



Thailand ATFM Operations at Sub-Regional Level

From BOBCAT to Cross-Border ATFM
ICAO Middle East ATFM Seminar

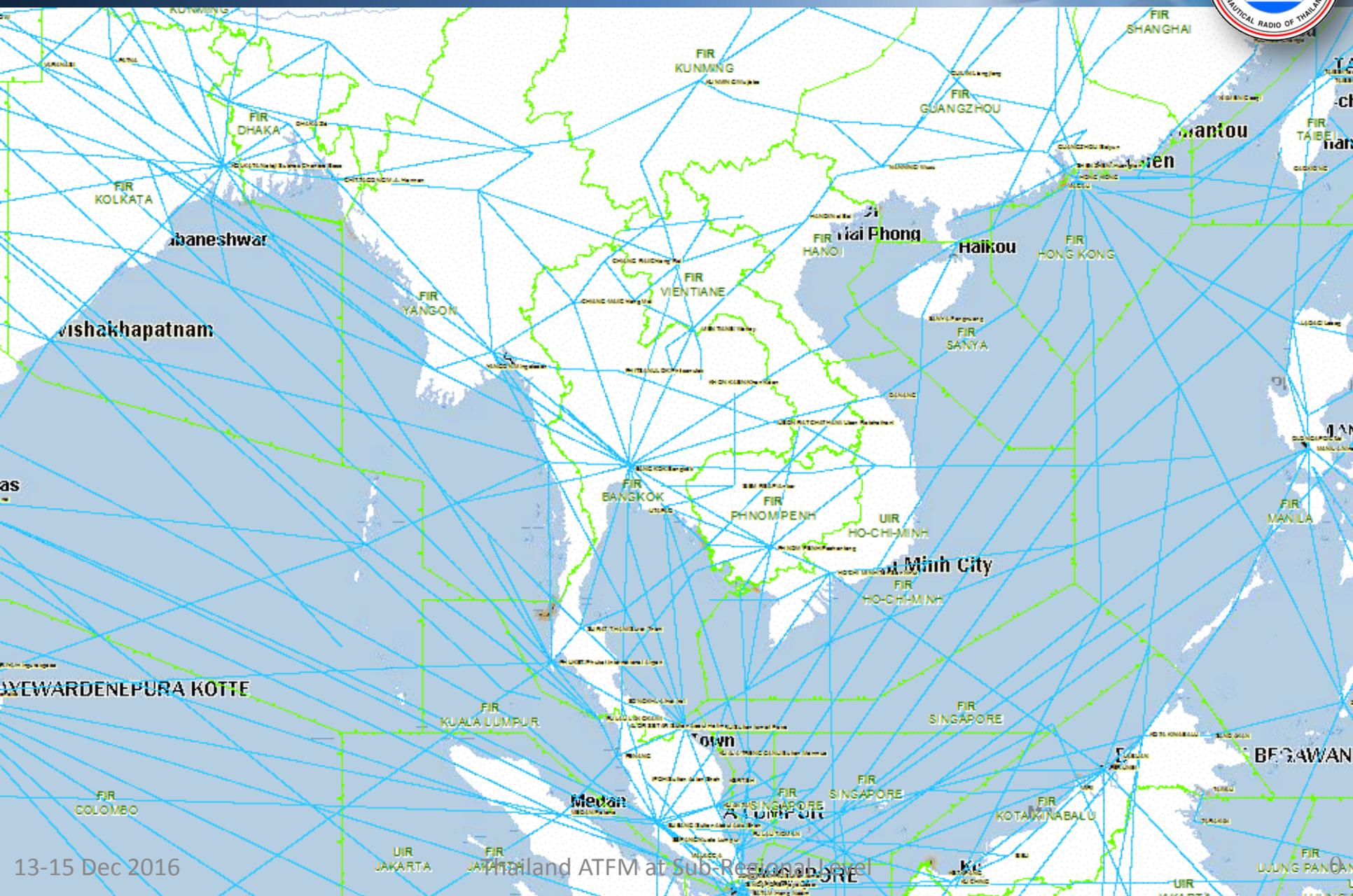


13 – 15 December 2016
Dubai, United Arab Emirates

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About Thailand

Thailand and International
CNS/ATM SYSTEM



13-15 Dec 2016

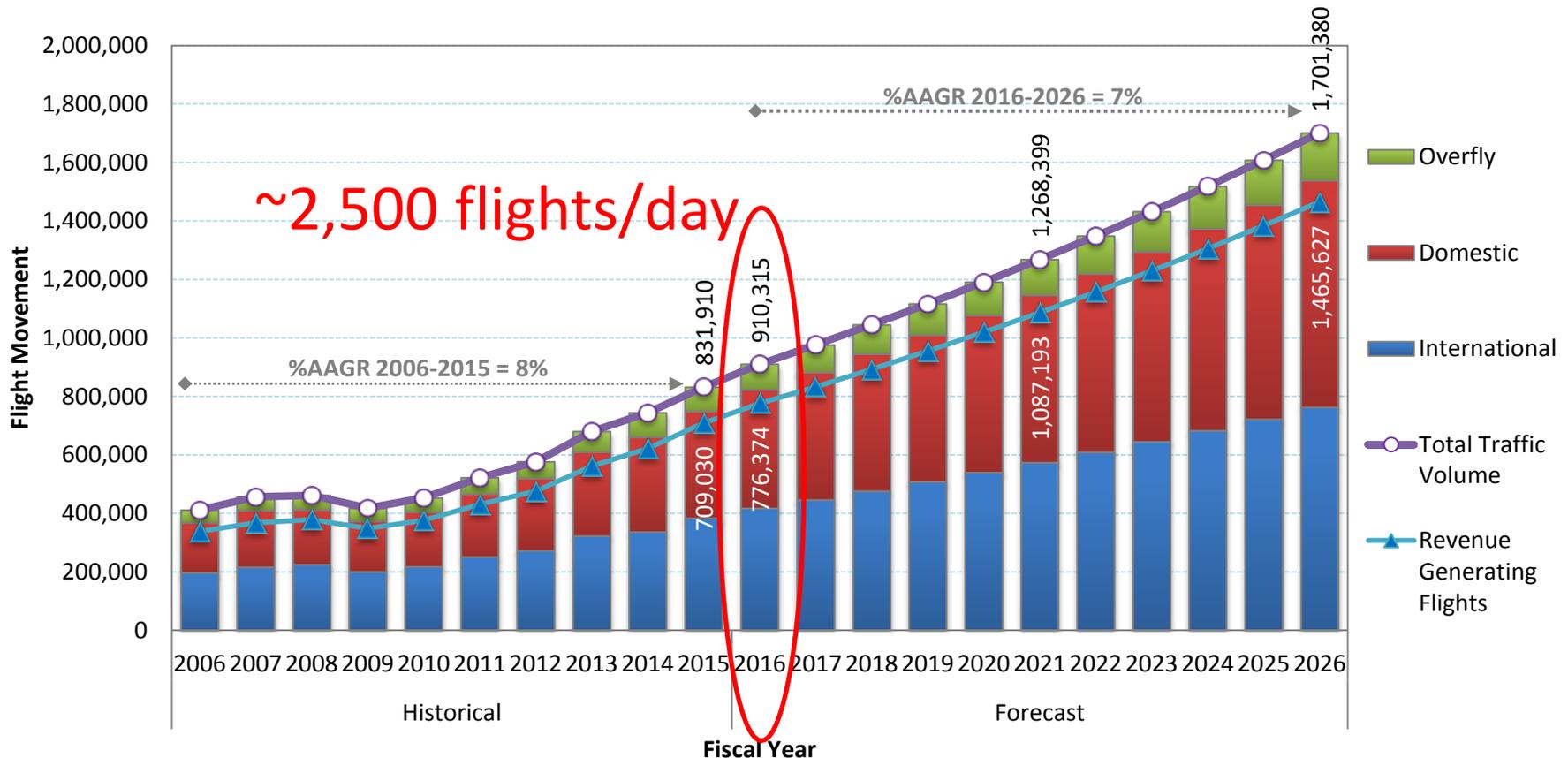
Thailand ATFM at Sub-Regional level

Thailand Air Traffic Growth



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

Forecast Annual Traffic Volume - Fiscal Year 2016-2026



Note: Assumed GDP growth rate in 2016 of 3.5% per year and GDP growth rate in 2017-2026 at 3.8% per

Thailand Air Traffic Demand

North

195,367 Flights/Year
535 Flights Daily
Overall GR: **20.1%**

	Volume	GR
Int'l	62%	27.2%
Dom	33%	7.4%
Overfly	5%	34.3%

East/North East

207,147 Flights/Year
568 Flights Daily
Overall GR: **7.8%**

	Volume	GR
Int'l	63%	6.6%
Dom	26%	7.6%
Overfly	11%	15.3%

West

120,692 Flights/Year
331 Flights Daily
Overall GR: **9.5%**

	Volume	GR
Int'l	70%	8.1%
Dom	0%	
Overfly	30%	13.0%

South

257,213 Flights/Year
705 Flights Daily
Overall GR: **5.3%**

	Volume	GR
Int'l	35%	2.7%
Dom	55%	5.8%
Overfly	10%	12.0%

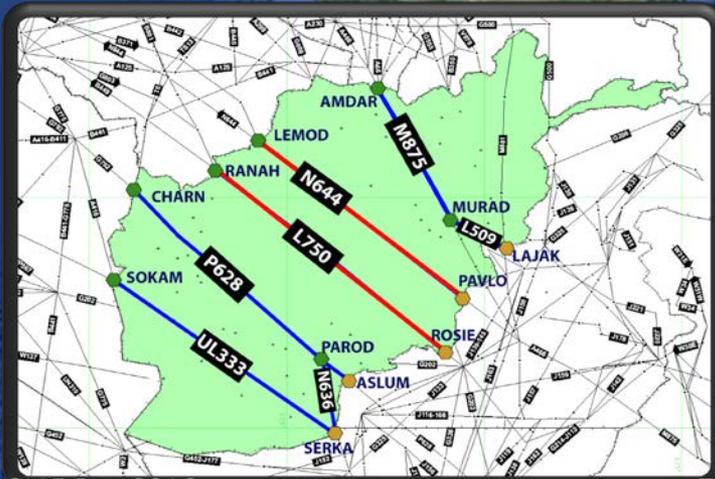
Note: Annual Growth Rate / Data up to 30 Sep 2016

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Thailand's ATM at Sub-Regional Level

Collaborative ATFM through Afghanistan

BOBCAT



es/Spot Image
ate Geographer
S. Navy, NGA, GEBCO
pa Technologies

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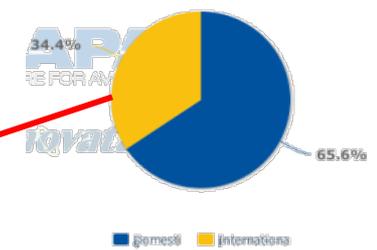
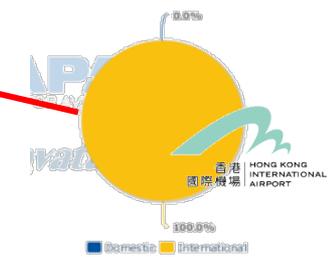
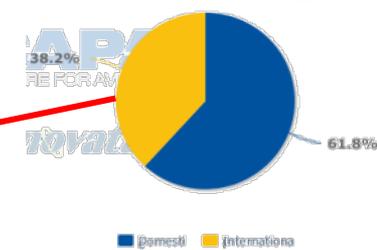
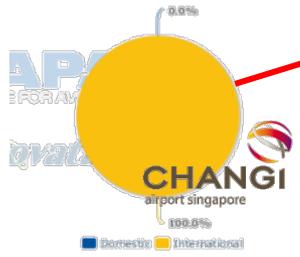
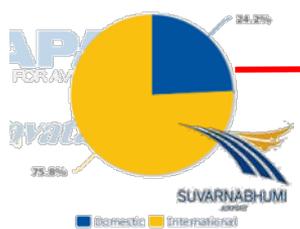
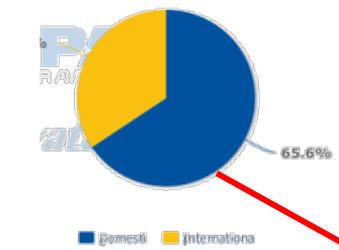
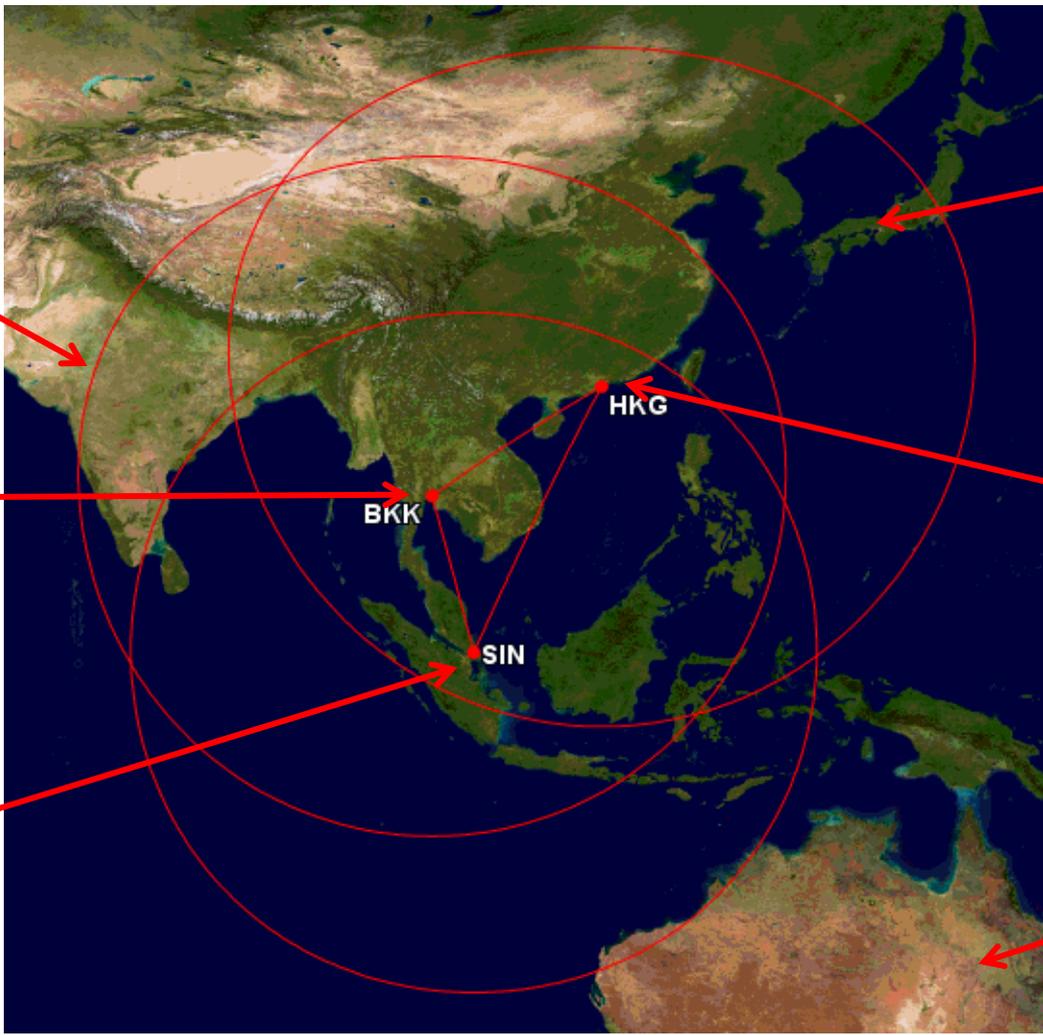
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Thailand ATFM at Sub-Regional Level

21°16'31.77" N 83°43'22.17" E elev 282 m

Eye alt 5121.36 km

CDM/ATFM in Asia-Pacific : Traffic Balance

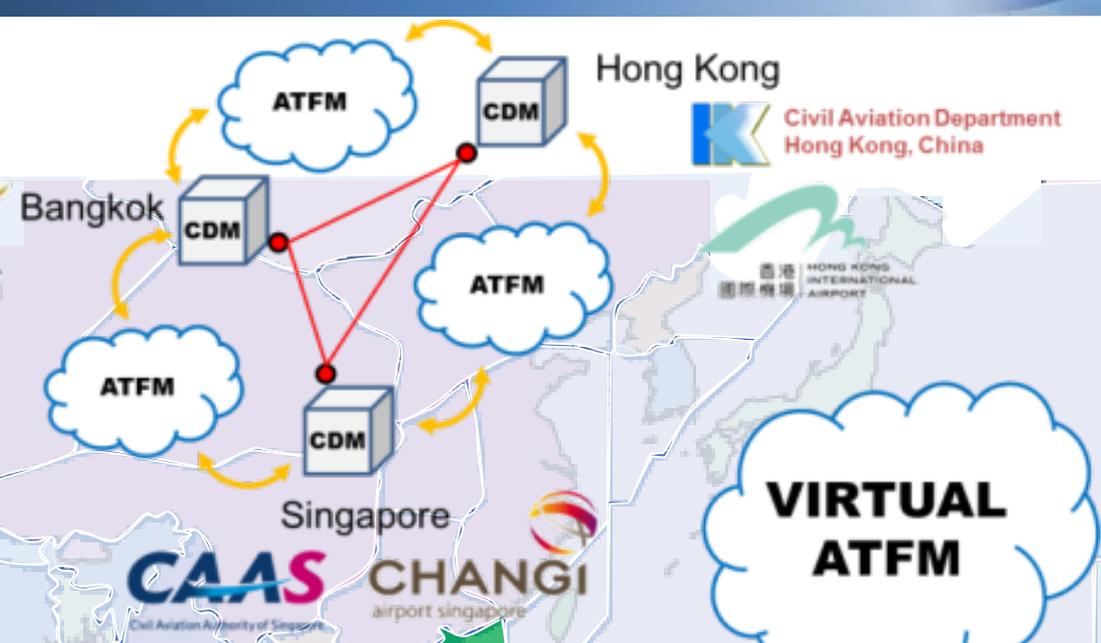


CANSO Bangkok-Singapore Whole-Flight CDM (2011-2012)

Thailand and Malaysia
CNS/ATM SYSTEM



Tripartite CDM/ATFM Project (2012-2013)



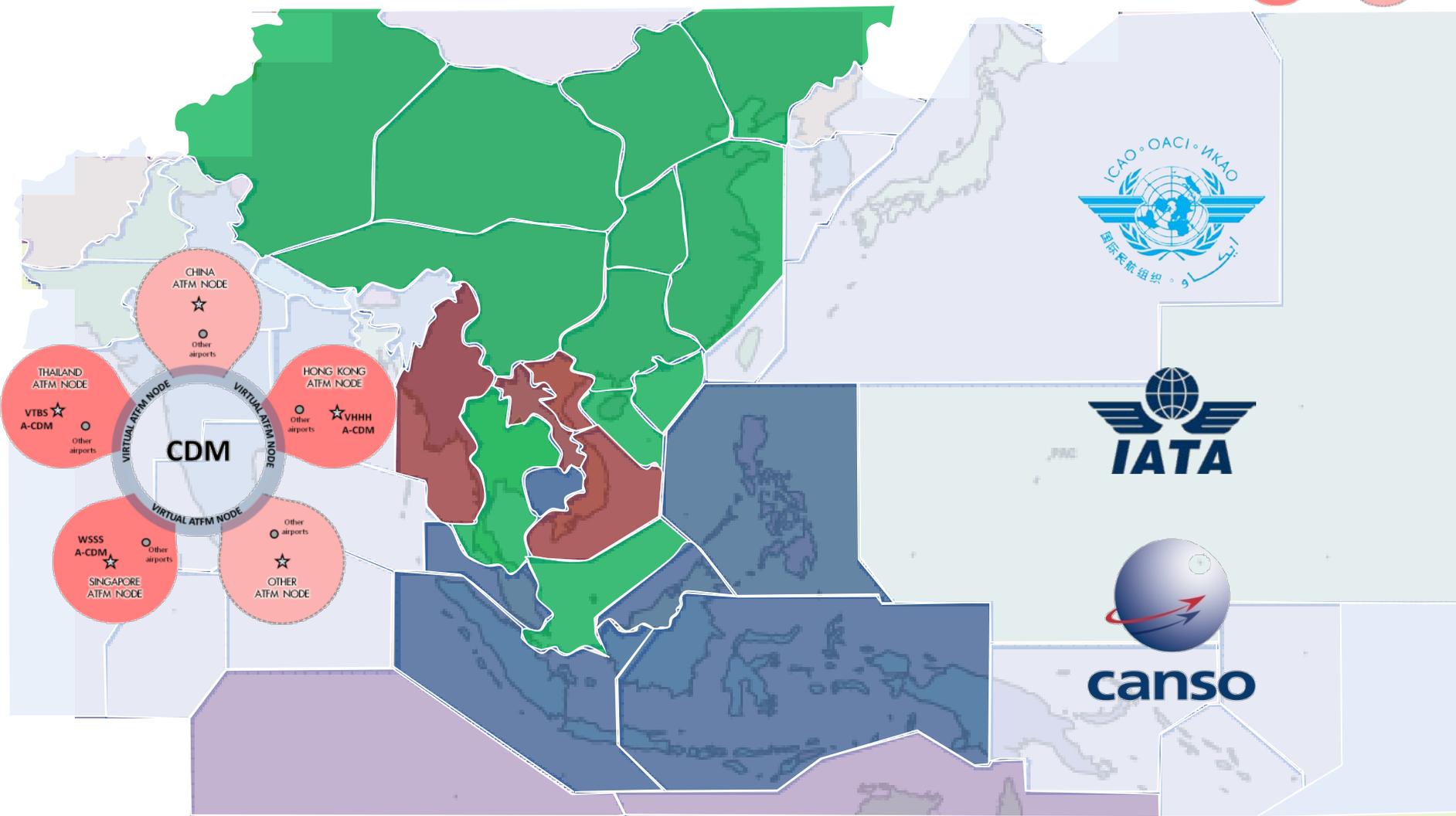
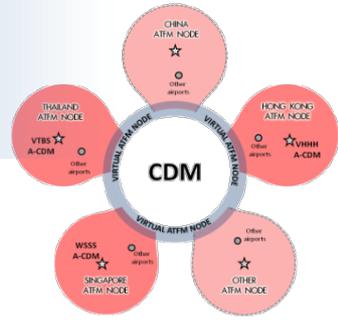
APEC ATM Emissions Reduction Project (2012-2013)



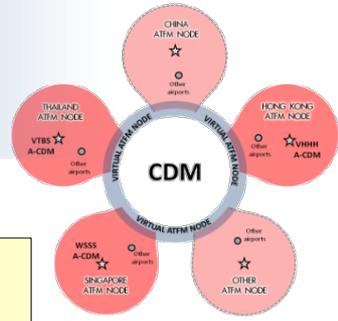
Air Traffic Management
Emissions Reduction
Project Report

APEC Transportation Working Group
December 2013

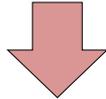
Distributed Multi-Nodal ATFM/CDM Network (2014+)



Multi-Nodal ATFM Network : Research



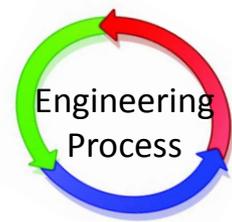
Problem Statement:
Develop a viable ATFM/CDM concept that can regulate flights into constrained resource, when those flights **depart from ANSPs under different control authority**



ATFM/CDM Proof-of-Concept Project:
10-month proof-of-concept research project supported by industry partners



Analysis of Existing Solutions



Engineering Process

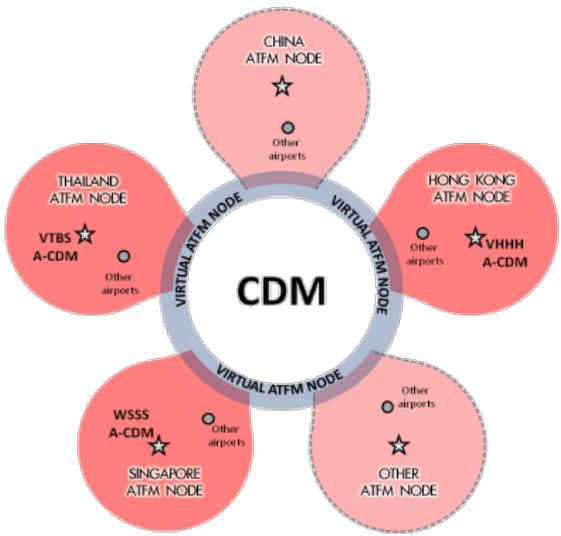
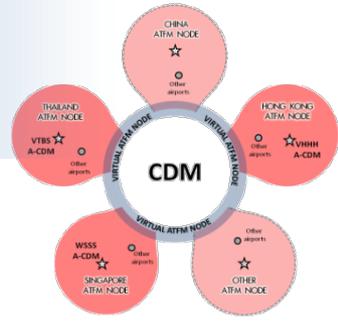


Stakeholders Involvement



HITL Simulation

Multi-Nodal ATFM Network : Concept

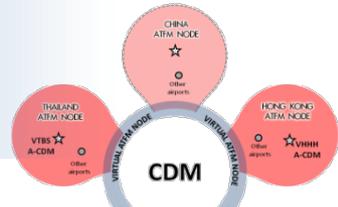


- Bases:**
- Common ATFM principles and guidance with harmonized protocols supported by agreed Common Operating Procedures (COP)
 - Effective information sharing and dissemination framework

Concept:
Independent “virtual” ATFM nodes supported by interconnected information sharing framework

Supplement: A-CDM Process

Multi-Nodal ATFM Network : Participation



Level 3 ATFM Nodes
Generate, Distribute, Comply

- to ATFM Measure
- China
 - Hong Kong China
 - Singapore
 - Thailand

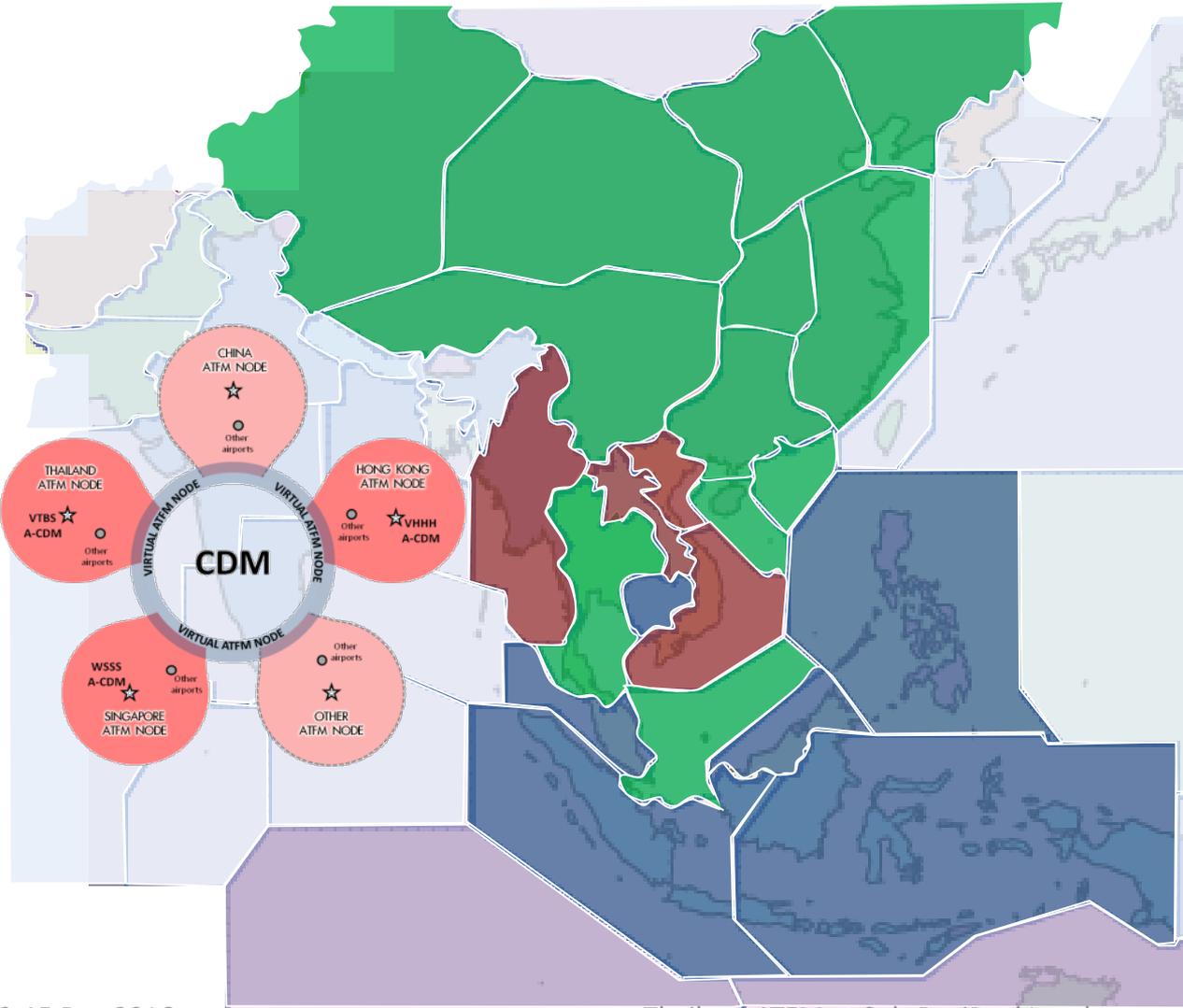
Level 2 ATFM Nodes
Comply to ATFM Measure

- Indonesia
- Malaysia
- Cambodia
- Philippines

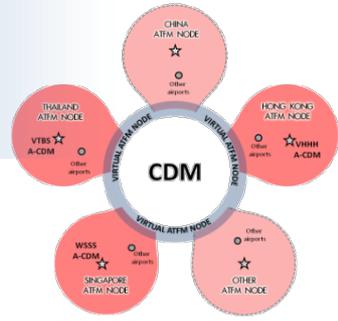
Level 1 ATFM Nodes
Observers

- Lao PDR
- Myanmar
- Viet Nam

Advisory ATFM Node
○ Australia



Multi-Nodal ATFM Operational Trial



Phased Approach to the Operational Trial

Phase 1
2015 - 2016

- Distributed Ground Delay Program
- Airport Arrival Constraints (short-term & medium-term) e.g. weather, runway outage

Phase 2

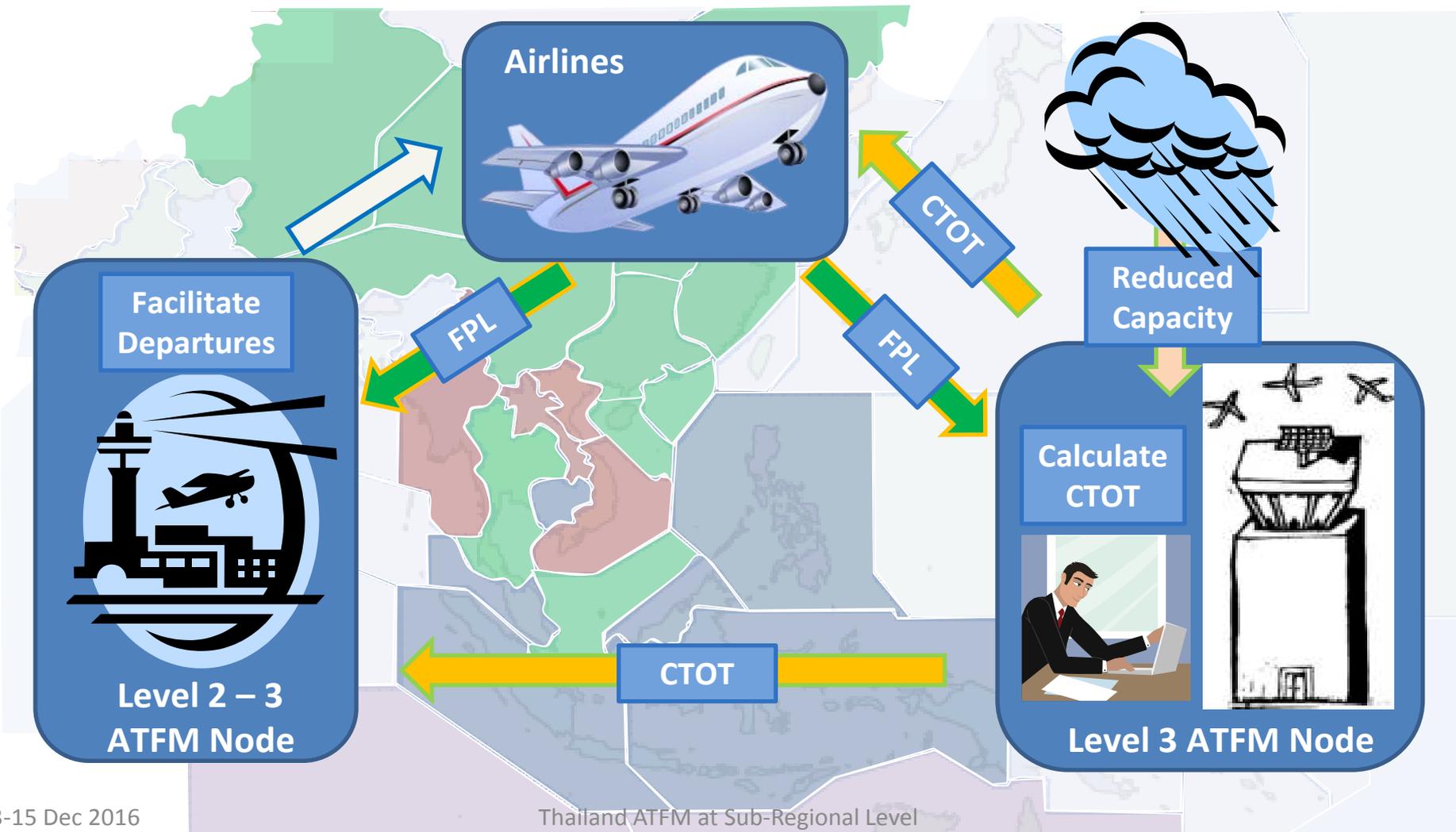
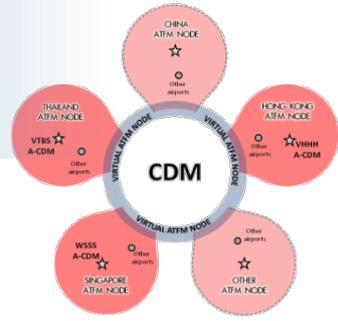
- Ground Delay Program supporting Airspace Congestion & Capacity Planning
- Explore interconnectivity among ATFM systems

Phase X
Vision

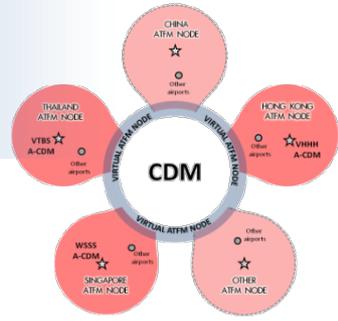
- Fully interconnected Global ATFM Service
- Integration with SWIM and 4D-Trajectory Management

Multi-Nodal ATFM Network : Phase 1

Phase 1 : DCB for Arrival Airport Constraints



Multi-Nodal ATFM Network : Progress



Where We Are Today

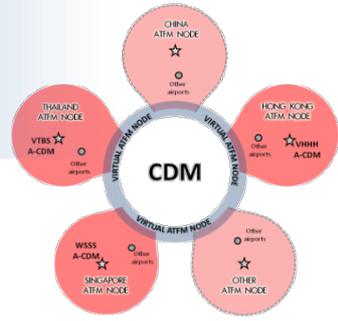
Phase 1 – DCB for Constrained Airports

Stage 1	Stage 2	Stage 3
<ul style="list-style-type: none"> ✓ Communication Linkage and Protocols ✓ Dissemination of Information 	<ul style="list-style-type: none"> ✓ Demand Prediction Validation ✓ Local Table-Top Exercises ✓ Cross-Border ATFM Procedures Development and Validation (through demo flights) 	<ul style="list-style-type: none"> ➤ Limited-Scope Operational Service - Planned Event - Ad-Hoc ATFM

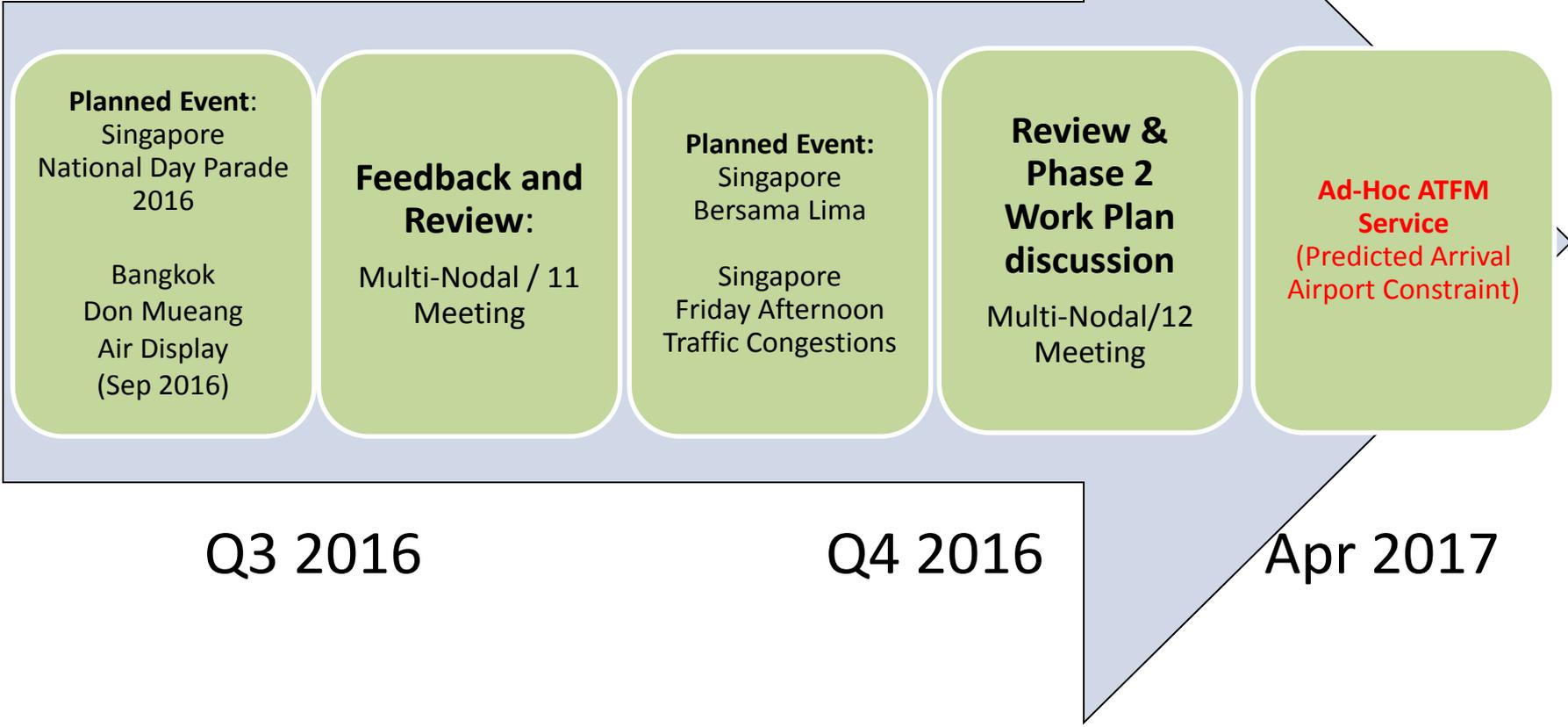
Phase 2 – DCB for Constrained Airspace

TBD

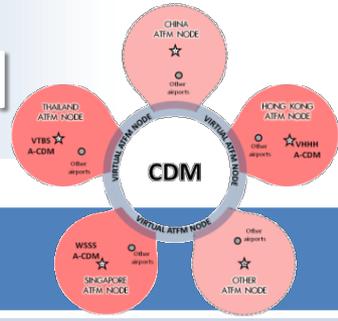
Phase 1 Stage 3: Limited-Scope Ops Service



Project Progression

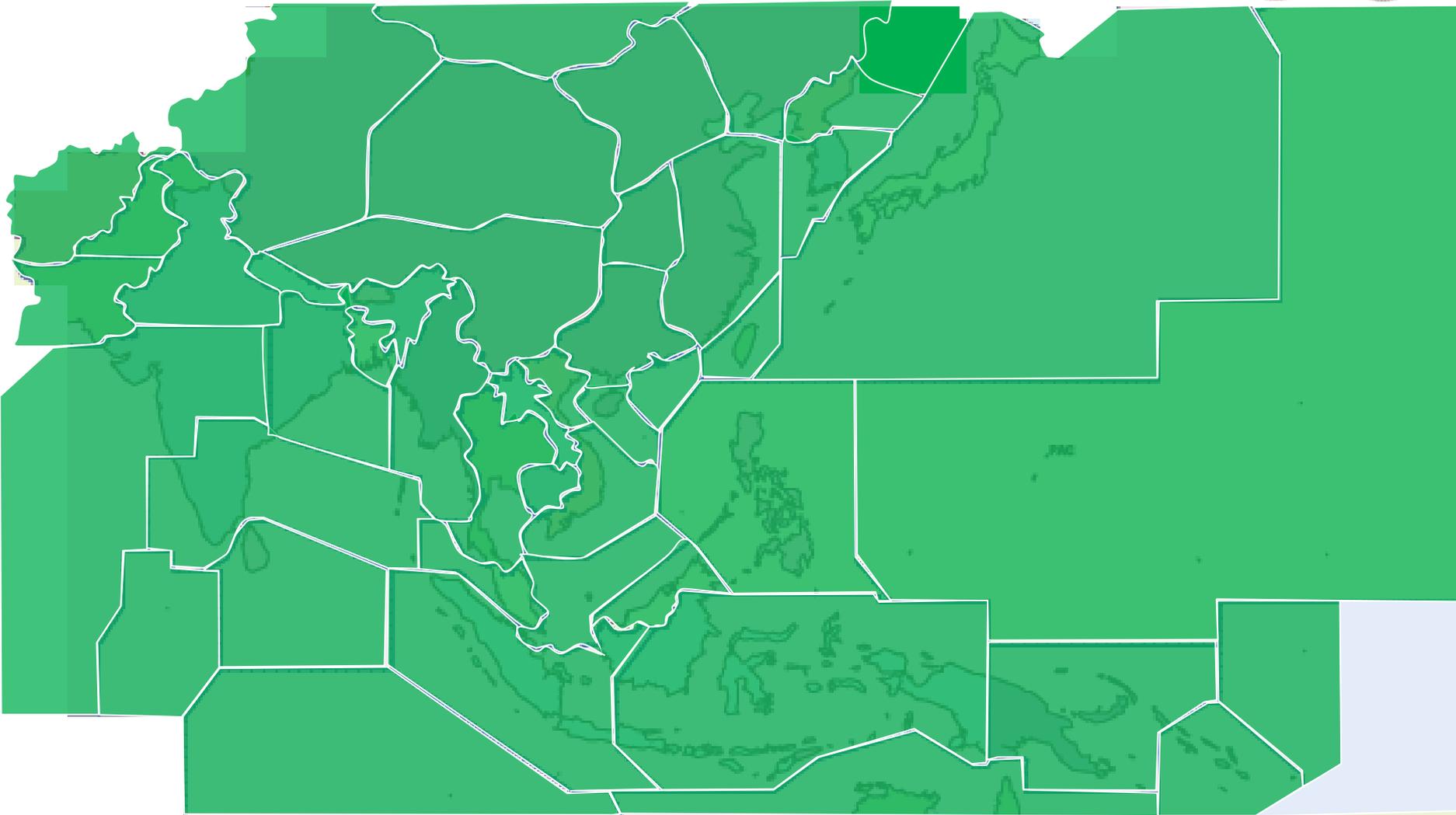
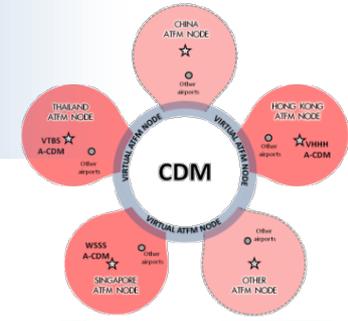


Multi-Nodal ATFM Project : Moving Forward



Time	Event
Nov – Dec 2016	Singapore Fridays Peak Hour GDP/CTOT
Dec 2016	Multi-Nodal/12 Project Team Meeting 
14 Jan 2017	Don Mueang Children’s Day 2017 Airshow
Feb 2017	Cobra Gold Joint Military Exercise 2017
Mar 2017	Cope Tiger Joint Military Exercise 2017
Mar 2017	Multi-Nodal/13 Project Team Meeting 
Mar – May 2017	Suvarnabhumi Runway Maintenance
Q2 2017	Multi-Nodal/14 Project Team Meeting
Q4 2017 – 2018	Thailand ATM System Transition

Towards Regional Cross-Border ATFM





Thank You!