



*International Civil Aviation Organization*

**The Third Meeting of ICAO Asia/Pacific Air Traffic Flow Management Steering Group (ATFM/SG/3)**

Singapore, 10 – 14 March 2014

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**Agenda Item 5: Development of Regional ATFM Framework**

**THAILAND CDM/ATFM CONCEPT**

(Presented by Thailand)

**SUMMARY**

This working paper presents Thailand's CDM/ATFM Concept of Operations based on ICAO Manual on Collaborative ATFM (Doc 9971) and potential applicability towards the Interim Framework for Collaborative ATFM and Asia Pacific Regional Framework for Collaborative ATFM.

**1. INTRODUCTION**

1.1 The meeting is advised that the Asia-Pacific region has been experiencing rapid traffic growth as a part of economic development. For illustrative purposes, Thailand has been experiencing 12-16 percent traffic growth for the past few years. Such rapid traffic growth quickly puts stress on Air Navigation Services infrastructure throughout the region.

1.2 In recognition of the need to enhance Air Navigation Service capacity to handle such rapid growth, ICAO developed Aviation System Block Upgrade (ASBU) framework, with module on regional networked Air Traffic Flow Management forming major part of the ASBU framework since Block 0 (2013) through B0-NOPS.

1.3 In support of the B0-NOPS module, ICAO Headquarters enlisted a group of experts from States, ANSPs, and International Organizations with ATFM experience (ATFM Manual Coordination Team) to develop the ICAO Manual on Collaborative ATFM (Doc 9971), providing guidance on Collaborative ATFM implementation. A draft of Doc 9971 was released during the ICAO Air Navigation Conference (AN-Conf/12) in November 2012, soliciting comments and suggestions from States. In response, ICAO continued to further develop the manual through the ATFM Manual Coordination Team with updated document to be released at the Advanced ATM Techniques Symposium and Workshop in November 2013 at Montreal, Canada.

1.4 Thailand, along with other States in Asia-Pacific region including Hong Kong, China; India; Japan and the United States, was privileged to be invited to contribute in development of the manual.

1.5 Meanwhile, ICAO Asia-Pacific moved forward to develop ICAO Asia/Pacific Seamless ATM Plan, including provision on CDM/ATFM development to support Seamless ATM Operations in the region. Version 1.0 of the Seamless ATM Plan was endorsed by APANPIRG/24 meeting in June 2013.

1.6 Along with endorsement of the ICAO Asia/Pacific Seamless ATM Plan, APANPIRG/24 meeting approved Conclusion 21/15 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.

1.7 Moreover, the ATFM/SG/2 meeting in Hong Kong, China in September-October 2013 made the decision to form the ATFM Specialist Team of experienced ATM/ATFM specialist and other stakeholders to develop the Interim Framework for Collaborative ATFM with the goal for consideration at APANPIRG/25 and the Asia Pacific Regional Framework for Collaborative ATFM.

## **2. DISCUSSION**

2.1 While regional CDM/ATFM development continued, Thailand continued to experience traffic increase to such extent that various sectors in the Bangkok ACC would become saturated during peak hours by a margin of 20-30%. Fortunately, saturated sectors currently service traffic mostly originating from airports within the Bangkok FIR.

2.2 While capacity enhancements are being deployed to address the sector saturation such as new ATS automation system and the decision to procure ATFM automation to support transition towards new ATS automation, Thailand took the initiative to develop CDM/ATFM Concept of Operations based on ATFM Operations Management principle in ICAO Manual on Collaborative ATFM (Doc 9971) as in **Attachment 1**.

2.3 It is envisaged that the CDM/ATFM Concept of Operations should be complementary with other concepts being developed in the region such as those Thailand has been collaborating with Hong Kong, China, Malaysia and Singapore in ways that congestions in ACC sectors as well as airports are being addressed. Moreover, the CDM/ATFM Concept of Operations could then be integrated with Distributed CDM/ATFM Concept over time.

2.4 When used in conjunction with the ICAO Doc 9971 Part II, the Concept of Operations should enhance understanding of roles of stakeholders involved in CDM/ATFM process from Strategic CDM/ATFM Operations through Pre-Tactical CDM/ATFM Operations and Tactical CDM/ATFM Operations.

2.5 In order to support rapid traffic increase and transition towards new ATS automation system, Thailand has secured appropriate budget to procure ATFM automation system in line with the CDM/ATFM concept mentioned. While it may appear that the ATFM automation system could be largely initially “domestic,” interoperability requirement will be included in the upgrade roadmap to ensure interoperability with other similar systems. In addition, it is envisaged that the ATFM automation support system will be in position to support Distributed CDM/ATFM trial proposed in a separate joint Working Paper.

2.6 Therefore, it is proposed that the Concept of Operations be adapted and integrated into the Interim Framework for Collaborative ATFM and the Asia Pacific Regional Framework for Collaborative ATFM in appropriate form.

**3. ACTIONS BY THE MEETING**

3.1 The meeting is invited to:

- a) note information presented in this WP;
- b) discuss regional applicability of the CDM/ATFM Concept of Operations,
- c) discuss proposal to adapt and integrate the CDM/ATFM Concept of Operations into the Interim Framework for Collaborative ATFM and the Asia Pacific Regional Framework for Collaborative ATFM; and,
- d) discuss any relevant matters as appropriate.

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# Thailand CDM/ATFM Concept

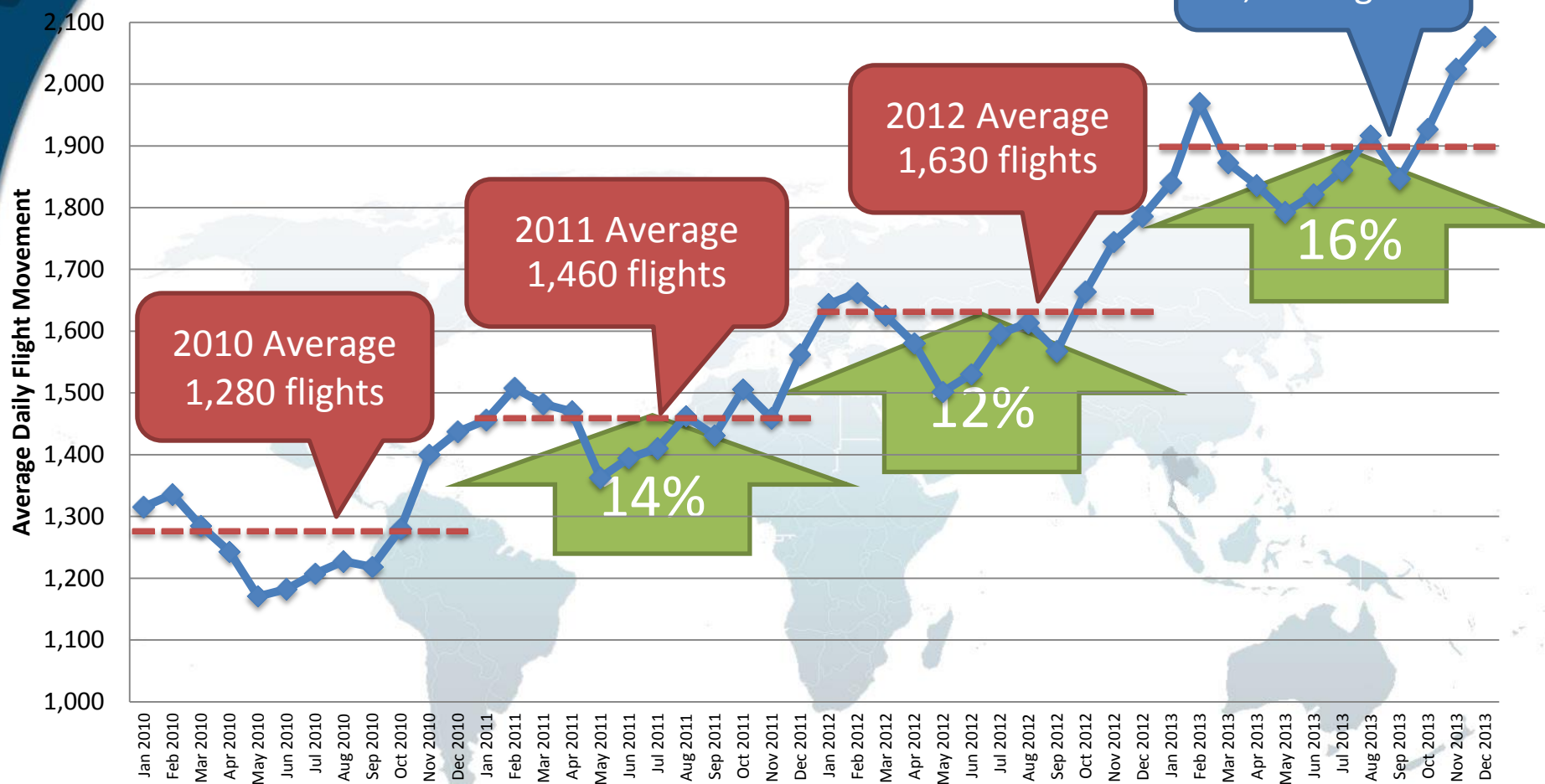
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# Traffic Growth : Airborne Flights

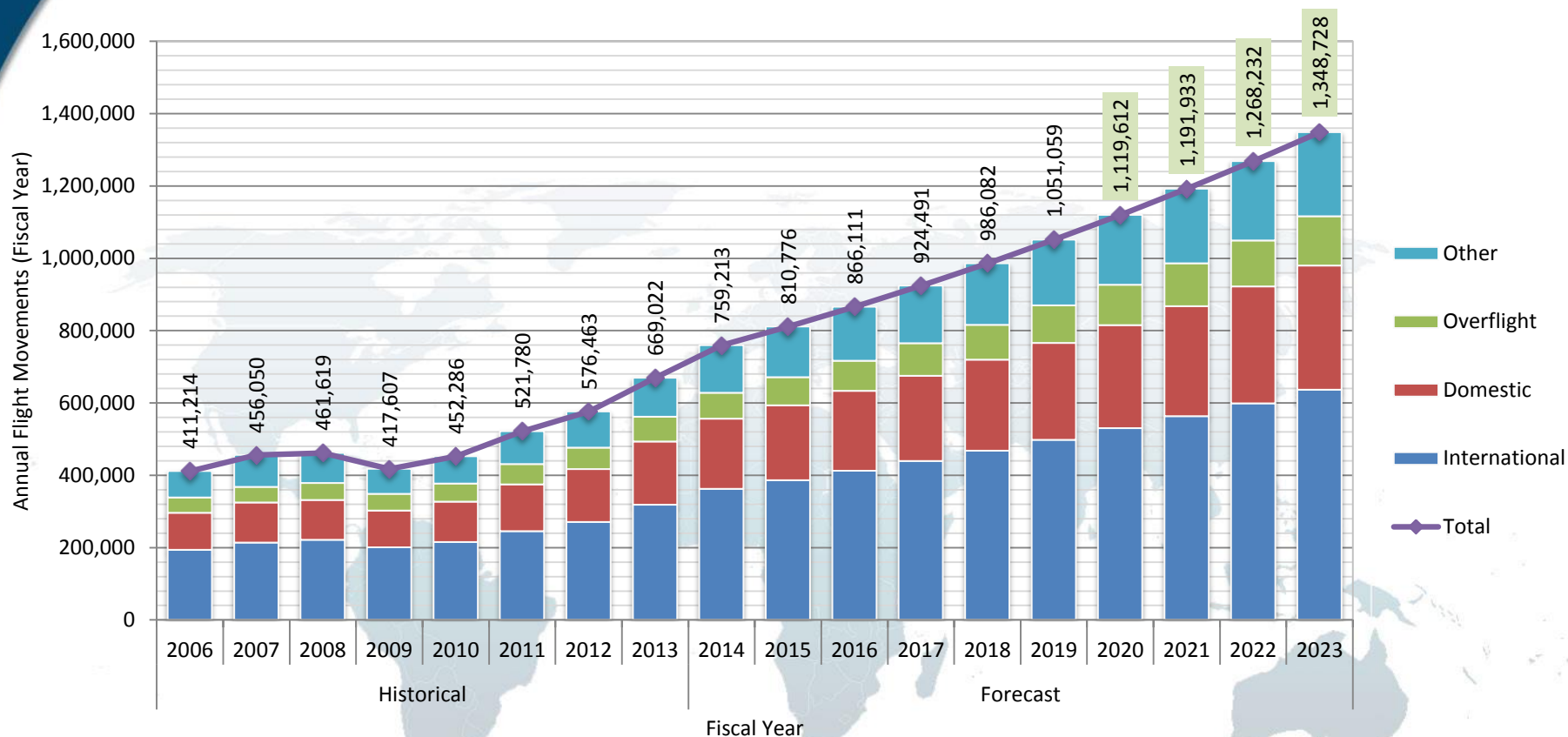
**Average Daily Flight Movement in Bangkok FIR**  
January 2010 - December 2013





# Thailand Traffic Growth: Annual Flight Movements

Flight Movements in Bangkok FIR  
Historical Fiscal Year 2000 - 2013 & Forecasted Growth 2014 - 2023



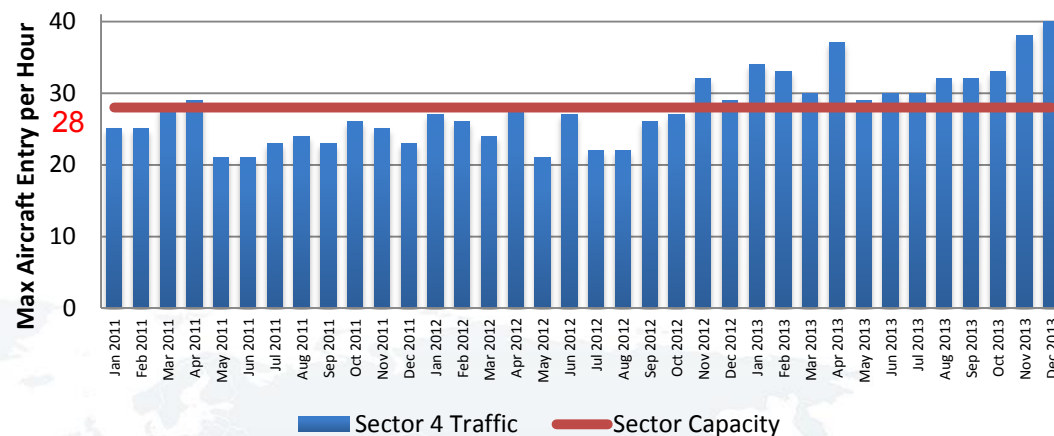
- Note:**
1. Thailand's Fiscal Year starts on 1 October of each year e.g. Fiscal Year 2013 falls between 1 October 2012 and 30 September 2013
  2. Based on Quarterly GDP growth with 2014 growth at 5.1% and 2015-2023 at 5.5%
  3. Based on actual historical data up to 30 September 2013



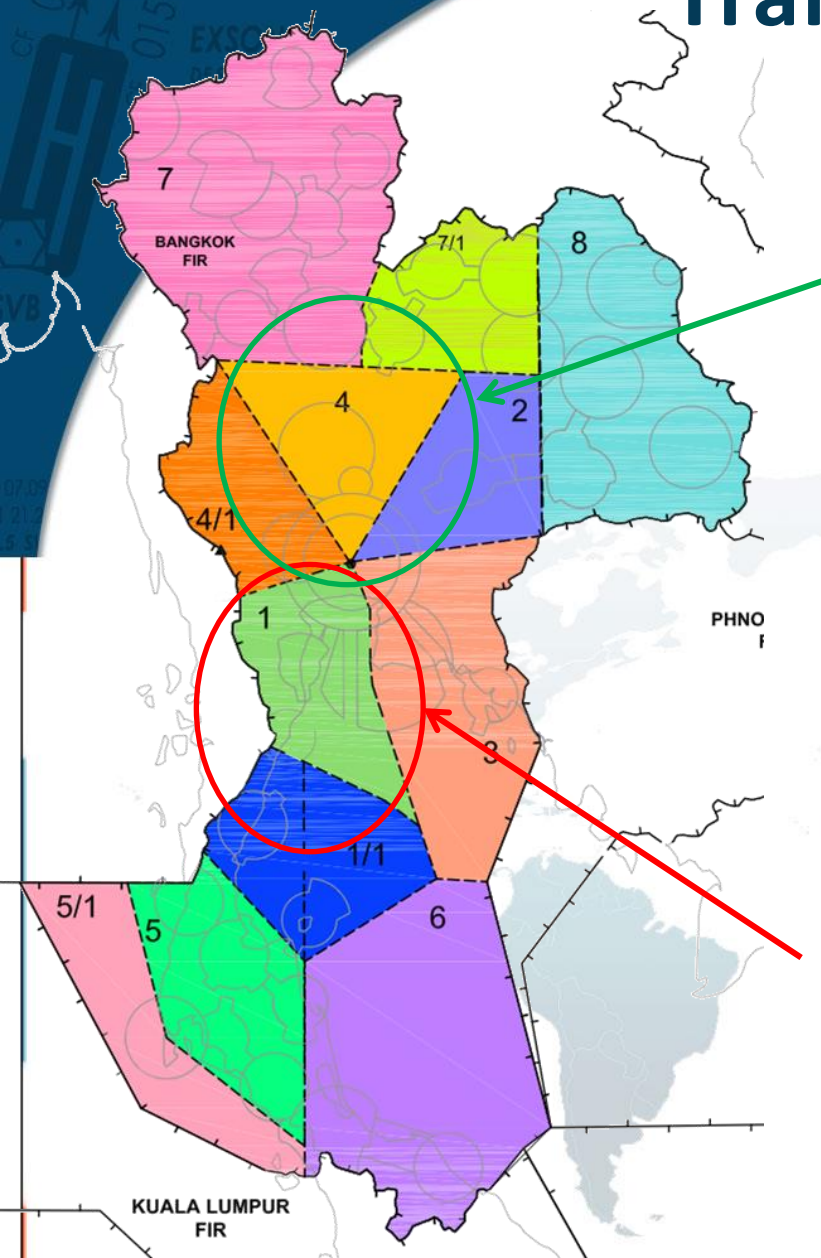
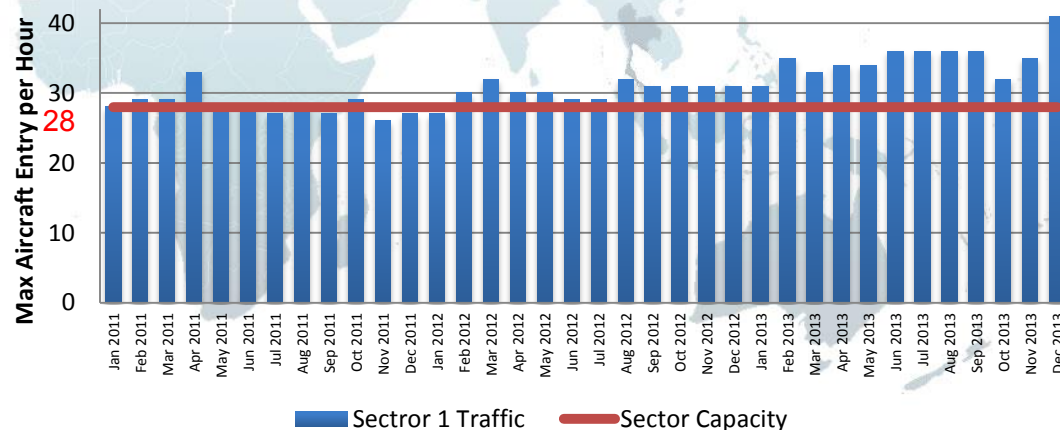


# Traffic Growth : Sector Traffic

**Traffic Volume - Sector 4**  
(Maximum Entry Count – Jan 2011- Dec 2013)

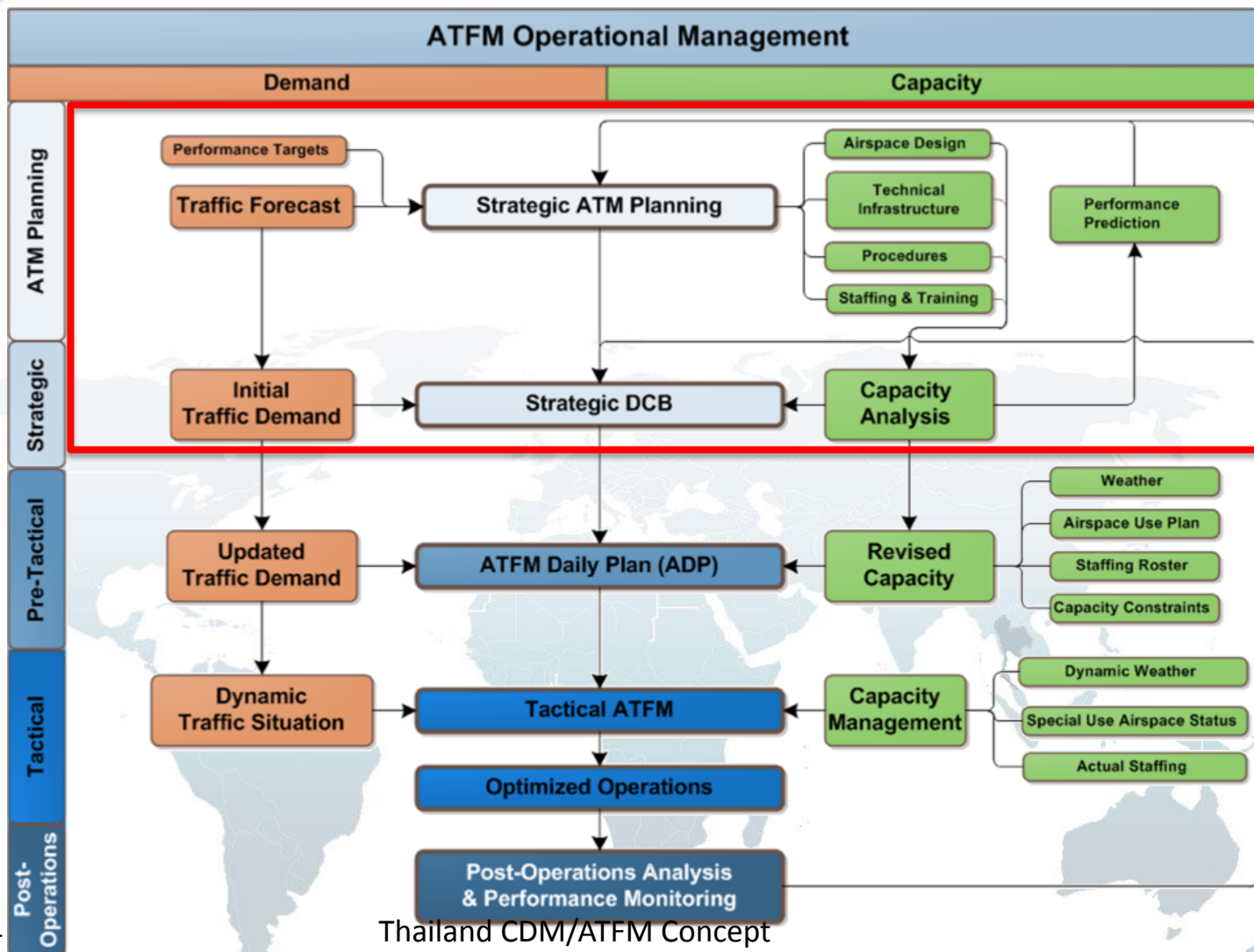


**Traffic Volume - Sector 1**  
(Maximum Entry Count – Jan 2011 - Dec 2013)





# ATFM Operations Management

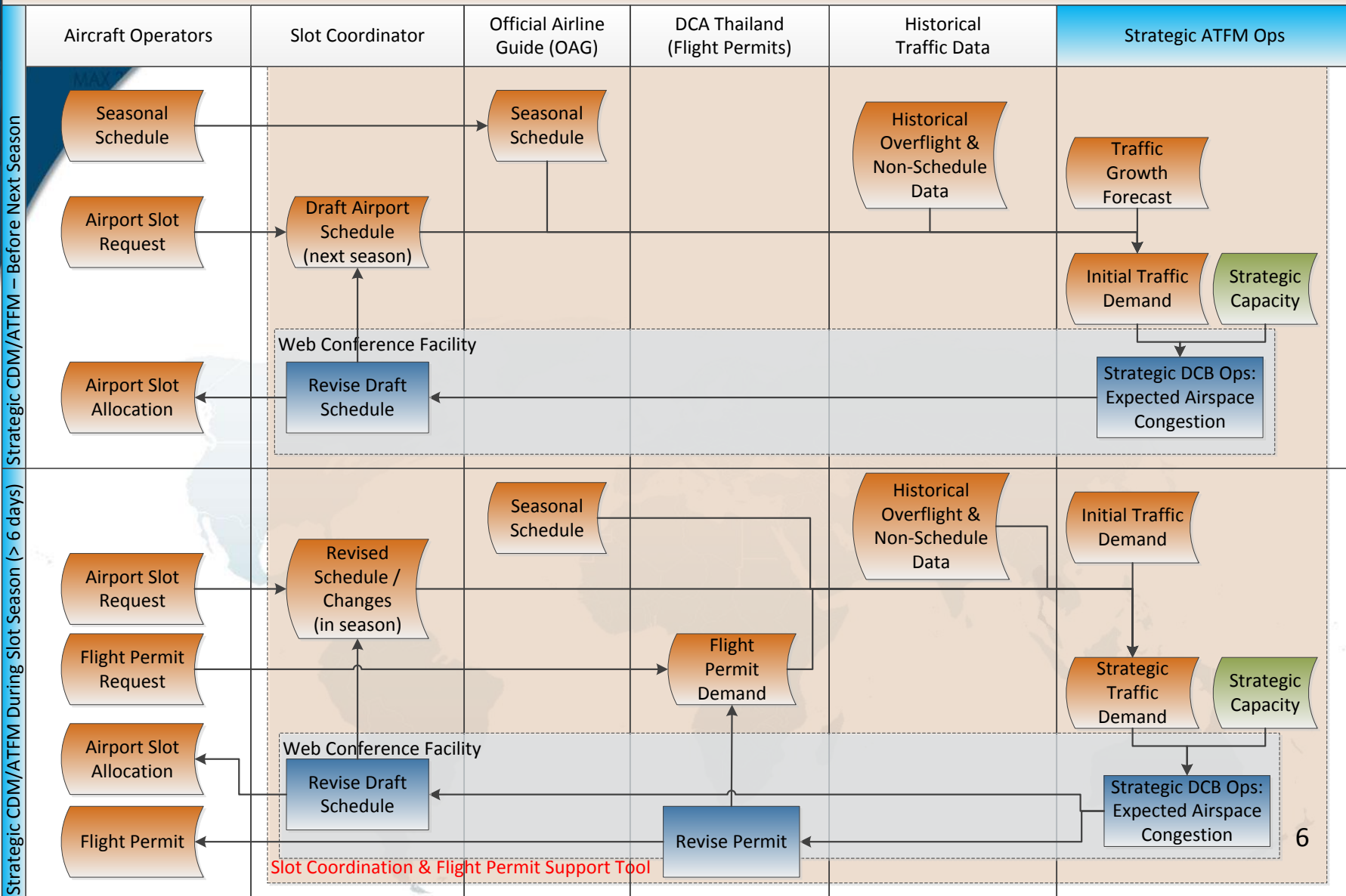






# Strategic CDM/ATFM : **Traffic Demand** & Ops

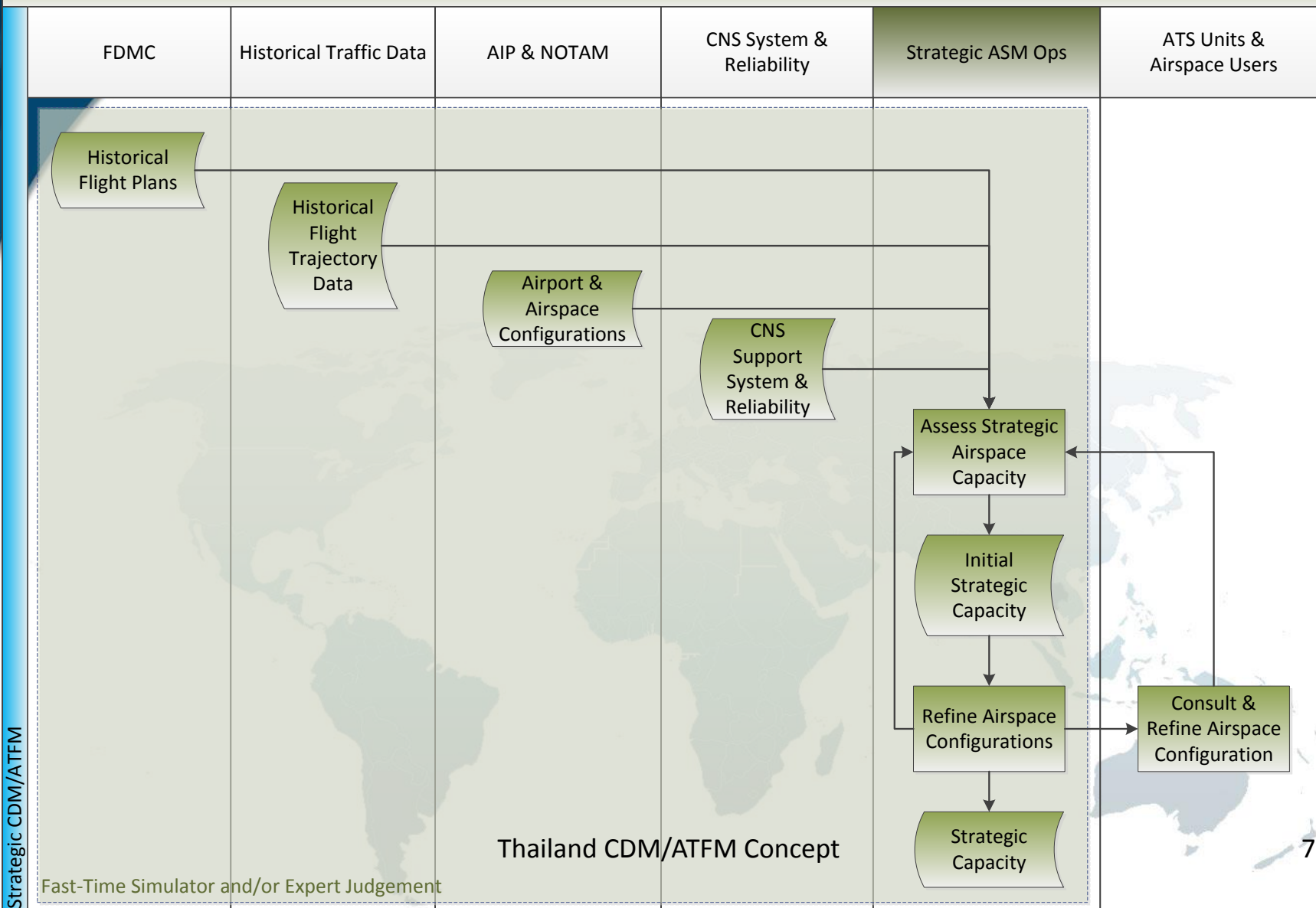
Strategic Demand Monitoring (days to months/years before operations)





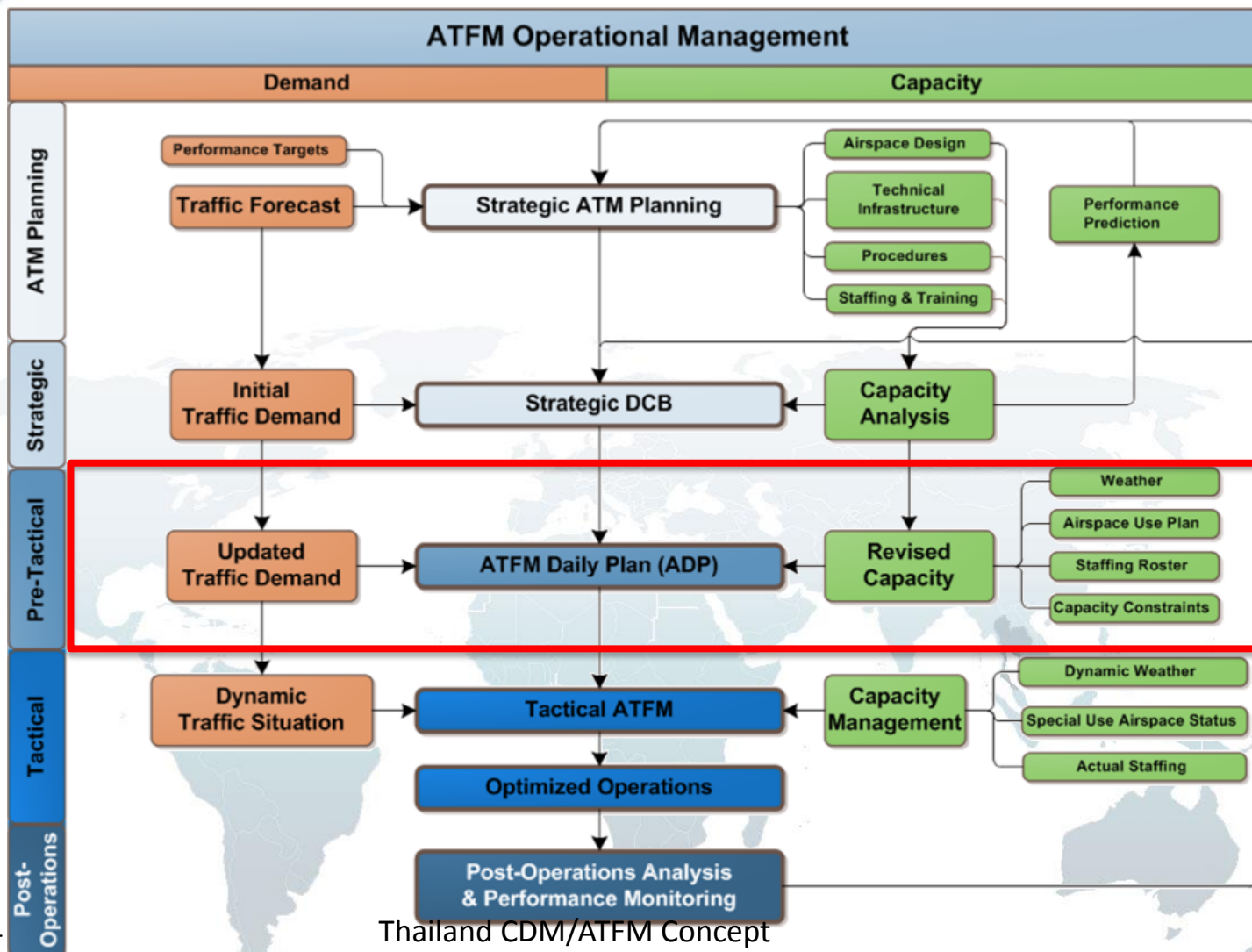
# Strategic CDM/ATFM: Initial Capacity Analysis

Strategic Capacity Assessment (months before operations)





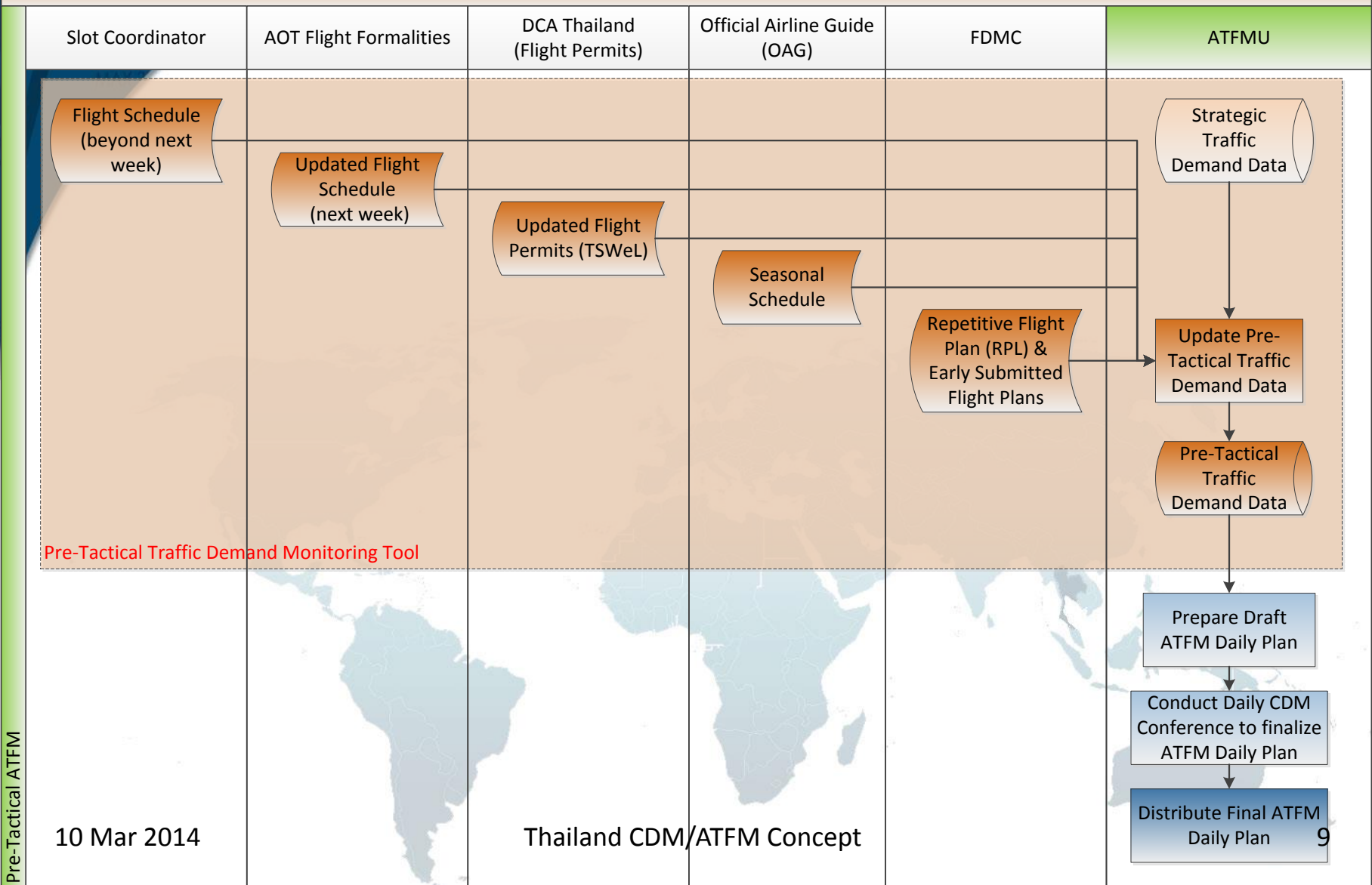
# ATFM Operations Management





# Pre-Tactical CDM/ATFM: Updated Traffic Demand

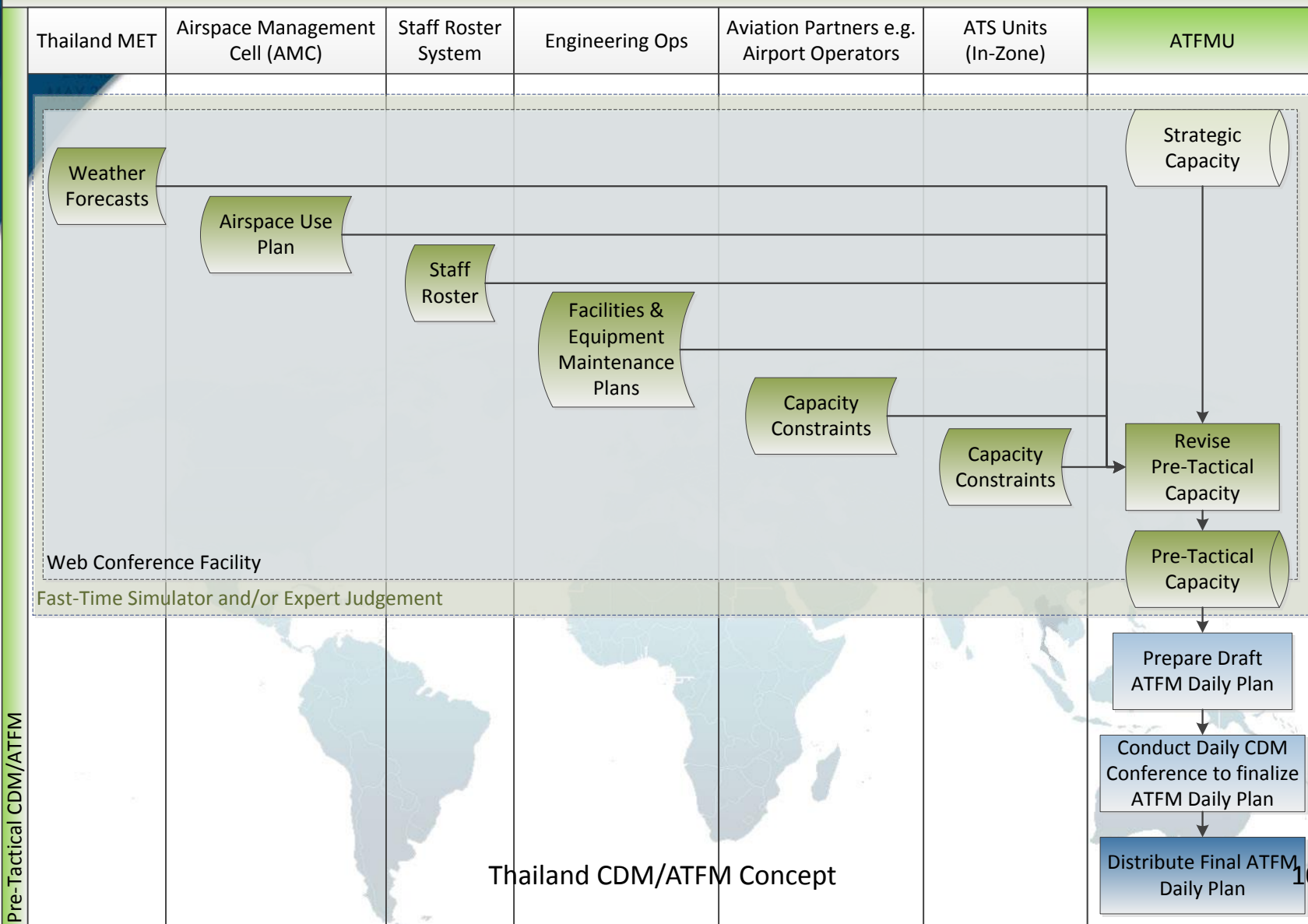
Pre-Tactical Demand Monitoring (hours – 1 day before operations)





# Pre-Tactical CDM/ATFM: Revised Capacity

## Pre-Tactical Capacity Assessment (day before operation)

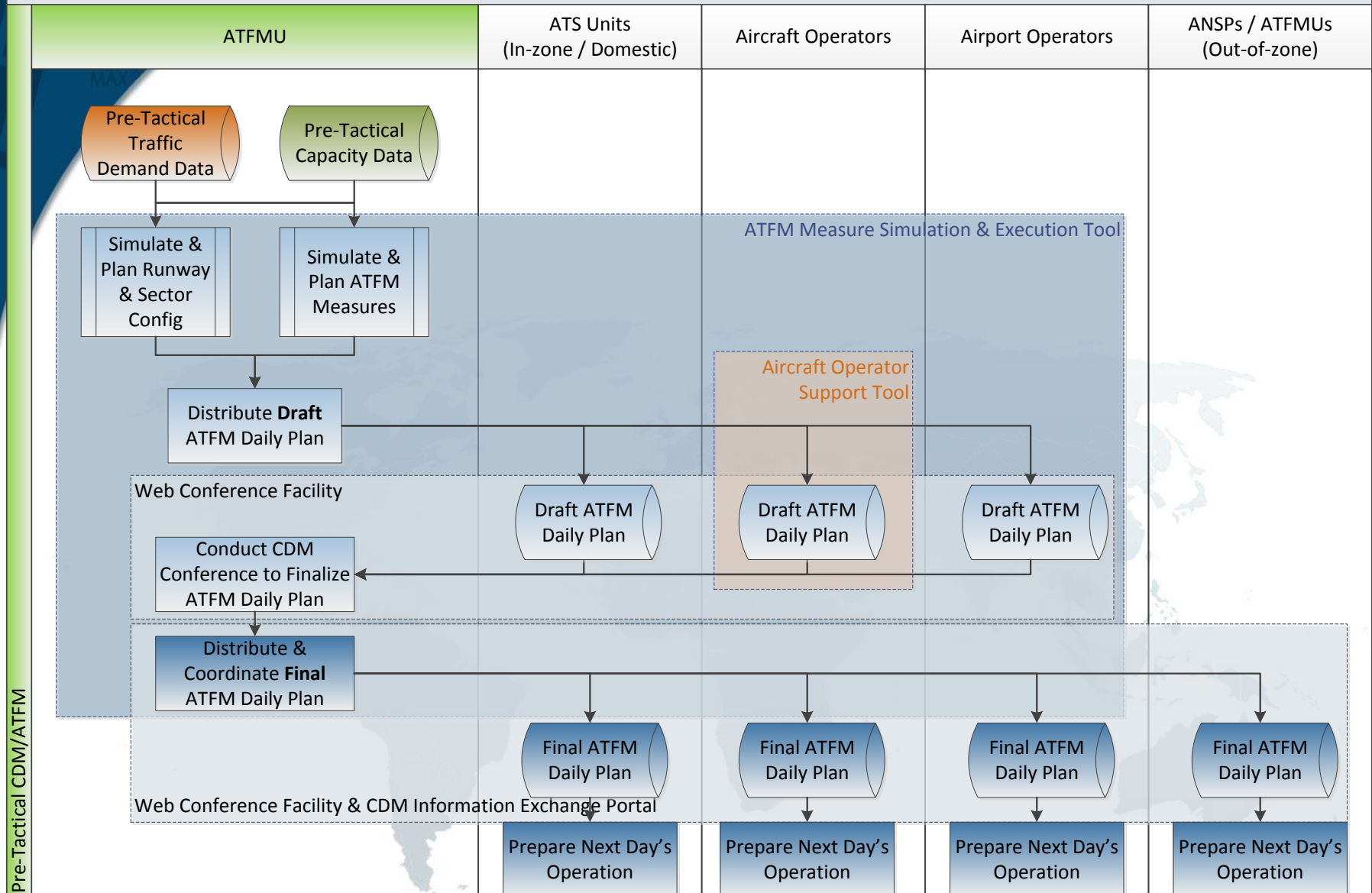






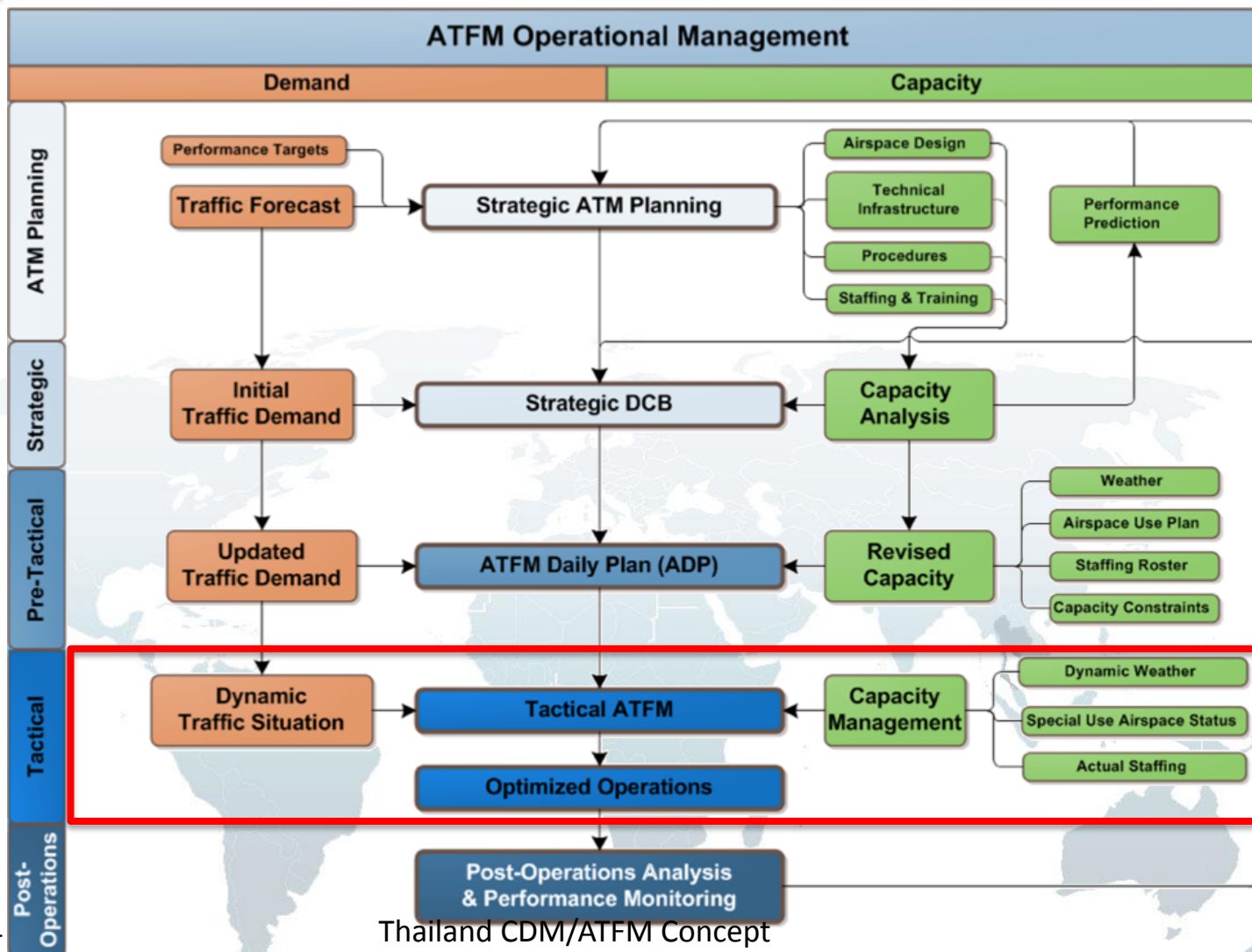
# Pre-Tactical CDM/ATFM: ATFM Daily Plan

Pre-Tactical CDM/ATFM (day before operation)





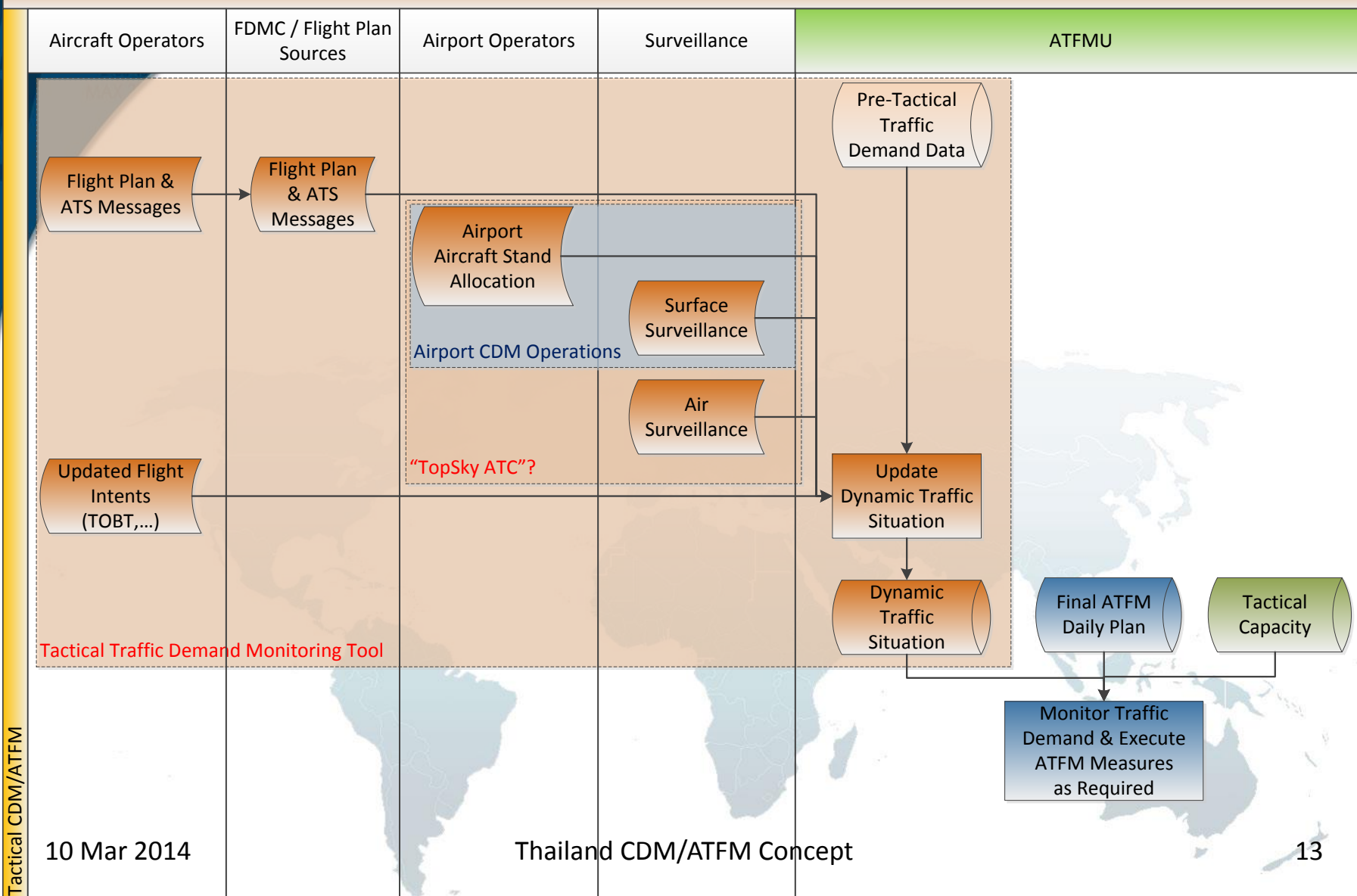
# ATFM Operations Management





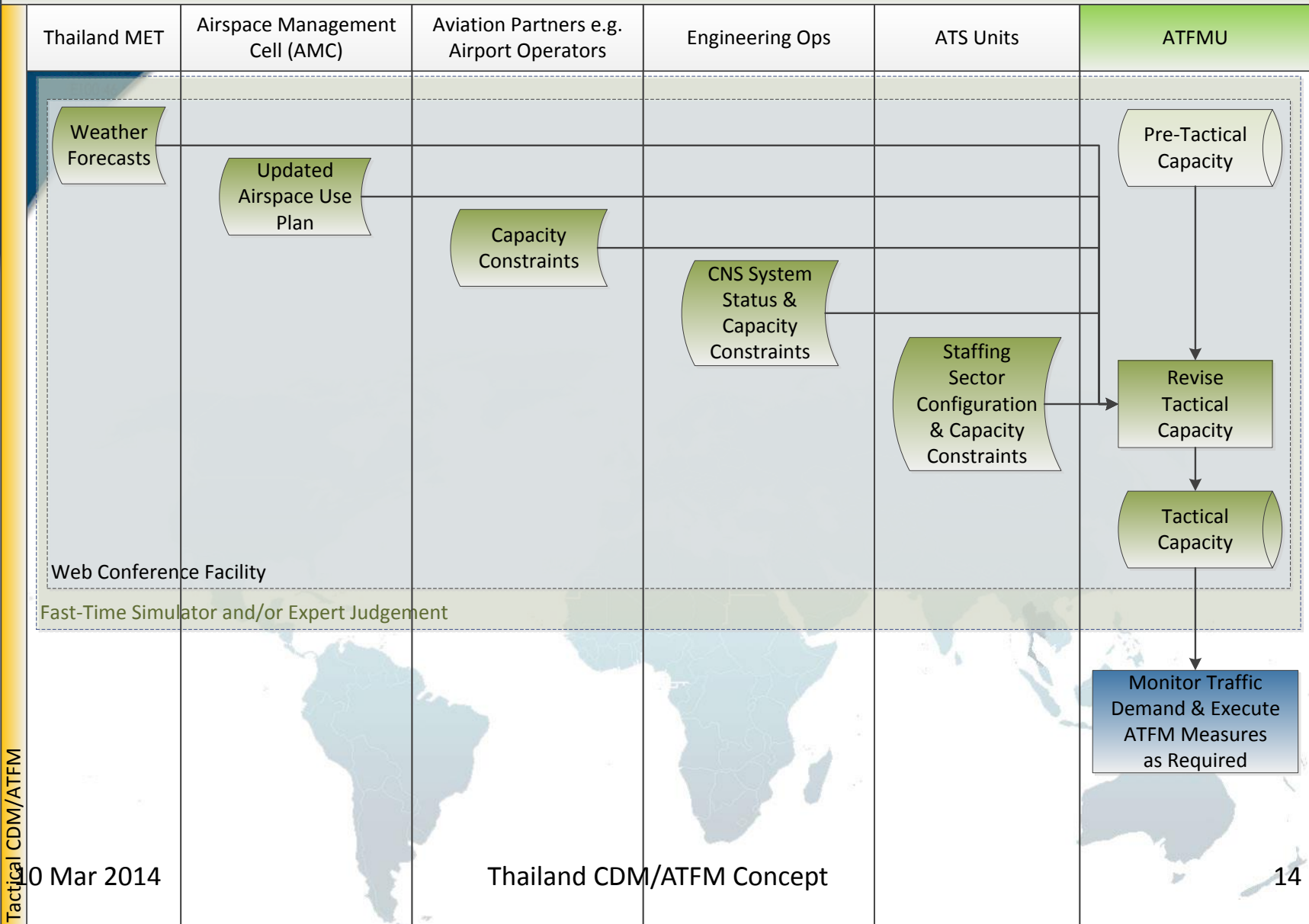
# Tactical CDM/ATFM: Dynamic Traffic Situation

Tactical CDM/ATFM: Demand Monitoring (day of operation)





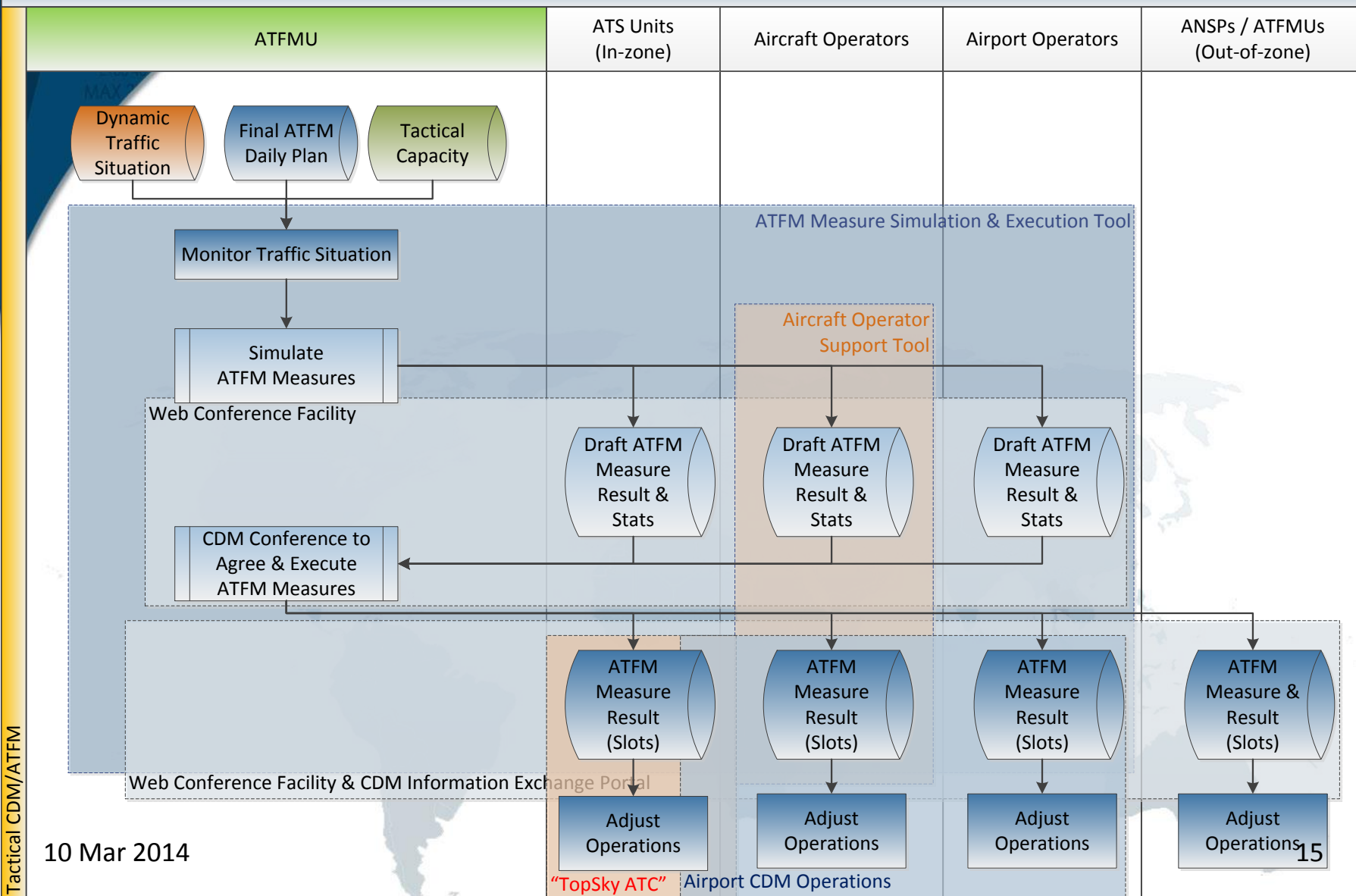
## Tactical Capacity Assessment (day of operation)





# Tactical CDM/ATFM Operations

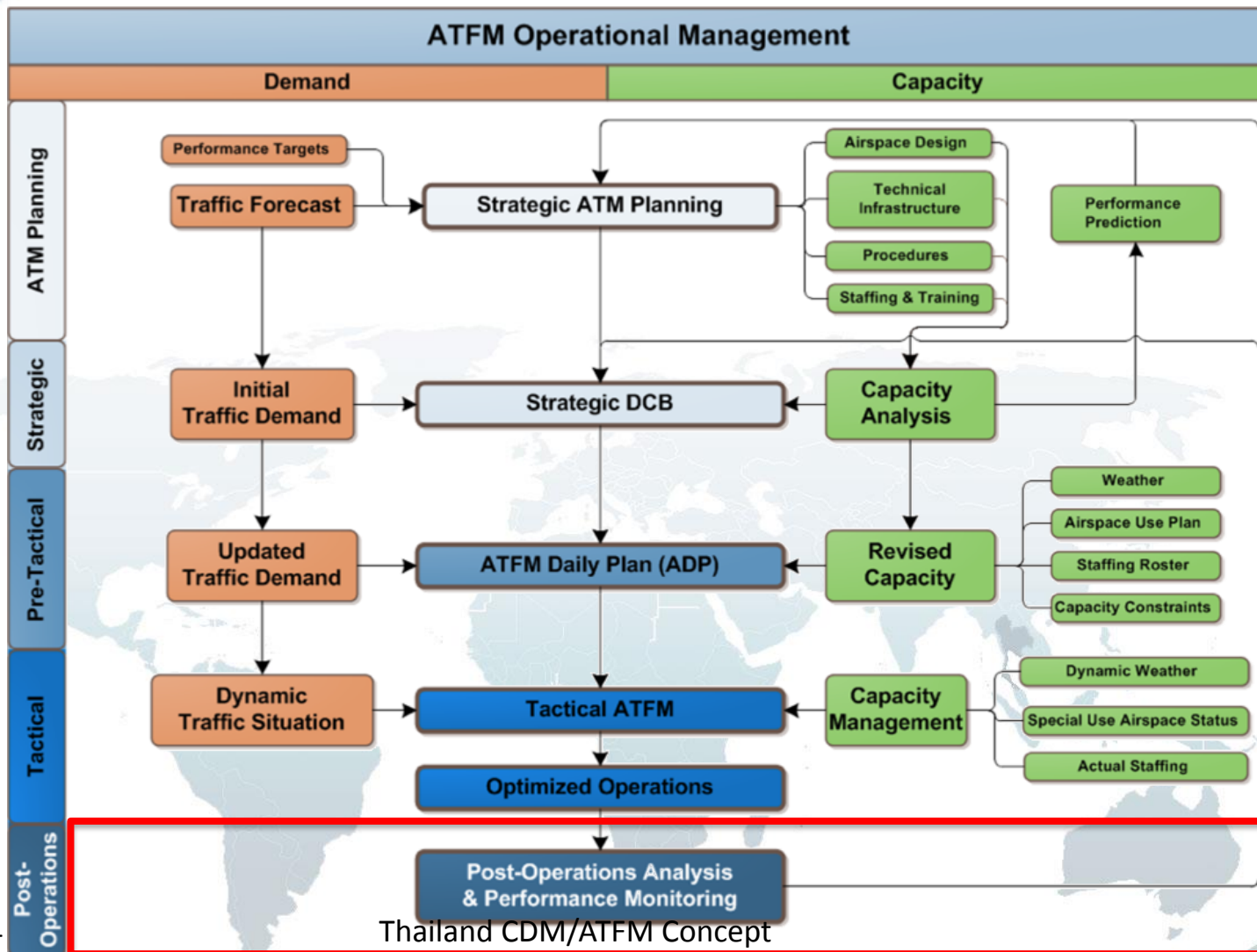
Tactical CDM/ATFM Operations (day of operation)







# ATFM Operations Management





# DISCUSSIONS