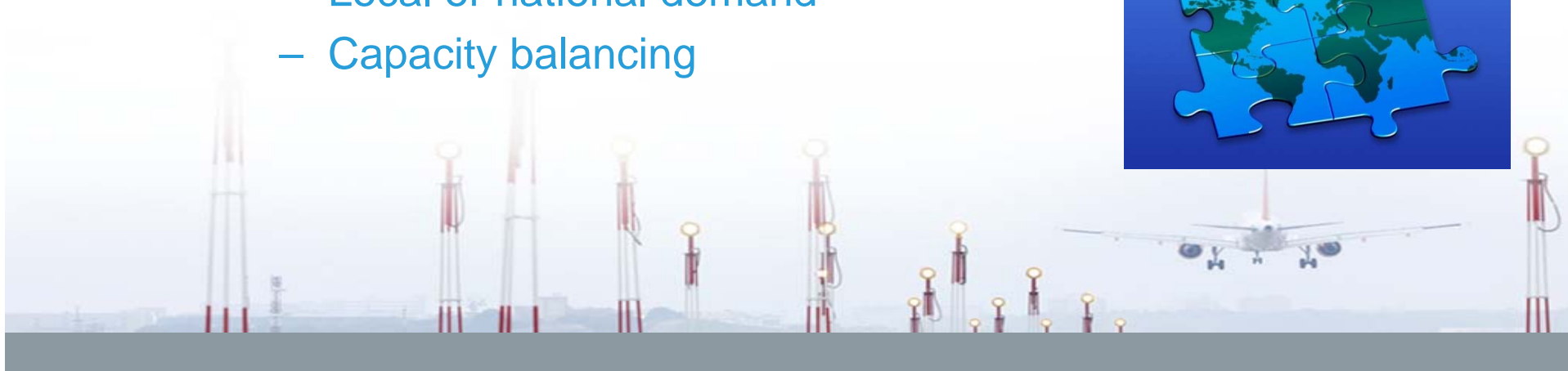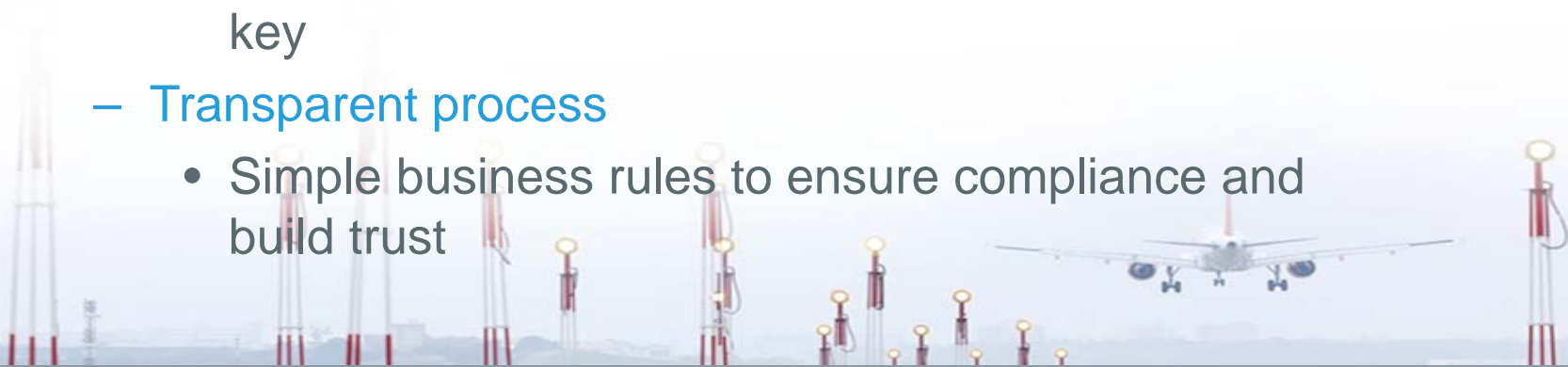
Collaborative Decision Making (CDM)

- Maturing of ATFM systems and expansion across national boundaries (cross boundary, networked ATFM) will require:
  - New levels of collaborative decision-making among multi-national stakeholders
  - CDM environment of multilateral decision-making with complementary individual goals

Collaborative Decision Making (CDM)

- Characteristics of Cross-Border ATFM:
  - Inclusive process
    - Participation by States and other Stakeholders is the key
  - Transparent process
    - Simple business rules to ensure compliance and build trust

Collaborative Decision Making (CDM)

- Characteristics of Cross-Border ATFM:
  - Allow sharing of information among all partners through common network to improve efficiency and operational decision making

  - Achieve common situational awareness for all partners, taking into account the data sharing capability of stakeholders
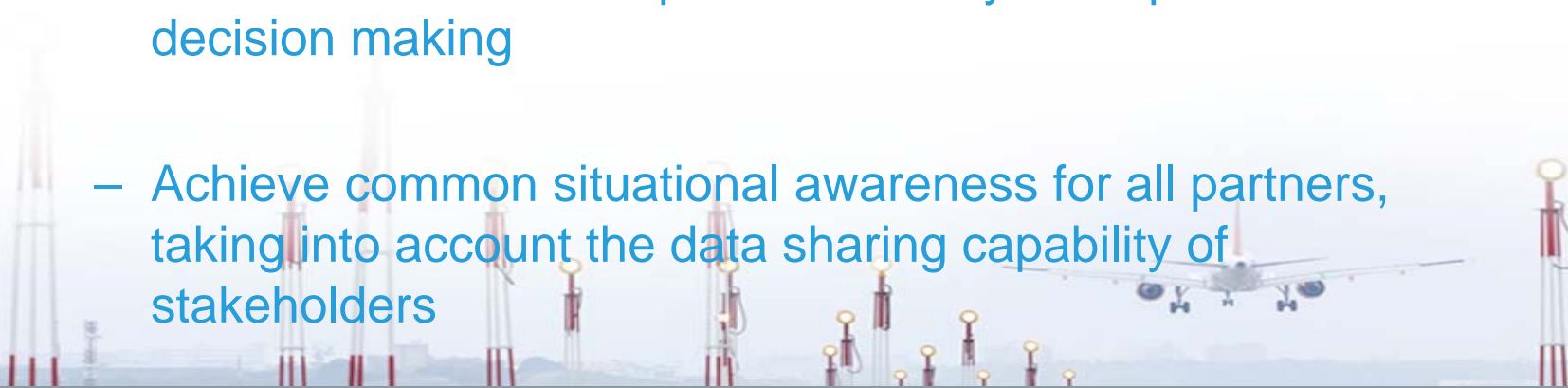
Collaborative Decision Making (CDM)

- CDM partners and stakeholders:
  - States : Establishing regulations and overseeing safety and compliance
  - ANSPs : Implementing ATFM capability
  - International Organizations : ACI, CANSO, IATA, IFATCA
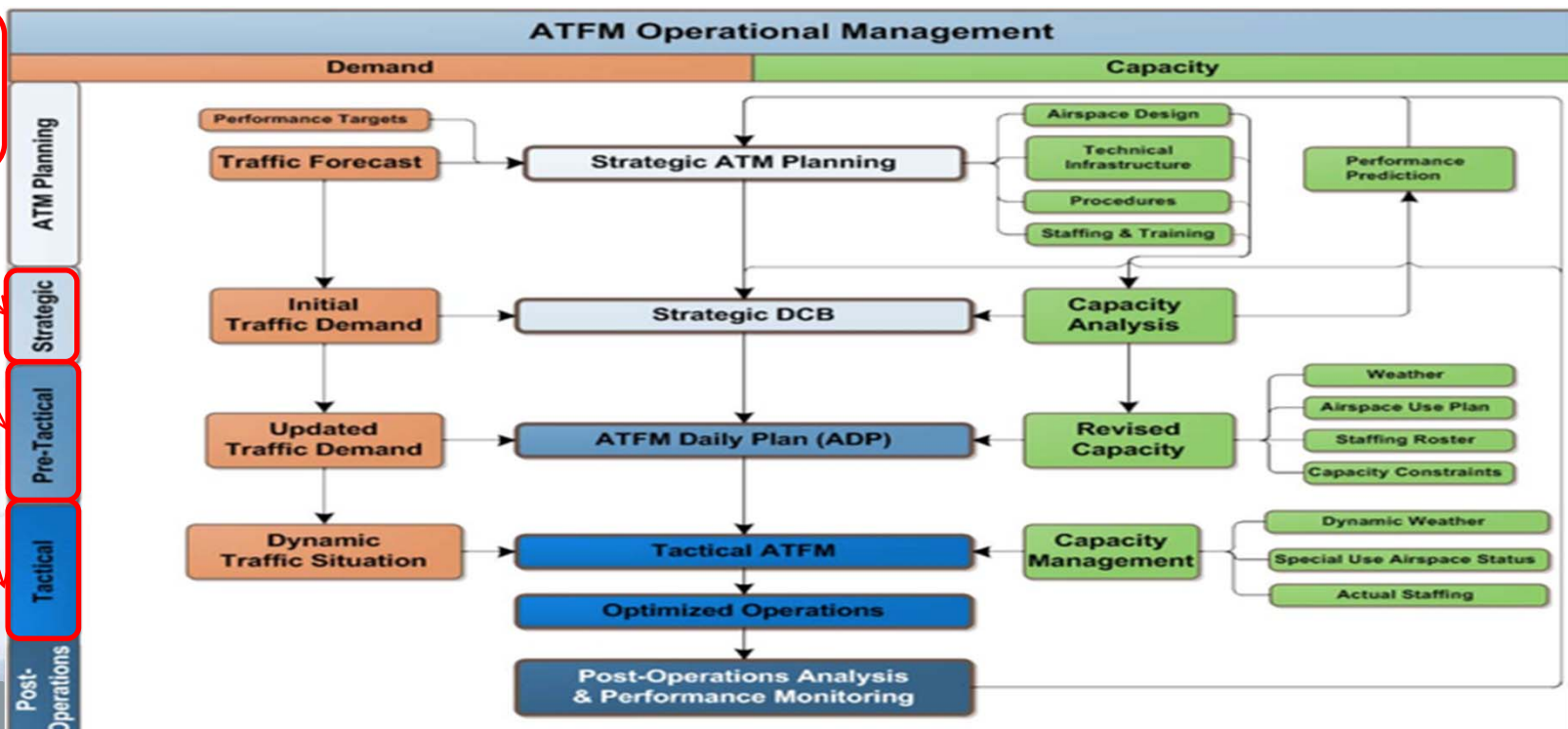
Collaborative Decision Making (CDM)

- CDM partners and stakeholders (con't):
  - International ATFM Organizations : To share tactical flight data through FUM (eg Eurocontrol, FAA)
  - Airport Operators
  - CDM participating airlines

ATFM Phases

ATFM Phases

- Timely application of measures requires:
  - Fundamental understanding of airport and airspace capacity
  - Continuous assessment of capacity and factors that impact it

Airspace and Airport Capacity

- Increasing capacity is the **primary** and **central** method for managing increasing demand

Airspace Capacity Improvement

- May be achieved by:
  - Improved ATS route design
  - Civil-military cooperation
  - Improved ATC sectorization
  - Segregation of SIDs and STARs

Airspace Capacity Improvement

- May be achieved by (con't):
    - ATM automation system enhancements
    - Implementation or extension of ATS surveillance services and surveillance based separations specified in ICAO Doc 4444 (PANS-ATM)
    - Implementation of RNP-based separations (RNP 4 or better) in non-surveillance airspace

Airport Capacity Improvement

- May be achieved by:
    - Improved airport design
    - Harmonized AMAN, DMAN and A-CDM systems
    - Analysis and improvement of runway occupancy times
    - Implementation of precision approaches to all runways

Capacity Planning, Assessment and Declaration

- Annex 11 defines declared capacity as:
  - Measure of ability of the ATC system or any of its sub-systems or operating positions to provide service to aircraft during normal activities
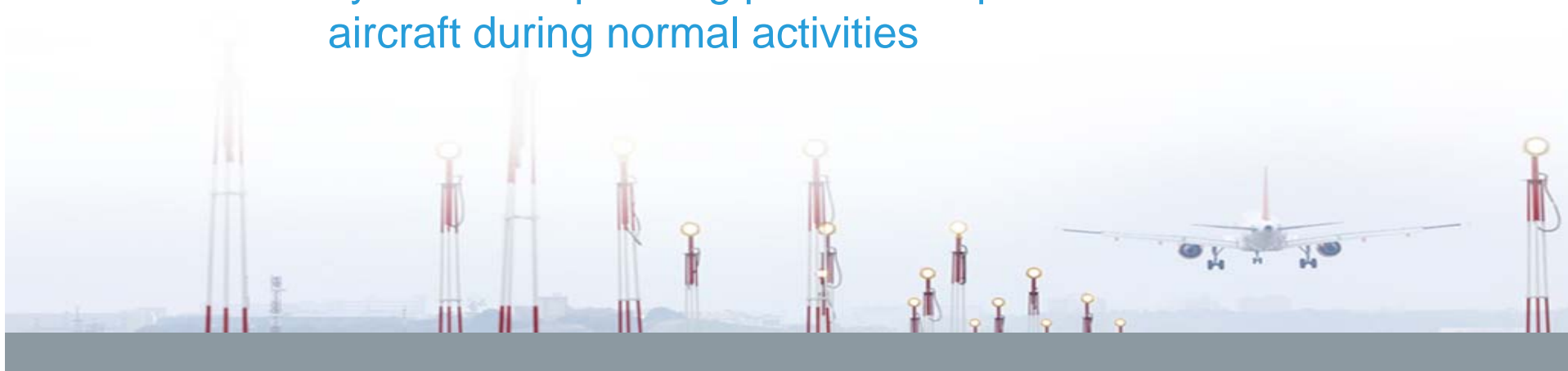
Capacity Planning, Assessment and Declaration

- Expressed as:
  - 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
  - Any other factors that may affect workload of controller responsible for the airspace

Capacity Planning, Assessment and Declaration

- Primary Areas:
  - Airport Acceptance Rate (AAR)
  - Airport Departure Rate (ADR)
  - Airspace sector capacity
- AAR and ADR : Expressed in terms of landings or departures per hour
- Sector Capacity : Expressed in terms of occupancy count and/or entry count
- Airport Capacity : Expressed in terms of movement per hour (ie AAR + ADR)

ATFM Daily Plan (ADP)

- Tactical briefings and conferences:
  - Provide overview of current ATFM situation
  - Discuss any issues
  - Provide outlook on operations for coming period
- Output of these conferences → ATFM Daily Plan (ADP)
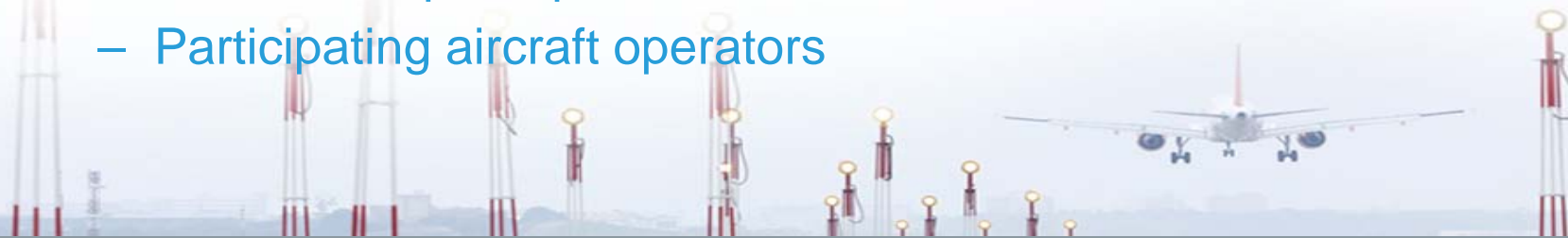
ATFM Daily Plan (ADP)

- ADP should be distributed to stakeholders by either:
  - Web-based ATFM network
  - Web-pages hosted by each participating ANSP
  - Email distribution

ATFM Daily Plan (ADP)

- Relevant stakeholders includes:
  - Neighbouring ATFM Units or, where not available, ATS Units
  - ATS Units supported by originating ATFM Units
  - Relevant airport operators
  - Participating aircraft operators

ATFM Daily Plan (ADP)

- ADP should include:
  – Aerodrome or Airspace Sector identification
  – AAR
  – Description of constraints
  – Timeframe
  – Proposed ATFM measures
  – Remarks / other relevant information
- Appendix C

Appendix C : ATFM Daily Plan Sample Template

REGIONAL FRAMEWORK FOR COLLABORATIVE ATFM

Example of ADP

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 – UFN	CTOT
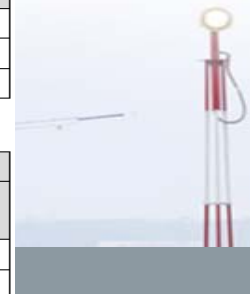
Post Operations Analysis

- **Important component of CDM**
  - Include consideration of feedback from airspace users, airport operators, ATS and other ATFM units

- **Daily post-operations analysis conferences should be held**
  - Supplemented where necessary by conference called to assess outcomes of ATFM measures responding to non-normal situations

ATFM Terminology

- Standardized ATFM terminology for Asia/Pacific Region
  - Promote harmonization and interoperability of CDM/ATFM systems and procedures

- Appendix D

ATFM Phraseology

- Harmonized phraseology developed
  - Based on research into the phraseology used
    - Australia
    - Eurocontrol
    - Japan
    - North America
   - South Africa

ATFM Phraseology

- Phrases are suggested for use as an interim procedure
- Pending development of globally standardized ATFM-related phraseology

ATFM System Communications

- **Flight Information Exchange Model (FIXM)**
  - Intended to provide global standard
  - Data interchange format for sharing information about flights through lifecycle
  - Part of suit of data exchange formats, including AIXM and WIXM
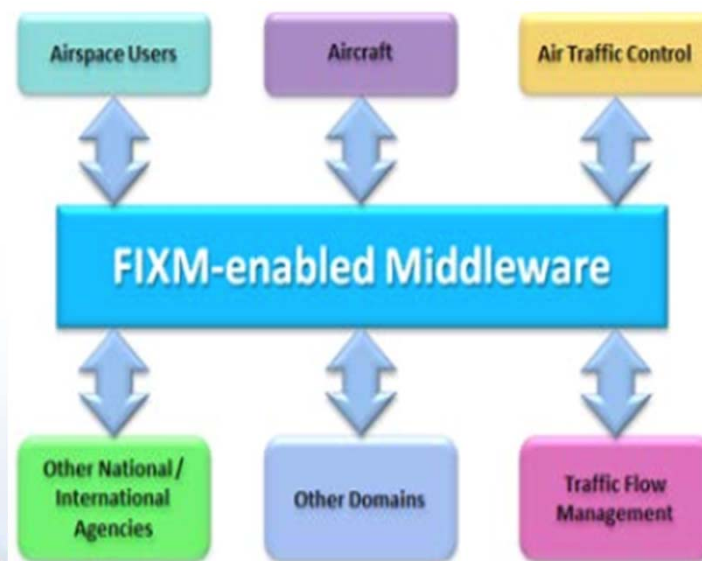
ATFM Information Distribution

- Voice Coordination

- Email distribution (eg ATFM Daily Plan)

- Networked, web-based interface

  - ATFM Unit, ATS Unit and airspace user locations, each forming a node of a distributed multi-nodal ATFM platform
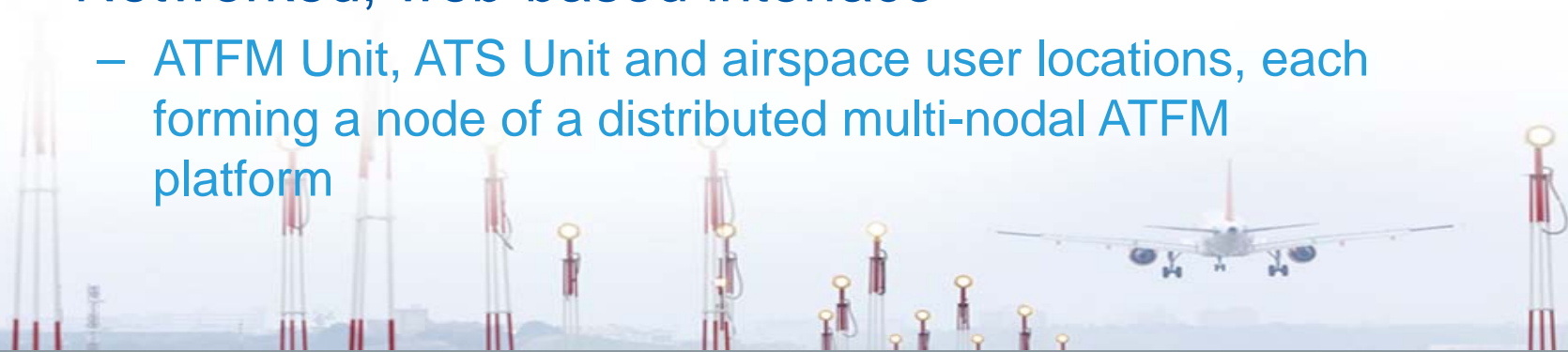
ATFM Information Distribution

- Web-based interface
  - ATFM Units, ATS Units and airspace user locations, providing access directly to ATFM information provided by ATFM Unit responsible for initiation of ATFM measures for destination airport or constrained airspace

- AFTN messages distributed to individual ATS Units (ATFM measures)

MET Products for ATFM

- Accuracy of pre-tactical and tactical demand and capacity assessment is reliant on predictability of events that will impact capacity (e.g. Met)

MET Products for ATFM

Colour coding: Enables rapid interpretation of impact on operations

MET Products for ATFM

- ANSPs and MET authorities should collaborate closely to define MET products enabling decisions based on specific impact to operations

- MET Requirements Task Force (MET/R TF) recently agreed to develop regional guidance material for MET products to support ATM, including ATFM

ATFM Operational Concept
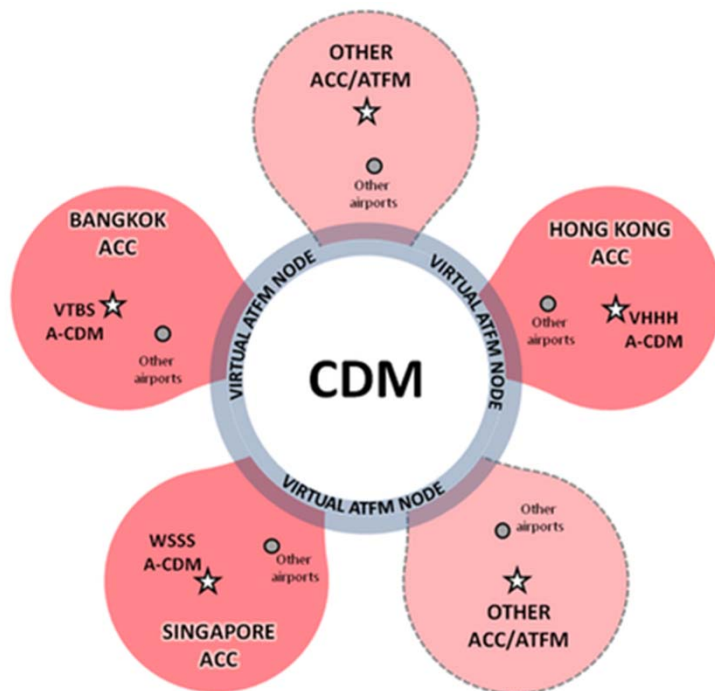
- Distributed Multi-Nodal ATFM Network

Training and Competencies

- ATFM Service Personnel
  - Sufficient knowledge and understanding of ATM System and potential effects of their work on safety and efficiency of air navigation
- States and ANSPs : Establish training plans to ensure ATFM service personnel are properly trained
- Appendix E

Sections of the Framework

- Current Situation

- Performance Improvement Plan

- Research and Future Development Possibilities

Current Situation

- IATA ATFM Study
  - Identify world's largest market
  - Summary of APAC collaborative ATFM capability
  - ATFM Infrastructure
  - CDM Procedures and Tools
  - ATFM Implementation Timeline
  - High Density FIRs : Showing busiest city pairs

World's Largest Market

- Asia Pacific Region : World's largest market for air transport

	Passenger Volume	Annual %
Indonesia	92,534,902	20.4
Thailand	62,831,288	16.4
China	404,174,939	11.8
Singapore	42,438,276	7.6
Malaysia	51,821,210	7.5
Japan	148,450,196	4.9
India	97,677,318	4.4
Hong Kong	44,399,060	3.9
Korea, Republic of	62,166,163	1.2
Australia	81,983,309	0.6
Asia/Southwest Pacific	1,075,572,893	8.5

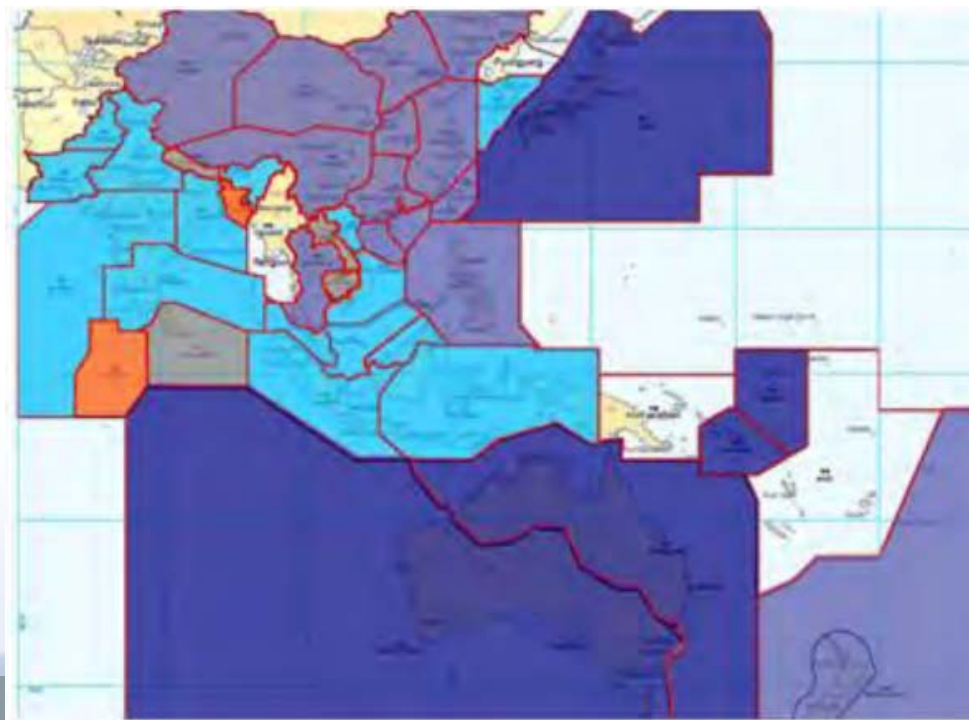Top Asia/Pacific Passenger Countries 2013

World's Largest Market

- As air transport in Asia Pacific continues to grow, it becomes essential to optimize use of available capacity through ATFM
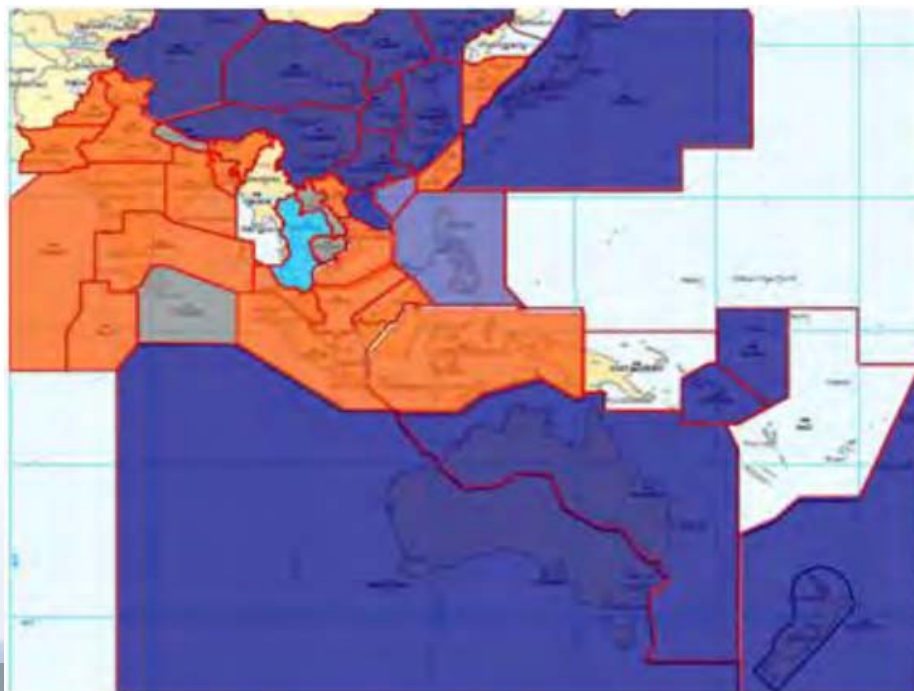
ATFM Infrastructure

CDM Procedures and Tools

CDM Procedures and Tools

Advanced
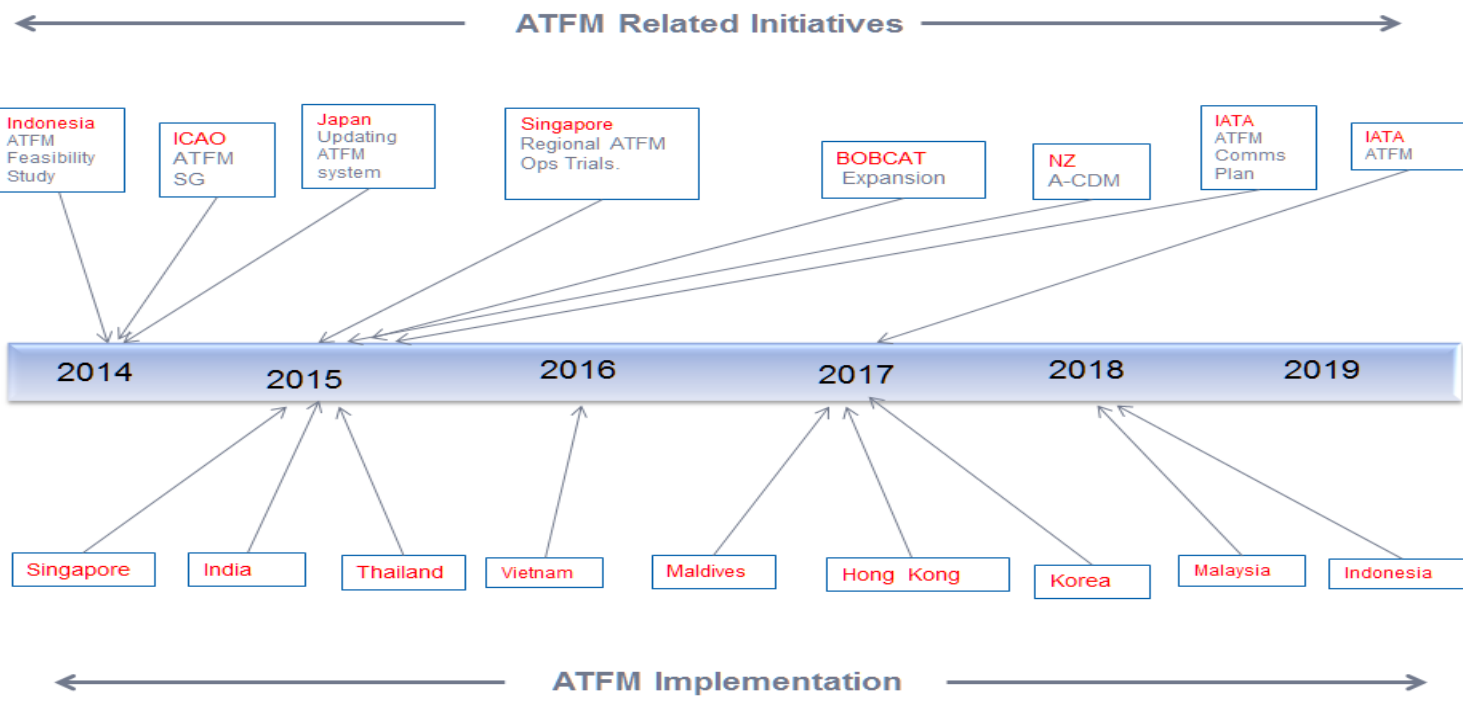
Australia
New Zealand
China
Japan
Hong Kong
Philippines
Thailand
India
Singapore
Bangladesh
Malaysia
Taiwan
Vietnam
Korea
Indonesia
Maldives
Pakistan

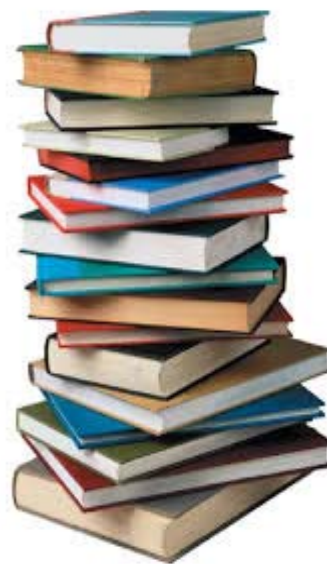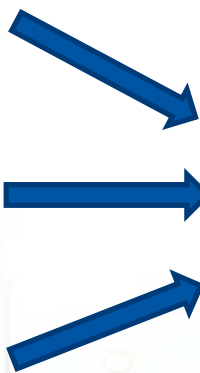# ATFM Implementation Timeline

Sections of the Framework

- Current Situation

- Performance Improvement Plan

- Research and Future Development Possibilities

Performance Improvement Plan

- When ?

- What ?

- Who ?

What ?

- Each phase of the Regional ATFM Capability will be structured as follows:
  - ATFM Regulators
  - ATFM Systems
  - Strategic ATFM, Pre-Tactical ATFM or Tactical ATFM

When ?

- Performance objectives in Regional ATFM Capability are aligned with Phase 1 and II of Seamless ATFM Plan:
  - Preferred Aerodrome/Airspace and Route Specifications (PARS)
  - Preferred ATFM Service Level (PASL)

Milestones and Timelines

- Recognizing short lead time between finalization of Framework and PASRS/PASL
- Phase 1 : Divided into sub-phases A and B

Regional ATFM Capability Phase	Expected Implementation
Phase IA	12 November 2015
Phase IB	25 May 2017
Phase II	8 November 2018

Who ?

- ATFM Program Airports
  - Busiest APAC aerodromes as defined in Asia/Pacific Region Seamless ATM Plan
  - Airports where strategic slot allocation is implemented under these performance objectives
  - All other airports designed by relevant authority as requiring or potentially requiring ATFM implementation

Sections of the Framework

- Current Situation
- Performance Improvement Plan
- Research and Future Development Possibilities
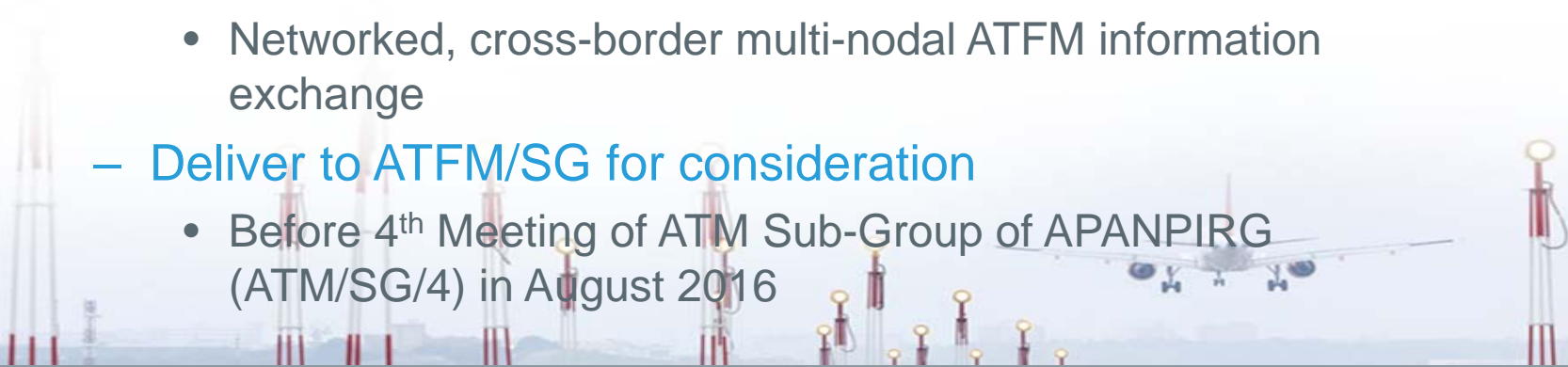
Research and Development

- Regional Framework for Collaborative ATFM
  - Require regular update in medium term

- Outcomes of trials and lessons learnt from operational deployment
  - Considered by ATFM/SG for improvement and updating of Framework

ATFM Interface Control Document

- ATFM Information Requirements Small Working Group (ATFM/IR/SWG)
  - Develop operational requirements document and ICD
    - Networked, cross-border multi-nodal ATFM information exchange
  - Deliver to ATFM/SG for consideration
    - Before 4th Meeting of ATM Sub-Group of APANPIRG (ATM/SG/4) in August 2016

Collaborative ATFM Concepts Developments

- Following concepts should be researched and developed
    - Delay Absorption Intent
    - FIXM Extension
    - ATFM for Long Range flights
    - Interoperability of ATFM, AMAN/DMAN and A-CDM
    - Collaborative Trajectory Options
    - Network CDM

ICAO

North American
Central American
and Caribbean
(NACC) Office
Mexico City

South American
(SAM) Office
Lima

ICAO
Headquarters
Montréal

Western and
Central African
(WACAF) Office
Dakar

European and
North Atlantic
(EUR/NAT) Office
Paris

Middle East
(MID) Office
Cairo

Eastern and
Southern African
(ESAF) Office
Nairobi

Asia and Pacific
(APAC) Sub-office
Beijing

Asia and Pacific
(APAC) Office
Bangkok

THANK YOU