

Regional Focus



# CANSO/ACI Asia-Pacific ATFM/A-CDM Integration Workshop

Thursday 03 June 2021, 06:00-09:00 UTC

## Setting the Scene for ATFM/A-CDM Integration Section



**Mr. SL Wong**

Head of Technical Affairs, Safety,  
Capacity and ATM

ACI Asia-Pacific



**Mr. Fredrik Lindblom**  
Co-Chair CANSO ATFM/A-CDM  
Workgroup  
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**Mr. Stuart Ratcliffe**  
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**Mr. Satya Subramaniam**  
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Assistant Director Safety & Flight  
Operations  
IATA Asia Pacific



# **Mr. Fredrik Lindblom**

Co-Chair CANSO ATFM/A-CDM  
Workgroup

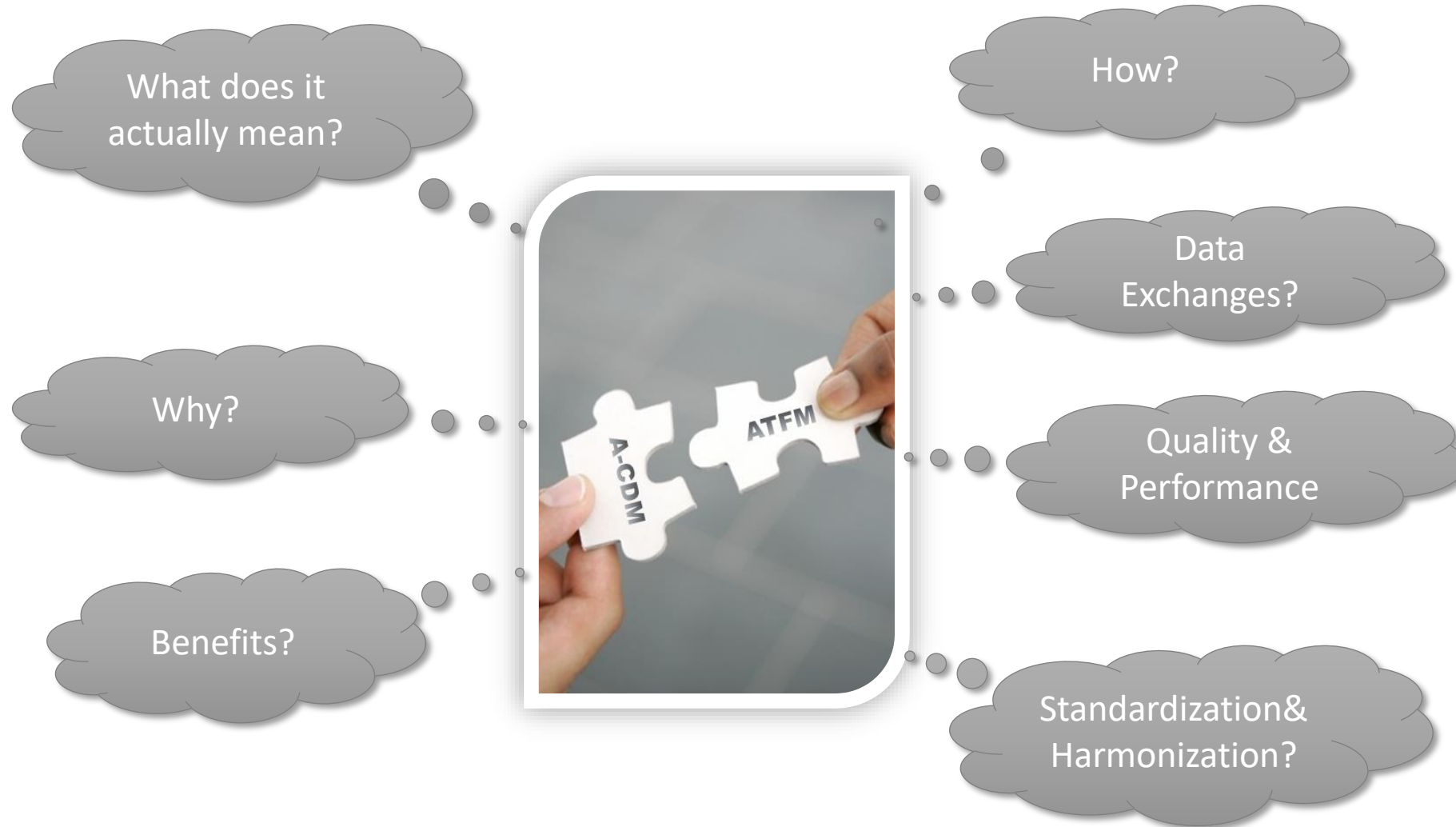
Sales Director & ATM Specialist  
SAAB ATM

Regional Focus



# Introduction to ATFM/A-CDM Integration

# ATFM/A-CDM Integration



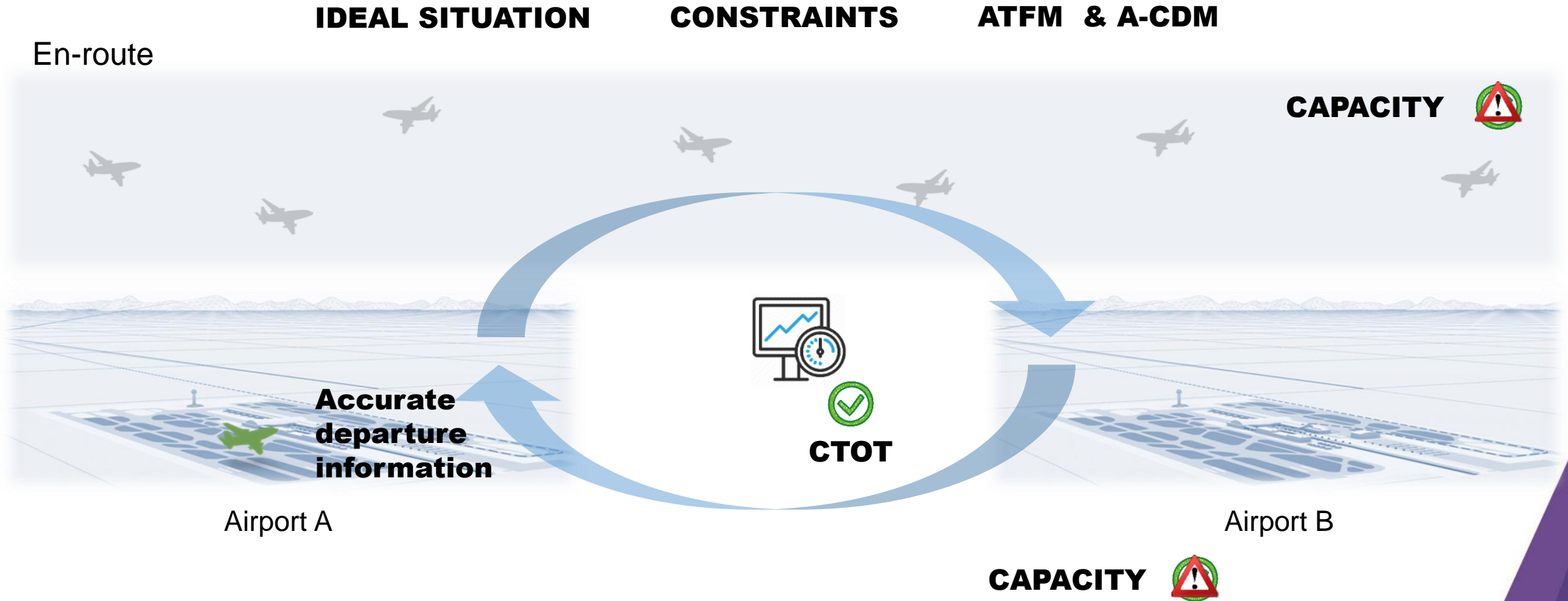


# CANSO Guide on ATFM/A-CDM Integration



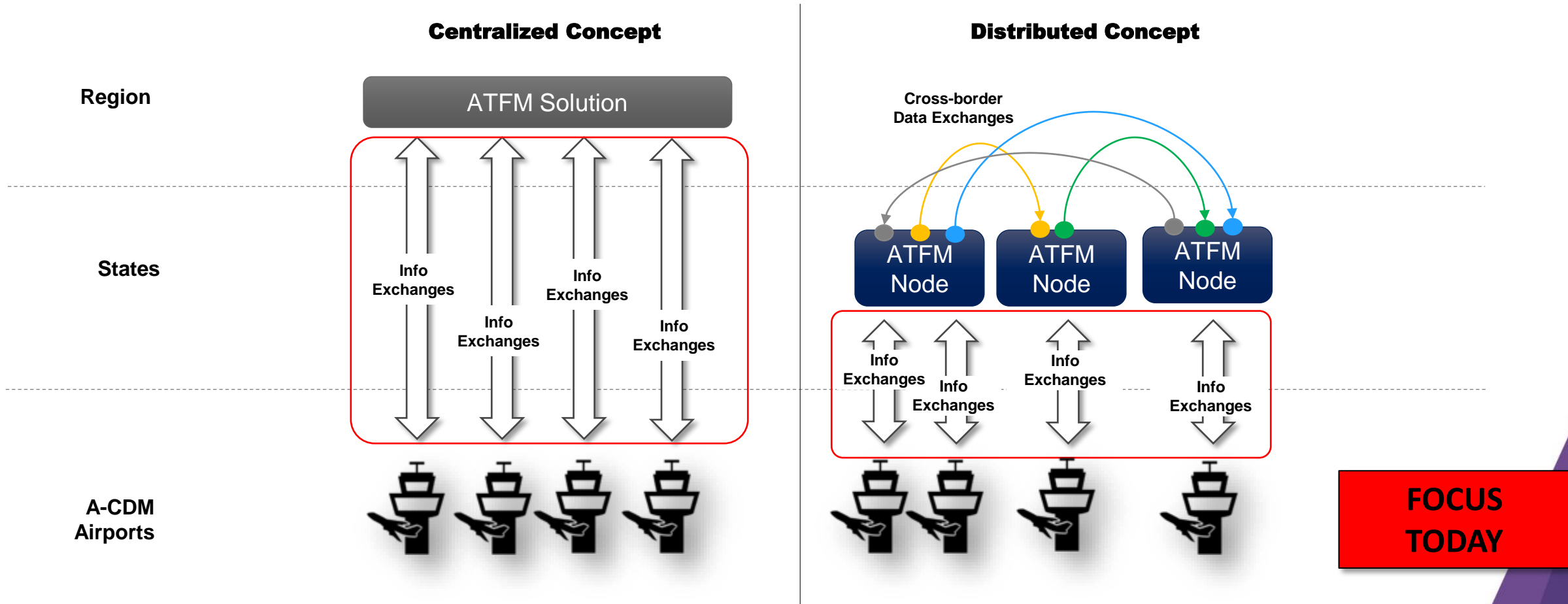
1	Executive Summary
2	Acronyms
3	Background Basics
3.1	Basics of ATFM
3.2	Basics of A-CDM
3.3	ATFM/A-CDM Integration
4	Benefits of ATFM/A-CDM Integration
4.1	Purpose and Benefits of ATFM/A-CDM Integration
4.2	Integration Benefits: the European Network Example
5	<b>ATFM/A-CDM Integration Concept</b>
5.1	Conceptual Approach to the Integration
5.2	Key Information Exchanges for Successful Integration
5.3	Exchange of ATFM Measure Information
5.4	Exchange of Flight Update Information
5.5	Exchange of Flight Departure Information
6	<b>Sample Use Cases for AFTM/A-CDM Integration</b>
6.1	Use Case 1 – Exchange of ATFM Measure Information
6.2	Use Case 2 – Exchange of Flight Update Information
6.3	Use Case 3 – Exchange of Flight Departure Information
7	<b>SWIM and ATFM/A-CDM Information Exchange</b>
7.1	What Is SWIM and Why Is It Relevant?
7.2	SWIM and ATFM/A-CDM Information Exchange
8	<b>Recommendations for ATFM/A-CDM Integration</b>
8.1	Stakeholder Engagement
8.2	Establishment of Common Objectives
8.3	Integration Planning & Execution
8.4	Data Quality & Testing
8.5	Success Measure Development
9	Case Studies

# Big Picture: Integrated ATFM & A-CDM





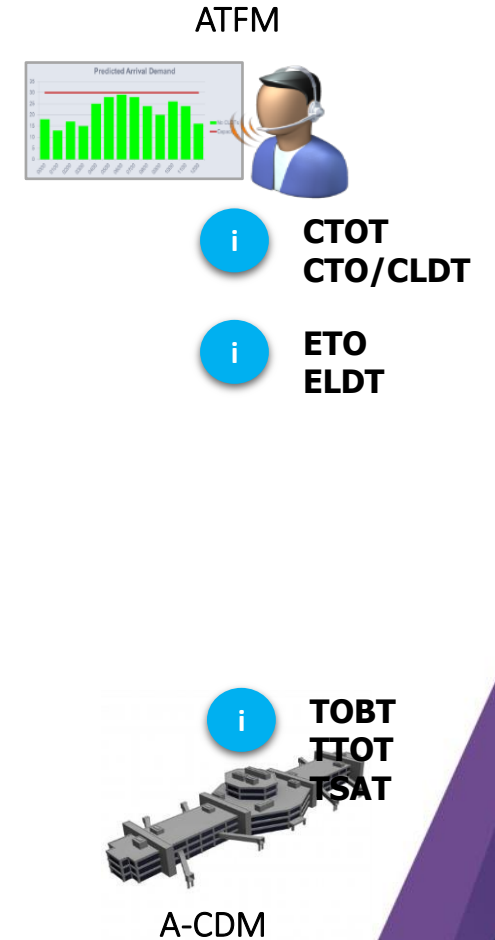
# ATFM/A-CDM Integration Environment



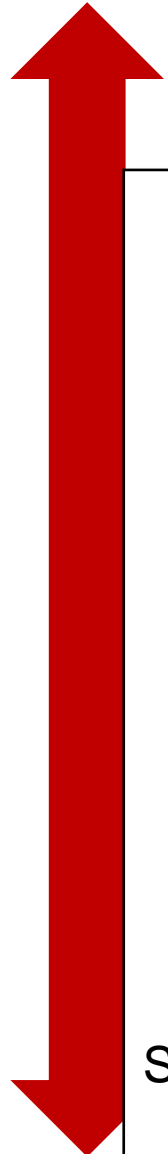
# ATFM / A-CDM Information Exchange

## Three Key Information Exchanges

1. ATFM measures (e.g. ATFM slots) from ATFM to A-CDM
2. Updated flight information from ATFM to A-CDM
3. Flight departure information from A-CDM to ATFM

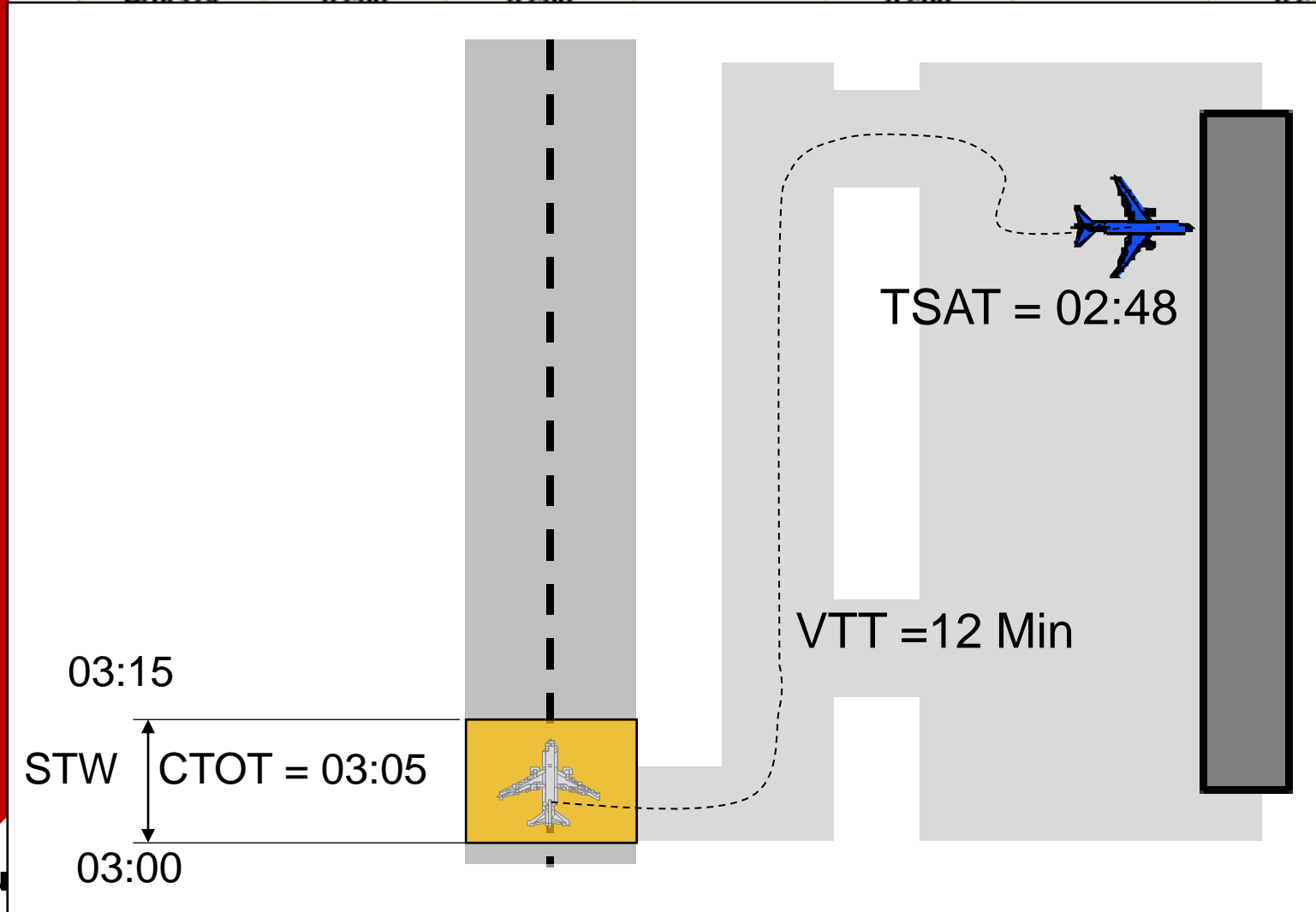


Current  
Time



+3 hou

Pre Departure Sequence ▾								
Call Sign Out	EOBT (ATC)	TOBT/POBT ...	ARDT	TSAT/PSA... ↑	ASAT	TTOT	CTOT	Runway Pred
CPA806	01:50	01:50		01:50		02:12		07R
HDA946	01:50	01:50		01:50		02:09		07R
CES722	01:55	01:55		01:55		02:14		07R
HDA760	01:55	01:55		01:55		02:16		07R
CRK248	01:55	01:55		01:55		02:11		07R
STY1265	02:00	02:00		02:00		02:22		07R
HDA379	02:00	02:00		02:00		02:18		07R
...	...	...	...	...	...	...	...	...



...	03:05	07R
...	...	...
...	03:20	07R
...	...	...
...	05:00	07R
...	...	...
...	05:40	07R
...	...	...

A large red arrow pointing upwards, with a small 'S' at the bottom right.

Call Sign	Out	EOBT (ATC)	TOBT/POBT ...	ARDT	TSAT/PSA...	ASAT	TTOT	CTOT	Runway Pred
CPA806		01:50	01:50		01:50		02:12		07R
HDA946		01:50	01:50		01:50		02:09		07R
CES722		01:55	01:55		01:55		02:14		07R
HDA760		01:55	01:55		01:55		02:16		07R
CRK248		01:55	01:55		01:55		02:11		07R
STY1265		02:00	02:00		02:00		02:22		07R
HDA370		02:00	02:00		02:00		02:18		07R

Does NOT Change

Visible  
delay of  
43 Min

02:48

03:05

03:05

03:20

05:00

05:40

03:15

STW

CTOT = 03:05

03:00

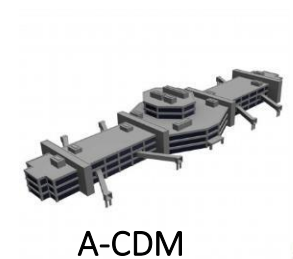
VTT =12 Min

+3 hou

# ATFM / A-CDM Information Exchange

## Three Key Information Exchanges

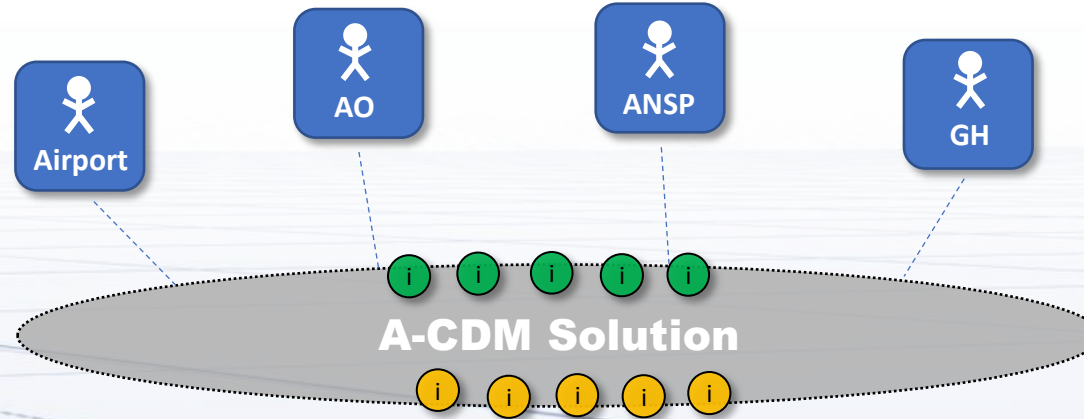
1. ATFM measures (e.g. ATFM slots) from ATFM to A-CDM
2. (Updated flight information from ATFM to A-CDM)
3. Flight departure information from A-CDM to ATFM



# ELDT updates from ATFM to A-CDM



ELDT



ARRIVAL

TURN AROUND

DEPARTURE

EIBT | TOBT | TSAT

TTOT

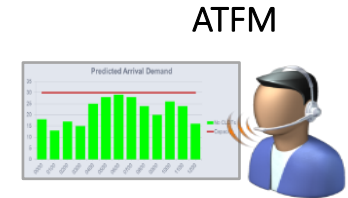




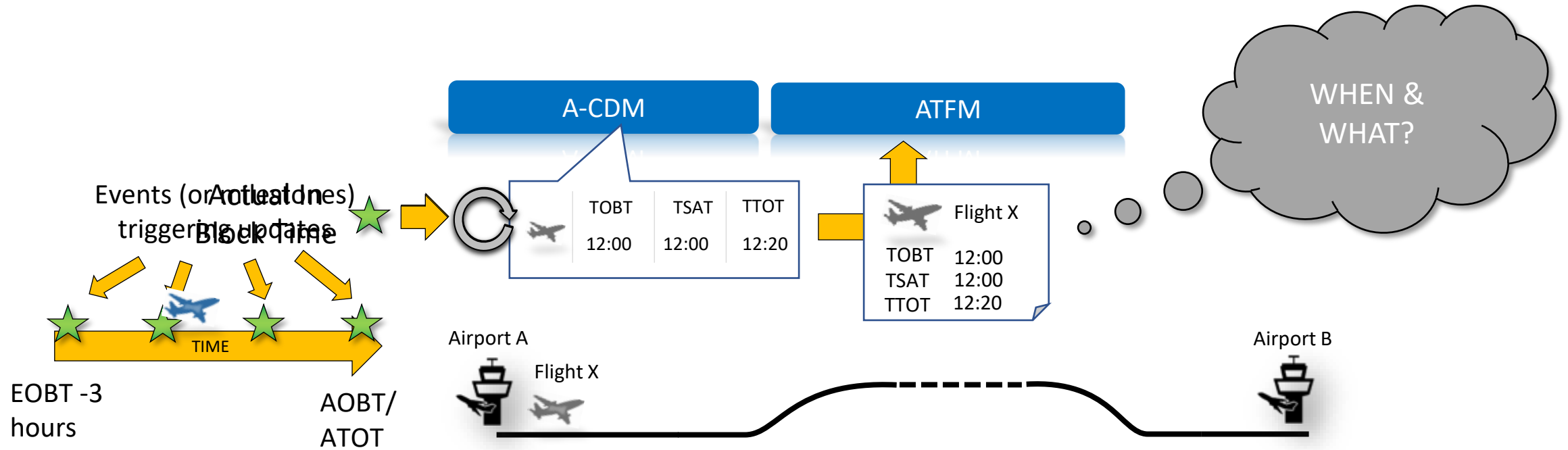
# ATFM / A-CDM Information Exchange

## Three Key Information Exchanges

1. ATFM measures (e.g. ATFM slots) from ATFM to A-CDM
2. (Updated flight information from ATFM to A-CDM)
3. Flight departure information from A-CDM to ATFM



# Flight Departure Information



# Flight Departure Information

- For the When & What a “DPI style” approach is adopted
- However, a more scalable approach is recommended to allow for more flexible implementation

A-CDM Milestones	DPI Message Name	Minimal Set
<b>1. Flight Plan Activated</b>	<b>Early DPI (EDPI)</b>	<b>Mandatory</b>
2. EOBT – 2 Hours	Target DPI-target (TDPI-t)	
3. Take-Off from Outstation	Target DPI-target (TDPI-t)	
4. Local Radar Update	Target DPI-target (TDPI-t)	
5. Final Approach	Target DPI-target (TDPI-t)	
6. Landing	Target DPI-target (TDPI-t)	
<b>7. In Block</b>	<b>Target DPI-target (TDPI-t)</b>	<b>Mandatory</b>
8. Ground Handling Starts	Target DPI-target (TDPI-t)	
<b>9. TOBT Update prior to TSAT</b>	<b>Target DPI-target (TDPI-t)</b>	<b>Mandatory</b>
<b>10 TSAT Issue</b>	<b>Target DPI-sequenced (TDPI-s)</b>	<b>Mandatory</b>
11. Boarding Starts	Target DPI-sequenced (TDPI-s)	
12. Aircraft Ready	Target DPI-sequenced (TDPI-s)	
13. Start Up Request	Target DPI-sequenced (TDPI-s)	
14. Start Up Approved	Target DPI-sequenced (TDPI-s)	
<b>15. Off-Block</b>	<b>ATC DPI (ADPI)</b>	<b>Mandatory</b>
16. Take-Off		
<b>No Applicable Milestone</b>	<b>Cancel DPI (CDPI)</b>	<b>Mandatory</b>

# Data Quality in ATFM/A-CDM Integration

***“Can I rely on this information to be accurate?”***



# Data Quality in ATFM/A-CDM Integration

## Exchange of ATFM Measure Information

ATFM  
Node

Message direction

CTOTs

A-CDM Airport



## Exchange of Flight Update Information

ATFM  
Node

Message direction

ELDTs

Is this info  
accurate?

## Exchange of Flight Departure Information

ATFM  
Node

Message direction

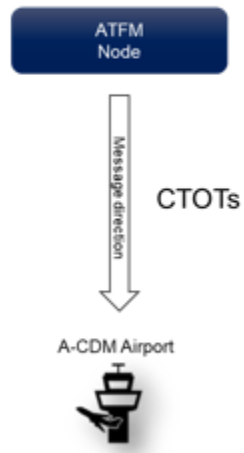
Dep. Flight  
Info

A-CDM Airport



# Data Quality in ATFM/A-CDM Integration

## Exchange of ATFM Measure Information



### KPI & Accuracy Recommendations

Indicator name	Formula	Target Value	Acceptable Range
TSAT+VTT inside CTOT STW	$CTOT_{[STW\ min]} < TSAT + VTT < CTOT_{[STW\ min]}$ <small>*STW = slot tolerance window or CTOT compliance window. Its value should be agreed upon among stakeholders in the network. Normally, STW are prescribed as: - STW[min] = -5 min - STW[max] = +10 min</small>	Agreed value, e.g. 100% in Europe	Agreed value, e.g. >=90% in Europe

## Exchange of Flight Update Information



### KPI & Accuracy Recommendations

Indicator name	Formula	Target Value	Acceptable Range
ELDT Accuracy at Milestone 3 (MS3)	$ELDT_{[MS3]} - ALDT$	Agreed value, e.g. <15 mins	Agreed value, e.g. <=30 mins
ELDT Accuracy at Milestone 4 (MS4)	$ELDT_{[MS4]} - ALDT$	Agreed value, e.g. <10 mins	Agreed value, e.g. <=20 mins

## Exchange of Flight Departure Information

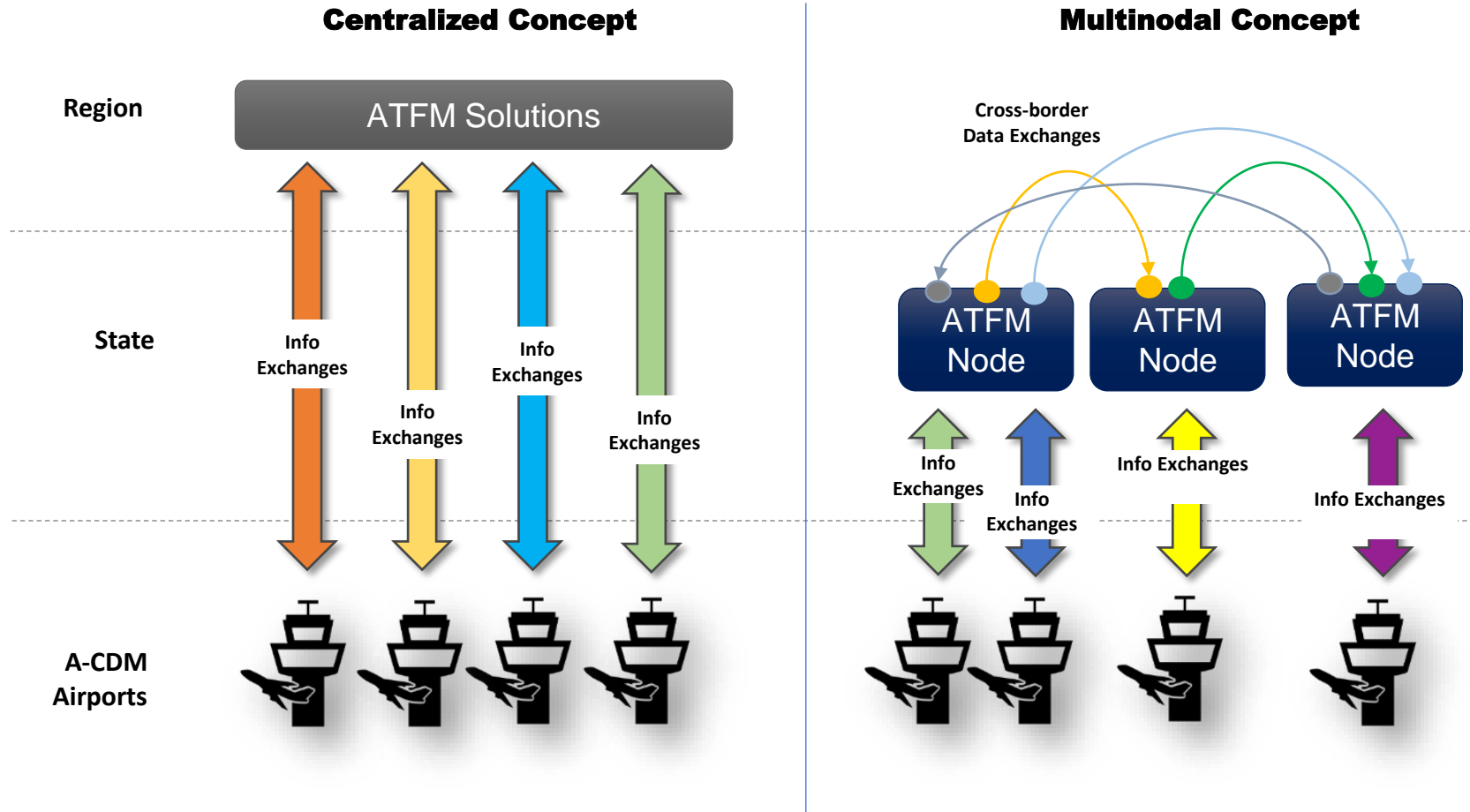


### KPI & Accuracy Recommendations

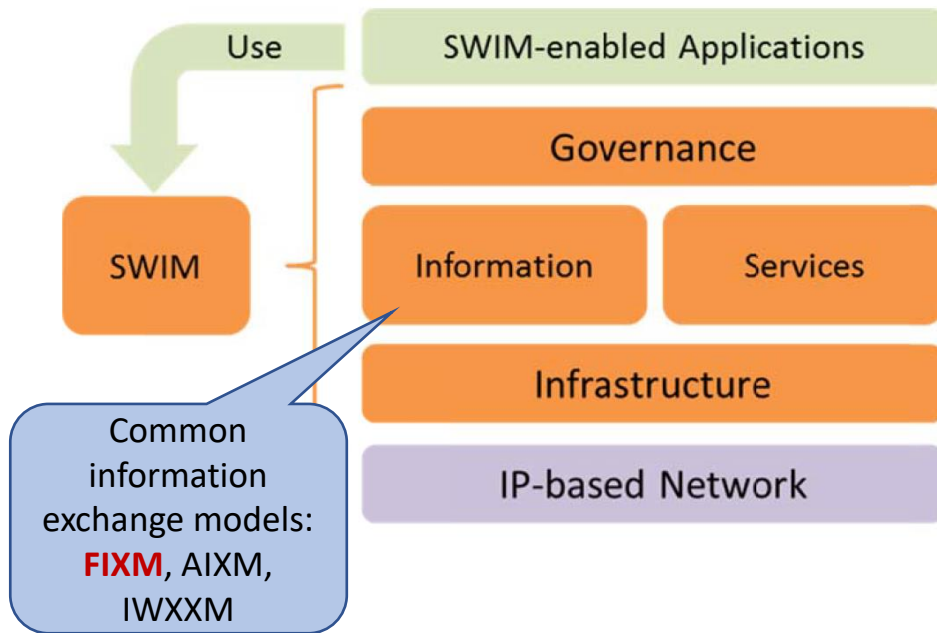
Indicator name	Formula	Recommended Target Value [min]	Recommended Acceptable Range [min]
EDPI_TTOT	$TTOT_{[MS1]} - ATOT$	0	<=15
TDPI-t_TTOT	$TTOT_{[MS7]} - ATOT$	0	<=12
TDPI-t_TTOT	$TTOT_{[MS9]} - ATOT$	0	<=12
TDPI-s_TTOT	$TTOT_{[MS10]} - ATOT$	0	<=10
ADPI_TTOT	$TTOT_{[MS15]} - ATOT$	0	<=5



# SWIM: Enabler for the Information Exchange



# SWIM: Enabler for the Information Exchange



## Available Provisions

### ✓ **APAC Flow Extension 1.0.0**

- Published Jul 2019
- Extend FIXM Core v4.1.0
- Support exchange of:  
AOBT, CTOT, CLDT, TOBT, TSAT,  
TTOT, ELDT

### ✓ **US NAS Extension 4.2.1**

- Published Dec 2018
- Extend FIXM Core v4.1.0
- Support exchange of U.S. ATFM and Surface-CDM data elements

More information at: <http://www.fixm.aero>

# CANSO Guide on ATFM/A-CDM Integration



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# Thank you





# Mr. Stuart Ratcliffe

Co-Chair CANSO ATFM/A-CDM  
Workgroup

Principal SME: ATFM/CDM  
Metron Aviation

Regional Focus



# ATFM/A-CDM Integration: Benefits & Challenges



# ATFM / A-CDM Integration: Mutual Benefits



Enhanced flight information  
for better demand prediction



Improved ATFM slot  
adherence



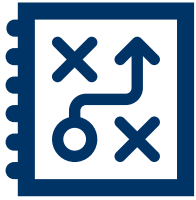
Improved slot management  
coordination process based  
on common information

**Benefits  
*for ATFM*  
with  
A-CDM  
integration**



Reduced ATFM slot wastage

# ATFM / A-CDM Integration: Mutual Benefits



Enhanced information for  
better planning



Improved ATFM slot  
adherence



Improved situational  
awareness and predictability  
with common information

Benefits  
*for A-CDM*  
with ATFM  
integration



Improved ground operations  
and reduced taxi-out times

# Real-World Example: European Network Benefit

## Local benefits

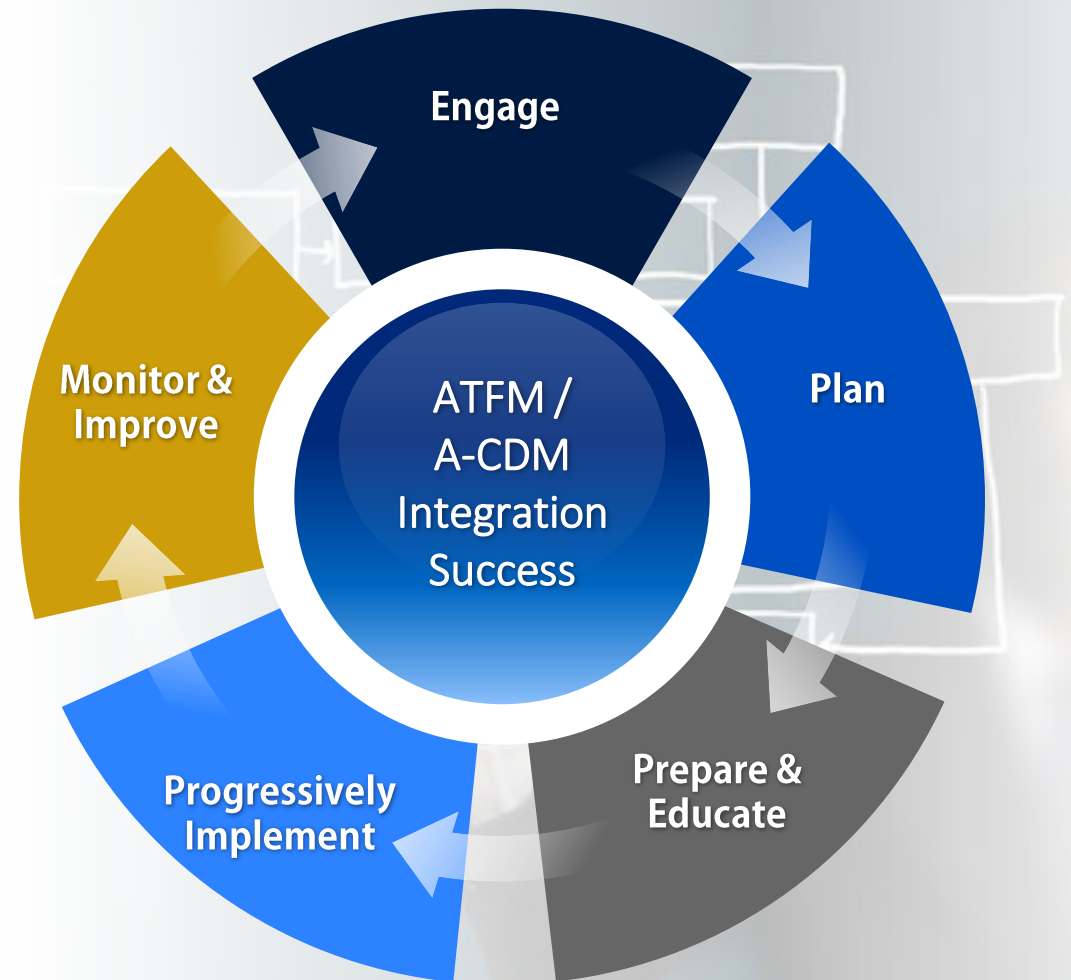
- Average taxi-out time savings between 0.25 and 3 minutes per departure.
- Average schedule adherence improvements between 0.5 and 2 minutes per flight.
- Reduction in push-back delays after start-up approval.
- Increased ATFM slot adherence.
- Improved ground handling resource utilisation.
- Reduction in the number of late stands and gate changes.
- Improved management of and recovery from adverse conditions.
- Reduction in Flight Activation Monitoring suspensions.
- Increased peak departure rates at the runway.
- Improved take-off time predictability by 85% during adverse conditions.

## Network benefits

- Reduction in the standard deviation of take-off accuracy from 14 to between 5 and 7 minutes.
- Clear reduction in en route sector over-delivery risk when fed by 60% of flights from a CDM airport.
- Increase by 3.5 - 5.5% of en route capacity when Europe's 50 busiest airports become integrated.
- 80% of en route capacity benefits realised when the top 30 European airports are integrated.
- Average ATFM delay reduction of three minutes per regulation.
- 40 CDM airports could yield reductions of average ATFM delay of 20-25%.
- Departures from ACDM airports receive less ATFM delays than departures from non-ACDM airports through the same restriction – by an average of one minute per flight.

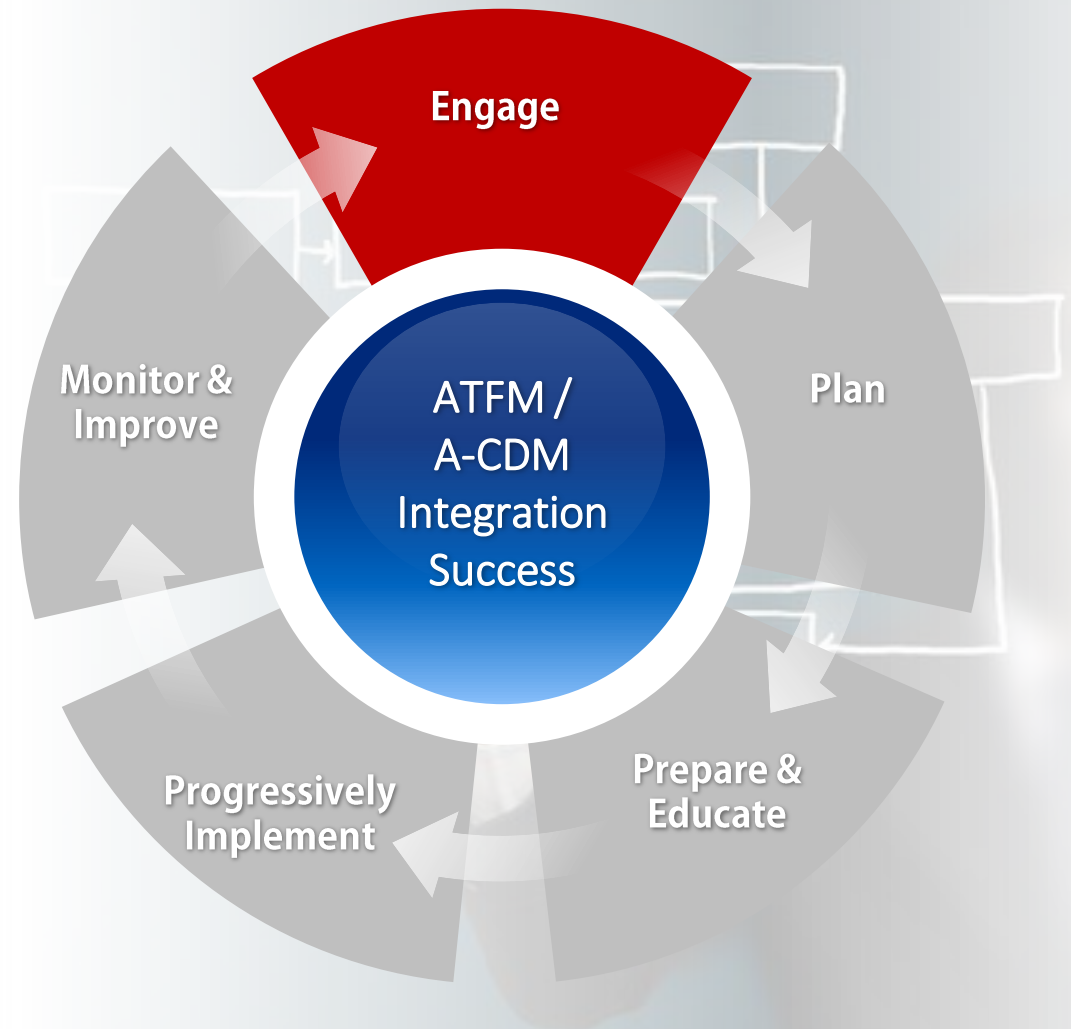
# Integrated ATFM / A-CDM Implementation Process

- ✓ **Stakeholder engagement is a must**
- ✓ **Proper planning and progressive implementation required**
- ✓ **Stakeholder education is very important**
- ✓ **Close monitoring and improvement throughout**



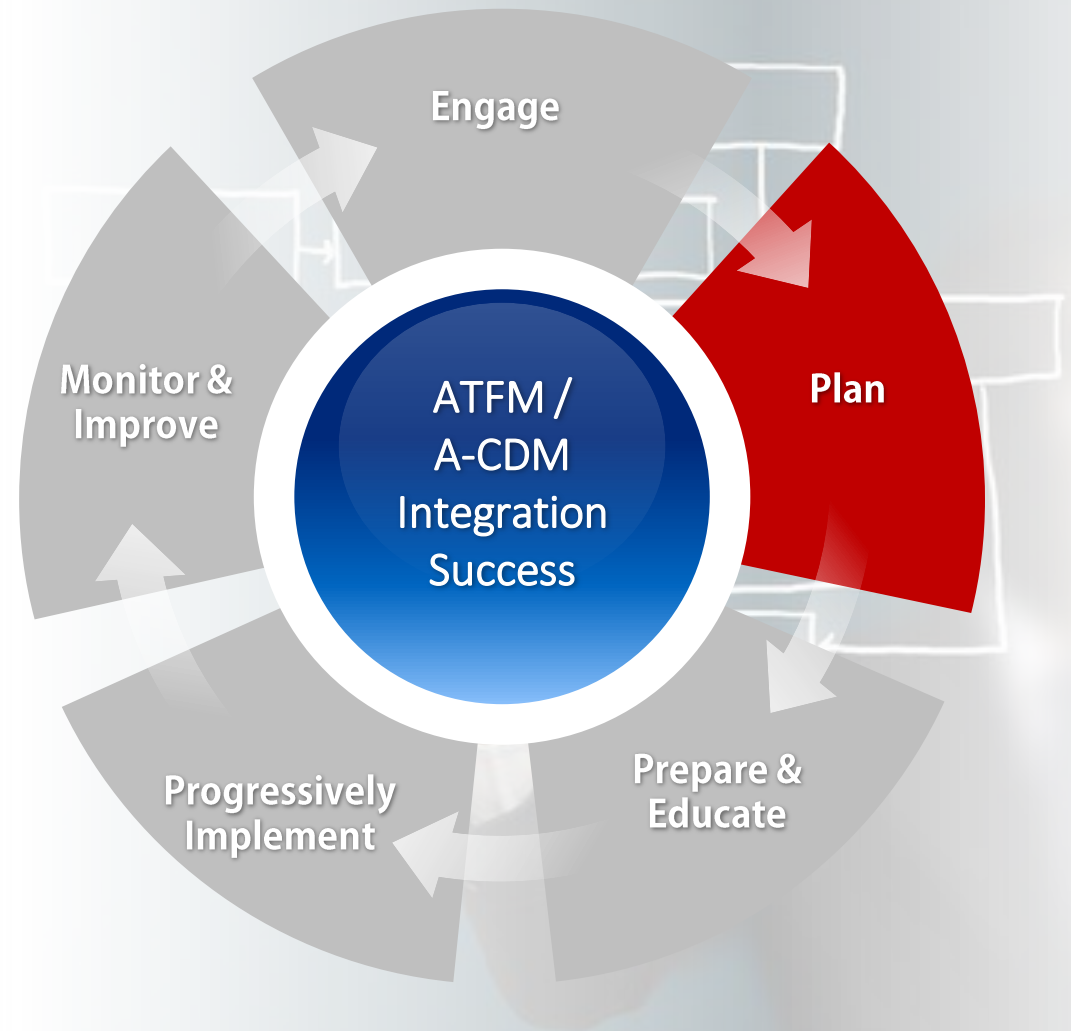
# Integrated ATFM / A-CDM Implementation Process

- **Bring onboard ALL stakeholders**
  - ANSP
  - Airport Operator
  - (Major) Airspace Users
- **Understand the challenges and local environment**
- **Develop common understanding on the changes required**
  - Operational procedures
  - System integration



# Integrated ATFM / A-CDM Implementation Process

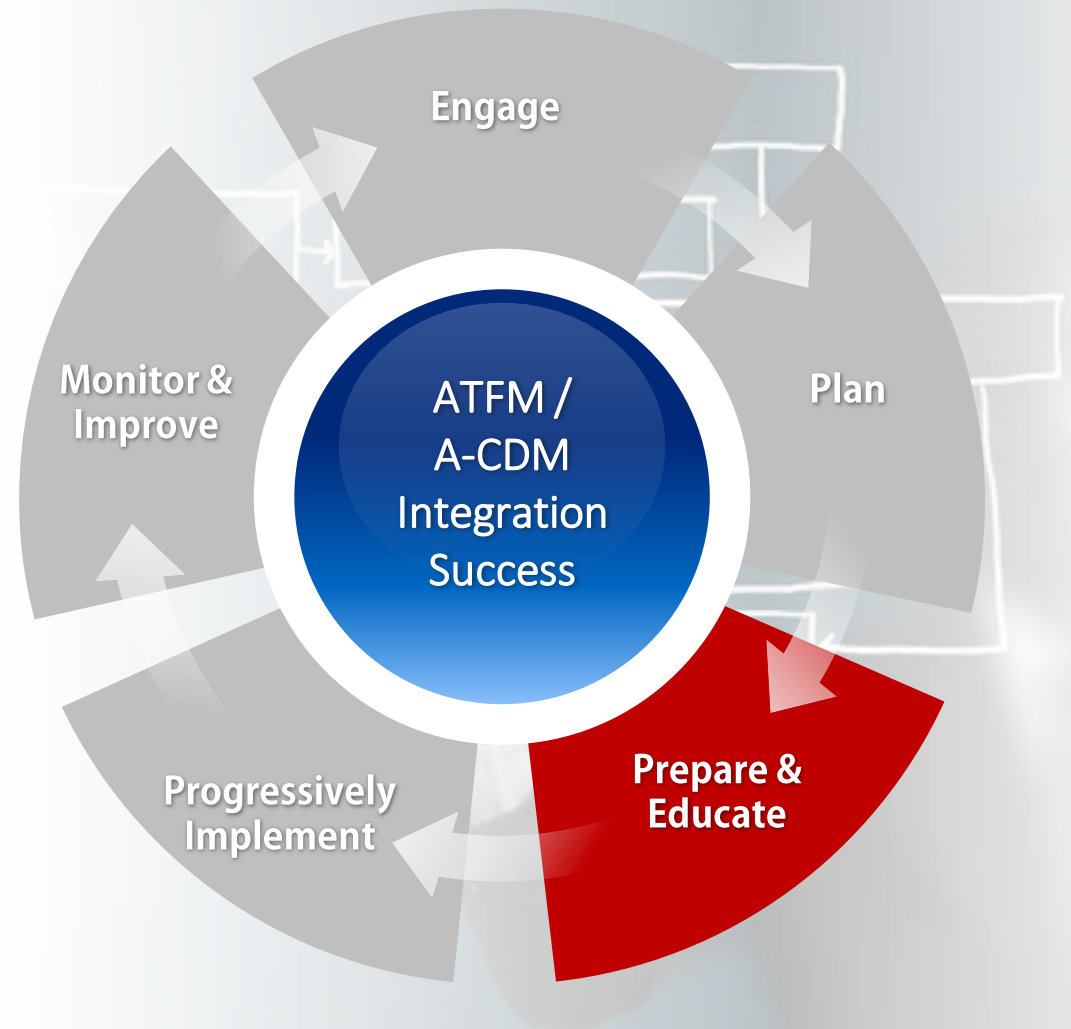
- **Plan for progressive implementation**
- **Do not underestimate the time required for changes**
- **Develop metrics to measure success**





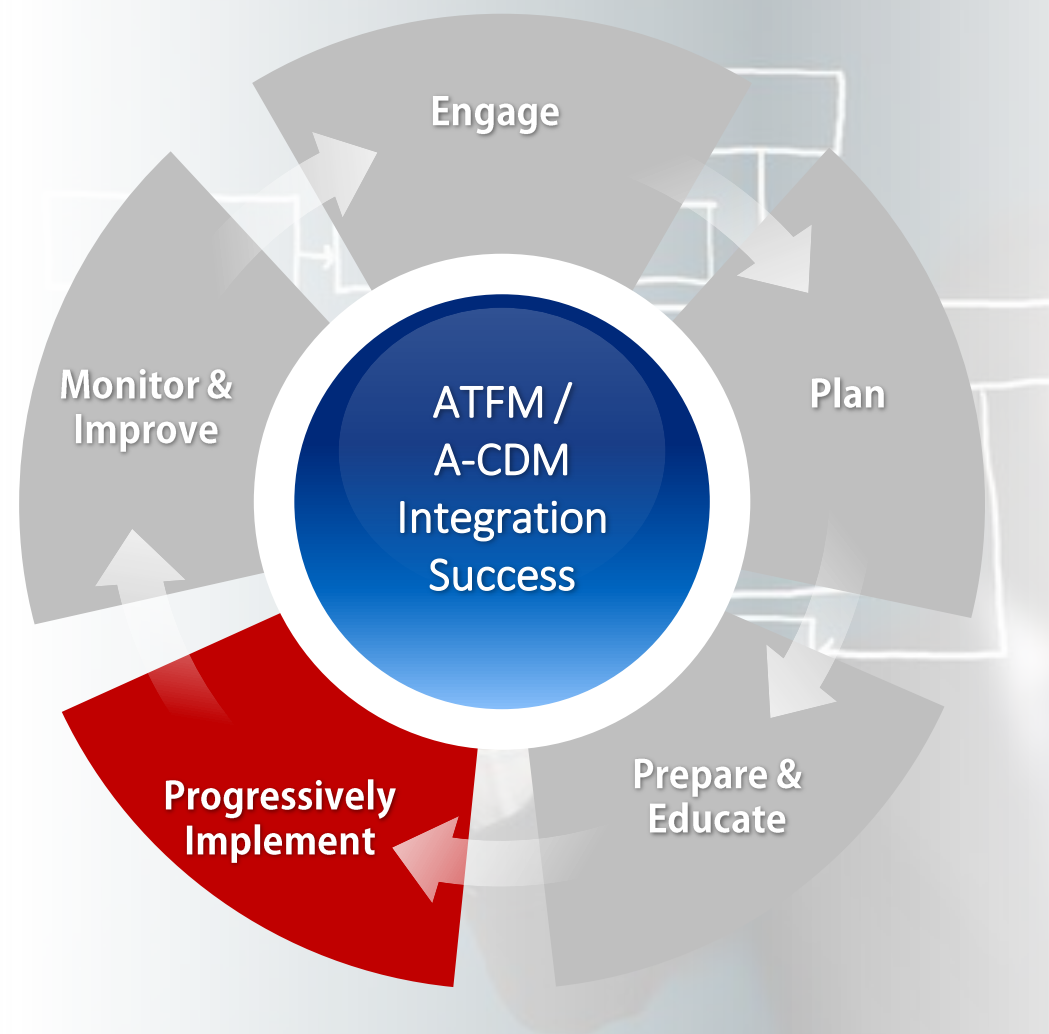
# Integrated ATFM / A-CDM Implementation Process

- **Prepare required changes to the support systems**
  1. Integrate ATFM information into A-CDM system
  2. Integrate A-CDM information into ATFM system
- **Develop operational procedures in context of the changed environment**
- **Educate front-line operators on the changes**



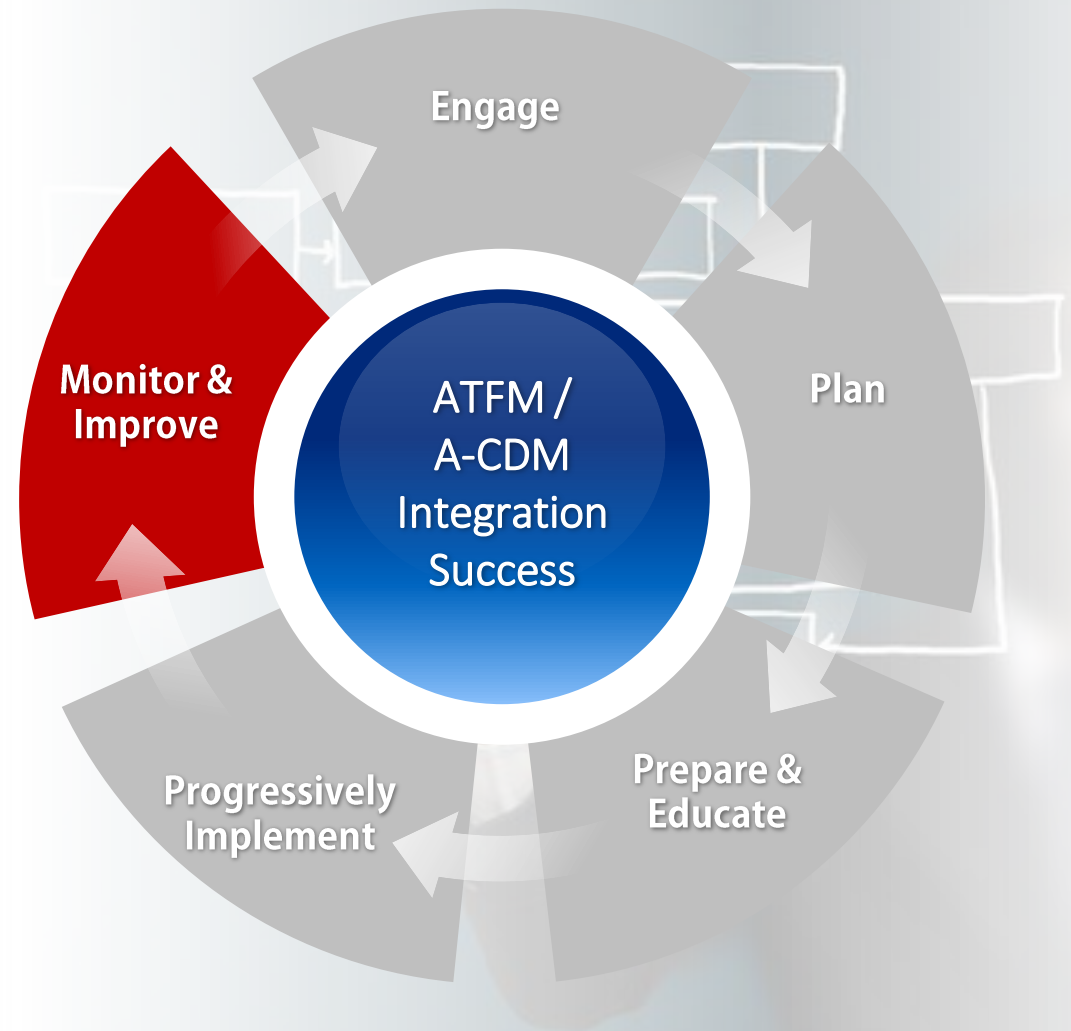
# Integrated ATFM / A-CDM Implementation Process

- **Progressively introduce the elements into the operations**
  - Start with limited-scope operations, then progressively expand as stakeholders become more familiar
- **Have at hand contingency support & rollback procedure**
  - e.g. what to do if data are missing or new operators are confused?
- **Monitor the quality of data exchanged**



# Integrated ATFM / A-CDM Implementation Process

- **Assess success against planned metrics**
- **Improve on the system integrity and operations based on observed metrics**



# Possible Challenges?

- ❑ ATFM and A-CDM systems are not able to “speak” to each other
- ❑ Systems purchased/developed are used for the wrong objectives
- ❑ Stakeholders disregard procedures due to lack of knowledge and understanding
- ✓ ICD and integration requirements need to be specified clearly
- ✓ Concept development and needs analysis need to be conducted prior to system procurement/development
- ✓ Continued education of stakeholders are required throughout the implementation

## Finally...

- ✓ ATFM and A-CDM can exist independently but **INTEGRATION will give the full benefits**
- ✓ ATFM /A-CDM integration requires **strong stakeholder collaboration**



# Thank you





# Mr. Satya Subramaniam

Deputy General Manager - Safety

Bangalore International Airport Limited  
(BIAL)



# Satya.S



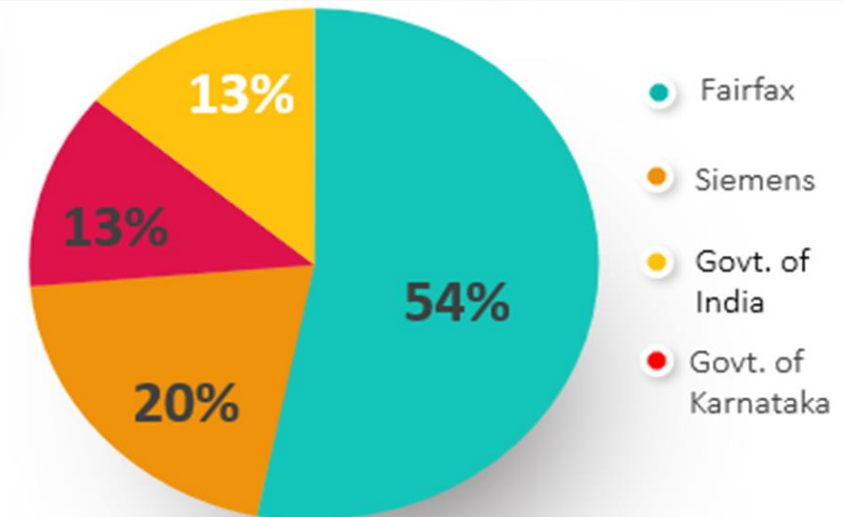
## Satya Subramaniam

Dy. General Manager- Safety

Bangalore International Airport  
Limited (BIAL)

Integration at Bangalore International Airport.

# BLR Airport is the First PPP Airport in India



Shareholding Pattern

# Connectivity

Non-stop and one-stop flights to  
**25** International  
Destinations



## 57 Domestic Destinations



## New routes launched

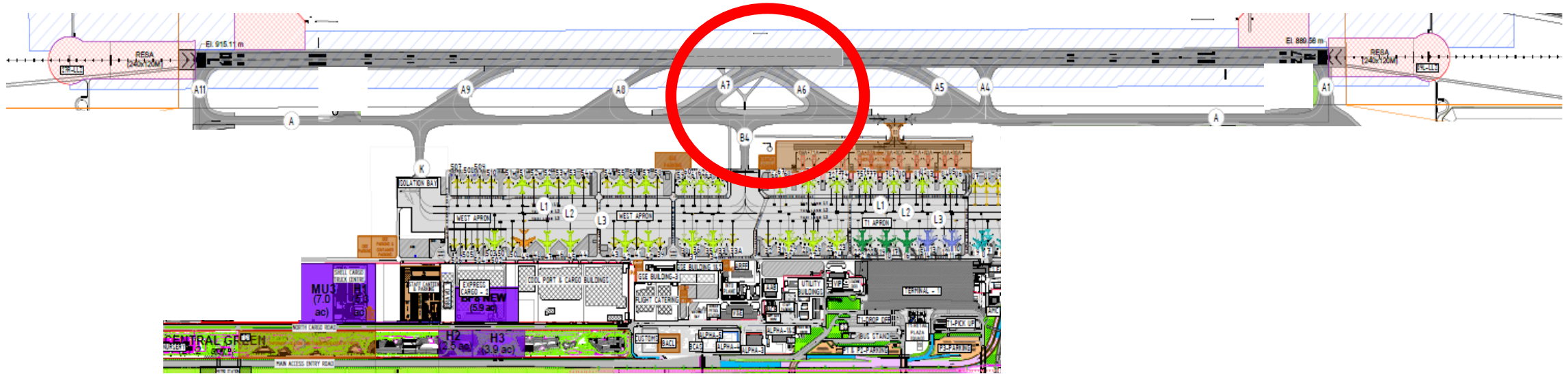
- ✈ KLM to Amsterdam
- ✈ Ethiopian Airlines to Addis Ababa
- ✈ Air India to SFO

Other routes (upcoming)

- ✈ Japan Airlines to Tokyo
- ✈ Lufthansa to Munich
- ✈ United Airlines to SFO



# Aerodrome Layout – Pre Dec'2019



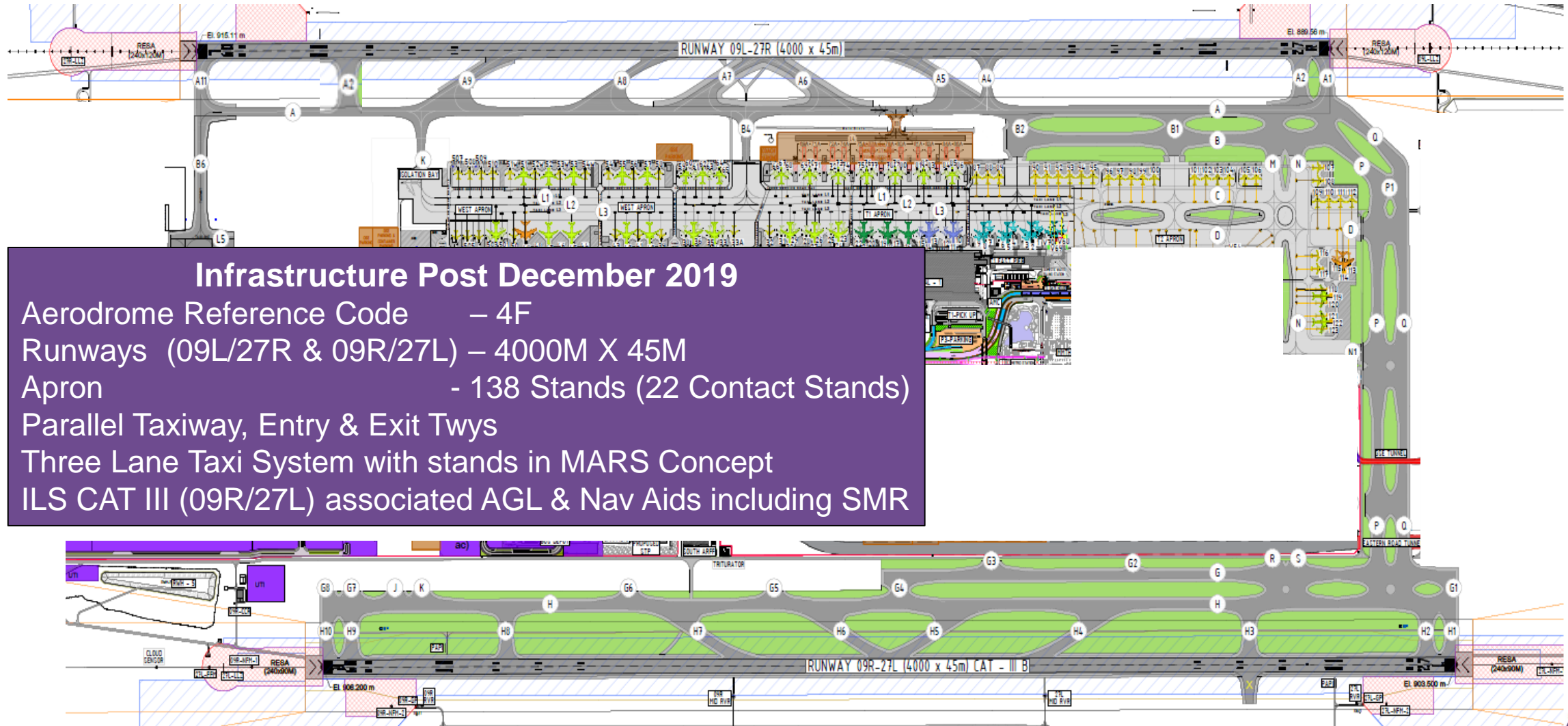
## Infrastructure Pre December 2019

1. Aerodrome Reference Code – 4E
2. Runway (09/27) – 4000M X 45M
3. Apron - 102 Stands (22 Contact Stands)
4. Parallel Taxiway, Entry & Exit Twys
5. Three Lane Taxi Lane System with stands in MARS Concept
6. ILS CAT I with associated AGL & Nav Aids including SMR

Post 2009 measures taken to enhance capacity with single runway ( handle growth 2017-2020)

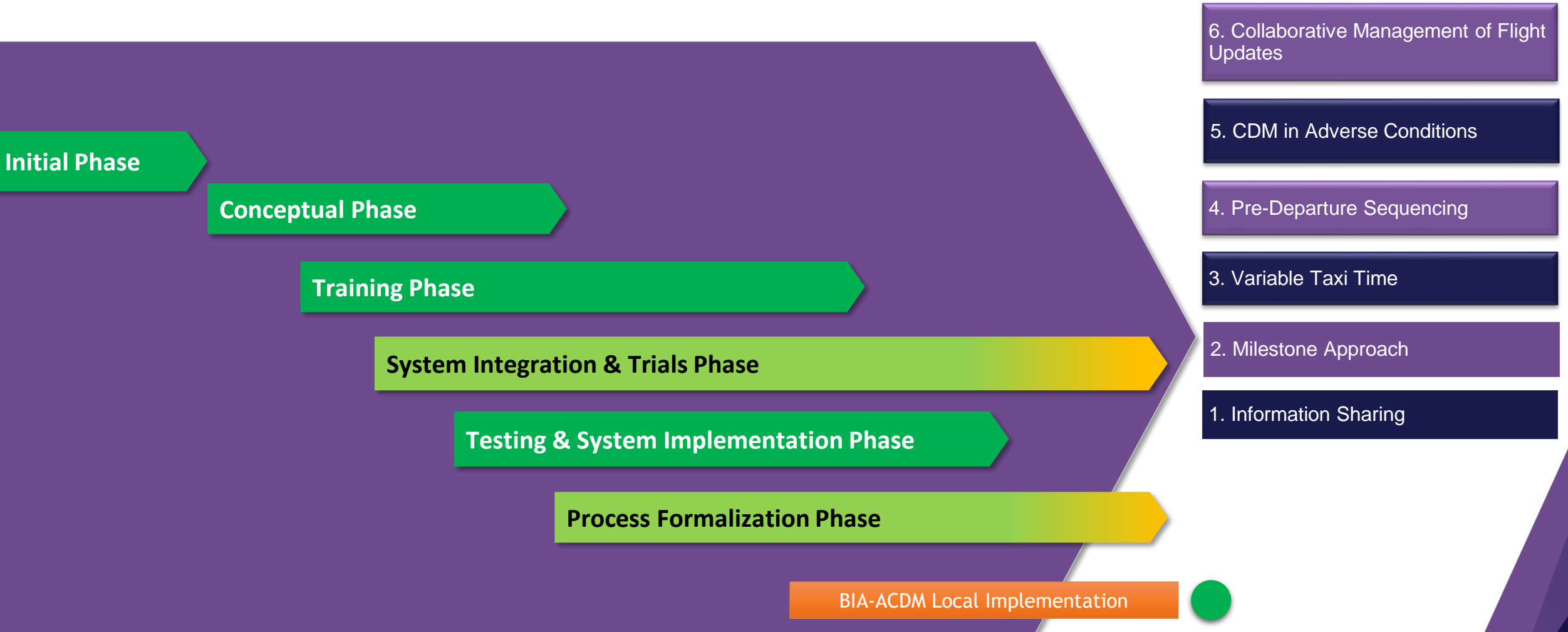
1. A-CDM project (Enhance Predictability )
2. AODB Upgradation Plan
3. Joint Working Group for Runway Throughput
4. Consultant for airspace restructuring
5. Runway Utilization Improvement Group (RUIG)

# Aerodrome Layout – Post Dec'2019



# Our A-CDM Journey

Achieved through core A-CDM element



ACDM Project started in Dec 2013- 2015 ( 2011-12 Initial) & still on-going. Dec 2019 2<sup>nd</sup> Runway commissioned

# A-CDM Dependency

Integration  
Process is key.

1. Process ( Old to New)
2. Integration – New System
3. Protocol for data exchange with Stakeholders
4. Change Management (Acceptance)
5. Training & Handholding

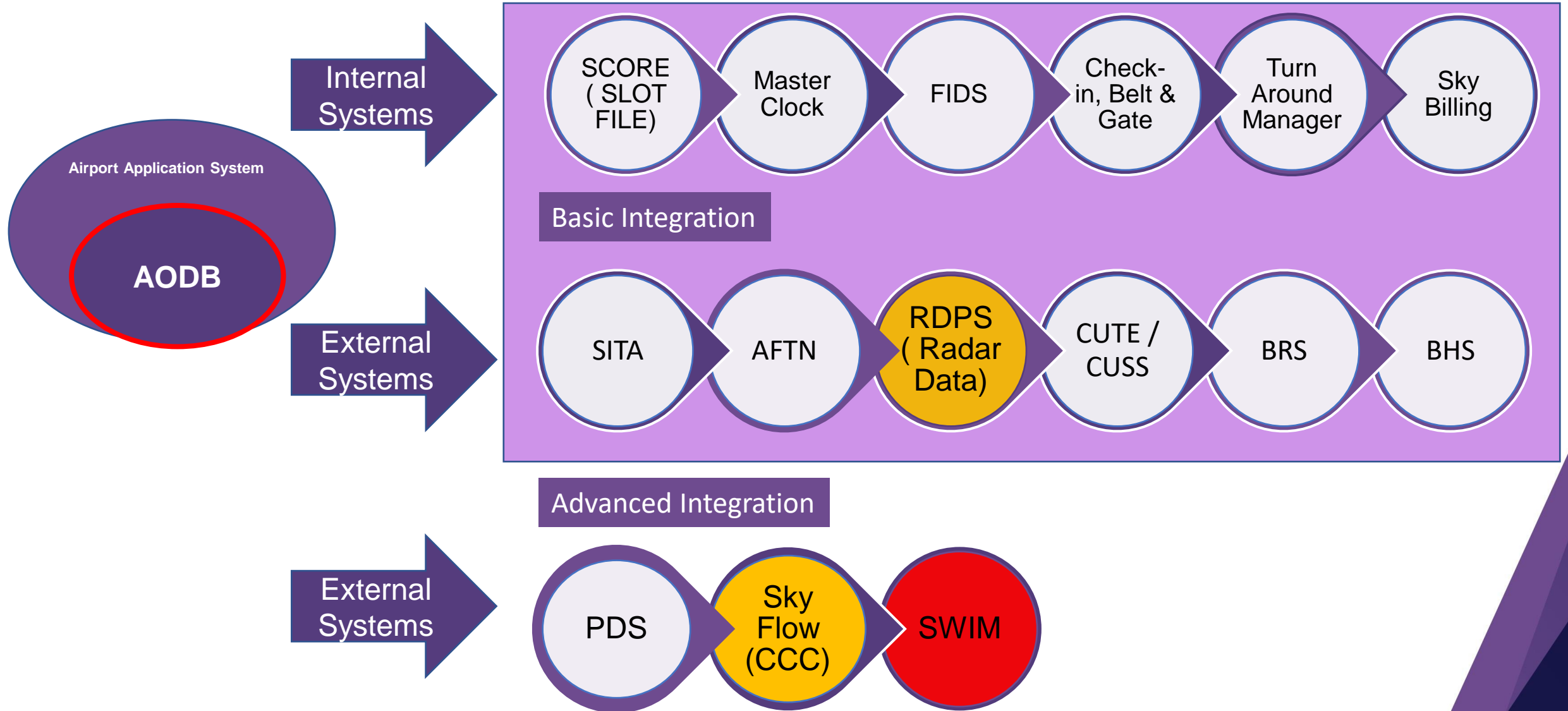
**Basic Airport**

**Integration &  
Process**

**A-CDM Airport**



# Integration at Bangalore Airport



# Basic Level – Information Sharing

## Integration at Bangalore International Airport

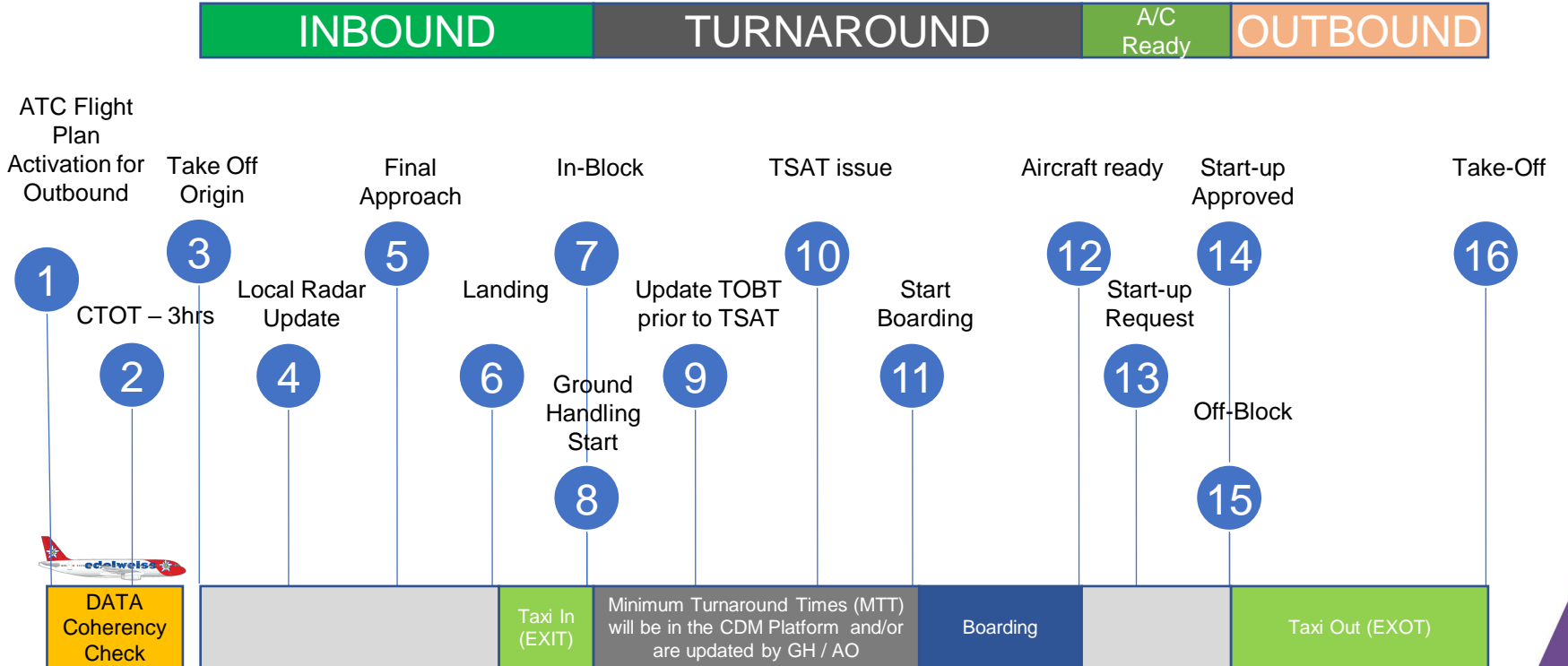
Stakeholder	Flows / Milestones	Interface Source
Airport Operator	All flows from landside to airside & Resource Allocation	AODB, VDGS (GoS), BHS , CUTE (Gate / Belts & Counter data)
Aircraft Operator	Aircraft/ Passenger/ Cargo Flows	Airline DCS / SITA / CUTE / CUSS/ BRS etc
GHA / Concessionaire	Ground Services	Leveraging Airport System / Resource Management System
ANSP	Aircraft Milestones	Radar Data , A-SMGCS
Air Traffic Management	Aircraft on ground Position & Instruction	e-Strip, AFTN , RDPS ( SELEX)



Information Sharing – Basic Level of Integration

# Basic Level –Aircraft Milestones

Milestone	Data Source
ATC Flight plan activation	AFTN
CTOT by CFMU	CCC Sky flow ( Advanced Integration)
Take off from origin	AFTN/ SELEX/ SITA/ FUM
Local Radar KIAB	SELEX Message (RDPS System)
Final Approach-TMO	SELEX Message
Landing - ALDT	SELEX/ ACARS equipped Aircraft
In-Blocks- AIBT	GHA/ Airlines-Manual / AVDGS (40%)
Ground Handling Starts (ACGT)	GHA/ Airlines / Turn Around Management System
TOBT Updation	GHA/ Airlines - AODB at AOCC
TSAT Issued	ATC/ Sequence Planner Tool/ AODB ( Advanced Integration)
Boarding Start	Gates system or Manual from GHA/ Airlines
Aircraft Ready-Door Close	GHA/Airlines
Start Up Request	Pilot – Manual update at AODB by AOCC
Start up Approved	Pilot – Manual update at AODB by AOCC
Off Block – AOBT	GHA/ Airlines/ ACARS / AVDGS (40%)
Take off - ATOT	SELEX/ ACARS equipped Aircraft



CTOT / TAST issue is achieved as part of Advanced Integration Phase

Integration at Bangalore International Airport

# Basic Level –Turnaround Process

## Integration at Bangalore International Airport

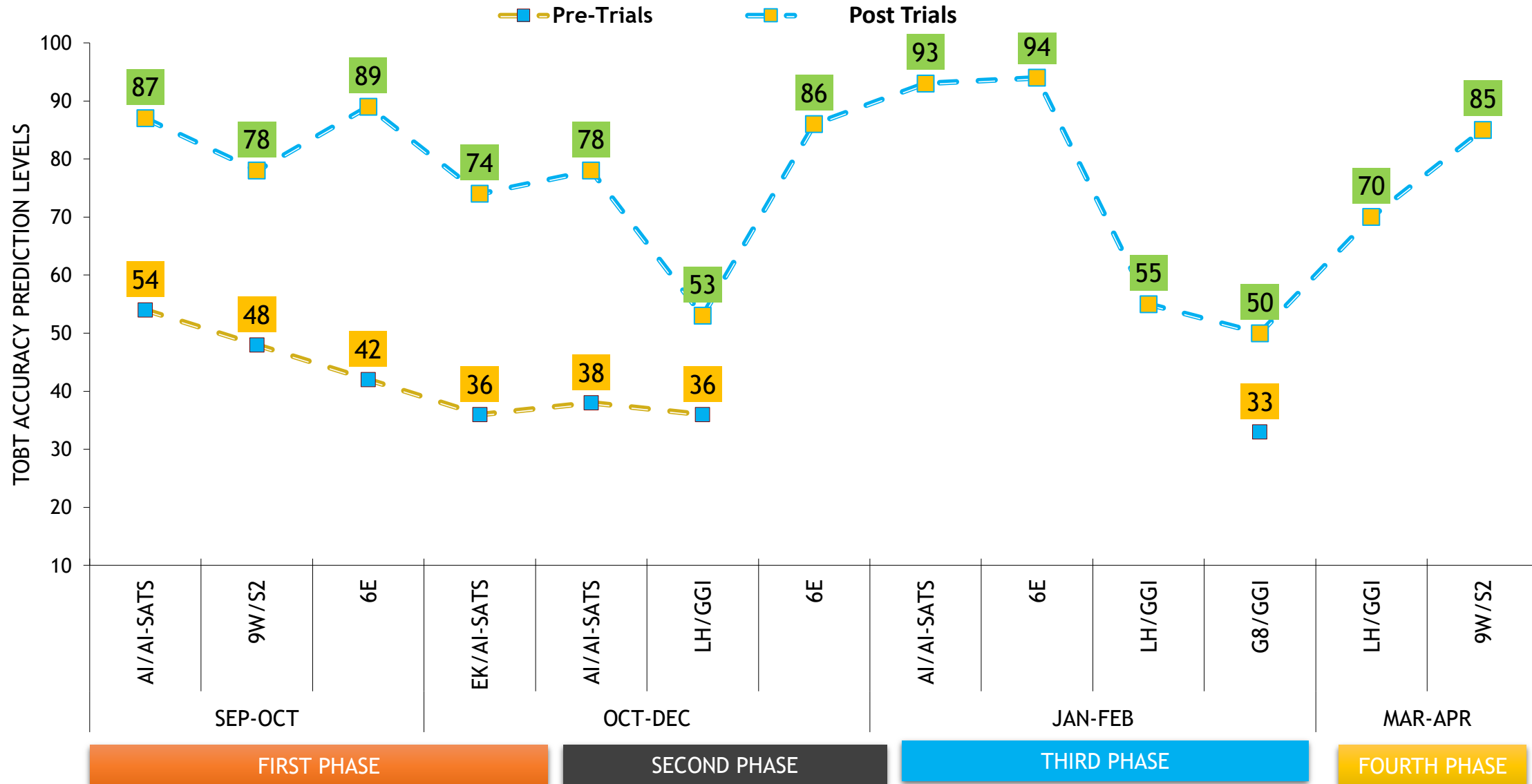
TOBT MATRIX FOR 30 MINUTES GROUND TIME FLIGHT							
S.no	Flight Process Event	Department	Start of the Event	End of the Event	Actual Start	Actual End	TOBT
1	Check in Process	Commercial	120	45			
2	Positioning of resource at Bay	Ramp Operations	40				
3	Aligning of Step Ladder / Aero Bridge	Ramp Operations	28	27			
4	Opening of Holds	Airline Engg Team	28	28			
5	Aligning of Conveyor Belt	Ramp Operations	28	28			
6	Fuelling	Ramp Operations	28	18			
7	Disembarkation	Airline Commercial Team	27	22			
8	Off Loading	Ramp Operations	27	17			
9	Cabin Cleaning	Ramp Operations	23	18			
10	Catering	Catering	20	2			
11	Last bag received from BMA	Ramp Operations	20	15			
12	Loading	Ramp Operations	16	5			
13	Boarding	Airline Commercial Team	15	5			
14	Load and Trim Reporting	Ramp Operations	10	5			
15	Positioning of Push Back Tractor	Ramp Operations	5	4			
16	Connecting of Push Back	Ramp Operations	2	2			
17	Commencement of Push Back	Ramp Operations	0	6			

Most critical is to achieve robust and dependable TOBT (within defined tolerance)

1. TOBT based on SOBT / EOBT
2. TOBT Matrix defined for various turn around
3. Revision of TOBT regularly as per milestone
4. Regular evaluation of predictability % for stakeholders

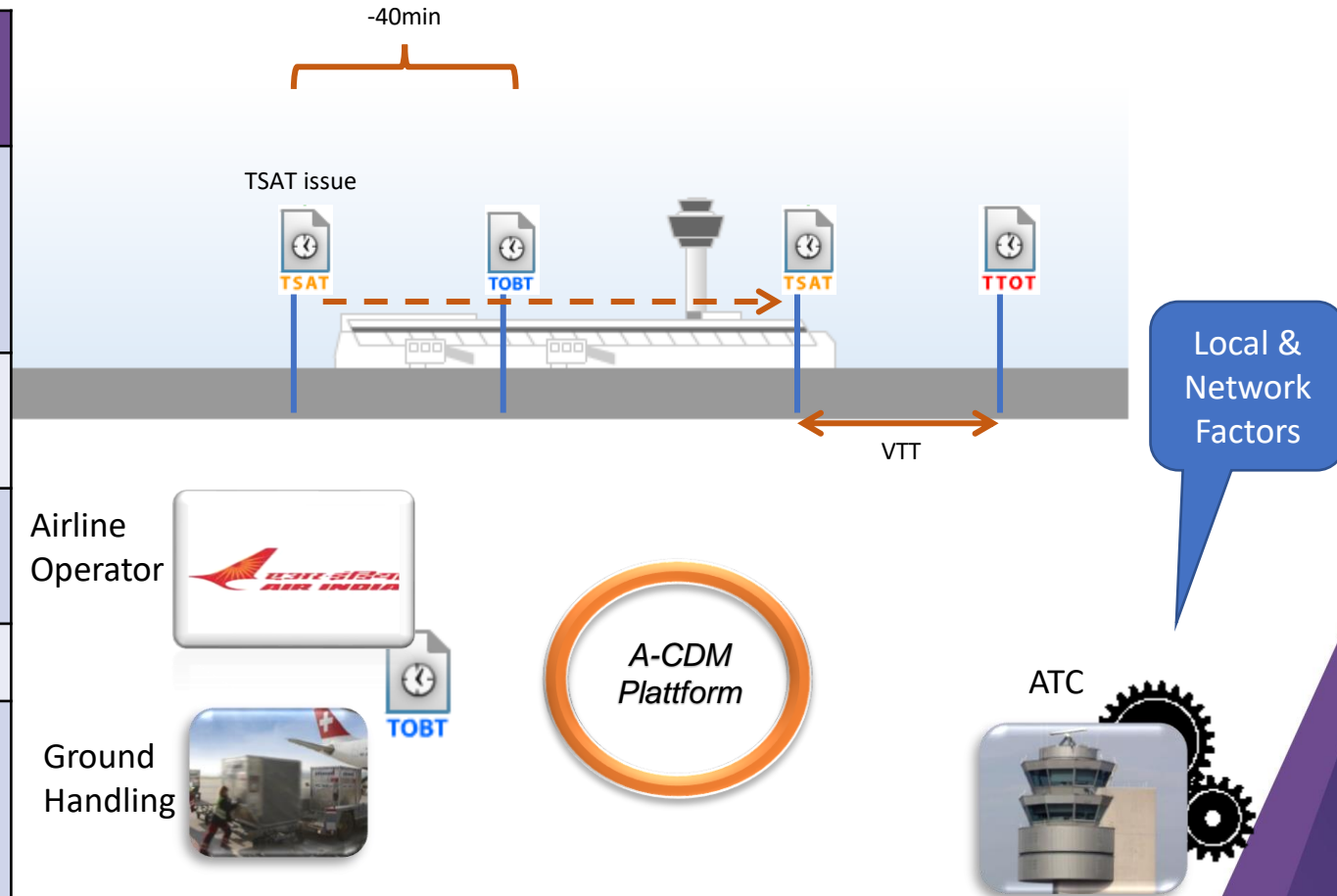
Data Interface of all process is through a local system application “Turn Around Management”

# A-CDM TOBT Prediction Trials



# Advanced - Local A-CDM

Data Field	Stakeholder	Data Field ( Integration)
SOBT/EOBT	Airline Operator / Ground Handler	Manual TOBT into AODB
<b>TOBT Matrix</b> for revision based on SOBT/EOBT. All tolerance levels are defined in ACDM manual		
TOBT	Airport Operator	AODB to ANSP
Pre-Tactical sent to PDS Tools & processed.		
TSAT	ATM	ANSP PDS Tool
AODB / Web Info System / AVDGS / SITA (ACARS)		
Based on CTOT / TTOT back calculated , WRT airport 10mins rolling handling capacity.		

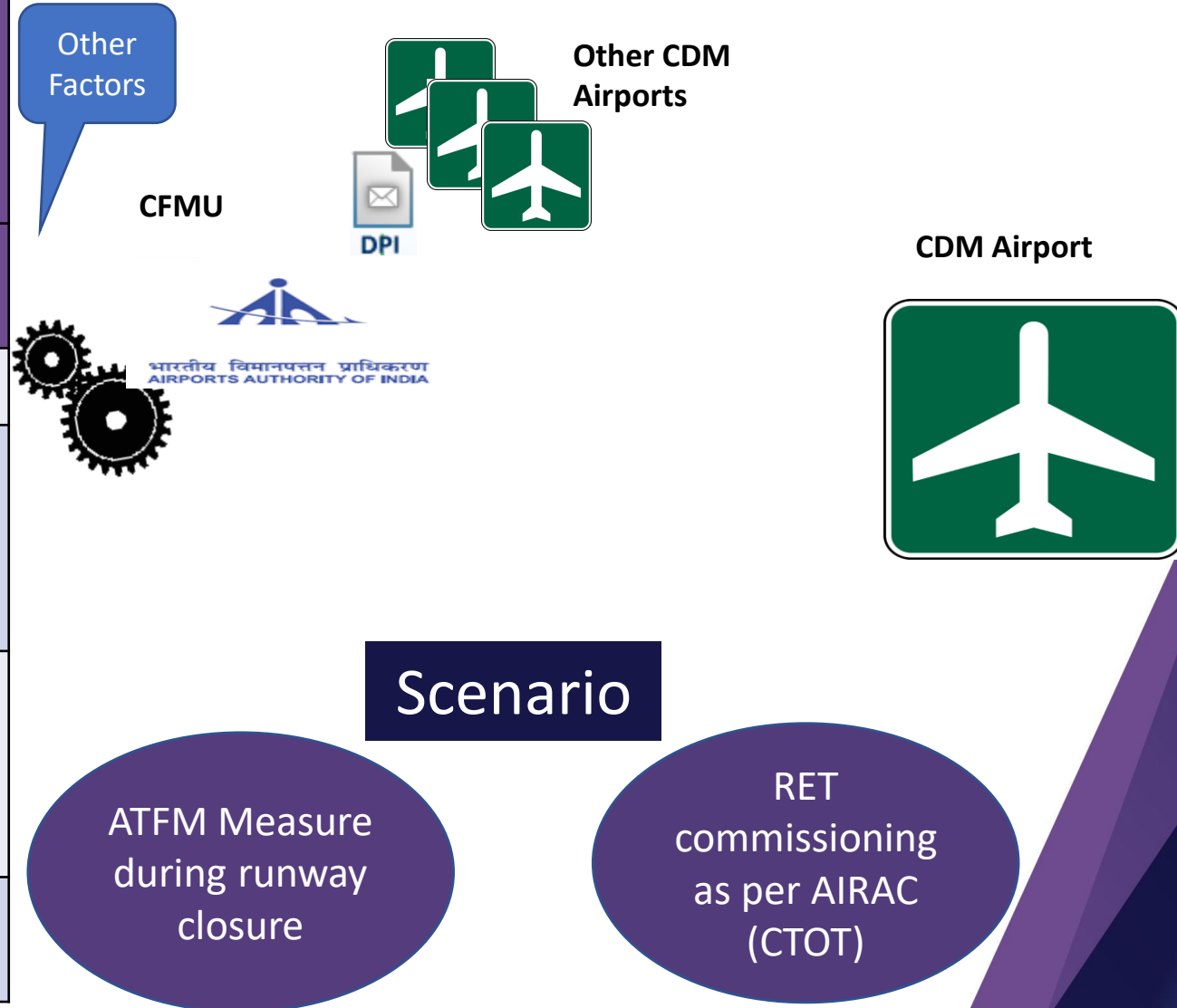


Integration at Bangalore International Airport

# Advanced – National ACDM

1. CCC established in India
2. Airspace is regulated and integrated at CCC
3. Analysis of demand vs Declared Capacity
4. Schedule compared with RPL at pre-tactical
5. CTOT is issued which is fed into PDS tool of local ACDM

Stakeholder	System	Data Field ( Integration)
CCC	Sky flow	RPL data available
	SKY Flow to AODB	FUM – ATOT from origin , ELDT – Estimated landing
Airport	AODB to Sky Flow	DPI – SOBT/ TOBT / ATOT along with aircraft type and other FPL data.
Fields's interface mapped in AODB as per ICD document of CCC flow control system		



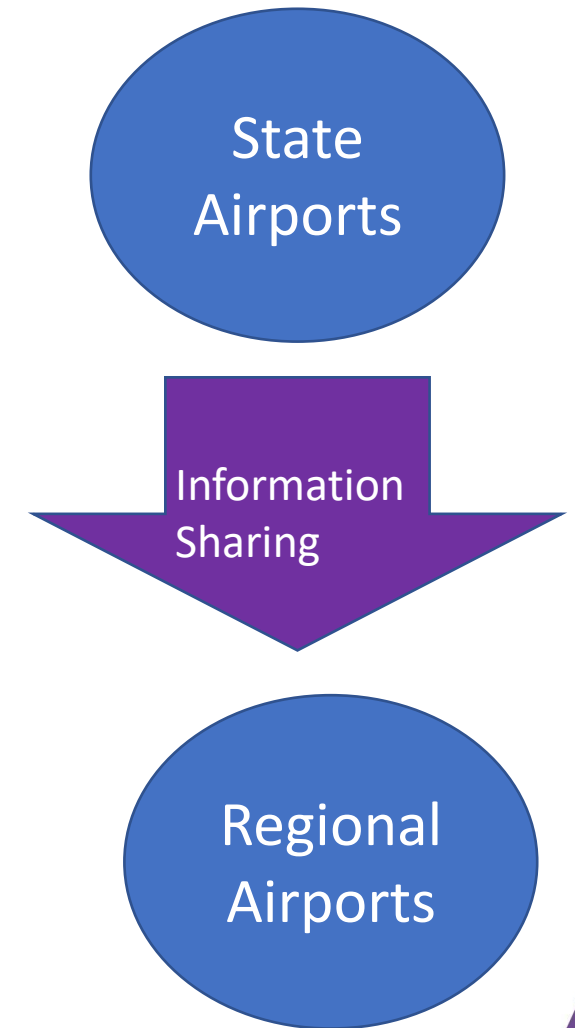


# Advanced – Global

Work is in progress for this phase of work

## Advanced 2<sup>nd</sup> Level ( Proposed)

1. Global / Regional sharing of information & update
2. Data exchange between CCC and across ATM systems
3. INDIA-CCC is having seminars & discussions to define system protocols
4. **Solution is SWIM – System Wide Information Management**



# Success Factor

1. Synchronized Approach
2. We ensured Robust AODB
3. Airline Operator/ GHA / ANSP/ ATM Data integration need
4. System Interface requirement & Gap Analysis
5. Stakeholder Information Availability & Location
6. Data Matrix
7. Protocol for data exchange ( at RFP MoU levels)
8. ICD ( Interface Control Document) , an important factor
9. Data Fields Mismatch between AODB/ DCS/ RDPS systems  
( Field Mapping is required )
10. Change Management – Human & System Adaption  
( SHELL Model)
7. Collaboration Amongst Stakeholders ( Desire to achieve)



# Overview

TOBT Matrix Defined

BIA-CDM Process  
Description  
Document

2512 Man Hours on  
A-CDM Project

Over 20 Hours of  
Discussion with ATC  
on Data Exchange

Over 150 Man Hours  
on Airport  
Application System  
(AODB) Testing

Airport System  
( AODB) Training

150+ Staffs trained  
on A-CDM Concept

Variable Taxi Time  
Defined

Logics for BIA "A-  
CDM data exchange  
defined

Over 3,00,000  
Flights Analyzed

Procedures for BIA  
A-CDM defined as  
AIP Draft

A-CDM Focus  
( Monthly  
Newsletter)

BIA-CDM CBA  
Analysis - On ground  
Fuel Analysis

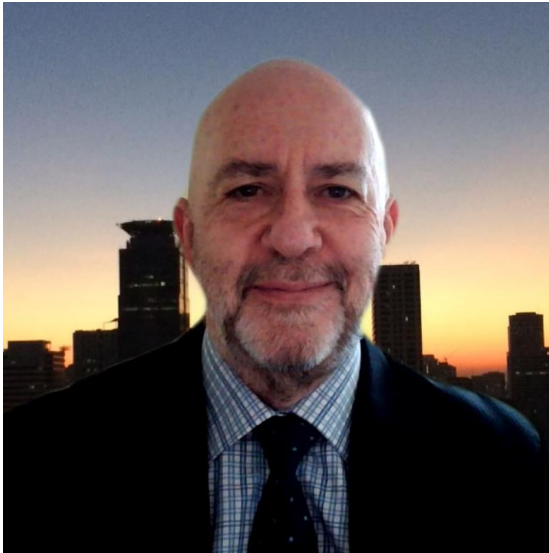
70 Pilots briefed on  
BIA CDM Project

2 BIA-ACDM  
Integration Trials  
Conducted

A-CDM Logo Launch

# Thank you





# Mr. Shane Sumner

Regional Officer (ATM)

ICAO Asia Pacific Office



ICAO UNITING AVIATION

# ATFM/A-CDM Integration in the ICAO Asia/Pacific Region

CANSO/ACI-APAC ATFM/A-CDM Integration  
Workshop  
02 – 03 June 2021

Shane Sumner  
Regional Officer ATM/AIM  
ICAO Asia/Pacific Regional Office  
[ssummer@icao.int](mailto:ssummer@icao.int)





# Topics ....

- Global Plans and Guidance
- Regional Guidance







## Convention on International Civil Aviation (Chicago Convention)

### Annexes

Annex 11 – Air Traffic Services

### PANS

ICAO Doc 4444 – PANS-ATM

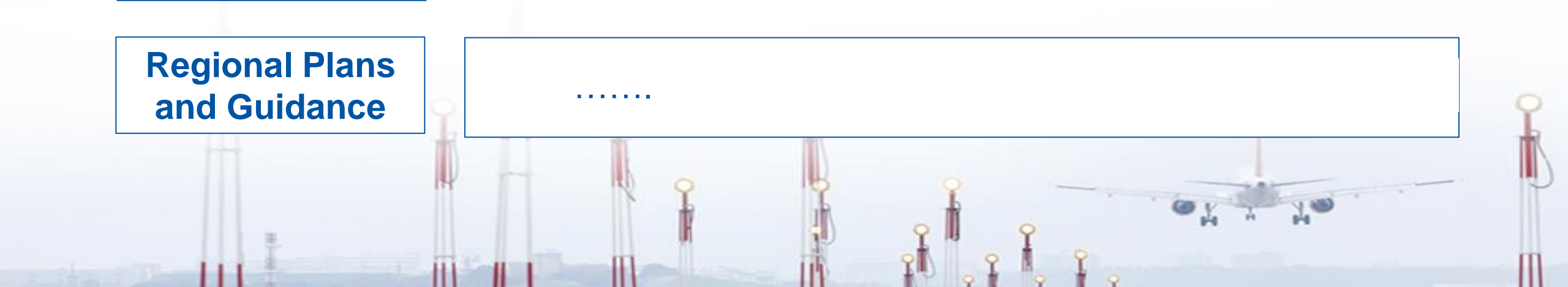
### Global Plans and Guidance

**ICAO Doc 9750 - Global Air Navigation Plan (GANP)**

ICAO Doc 9971 – Manual on Collaborative ATFM

### Regional Plans and Guidance


.....





## ICAO Doc 7950 Global Air Navigation Plan (GANP)

([link](#))

 ICAO GANP PORTAL

[Global Strategic](#) [Global Technical](#) [Regional](#) [National](#) [Login](#)

### WELCOME TO THE GLOBAL AIR NAVIGATION PLAN PORTAL

The GANP Portal is a web portal where all aviation stakeholders will be able to find the most relevant information related to the GANP

### MULTILAYER STRUCTURE OF THE GANP

Click a level to navigate

GLOBAL STRATEGIC

GLOBAL TECHNICAL

REGIONAL

NATIONAL

LEVEL 1

LEVEL 2

LEVEL 3

LEVEL 4

## GLOBAL TECHNICAL

Supports technical managers in planning the implementation of basic air navigation services and new operational improvements in a cost-effective manner.

  
ASBUs  
& PF



















  
AN-SPA

  
BBBs



## ICAO Doc 7950 Global Air Navigation Plan (GANP)

[\(link\)](#)



















ACDM			
ACDM-B0/1	Airport CDM Information Sharing (ACIS)	Operational	  
ACDM-B0/2	Integration with ATM Network function	Operational	  
ACDM-B1/1	Airport Operations Plan (AOP)	Operational	  
ACDM-B1/2	Airport Operations Centre (APOC)	Operational	  
ACDM-B2/1	Total Airport Management (TAM)	Operational	  
ACDM-B3/1	Full integration of ACDM and TAM in TBO	Operational	  



## ICAO Doc 7950 Global Air Navigation Plan (GANP)

[\(link\)](#)

### NOPS

NOPS-B0/1	Initial integration of collaborative airspace management with air traffic flow management	Operational	  
NOPS-B0/2	Collaborative Network Flight Updates	Operational	  
NOPS-B0/3	Network Operation Planning basic features	Operational	  
NOPS-B0/4	Initial Airport/ATFM slots and A-CDM Network Interface	Operational	  
NOPS-B0/5	Dynamic ATFM slot allocation	Operational	  
NOPS-B1/1	Short Term ATFM measures	Operational	  



## ICAO Doc 9971 Manual on Collaborative Air Traffic Flow Management



ICAO

Doc 9971

Manual on Collaborative  
Air Traffic Flow Management (ATFM)

Third Edition, 2018

### Part III – Airport Collaborative Decision-Making (A-CDM)

2.3.1.2 ANSPs are also responsible for tactical traffic management measures, whether they be local or from a broader international ATFM unit. It should be noted that ***regardless of their origin, ATFM measures must be integrated in the A-CDM decision-making process.***



**Regional Plans  
and Guidance****Asia/Pacific Seamless ANS Plan**[\(link\)](#)***PARS Phase II (expected implementation by 07 November 2019)***

7.3 All international aerodromes should operate an A-CDM system for ACIS integrated with the ATM network function consistent with ACDM-B0/1 – 2 (Priority 1).

***PARS Phase III (expected implementation by 03 November 2022)***

7.18 All international aerodromes should operate an A-CDM system integrated with the ATM network, and an AOP and where practicable an APOC consistent with ACDM-B1/1 – 2.

***PASL Phase II (expected implementation by 07 November 2019)***

7.38 All ACCs operating within FIRs where demand may exceed capacity should implement ATFM incorporating CDM to enhance capacity, using bi-lateral and multi-lateral agreements, initial integration of ASM with ATFM, Collaborative Network Flight Updates, Basic Network Operation Planning and Initial Airport/ATFM slots, A-CDM Network Interface and Dynamic Slot Allocation consistent with NOPS-B0/1 – 5 (Priority 1).



## Regional Plans and Guidance

## Regional Framework for Collaborative ATFM

[\(link\)](#)

### ***EXECUTIVE SUMMARY***

3.7 .....the interoperability of ATFM, Airport Collaborative Decision-Making (A-CDM), Arrival Manager (AMAN) and Departure Manager (DMAN) systems, and airspace user and ATM automation system interfaces, is critical to the success of a regional ATFM program and the optimized use of available capacity.

### ***Regional ATFM Capability Phase 1B (expected implementation by 25 May 2017)***

7.17 ATFM, AMAN/DMAN and A-CDM systems should be integrated through the use of common fixes, terminology and communications protocols to ensure complementary operations.

### ***Regional ATFM Capability Phase II (expected implementation by 08 November 2018)***

7.32 Full interoperability of cross border ATFM, A-CDM, AMAN, DMAN, ATM automation and airspace user systems should be implemented, utilizing FIXM 3.0 (or later) , to provide seamless gate-to-gate collaborative ATFM operations.





**Regional Plans  
and Guidance****Regional Framework for Collaborative ATFM**[\(link\)](#)*Minimum ATFM Information for Distribution and Sharing*

Estimated	Calculated	Actual	Applicable
EOBT		AOBT	Terminal Gate
	CTOT	ATOT	Departure Runway
ETO	CTO	ATO	RFIX or AFIX
ELDT	CLDT	ALDT	Arrival Runway
Other			
ADP			

*Requires update to align with knowledge developed*

## Regional Plans and Guidance

### Asia/Pacific A-CDM Implementation Plan

[\(link\)](#)

1.10 ..... there is a need for States to work together to ensure system interoperability between Air Traffic Flow Management (ATFM ) and A-CDM implementations in the Asia Pacific Region.

1.11 A-CDM can further optimise operations at the airport by taking into consideration ATFM programmes. In a scenario where local and regional networks of A-CDM and/or ATFM units are set up and connected, key stakeholders will be able to exchange useful departure and arrival information to further improve predictability of events (as compared to standalone A-CDM or ATFM) to enhance the planning and overall situational awareness for all CDM partners. The implementation of an integrated ATFM and A-CDM network will complement each other and together create a seamless air traffic environment. This would improve flight and ATM efficiency throughout the three phases of flight (arrival, turnaround and departure), benefiting all CDM partners.



## Regional Plans and Guidance

## Asia/Pacific A-CDM Implementation Plan

[\(link\)](#)

1.10 ..... there is a need for States to work together to ensure system interoperability between Air

**Fundamentally:**

**A-CDM and ATFM can work independently, but they work better when they work together**

ATFM and A-CDM network will complement each other and together create a seamless air traffic environment. This would improve flight and ATM efficiency throughout the three phases of flight (arrival, turnaround and departure), benefiting all CDM partners.

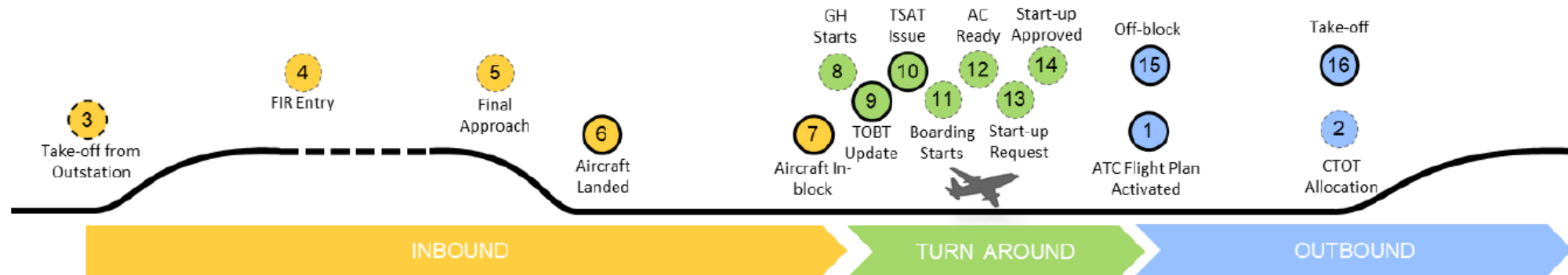


Regional Plans  
and Guidance

Asia/Pacific A-CDM Implementation Plan

[\(link\)](#)

*A-CDM Milestones*





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## ATFM

Estimated	Calculated	Actual	Applicable
EOBT		AOBT	Terminal Gate
	CTOT	ATOT	Departure Runway
ETO	CTO	ATO	RFIX or AFIX
ELDT	CLDT	ALDT	Arrival Runway
Other			
ADP			
Target	Calculated	Actual	Applicable
		AIBT	Turn Around
TOBT	TSAT		Turn Around
Other			
SIBT SOBT			

## A-CDM



**UNDER  
DEVELOPMENT**

Plans  
Guidance

## Joint Operational Procedure Guidance for the Integration of ATFM and A-CDM Operations

### Sixth Meeting of the Asia/Pacific A-CDM Task Force

**APA-CDM/TF** 28 to 30 April 2021

[\(link\)](#)

- WP03 – *China, Hong Kong China (lead), India, Republic of Korea, Thailand, CANSO (APA-CDM/TF Task 5/2)*
- Balanced solution to meet needs of ANSPs and Aircraft Operators
- Address complex tech. challenges using SWIM, FIXM, IWXXM etc.
- Survey results – generalize common features to develop joint operational procedure guidance
  - Appendix E to the APA-CDM/TF/6 report





**UNDER  
DEVELOPMENT**

Plans  
Guidance

## Joint Operational Procedure Guidance for the Integration of ATFM and A-CDM Operations

### Sixth Meeting of the Asia/Pacific A-CDM Task Force

**APA-CDM/TF** 28 to 30 April 2021

[\(link\)](#)

- Task 5/2
  - *Develop joint operational procedure guidance for the integration of ATFM and A-CDM operations, focusing on the integration between A-CDM and "cross-border" ATFM in collaboration with Experts from ATFM/SG and SWIM TF.*
  - *To be carried out by the APANPIRG technical body assigned ongoing responsibility for oversight of A-CDM*





IC

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## Regional Plans and Guidance

## Asia/Pacific FIXM version 4.1 Extension

[\(link\)](#)

### ► FIXM Applications

### ▼ FIXM Extensions

Supports localized requirements from particular communities of interest. Extends basic flight data and/or applications.

#### ► US Extension

#### ▼ APAC Flow

FIXM Extension containing data attributes to support Air Traffic Flow Management operations in accordance with Distributed Multi-Nodal Air Traffic Flow Management Network concept and Airport-Collaborative Decision Making operations in Asia/Pacific region.

	Version	Core Version	Release Date	<a href="#">Download</a> Release Package	Core User Manual
Current Version	<a href="#">1.00</a>	<a href="#">4.1.0</a>	11-Jul-2019	<a href="#">Download</a>	<a href="#">FIXM Implementation Guidance 4.1.0</a>
► Previous Versions	None				



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ATFM

✓  
Included  
in APAC  
FIXM  
v4.1  
Extension

A-CDM

Estimated	Calculated	Actual	Applicable
EOBT		AOBT ✓	Terminal Gate
	CTOT ✓	ATOT	Departure Runway
ETO ✓	CTO ✓	ATO ✓	RFIX or AFIX
ELDT ✓	CLDT ✓	ALDT	Arrival Runway
Other			
ADP			
Target	Calculated	Actual	Applicable
		AIBT	Turn Around
TOBT ✓	TSAT ✓		Turn Around
Other			
SIBT SOBT			



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UNITING AVIATION



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THANK YOU



# **Mr. John Moore**

Assistant Director Safety & Flight  
Operations

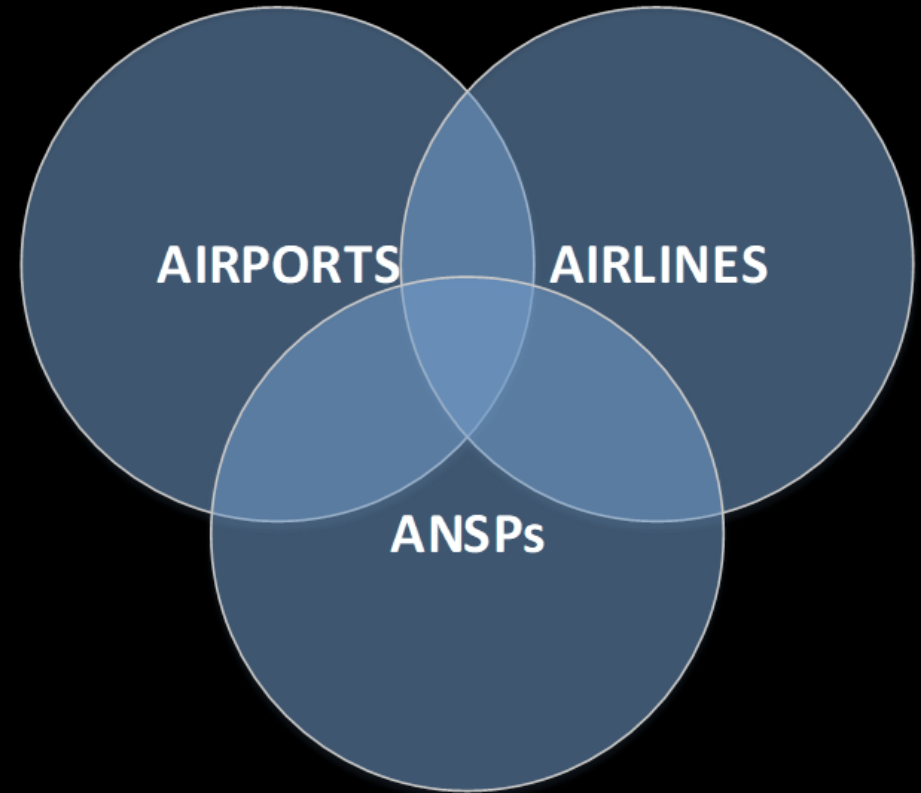
IATA Asia Pacific

# Integrating ATFM & A-CDM



# Bringing it together

- Connected phases - TBO
- Connected systems
- Whole-of-Network Management
- Challenges for integration
- National Air Navigation Plans



# Connected phases – Trajectory Based Operations (TBO)

## Gate-to-Gate:

- Keep the wheels turning on taxi-out and taxi-in
- GDP already providing benefit
- Maximise (Long-Range) ATFM to better inform AMAN and A-CDM systems



## Cruise-to-Cruise:

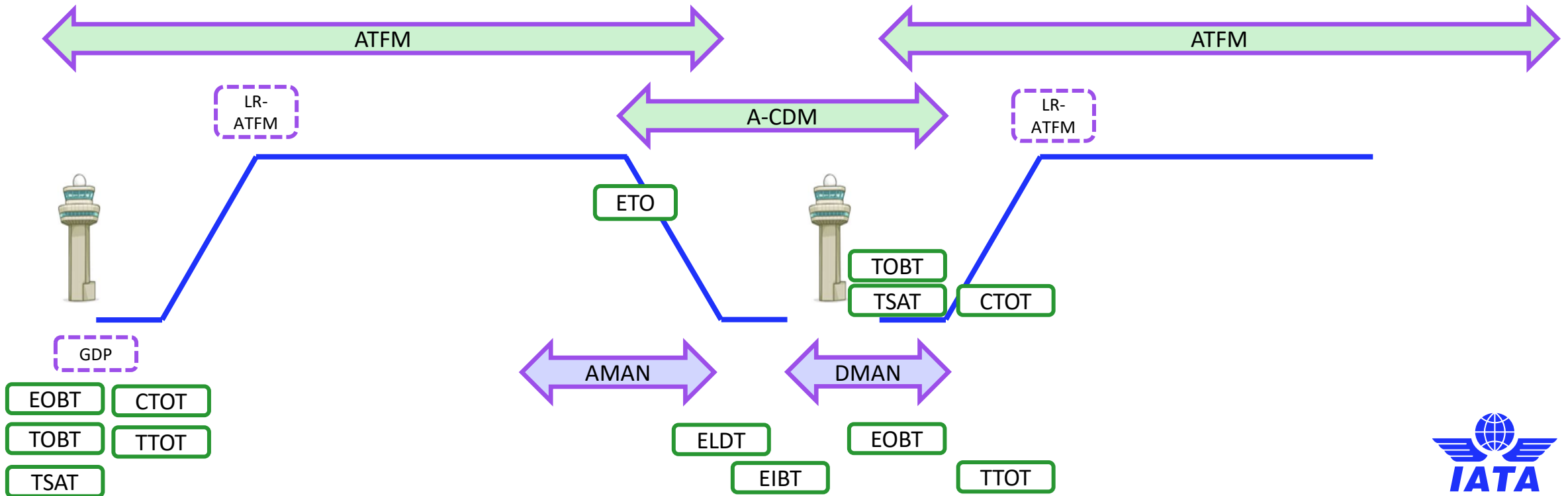
- Alternative perspective
- Includes the turnaround period as another element of TBO
- Each phase is informing the next



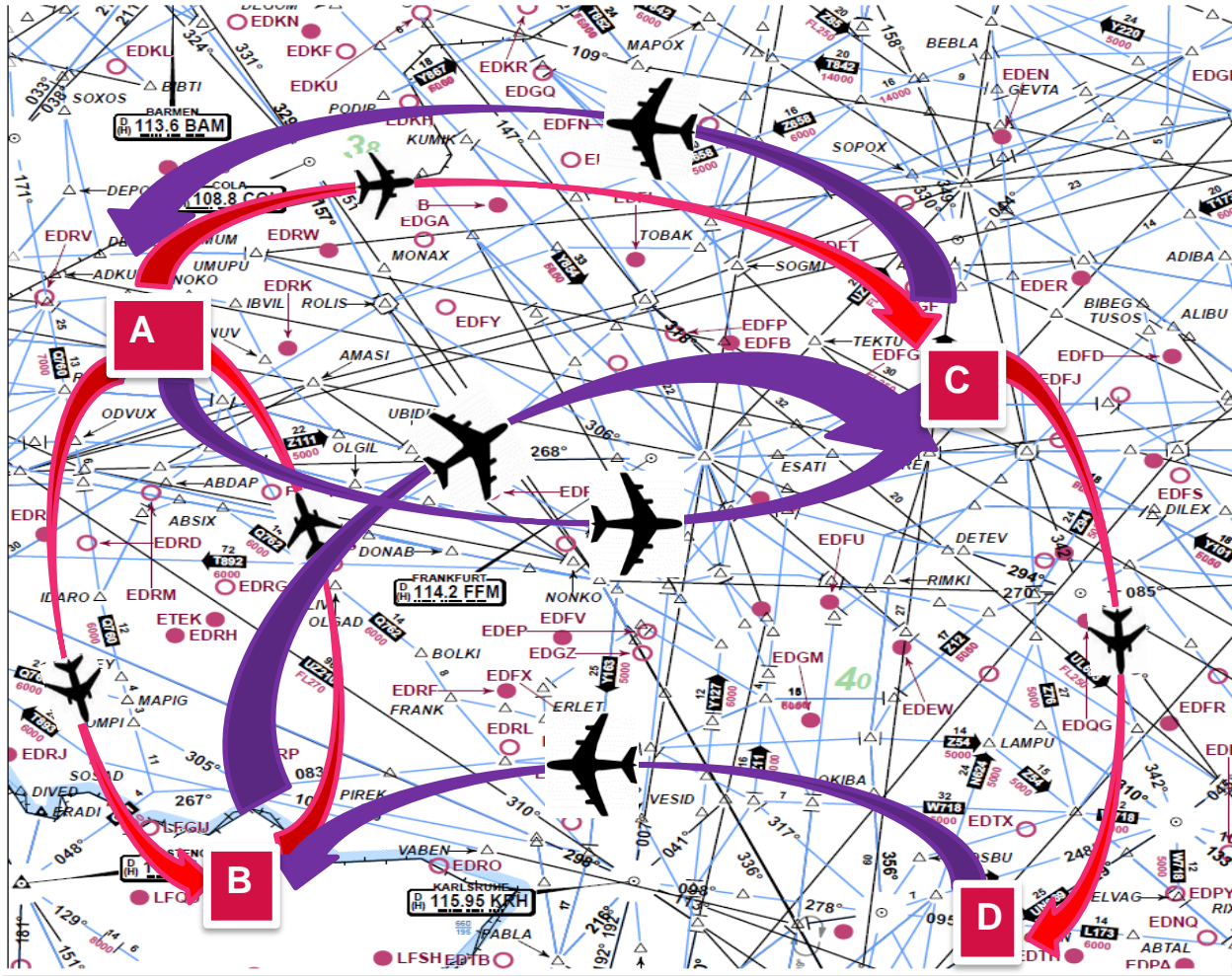


# Connected systems

- Need to align and complement benefits of both programs
- A-CDM systems should interface with the ATFM system, using the Regionally agreed terminologies relevant to both ATFM and A-CDM
- Future operations under SWIM can support



# Whole-of-Network Management



- Maximising coverage
- Brings together all components
- Predictability
- Enhanced ATM system safety
- Increased situational awareness for CDM
- On-Time Performance = Customer Management
- Reduced fuel burn » environment
- Improved disruption management
- Informing the Trajectory for Whole-of-Network Management

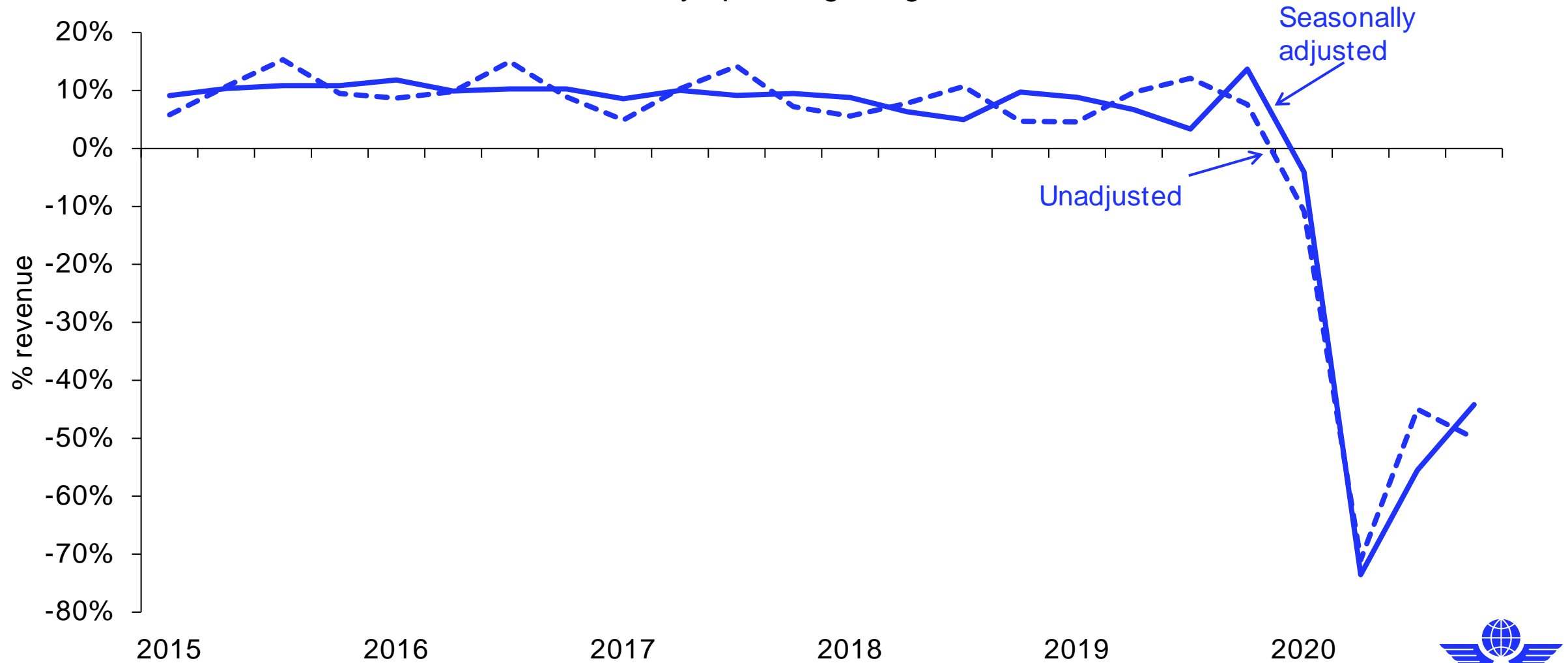
# Challenges for integration

- Individual success of concepts such as ATFM and A-CDM are excellent outcomes, but wider potential for success lies in integrating the network
- Asia-Pacific doesn't have a centralised ATM network like Europe so requires multiple stakeholder engagement to effect traffic management broadly
- Some States have large domestic networks, but others don't and rely on cross-border coord
- Multiple States means many disparate systems and procedures
- Aligning evolution to maintain harmonisation and standardisation
- Airlines need to be able to connect with all systems – what are the costs?
- Airlines still managing COVID impacts

# Airline industry finances improving but still weak

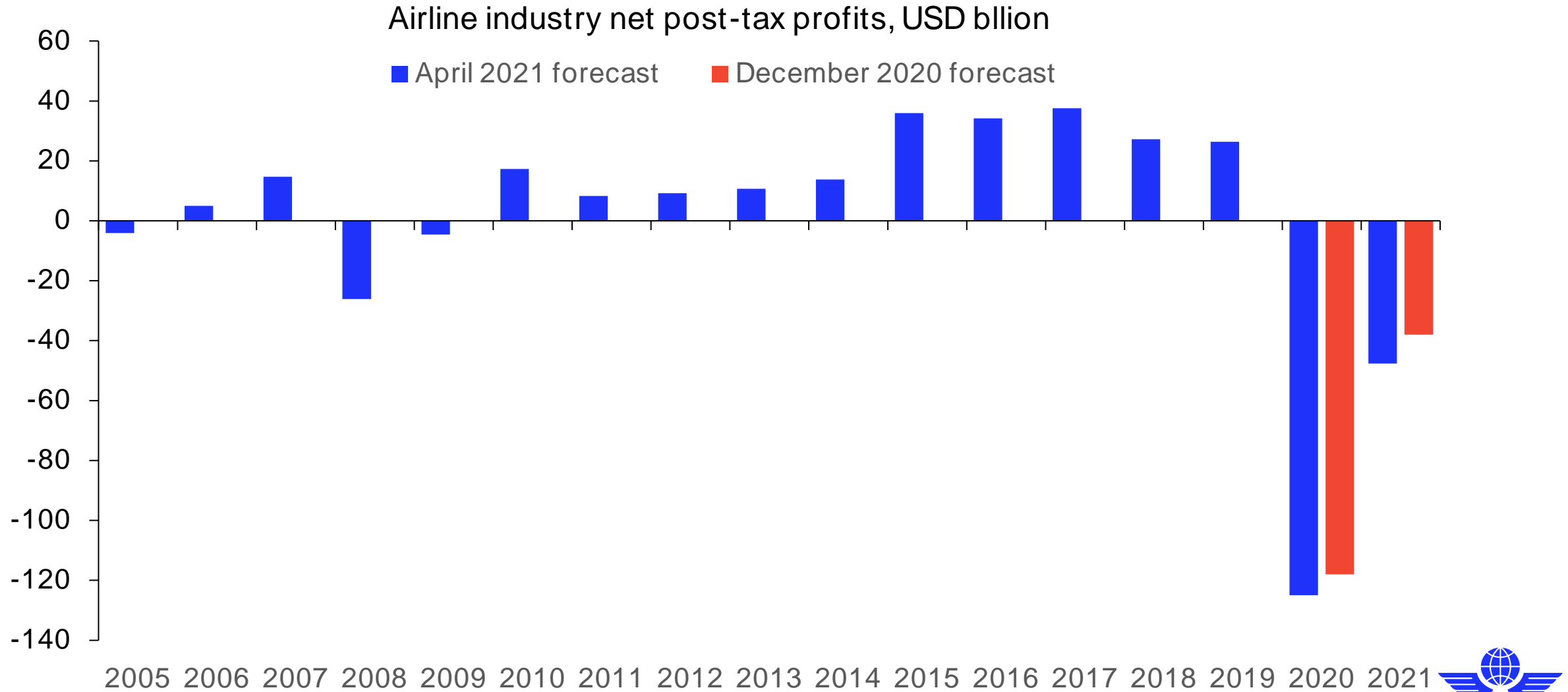
## Operating losses reduced only to 50% of revenues by Q4 of 2020

Global airline industry operating margin, % revenue



# Another year of losses in 2021 but down 2-3x on last year

## With a slower revenue recovery, return to profit delayed until 2022

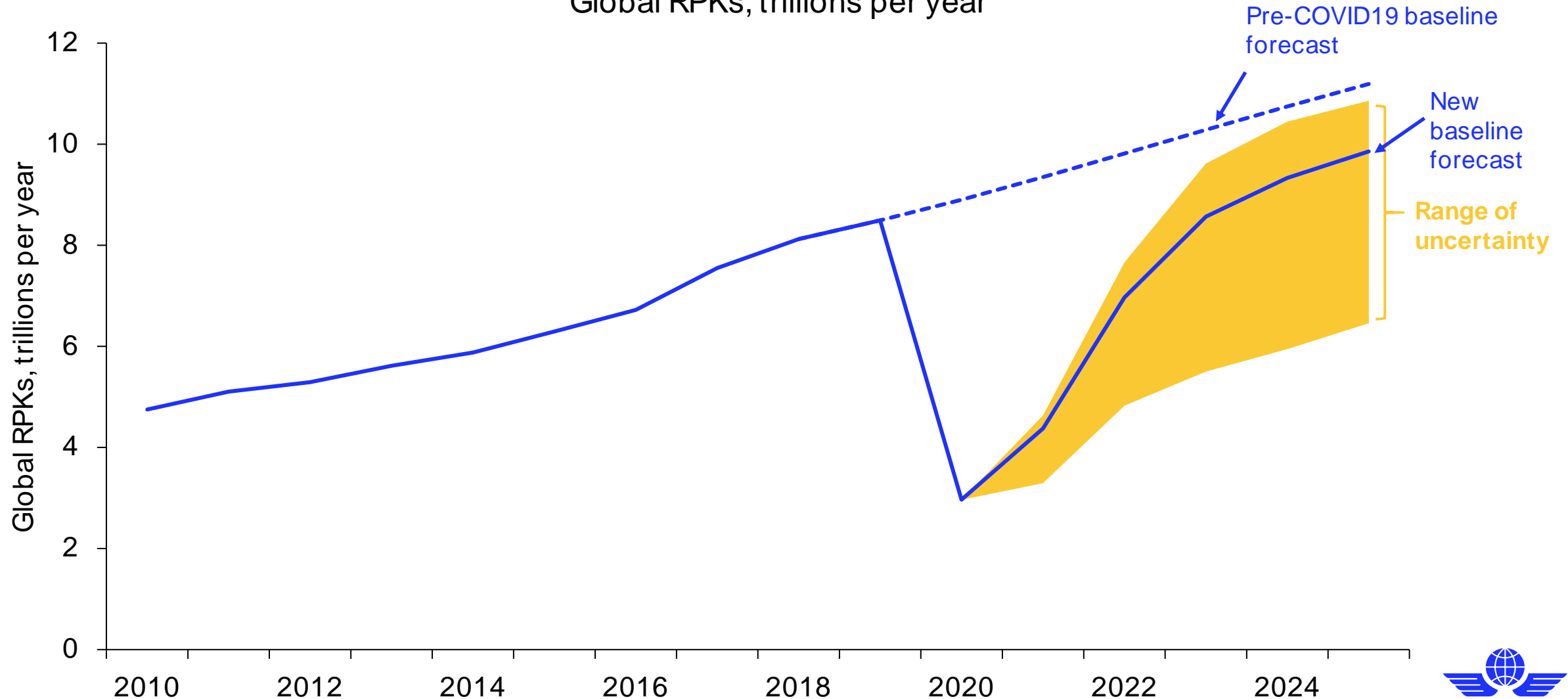


Source: IATA Economics Airline Industry Financial Forecast update, April 2021

# 2022/23 should see much stronger rebound of revenues

Once barriers down there is large pent-up demand and savings to spend

Global RPKs, trillions per year



Source: IATA/Tourism Economics 'Air Passenger Forecasts' January 2020



# National Air Navigation Plans (NANPs)



- New environment post-COVID-19
- Changed airline fleets and associated CNS capabilities
- ICAO Asia-Pacific office advocating all States review their service delivery and investments to match the needs and capabilities of the Aircraft Operators
- ATFM and A-CDM important enablers for safety and efficiency
- Aircraft Operator input is vital



# Thank-you

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Regional Focus



# CANSO/ACI Asia-Pacific ATFM/A-CDM Integration Workshop

Thursday 03 June 2021, 06:00-09:00 UTC



# Questions and Answers

# Recap of the Workshop



**Mr. SL Wong**

Head of Technical Affairs, Safety,  
Capacity and ATM

ACI Asia-Pacific

# Closing Remarks



**Mr. SL Wong**

Head of Technical Affairs, Safety,  
Capacity and ATM

ACI Asia-Pacific

# Closing Remarks



**Mr. Hai Eng Chiang**

Director Asia Pacific Affairs

CANSO



# Contact us



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**Mr. Satya Subramaniam**

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**Contact:** [satya@bialairport.com](mailto:satya@bialairport.com)



# Thank you

