Bangkok

Air Traffic Flow Management Unit

(Bangkok ATFMU)

Users Manual

Edition No. **: 1.4**

Effective Date **: 15 May 2020**

INTENTIONALLY BLANK PAGE

Document Approval Page.

……

MR. TINNAGORN CHOOWONG
EXECUTIVE VICE PRESIDENT (OPERATIONS)

……

MRS. SIRIKES NIEMLOY
VICE PRESIDENT (AIR TRAFFIC MANAGEMENT)

……

MR. WINYOU SRIWONG
SENIOR DIRECTOR, AIR TRAFFIC MANAGEMENT NETWORK BUREAU

……

MR. SUVICHAN SATHITKITPICHET
DIRECTOR, NETWORK OPERATIONS AIR TRAFFIC MANAGEMENT CENTER

INTENTIONALLY BLANK PAGE

Edition Change Record

Edition No.	Date	Revised by	Revised Data
1.3	27 January 2020	AEROTHAI	Initial Version
1.4	15 May 2020	AEROTHAI	Revised procedure, Procedure clarifications, Correct typo.

INTENTIONALLY BLANK PAGE

Table of Contents

1. Introduction

1.1 Purpose

The Bangkok ATFMU Users Manual provides an operational description of Bangkok ATFMU's required actions and procedures in the provision of ATFM services within its Area of Responsibility.

1.2 Applicability

This Manual is applicable for all stakeholders involved in the ATFM operations serviced by Bangkok ATFMU. Stakeholders involved include:

a) Bangkok ATFM Unit (ATFMU)
b) Airspace Users,
c) Airport Operators,
d) Air Traffic Service Units (ATS Units),
e) Other organizations and individuals involved in ATFM operations.

1.3 Reference Materials

a) ICAO Doc 9971 (3rd Edition) – Manual on Collaborative Air Traffic Flow Management
b) ICAO Doc 4444 (16th Edition)
c) Distributed Multi-Nodal ATFM Network Common Operating Procedure v4.0
d) Distributed Multi-Nodal Air Traffic Flow Management AFTN/AMHS-Based Interface Control Document v.1.0
e) EUROCONTROL ATFCM Users Manual (23rd Edition)

1.4 ATFM Principles

As described in ICAO Doc 9971 (3rd Ed.), the core objective of ATFM is to facilitate safe, orderly and expeditious flow of air traffic by not only ensuring that ATC capacity is optimized and utilized to the maximum extent possible, but also allowing the traffic demand to be compatible with ATC capacity. Key objectives and core principles of ATFM can be found in section 1.3 of Chapter 1, Part II in ICAO Doc 9971 (3rd Ed.).

It is worth noting that ATFM is not a substitute for effective capacity enhancement efforts by ANSPs. It should, on the contrary, be used to manage available capacity while efforts to increase capacity to meet the actual or forecast traffic demand continue in parallel.

1.5 Distributed Multi-Nodal ATFM Network

Asia-Pacific airspace is characterized by several FIRs and low transit times for flights. Independent local ATFM measures implemented in isolation within one FIR tend to have knock-on effect on downstream FIRs. Previously, existing ATFM frameworks were based fundamentally on centralized management of air traffic flow, which adequately addressed domestic ATFM needs. However, a distributed solution for cross-border ATFM was essential to meet the needs of Asia-Pacific. Southeast Asian States led by Hong Kong China, Singapore and Thailand developed a Distributed Multi-Nodal ATFM Network concept as an alternative solution to implement cross-border ATFM in this region.

The concept involves each ANSP leading and operating an independent ATFM node supported by interconnected information sharing framework. The flow of air traffic will be managed based on a common set of agreed ATFM measures and principles among participating stakeholders. In the case of a Ground Delay Program (GDP), an ATFM measure chosen as the primary means for cross-border ATFM in APAC, an ATFM node comprising ANSP and associated airports manages demand and capacity through adjustments in aircraft Calculated Landing Time (CLDT) and Calculated Take-Off Time (CTOT) distributed to aircraft prior to departures to enable advanced planning. Calculation and distribution of CTOT will be based on agreed principles and information exchange network. Figure 1.1 illustrates this concept.

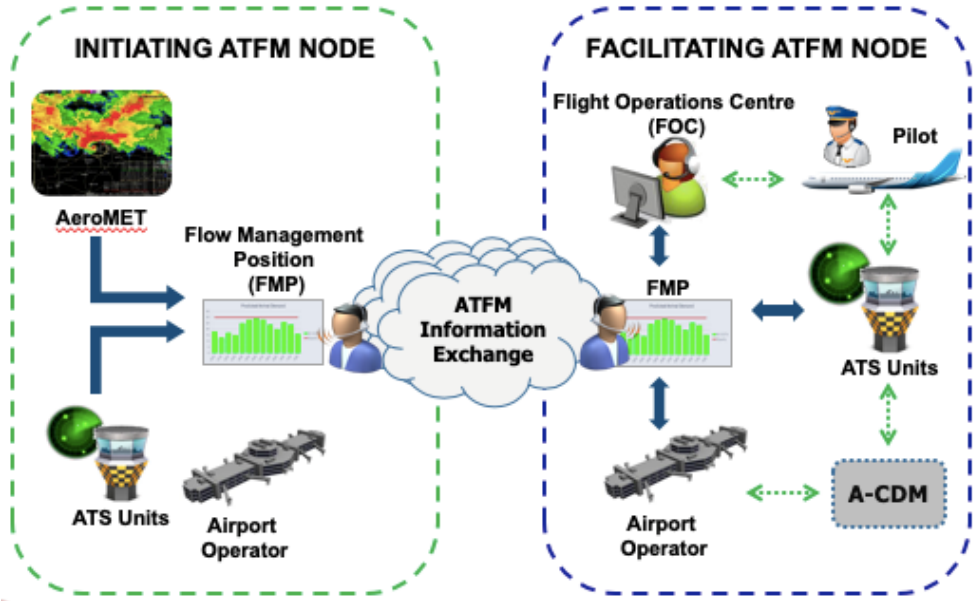


Figure 1.1 - Distributed Multi-Nodal ATFM Network Concept

The choice of GDP as a basis for ATFM in the region came from predictability problem faced due to frequent use of Miles-in-Trail (MIT) and Minutes-in-Trail (MINIT) to regulate traffic across several borders. Both MIT and MINIT, while effective for the regulation of air traffic from immediate neighboring FIR, tend to get expanded as the restrictions traverse across several FIRs in Asia-Pacific. The result is unpredictable, and sometimes excessive, airborne holdings being imposed on flights as the ATS units have to ensure the required spacing between them. With collaborative use of GDP; flights will be given specific take-off time slots, allowing them to absorb the required ATFM delays on the ground – sometimes with engine shut off – in a more predictable manner. Figure 1.2 illustrates the idea.

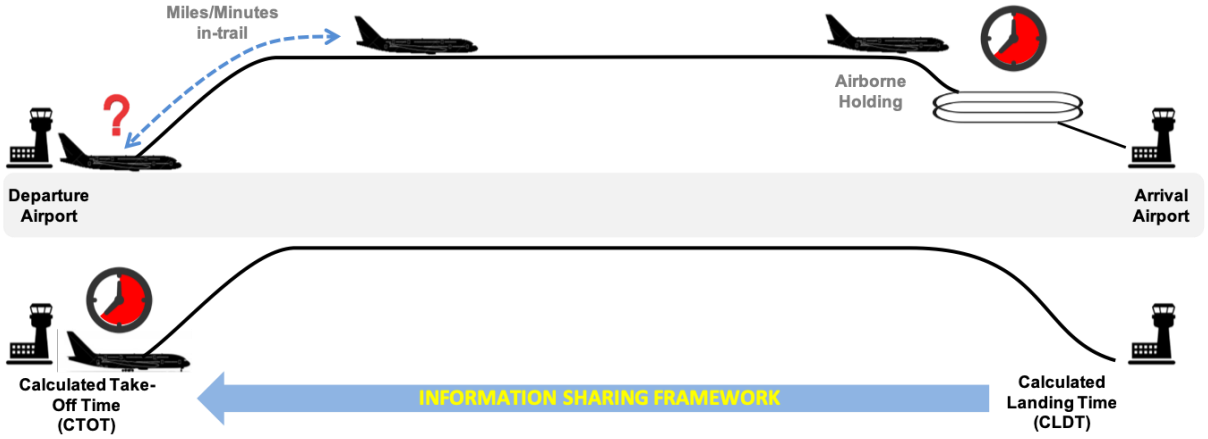


Figure 1.2 - GDP in a Distributed Multi-Nodal ATFM Network environment

Airspace Users can play a fundamental role in Collaborative Decision Making (CDM) by specifying delay absorption intent and additional information regarding the flights indicating the capability of compliance to CTOTs. Additionally, being involved in the ATFM operations, Airspace Users will be able to receive advance CTOT information, which will in turn allow for improved flight operations and optimization of available resources.

Airport Operators contribute to CDM by providing accurate and updated airport infrastructure capacity and maximum allowable gate delay based on the airport's operational demand and capability to manage it. The maximum gate delay component could be considered in the appropriate issuance of CTOTs during ATFM implementation.

In summary, common core principle, efficient interconnected information sharing platform, and effective CDM chain with comprehensive stakeholders participation form the basis of Distributed Multi-Nodal ATFM Network concept. The concept in turn forms the most viable ATFM solution that can better manage the cross-border flow of traffic in Asia-Pacific region.

1.6 Distributed Multi-Nodal ATFM Network Participation Level.

Participation Level	Expected Capabilities
Level-3 ATFM Nodes	- Able to generate, deliver, and receive ATFM measures; - Able to comply with ATFM measures from all Level-3 ATFM Nodes
Level-2 ATFM Nodes	- Able to comply with ATFM measures from all Level-3 ATFM Nodes
Level-1 ATFM Nodes	- Observe and participate in the trial progress

Table 1.1 – Tired Participation in Distributed Multi-Nodal ATFM Network

1.7 Participating ANSPs and Airports.

ANSP	Participation Level	Participation Airports
AEROTHAI Thailand	3	All airports
Civil Aviation Authority of Singapore (CAAS) Singapore	3	WSSS
Civil Aviation Authority of China, Air Traffic Management Bureau (CAAC ATMB) China	3	ZGGG ZGSZ ZJSY ZJHK
Cambodia Air Traffic Services (CATS) Cambodia	3	VDPP VDSR
Hong Kong Civil Aviation Department (HKCAD) Hong Kong	3	VHHH VMMC
Airnav Indonesia Indonesia	2	WIII WARR WADD
Civil Aviation Authority of Malaysia (CAAM) Malaysia	2	WMKK WMSA WMKL WMKC WMKP WMKI

ANSP	Participation Level	Participation Airports
		WMKJ WBKK WBGR WBGG
Civil Aviation Authority of The Philippines (CAAP) Philippines	2	RPLL
Viet Nam Air Traffic Management (VATM) Viet Nam	2	VVNB VVTS VVDN
Department of Civil Aviation Myanmar (DCA Myanmar) Myanmar	2	VYYY VYNT VYMD
Lao Air Navigation Services (LANS) Lao PDR	1	VLVT VLLB VLPS (Can support ATFM measure as Level 2 Participation)

Table 1.2 – List of Participated States and Airports

1.8 Participation Airports Map

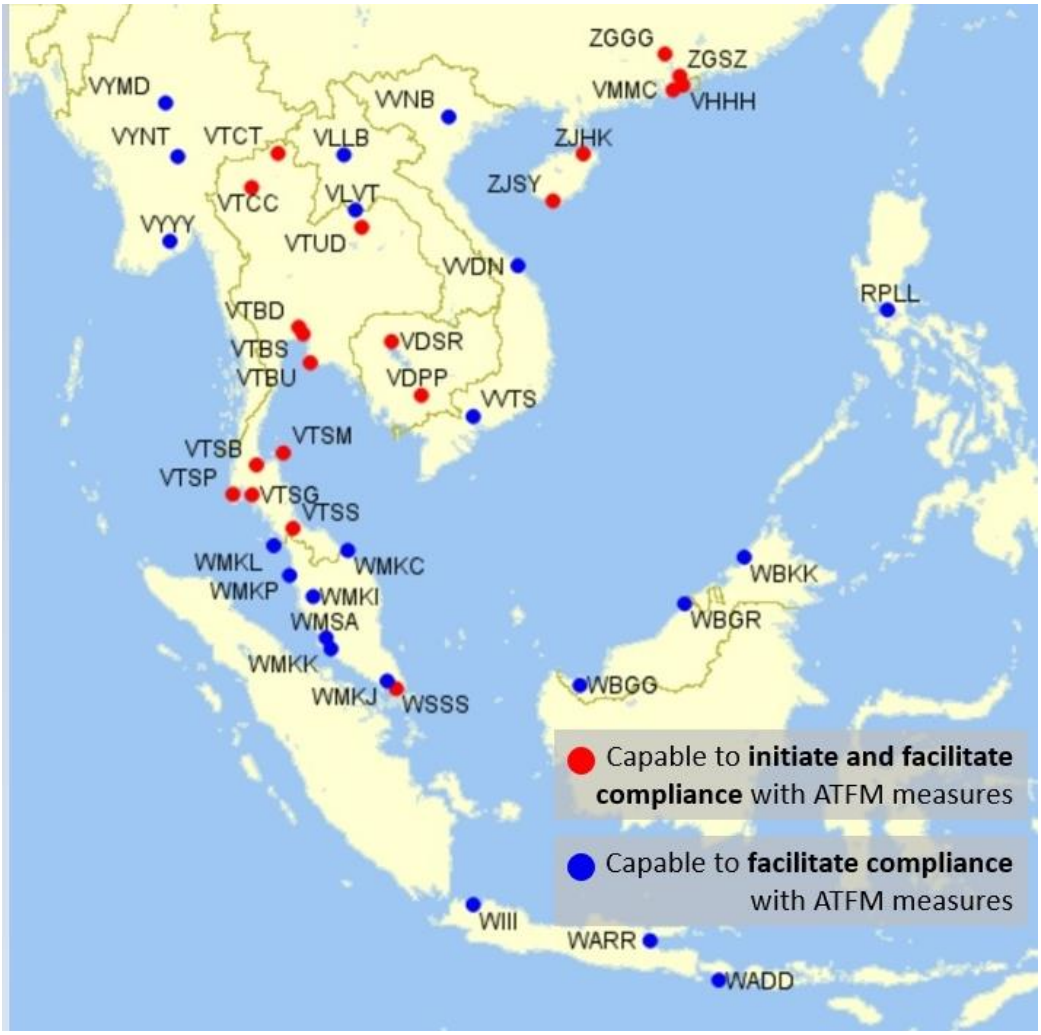


Figure 1.3 – Participation Airports Map

1.9 ATFM Terminologies

Flight Event Time Terminology was selected to provide harmonization with airport collaborative decision-making (A-CDM) process. Flight Event Time Terminology adopts a four-character format, where the last three characters represent the time of flight such as "TOT" representing "take-off time", while the first character represents status of the information. For example, the character "A" in ATOT represents "actual" take-off time. This terminology attempts to avoid the use of "departure" and "arrival" due to their ambiguities in specifying the intent of the information.

General ATFM Terminologies

Acronym	Term	Definition
AAR	Airport arrival rate	The arrival capacity of an airport normally expressed in movements per hour.
ADR	Airport departure rate	The departure capacity of an airport normally expressed in movements per hour.

Acronym	Term	Definition
FCA	Flow constrained area	A sector of airspace where normal flows of traffic are constrained, which could be caused by meteorological conditions, military exercise, etc.
FMP	Flow management position	A position that monitors traffic flows and implements or requests ATFM measures to be implemented.
GDP	Ground delay program	An ATFM measure where aircraft are held on the ground, in order to manage capacity and demand in a specific volume of airspace or at a specific aerodrome. In the process, departure times are assigned.
GSt	Ground stop	A tactical ATFM measure taken in reaction to an unpredicted adverse situation, where select aircraft remain on the ground.
MINIT	Minutes in trail	A tactical ATFM measure expressed as the number of minutes between successive aircraft at an airspace boundary point.
MIT	Miles in trail	A tactical ATFM measure expressed as the number of miles between successive aircraft at an airspace boundary point.

Table 1.3 – General ATFM Terminologies

ATFM terminologies for Flight Event Time

Acronym	Term	Definition
SOBT	Scheduled off-block time	The time that an aircraft is scheduled to depart from the parking position.
EOBT	Estimated off-block time	The estimated time that an aircraft will start movement associated with its departure.
COBT	Calculated off-block time	A time calculated and issued by an ATFM unit, as a result of tactical slot allocation, at which a flight is expected to push back/vacate its parking position so as to meet a CTOT, taking into account start and taxi time.
AOBT	Actual off-block time	The time the aircraft pushes back/vacates its parking position (equivalent to airline/handlers ATD – actual time of departure and ACARS = OUT).
CTOT	Calculated take-off time	A time calculated and issued by an ATFM unit, as a result of tactical slot allocation, at which a flight is expected to become airborne.
ETOT	Estimated take-off time	The estimated take-off time taking into account EOBT plus estimated taxi-out time.
ATOT	Actual take-off time	The time that an aircraft takes off from the runway (equivalent to the air traffic control ATD – actual time of departure).
ETO	Estimated time over	Estimated time at which an aircraft would be over a fix, waypoint or particular location typically where air traffic congestion is expected.
CTO	Calculated time over	Time calculated and issued by an ATFM unit, as a result of tactical slot allocation, at which a flight is expected to be over a fix, waypoint or particular

Acronym	Term	Definition
		location. The implementation of this constraint may be carried out through tactical ATC intervention, such as speed control or route extension, or by having the aircraft meet the constrained time through the use of its Flight Management System RTA function.
CLDT	Calculated landing time	A landing time calculated and issued by an ATFM unit, as a result of tactical slot allocation at which a flight is expected to land on a runway.
ELDT	Estimated landing time	The estimated time that an aircraft will touch down on the runway
ALDT	Actual landing time	Actual time an aircraft lands on a runway (equivalent to ATC ATA – actual time of arrival = landing, ACARS = ON)
SIBT	Scheduled in-block time	The time that an aircraft is scheduled to arrive at its first parking position.
AIBT	Actual in-block time	The time that an aircraft arrives in-blocks (equivalent to airline/handler ATA – actual time of arrival, ACARS = IN).

Table 1.4 – ATFM terminologies for Flight Event Time

Flight Event Time Terminology mapped to specific flight event time and status

Flight Event Times	Scheduled	Flight plan	ATFM Measure	ATFM Estimate	Actual
Off-block time (OBT)	SOBT	EOBT	COBT	-	AOBT
Take-off time (TOT)	-	-	CTOT	ETOT	ATOT
Time over (TO)	-	-	CTO	ETO	ATO
Landing time (LDT)	-	-	CLDT	ELDT	ALDT
In-block time (IBT)	SIBT	-	-	-	AIBT

Table 1.5 – Flight Event Time Terminology mapped to specific flight event time and status

For further information and glossary, see Appendix 3

INTENTIONALLY BLANK PAGE

2. Quick Reference Guide

2.1 Bangkok ATFMU operational help desk.

Telephone:	+66 2287-8024, +66 2287-8025
Fax:	+66 2287-8026, +66 2287-8027
AFTN:	VTBBZDZX
Web Portal:	http://atfm.aerothai.aero
Web Conference Help Desk:	https://aerothai.adobeconnect.com/bkkatfmu
Hours of operation:	H24

2.2 Bangkok ATFMU Scope of Operations

a) Preparation and distribution of ATFM Daily Plan (ADP),
b) Planning and issuance of ATFM measures to balance demand and capacity in airspace sectors and airports within Bangkok FIR and any other areas designated through State-level agreements,
c) Facilitation of ATFM-related information dissemination to ensure local stakeholders are aware of and able to comply with relevant ATFM measures.
d) Monitoring and post-operations analysis of ATFM operations,
e) Provision of ATFM service for westbound flights intending to transit Kabul FIR between 2000 - 2359 UTC through the use of Bay of Bengal Cooperative ATFM System (BOBCAT). More information can be referred to in Bay of Bengal and South Asia ATFM Handbook available at <www.bobcat.aero>.

2.3 Stakeholder's Responsibilities

AEROTHAI

Responsibilities	Descriptions
General ATFM Responsibilities	
Demand-Capacity Prediction and Monitoring	• Predict traffic demand at ATM resources within Bangkok FIR through a range of data sources including schedules, airport slots, flight plans (FPLs) and ATS messages or other forms of flight progress updates • Predict capacities at ATM resources within Bangkok FIR • Assess demand-capacity imbalance • Monitor the accuracy of demand and capacity predictions
Local CDM Conference	• Host scheduled CDM conference with concerned stakeholders to prepare ATFM measures
Cross-Border CDM Conference	• Host or participate in cross-border CDM conference with other node leaders
ATFM Daily Plan (ADP)	• Generate ADP to outline ATM situation for the day
ATFM Measure Execution	• Ensure the effective implementation / revision / cancellation of ATFM measures in collaboration with ATS units

Responsibilities	Descriptions
	• Provide information on ATFM in a timely manner to relevant stakeholders in accordance to the cross-border procedures developed
ATFM Measure Effectiveness Monitoring	• Monitor ATFM measure effectiveness and revise as appropriate to the developing situations
ATFM Post-Operations Analysis	• Lead the collaborative effort to perform post-operations analysis after each round of ATFM program
Responsibilities Specific to GDP	
CTOT Distribution	• Generate CTOTs and distribute via e-mail, AFTN and web portal no less than 90 minutes before Estimated Off-Block Time (EOBT) to support stakeholder's advance planning
Slot Management	• Provide platform or protocol for slot management process (change, swap, remove, add)
Adherence to CTOT in departure management	• Manage departure traffic in adherence to CTOT within the CTOT compliance window
	• Include CTOT information as part of the air traffic control clearance when a given flight is subject to CTOT *Ref: ICAO Doc 9971, 3rd Ed., Part II, Chapter 6*
	• Ensure that local ATC procedures and CDM processes facilitating compliance with received CTOT are implemented

AIRPORT OPERATORS

Responsibilities	Descriptions
General ATFM Responsibilities	
Provision of Updated Flight Information	• Provide updated flight information to ATFMU for accurate demand prediction
Provision of Airport Capacity Constraints Information	• Notify ATFMU of events that may impact capacity at airports
Local CDM Conference	• Actively participate in local CDM conference to provide input on ATFM measures
Receipt of ATFM Information	• Participate in ATFM communication flow and ensure capability to receive ATFM information in a timely manner
ATFM Post-Operations Analysis	• Participate in the collaborative effort to perform post-operations analysis by providing information from airport side
A-CDM Linkage	• If A-CDM process is deployed or planned, ensure it is able to integrate or coordinate with ATFM process, especially in terms of data/information exchange

AIRSPACE USERS

Responsibilities	Descriptions
General ATFM Responsibilities	
Special Circumstance Information	• Where applicable, advise ATFMU of special or extenuating circumstances that would impact the ability to comply with ATFM measures
Flight Plan (FPL) Management	• Ensure updated FPLs are filed at least 3 hours prior to EOBT
DLA /CHG Message	• Submit DLA or CHG messages via AFTN for delay of more than 15 minutes. • **Do not update EOBT as a result of ATFM measure**, as the ATFM system may misinterpret the update as an intention to request further delay.
Local / Cross-Border CDM Conference	• Actively participate in CDM conference to provide input on ATFM measures
Monitoring of ATFM Information	• Monitor ATFM Daily Plan (ADP) for ATFM alerts and receive ATFM information for operational planning
Critical Operational Concerns	• Highlight significant operational concerns during CDM conference
Post-Ops Analysis	• Provide feedback and information on ATFM operations in the Post-Ops Analysis effort
Responsibilities Specific to GDP	
CTOT Compliance Management	• Plan the affected flights such that they will be ready for start-up/pushback at appropriate time to comply with CTOT at the runway, considering taxi-out time
Slot Revision / Substitution Management	• Request or process revisions to CTOTs / ATFM slots when the flights are unable to comply with assigned CTOTs

2.4 Brief GDP Procedure

EOBT -3 Hours	
Airspace users	• Submit FPL at least 3 hours before EOBT
ATS Units	-
Bangkok ATFMU	• Monitor traffic demand and ATM capacities

EOBT -2 Hours	
Airspace users	• Check for CTOT via email / AFTN / web portal • Communicate to relevant personnel • Contact Bangkok ATFMU for changes to flight
ATS Units	• Check for CTOT via email / AFTN / web portal
Bangkok ATFMU	• Generate and distribute CTOT • Prepare for coordination of changes

Departure	
Airspace users	• Prepare for flight in accordance with CTOT. • Contact Clearance Delivery *at least* 25 minutes before CTOT and **request push back/start-up clearance at least 20 minutes prior to CTOT** (For departures from VTBS, VTBD and VTSP). • Contact Clearance Delivery *at least* 20 minutes before CTOT and **request push back/start-up clearance at least 15 minutes prior to CTOT** (For departures from other airports in Bangkok FIR) • Flights departing from airports outside Bangkok FIR should comply with the local procedures or plan the affected flights to be ready for start-up/pushback at appropriate time to comply with CTOT. • Contact Bangkok ATFMU for changes to flight.
ATS Units	• Deliver CTOT to flight crews with ATC clearance. • Facilitate departure in accordance with CTOT.
Bangkok ATFMU	• Monitor flight progress. • Prepare to support coordination of CTOT changes.

CTOT Change Process	
Airspace users	• Coordinate with Bangkok ATFMU for CTOT change request **while the aircraft is still at the parking bay**. • (Flt Ops) contact Bangkok ATFMU for coordination. • CTOT revision request should be lodged not less than 30 minutes before the assigned CTOT.
ATS Units	• Coordinate CTOT changes on behalf of the Airspace User ***after the aircraft has pushed back*** if necessary; otherwise allow the aircraft to continue and inform Bangkok ATFMU of non-compliance.
Bangkok ATFMU	• Facilitate and coordinate change requests. • Ensure all units are updated.

2.5 Problem Reporting

Operational Problem Reporting is a procedure to:

a) Ensure all necessary reports and data pertaining to *abnormal situations* are collected for analysis in a timely manner, and
b) Ensure all *abnormal situations* are fully analyzed, with feedback given and remedial actions taken by concerned parties to prevent future occurrences.

Reporting form for abnormal situations is available in *Appendix 1* of this manual. Situations such as unexpected behaviors by stakeholders, inadequacy in the procedures, and erroneous flight information data and ATFM system should be promptly reported.

The reporting form should be *fully* and *comprehensively* completed, with all relevant information provided. Supporting materials, including – inter alia – screenshots and document printouts, should be included with the report to assist in the investigation. One report should be used for each occurrence, and should be submitted as soon as possible after the event. ATFM investigation team will assess all information and make necessary recommendations for concerned parties.

3. Air Traffic Flow Management

3.1 ATFM Objectives

The objectives of ATFM consist of:

a) Enhancing the safety of the ATM system by ensuring the delivery of safe traffic densities and minimizing traffic surges;
b) Ensuring an optimum flow of air traffic throughout all phases of the operation of a flight by balancing demand and capacity;
c) Facilitating collaboration among system stakeholders to achieve an efficient flow of air traffic through multiple volumes of airspace in a timely and flexible manner that supports the achievement of the business or mission objectives of Airspace Users and provides optimum operational choices;
d) Balancing the legitimate but sometimes conflicting requirements of all Airspace Users, thus promoting equitable treatment;
e) Reconciling ATM system resource constraints with economic and environmental priorities;
f) Facilitating, by collaborating with all stakeholders, the management of constraints, inefficiencies, and unforeseen events that affect system capacity in order to minimize negative impacts of disruptions and changing conditions; and
g) Facilitating the achievement of a seamless and harmonized ATM system while ensuring compatibility with international developments.

3.2 ATFM Benefits

Operational:

a) Enhanced ATM system safety;
b) Increased system operational efficiency and predictability through CDM processes;
c) Effective management of capacity and demand through data analysis and planning;
d) Increased situational awareness among stakeholders and a coordinated, collaborative development and execution of operational plans;
e) Improved punctuality, reduced fuel burn and other AU operating costs;
f) Effective management of irregular operations and effective mitigation of system constraints and consequences of unforeseen events; and
g) Provision of post-operational data related to traffic movements.

Societal:

a) Improved quality of air travel, including improved information provided to the travelling public;
b) Increased economic development through efficient and cost-effective services to the projected increased levels of air traffic;
c) Reduction of aviation-related greenhouse gas emissions; and
d) Mitigation of the effects of unforeseen events and situations of reduced capacity, through the coordination of effective and rapid solutions to recovery.

3.3 ATFM Phases

Strategic ATFM

Strategic ATFM takes place **seven days or more prior to the day of operations** and includes research, planning and coordination activities through a Collaborative Decision Making (CDM) process. This phase comprises a continuous data collection with a review of procedures and measures directed towards an early identification of major demand-capacity imbalances e.g. runway maintenance, air shows, major sport events, military exercises, etc. When imbalances are expected, the Bangkok ATFMU Strategic ATFM Team is responsible for the strategic planning and coordination necessary to minimize the impact and optimize available capacity far in advance of the actual operations.

Pre-Tactical ATFM

Pre-Tactical ATFM takes place during the **six days prior to the day of operations** and consists of planning and coordination activities. In this, updated demands are compared with predicted available capacity and pre-determined strategic ATFM plans are revised if necessary. Pre-tactical ATFM measures, such as sector configuration adjustment and rerouting arrangement, may be carried out in this phase. Tactical ATFM measures, such as GDP, will also be planned through a CDM process with stakeholders. The planned ATFM measures to be carried out during tactical phase are summarized and communicated to stakeholders via the ATFM Daily Plan (ADP).

Tactical ATFM

Tactical ATFM takes place **on the day of operations** and involves considering, in real time, those events that affect the ADP and making the necessary modifications to it. This phase is aimed at ensuring that the measures taken during the strategic and pre-tactical phases are the minimum required to solve the demand/capacity imbalances. The need to adjust the original plan may result from disturbances such as ATC staffing, significant meteorological phenomena, crises and special events, unexpected limitations related to ground or air infrastructure, etc. and taking advantage of any opportunities that may arise. The provision of accurate information is of vital importance in this phase, since it permits short-term forecasts, including the impact of any event and maximizes the existing capacity without jeopardizing safety.

3.4 ATFM Process

ATFM loosely follows the following process:

a) *Determine capacity*: review/assess airport/airspace sector capacity,
b) *Assess demand*: determine forecasted demand for a specific time frame,
c) *Analyze and compare demand and capacity levels:* focus more specifically on the periods in which demand exceeds available capacity,
d) *Collaborative Decision Making (CDM):* communicate the situation to stakeholders involved through the means available,
e) *Determine the most appropriate ATFM solutions*,
f) *Disseminate information:* using the means of communication established to that end, inform, in a timely manner, the parties involved about the ATFM solutions to be applied or of the cancellation thereof,
g) *Monitor the situation:* examine the situation periodically, as necessary, to ensure that the ATFM solutions mitigate the consequences of the imbalance. If necessary, re-assess and adjust accordingly,
h) *Post-operations analysis:* evaluate the effectiveness of the ATFM solution and catalogue the best work practices.

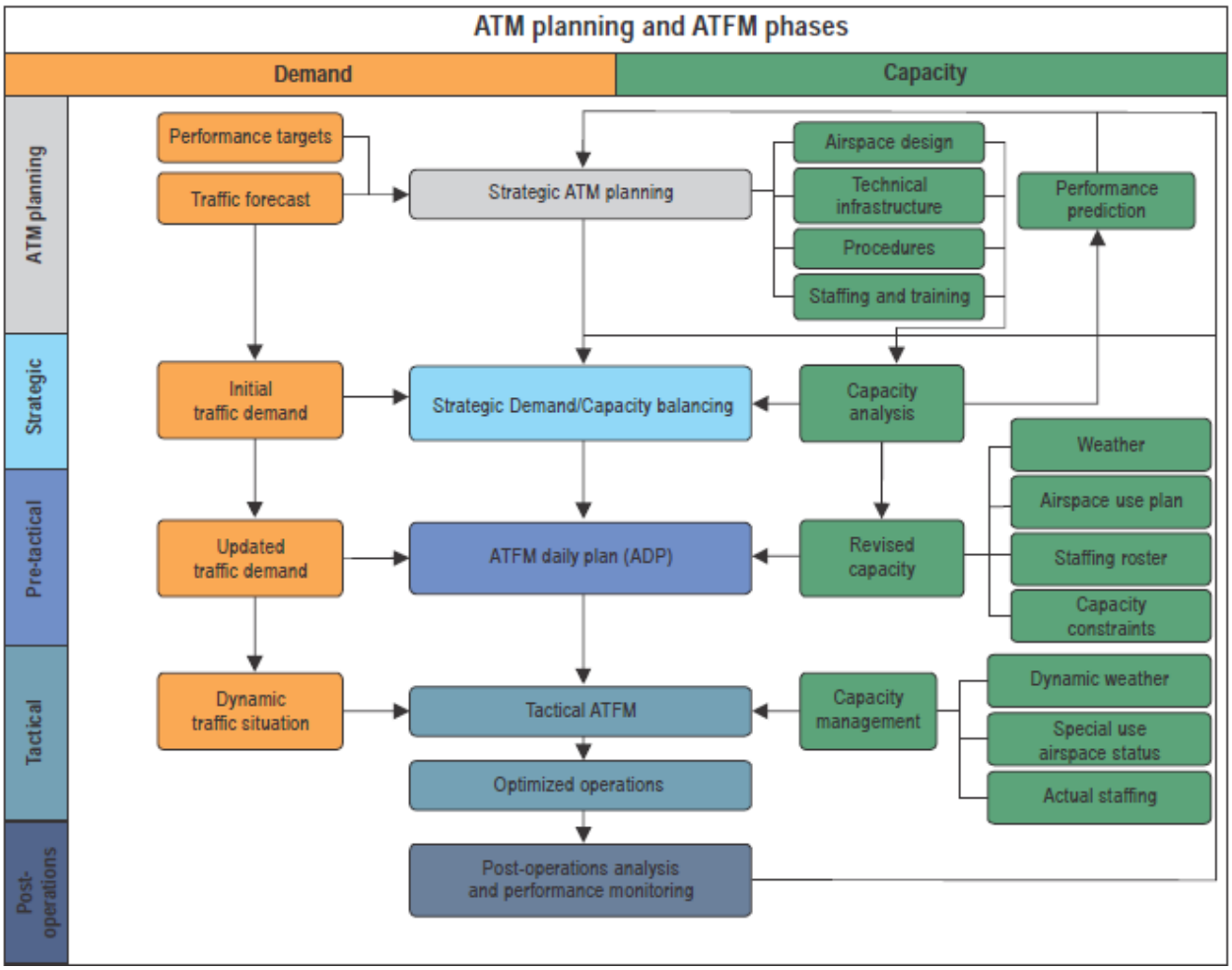


Figure 3.1 – ATM Planning and ATFM Phases

3.5 ATFM Measures

ATFM measures are techniques used to manage air traffic demand according to system capacity. Some ATC instructions or procedures (such as radar vectors or speed control instructions) can also be considered ATFM measures.

ATFM measures are important initiatives for managing the flow of air traffic. They are very efficient when used to manage traffic demand. However, ATFM measures can have a significant impact on Airspace Users and should only be implemented and used when necessary to maintain the safety and efficiency of the ATM system, minimizing as much as possible the impact on flight operations.

The table below illustrates various ATFM measures applied during the pre-tactical and tactical phases. The table also outlines how these measures are applied as well as the usual timeframe associated with their use. The list is not exhaustive, but suffices for the purpose of ATFM services provided by Bangkok ATFMU.

ATFM measure	Constraint			Control mechanism	Time frame	Requirements to be effective
	Airport arrivals	Airport departures	Airspace			
GDP	X	X	X	CTOT	Pre-tactical and tactical	Participation in percentage and distance
Re-route			X	Flight path change to avoid constraint	Pre-tactical and tactical	Access to airspace and published routes
Ground stop	X			Prevent departures from specific aerodromes to address existing tactical load on an arrival aerodrome	Tactical	
MIT/MINT	X		X	Time- or distance-based separation on a single stream of traffic	Tactical	
MDI	X		X	Time-based separation from departures from the same aerodrome	Tactical	
Fix balancing	X		X	Flight path change to avoid	Tactical	
Level capping			X	Flight path change to avoid	Tactical	

Table 3.1 – Summary of ATFM Measure

Ground delay program (GDP)

GDP is a pre-tactical or tactical ATFM measure in an ATM process where aircraft are held on the ground in order to manage capacity and demand in a specific volume of airspace or at a specific aerodrome. In the process, take-off times are assigned to corresponding available entry slots into the constrained airspace or arrival/departure slots into/from the constrained aerodrome. A GDP aims to, among other things, minimize airborne delays. It is a flexible program, and its form may therefore vary depending on the needs of the ATM system. GDPs are best developed in a collaborative manner even though they are typically administered and managed by an ATFMU. When a GDP is scheduled to last for several hours, the likelihood of slots having to be revised increases, as conditions could change. There should therefore be a system in place to advise Airspace Users and/or pilots of departure slots as well as of any changes to the GDP.

Ground stop (GSt)

GSt is a tactical ATFM measure taken in reaction to an unpredicted adverse situation. Some selected aircraft remain on the ground. Due to the heavy impact of ground stops on Airspace Users (mostly due to the absence of notice), alternative ATFM measures should be explored and implemented prior to a GSt, time and circumstances permitting. The GSt is typically used:

a) When capacity has been severely reduced at aerodromes due to significant meteorological events or due to runway closures, for example, as a result of aircraft accidents/incidents,
b) To preclude extended periods of in-flight holding; to preclude a sector/center reaching near saturation levels or aerodrome gridlock,
c) In the event an ATS unit is unable or partially unable to provide air traffic services due to unforeseen circumstances; and
d) When routings are unavailable due to severe meteorological or catastrophic events.

Minutes-in-trail (MINIT) and miles-in-trail (MIT)

These items are tactical ATFM measures and are expressed as the number of minutes or miles between each successive aircraft at an airspace boundary point. The workload associated with its compliance falls on the air traffic controller because of potential upstream network effects. As such, regular usage of MINIT or MIT may indicate that more appropriate ATFM measures should be used in their places.

Minimum departure intervals (MDIs)

MDIs are tactical ATFM measures and are applied by setting a rate of departure flow of, as an example, three minutes between successive departures from a single aerodrome. MDIs are typically applied for short periods when a departure sector becomes excessively busy, when sector capacity is suddenly reduced (due to equipment failure, meteorological conditions, etc.), or to support demand smoothing at an arrival aerodrome with a short-term demand/capacity imbalance.

Re-routing

Route-based ATFM measures (horizontal or vertical) aim to remove a number of flights scheduled to arrive at a constrained ATM resource. Re-routings are usually organized in scenarios and can be mandatory or advisory. A re-routing is normally issued to ensure that aircraft:

a) Operate along with a required flow of traffic;
b) Remain clear of constrained airspace; and
c) Avoid areas of known meteorological conditions of such a nature that aircraft must circumvent it.

Level capping scenarios

These scenarios are carried out by means of flight level restrictions limiting climb or descent.

Fix balancing

This tactical ATFM measure, usually applied during flight, aims to distribute demand and avoid delays. The aircraft is assigned a different arrival or departure fix than the one indicated in the flight plan. This can also be used, for example, during periods of convective meteorological conditions where a standard instrument arrival (STAR) or a standard instrument departure (SID) is unusable.

3.6 Selection of the appropriate ATFM measure

Selection of ATFM measure begins when an imbalance appears between demand and capacity that cannot be resolved with a capacity optimization action, occurring in an aerodrome or in a given airspace. Minor imbalances are usually dealt with by ATC on a tactical basis. Short notice or unplanned repetitive use of tactical ATFM measures such as MDI, MINIT and MIT, may indicate that other forms of ATFM measures, such as GDP, that can be applied with more advance notice should be considered. Figure 3.2 shows an example process of ATFM measure selection.

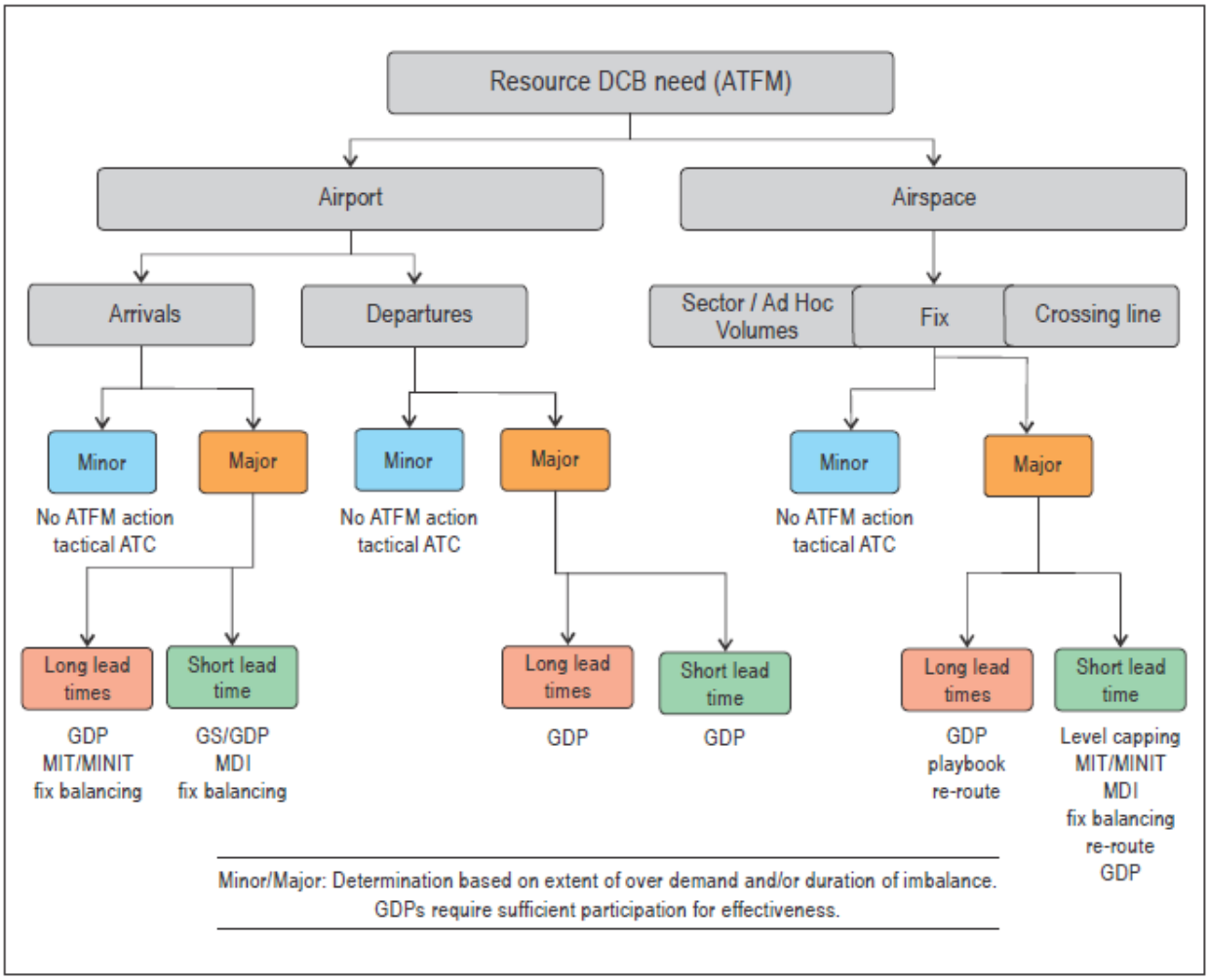


Figure 3.2 – Selection process of ATFM measures

3.7 Applicability of ATFM Measures

While ATFM measure(s) are in effect, both international and domestic flights may be subjected to such ATFM measures. As Bangkok ATFMU operates on a 24-hour basis, ATFM measure(s) may be initiated as and when necessary.

3.8 Exemption of Flights from ATFM Measure(s)

Bangkok ATFMUs may choose to **prioritize or exempt** certain classes of flights from ATFM measures. Examples of such flights include, inter alia:

a) Flights experiencing an emergency, including aircraft subjected to unlawful interference;
b) Flights in search and rescue or firefighting missions;
c) Urgent medical evacuation flights specifically declared by medical authorities where flight delays would put the life of patients at risk;
d) Flights with “Head of State” status; and
e) Other flights specifically identified by appropriate authorities.

State and Military aircraft operating time-sensitive and/or critical missions can also be exempted from ATFM measure(s). State and Military aircraft operating non-critical missions should comply with ATFM measures or coordinate with Bangkok ATFMU for exemption if deemed necessary.

3.9 Post-Operations Analysis

Bangkok ATFMU will ensure that post-operations analysis reports, indicating the quality of ATFM programs activated, are produced at regular intervals. The reports will include, at minimum, the following detail:

a) Cause(s) of the ATFM measure(s);
b) Impact of the ATFM measure(s);
c) Compliance to the ATFM measure(s); and
d) Effectiveness of the ATFM measure(s).

Currently, a Post-Operations Analysis Dashboard maintained by AEROTHAI is housed at http://bit.ly/thailand-gdp-analysis and will be updated monthly. The dashboard provides first-level overview of GDP-related performance and can be accessed by stakeholders.

3.10 Failure of the ATFM System

In the event of an ATFM system failure during the active ATFM period, Bangkok ATFMU will advise relevant stakeholders of the cancellation of the active ATFM measures and of any alternative measures to be activated. If no other ATFM measures are activated, Airspace Users will be advised to operate based on their normal schedules or in accordance with alternative ATC instructions.

3.11 Flight Plans and ATS Messages

Submission of timely flight plans together with ATS messages such as DLA, CNL and CHG helps ensure accuracy in demand prediction. It also allows ATFM units to derive an effective ATFM measure when required. Transmission of DEP messages provides ATFM operations with accurate updates of the predicted demand and facilitates the verification of ATFM measure adherence for the arrival ATFM unit, as well as allowing statistical analysis for post operations review.

In view of the above, Airspace Users are requested to ensure that their flight plans (FPLs) reflect the most accurate intention and include comprehensive information – speed, flight levels, routings, EETs, etc. – about the flights. Airspace Users are also requested to adhere to the following timing requirements:

a) Except where necessary for operational or technical reasons, FPL should be submitted not less than 3 hours before EOBT;
b) DLA message should be originated when the departure of an aircraft, for which basic flight plan data (FPL or RPL) has been sent, is delayed by 15 minutes of more after the EOBT contained in the basic flight plan;
c) CHG and CNL message are promptly originated in accordance with the provision of ICAO Doc 4444 Procedures for Air Navigation Services (PANS-ATM) 11.4.2.2; and
d) DEP message to be transmitted in accordance with the provision of ICAO Doc 4444 Procedures for Air Navigation Services (PANS-ATM) 11.4.2.2.

INTENTIONALLY BLANK PAGE

4. ATFM Daily Plan (ADP) and CDM Web Conference

4.1 ATFM Daily Plan

The ADP will provide a summary of the planned ATFM measures for the 24 hours period. ADP is normally distributed one day before operations, with a revised version issued on the day of operations when necessary. The ADP will provide information about resource constraints, planned ATFM measures and possible developing issues that may affect ATC operations.

For Bangkok ATFMU, the following template is to be used for ADP publication:

ATFM DAILY PLAN (ADP)

ATFM DAILY PLAN	**THAILAND** (Domestic)
DATE / TIME OF ISSUE	22 MAR 2018, 0250UTC
STATUS / REFERENCE	**Original Version** EFFECTIVE IMMEDIATELY

CONSTRAINTS AND IMPACT					
LOCATION	PERIOD (UTC)			DETAILS	REMARK
VTBS	22 MAR 18	0240	0430	URGENT RWY MAINT	AAR = 22

ATFM MEASURE				
LOCATION	ATFM MEASURE PERIOD (UTC)			ATFM MEASURE
VTBS	22 MAR 18	0330	0600	GDP/CTOT FOR FLT DEST VTBS

POSSIBLE / DEVELOPING ISSUES				
LOCATION	PERIOD (UTC)			REMARK

WEATHER BRIEFING
-TBN-

AIRSPACE STATUS BRIEFING

OTHER INFORMATION
ANY CHANGES TO FLIGHTS, PLEASE CONTACT BANGKOK ATFMU VIA PHONE OR HELP DESK. CTOT Window -5/+10 minutes. GDP/CTOT measure period in this ADP will supersede other measures in Domestic ADP AND CT18 CTOT. **BANGKOK ATFMU** PHONE LINE: +66 2287-8024, +66 2287-8025 WEB CONFERENCE HELP DESK https://aerothai.adobeconnect.com/bkkatfmu CTOT VIEW PAGE: http://atfm.aerothai.aero OR http://202.57.133.148

Figure 4.1 – Example of ATFM Daily Plan

Information published in ADP as following:

a) *Constraint and Impact* provides information about ATM resources with expected demand-capacity imbalance within Bangkok FIR and concerned area.
b) *ATFM Measure* provides information on the ATFM measure(s) to be used in order to address the imbalance discussed in *Constraint and Impact*.
c) *Possible/Developing Issues* provides information on possible issues that may affect ATC operations and/or ATM capacity. The information is provided for situational awareness purpose.

The ADP will be sent via e-mail to stakeholders' point of contact. To subscribe or edit your point of contact, please contact Bangkok ATFMU

In order to facilitate automated ADP processing, ADP is to be sent as a pdf file attached to an e-mail with the following specifications:

a) E-Mail Subject: ADP_[FIR Name]_[Effective Date, yyyyymmdd]_[Version number]
b) PDF File Name: ADP_[FIR Name]_Effective Date, yyyymmdd]_[Version number]

Example: ADP_VTBB_20181207_1

4.2 CDM Web Conference

Bangkok ATFMU will host a CDM web conference daily at 0930 LT (0230 UTC) with AEROTHAI's ATS units to discuss the demand/capacity situation within/related to the Bangkok FIR, significant weather affecting aircraft/ATC operations, NOTAMs, and ATFM measures especially GDP operations. ADP may be revised after the Web Conference if the published ATFM measures need to be adjusted or more ATFM measures are needed. Airspace Users and concerned units are welcomed to join this CDM web conference.

Web conference address:

Primary	https://aerothai.adobeconnect.com/bkkatfmu
Secondary	https://aerothai.adobeconnect.com/adpthailand

5. Ground Delay Program (GDP) Procedure

When a GDP is activated, stakeholders shall adhere to the procedures described in this section.

5.1 ATFM Daily Plan (ADP)

Bangkok ATFMU shall communicate the intention to activate ATFM measures via ADP. When possible (e.g. with enough lead time to the program), a tactical CDM conference will be conducted to provide clarification and detailed information on the planned ATFM measures. The CDM conference will also provide a better understanding on other constraints stakeholders may be experiencing.

5.2 FPL and DLA Message

Flights concerned with ATFM measure published in the ADP should submit Flight Plans (FPL) not less than **3 hours** prior to their Estimated Off-Block Times (EOBT) except where necessary for operational and technical reasons. The FPL shall reflect actual intention of the operation for the flight (i.e. speed, flight level, routing, EET, etc.)

Delay Message (DLA) should be transmitted when departure of an aircraft, for which basic flight plan data (FPL) has been sent, is delayed by more than **15 minutes** after the Estimated Off-Block Time contained in the latest submitted basic flight plan.

5.3 CDM Web Conference

Bangkok ATFMU will host a CDM web conference daily at 0930 LT (0230 UTC) with AEROTHAI's ATS units to discuss the demand/capacity situation within/related to the Bangkok FIR, significant weather affecting aircraft/ATC operations, NOTAMs, and ATFM measures especially GDP operations. Following the briefing, the web conference room will remain open as a Help Desk to provide assistance and facilitate CTOT management for stakeholders. Airspace Users and concerned units are welcomed to join this CDM web conference.

Web conference address:

Primary	https://aerothai.adobeconnect.com/bkkatfmu
Secondary	https://aerothai.adobeconnect.com/adpthailand

5.4 CTOT Publication

Bangkok ATFMU will publish CTOTs not less than 90 minutes before the flight's initial EOBT, to provide predictability and minimize disruption to stakeholder's operations. The distribution of CTOT information will be done in batches according to arrival times or points of departure or be delivered singularly to individual flights.

Stakeholders, on receipt of CTOT, shall trigger follow-up actions accordingly:

a) *Arrival Airport Operator*, having noted that arriving flight(s) with CTOT would have different landing and in-block times from schedule, may make adjustments to gate allocation if necessary;
b) *Facilitating ATFMU* shall inform ATC at the departure airports of relevant CTOTs.
c) *Departure Airport Operator*, having noted the CTOTs, shall adjust their gate planning accordingly, taking into account the possible delayed push-back due to CTOT compliance attempt;
d) *Airspace Users*, on receiving their CTOTs, shall inform affected flight crews and relevant operational personnel of the ATFM delay required.

For flights originally operating outside of the GDP period but delaying into it, Airspace Users shall contact Bangkok ATFMU to obtain CTOT as soon as possible and before requesting ATC clearance. If uncertain whether the flight should be subjected to GDP, Airspace Users and/or ATS unit shall contact Bangkok ATFMU to verify.

Late delivery of CTOTs

Due to system limitations or last-minute modification of a GDP, some CTOTs may be distributed less than 90 minutes prior EOBT. To ensure fair operation for Airspace Users, CTOT compliance is not mandatory for flights receiving CTOTs less than 90 minutes prior to their EOBTs. However, to contribute to overall network efficiency and to help maximize the benefit of a GDP, Airspace Users are requested to make best attempt to comply with their CTOTs insofar as possible.

Flights with Multiple CTOTs

Due to the nature of a distributed ATFM network in Asia-Pacific, several concurrent GDPs may be activated and a particular flight may be subjected to more than 1 CTOTs. Insofar as possible, Bangkok ATFMU will assist in resolving the conflicting requirements through coordination with other ATFMUs in the region. Should a problem of conflicting or concurrent CTOTs occur, Airspace Users are to contact Bangkok ATFMU for assistance.

5.5 CTOT Information Delivery

Bangkok ATFMU will disseminate CTOTs to relevant stakeholders through various channel to provide operational flexibility for all stakeholders. CTOTs will be distributed via:

a) Web Portal: <http://atfm.aerothai.aero/CTOTDistributor>
b) E-mail: Sent to stakeholders who have provided addresses to Bangkok ATFMU
c) AFTN: Sent to stakeholders who have provided addresses to Bangkok ATMFU, utilizing formats prescribed in Distributed Multi-Nodal Air Traffic Flow Management AFTN/AMHS-Based Interface Control Document v1.0. For the purpose of Bangkok ATFMU's ATFM services, messages used are Slot Allocation Message (SAM), Slot Revision Message (SRM), and Slot Cancellation Message (SLC).

5.6 CTOT Management

When the crew of a flight deemed they are unable to comply with CTOT, a series of coordination should be triggered to request a revised CTOT from Bangkok ATFMU:

a) *Flight Crew/Flight Operations/Ground Handler* should coordinate per aircraft operator's specific coordination procedure to request for a new CTOT;
b) *Flight departing from Multi-Nodal Level 3 ATFM Nodes* shall contact Facilitating ATFMU, who will then coordinate with the Bangkok ATFMU (Initiating ATFMU),
c) *Flight departing from Multi-Nodal Level 2 ATFM Nodes* shall contact ATC at the departure airport, who will then coordinate with the Bangkok ATFMU (Initiating ATFMU) or contact Bangkok ATFMU directly,
d) *Flight departing from airports within Bangkok FIR* shall contact Bangkok ATFMU, A new CTOT will be delivered to Facilitating ATFMU (or ATC units), aircraft operator's Flight Operations and other concerned units.
e) *Facilitating ATFMU/ATC units* shall inform ATCs and airport stakeholders of the change in departure time for the flight(s) concerned for their gate and resource planning. ATC shall facilitate departure of the flight(s) based on the revised CTOT.
f) *Bangkok ATFMU* will assess the latest development in demand prediction and best facilitate the slot substitution request coordinated by Facilitating ATFMU. They shall update all relevant stakeholders with the latest CTOT information after the substitution had been made.

To mitigate disruptions from insufficient reaction time for the processing of revised CTOT and the consideration of the operational restrictions. Stakeholders should lodge CTOT revision request as soon as practicable. In issuing a revised CTOT, Initiating ATFMU should ensure that the revised CTOT is not too early as to render stakeholders unable to react to it. Table 5.1 specifies conditions for the revised CTOT.

Changes Initiated by	**Lead Time Requirement (Latest time to lodge a CTOT revision request)**	
	Revised CTOT is **EARLIER**	Revised CTOT is **LATER**
Airspace User	**New CTOT > Current time + 30 minutes** (Current time + [Max STT** + Buffer])	No specific requirement
Initiating ATFMU	**New CTOT > Current time + 45 minutes** (Current time + Reaction time)	
* ">" mean Greater than ** "Max STT" refers to maximum standard taxi-out time used in CTOT calculation among the airports in the network. For current operations, the maximum STT is 20 minutes.		

Table 5.1 – conditions for the revised CTOT

5.7 Slot Swapping

Slot Swapping allows Airspace Users to request to the Bangkok ATFMU to rearrange their own flights subject to an ATFM measure in order to better suit their needs. Slot Swapping can be done subject to these requirements:

a) The two concerned flights must be in issued CTOTs.
b) The two flights must be subjected to the same ATFM measure.
c) A swap within the same Airspace Users is requested from its operation control center or person responsible for the schedule and rotation of aircraft
d) A swap between two different Airspace Users is possible, given that both Airspace Users' operation control centers (or person responsible for the schedule and rotation of aircraft) agree.
e) A swap between two different Airspace Users requested by an ATC at the departure airport for the purpose of tactical departure management can be done after the Pilot-In-Commands on both flights have agreed to do so. New CTOTs may not be exactly the same as previously assigned CTOTs due to flight profile variations.

5.8 Revision and Cancellation of GDP

When Bangkok ATFMU determines that the current GDP is insufficient to balance demand and capacity or the projected capacity allows for a relaxation of the restriction at the ATM resource, Bangkok ATFMU may issue a revision of the GDP. Bangkok ATFMU shall determine the revised AAR and GDP period. This information shall be disseminated, with the appropriate intention stated, in the revised ADP to all stakeholders. Bangkok ATFMU shall then publish/distribute the revised CTOTs and inform all stakeholders involved to note the revisions.

5.9 GDP Coordination Language Guidance

To assist in the communication between ATFMUs, Airspace Users, and airport operators for GDP coordination, a sample list of basic phrases that can be used in most key actions relating to GDP facilitation is included below. The list is not exhaustive and cannot cover all possible nuances in the tactical management and negotiation of an ATFM measure, but provide a harmonized guideline on which communication can be based.

Circumstance	Sample Phraseology
GDP Activation Announcement (e.g. for CDM conference)	GDP WILL BE ACTIVATED FOR <location> DUE TO <reason>. CTOT WILL BE ISSUED FOR FLIGHTS PLANNED TO ARRIVE <location> BETWEEN <activation time>.
GDP Cancellation Announcement (e.g. for CDM conference)	GDP FOR <location> HAS BEEN CANCELLED. FLIGHTS FOR <location> MAY DISREGARD CTOT AND DEPART WHEN READY.
CTOT Change Request (Requested by stakeholder)	(THIS IS <caller ID>) <aircraft ID> <adep> TO <ades> CURRENT CTOT <current CTOT> REQUEST NEW CTOT WITH ADDITIONAL <number of minutes> DELAY.

Circumstance	Sample Phraseology
	(or […] WITH NEW ESTIMATED TAKE-OFF <new ETOT>)
CTOT Change Response – Change Approved (Responded by Bangkok ATFMU)	<aircraft ID> CHANGE REQUEST NOTED, STANDBY NEW CTOT <aircraft ID> <new CTOT> (STANDBY FOR NOTIFICATION VIA <AFTN / web / e-mail>)
CTOT Swap Request (Requested by stakeholder)	(THIS IS <caller ID>) REQUEST SLOT SWAP BETWEEN <aircraft ID 1> <adep> TO <ades> AND <aircraft ID 2> <adep> TO <ades>
CTOT Swap Request Response (Responded by Bangkok ATFMU)	<aircraft ID 1> SWAP REQUEST NOTED, STANDBY SWAP REQUEST APPROVED NEW CTOT <aircraft ID 1> <new CTOT 1> NEW CTOT <aircraft ID 2> <new CTOT 2> (STANDBY FOR NOTIFICATION VIA <AFTN / web / e-mail>)
CTOT Cancellation (for a particular flight)	(THIS IS <name> ATFMU) CTOT <aircraft ID> CANCELLED FLIGHT MAY DEPART WHEN READY (STANDBY FOR NOTIFICATION VIA <AFTN / web / e-mail>) (or […] FLIGHT MAY DEPART AFTER <time restriction>)

Table 5.2 – GDP Coordination Language Guidance

5.10 CTOT Compliance Management for Airspace User

Flight's adherence to CTOT is a shared responsibility between Airspace Users and departure ATS units. **Airspace Users should plan their flights to be ready for take-off *at the assigned CTOT* regardless of the compliance window.**

a) *Flights departing from VTBS VTBD and VTSP:* crews shall contact ATC to obtain ATC clearance at least 25 minutes prior to CTOT and **request push back/start-up clearance at least 20 minutes prior to CTOT.**
b) *Flights departing from other airports in Bangkok FIR:* crews shall contact ATC to obtain ATC clearance at least 20 minutes prior to CTOT and **request push back/start-up clearance at least 15 minutes prior to CTOT**.

ATC may deny start up clearance to a flight unable to meet its CTOT until coordination with Bangkok ATFMU is completed and a revised CTOT or other instructions have been issued.

Flights departing from airports outside Bangkok FIR should comply with the local procedures or plan the affected flights to be ready for start-up/pushback at appropriate time to comply with CTOT at the runway, considering taxi-out time

5.11 CTOT Compliance Management for ATC

Flight's adherence to CTOT is a shared responsibility between Airspace Users and departure ATS units. Airspace Users should plan their flights to be ready for take-off (conventionally at the RWY holding point) at the assigned CTOT. However, operational variance in airport ground conditions and ATC capabilities are allowed and accounted for in the CTOT compliance windows. CTOT compliance windows are defined as:

a) **-5/+10** minutes for CTOTs assigned in response to **constrained arrival airports**;
b) **-5/+5** minutes for CTOTs assigned in response to **constrained airspace volumes**.

ATS Units should establish local procedures to facilitate and ensure compliance to CTOT at an airport of departure as described above.

In the event that a flight has also been given additional ATC restriction(s) from other ATS units (e.g. ACC), the ATS unit at the airport of departure (e.g. departure TWR) should attempt to comply with both the additional restriction(s) and CTOT insofar as practicable by utilizing the abovementioned CTOT compliance windows.
Should CTOT compliance not be possible considering the overriding ATC restrictions and safety concern, the ATS unit at the airport of departure should notify Bangkok ATFMU as soon as practicable.

Multiple flights with the same city-pair may be assigned the same or closely-spaced CTOTs. This is due to the differing flight profiles as advised by the Airspace Users through their flight plans.

In such cases; the ATS units at the airport of departure should attempt to manage the flights' CTOT compliance, while maintaining the required departure separations, by utilizing allowable compliance windows defined above.

5.12 Departure Procedure

For flights subjected to CTOTs, relevant stakeholders shall comply with the following departure procedure:

a) ATC units shall ensure that CTOT, if applicable, be included as part of the ATC clearance. This is to verify the alignment of CTOT information between the ATC and flight crews.
b) Once clearance has been issued, unless otherwise specified by the ATC, flight crews shall ensure readiness for pushback within 5 minutes. Failure to comply with this timeframe may result in further gate holding, and the ATC may request flight crews to obtain a new CTOT from Bangkok ATFMU through coordination with their flight operations / flight dispatcher.
c) Flight crews, through coordination with their flight operations / flight dispatchers, are responsible for new CTOT requests with Bangkok ATFMU while their aircraft are still at the parking bays (before pushback)

d) Once the aircraft has been cleared for pushback, ATC shall provide best assistance to ensure flights can take-off within CTOT compliance window. ATC shall assist in coordinating with Bangkok ATFMU for a new CTOT if necessary.

5.13 ATFM Phraseology for ATC

To prevent misunderstanding and ensure efficient ATFM verbal coordination, the following phrases are suggested for use as an interim procedure, pending the development of globally standardized ATFM – related phraseology for ATC.

Circumstance	Phraseology
Calculated take-off time (CTOT) delivery resulting from a slot allocation. The CTOT shall be communicated to the pilot at the first contact with ATC.	CTOT (*time*)
Change to CTOT resulting from a Slot Revision.	REVISED CTOT (time)
CTOT cancellation resulting from a Slot Cancellation	- CTOT CANCELLED. or - CTOT CANCELLED, REPORT READY
Start-up requested too late to comply with the given CTOT.	CTOT EXPIRED, CONTACT ATFMU TO REQUEST A NEW CTOT.
Denied of Start-up when requested too late to comply with the given CTOT.	UNABLE TO APPROVE START-UP CLEARANCE DUE CTOT EXPIRED, CONTACT ATFMU TO REQUEST A NEW CTOT
Denied of Start-up when requested too early to comply with the given CTOT.	UNABLE TO APPROVE START-UP CLEARANCE DUE CTOT (time), REQUEST START-UP AT (time)

Table 5.3 – ATFM Phraseology

5.14 ATFM data exchange messages

ATFM data exchange messages issued by ATFM Nodes are: SAM, SRM, and SLC. These messages are referenced from Distributed Multi-Nodal Air Traffic Flow Management AFTN/AMHS-Based Interface Control Document v.1.0.

Fields	Definition
ADEP	ICAO indicator of aerodrome of departure
ADES	ICAO indicator of aerodrome of destination
CTOT	Calculated Take-Off Time
EOBD	Estimated Off-Block Date.
EOBT	Estimated Off-Block Time
NEWCTOT	Revised CTOT
NEWEOBT	Revised EOBT
REGUL	Identifier for the restriction imposed
COMMENT	Commentary
TAXITIME	Taxi Time
REGCAUSE	Regulation Cause

Table 5.4 – Fields in ATFM data exchange messages

Sample of ATFM data exchange messages. (AFTN)

Message	Originator and Description	Action
Slot Allocation Message (SAM)		
- TITLE SAM - ARCID ABC123 - ADEP WSSS - ADES VTBD - EOBD 191002 - EOBT 0925 - CTOT 1037 - REGUL VTBD02OCTM - COMMENT DUE TO AIR DISPLAY - TAXITIME 0010 - REGCAUSE GA 83	SAM: Slot Allocation Message Sent to AU/ATC 90 minutes before last received EOBT. The SAM is used to inform AUs & ATS of the Calculated Take-Off Time (CTOT) computed by ATFM system for an individual flight, to which AUs/ATC must adhere.	Sent to AUs/ATS 2 hours before the last received EOBT. AUs/ATC must comply with the CTOT.
Slot Revision Message (SRM)		
- TITLE SRM - ARCID ABC123 - ADEP WSSS - ADES VTBD - EOBD 191002 - EOBT 0925 - NEWCTOT 1037 - REGUL VTBD02OCTM - COMMENT DUE TO AIR DISPLAY - TAXITIME 0010 - REGCAUSE TBA	SRM : Slot Revision Message Sent to AU/ATC to pass or confirm any revision to a CTOT following the issue of the initial SAM. This message may be used to indicate a delay increase or decrease.	The SRM notifies a significant change of slot. AUs/ATC must comply with the NEWCTOT.
Slot Cancellation Message (SLC)		
- TITLE SLC - ARCID ABC123 - ADEP WSSS - ADES VTBD - EOBD 191002 - EOBT 0925 - TAXITIME 0010	SLC : Slot Cancellation Message Sent to AU/ATC to advise that a flight, which has received a CTOT, is no longer subject to a restriction.	Flight may depart without CTOT unless a new CTOT message is received later or other restriction has been given.

Table 5.5 – Sample of ATFM data exchange messages

Slot Allocation Message (SAM)

An SAM is sent by the local ATFM System any time a flight is assigned a CTOT. The SAM is used to inform of the Calculated Take-Off Time (CTOT) for each individual flight. The SAM is to be sent approximately 90 minutes before EOBT.

Slot Revision Message (SRM)

An SRM is sent by an ATFM system any time a flight that has already received an SAM message, is assigned a revised CTOT. The SRM is used to inform of the new Calculated Take-Off Time (CTOT) for each individual flight.

Slot Cancellation (SLC) Message

An SLC is sent by an ATFM system any time a flight is no longer assigned a CTOT. The SLC is used to inform that the previously assigned Calculated Take-Off Time (CTOT) no longer applies for an individual flight. An SLC does not guarantee that the flight will not be subject to further regulations. If following receipt of the SLC, a new regulation is imposed which affects the flight, the concerned units will receive a new SAM.

REGUL Field

The - REGUL field indicates the name of the regulation affecting the flight. Use for identify the regulation and for the purpose of post-operation analysis.

The name of the regulation is built with the following elements:

a) Location of the regulation (ATC sector, aerodrome, waypoint).
b) Date of the regulation.
c) Period in the day:

M = Morning	(0600-1159 LT)
A = Afternoon	(1200-1759 LT)
N = Night	(1800-2359 LT)
E = Early morning	(0000-0559 LT)
X = Other	

REGCAUSE Field

In order to provide more specific nomenclature for delay causes and, at the same time, to assist the post-flight analysis, the ADEXP field - REGCAUSE comprises:

a) ATFM Measure cause code (one (1)-letter code corresponding to the cause assigned by the Bangkok ATFMU upon the implementation of the ATFM measure).
b) ATFM Measure Location code -one (1)-letter code: D, E, or A, describing the phase of the flight (Departure, Enroute, and Arrival) f the constraint that triggered the ATFM Measure.
c) A space.
d) The IATA Delay Code in numeric (e.g. 81, 82, 83, 89) or 00 when no IATA Code available.
   - The following codes comprise the list of Air Traffic Control (ATC) delay codes.
     i. 81 (AT) ATFM due to ATC EN-ROUTE DEMAND/CAPACITY, standard demand/capacity problems.
     ii. 82 (AX) ATFM due to ATC STAFF/EQUIPMENT EN-ROUTE, reduced capacity caused by industrial action or staff shortage, equipment failure, military exercise, or extraordinary demand due to capacity reduction in neighboring area.
     iii. 83 (AE) ATFM due to RESTRICTION AT DESTINATION AIRPORT, airport and/or runway closed due to obstruction, industrial action, staff shortage, political unrest, noise abatement, night curfew, special flights.
     iv. 84 (AW) ATFM due to WEATHER AT DESTINATION.
     v. 85 (AS): Mandatory security.
     vi. 86 (AG): Immigration, Customs, Health.

vii. 87 (AF): Airport Facilities, parking stands, ramp congestion, buildings, gate limitations.

viii. 88 (AD): Restrictions at airport of destination, airport/runway closed due obstruction, industrial action, staff shortage, political unrest, noise abatement, night curfew, special flights.

ix. 89 (AM): Restrictions at airport of departure, airport/runway closed due obstruction, industrial action, staff shortage, political unrest, noise abatement, night curfew, special flights, start-up and pushback, ...

Example;

- GA 83
- PE 81

The - REGCAUSE appears in the SAM and SRM messages, and is associated only with the controlling ATFM Measure. The code appearing in the message is the code valid at the time the delay was given to the flight. (See *Appendix 2* for more information)

5.15 Post-Operations Analysis for Ground Delay Program

Bangkok ATFMU continuously monitors and analyzes GDP operations in accordance to the Asia/Pacific ATFM Post-Operations Analysis Recommended Framework as discussed in **Chapter 3 (Section 3.9)**. At minimum, GDP post-operations analysis is updated and reviewed monthly; with the interval increased when necessary. The GDP post-operations analysis focuses on the following key indicators:

Performance Area	Description	Indicators
Impact Analysis	Analyze the impact of GDPs on stakeholders, in terms of flights affected and ATFM delays, which can indicate the *degree* of demand-capacity imbalance. With higher degree of imbalance, the impact is expected to be greater.	- ATFM delay statistics, based on assigned CTOTs - Number of flights affected
Compliance Assessment	Assess the degree of compliance to CTOTs achieved by Airspace Users and Departure Aerodromes.	- CTOT compliance statistics, based on comparison between flights' ATOTs and associated CTOTs
GDP Effectiveness Analysis	Analyze the effective of GDPs to manage traffic demand in accordance to the capacity, as well as its ability to transfer the expected / required airborne delays into ground delays.	- Comparison of actual traffic throughput and planned capacity - Assessment of airborne delays based on flights' actual and intended flying time

Table 5.6 – GDP post-operations analysis key indicators

Apart from indicators abovementioned, a number of other data useful for internal management are also collected and assessed. The aim of post-operations analysis process is to holistically identify operational challenges and continually improve ATFM operational performance.

5.16 GDP in A-CDM Environment

Airport Collaborative Decision Making (A-CDM) process is becoming more common and several airports around the world have implemented or are in the process of implementation. ICAO recommends that ATFM and A-CDM be integrated at airports where A-CDM process are in place. Civil Air Navigation Services Organization (CANSO) recommends that, as a best practice, the integration of ATFM and A-CDM should occur at both operational and system levels. Consequently, Airspace Users operating out of A-CDM airports may experience slightly a different procedure in dealing with the various timing requirements, e.g. CTOT, TOBT, TSAT, TTOT.

While different airports will implement A-CDM differently; in general flight crews will be asked to operate their flights based primarily on the assigned Target Start-Up Approval Times (TSAT). When ATFM and A-CDM are effectively integrated, TSATs should have already taken into account the required take-off times assigned as CTOTs by ATFM systems and flight crews should be able to focus on only one timing element.

Airspace Users operating their flights out of A-CDM airports are advised to consult local A-CDM procedures and seek clarification on the integration with ATFM from local ATS units and/or airport operators.

INTENTIONALLY BLANK PAGE

Appendix 1
Bangkok ATFMU Problem Report

INTENTIONALLY BLANK PAGE

Bangkok ATFMU Problem Report

Please return this form to:

Bangkok Air Traffic Flow Management Unit (Bangkok ATFMU)
Network Operations Air Traffic Management Center
102 Ngamduplee,
Tungmahamek
Bangkok 10120, Thailand
e-Mail: feedback@bobcat.aero

Originator:	**Form Submit Date:**	**Bangkok ATFMU Receive Date**

This report relates to:	○ Bangkok ATFMU Operations ○ ATC Operations related to ATFM ○ Traffic Overflow ○ Other (Please specify) ……	**Date, Time and Location of event:**

Impact on operations (1= most severe, 5 = no immediate effect)					**Safety related:** (If YES, please provide more information in details description)	○ Yes ○ No ○ Undeterminded
○ 1	○ 2	○ 3	○ 4	○ 5		

Summary Description (e.g. No CTOT receipt, ATC sector overload, etc.):

ARCID	**ADEP**	**ADES**	**EOBT/Date**	**Original CTOT** (if issued)	**Regulation name**	**Other information**

Detailed description (include all details necessary for the investigation, e.g. messages received/transmitted, screen captures, or any other supplementary information)**:**

Your details	
Name: Position: Country:	Contact details E-Mail: Phone:

INTENTIONALLY BLANK PAGE

Appendix 2
REGCAUSE table

INTENTIONALLY BLANK PAGE

This REGCAUSE table is reference from Eucontrol ATFCM Users Manual

Correlation between IATA Delay Codes and the NM Regulation Reasons					
NM				IATA	
Regulation cause	CODE	Regulation Location	*GUIDELINES*	Code	Delay Cause
ATC capacity	C	D	En Route: Demand exceeds or complexity reduces declared or expected ATC capacity Airport: Demand exceeds declared or expected ATC capacity.	89	RESTRICTIONS AT AIRPORT OF DEPARTURE
		E		81	ATFM due to ATC ENROUTE DEMAND / CAPACITY
		A		83	ATFM due to RESTRICTION AT DESTINATION AIRPORT
ATC industrial action	I	D	Reduction in any capacity due to industrial action by ATC staff	89	RESTRICTIONS AT AIRPORT OF DEPARTURE
		E		82	ATFM due to ATC STAFF / EQUIPMENT ENROUTE
		A		83	ATFM due to RESTRICTION AT DESTINATION AIRPORT
ATC routeings	R	E	Network solutions / scenarios used to balance demand and capacity	81	ATFM due to ATC ENROUTE DEMAND / CAPACITY
ATC staffing	S	D	Unplanned staff shortage reducing expected capacity.	89	RESTRICTIONS AT AIRPORT OF DEPARTURE
		E		82	ATFM due to ATC STAFF / EQUIPMENT ENROUTE
		A		83	ATFM due to RESTRICTION AT DESTINATION AIRPORT
ATC equipment	T	D	Reduction of expected or declared capacity due to the non-availability or degradation of equipment used to provide an ATC service.	89	RESTRICTIONS AT AIRPORT OF DEPARTURE
		E		82	ATFM due to ATC STAFF / EQUIPMENT ENROUTE
		A		83	ATFM due to RESTRICTION AT DESTINATION AIRPORT
Accident / incident	A	D	Reduction of expected ATC capacity due to an aircraft accident / incident.	89	RESTRICTIONS AT AIRPORT OF DEPARTURE
		A		83	ATFM due to RESTRICTION AT DESTINATION AIRPORT
Aerodrome capacity	G	D	Reduction in declared or expected capacity due to the degradation or non-availability of infrastructure at an airport. e.g. Work in Progress, shortage of aircraft stands etc. Or when demand exceeds expected aerodrome capacity.	89	RESTRICTIONS AT AIRPORT OF DEPARTURE'
		A		83	ATFM due to RESTRICTION AT DESTINATION AIRPORT
Aerodrome Services	E	D	Reduced capacity due to the degradation or non-availability of support equipment at an airport e.g. Fire Service, De-icing / snow removal equipment or other ground handling equipment.	99	OTHER
		A		99	OTHER
Industrial action NON-ATC	N	D	A reduction in expected / planned capacity due to industrial action by non ATC personnel.	98	INDUSTRIAL ACTION OUTSIDE OWN AIRLINE
		A		98	INDUSTRIAL ACTION OUTSIDE OWN AIRLINE
Airspace management	M	D	Reduction in declared or expected capacity following changes in airspace / route availability due to small scale military activity	89	RESTRICTIONS AT AIRPORT OF DEPARTURE
		E		82	ATFM due to ATC STAFF/EQUIPMENT ENROUTE
		A		83	ATFM due to RESTRICTION AT DESTINATION AIRPORT
Special event	P	D	Reduction in planned, declared or expected capacity or when demand exceeds the above capacities as a result of a major sporting, governmental or social event. It may also be used for ATM system upgrades and transitions. Large multinational military exercises may also use this reason. This category should only be used with prior approval during the planning process.	89	RESTRICTIONS AT AIRPORT OF DEPARTURE
		E		82	ATFM due to ATC STAFF / EQUIPMENT ENROUTE
		A		83	ATFM due to RESTRICTION AT DESTINATION AIRPORT

Correlation between IATA Delay Codes and the NM Regulation Reasons					
NM				IATA	
Regulation cause	CODE	Regulation Location	*GUIDELINES*	Code	Delay Cause
Weather	W	D	Reduction in expected capacity due to any weather phenomena. This includes where weather impacts airport infrastructure capacity, but where aerodrome services are operating as planned / expected.	89	RESTRICTIONS AT AIRPORT OF DEPARTURE
		E		81	ATFM due to ATC ENROUTE DEMAND / CAPACITY
		A		84	ATFM due to WEATHER AT DESTINATION
Environmental issue	V	D	Reduction in any capacity or when demand exceeds any capacity due to agreed local noise, runway usage or similar procedures. This category should only be used with prior agreement in the planning process.	89	RESTRICTIONS AT AIRPORT OF DEPARTURE
		E		81	ATFM due to ATC ENROUTE DEMAND / CAPACITY
		A		83	ATFM due to RESTRICTION AT DESTINATION AIRPORT
Other	O	D	This should only be used in exceptional circumstances when no other category is sufficient. An explanatory ANM remark MUST be given to allow post ops analysis.	89	RESTRICTIONS AT AIRPORT OF DEPARTURE
		E		81	ATFM due to ATC ENROUTE DEMAND / CAPACITY
		A		83	ATFM due to RESTRICTION AT DESTINATION AIRPORT

Appendix 3
Glossary

INTENTIONALLY BLANK PAGE

GLOSSARY

ABBREVIATIONS/ACRONYMS

AAR	Airport arrival rate
ACARS	Aircraft Communication Addressing and Reporting System
ACC	Area control centre
A-CDM	Airport collaborative decision-making
ACIS	A-CDM information sharing
ACISP	A-CDM information sharing platform
ADEP	Departure airport
ADES	Destination airport
ADEXP	ATS data exchange presentation
ADP	ATFM daily plan
ADR	Airport departure rate
ADS-B	Automatic dependent surveillance — Broadcast
AFP	Airspace flow programme
AFS	Aeronautical fixed service
AFTN	Aeronautical fixed telecommunication network
AGHT	Actual ground handling time
AIBT	Actual in block time
AIM	Aeronautical information management
AIP	Aeronautical information publication
AIRM	ATM information reference model
AIXM	Aeronautical information exchange model
ALDT	Actual landing time
AMAN	Arrival manager
AMAT	Actual movement area entry time
AMHS	ATS message handling system
ANSP	Air navigation services provider
AO	Aircraft operator
AOBT	Actual off-block time
AOP	Airport operator
AP	Airspace provider
APP	Approach control service
ARCID	Aircraft identification (Call sign)
ARCTYP	Aircraft type
ARDT	Aircraft ready time
ARR	Arrival message
ASAT	Actual start up approval time
ASBU	Aviation system block upgrade
ASM	Airspace management
A-SMGCS	Advanced surface movement guidance and control system
ASP	ATM service provider
ASRT	Actual start up request time
ATA	Actual time of arrival
ATC	Air traffic control
ATCO	Air traffic controller
ATD	Actual time of departure
ATFCM	Air traffic flow and capacity management
ATFM	Air traffic flow management
ATM	Air traffic management
ATMC	Air traffic management centre
ATOT	Actual take-off time

ATS	Air traffic services
ATTT	Actual turnaround time
AU	Airspace User
CAA	Civil Aviation Authority
CBA	Cost benefit analysis
CDM	Collaborative decision-making
CEF	Capacity enhancement function
CFMU	Central flow management unit
CGNA	Centro de Gerenciamento da Navegação Aérea (air navigation management centre)
CHG	Modification message
CLDT	Calculated landing time
CNS/ATM	Communications, navigation and surveillance/air traffic management
CNL	Flight plan cancellation message
COBT	Calculated off-block time
CPDLC	Controller-pilot data link communications
CPL	Current flight plan
CSA	Common situational awareness
CTO	Calculated time over
CTOT	Calculated take-off time
DCB	Demand and capacity balancing
DCL	Departure clearance message (via data link)
DCPC	Direct controller-pilot communications
DEP	Departure message
DLA	Delay message
DMAN	Departure manager
DPI	Departure planning information message
ECAC	European Civil Aviation Conference
EDCT	Expected departure clearance time
EEZT	Estimated end of de-icing time
EIBT	Estimated in-block time
ELDT	Estimated landing time
EOBT	Estimated off-block time
ERTD	Earliest runway time of departure
ERZT	Estimated ready for de-icing time
ESP	Emergency service provider
EST	Estimated message
ETD	Estimated time of departure
ETO	Estimated time over
ETOT	Estimated take-off time
EXIT	Estimated taxi in time
EXOT	Estimated taxi out time
FAP	Future ATM profile
FCA	Flow constrained area
FDPS	Flight data processing system
FDP	Flight data processor
FF-ICE	Flight and flow — information for a collaborative environment
FIR	Flight information region
FIXM	Flight information exchange model
FMP	Flow management position
FMU	Flow management unit
FOC	Flight operation centre
FPL	Filed flight plan
FUA	Flexible use of airspace
FUM	Flight update message

GANP	Global air navigation plan
GDP	Ground delay programme
GH	Ground handler
GNSS	Global navigation satellite system
GSt	Ground stop
ICAO	International Civil Aviation Organization
IATA	International Air Transport Association
IBT	In block time
IFR	Instrument flight rules
ILS	Instrument landing system
IMC	Instrument meteorological conditions
IR	Infra-red
IWXXM	ICAO weather information exchange model
KPA	Key performance area
KPI	Key performance indicator
LDT	Landing time
LoA	Letter of agreement
MDI	Minimum departure interval
MET	Meteorology
MINIT	Minutes-in-trail
MIT	Miles-in-trail
MLAT	Multilateration
MoU	Memorandum of Understanding
MTTT	Minimum turnaround time
NAVAIDs	Aid to air navigation
NOPS	Network operations
NOTAM	Notice to airmen
OBT	Off-block time
OLDI	Online data interchange
PBA	Performance-based approach
PBN	Performance-based navigation
PIA	Performance improvement area
PMP	Project management plan
Prog	Prognosis
R&D	Research and development
REG	Aircraft registration
RFF	Rescue and firefighting
ROI	Return on investment
RTA	Required time of arrival
RVR	Runway visual range
RWY	Runway
SAR	Search and rescue
S-CDM	Surface-CDM (United States)
SIBT	Scheduled in-block time
SID	Standard instrument departure
SOBT	Scheduled off-block time
SSR	Secondary surveillance radar
STAM	Short-term ATFM measure
STAR	Standard instrument arrival
SUB	Slot swapping
SWIM	System-wide information management
TAF	Aerodrome forecast
TAS	True air speed
TCAC	Tropical Cyclone Advisory Centre

TFM	Traffic flow management
TMA	Terminal control area
TMAT	Target movement area time
TOBT	Target off-block time
TOT	Take-off time
TS	Thunderstorms
TSAT	Target start-up approval time
TTOT	Target take off time
TWR	Aerodrome control tower
UDPP	User-driven prioritization process
VAAC	Volcanic Ash Advisory Centre
VMC	Visual meteorological conditions
VTT	Variable taxi time
WAFC	World Area Forecast Centre
WAM	Wide area multilateration
WXXM	Weather information exchange model

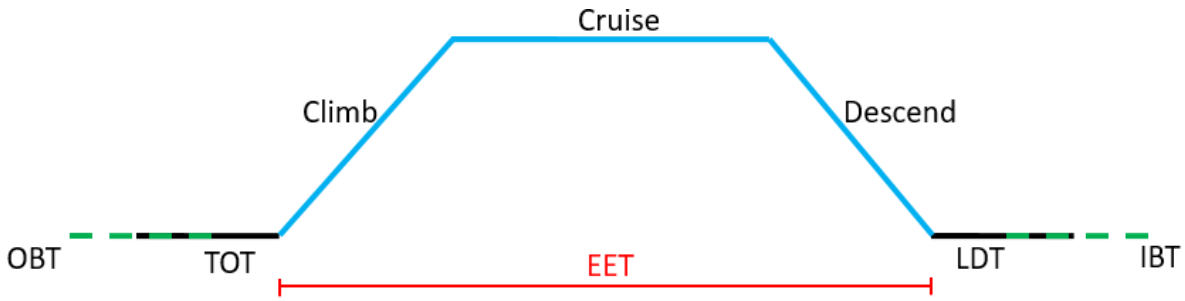
Appendix 4
CTOT Calculation Methodology

INTENTIONALLY BLANK PAGE

CTOT Calculation Methodology by the Air Traffic Flow Advisory System (ATFAS)

Air Traffic Flow Advisory System (ATFAS) is the software developed by AEROTHAI as the ATFM support tool, and is capable of calculating, distributing, and managing CTOTs. Vital to ATFAS' calculation of CTOTs are flight plan information – speed, flight levels, routing, and EETs – that accurately reflects flight crew's operational intentions. Basic CTOT calculation methodology is shown below;

Constrain location: Airport



a) Calculate Estimated Take-Off Time (ETOT) based on Estimated Off-Block Time (EOBT) from FPL and the Standard Taxi-out Time

ETOT = EOBT + STT (Standard Taxi-out Time)

b) Calculate Estimated Landing Time (ELDT) based on aircraft speed, flight levels, routing, and Estimated Elapse Time (EET) from FPL and ETOT

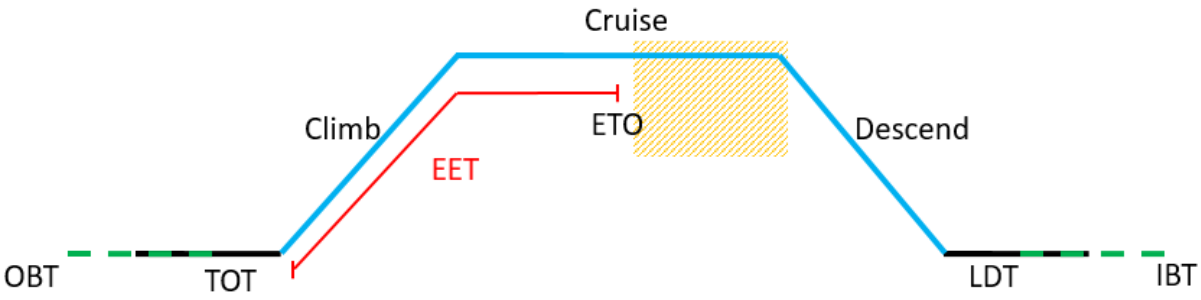
ELDT = ETOT + EET

c) Re-arrange and sort ELDT for each flight to meet capacity requirement at the destination airport. The re-arranged ELDT will became Calculated Landing Time (CLDT)

d) Calculate CTOT based on CLDT

CTOT = CLDT - EET

Constrain location: Airspace



a) Calculate Estimated Take-Off Time (ETOT) based on Estimated Off-Block Time (EOBT) from FPL and the Standard Taxi-out Time

ETOT = EOBT + STT (Standard Taxi-out Time)

b) Calculate Estimated Elapse Time (EET) to each airspace constrain area based on aircraft speed, flight levels, routing, Estimated Elapse Time (EET) at FIR boundary from FPL, and navigation database.

c) Calculate Estimated Time Over (ETO) airspace constrain area, using information from b).

ETO = ETOT + EET

d) Re-arrange and sort ETO for each flight to meet capacity requirement at the airspace constrain area. The re-arranged ETO will became Calculated Time Over (CTO).

e) Calculate CTOT based on CTO and EET.

CTOT = CTO - EET

Appendix 5
Frequently asked questions (FAQs)

INTENTIONALLY BLANK PAGE

Question: I didn't receive the ADP, how can I get it?

Answer: Normally Bangkok ATFMU will send the ADP via e-mail to all stakeholders who provide their e-mail to Bangkok ATFMU. To receive the ADP, please contact Bangkok ATFMU and provide your e-mail.

Question: What action do I take if I cannot comply with my CTOT?

Answer: If your flight is expected to be delayed, contact Bangkok ATFMU as soon as possible.