Regional Focus

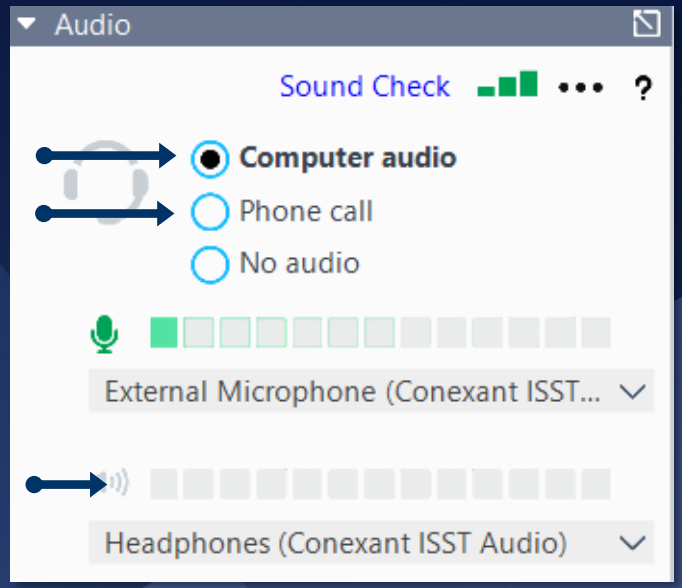
CANSO / ICAO Joint Workshop on Aviation System Block Upgrades (ASBU) Part 1

Thursday 10 September 2020

14:00 – 16:00 CEST

Before we start

- Please make sure your internet connection is stable for an optimal streaming experience. If you experience connection challenges, using a hardwired connection rather than Wi-Fi will benefit the strength and speed of your connection.
- Ensure the sound is working well. If it is not working correct, please dial in via your phone using the phone number in your confirmation e-mail.

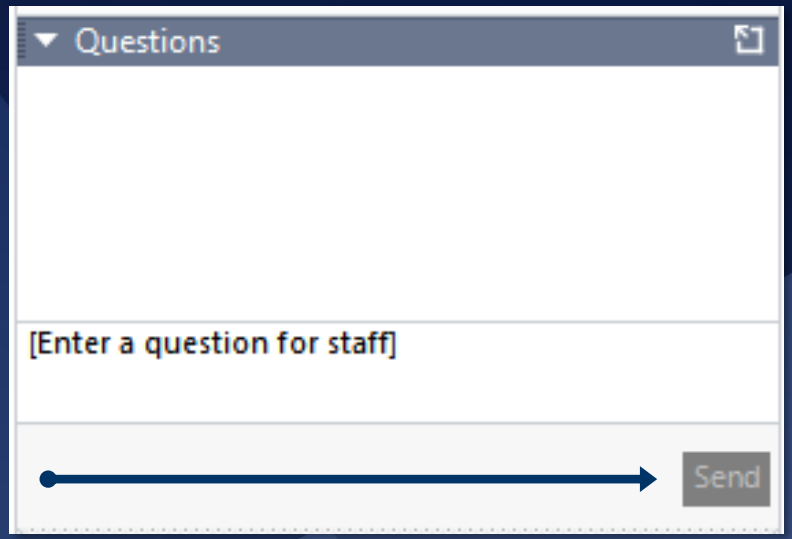


Before we start

Any questions

Please feel free to submit your technical or content related questions into the Questions pane and press send.

We do our best to answer all your questions live during the panel.



Regional Focus

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Thursday 10 September 2020

14:00 – 16:00 CEST

Ms. Boni Dibate

Director Africa Affairs

CANSO

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Regional Director

ICAO – ESAF

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CAA Uganda

1. Uganda Review

- 2014 and 2015 CANSO/ICAO workshops in Mozambique and Kenya.
- Topics – RATS, ATFM, A-CDM, Training(ANS Tech) and Flight calibration.
- 24 – 25 April 2019 CANSO/ICAO arranged a status of implementation workshop in Entebbe Uganda.
- 109 participants from 9 ANSPs and eight organizations.

1. Uganda Review

- Explored the status/challenges of ASBU implementation.
- Provided improved understanding of ASBU framework.
- Assisted participating states to complete ANRF forms
- Helped regulators and ANSPs way forward with implementation and prioritizing ASBUs.

1. Uganda Review

- Objectives - Report back – ASBU Block 0 implementation.
- Challenges of Block 0 implementation.
- Understanding of components of ASBU framework.
- Assisting with ANRF completion.
- Assist with ASBU way forward.

1. Uganda Review

- Missing flight plans – Major safety concern
- ANSPs/Regulators – Should have ASBU focal points/ASBU champion.
- CANSO ATFM Mombasa Roadmap helped by states implementing CDM, A-CDM and ATFM – Harmonisation in the region.
- Regulators/ANSPs encouraged to develop a concept of operations for UTM/UAS OPS.

1. Uganda Review

- **Recommendations:**
- Suppliers – Integrate new ATM/CNS systems.
- States to work more closely to ensure regional integration.
- States should implement ACDM, CDM and AFTM – Mombasa ATFM Roadmap - 2018.
- States/ANSPs – RPAS/ASBU champion.
- States develop – ATM roadmap, NAMP, SUR

ASBU

- **Recommendations:**
- States review ASBU implementation priorities.
- ASBU – SWIM (AIDC) focus support safety and flight plan distribution.
- States fill in and distribute ANRFs and submit
- CANSO report – 6th AFI Aviation week in Kampala Uganda 13 – 17 May 2019.

Mr. Colin Bryant

ATM OPS System Specialist

ATNS

STRATEGY

- Uganda April 2019 – Recommendation: States develop a NAMP (National Airspace Master Plan), ATM Roadmap and Surveillance Strategy.
- Are living documents, i.e. – Can/should be updated regularly.
- They are interdependent on each other and serve to plot the State ASBU strategy.

STRATEGY

- **NAMP:**
- Intention – Serve as a broad description of States policy on management of airspace – responding to ICAO Global ATM Concept, Global and regional Air Navigation safety plans.
- References to user/ATM community requirements for airspace use and associated services.

STRATEGY

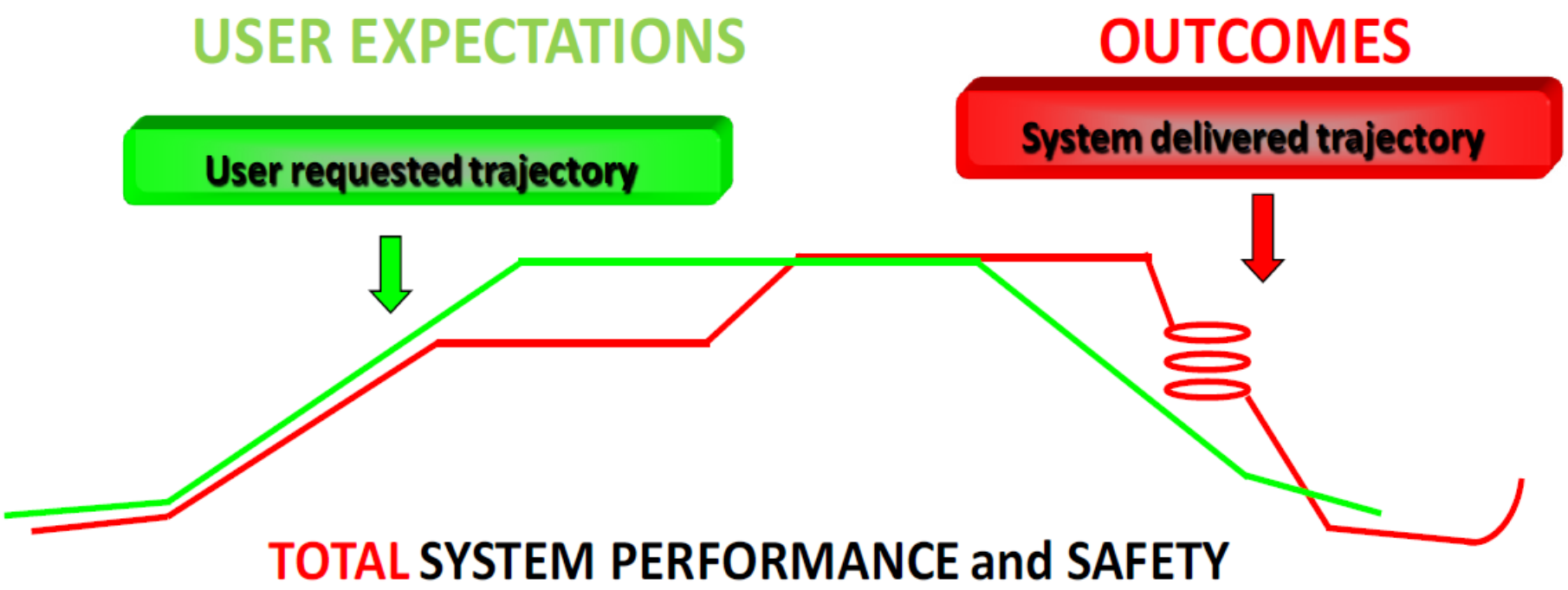
- ICAO – Articulated the need to not leave any State behind.
- NAMP must consider collaboration nationally, regionally and internationally moving forward.
- Understanding the ATM community and interdependence – No “silo” mentality.
- Possible solution – Create an ATM/CNS Implementation committee?

STRATEGY

- Committee ensures – Implementation of Systems is coordinated, harmonious and a collaborated process involving the entire affected community.
- Give consideration to reliance on supporting services – WX Services. ICAO has identified as most important to achieving expected outcomes.

STRATEGY

Given that the effort of managing airspace is a product of a system and collective action, the entire ATM Community is involved



STRATEGY

National Airspace management and user expectations:

a) Access and Equity
b) Capacity
c) Cost Effectiveness
d) Efficiency
e) Environment
f) Flexibility

STRATEGY

National Airspace management and user expectations:

g) Global Interoperability

h) Participation by the ATM community

i) Predictability

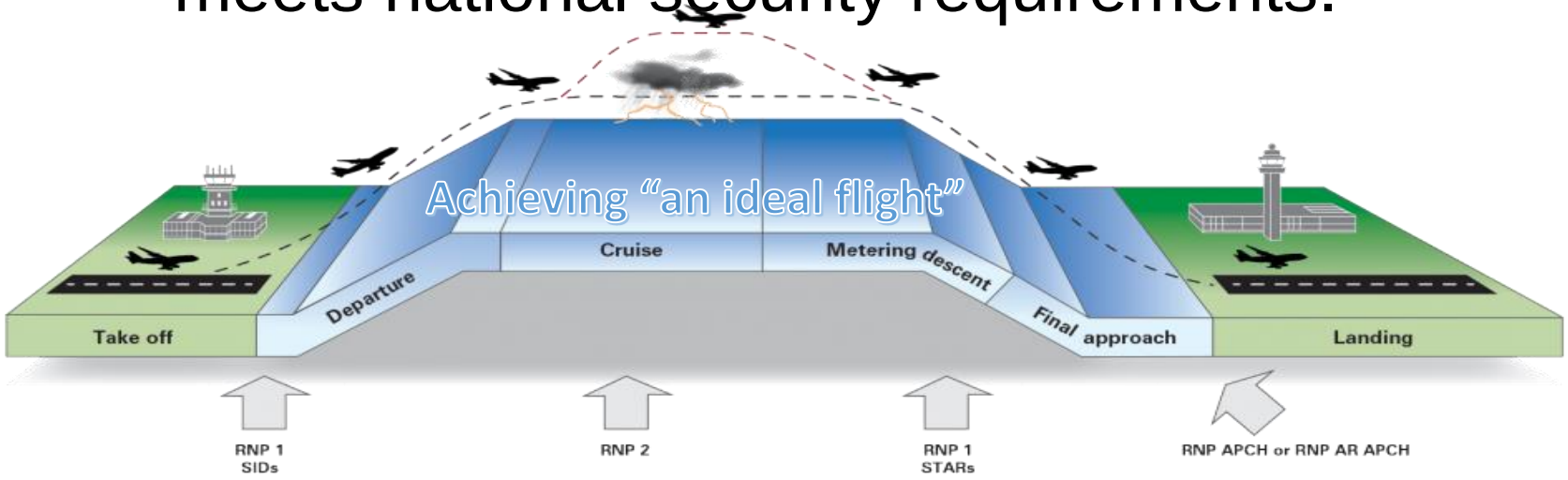
j) Safety

k) Security

STRATEGY

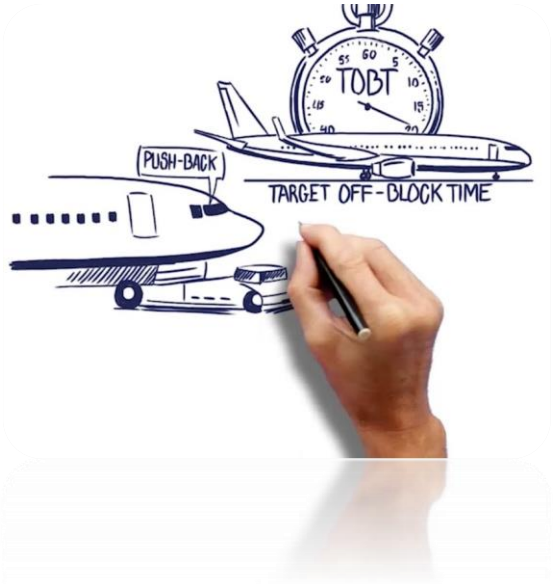
Primary driver for an **ATM Roadmap** is to achieve an interoperable, global air traffic management system for all users during all phases of flight that:

- meets agreed to levels of safety;
- provides for optimum economic operations;
- is environmentally sustainable, and
- meets national security requirements.



STRATEGY

- ATM Operational Concept
- GANP
- AFI Plan
- NAMP
- ANSP Strategy
- ATM Roadmap



*FOEM
*CAPEX Plan
*Enabling Technologies Plan

STRATEGY

Short Term

until 2021

- * AIDC
- * RAIM
- * Disaster Recovery (Phase 1)
- * PBN - CCO/CDO
- * UTM Conops
- * IWXXM / SWx
- * AIXM
- * Remote Air Traffic Services (RATS)
- * TWR Remoting Feasibility
- * RE-CAT
- * AMAN/DMAN
- * WAM Phase 1
- * Airspace re-sectorisation/ configuration and design
- * Route Adherence Monitoring
- * Reduced emissions

Medium Term

2022 - 2027

- * FF-ICE / 4-D Trajectory Management
- * PBCS Monitoring
- * Disaster Recovery (Phase 2)
- * Consolidation of APP Centres
- * Centralisation of ACCs
- * TWR Remoting
- * Intergration of UTM into ATM System
- * Augmentation Systems (GBAS/ABAS/SBAS)
- * D-TAXI
- * WAM Phase 2
- * SWIM / IM
- * ATFM / Flex tracking
- * Dynamic Sector Management
- * Alternative Energy Sources

Long Term

2028 onwards

- * SADC UACC
- * AIRM

STRATEGY

- **Surveillance Strategy:**
- Providing alignment and support for NAMP.
- Ensure the provision of adequate air traffic surveillance which cover all defined or determined areas.
- Guided by user requirements + provision of aeronautical surveillance - NAMP, ICAO SARPS, GANP and AFI Air Navigation Plan.

Polling Question

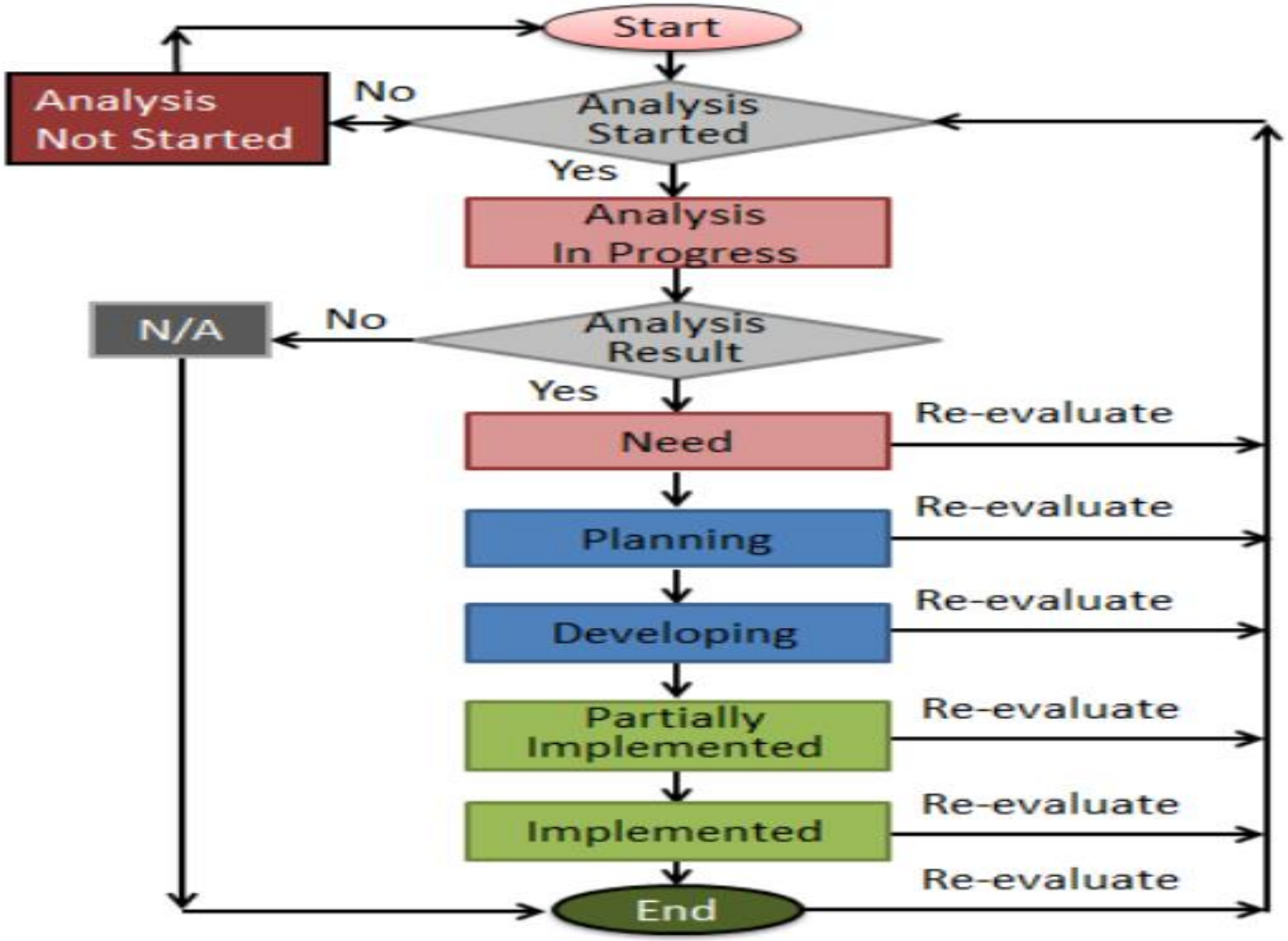
Has your ANSP/State developed all three strategy documents?

a. Yes
b. Some
c. No
d. Not sure

STRATEGY

- Surveillance strategy outlines a plan that ensures the achievement for the provision of air traffic surveillance - Shall cover all areas of routing and homogeneous traffic flow within an airspace.
- Interdependence of NAMP, ATM Roadmap and Surveillance strategy.
- **NB –** Living documents!

Analysis and implementation flow



Analysis and implementation flow

- **APIRG 21WP10 initiative**
- **Analysis Not Started** - Requirement to implement this ASBU Module element – Not been assessed by State/ANSP.
- **Analysis In Progress** - Need Analysis as to whether or not this ASBU Module is required is in progress by at least one State in the Region

Analysis and implementation flow

- **N/A** – The Region has decided not to implement this ASBU Module.
- **Need** - One or more States in the Region have determined the ASBU Module is required, but none have begun planning for the implementation.
- **Planning** – Implementation of this ASBU Module is planned, but not started.

Analysis and implementation flow

- **Developing** – Implementation of this ASBU Module is in the development phase, but not yet operational.
- **Partially Implemented** – Implementation of this ASBU Module is partially completed and/or operational in at least one area of the Region
- **Implemented** - Implementation of this ASBU Module has been completed.

Analysis and implementation flow

CATEGORIES AND PRIORITY

a) **Essential** - Substantial contribution towards global interoperability, safety or regularity.

8 Modules are: FICE, DATM, ACAS, FRTO,AMET, APTA, CDO and CCO.

Analysis and implementation flow

CATEGORIES AND PRIORITY

b) **Desirable** - Because of their strong business and/or safety case, are recommended for implementation.

5 Modules are: ACDM, NOPS, ASUR, SNET and TBO.

Analysis and implementation flow

CATEGORIES AND PRIORITY

c) **Specific** – Recommended implementation to address a particular operational environment in specific countries of AFI Region.

3 Modules are: OPFL, ASEP and WAKE.

Analysis and implementation flow

CATEGORIES AND PRIORITY

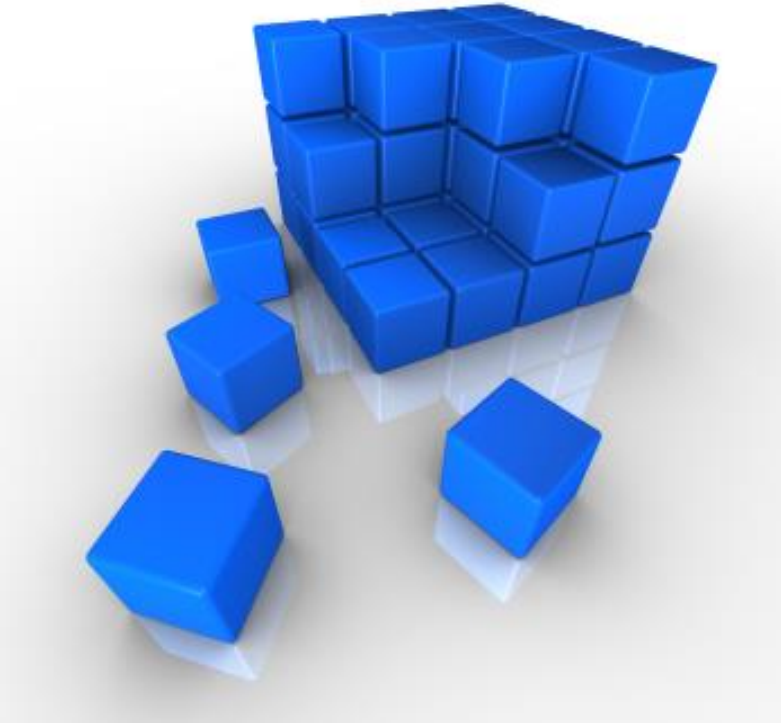
d) **Optional** – Address particular operational requirements in specific countries of AFI Region

2 Modules are: SURF and RSEQ.

Analysis and implementation flow

- Priority 1 requires immediate implementation.
- Priority 2 corresponds to a recommended implementation.
- Of the 18 Block 0 Modules, only nine (9) Modules have Priority 1 and apply to most of the AFI States, the remaining Modules are Priority 2 and apply to only specific States.

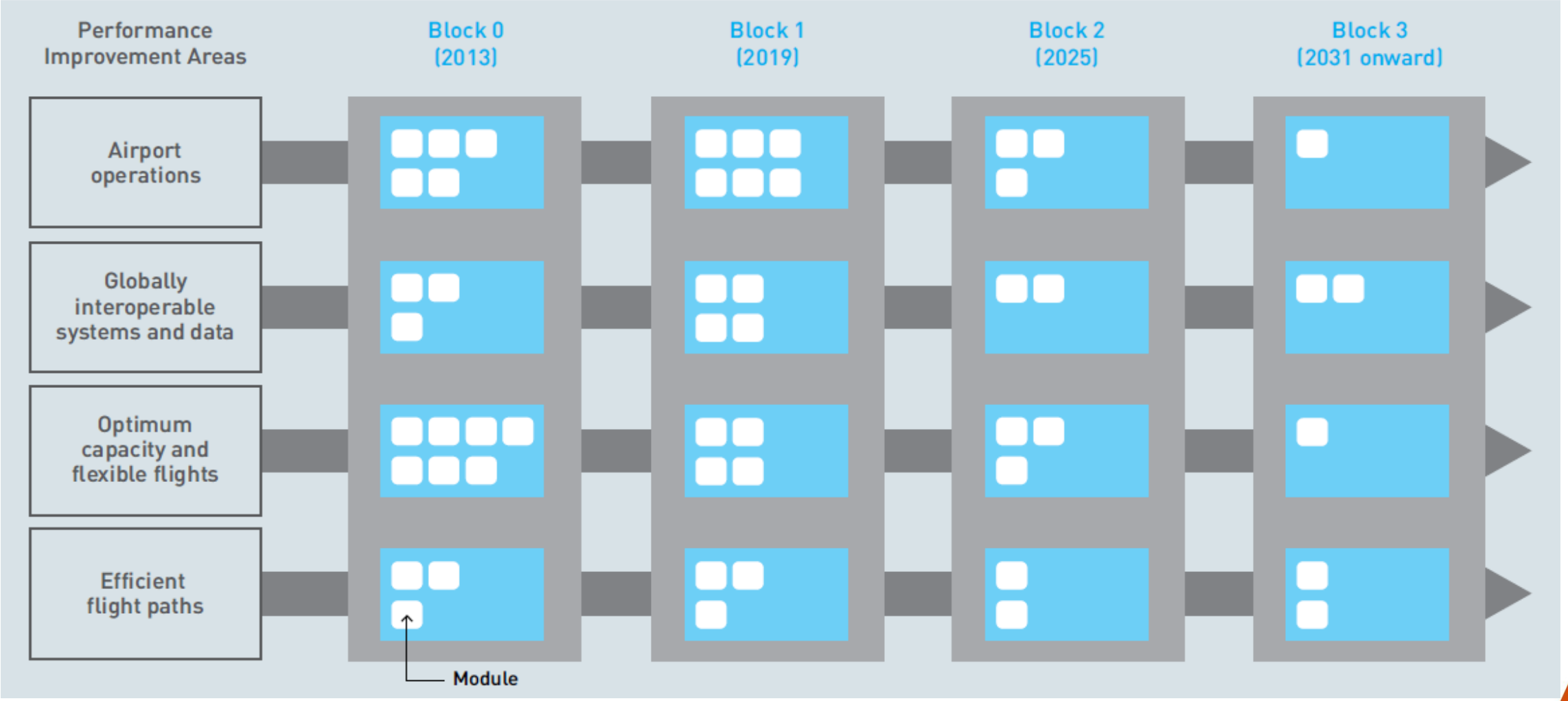
The Need for ASBU



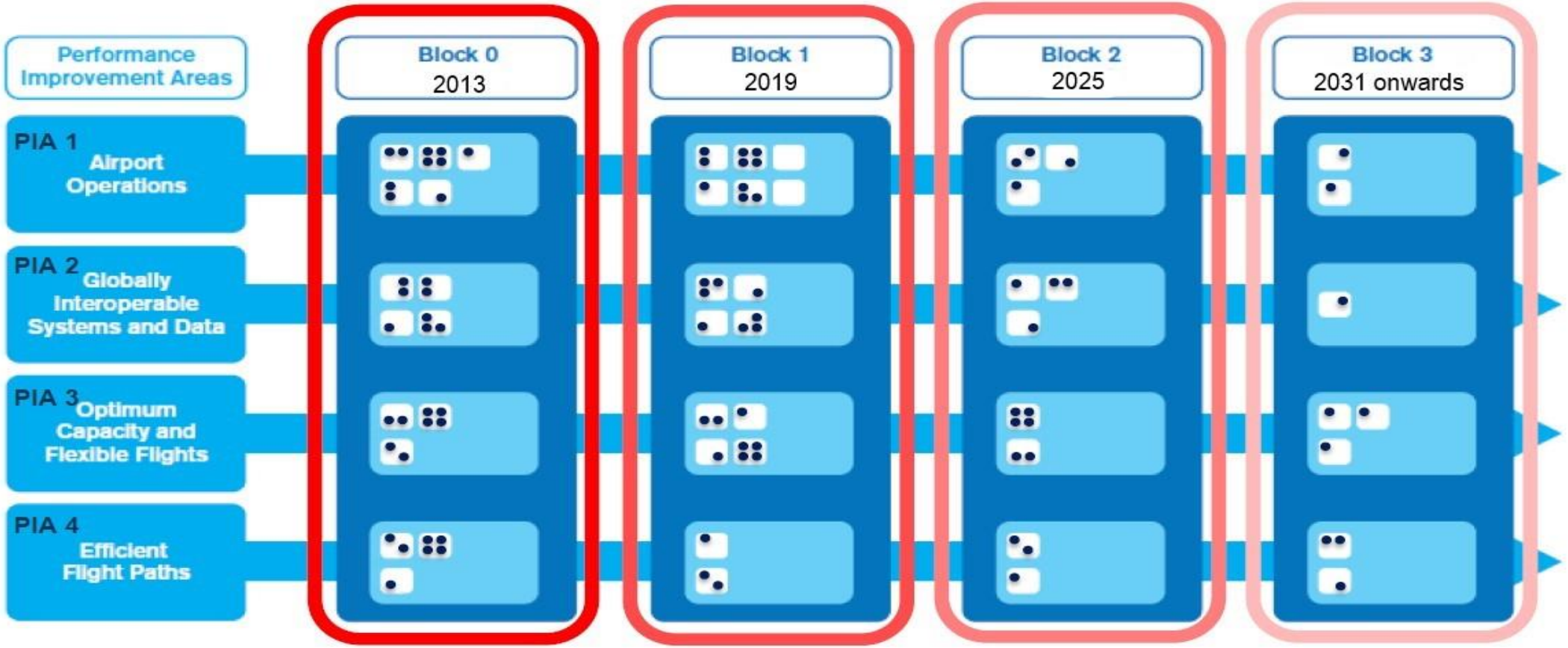
- 15 Year Strategic methodology,
- Structured approach for operational improvements (technologies and procedures),
- Leverages existing technologies and anticipates future developments,
- Based on State/industry agreed operational objectives,
- Enables global interoperability.

ASBU Overview

ASBU Overview



ASBU
Blocks


Performance Improvement Areas
Block 0
2013
Block 1
2019
Block 2
2025
Block 3
2031 onwards
PIA 1
Airport Operations
PIA 2
Globally Interoperable Systems and Data
PIA 3
Optimum Capacity and Flexible Flights
PIA 4
Efficient Flight Paths

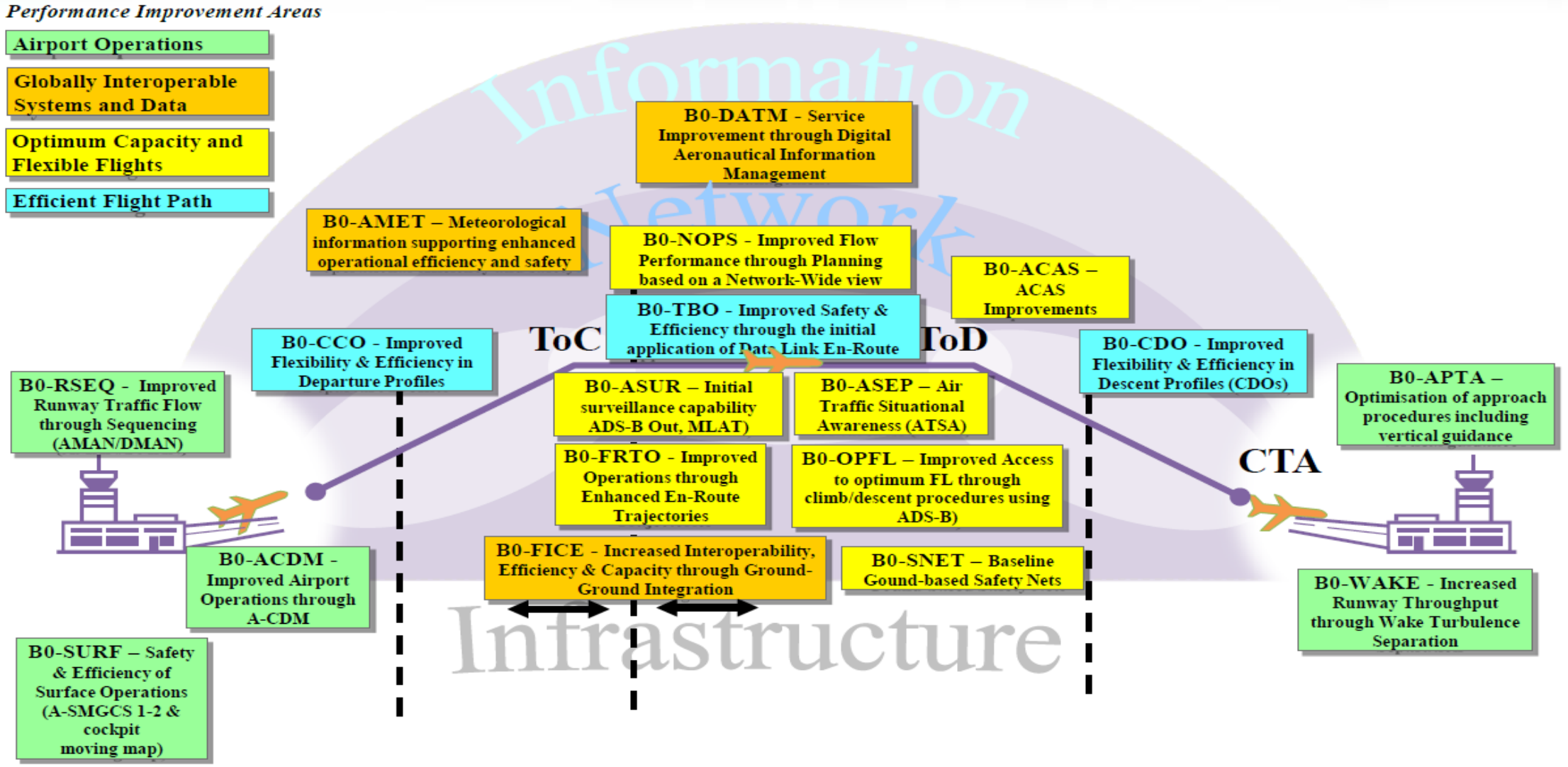
ASBU Overview

4 Main Performance improvement areas

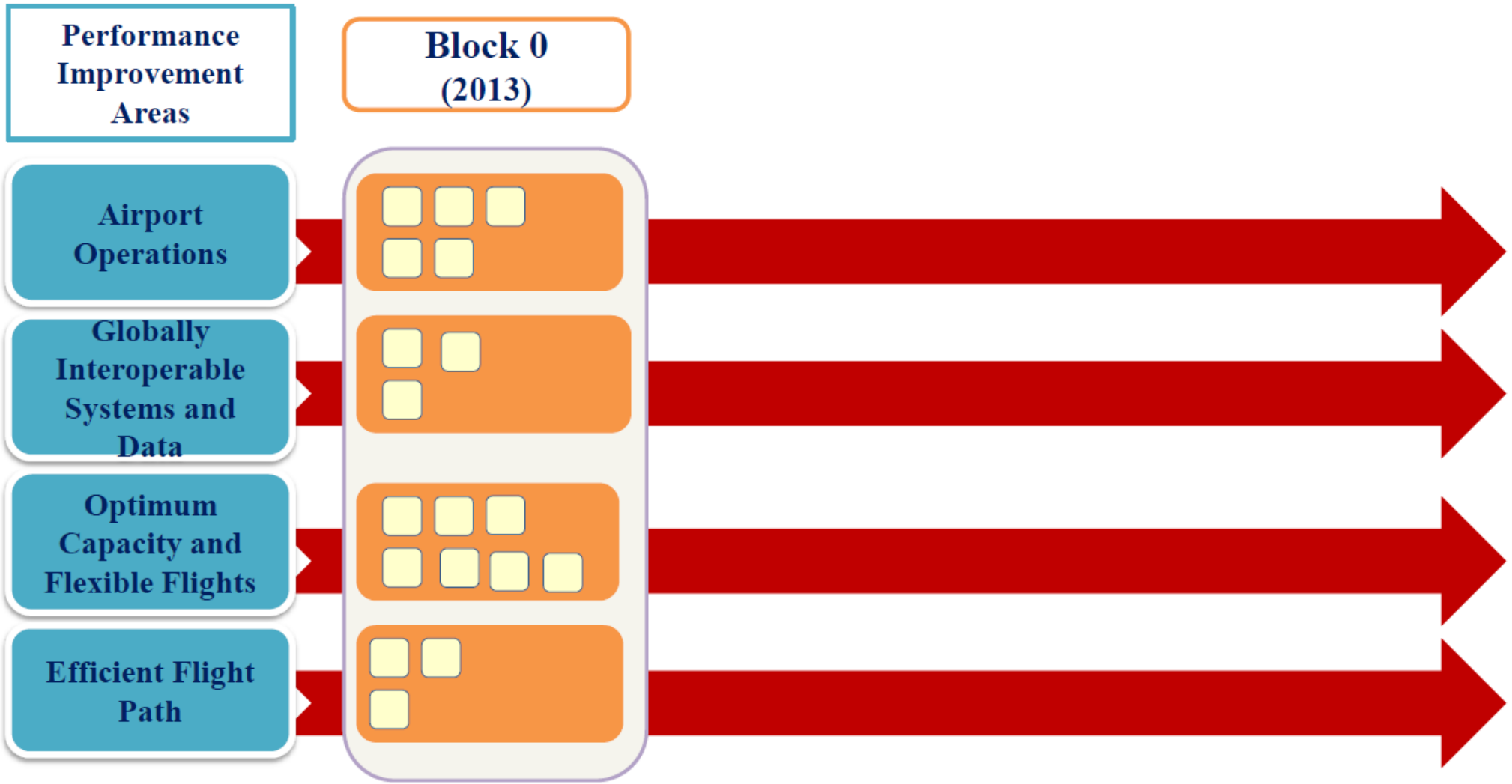
- Airport Operations (5 modules)
- Globally interoperable systems & data (3 modules)
- Optimum capacity & flexible flights (7 modules)
- Efficient flight path (3 modules)

- Block 0 will serve as the enabler and foundation for the envisioned future aviation systems.

ASBU Overview



ASBU Overview



ASBU Overview

ASBU Threads

Airport Operations - Full AMAN/DMAN/SMAN	
ACDM	Airport CDM
APTA	Airport Accessibility
RATS	Remote ATS
RSEQ	Runway Sequencing
SURF	Surface Operations
WAKE	Wake Turbulence Separation

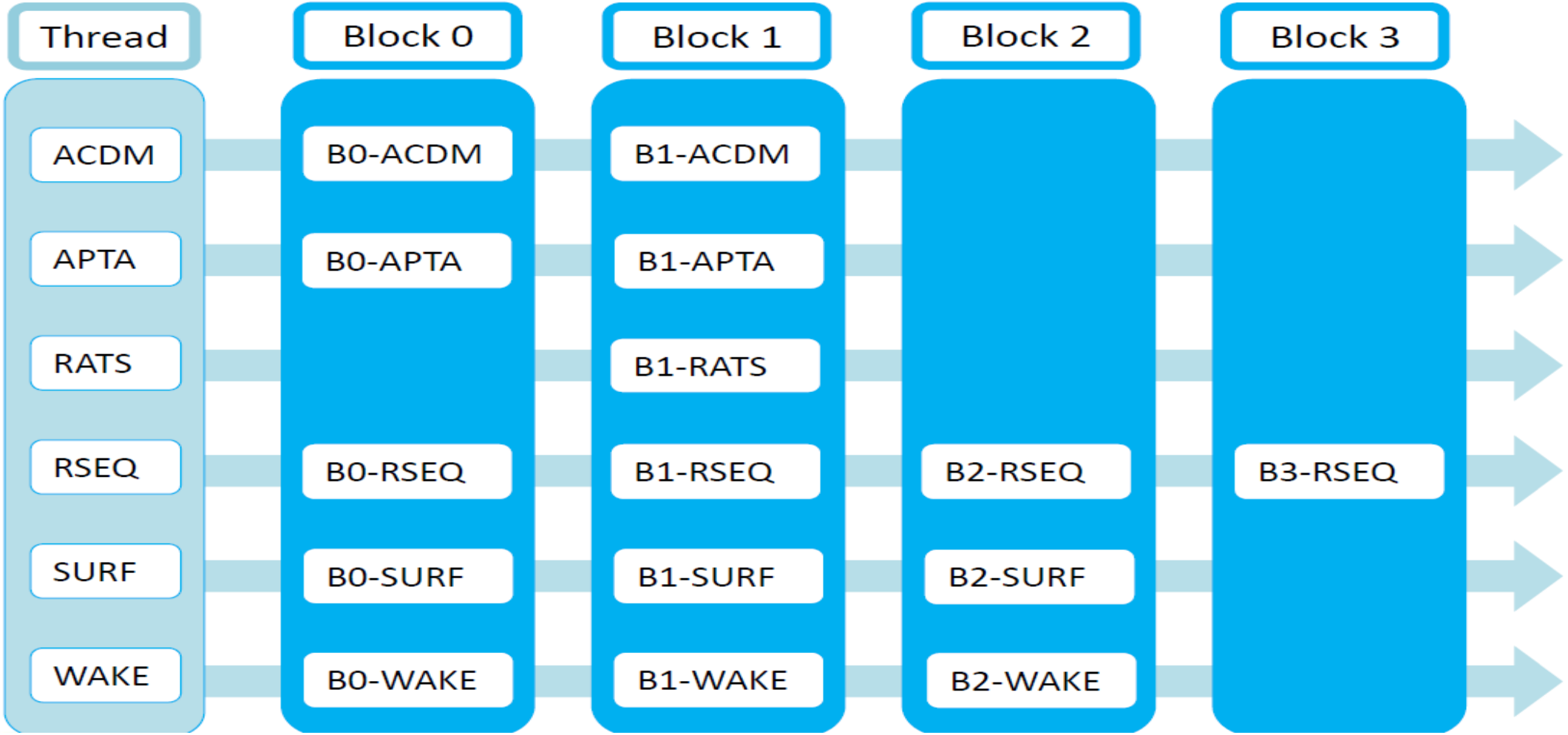
Optimum Capacity & Flexible Flight – through Global Collaborative ATM	
ACAS	Airborne Collision Avoidance Sys
ASEP	Airborne Separation
ASUR	Alternative Surveillance
FRTO	Free Route Operations
NOPS	Network Operations
OPTL	Optimum Flight Levels
SNET	Ground-Based Safety Nets

Globally Interoperable Systems & Data - through Globally Interoperable SWIM	
AMET	Advanced MET Information
DATM	Digital ATM
FICE	FFICE
SWIM	SWIM

Efficient Flight Paths – through Trajectory-based Operations	
CCO	Continuous Climb Operations
CDO	Continuous Decent Operations
RPAS	Remotely Piloted Aircraft Sys.
TBO	Trajectory-Based Operations

ASBU Overview

PIA 1: Airport Operations

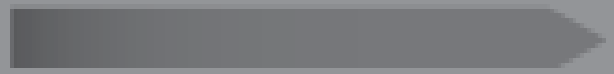


ASBU Overview

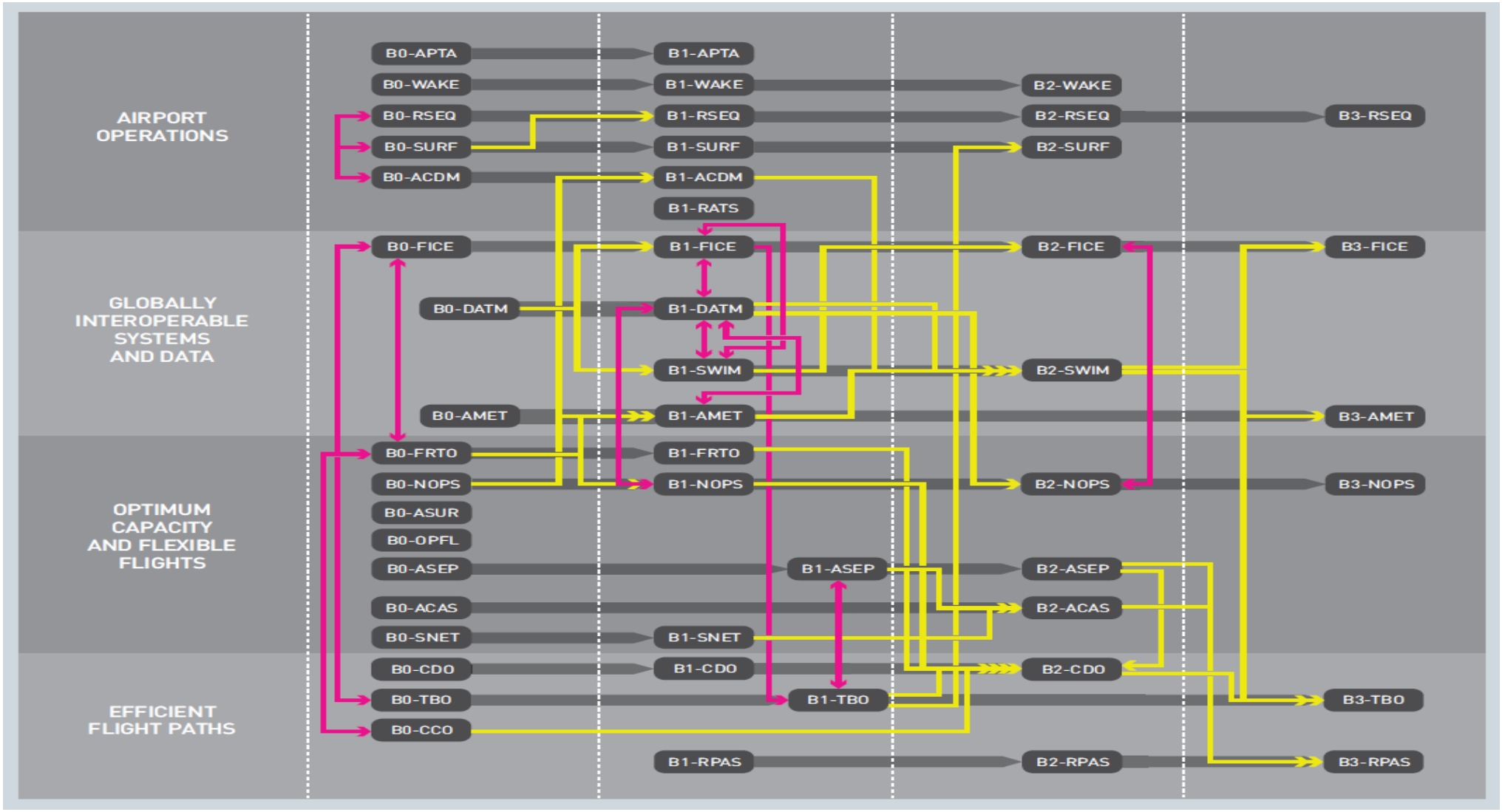
PIA1 Modules: Airport Operations

ACDM	B0	Improved Airport Operations through Airport-CDM
	B1	Optimized Airport Operations through Airport-CDM
APTA	B0	Optimization of Approach Procedures including Vertical Guidance
	B1	Optimized Airport Accessibility
RATS	B1	Remotely Operated Aerodrome Control
RSEQ	B0	Improve Traffic Flow through Sequencing (AMAN/DMAN)
	B1	Improved Airport Operations through Departure, Surface and Arrival Management
	B2	Linked Arrival Management and Departure Management (AMAN/DNAM)
	B3	Integration AMAN/DMAN/SMAN
SURF	B0	Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2)
	B1	Enhanced Safety and Efficiency of Surface Operations – SURF, SURF-IA and Enhanced Vision Systems (EVS)
	B2	Optimized Surface Routing and Safety Benefits (A-SMGCS Level 3-4 and SVS)
WAKE	B0	Increased Runway Throughput through Optimized Wake Turbulence Separation
	B1	Increased Runway Throughput through Dynamic Wake Turbulence Separation
	B2	Advanced Wake Turbulence Separation (Time-Based)

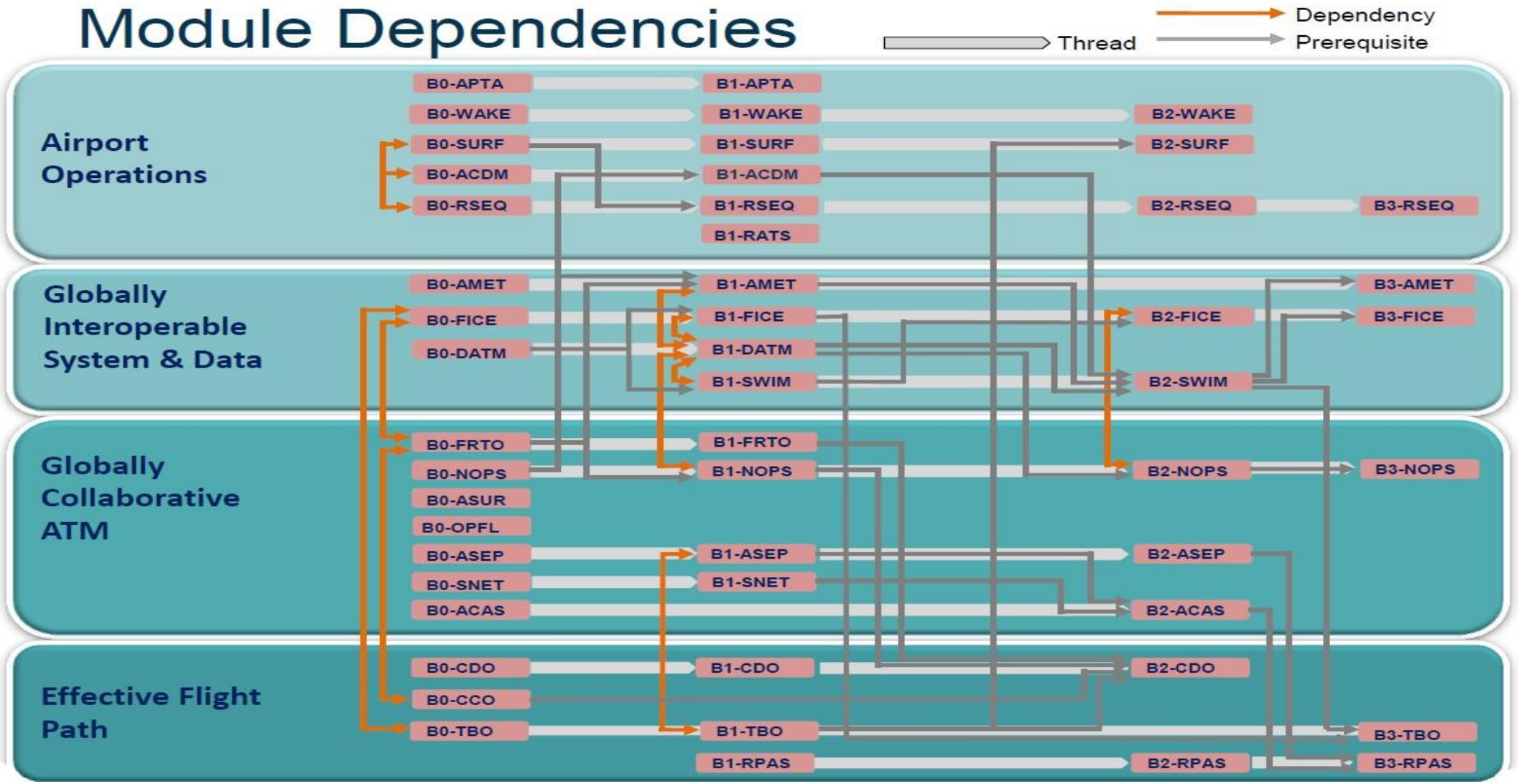
ASBU Overview

Legend	
	Links from a Module in Block '*n*' to a Module in Block '*n*+1'
	Dependencies across Threads/Performance Areas
	Links to other Threads/Performance Areas where a Module is dependent on an earlier Module or Modules

ASBU Overview



ASBU Overview



ASBU Overview

Global Readiness Checklist		Status (ready or date)
	Standards Readiness	√
	Avionics Availability	√
	Infrastructure Availability	√
	Ground Automation Availability	√
	Procedures Available	√
	Operations Approvals	√

- Each Module is evaluated for its readiness
- If any component is not found to be ready it moves to a future Block for implementation
- Those Modules that are not specifically ready at a Block release are noted as “dates of readiness”

All Block 0 Modules Have Met the Readiness Criteria

ASBU Overview

Did someone ask

B0-SURF	Surface Operations - Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2)

1. Which airports in your State currently have implemented A-SMGCS level 1 and 2?
2. Estimate the percentage of aircraft movements which are operating girth A-MSGCS in your state/region?
3. Which additional airports in your state/organization will implement A-SMGCS Level 1 and 2 in 2018?
4. What percentage of aircraft movements do you estimate will be operating with A-SMGCS in your state in 2018?

ASBU Overview
Sample Metrics and Target
Aerodrome Centric Elements

Block 0 Modules	Elements	Metrics	Targets
Performance Improvement Area 1: Airport Operations			
APTA	**1.** PBN Approach Procedures with vertical guidance (LPV, LNAV/VNAV minima, using SBAS and Baro VNAV	**a.** Number of international aerodromes for which the need for this Element has been assessed = X. *Metric: X out of 5* have been assessed* **b.** Number of assessed international aerodromes which need this Element = Y *Metric: Y out of X need this element* **c.** Number of needed implementations that have been completed = Z *Metric. Z out of Y have been completed*	**B0-APTA-1** **Target 1:** X=5 by Dec 2016

* Assume that the State has 5 international aerodromes.

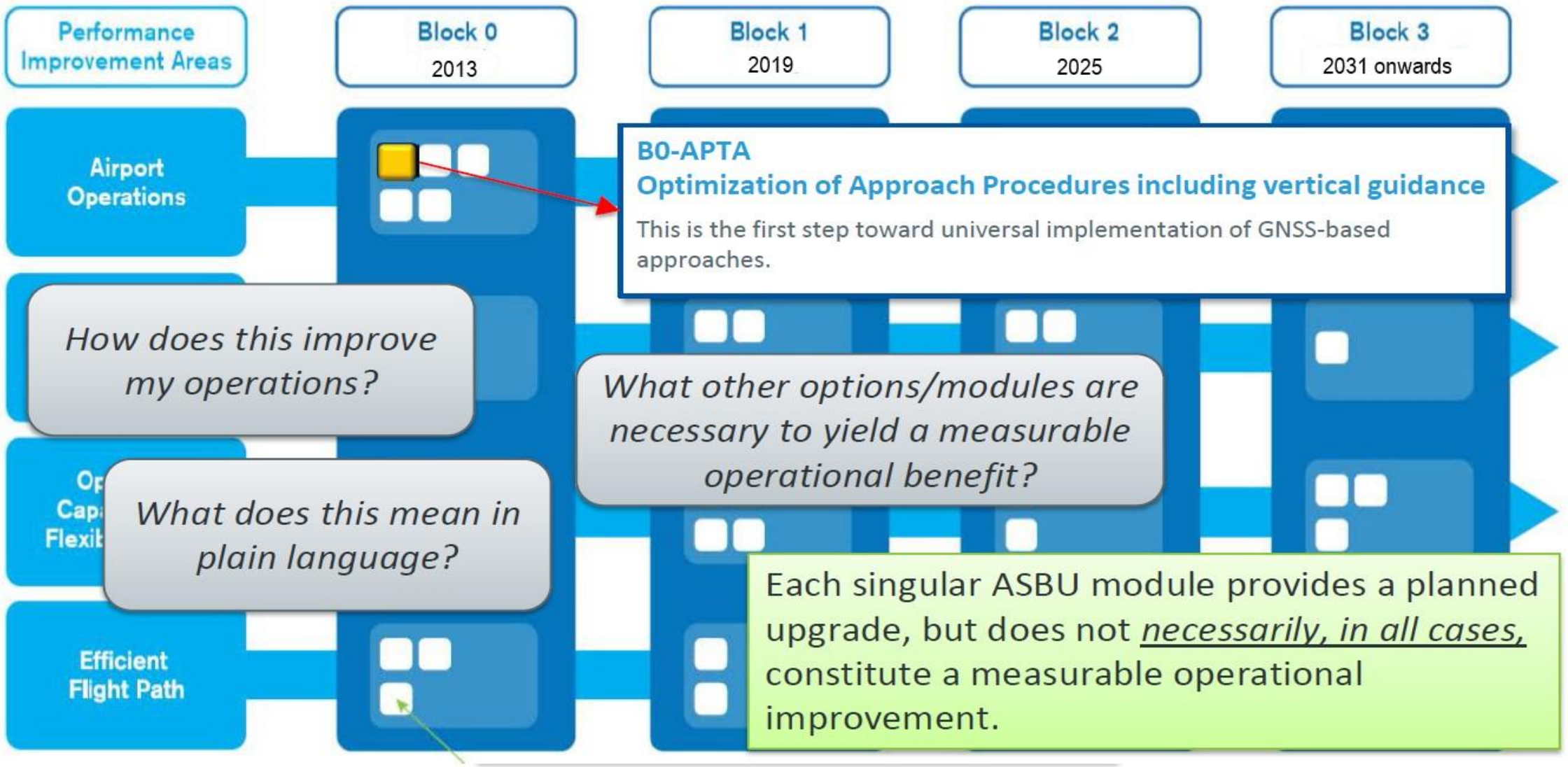
ASBU Overview

Air Navigation Report Form (ANRF)

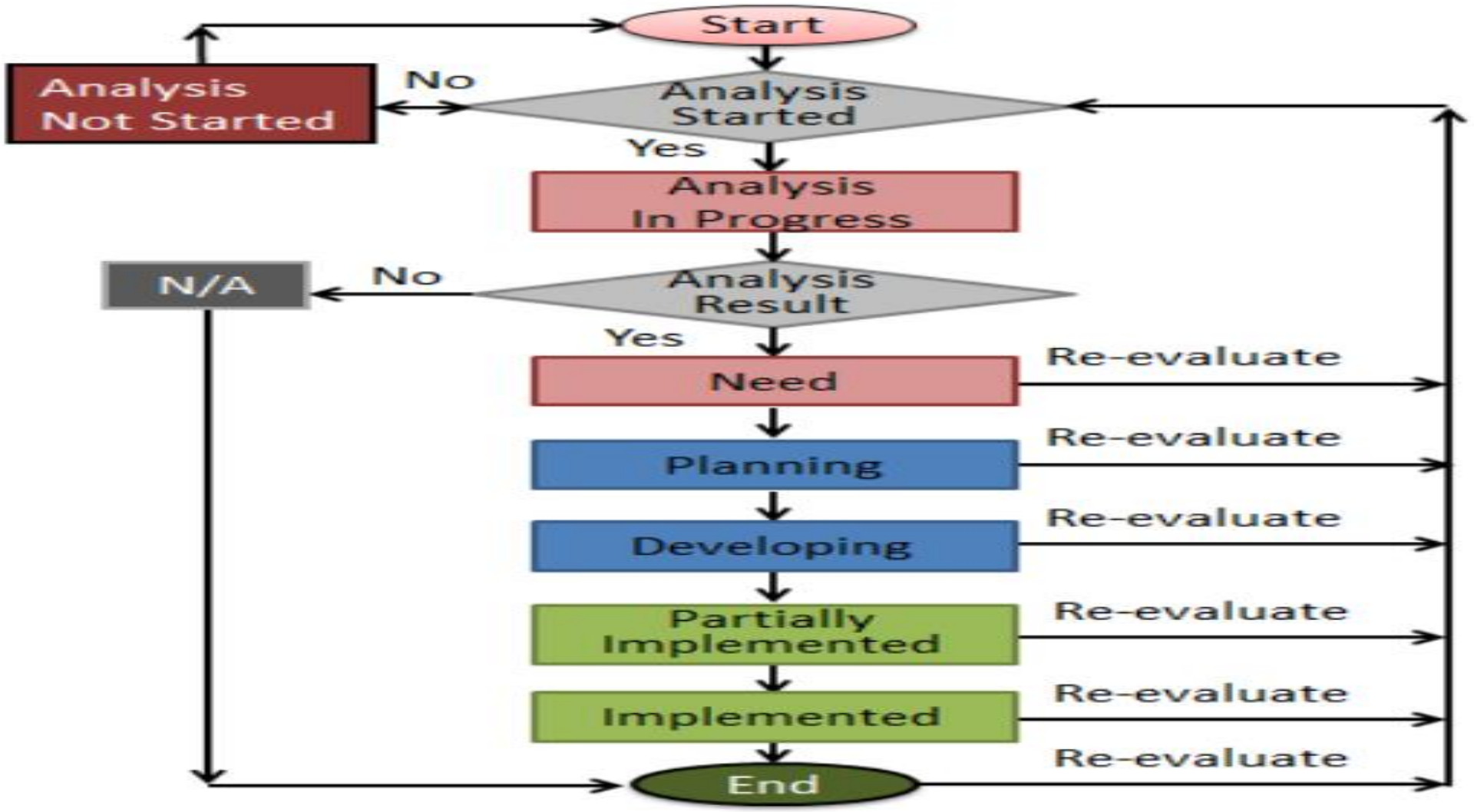
- **Purpose**
  - Report the implementation status
  - Report qualitative performance benefits
  - Provide the progress status via web viewer
- **Use the same report form for Regions and States**
- **One ANRF per module**
- **Specific focus on what will be reported**

FAA ASBU Air Navigation Reporting Form (ANRF)					
PIA		**Block - Module**		**Date**	
Module Description					
Element Implementation Status					
1	**Element Description**			**Date Planned/Implemented**	**Status**
	Status Details				
2	**Element Description**			**Date Planned/Implemented**	**Status**
	Status Details				
3	**Element Description**			**Date Planned/Implemented**	**Status**
	Status Details				
etc.	**Element Description**			**Date Planned/Implemented**	**Status**
	Status Details				
Achieved Benefits					
Access and Equity					
Capacity					
Efficiency					
Environment					
Safety					
Implementation Challenges					
Ground system Implementation					
Avionics Implementation					
Procedures Availability					
Operational Approvals					
Notes					

ASBU Overview



Analysis and implementation flow

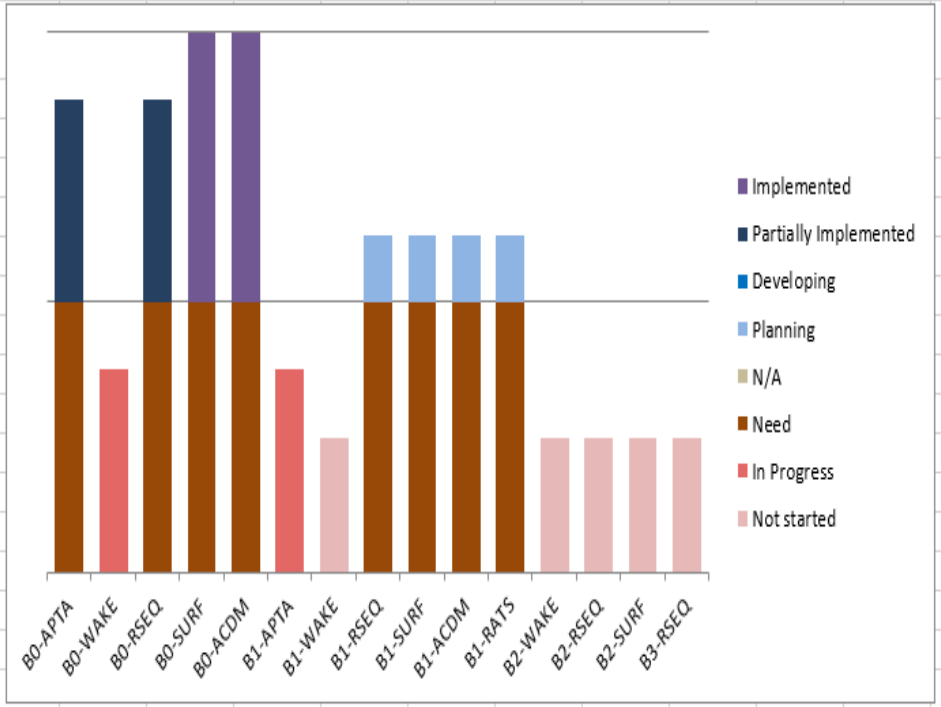


ASBU Overview

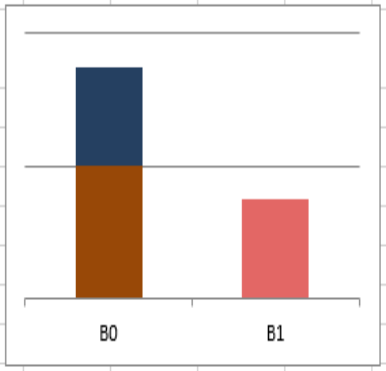
PIA 1 Block 0 Module Elements Table (with sample checks "X")

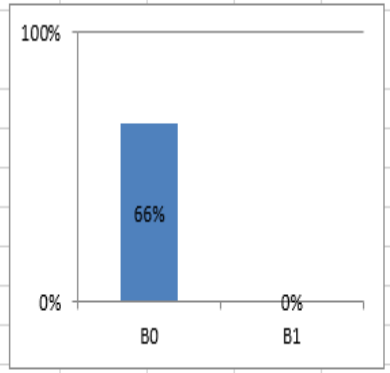
Block 0 Modules	Module Elements	Need Analysis of Module Elements				Implementation Status (if Element is needed)			
		Not Started	In Progress	Need	N/A	Planning	Developing	Partially Implemented	Implemented
Performance Improvement Area 1: Airport Operations									
ACDM	1. (Derived from 1.2.1 and 1.2.2) Airport CDM procedures	X							
	2. (Derived from 1.2.1 and 1.2.2) Airport CDM tools	X							
	3. (Derived from 3.1 & 7.2.1) Collaborative departure queue management	X							
APTA	1. (Derived from 4.1.1) PBN Approach Procedures with vertical guidance (LPV, LNAV/VNAV minima, using SBAS and Baro|VNAV)	X							
	2. (Derived from 4.1.1) PBN Approach Procedures without vertical guidance (LP, LNAV minima; using SBAS)	X							
	3. (Derived from 1.3.2) GBAS Landing System (GLS) Approach procedures	X							
RSEQ	1. (Derived from Element 1) AMAN via controlled time of arrival to a reference fix	X							
	2. (Derived from Element 1) AMAN via controlled time of arrival at the aerodrome	X							
	3. (Defined: Element 2) Departure management	X							
	4. (Derived from Element 2) Departure flow management	X							
	5. (Defined: Element 3) Point merge	X							
SURF	1. (Derived from Element 1) A-SMGCS with at least one cooperative surface surveillance system	X							
	2. (Derived from Element 1) Including ADS-B APT as an element of A-SMGCS	X							
	3. (Derived from Element 2) A-SMGCS alerting with flight identification information	X							
	4. (Derive from 1.4.1) Airport vehicles equipped with transponders	X							
WAKE	1. (Defined: Element 1) New PANS-ATM wake turbulence categories and separation minima	X							
	2. (Derived from Element 2) Dependent diagonal paired approach procedures for parallel runways with centrelines spaced less than 760 meters (2,500 feet) apart	X							
	3. (Derived from Element 3) Wake independent departure and arrival procedures for parallel runways with centrelines spaced less than 760 meters (2,500 feet) apart	X							
	4. (Derived from Element 3) Wake turbulence mitigation for departures procedures for parallel runways with centrelines spaced less than 760 meters (2,500 feet) apart	X							
	5. (Identified by the United States) 6 wake turbulence categories and separation minima	X							

				3	4	5	6	7	8	9	10	18
				Needs Analysis				Implementation Status				
				Not started	In Progress	Need	N/A	Planning	Developing	Partially Implemented	Implemented	% Completed
Airport Operations	B0	APTA	B0-APTA	0	0	1	0	0	0	0.75	0	66%
	B0	WAKE	B0-WAKE	0	0.75	0	0	0	0	0	0	0%
	B0	RSEQ	B0-RSEQ	0	0	1	0	0	0	0.75	0	67%
	B0	SURF	B0-SURF	0	0	1	0	0	0	0	1	100%
	B0	ACDM	B0-ACDM	0	0	1	0	0	0	0	1	100%
	B1	APTA	B1-APTA	0	0.75	0	0	0	0	0	0	0%
	B1	WAKE	B1-WAKE	0.5	0	0	0	0	0	0	0	0%
	B1	RSEQ	B1-RSEQ	0	0	1	0	0.25	0	0	0	0%
	B1	SURF	B1-SURF	0	0	1	0	0.25	0	0	0	0%
	B1	ACDM	B1-ACDM	0	0	1	0	0.25	0	0	0	0%
	B1	RATS	B1-RATS	0	0	1	0	0.25	0	0	0	0%
	B2	WAKE	B2-WAKE	0.5	0	0	0	0	0	0	0	0%
	B2	RSEQ	B2-RSEQ	0.5	0	0	0	0	0	0	0	0%
	B2	SURF	B2-SURF	0.5	0	0	0	0	0	0	0	0%
	B3	RSEQ	B3-RSEQ	0.5	0	0	0	0	0	0	0	0%
				2.5	1.5	8	0	1	13			



APTA	Not started	In Progress	Need	N/A	Planning	Developing	Partially Implemented	Implemented	% Completed
B0	0	0	1	0	0	0	0.75	0	66%
B1	0	0.75	0	0	0	0	0	0	0%





Selections | GRAPH | BLOCK 0 | BLOCK 1 | BLOCK 2 | BLOCK 3 | ASBU Block Summary | POA 1 Summary | POA 2 Summary | POA 3 Summary

ASBU Overview

Block 0 initiatives must leverage on existing on-board avionics.

3 Priorities ➡ Global community:

– Performance Based Navigation (PBN)
– Continuous Descent Operations (CDO)
– Continuous Climb Operations (CCO)

Polling Question

Has your State/ANSP developed CCO/CDO's?

a. Yes
b. Some
c. No
d. Not sure

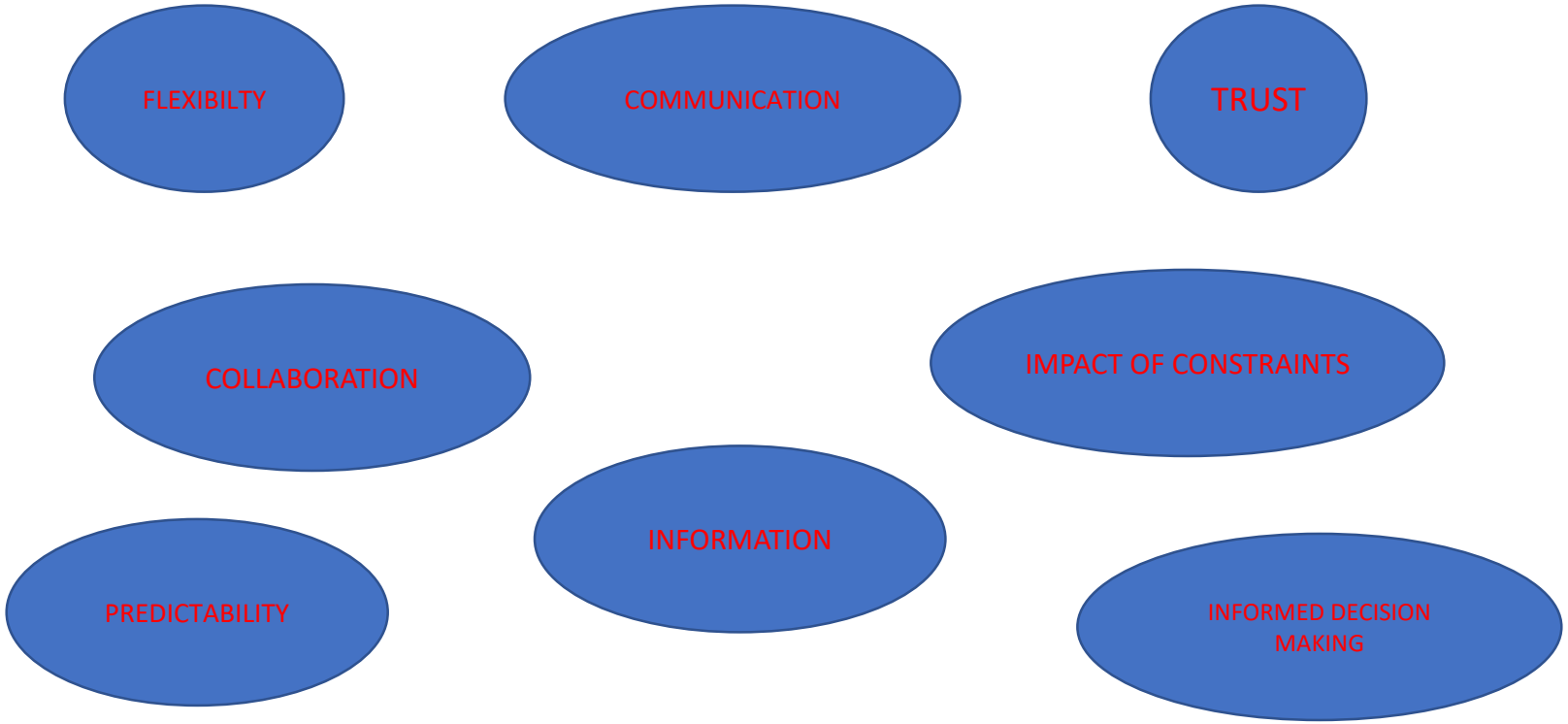
ASBU Overview

The Modules of Block 0 are ready for implementation today

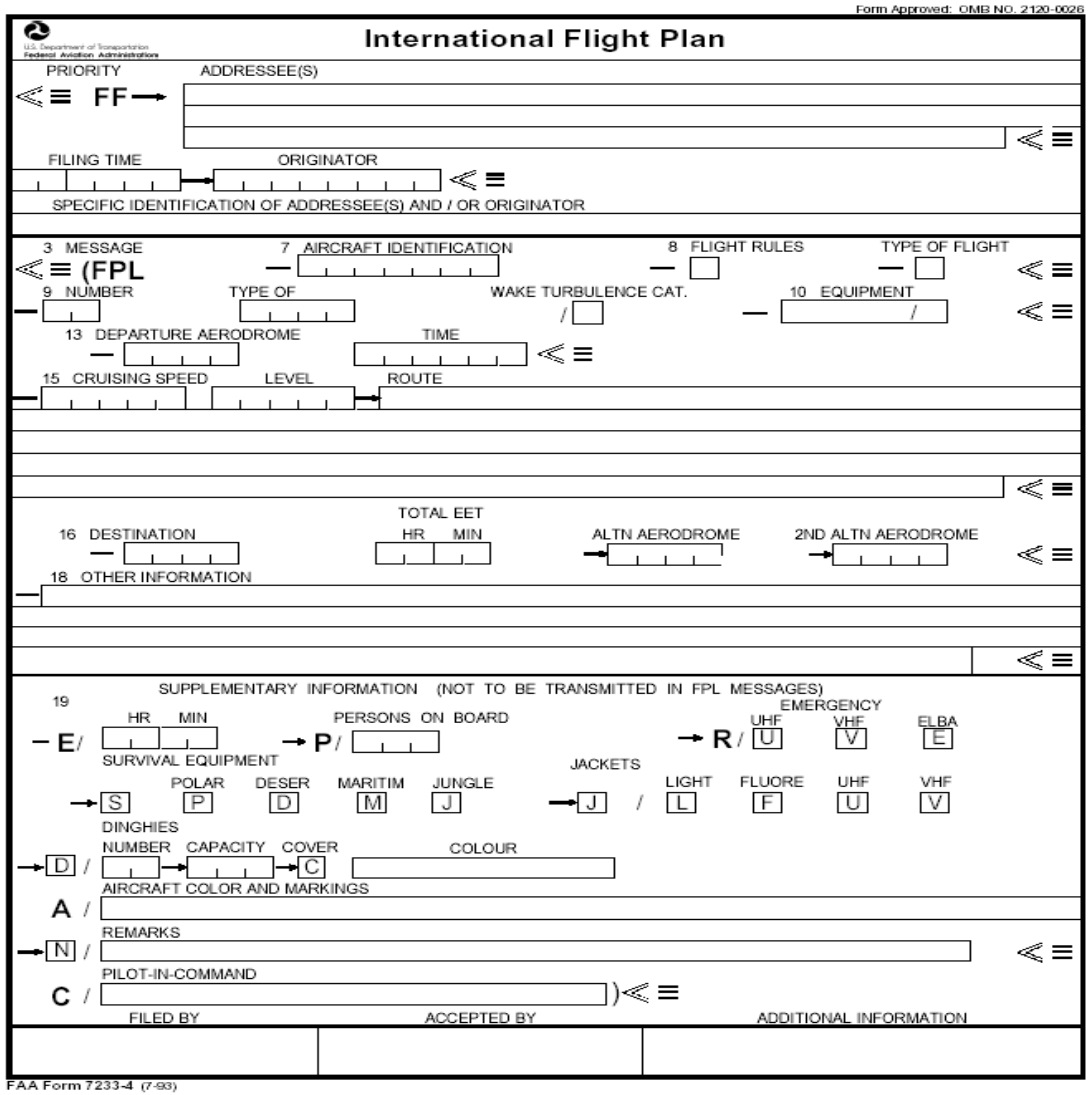
- Standards are ready – The Infrastructure is available.
- Avionics are ready – Ground Automation is ready.
- Procedures and Operational Approvals are in place.

FICE/DATM

- STAKEHOLDER EXPECTATIONS



FICE/DATM



Form Approved: OMB NO. 2120-0026

U.S. Department of Transportation
Federal Aviation Administration

International Flight Plan

PRIORITY — FF → ADDRESSEE(S)

FILING TIME → ORIGINATOR

SPECIFIC IDENTIFICATION OF ADDRESSEE(S) AND / OR ORIGINATOR

3 MESSAGE — (FPL

7 AIRCRAFT IDENTIFICATION

8 FLIGHT RULES — TYPE OF FLIGHT

9 NUMBER — TYPE OF — WAKE TURBULENCE CAT. — 10 EQUIPMENT

13 DEPARTURE AERODROME — TIME

15 CRUISING SPEED — LEVEL — ROUTE

TOTAL EET — HR MIN

16 DESTINATION — ALTN AERODROME — 2ND ALTN AERODROME

18 OTHER INFORMATION

SUPPLEMENTARY INFORMATION (NOT TO BE TRANSMITTED IN FPL MESSAGES)

19

E/ HR MIN — SURVIVAL EQUIPMENT — P/ PERSONS ON BOARD

EMERGENCY — R/ UHF U — VHF V — ELBA E

S — POLAR P — DESER D — MARITIM M — JUNGLE J

JACKETS — J / LIGHT L — FLUORE F — UHF U — VHF V

DINGHIES — D / NUMBER — CAPACITY — COVER C — COLOUR

A / AIRCRAFT COLOR AND MARKINGS

N / REMARKS

C / PILOT-IN-COMMAND)

FILED BY — ACCEPTED BY — ADDITIONAL INFORMATION

FAA Form 7233-4 (7-93)

ICAO FLIGHT PLAN FORM

FIT FOR PURPOSE?

FICE/DATM

INFORMATION FOR A COLLABORATIVE ENVIRONMENT(ICE)

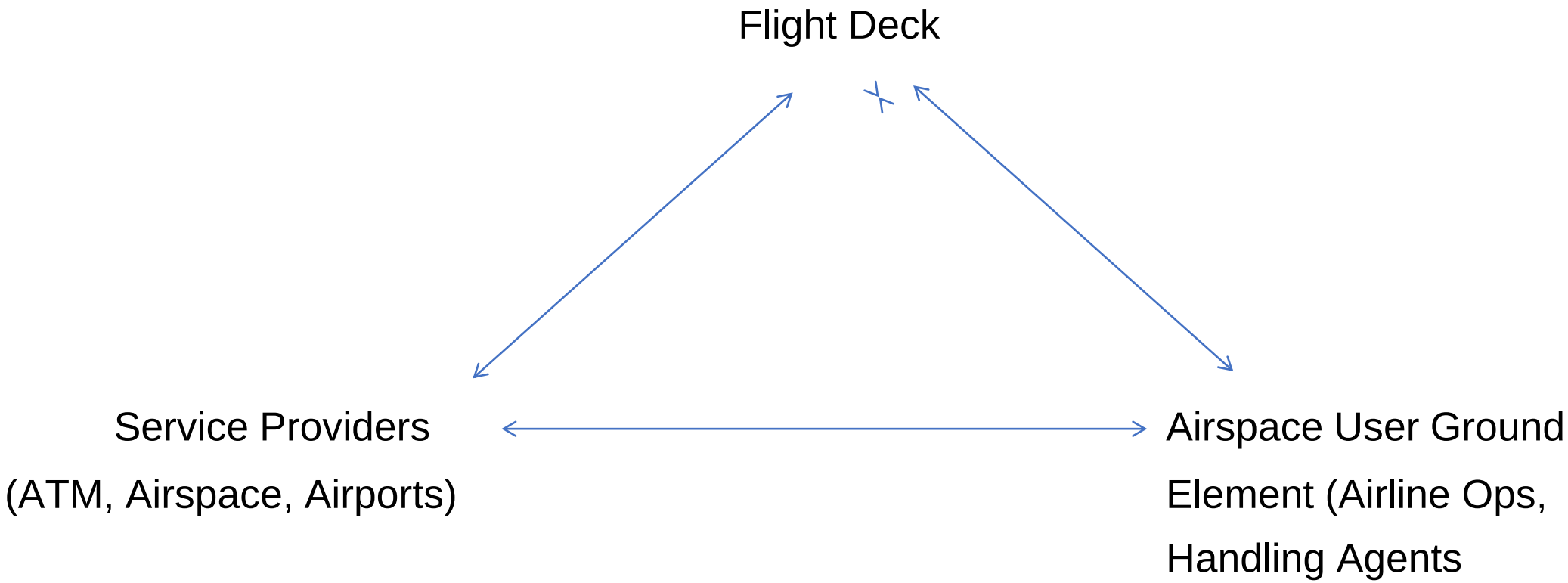
- Dynamic, Information-rich Environment
- Interacting Information Domains – Met, AIS, Surveillance, Infrastructure
- Globally Standardised Definitions of Data Elements and Communications Mechanisms

FICE/DATM

- Wider Access to Information for Multiple ATM Actors Leading to Better Co-ordination
- Constant Exchange of Information Between All Parties

FICE/DATM

INFORMATION EXCHANGE



FICE/DATM

Current Limitations:

- Limited collaborative planning amongst ATM, aerodrome operators & aircraft operators
- Less than optimum use of scarce resources such as airspace. Limited collaborative planning amongst ATM, aerodrome operators.

FICE/DATM

Current Limitations:

- Limited facilities for real time information exchange amongst ATM actors resulting in less than optimal response to real time events & changes in operational requirements
- Limited ability to maximise the benefits of advanced avionics

= Inefficient Aircraft Operations

FICE/DATM

Consequences:

- Need to fly circuitous departure & arrival procedures
- Exclusion of civil traffic from airspace reserved for military use
- Indirect fixed routes
- Excessive system related delays

FICE/DATM

Consequences:

- Operation of a/c at inefficient FL's, speeds & in unfavourable met
- Insufficient flexibility to properly manage disruptions to airline operations

FICE/DATM

BENEFITS TO BE DELIVERED:

- Capacity - Reduced controller workload and increased data integrity supporting reduced separations and capacity flow increases
- Efficiency – better knowledge of aircraft capabilities facilitates trajectories closer to user preferred trajectories and better planning

FICE/DATM

BENEFITS TO BE DELIVERED:

- **Flexibility** – quicker adaptation of route changes
- Global Interoperability – A new mechanism for FPL filing and information sharing will facilitate flight data sharing amongst ATM actors

FICE/DATM

BENEFITS TO BE DELIVERED:

- FF-ICE/1 will facilitate CDM, the implementation of systems interconnection for information sharing & trajectory negotiation before departure thus improving capacity & efficiency.
- Safety – more accurate flight information & dynamic management of TBO

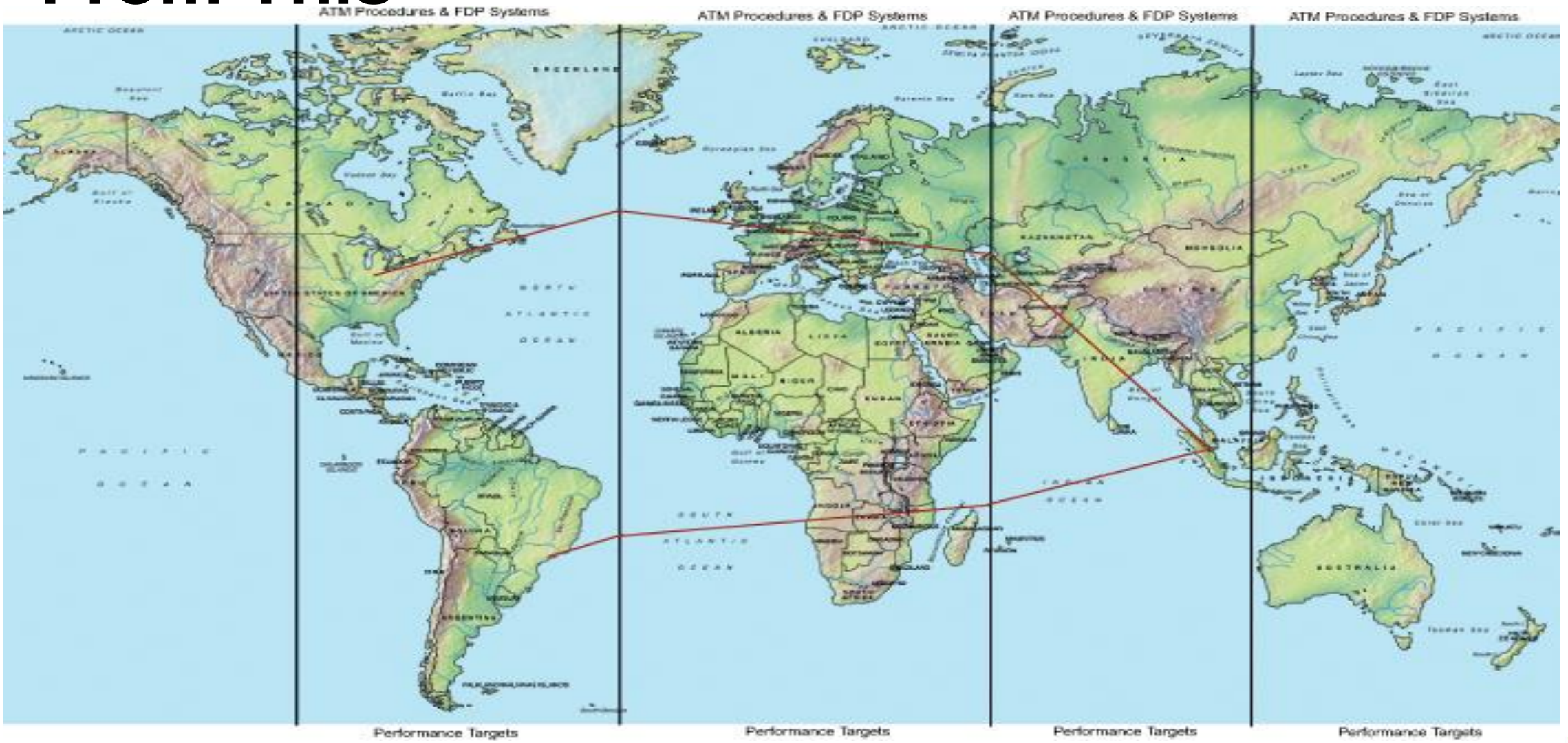
FICE/DATM

Next Steps:

- Internal ICAO Ratification
- Promulgation for 2018 onwards implementation in accordance with ASBU Block 1
- Development of Trajectory Based Operations Concept by end of 2016
- Development of ICAO Guidance Material as Volume 2 of FF-ICE Concept Document

ASBU

From This

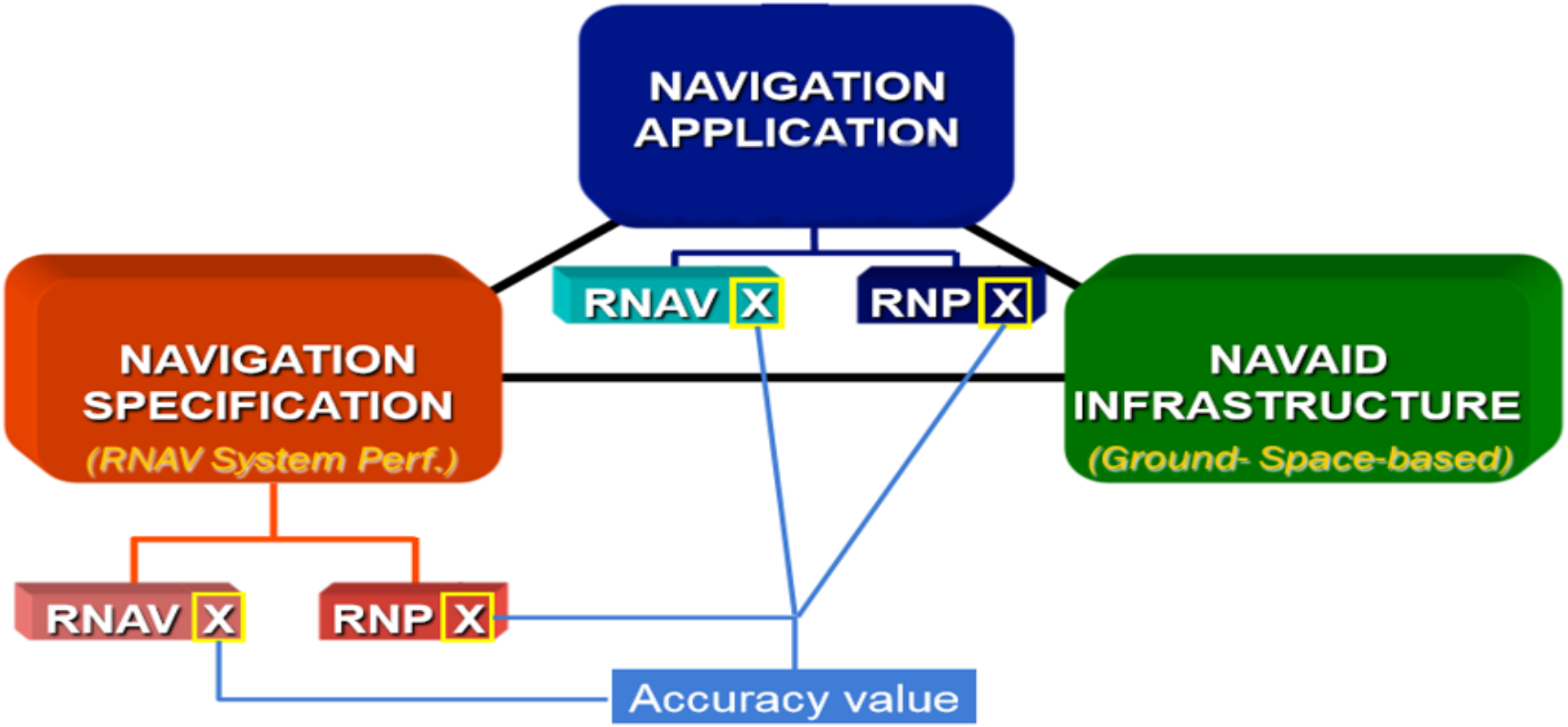


ASBU

To This


GREENLAND
CANADA
UNITED STATES OF AMERICA
MEXICO
ATLANTIC OCEAN
PACIFIC OCEAN
SOUTH AMERICA
BRAZIL
ARGENTINA
RUSSIA
KAZAKHSTAN
MONGOLIA
CHINA
INDIA
INDIAN OCEAN
AUSTRALIA

APTA


NAVIGATION APPLICATION
RNAV X
RNP X
NAVIGATION SPECIFICATION
(RNAV System Perf.)
NAVAID INFRASTRUCTURE
(Ground- Space-based)
RNAV X
RNP X
Accuracy value

APTA

What is an Airspace Concept?

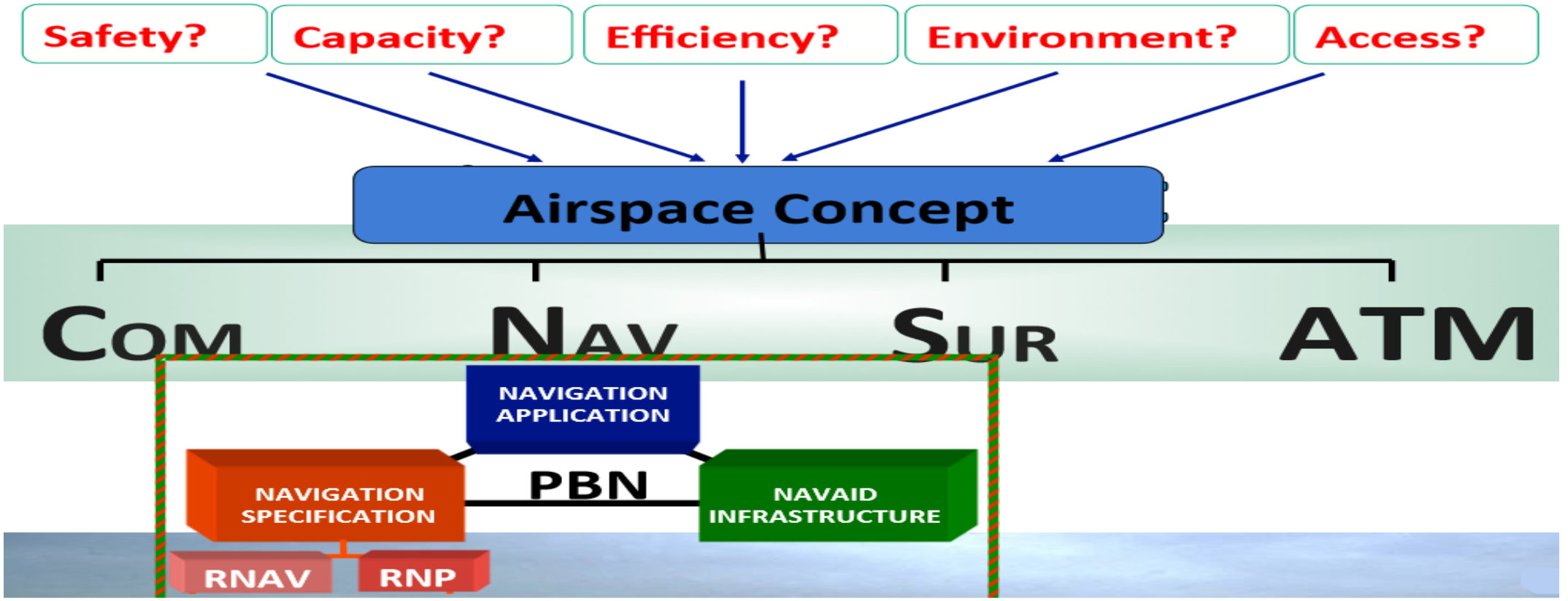
- Describes in details the airspace organisation and its operations;
- Addresses all the strategic objectives identified for the Project;
- Addresses all CNS/ATM enablers;
- Identifies all operational and technical assumptions.

APTA


Airport Authority
GA Users
COM/NAV/SUR Engineers
Military Users
Core Airspace Design Team
Airspace Planners, Procedure Designers, Air Traffic Controllers (both en-route and terminal), ATM Operations Manager, Airline Operators, (Regulator)
Environmental Specialists(s)
Simulation Specialist(s)
ATM System Engineer(s)
Technical Pilots
Airspace Design Team expanded on an as needed basis

APTA

Strategic Goals & Implementation Process



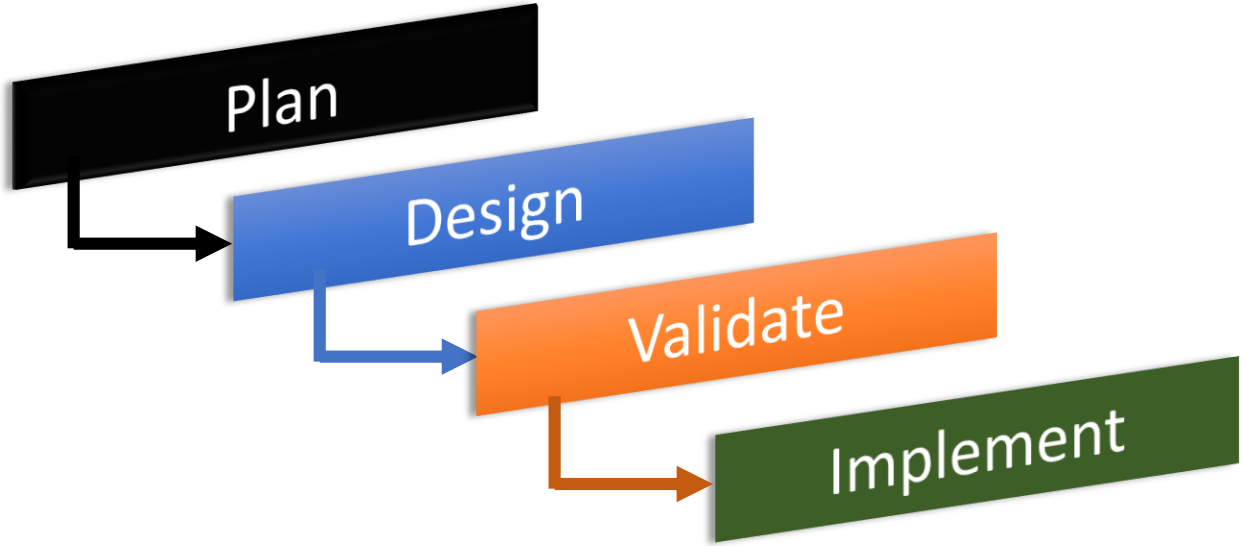
APTA

STRATEGIC GOALS:

- Improved safety,
- Increased air traffic capacity,
- Improved efficiency,
- Mitigation of environmental impact.

APTA

IMPLEMENTATION PROCESS:

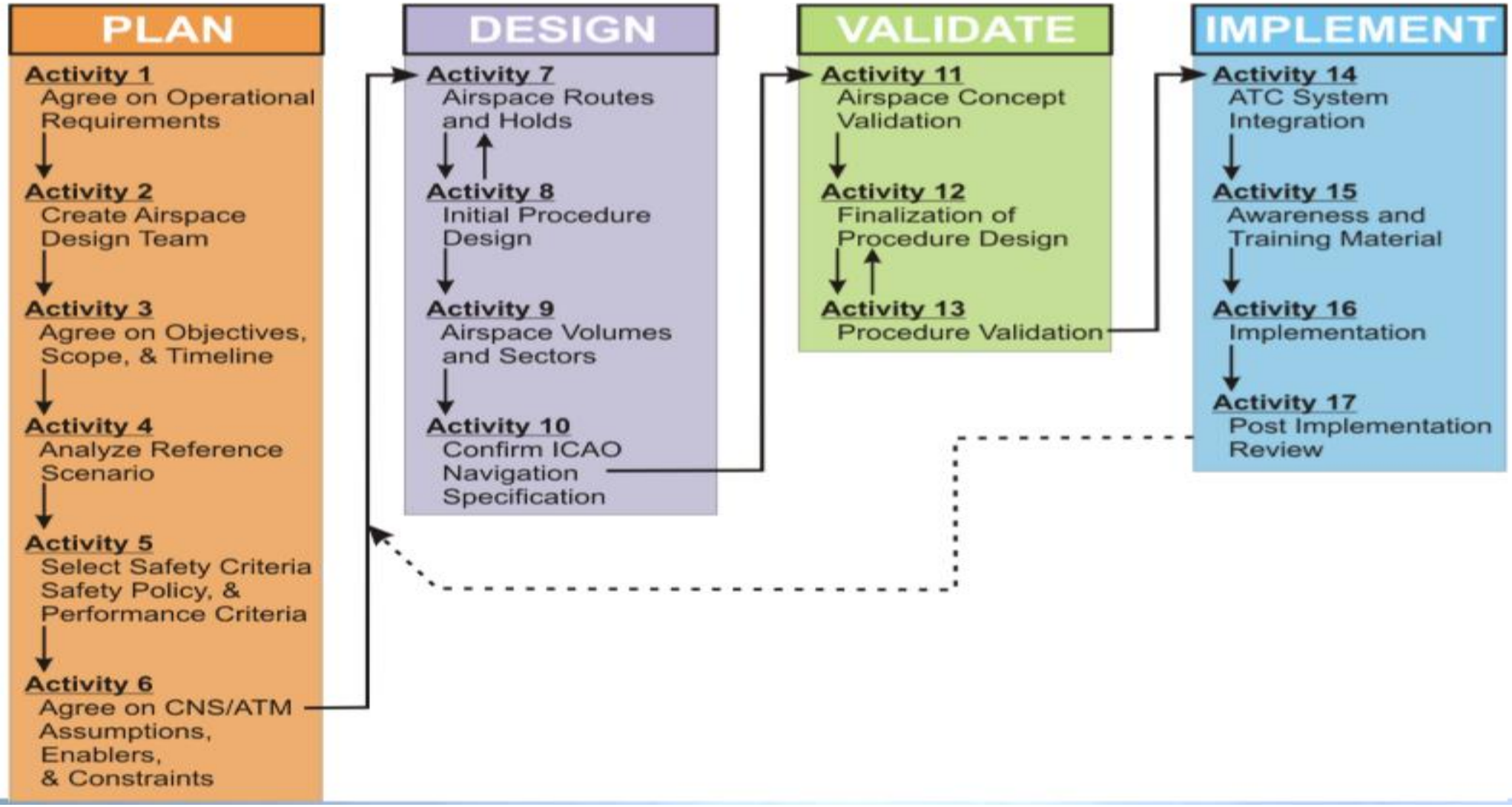


APTA

Strategic Goals & Implementation Process

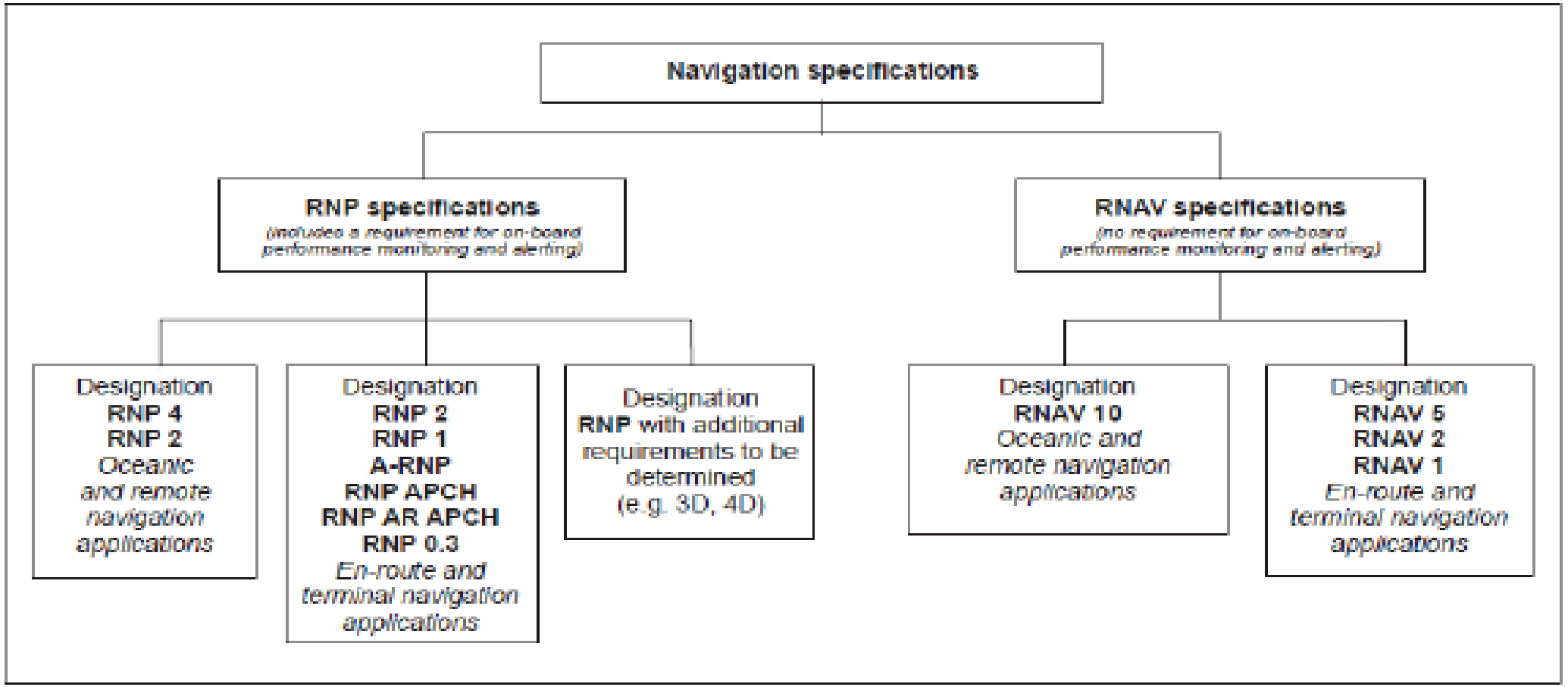
- Fleet equipage and CNS/ATM infrastructure in the State or region are assessed and navigation functional requirements are identified;
- An appropriate navigation specification is initially selected;

APTA


PLAN
Activity 1
Agree on Operational Requirements
Activity 2
Create Airspace Design Team
Activity 3
Agree on Objectives, Scope, & Timeline
Activity 4
Analyze Reference Scenario
Activity 5
Select Safety Criteria Safety Policy, & Performance Criteria
Activity 6
Agree on CNS/ATM Assumptions, Enablers, & Constraints
DESIGN
Activity 7
Airspace Routes and Holds
Activity 8
Initial Procedure Design
Activity 9
Airspace Volumes and Sectors
Activity 10
Confirm ICAO Navigation Specification
VALIDATE
Activity 11
Airspace Concept Validation
Activity 12
Finalization of Procedure Design
Activity 13
Procedure Validation
IMPLEMENT
Activity 14
ATC System Integration
Activity 15
Awareness and Training Material
Activity 16
Implementation
Activity 17
Post Implementation Review

APTA

Navigation specification



APTA

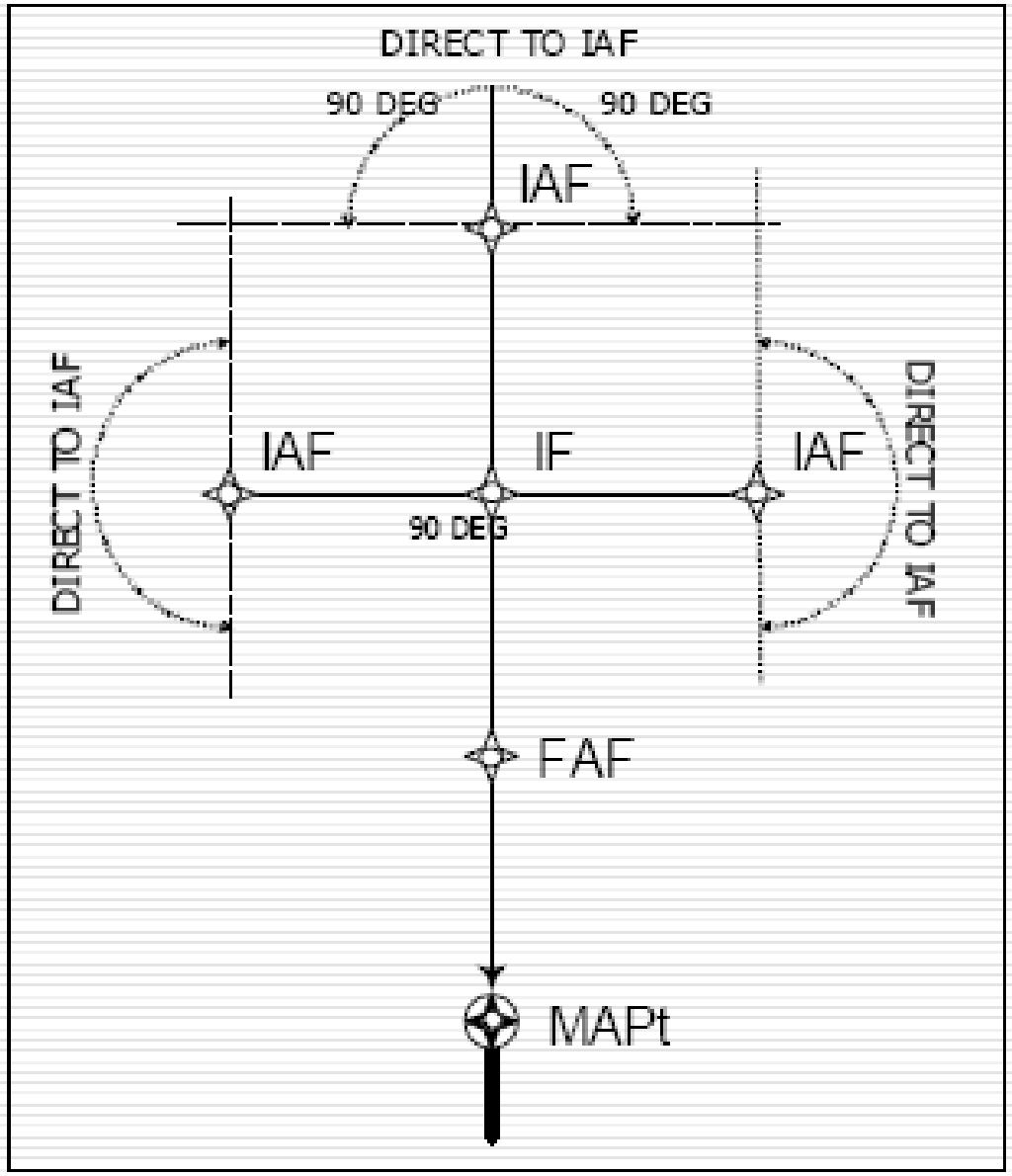
Different Types of Instrument Approach Procedures:

- ❑ Non-precision approach (NPA) procedure;
- ❑ Approach procedure with vertical guidance;
- ❑ Precision approach (PA) procedure.

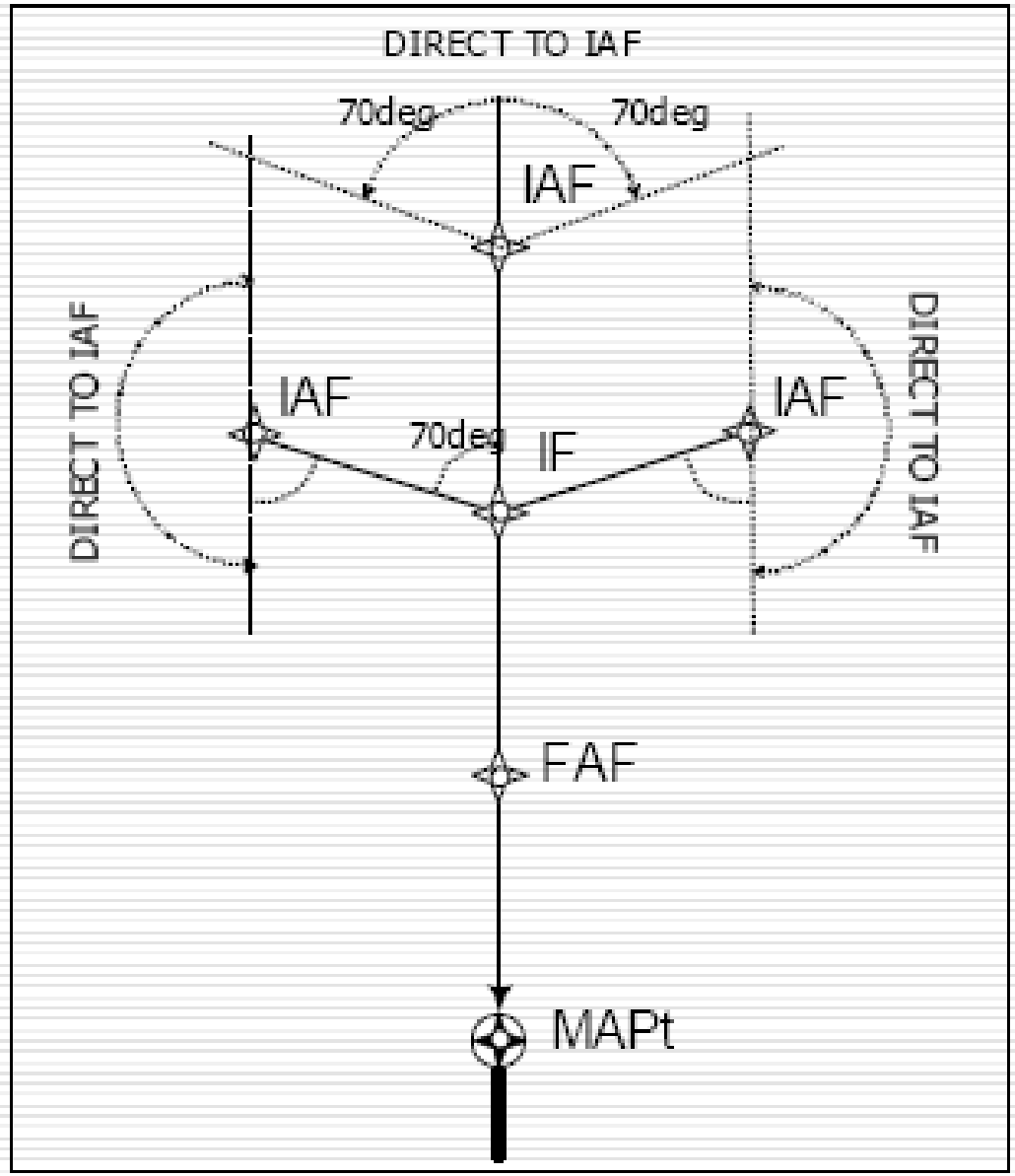
APTA

RNAV GNSS approaches have been designed as RNP APCH approaches.

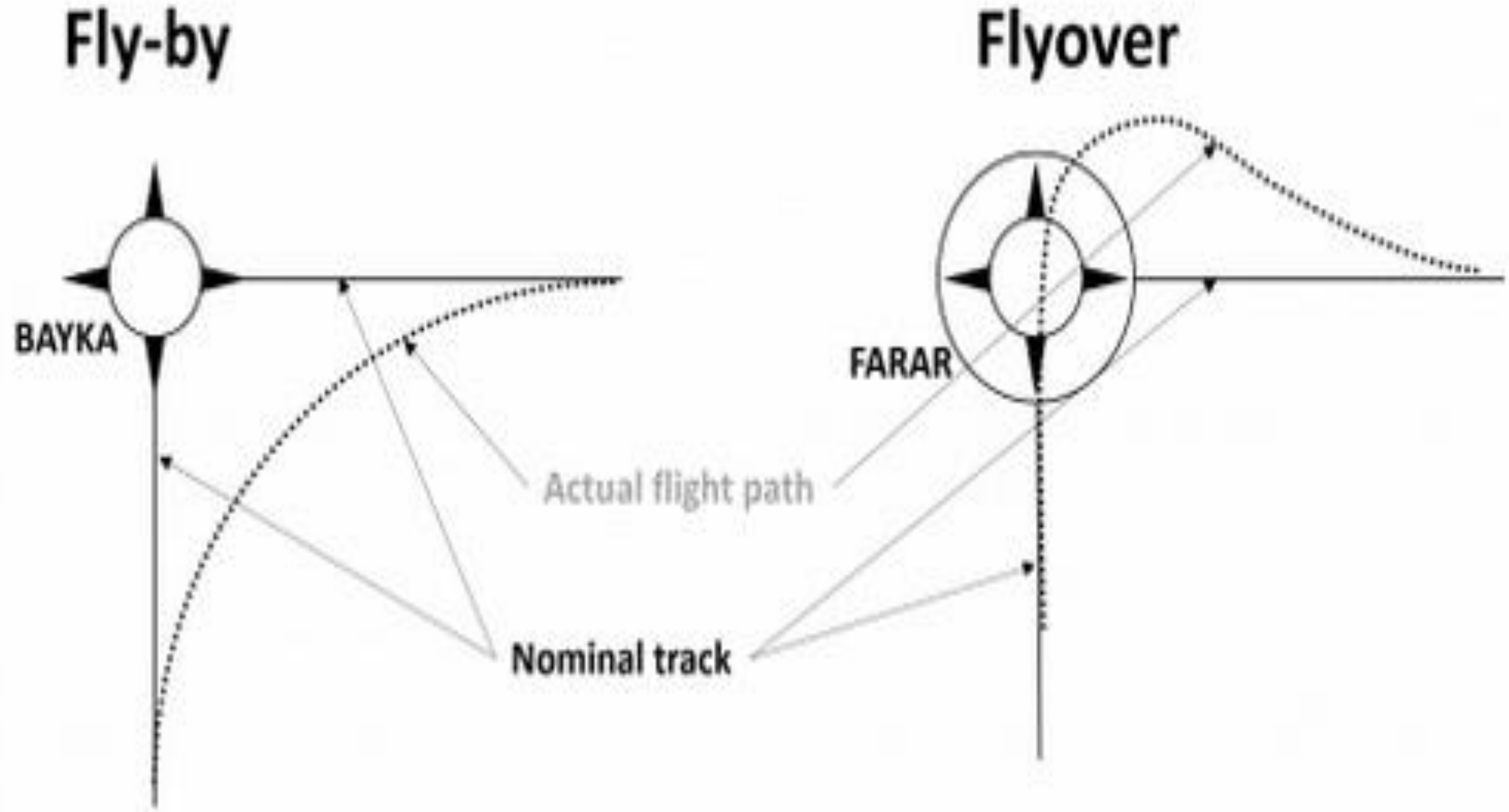
- RNP APCH – LNAV - Lateral navigation
- RNP APCH – LNAV/VNAV – Where a vertical guidance system is used.
- RNP APCH – LPV - Localiser Performance with Vertical Guidance provided by SBAS.

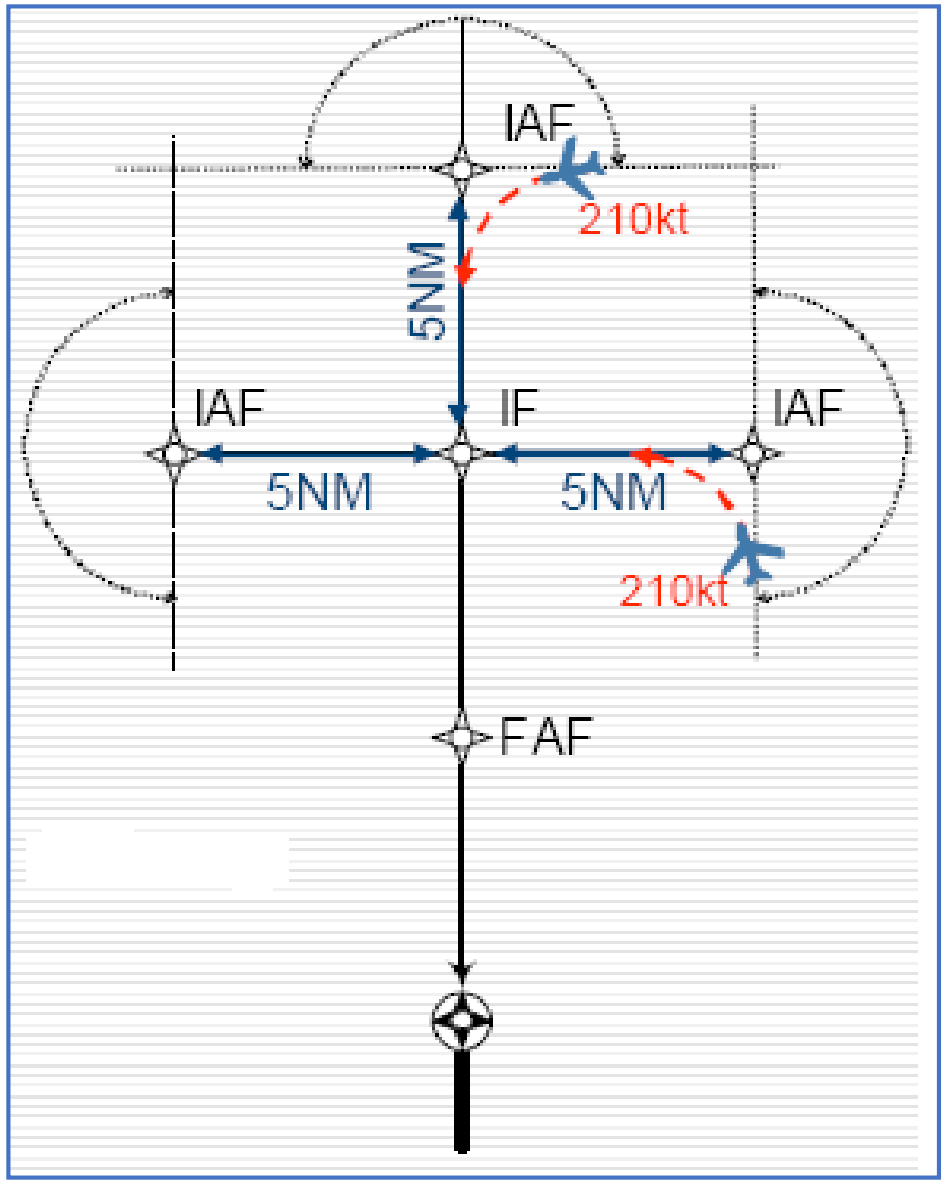


RNP APCH Fixes: T-Type

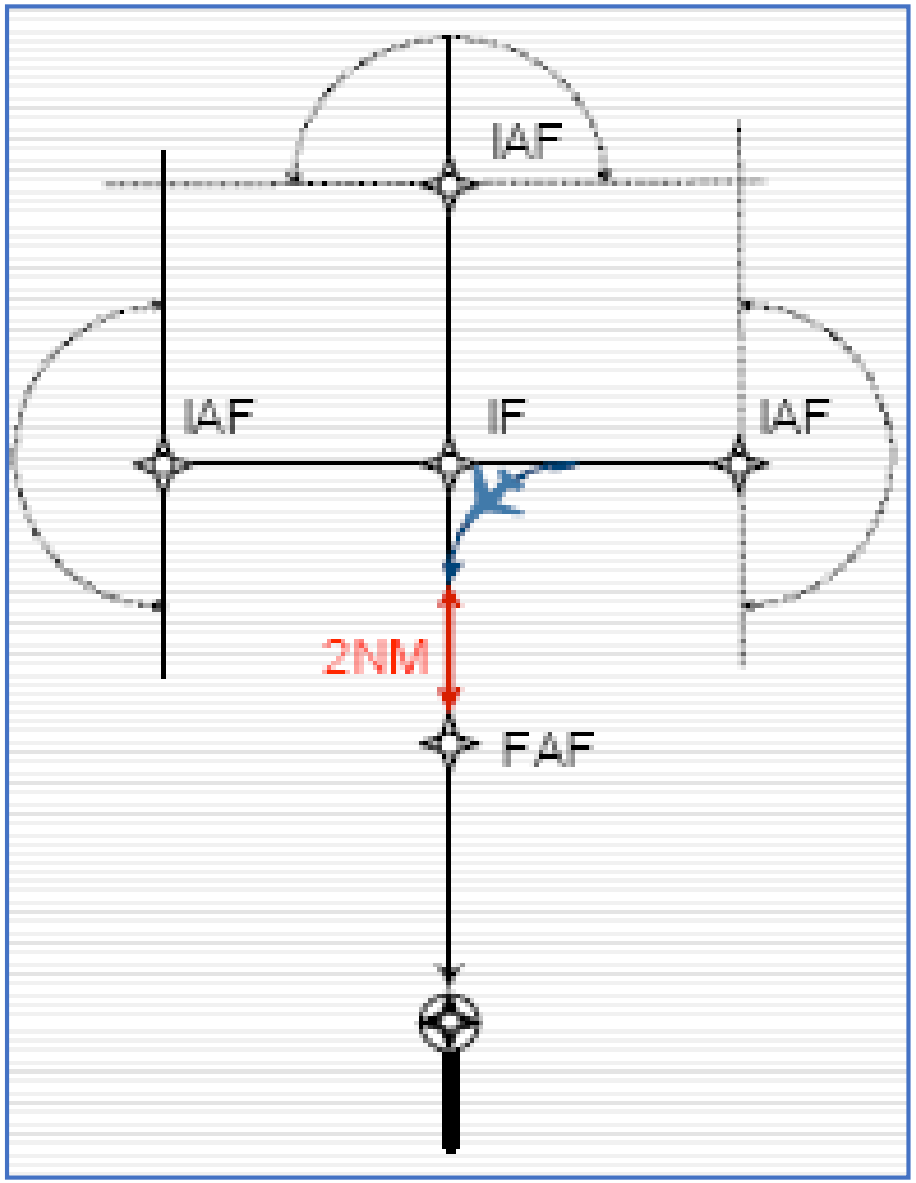


RNP APCH Fixes: Y-Type


Fly-by
Flyover
BAYKA
FARAR
Actual flight path
Nominal track

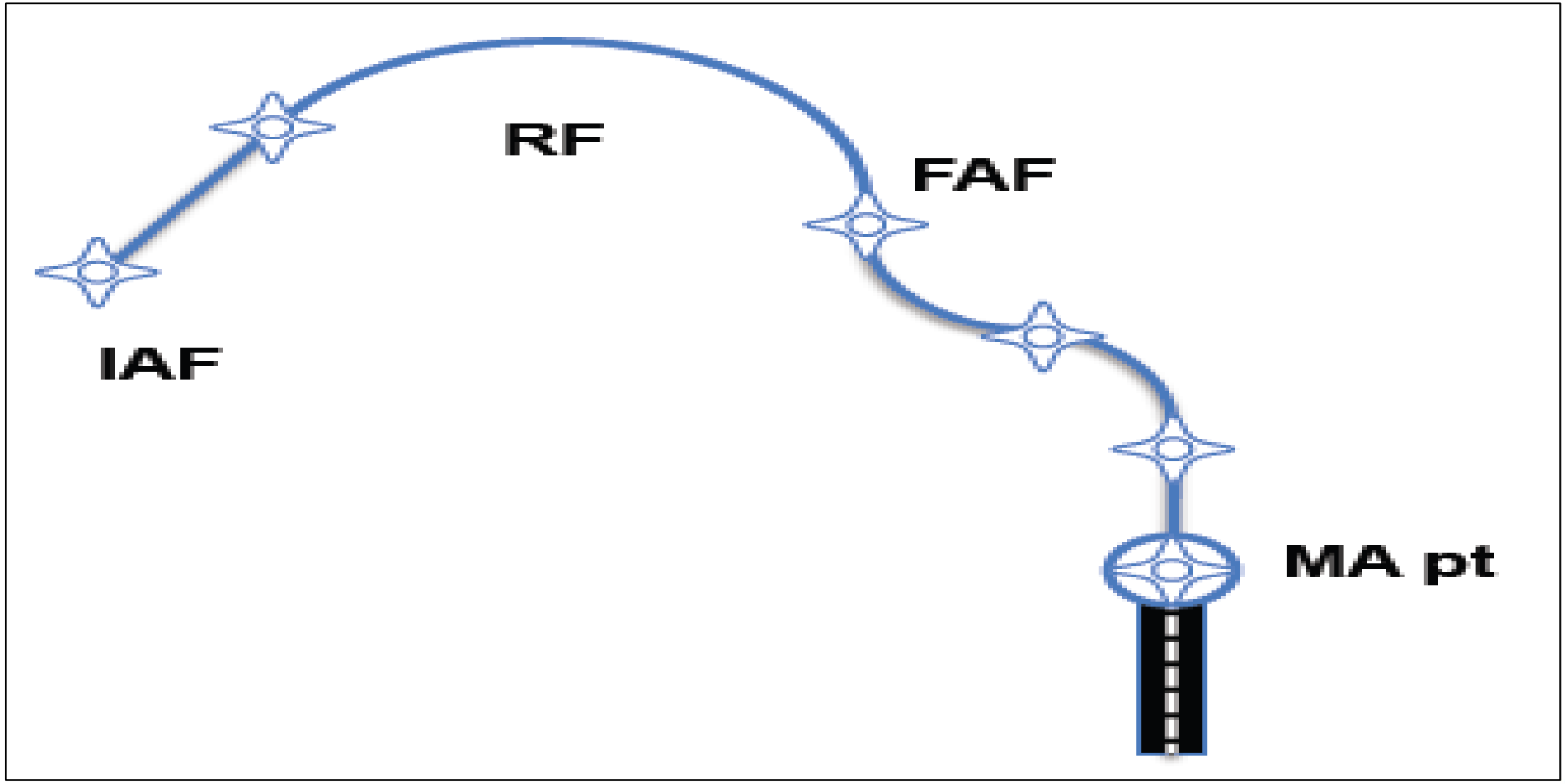


RNP APCH T-Type Layout



RNP APCH T-Type Layout

APTA



APTA

Main advantages of PBN:

a) PBN is environmentally friendly;

b) PBN helps improve safety;

c) PBN enables aircraft to reliably access airports with low visibility restrictions;

d) PBN helps to improve operating returns;

APTA

Main advantages of PBN:

e) PBN helps to increase airspace capacity;

f) For Pilots: PBN brings harmonised navigation environments.

Questions

and

Answers

Questions and Answers

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ICAO - ESAF

Ms. Boni Dibate

Director Africa Affairs

CANSO

Thank you

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