ATFM Implementation
Thailand and Southeast Asia

55th DGCA Conference
22 – 26 October 2018
Nadi, Fiji
Thailand and Southeast Asia Air Traffic Growth
Thailand Air Traffic Demand Growth

Historical Annual Traffic Volume in Bangkok FIR Fiscal Year 2007-2017
Forecast Annual Traffic Volume - Fiscal Year 2018-2032

Historical Annual Traffic Volume

- 2007: 796,959
- 2008: 899,700
- 2009: 1,007,700
- 2010: 1,296,314
- 2011: 1,734,761
- 2012: 2,235,129
- 2013: 2,106,630
- 2014: 1,604,814
- 2015: 1,178,190
- 2016: 899,700
- 2017: 848,799

Forecast Annual Traffic Volume

- 2018-2022
- 2023-2027
- 2028-2032

CAGR (15Y) 2017-2032 = 6%
CAGR 2007-2017 = 8%
# Thailand Air Traffic Demand

## North
- Flights/Year: 246,059
- Flights Daily: 674
- Overall GR: **21.9%**

<table>
<thead>
<tr>
<th>Volume</th>
<th>GR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Int'l</td>
<td>62%</td>
</tr>
<tr>
<td>Dom</td>
<td>33%</td>
</tr>
<tr>
<td>Overfly</td>
<td>5%</td>
</tr>
</tbody>
</table>

## East/North East
- Flights/Year: 227,140
- Flights Daily: 622
- Overall GR: **6.0%**

<table>
<thead>
<tr>
<th>Volume</th>
<th>GR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Int'l</td>
<td>62%</td>
</tr>
<tr>
<td>Dom</td>
<td>26%</td>
</tr>
<tr>
<td>Overfly</td>
<td>12%</td>
</tr>
</tbody>
</table>

## West
- Flights/Year: 141,344
- Flights Daily: 387
- Overall GR: **7.7%**

<table>
<thead>
<tr>
<th>Volume</th>
<th>GR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Int'l</td>
<td>70%</td>
</tr>
<tr>
<td>Dom</td>
<td>0%</td>
</tr>
<tr>
<td>Overfly</td>
<td>30%</td>
</tr>
</tbody>
</table>

## South
- Flights/Year: 266,498
- Flights Daily: 730
- Overall GR: **-0.1%**

<table>
<thead>
<tr>
<th>Volume</th>
<th>GR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Int'l</td>
<td>34%</td>
</tr>
<tr>
<td>Dom</td>
<td>56%</td>
</tr>
<tr>
<td>Overfly</td>
<td>10%</td>
</tr>
</tbody>
</table>

Note: Annual Growth Rate / Data up to 30 Sep 2018
Why We Need ATFM in Southeast Asia

Source: Boeing Current Market Outlook 2017 - 2036
The Challenge: Demand Growth

In 20 years…

- **China** as the world’s largest aviation market
- More than half of new passengers from Asia-Pacific
- 5 APAC markets among the top 10, with Thailand surpassing France and Italy

IATA 20-Year Passenger Forecast, October 2017
Introduction  
Concept & Project Phases
Evolution of the Regional ATFM Concept

Research Collaboration on Regional ATFM Concept 2013

CANSO Whole of flight CDM Pilot Project between BKK-SIN 2011-2012

Distributed Multi Nodal Regional ATFM Concept 2014 - ....

Tripartite CDM Project between BKK-HKG-SIN 2012-2013
Multi-Nodal ATFM Network Concept

ARRIVAL ATFM NODE

- AeroMET
- Flow Management Position (FMP)
- ATFM Information Exchange
- ATS Units
- Airport Operator

DEPARTURE ATFM NODE

- Flight Operations Centre (FOC)
- Pilot
- A-CDM
- ATS Units
- Airport Operator

DISTRIBUTED MULTI-NODAL ATFM NETWORK
How We Approach The Project: *Multi-Phase Work*

**Phase 1** (2015-2016)
- Distributed GDP/CTOT to regulate traffic into constrained arrival airports

**Phase 2** (2017-20XX)
- Distributed GDP/CTOT to regulate traffic into constrained airspace

**Phase X**
- Globally-interconnected ATFM network, enabled by SWIM infrastructure

**Identification of Elements**
**Development of Relevant Provisions**
**ATFM System-to-System Information Linkage (SWIM-Enabled)**

*DISTRIBUTED MULTI-NODAL ATFM NETWORK*
Who The Members Are: *Tiered Participation*

**Level 3 ATFM Nodes**
Generate, Distribute, Comply to CTOT

- China
- Hong Kong China
- Singapore
- Thailand
- Cambodia

**Level 2 ATFM Nodes**
Receive and Comply to CTOT

- Indonesia
- Malaysia
- Myanmar
- Philippines

**Level 1 ATFM Nodes**
Observers
(soon to upgrade)

- Lao PDR**
- Viet Nam**
Key Achievements

- Planned Events
- Ad-Hoc WX-Induced
- Emergency

Spectrum of ATFM Operations

- Validated procedures for distributed GDP
- Proven benefits for constrained airports
- Increased awareness for cross-border ATFM
- Contribution to APAC States’ ATFM readiness
Technical Sub-Group
Distributed Multi-Nodal ATFM Network
TSG’s Objectives

For effective ATFM operation

Need for information sharing between ATFM systems

TSG established to achieve ATFM to ATFM systems interconnection

Allow effective information sharing

TSG’s objectives

Using standardized data format and interoperable infrastructure

Achieve synchronization between ATFM systems
Near Future

• Improved availability of quality data and information
• Improved shared situational awareness
• Improved decision making
• More flexible and cost-effective communications
• Increased system performance

• Loose system coupling
• Use of open standards
• Use of interoperable services
What’ve been done so far

- Technical Sub-Group of Distributed Multi-Nodal ATFM Network Project
  - System-to-system connection designed based on SOA with the use of XML-based information exchange model

![Diagram showing the process steps]

- Operational Scenarios (Operational Requirements)
- Required Data Elements
- Mapping to FIXM
- Develop FIXM Extension
- ATFM Sys-Sys Connection
- ATFM Sys-Sys ICD
- System Test

- CTOT, CLDT, etc. not included in FIXM4.1 Core

- Successful System-to-System between AEROTHAI and CAAS
ATFM-on-SWIM Forward Plan

Key milestones
- Network connection: CRV
- ICD amendment to include ADP service

ATFM-related services development based on operational scenarios

SWIM in ASEAN Demonstration

Oct 2018 - June 2019 - 2020
ASEAN ATFM Implementation Support Team
ASEAN ATM Enhancement Guidance

ICAO Global Air Navigation Plan (DOC 9750)

5th Edition of the GANP, covering 15-year strategic plan, including the introduction of the Aviation System Block Upgrades (ASBU)

ICAO Asia Pacific Seamless ATM Plan

Version 2.0, endorsed by APANPIRG/27 September 2016

ASEAN ATM Master Plan

Adopted at the 23rd ASEAN Transport Ministers Meeting in October 2017

DISTRIBUTED MULTI-NODAL ATFM NETWORK
ATFM in ASEAN Master Plan Context

**Required** ASEAN-Wide Harmonized Implementation

### Initiatives
- Performance Based Navigation (PBN) Routes
- **Air Traffic Flow Management (ATFM)**
- ATS Inter-facility Data Communication (AIDC)
- Aeronautical Information Management (AIM)
- Common Aeronautical Virtual Private Network (CRV)

DISTRIBUTED MULTI-NODAL ATFM NETWORK
## ATFM in ASEAN Master Plan Context

### ATFM Implementation Expectations

<table>
<thead>
<tr>
<th>Phases</th>
<th>Target Completion</th>
<th>Expectations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Phase I</strong></td>
<td>31 Dec 2018</td>
<td>All Member States to achieve <strong>Level-2</strong> capability in the Multi-Nodal ATFM Network</td>
</tr>
<tr>
<td></td>
<td></td>
<td>→ <em>Established local procedure to comply with ATFM measures distributed by other States</em></td>
</tr>
<tr>
<td><strong>Phase II</strong></td>
<td>31 Dec 2020</td>
<td>All Member States with <strong>major aerodromes</strong> to achieve <strong>Level-3</strong> capability in the Multi-Nodal ATFM Network</td>
</tr>
<tr>
<td></td>
<td></td>
<td>→ <em>Established procedure balance demand-capacity with ATFM measures</em></td>
</tr>
</tbody>
</table>
ASEAN ATFM Implementation Support Team

Core Idea:

- ASEAN ATM Master Plan
  → ASEAN Members supporting ATFM as Level-2 by 2018

- Support group to aid AMS in ATFM implementation
  → Workshop series
  → Guided / specific operational trials

Proposed Strategy:

- Singapore (CAAS) & Thailand (AEROTHAI) to lead

- Kick-off meeting: 24 August 2018, Bangkok
  - Develop a roadmap for harmonized ATFM implementation among ASEAN Members
Where We Are Headed: Road Forward

ASEAN ATFM Implementation Leads

- Appointed by ASEAN ATM SPG to lead the support for other Member States

<table>
<thead>
<tr>
<th>Initiatives</th>
<th>Lead / Co-leads</th>
</tr>
</thead>
<tbody>
<tr>
<td>PBN Routes</td>
<td>Cambodia &amp; Lao PDR</td>
</tr>
<tr>
<td><strong>ATFM</strong></td>
<td><strong>Singapore &amp; Thailand</strong></td>
</tr>
<tr>
<td>AIDC</td>
<td>Malaysia</td>
</tr>
<tr>
<td>AIM</td>
<td>Singapore &amp; Thailand</td>
</tr>
<tr>
<td>CRV</td>
<td>Singapore &amp; Thailand</td>
</tr>
</tbody>
</table>
Key Success Factors

Collaboration

Synergy  Consensus

Global and Regional Development
If you want to go fast,
go alone.
If you want to go far,
go together.
Thank You!

ICAO Air Traffic Flow Management (ATFM) Global Symposium

ATFM: together, bringing every destination closer

Singapore, 20 to 22 November 2017

DISTRIBUTED MULTI-NODAL ATFM NETWORK
## Phase 1 Key Objective & Work Plan

### Distributed GDP for Constrained / Congested Arrival Airports

<table>
<thead>
<tr>
<th>Phase 1 Stage 1</th>
<th>Phase 1 Stage 2</th>
<th>Phase 1 Stage 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication Linkage and Information Exchange Protocol Design</td>
<td>Procedure Development and Demonstration Flights</td>
<td>Progressive implementation effort</td>
</tr>
<tr>
<td>ATFM System-to-System Information Linkage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stakeholder Engagement</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Phase 2 Key Objective & Work Plan

<table>
<thead>
<tr>
<th>Phase 2 Stage 1</th>
<th>Phase 2 Stage 2</th>
<th>Phase 2 Stage 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATFM System-to-System Information Linkage</td>
<td>Stakeholder Engagement</td>
<td></td>
</tr>
</tbody>
</table>

**Distributed GDP (+other measures) for Constrained / Congested Airspace Volume**

For recent ATFM programs, refer to [http://tinyurl.com/multi-nodal-16](http://tinyurl.com/multi-nodal-16)
Summary
ASEAN ATFM Implementation
Support Team Kick-Off Meeting
## Updated AMS ATFM Implementation Status

+ **(Informal) Update during ASEAN ATFM Support / 1**

<table>
<thead>
<tr>
<th>AMS</th>
<th>Phase I 1 Jan 2018 to 31 Dec 2020</th>
<th>Phase II 1 Jan 2018 to 31 Dec 2022</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Expected Starting Date</td>
<td>Expected Completion Date</td>
</tr>
<tr>
<td>BRUNEI</td>
<td>To be provided</td>
<td>To be provided</td>
</tr>
<tr>
<td>CAMBODIA</td>
<td>Started</td>
<td>31-Dec-17</td>
</tr>
<tr>
<td>INDONESIA</td>
<td>26-Jun-16</td>
<td>31-Dec-17</td>
</tr>
<tr>
<td>LAO PDR</td>
<td>28-Dec-18</td>
<td>31-Dec-20</td>
</tr>
<tr>
<td>MALAYSIA</td>
<td>Started</td>
<td>Completed</td>
</tr>
<tr>
<td>MYANMAR</td>
<td>Started</td>
<td>31-Dec-19</td>
</tr>
<tr>
<td>PHILIPPINES</td>
<td>02-Apr-18</td>
<td>01-Nov-18</td>
</tr>
<tr>
<td>SINGAPORE</td>
<td>Started</td>
<td>01-Apr-17</td>
</tr>
<tr>
<td>THAILAND</td>
<td>Started</td>
<td>31-May-17</td>
</tr>
<tr>
<td>VIETNAM</td>
<td>Started</td>
<td>31-Dec-18</td>
</tr>
</tbody>
</table>

Updated: As of Oct 2017 / As of Jul 2018
Prioritized Work Areas

ATFM Implementation Support Wish List

• Prioritized Elements - Phase I
  1. ATFM operations training
  2. Regulatory framework development

• Prioritizes Elements - Phase II
  1. ATM resource capacity assessment

Input into EU ARISE Plus workshops
EU ARISE Plus Workshops

Workshop # 1: ASEAN ATM Master Plan

“Introduction to ATM Master Plan and Key Initiatives”

- Date: 10 – 12 September 2018
- Host: Civil Aviation Authority of Thailand (CAAT)
- Venue: Pathumwan Princess Hotel, Bangkok

Workshop # 3: Implementation of ATFM

“To assist implementation of ATFM in ASEAN”

- Date: 24 – 26 September 2018
- Host: AirNav Indonesia
- Venue: AirNav Indonesia HQ, Tangerang City