

Distributed Multi-Nodal ATFM Project A Reminder...



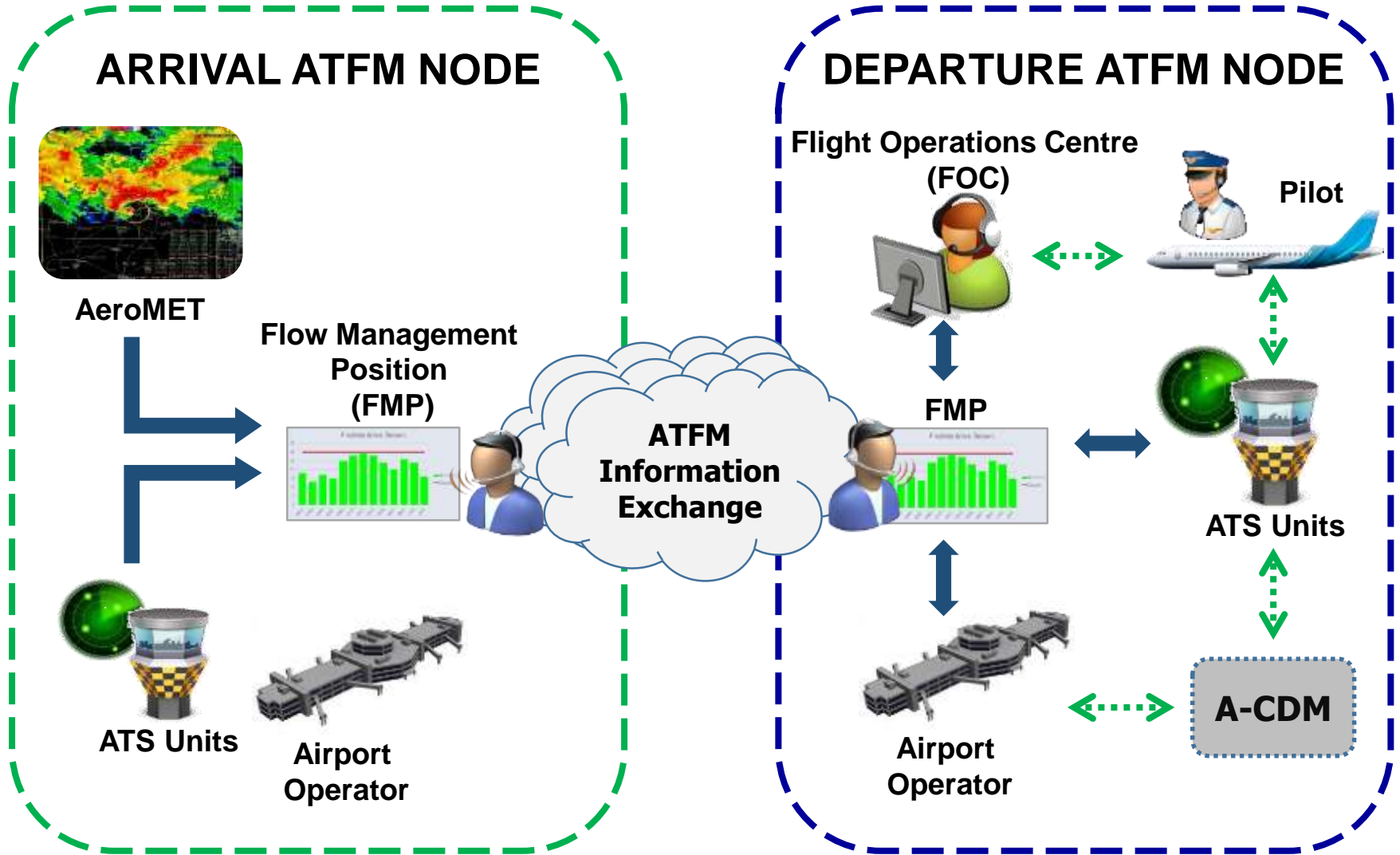
**ATFM Information Requirement
Small Working Group
29 August 2018**

Introduction

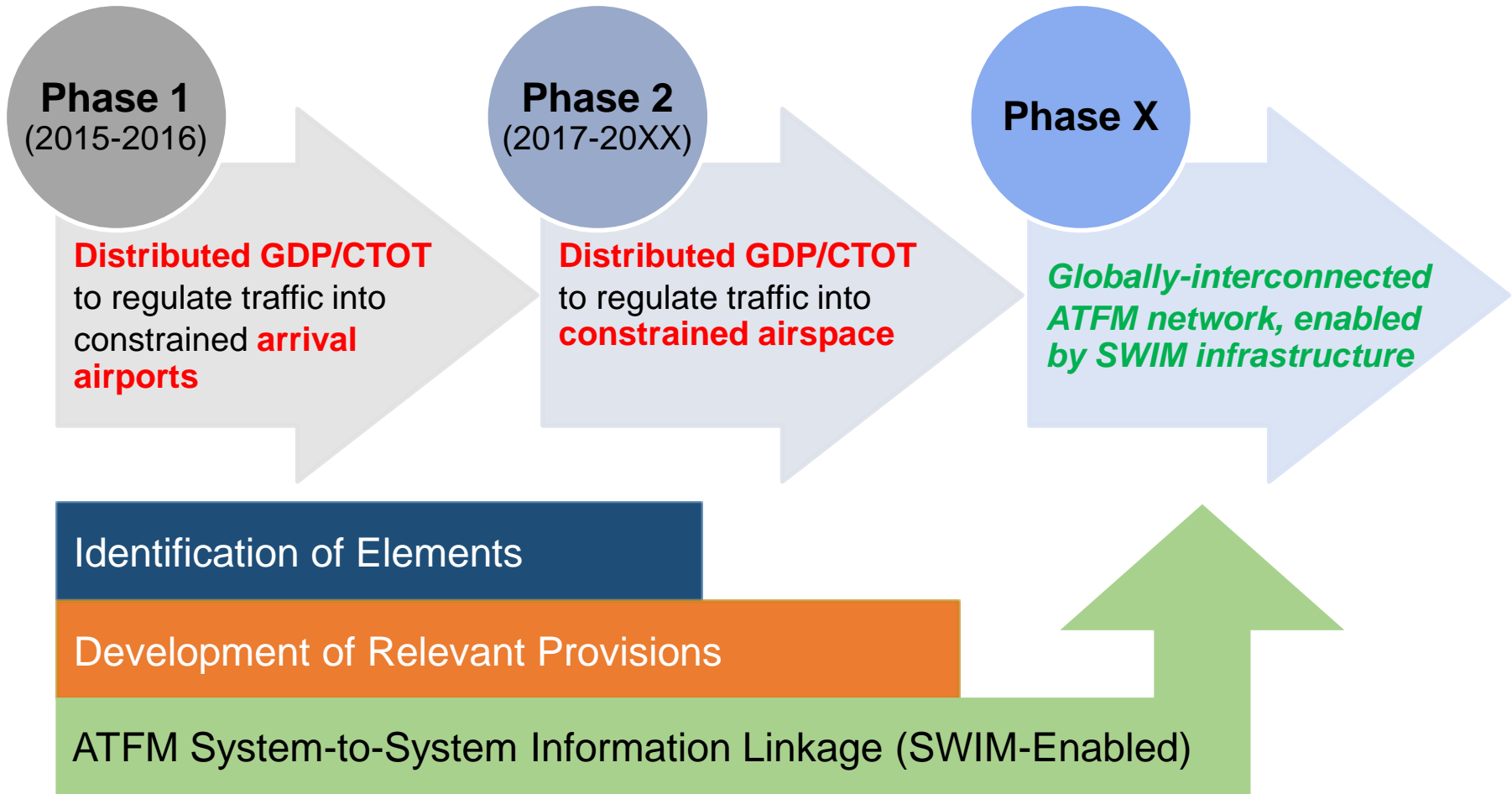


DISTRIBUTED MULTI-NODAL AIR TRAFFIC FLOW MANAGEMENT

What We Are Trying To Do: *Operational Environment*



How We Approach The Project: *Multi-Phase Work*

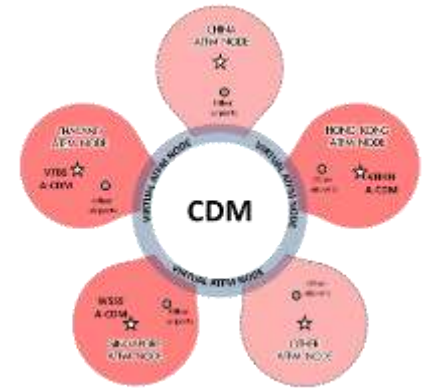


Who The Members Are: *Tiered Participation*

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**



Phase 1

Airport ATFM Programs



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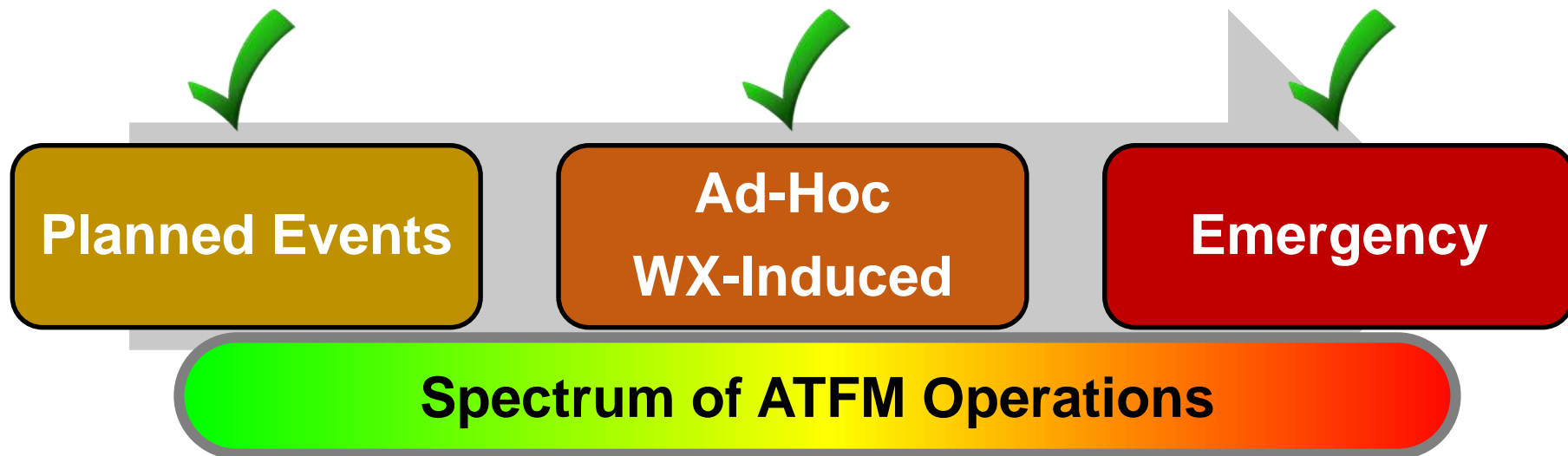
Phase 1 Key Objective & Work Plan

Distributed GDP
for
Constrained / Congested **Arrival Airports**

Phase 1 Stage 1	Phase 1 Stage 2	Phase 1 Stage 3
<i>Communication Linkage and Information Exchange Protocol Design</i>	<i>Procedure Development and Demonstration Flights</i>	<i>Progressive implementation effort</i>
ATFM System-to-System Information Linkage		
Stakeholder Engagement		



Key Achievements



Two yellow arrows point upwards from the text box towards the 'Planned Events' and 'Emergency' categories of the spectrum above.

Validated procedures for distributed GDP
Proven benefits for constrained airports
Increased awareness for cross-border ATFM
Contribution to APAC States' ATFM readiness



Phase 2

Airspace ATFM Programs



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Phase 2 Key Objective & Work Plan

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

Phase 2 Stage 1	Phase 2 Stage 2	Phase 2 Stage 3
<i>Airspace Demand-Capacity Assessment Capability</i>	<i>Procedure Development for Single-Constraint DCB</i>	<i>Procedure Development for Multi-Constraint DCB</i>
ATFM System-to-System Information Linkage		
Stakeholder Engagement		

For recent ATFM programs, refer to <http://tinyurl.com/multi-nodal-16>



ATFM System Readiness Status for Phase 2

GDP System Status

ATFMU	Resource	Status	CTOT Delivery Method
Bangkok (AEROTHAI)	Airport	✓ Operational	✓ E-Mail, Web, AFTN
	Airspace	✓ Waypoint: Operational ❑ Sector: In Dev	✓ E-Mail, Web, AFTN
Hong Kong (HKCAD)	Airport	❑ In Development	❑ AFTN: Q3 2019 ✓ E-Mail, Web
	Airspace	❑ In Development	❑ AFTN: Q3 2019 ✓ E-Mail, Web



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ATFM System Readiness Status for Phase 2

GDP System Status

ATFMU	Resource	Status	CTOT Delivery Method
Sanya (CAAC ATMB)	Airport	✓ Operational	<input checked="" type="checkbox"/> AFTN <input type="checkbox"/> E-Mail, Web (available)
	Airspace	✓ Waypoint: Operational ✓ Sector volume: operational	<input checked="" type="checkbox"/> AFTN <input type="checkbox"/> E-Mail, Web (available)
Singapore (CAAS)	Airport	✓ Operational	<input checked="" type="checkbox"/> E-Mail, Web <input type="checkbox"/> AFTN: 2019
	Airspace	✓ Operational	<input checked="" type="checkbox"/> E-Mail, Web <input type="checkbox"/> AFTN: 2019



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Forward Airspace ATFM Implementation Plan

ATS Route MINIT Conversion

Route	Lead ATFMU	Status
A1	Sanya ATFMU	✓ Ongoing
A202	Sanya ATFMU	✓ Ongoing
A581	Bangkok ATFMU	✓ Ongoing
M771	Singapore ATFMU	✓ Ongoing
DOTMI – A470	Hong Kong ATFMU	❑ Expected: Oct/Nov '18



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Key Revisions to Common Operating Procedure



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Key Areas of COP Revisions

Routine CDM Conference

- ✓ Scope of Attendance
 - ATFMUs (+team)
- ✓ Timing
 - Weekly, Thursdays 0800z
- ✓ Topic
 - Outlook of ATM resource issue and possible ATFM programs
- ✓ Commencement
 - Start with Level-3 ANSPs, expand subsequently
 - Start date: **Thursday 20 Sep 2018**



Key Areas of COP Revisions

Resolution of Conflicting ATFM Measures

- ✓ Requirement:
 - 1 flight should be subjected to only 1 ATFM measure (1 CTOT)
- ✓ Possible Issue:
 - Conflicting CTOTs given by >1 ATFM nodes
- ✓ Solution
 - Insofar as possible, **conduct CDM conference to resolve** by comparing ATFM delay
 - If CDM conference not possible
 - Departure ATFMU note the conflict and request appropriate exemption



Key Areas of COP Revisions

Standard Phrases for CDM Actions

- ✓ Issue:
 - Difficulty in CDM communication between ATFMUs and stakeholders, *sans phraseologies*
- ✓ **Solution:**
 - **Communication guideline**
 - **Sample list of phrases for basic coordination**
- ✓ *To be provided as an Annex to COP*



Key Areas of COP Revisions

Revised Requirement for Participation Levels

Tiered Participation	Expected Capabilities
Level 3	<ul style="list-style-type: none">• Capable to generate, deliver and receive CTOT.• Able to comply with CTOT from all Level 3 ATFM node
Level 2	<ul style="list-style-type: none">• Capable to receive and comply with CTOT from all Level 3 ATFM node
Level 1	<ul style="list-style-type: none">• Observe and participate in the Trial Progress



Key Challenges to the Project



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Key Problem Areas from Post-Ops Analysis

CTOT Compliance

- Lack of compliance remains an issue

Adherence to Procedure

- Respect of lead time requirement for CTOT revision

Overall / System Delay for Compliant Flights

- The struggle with adverse effect from non-compliance flights

Conflicting ATFM Measures

- Occurrences of “double penalties” due to concurrent ATFM measures and restrictions



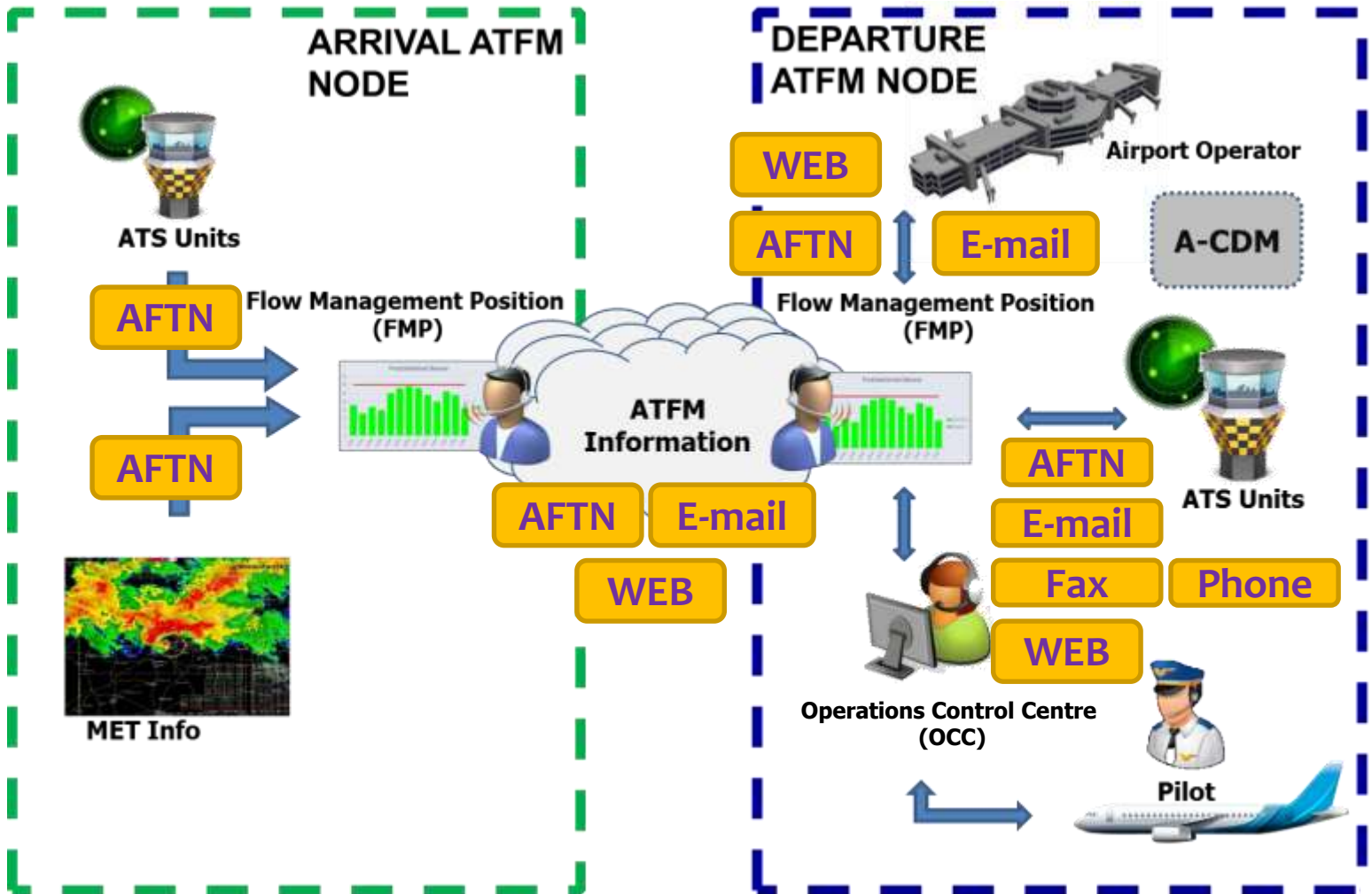
Technical Work Toward ATFM-on-SWIM



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Multi-Nodal ATFM Communication Today

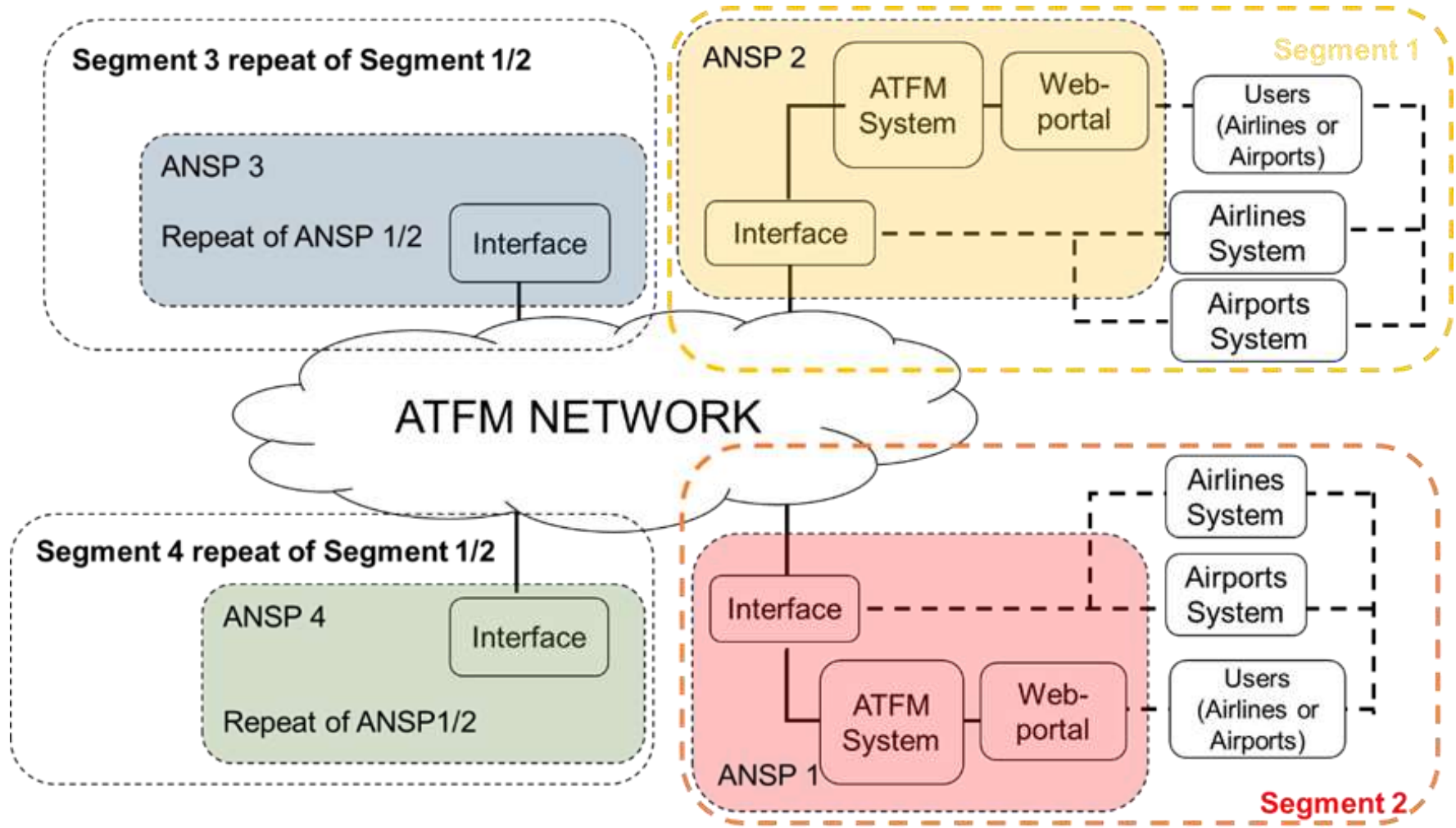
- MET Info
- ADP
- Flight Info
- ATFM Measure



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Multi-Nodal ATFM Communication **Tomorrow**



Technical Subgroup Main Tasks

Identify NEEDS

- ✓ Required data elements
- ✓ Operational scenarios

- ✓ Demand Monitoring
- ✓ GDP Activation – Congested Airport
- ✓ CTOT Management
- GDP Activation – Congested Airspace

Develop Infrastructure

- ✓ Map with FIXM provisions (v4.1)
- ✓ Initial FIXM extension (CTOT, CLDT)
- Connection, system, operational tests

Influence Provisions

- Coordinate with APAC SWIM TF
- Engage FIXM CCB
- Drive suitable provisions



Technical Work

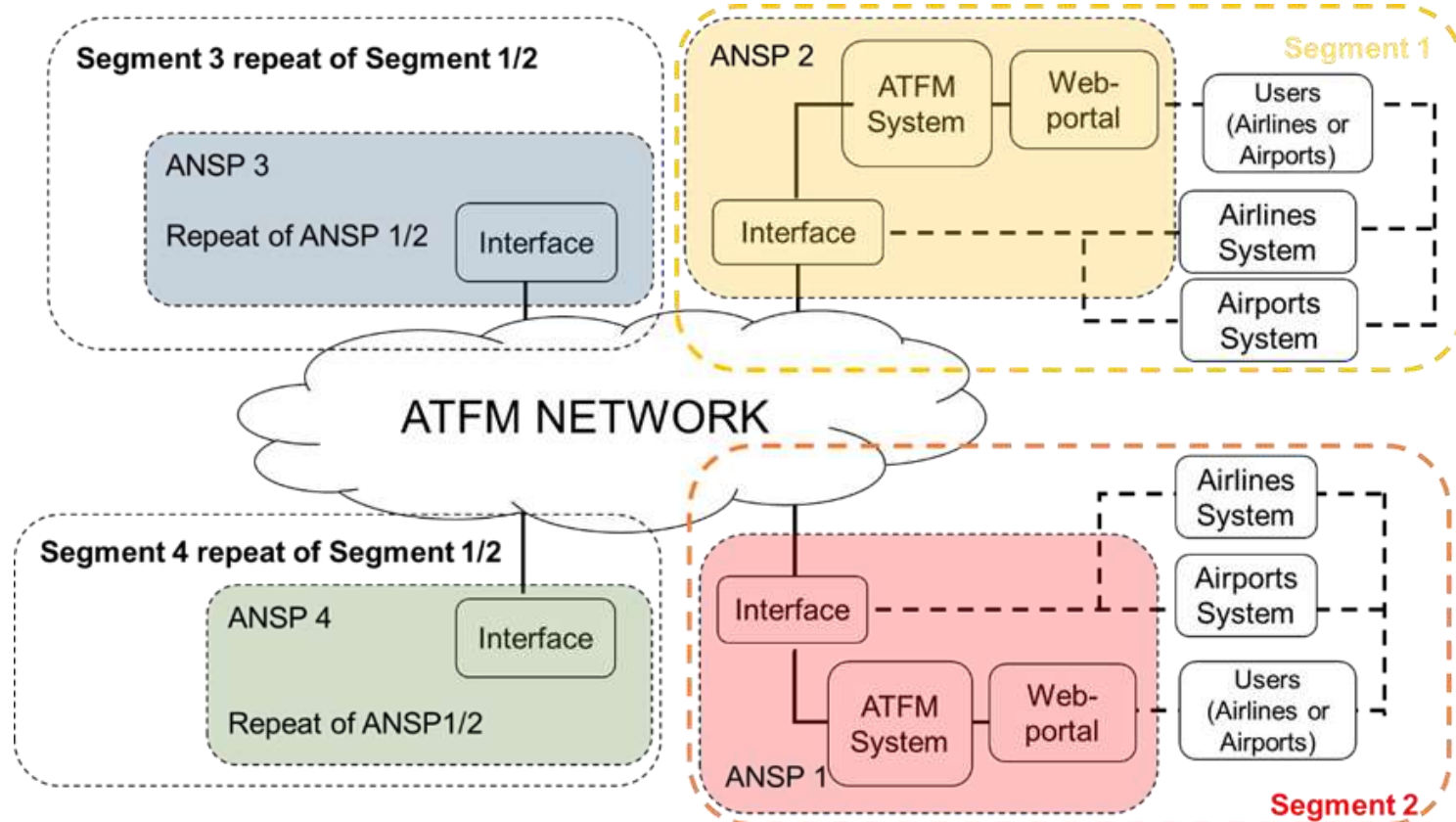
Technical Subgroup Work Plan



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Multi-Nodal ATFM Communication **Tomorrow**

- Loose system coupling
- Use of open standards
- Use of interoperable services



System-to-system connection designed based on SOA with the use of XML-based information exchange model



Collaboration

- ICAO APAC SWIM TF
- ICAO APAC ATFM/IR/SWG
- Multi-Nodal Technical Subgroup



Operational Scenarios
(Operational Requirements)

Why / When / How ?

Required Data Elements

CTOT, CLDT, etc.
not included in
FIXM4.0 and
FIXM 4.1 Core

Mapping to FIXM

ATFM Sys-Sys Connection

Develop FIXM Extension

ATFM Sys-Sys ICD

DRAFT

System Test



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Operational Scenarios (Operational Requirements)

- Demand-Capacity Monitoring
- GDP Activation
- CTOT Management

Required Data Elements

Mapping to FIXM

Develop FIXM Extension

- Finalized service description – Data elements to be exchanged between ATFM units
- Developed FIXM v4.0 Extension for CTOT and CLDT
- **With FIXM v.4.1 released in Dec 2017, new FIXM v4.1 was developed in Feb 2018 and validated in Apr 2018**

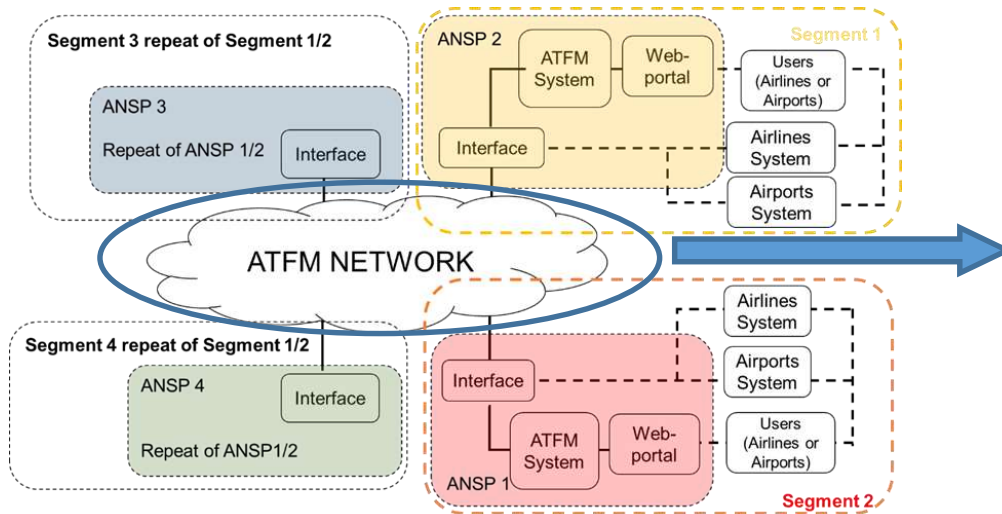
System Test

- Conducted system test between AEROTHAI and CAAS at the end of August 2017, using FIXM 4.0 with Extension
 - Flight Creation
 - Flight Update
 - CTOT Distribution
 - CTOT Cancellation



ICD Update

- Detailed interface requirements



Assumptions

- ATFM-to-ATFM system interconnection through EMS using **AMQP v1.0**

- I. Detailed service specification
- II. Readiness of FIXM v4.1 Extension
- III. Security requirements (done by EMS)

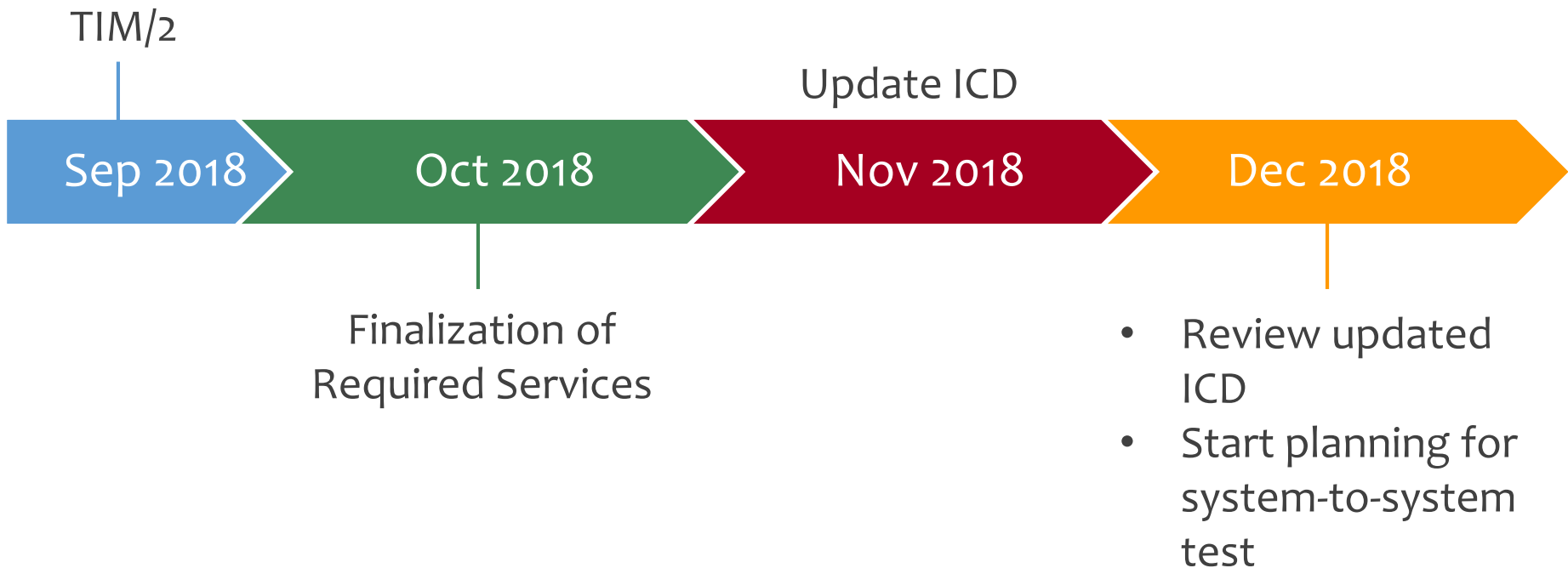
Within Sep 2018



ICD Update

- Detailed interface requirements

Synchronize with the SWIM in ASEAN Demonstration project timeline



ATFM-on-SWIM Forward Plan

ATFM-related
services
development based
on operational
scenarios

**SWIM in ASEAN
Demonstration**

2018

June 2019

Dec 2020

Key considerations

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



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In the Meantime...

...we use **Slot Allocation Message (SAM)**...

ANSP	SAM distribution
CATS	✓
CAAC ATMB	✓
HK CAD	Q3/2019
CAAS	Q3/2019
AEROTHAI	✓



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ASEAN ATFM Implementation Support Group



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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**



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Summary

ASEAN ATFM Implementation Support Team Kick-Off Meeting





Updated AMS ATFM Implementation Status

+ (Informal) Update during ASEAN ATFM Support / 1

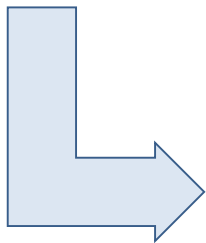
AMS	Phase I 1 Jan 2018 to 31 Dec 2020			Phase II 1 Jan 2018 to 31 Dec 2022		
	Expected Starting Date	Expected Completion Date	Progress (ASEAN ATFM/1)	Expected Starting Date	Expected Completion Date	Progress (ASEAN ATFM/1)
BRUNEI	To be provided	To be provided		To be provided	To be provided	
CAMBODIA	Started	31-Dec-17	100%	Started	31-Dec-20	Completed
INDONESIA	26-Jun-16	31-Dec-17	100%	26-Jun-16	31-Dec-18	Expect completion 31 Dec 2019
LAO PDR	28-Dec-18	31-Dec-20	30%	31-Dec-20	30-Dec-22	None
MALAYSIA	Started	Completed	100%	01-Dec-19	3rd Quarter 2020	
MYANMAR	Started	31-Dec-19	Completed	Started	31-Dec-20	
PHILIPPINES	02-Apr-18	01-Nov-18		01-Nov-18	01-Nov-19	
SINGAPORE	Started	01-Apr-17	100%	Started	01-Sep-18	Completed 30 Sep 2017?
THAILAND	Started	31-May-17	100%	Started	30-Sep-17	100%
VIETNAM	Started	31-Dec-18	80%	Started	31-Dec-20	



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



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

Thank You!

