



AEROTHAI

Air Traffic Management Network Management Centre

IATA-ICAO Cross-Border ATFM Workshop

17 – 18 November 2015

Bangkok, Thailand



Piyawut Tantimekabut (Toon)
Air Traffic Management Network Manager
Network Operations ATM Centre, AEROTHAI

Outline



- Thailand Traffic Demand Growth
- Thailand Response to Traffic Growth
- Air Traffic Management Network Management Centre (ATM NMC)
- Air Traffic Flow Management Operations
- Airspace Management Operations
- Information Management Operations



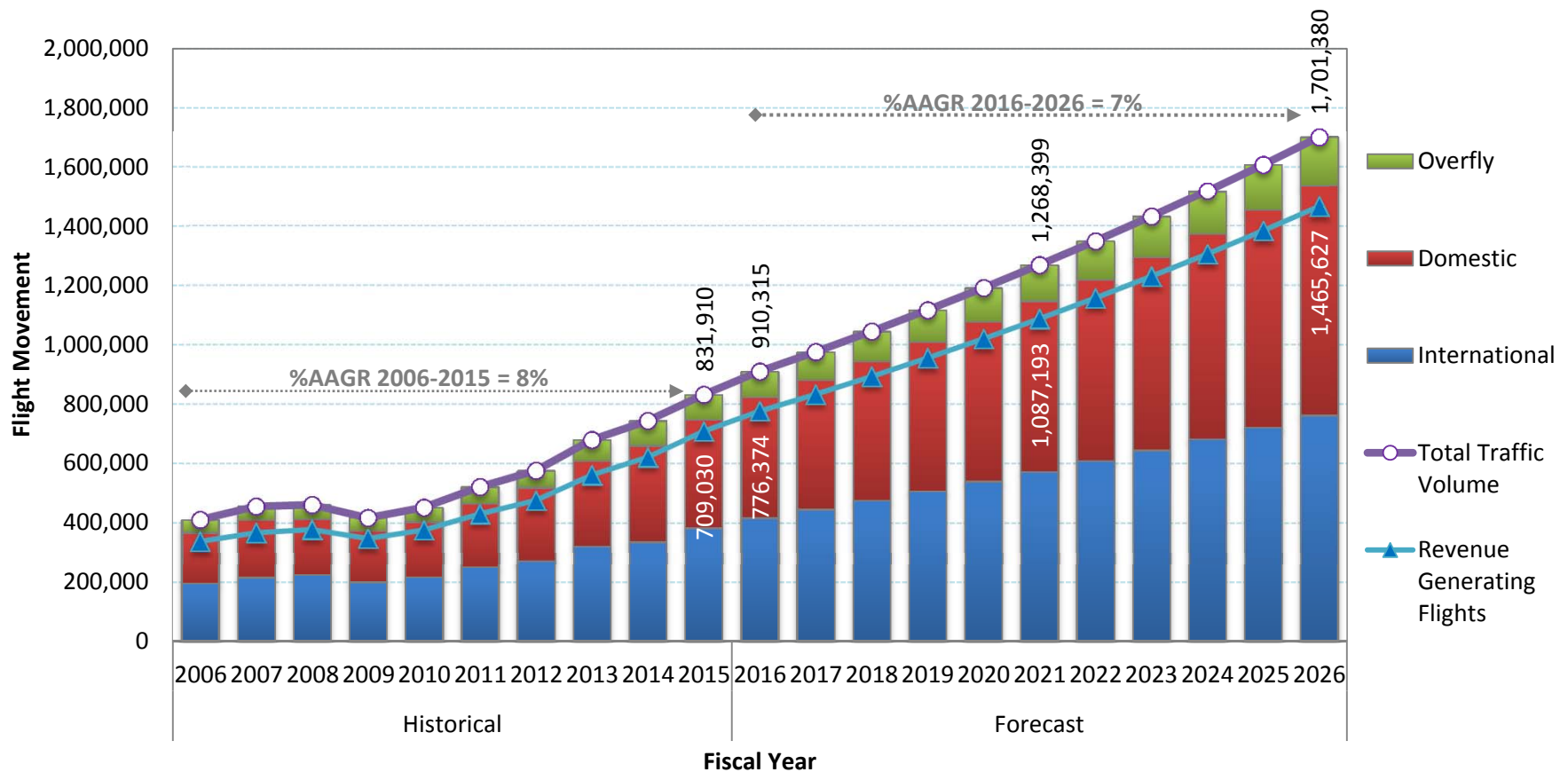
Thailand Traffic Demand Growth



Thailand Air Traffic Demand



Historical Annual Traffic Volume in Bangkok FIR Fiscal Year 2006-2015
Forecast Annual Traffic Volume - Fiscal Year 2016-2026



Thailand Air Traffic Demand

North

162,657 Flights/Year
446 Flights Daily
Overall GR: **34.1%**

| | Volume | GR |
|---------|--------|--------------|
| Int'l | 59% | 44.4% |
| Dom | 37% | 23.7% |
| Overfly | 4% | 6.4% |

East/North East

192,195 Flights/Year
527 Flights Daily
Overall GR: **17.0%**

| | Volume | GR |
|---------|--------|--------------|
| Int'l | 64% | 11.6% |
| Dom | 25% | 47.9% |
| Overfly | 11% | -2.7% |

West

110,184 Flights/Year
302 Flights Daily
Overall GR: **-0.6%**

| | Volume | GR |
|---------|--------|--------------|
| Int'l | 71% | 0.2% |
| Dom | 0% | |
| Overfly | 29% | -0.6% |

South

244,272 Flights/Year
669 Flights Daily
Overall GR: **8.7%**

| | Volume | GR |
|---------|--------|--------------|
| Int'l | 35% | 6.3% |
| Dom | 55% | 11.6% |
| Overfly | 10% | 2.3% |

Note: Annual Growth Rate / Data up to 30 Sep 2015

Capacity vs Demand

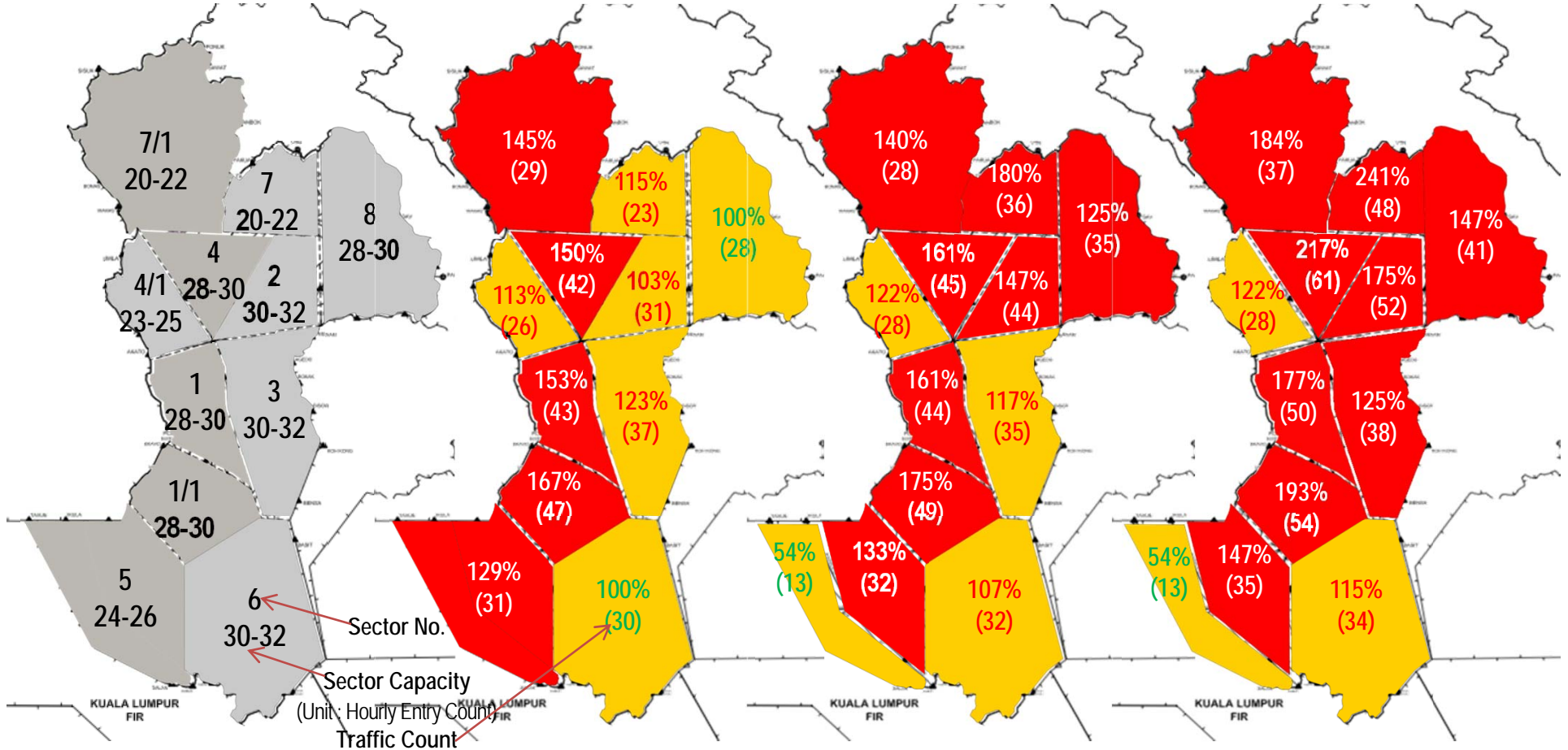


Capacity
Aug 2013

Capacity vs
Peak Hourly Traffic 2014

Capacity vs
Peak Hourly Traffic 2015*

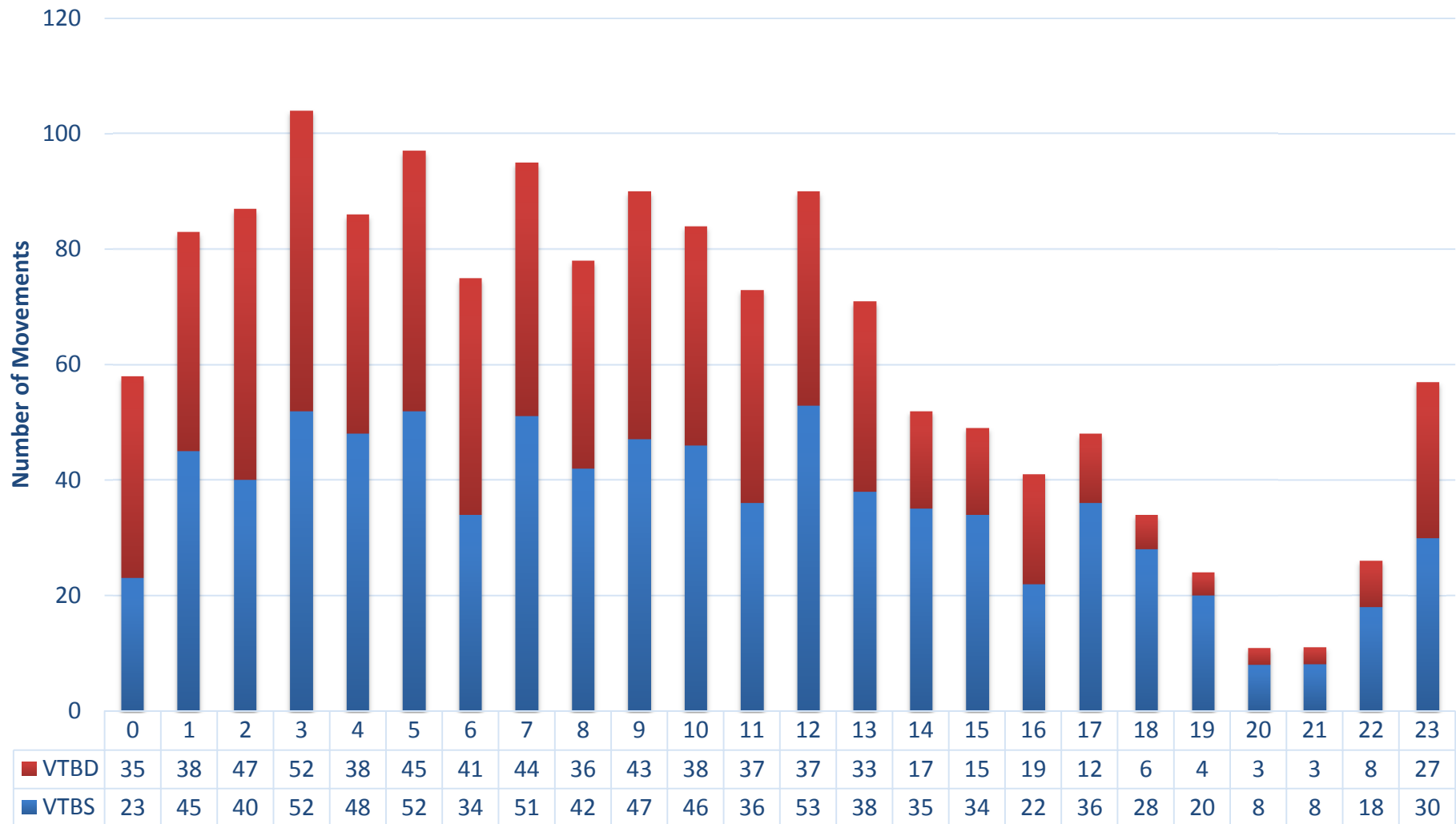
Capacity vs
Peak Hourly Traffic 2016



Bangkok TMA Traffic – Oct 2015



Bangkok TMA Traffic Movement - 17 Oct 2015





Thailand Response to Traffic Demand Growth



Thailand Response:



- Short-Term Capacity Enhancements
- National ATM Automation Replacement
- AOT Airport Automation Upgrade
- CDM/ATFM Operations

Thailand Response:



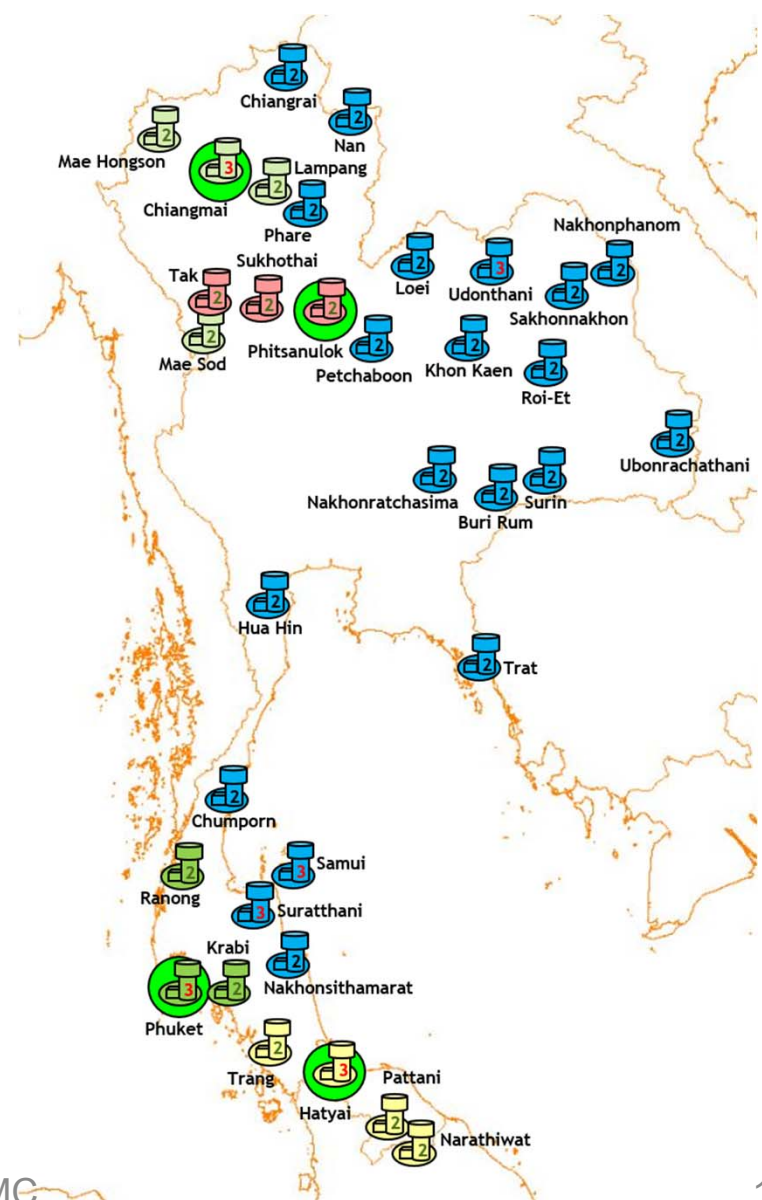
- Short-Term Capacity Enhancements
 - ATC Workload reduction initiatives
 - “Manual” Departure Management
 - Arrival Management enhancements
 - Route Structure enhancements
 - New SID/STAR for Bangkok TMA
- National ATM Automation Replacement
- AOT Airport Automation Upgrade
- CDM/ATFM Operations

Addressing Traffic Growth



Thailand Modernization of CNS/ATM Systems (TMCS)

- Nationwide ATM System replacement – Thales TopSky
- Integrated with VTBS/VTBD/ BKK TMA automation system upgrade
- Contingency / Training Unit



Addressing Traffic Growth



TMCS Key Features

- “Stripless” Human-Machine Interface (HMI)
- AIDC with neighboring FIRs for automated ACFT Handoff (AIDC v3)
- Automated ACFT Handoff within Bangkok FIR
- Conflict Probes: STCA, MTCD, Route Adherence Monitoring
- Integrated DMAN / AMAN for VTBD, VTBS
- AMAN for major provincial airports
- Flexible sector configurations
- Integration with ATFM system

Thailand Response:



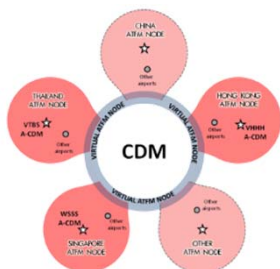
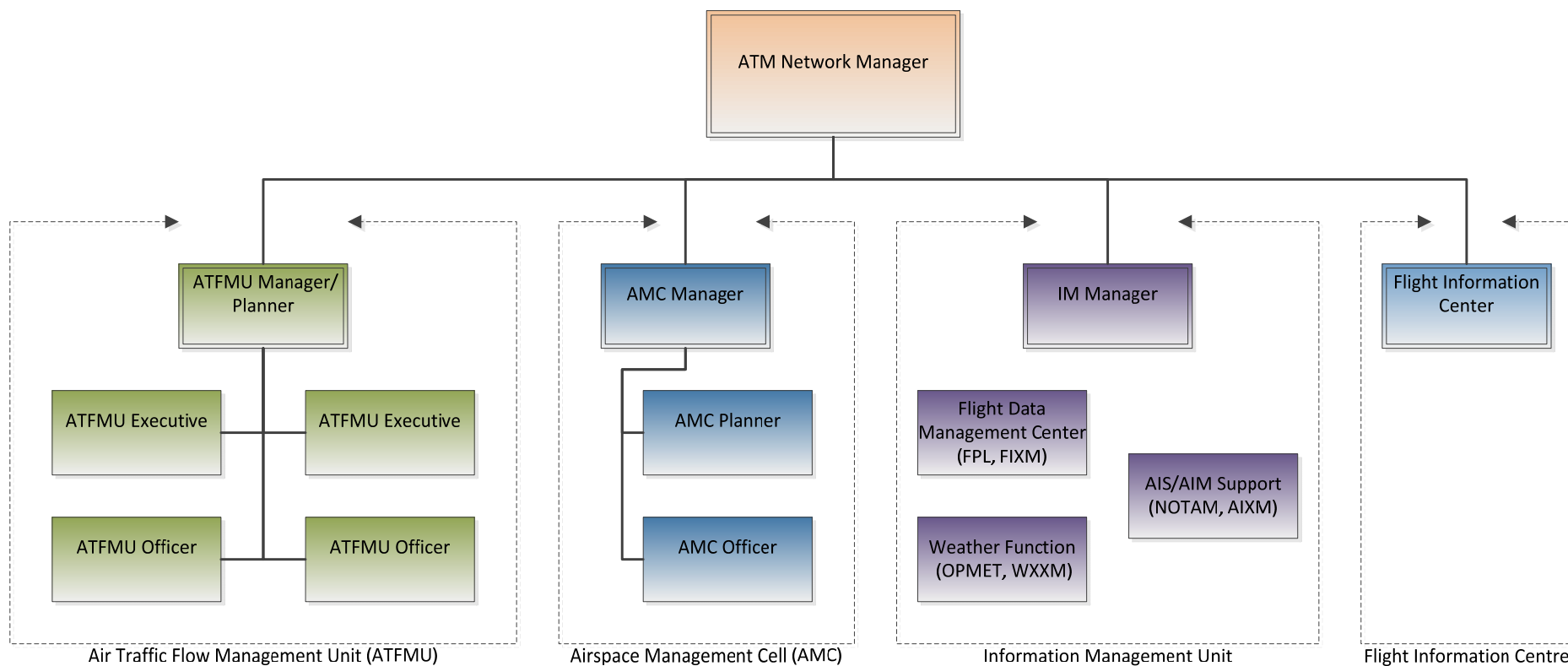
- Short-Term Capacity Enhancements
- National ATM Automation Replacement
- AOT Airport Automation Upgrade
- CDM/ATFM Operations
 - ACC Sector Capacity Review
 - Establish ATM Network Management Centre (ATM NMC)
 - Distributed Multi-Nodal CDM/ATFM Network
(Distributed Multi-Nodal ATFM Operational Trial Project)
 - ATFM/CDM Automation Support



Air Traffic Management Network Management Centre (ATM NMC)



AEROTHAI Response: ATM Network Management Centre (ATM NMC)





ATFM Operations



ATFM Operations

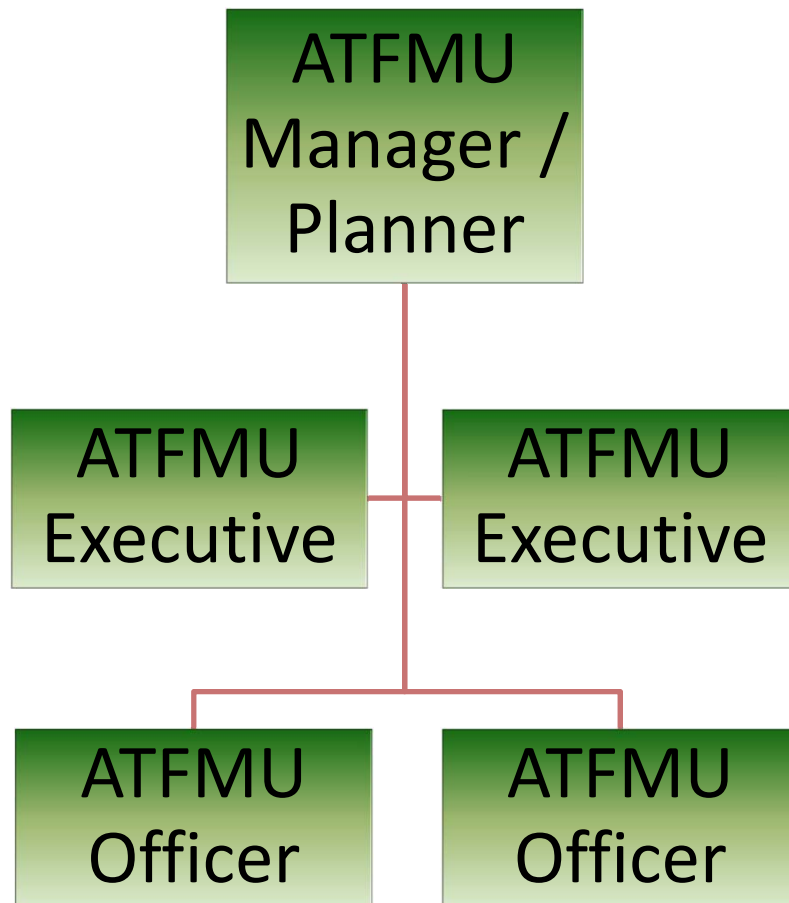


- ATFM Operations
- ATFM Training Requirement and Staff Development
- ATFM Automation Support



- **ATFM Operations**
 - BOBCAT Operations
 - Distributed Multi-Nodal ATFM Network
- ATFM Training Requirement and Staff Development
- ATFM Automation Support

ATM NMC : Air Traffic Flow Management Unit



- **ATFMU Manager/Planner**
 - 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
- **ATFMU Executive**
 - Coordinate tactical capacity adjustment on ATM resources
 - Monitor and execute ATFM Measure on day of operation as required based on ATFM Daily Plan
- **ATFMU Officer**
 - Ensure proper integration of traffic demand inputs
 - Ensure proper configuration of ATFM automation support systems

ATFM Operations



- ATFM Operations
- **ATFM Training Requirement and Staff Development**
- ATFM Automation Support



ATFM Training Requirements Development

EUROCONTROL – AEROTHAI
Cooperation



17-18 Nov 2015

AEROTHAI/ATM NMC

ATFM Training and Other Initiatives



ASBU
BO-NOPS



APAC
Seamless
ATM Plan



EU-ASEAN
Air Transport
Integration Project



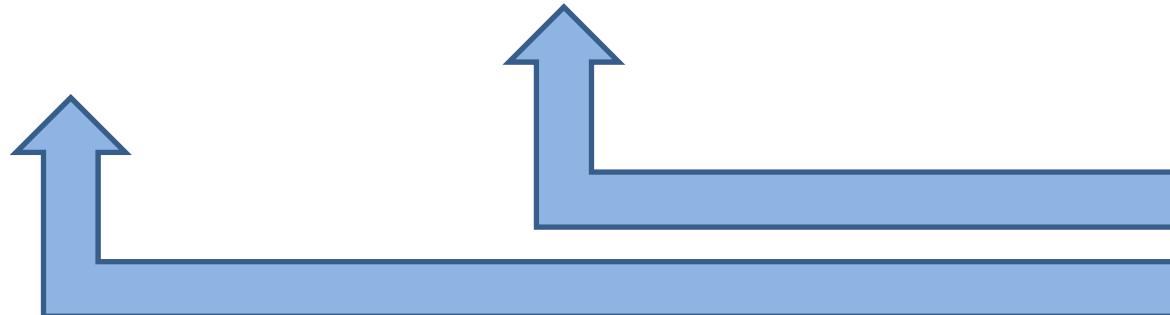
Thailand

Manual on
Collaborative
ATFM
(Doc 9971)

ICAO APAC
Regional Framework
for Collaborative ATFM

AATIP 4.3
Cross Border ATFM

ATM NMC
(2016)



Sub-Regional ATFM
Training Requirements

Scope



- Staff Selection
- Staff Training
- Validation
- Competencies

Scope



- Staff Selection
 - Pre-Requisite Skills
 - Medical requirements
 - Language requirements
- Staff Training
- Validation
- Competencies

Scope



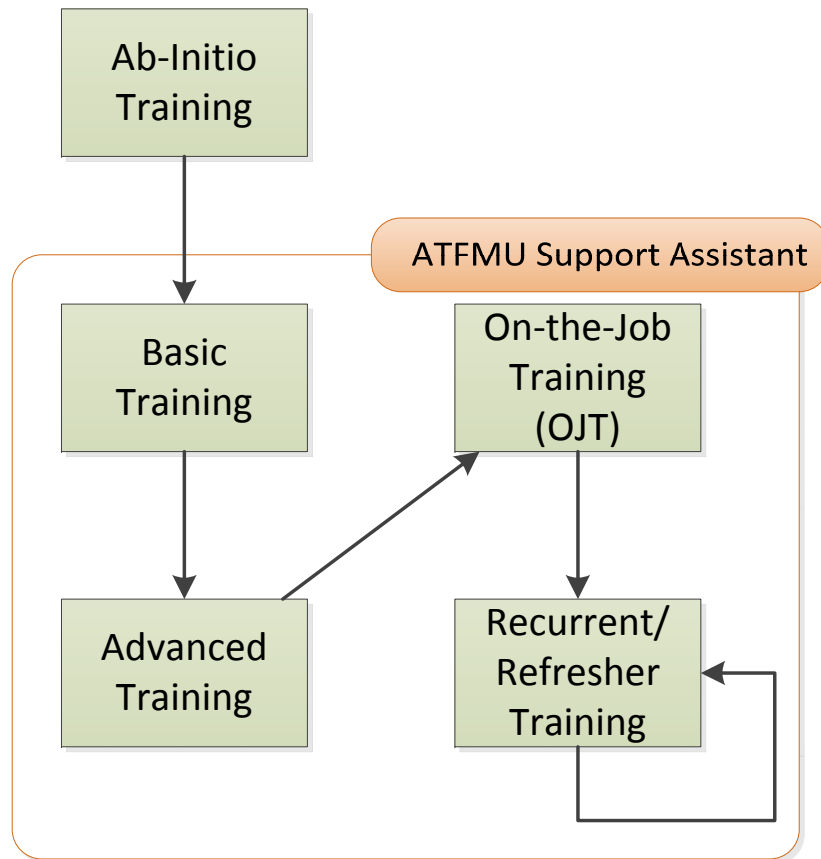
- Staff Selection
- Staff Training
 - Induction
 - Basic : Theoretical, Practical
 - OJT
 - Complementary Skills
- Validation
- Competencies

Scope

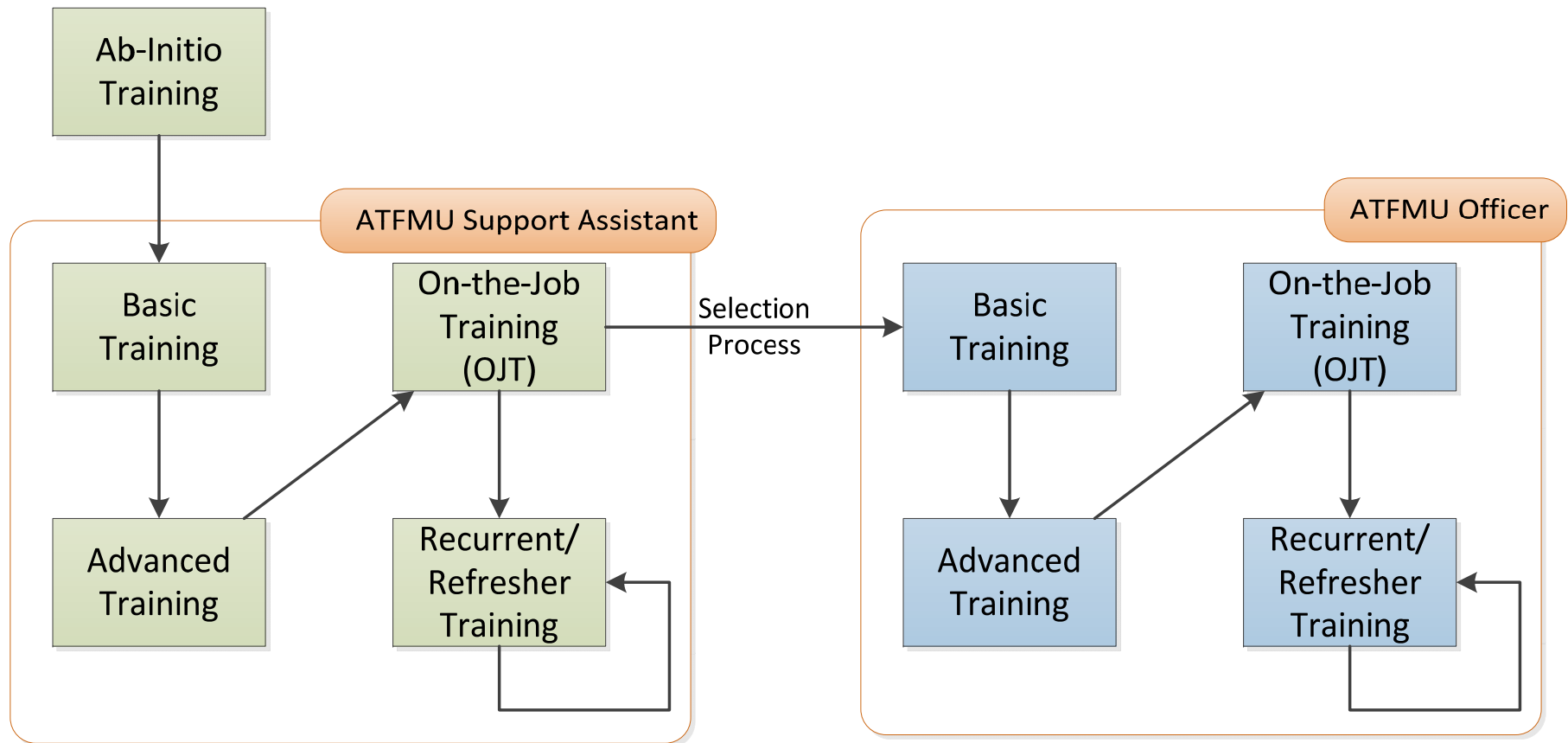


- Staff Selection
- Staff Training
- Validation
 - OJT
 - Check-Out
 - Continuous Training
 - Refresher
 - Periodic validation
 - Remedial, Suspension
- Competencies

Staff Selection & Training



Staff Progression

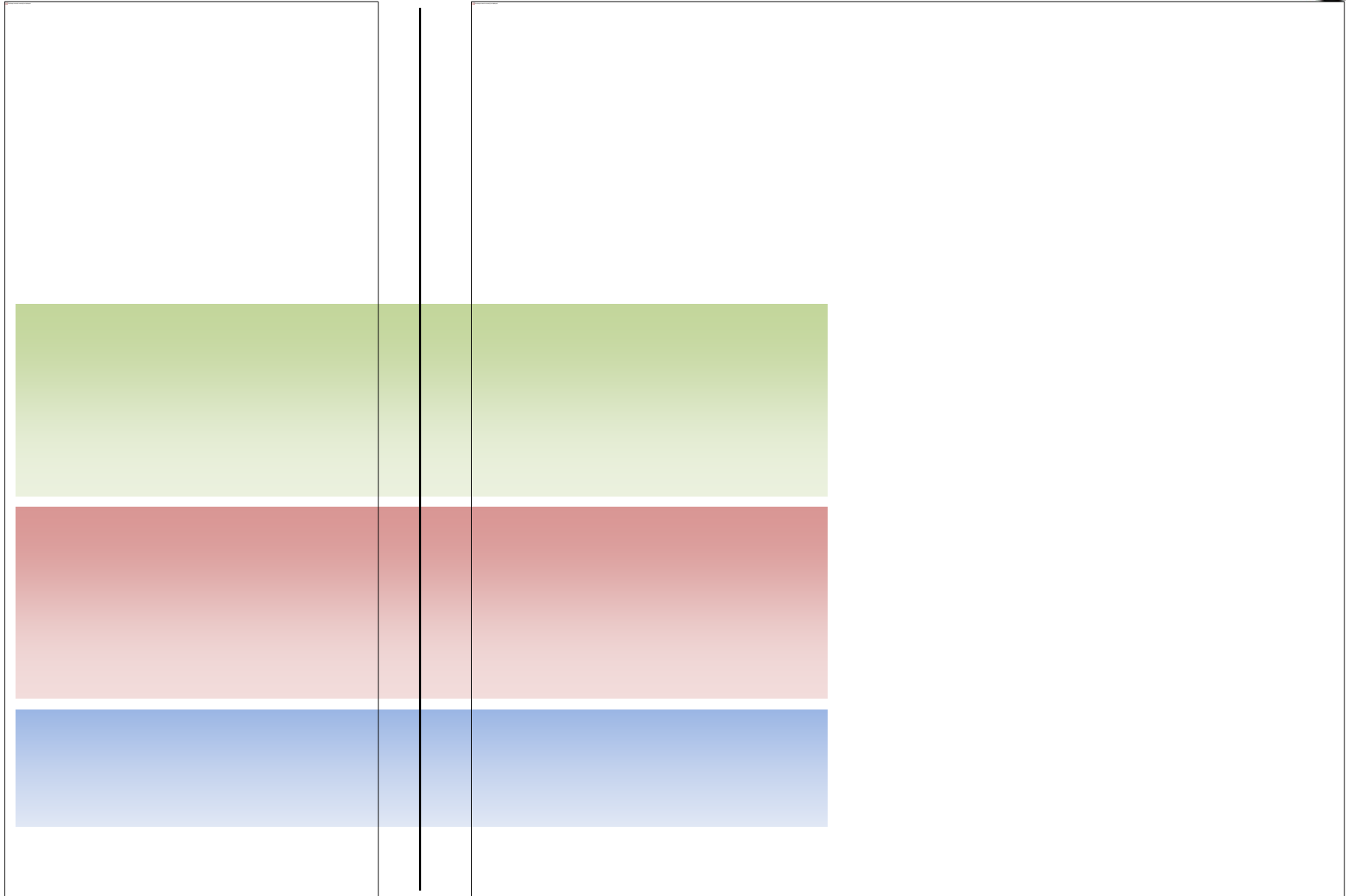


ATFM Responsibilities



- ATFMU Operations Manager
- ATFMU Supervisor
- ATFMU Planner
- ATFMU Officer (Executive)
- ATFMU Support Assistant
- ATFMU CDM Partner

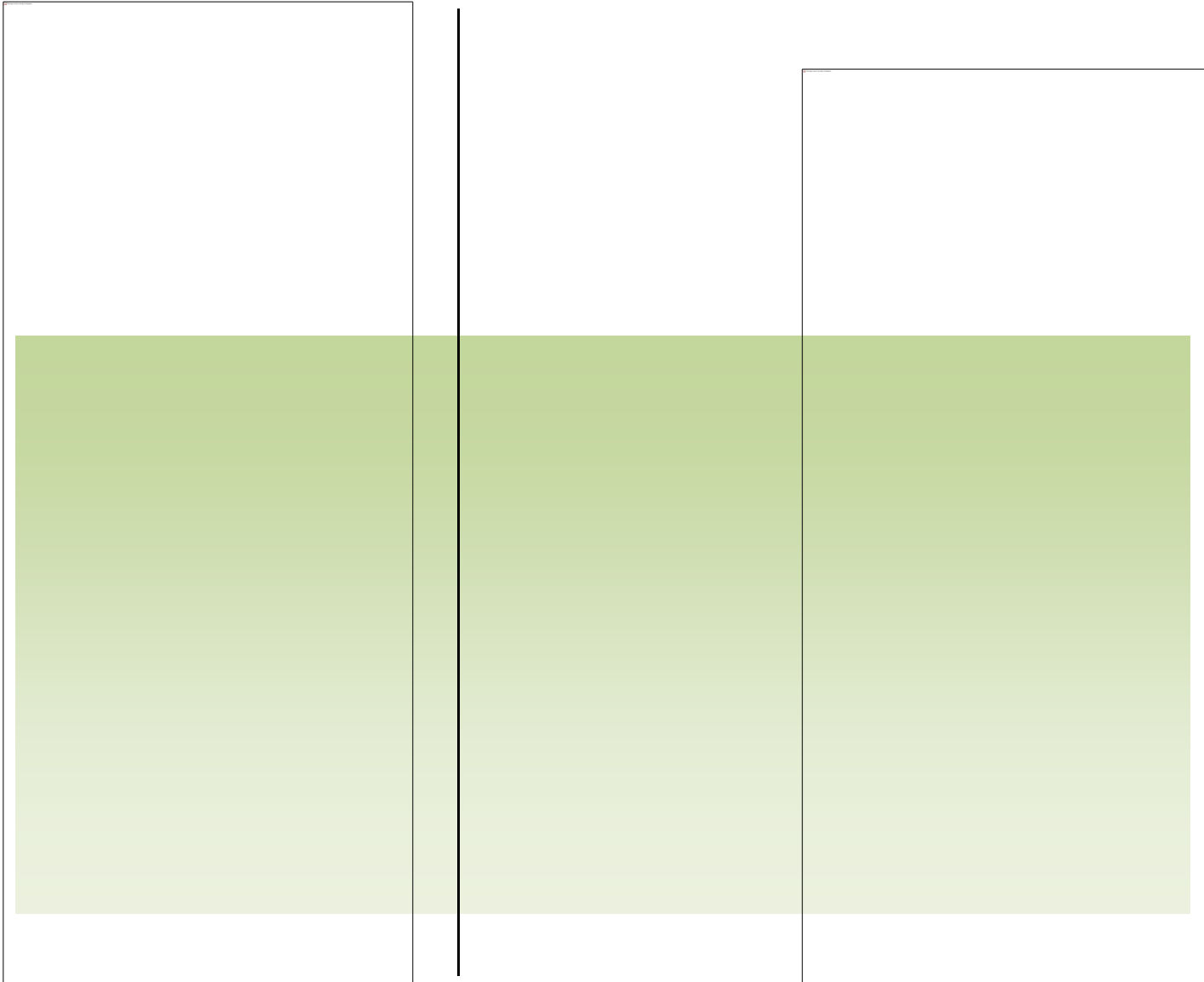
Sample ATFMU Organization



May 2015

AEROTHAI ATM NMC

Sample ATFMU Organization



May 2015

AEROTHAI ATM NMC

Training Levels



- **Level 0:** Awareness.
- **Level 1:** A basic knowledge, remember essential points, to memorize and retrieve data.
- **Level 2:** Ability to understand and to discuss the subject matter intelligently.
- **Level 3:** Thorough knowledge of the subject and the ability to apply it with accuracy.
- **Level 4:** Ability to establish a line of action 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:** Ability to analyze new situations in order to elaborate and apply one or other relevant strategy to solve a complex problem.

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

Function vs Competency



Indicated levels are for illustration purposes only

Training Syllabus



| | | |
|------------------------|--|--|
| Phase | Ab-Initio | |
| Subject | Air Traffic Management | |
| Objective | Knowledge and understanding of the international, local and regional air traffic management rules, concepts and structures | |
| Content | Air Traffic Control Service (Aerodrome, Approach, En-Route, Oceanic) | Annex 11 |
| | Flight Information and Advisory Service | |
| | Alerting Service | |
| | ATFM Introduction | Annex 11, Doc 4444, Doc 9971, Doc 7030, ATFM Manuals |
| | Airspace Management | |
| | Altimetry and Flight Level Allocation | Annex 2 |
| | Aircraft Separations | Doc 4444 |
| | ATM Data e.g. ICAO Designators | Doc 7910 |
| Flight Plan Processing | Doc 4444 | |

Training Syllabus



| | | | | | | |
|------------------|--|-------------|---------|-----------|---------|-------------|
| Phase | Basic | | | | | |
| Subject | ATFM Capacity | | | | | |
| Objective | a) Understanding of process to optimize available capacity, and how to use other available capacities; b) Awareness of factors impacting capacity. | | | | | |
| Content | <ul style="list-style-type: none"> ➤ Capacity Assessment models ➤ Monitoring values ➤ Intervention values ➤ ATC Capacity ➤ Adverse weather conditions ➤ Staffing schedules and opening schemes of ATC unit components ➤ Capacity optimization ➤ Factors impacting capacity | | | | | |
| Role | Operations Management | Supervision | Planner | Execution | Support | CDM partner |
| Level | 2 | 5 | 5 | 4 | 3 | 2 |

ATFM Phases



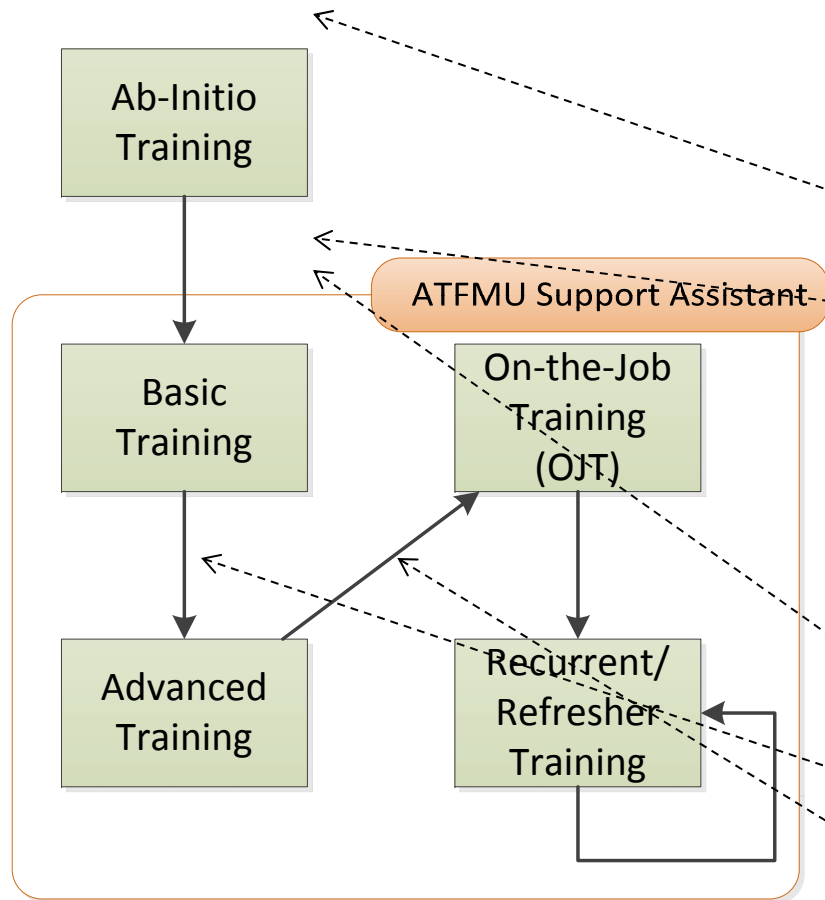
- ATM Planning
- ATFM Operations
 - Strategic ATFM
 - Pre-Tactical ATFM
 - Tactical ATFM
- Contingency and crisis management
- Post Operations

Proposed Training Content



- ATM
- ATFM
- Airport Operations
- Aircraft Operations
- Meteorology
- ICAO Framework
- Airspace design and capacity assessment
- ATFM tools
- General Skills and competences
- Procedures
- ASBU, SESAR, NEXTGEN

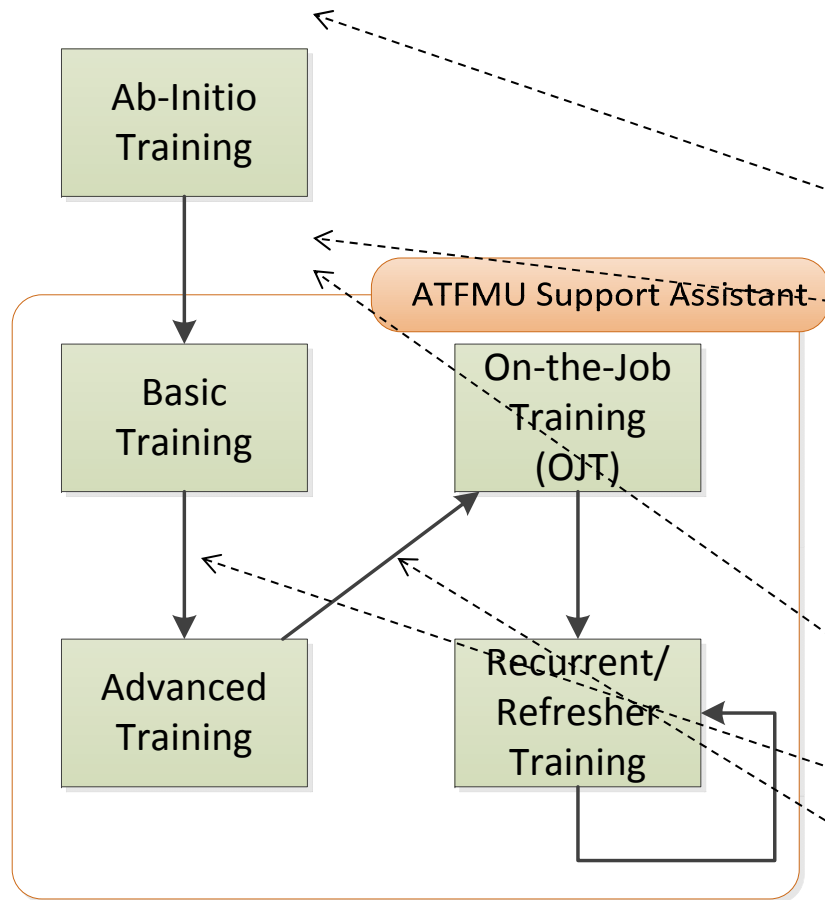
Customized Training (New Staff)



| Aviation Law | ATM | ATFM | Aircraft | ATM Support System | Airline Ops | ATFM & CDM | MET |
|--------------|-----|------|----------|--------------------|-------------|------------|-----|
| 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |

| ATFM General | ATFM Institution | ATFM Phases | ATFM Demand | ATFM Capacity | ATFM Measures | Contingency Procedures | ATFM Data & Tools |
|--------------|------------------|-------------|-------------|---------------|---------------|------------------------|-------------------|
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 |

Customized Training (Ex-Airline Ops to ATFM)



| Aviation Law | ATM | ATFM | Aircraft | ATM Support System | Airline Ops | ATFM & CDM | MET |
|--------------|-----|------|----------|--------------------|-------------|------------|-----|
| 1 | 0 | 0 | 1 | 0 | 2 | 0 | 1 |
| 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |

| ATFM General | ATFM Institution | ATFM Phases | ATFM Demand | ATFM Capacity | ATFM Measures | Contingency Procedures | ATFM Data & Tools |
|--------------|------------------|-------------|-------------|---------------|---------------|------------------------|-------------------|
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 |

Next Steps



- Status

- May 2015 : received from ASEAN Air Transport Working Group (ATWG) and Air Transport Technical Cooperation (ATTC) Sub-Working Group
- Jun 2015 : Incorporated into ICAO Asia/Pacific Regional Framework for Collaborative ATFM
- Aug 2015 : Presented to and endorsed by ICAO ATM Sub-Group of APANPIRG as part of ICAO APAC Regional Framework for Collaborative ATFM v1
- Sep 2015 : Presented to and endorsed by ICAO APANPIRG as part of ICAO APAC Regional Framework for Collaborative ATFM v1
- 2015-2016 : Incorporation in Doc 9971

ATFM Operations

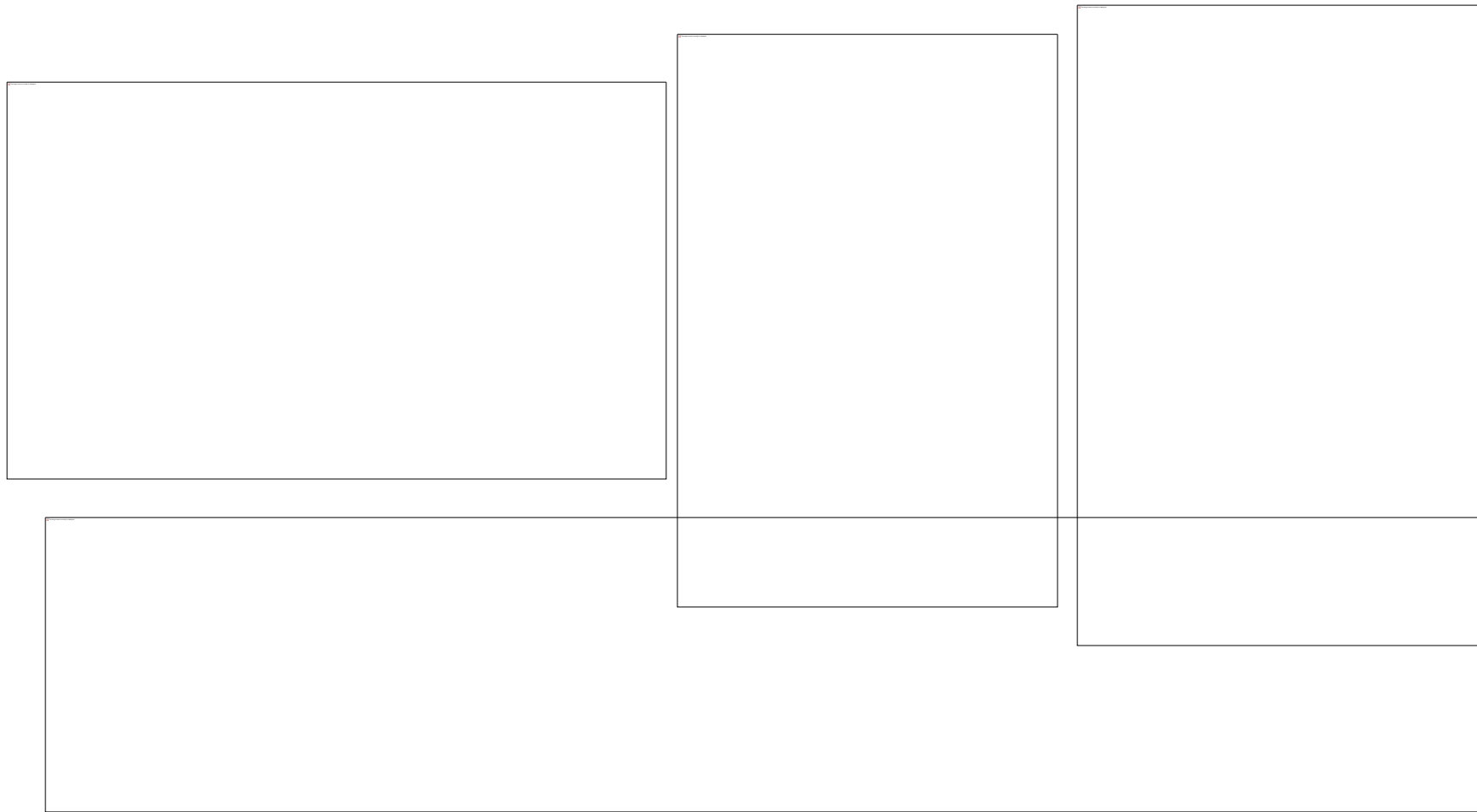


- ATFM Training Requirement and Staff Development
- ATFM Operations
- **ATFM Automation Support**
 - Current Automation Support System
 - Planned Automation Support System

ATFM Automation Support



ATFM Automation Support System



ATFM Operations



- ATFM Operations
- ATFM Training Requirement and Staff Development
- **ATFM Automation Support**
 - Current Automation Support System
 - Planned Automation Support System
 - Full Ground Delay Program support : arrival airport, airspace and departure airport constraint
 - Multiple ATM resource constraint resolution
 - Connectivity with ATS Automation System
 - Linkage with AOT A-CDM system



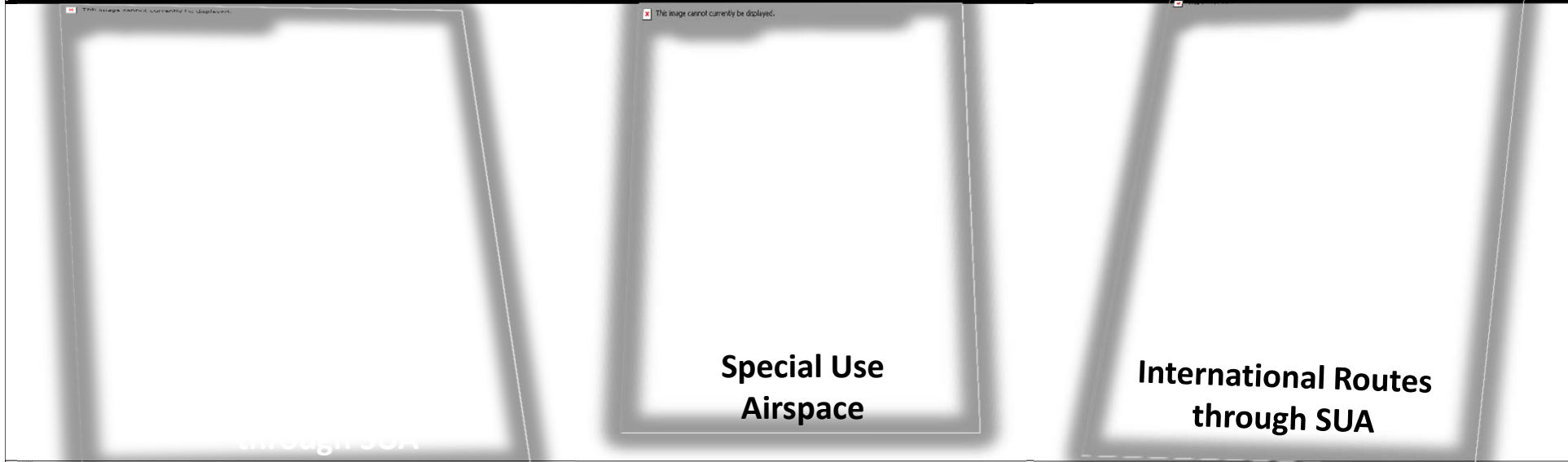
Airspace Management Operations



Current Special Use Airspace in Thailand



Current Flexible Use of Airspace in Thailand



Airspace Management Operations



- Trial Thai-CMAC (AMC-equivalent)
 - Joint civil-military airspace planning unit
 - Daily issue of Airspace Use Plan NOTAMs
- AMC in ATM NMC
 - Airspace Booking system
 - Expanded coverage of Conditional Routes
 - Potential activation time negotiation



Information Management Operations





Current Operations

- Aeronautical Information
 - Bangkok NOTAM Office
- Flight Information
 - Flight Data Management Centre (FDMC)
 - Consolidated flight plan processing operations
- Weather Information
 - OPMET / ROBEX Databank



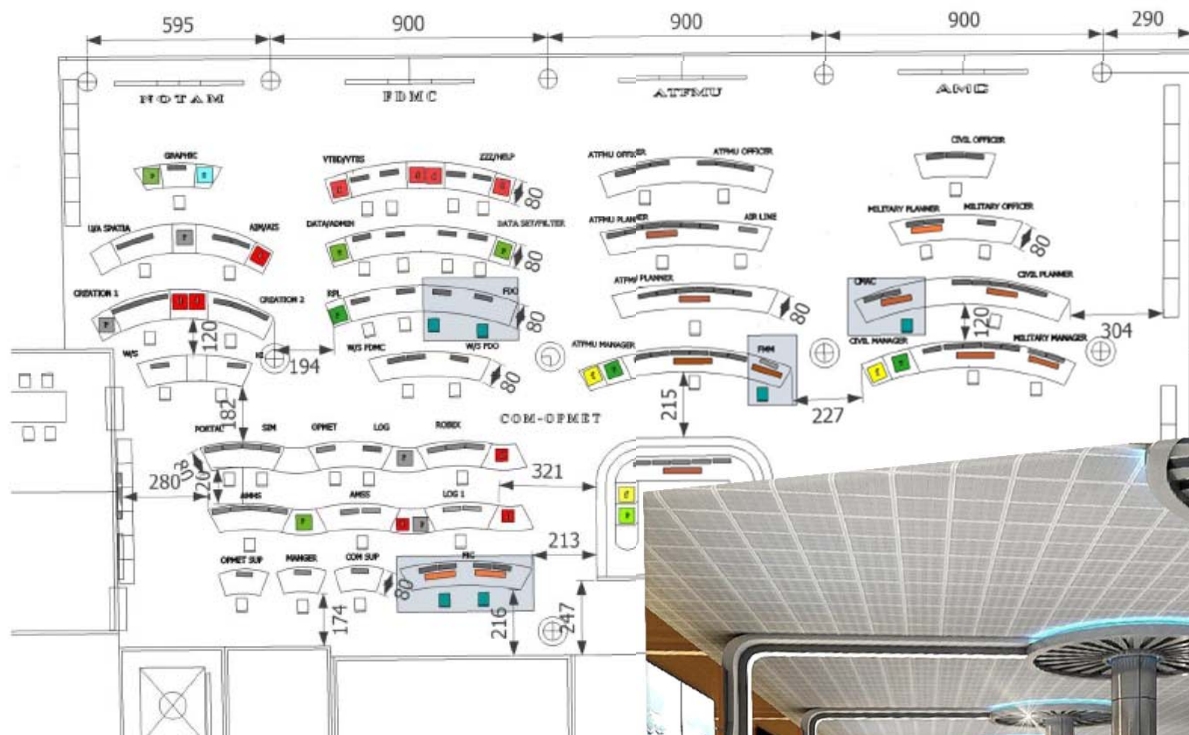
Current Initiatives

- Mini Global Demonstration Project
- SWIM-Compliant FDMC
 - Enterprise Service Bus support
- Flight Object Manager Prototype

AEROTHAI Mini Global Phase 2 Architecture



ATM Network Management Centre (ATM NMC)



17-18 Nov 2015

AEROTHAI ATM NMC

