ASBU B0 Implementation of Federal Aviation Administration

For: The 3rd Meeting of the Air Navigation Systems Implementation Group

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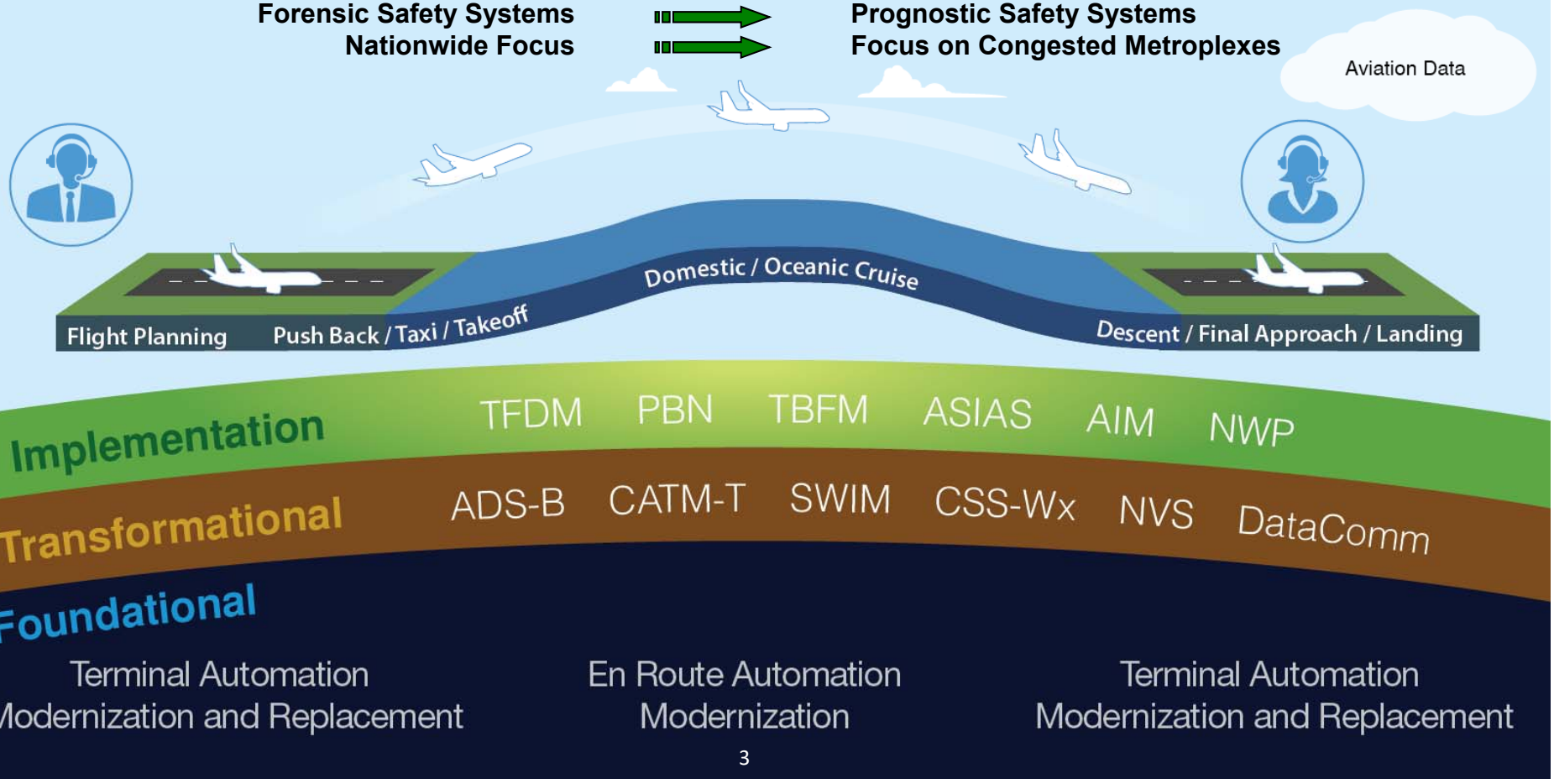
Contents

- GANP/ASBU and FAA
- FAA ASBU Block 0 Implementation Status
- Challenges and Lessons Learned
- Air Navigation Plans (ANPs)
- GANP/ASBU 2019

Delivering NextGen Improvements

Legacy System		NextGen
Radar	→	Satellite
Inefficient Routes	→	Performance Based Navigation (fuel savings)
Voice Communications	→	Voice & Digital Communications
Disparate Information	→	Automated Decision Support Tools
Fragmented Weather Forecasting	→	Integrated Weather Information
Weather Restricted Visibility	→	Improved Access in Low Visibility
Forensic Safety Systems	→	Prognostic Safety Systems
Nationwide Focus	→	Focus on Congested Metroplexes



GANP/ASBU and FAA

- The **GANP** is the *strategy* to achieve a global interoperable air navigation system.
- The **GANP** has evolved, and set a global precedent, to transform the air navigation system so that *no State or Stakeholder is left behind*.
- The **ASBU** *framework* is ICAO's systems engineering approach to achieve global ATM interoperability and harmonisation.
- The Next Generation Air Transportation System, or **NextGen**, is the FAA-led modernization of America's air transportation system to make flying even safer, more efficient, and more predictable.
- FAA is one of the major contributors to develop GANP/ASBU.

FAA ASBU Block 0 Implementation Status

	Completion	Need Analysis				Implementation Status (if Element is needed)			
		Not Started	In Progress	Need	N/A	Planning	Developing	Partially Implemented	Implemented
ACDM	80%				20%		20%		60%
APTA	100%				25%				75%
RSEQ	55%				30%		44%	1%	25%
SURF	93%				23%	7%			70%
WAKE	86%		8%		69%		6%		17%
AMET	100%								100%
DATM	100%								100%
FICE	75%					25%			75%
ACAS	100%				100%				
ASEP	100%								100%
ASUR	100%								100%
FRTO	100%								100%
NOPS	100%								100%
OPFL	100%								100%
SENT	100%								100%
CCO	100%								100%
CDO	100%								100%
TBO	67%					33%			67%

PIA 1

FAA ASBU Block 0 Implemen-tation Status

Module	Elements	Need Analysis				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. Interconnection between aircraft operator & ANSP systems to share surface operations information								30
	2. Interconnection between aircraft operator & airport operator systems to share surface operations information				30				
	3. Interconnection between airport operator & ANSP systems to share surface operations information								30
	4. Interconnection between airport operator, aircraft operator & ANSP systems to share surface operations information								30
	5. Collaborative departure queue management						30		
APTA	1. PBN approach procedures with vertical guidance to LNAV/VNAV minima				1				29
	2. PBN approach procedures with vertical guidance to LPV minima				1				29
	3. PBN approach procedures without vertical guidance to LNAV minima								30
	4. GBAS Landing System (GLS) procedures to CAT I minima				28				2
RSEQ	1. AMAN via controlled time of arrival to a reference fix								30
	2. Departure management				3		26	1	
	3. Departure flow management				3		27		
	4. Point merge				30				
SURF	1. A-SMGCS with at least one cooperative surface surveillance system								30
	2. ADS-B APT								30
	3. A-SMGCS alerting with flight identification information								30
	4. EVS for taxi operations				30				
	5. Airport vehicles equipped with transponders				4	11			15
WAKE	1. New PANS-ATM wake turbulence categories and separation minima				30				
	2. Dependent diagonal paired approach procedures for parallel runways with centrelines spaced less than 760 meters (2,500 feet) apart		2		20				8
	3. Wake independent departure and arrival operations (WIDAO) for parallel runways with centrelines spaced less than 760 meters (2,500 feet) apart				30				
	4. Wake turbulence mitigation for departures (WTMD) procedures for parallel runways with centrelines spaced less than 760 meters (2,500 feet) apart based on observed crosswinds		10		20				
	5. 6 wake turbulence categories and separation minima				4		9		17

PIA 2 FAA ASBU Block 0 Implementation Status

Module	Elements	Need Analysis				Implementation Status (if Element is needed)			
		Not Started	In Progress	Need	N/A	Planning	Developing	Partially Implemented	Implemented
Performance Improvement Area 2: Globally Interoperable Systems and Data									
AMET	1. WAFS								√
	2. IAVW								√
	3. TCAC forecasts								√
	4. Aerodrome warnings								30
	5. Wind shear warnings and alerts								30
	6. SIGMET								√
	7. Other OPMET information (METAR, SPECI and/or TAF)								30
	8. QMS for MET								√
DATM	1. Standardized Aeronautical Information Exchange Model (AIXM)								√
	2. eAIP								√
	3. Digital NOTAM								√
	4. eTOD								30
	5. WGS-84								√
	6. QMS for AIM								√
FICE	1. AIDC to provide initial flight data to adjacent ATSUs								√
	2. AIDC to update previously coordinated flight data								√
	3. AIDC for control transfer								√
	4. AIDC to transfer CPDLC logon information to the Next Data Authority					√			

PIA 3 FAA ASBU Block 0 Implementation Status

Module	Elements	Need Analysis				Implementation Status (if Element is needed)			
		Not Started	In Progress	Need	N/A	Planning	Developing	Partially Implemented	Implemented
Performance Improvement Area 3: Optimum Capacity and Flexible Flights									
ACAS	1. ACAS II (TCAS version 7.1)				√				
	2. APFD function				√				
	3. TCAP function				√				
ASEP	1. ATSA-AIRB								√
	2. ATSA-VSA								√
ASUR	1. ADS-B								√
	2. Multilateration (MLAT)								30
FRTO	1. CDM incorporated into airspace planning								√
	2. Flexible Use of Airspace (FUA)								√
	3. Flexible routing								√
	4: CPDLC used to request and receive re-route clearances								√
NOPS	1. Sharing prediction of traffic load for next day								√
	2. Proposing alternative routings to avoid or minimize ATFM delays								√
OPFL	1. ITP using ADS-B								√
SNET	1. Short Term Conflict Alert implementation (STCA)								√
	2. Area Proximity Warning (APW)								√
	3. Minimum Safe Altitude Warning (MSAW)								√
	4. Medium Term Conflict Alert (MTCA)								√

PIA 4 FAA ASBU Block 0 Implementation Status

Module	Elements	Need Analysis				Implementation Status (if Element is needed)			
		Not Started	In Progress	Need	N/A	Planning	Developing	Partially Implemented	Implemented
Performance Improvement Area 4: Efficient Flight Paths									
CCO	1. Procedure changes to facilitate CCO								30
	2. Airspace changes to facilitate CCO								30
	3. PBN SIDs								30
CDO	1. Procedure changes to facilitate CDO								30
	2. Airspace changes to facilitate CDO								30
	3. PBN STARs								30
TBO	1. ADS-C over oceanic and remote areas								√
	2. CPDLC over continental areas					√			
	3. CPDLC over oceanic and remote areas								√

Challenges and Lessons Learnt

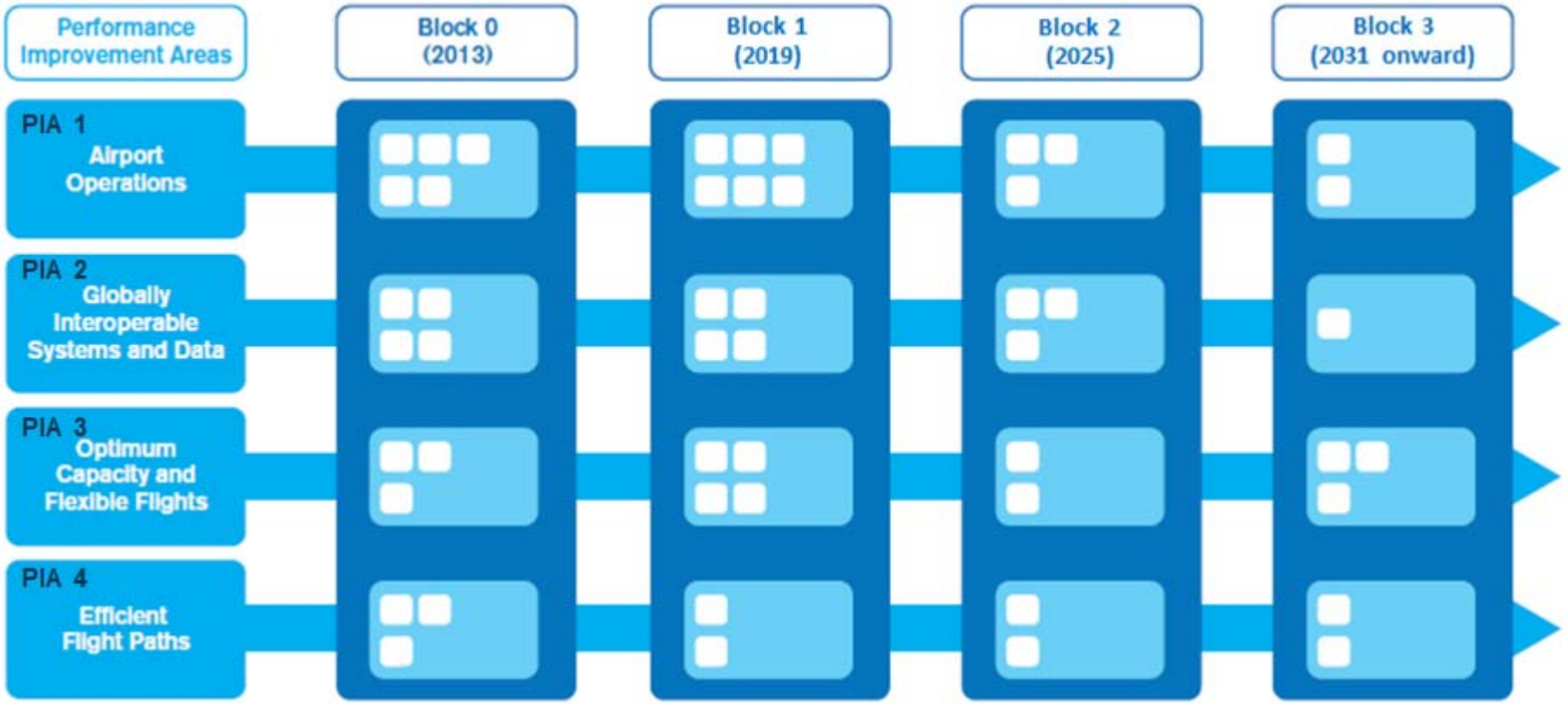
Road to the Summary Tables

- Module vs. Element
- Define Elements
- Aerodrome centric vs Organization centric
- ASBU Element Analysis and Implementation Process
- Metrics and Targets
- Air Navigation Reporting Form (ANRF)

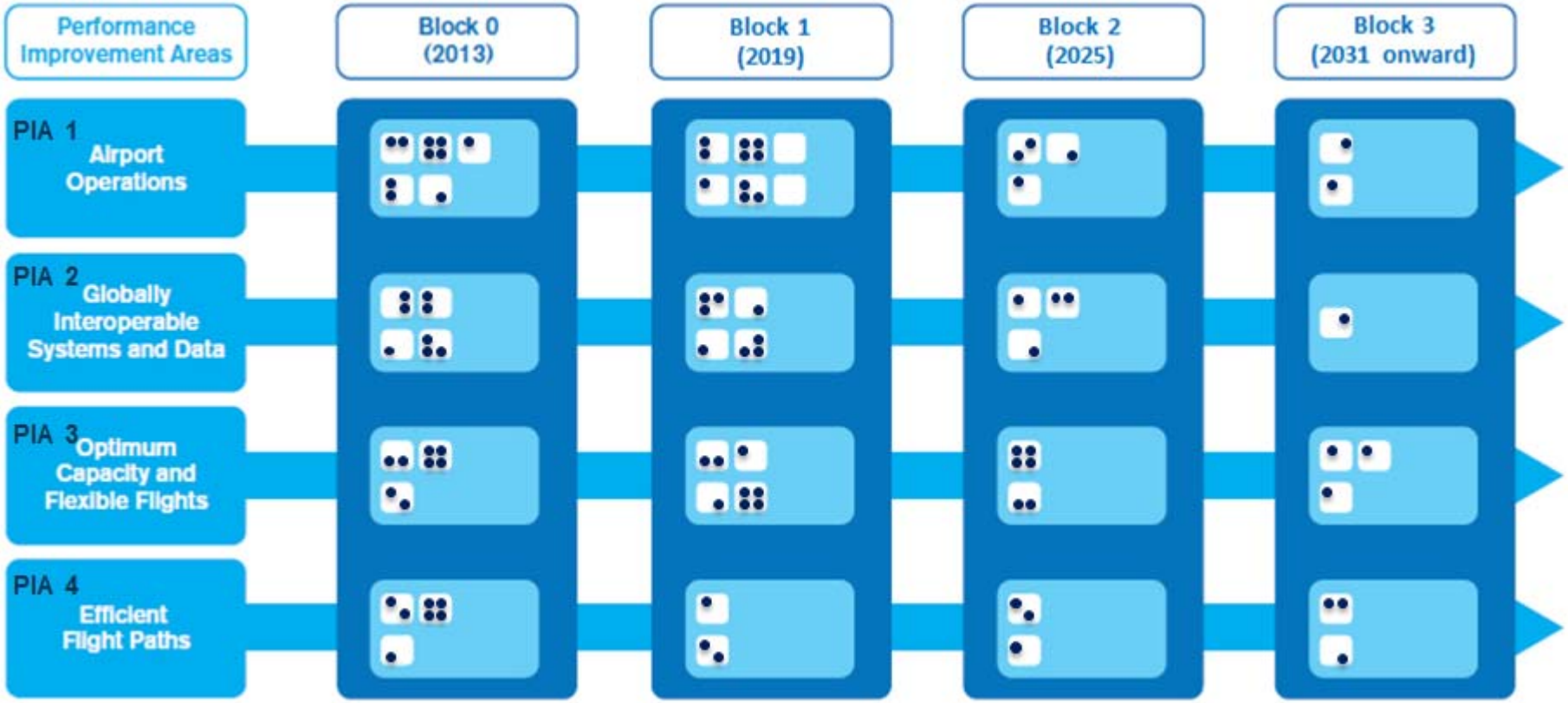
ASBU
RASI
SASI

ASBU Structure:

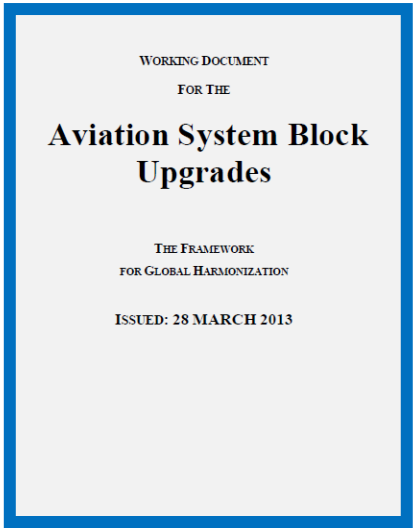
(1) Performance Improvement Areas (PIA), (2) Blocks, (3) Threads, (4) Modules



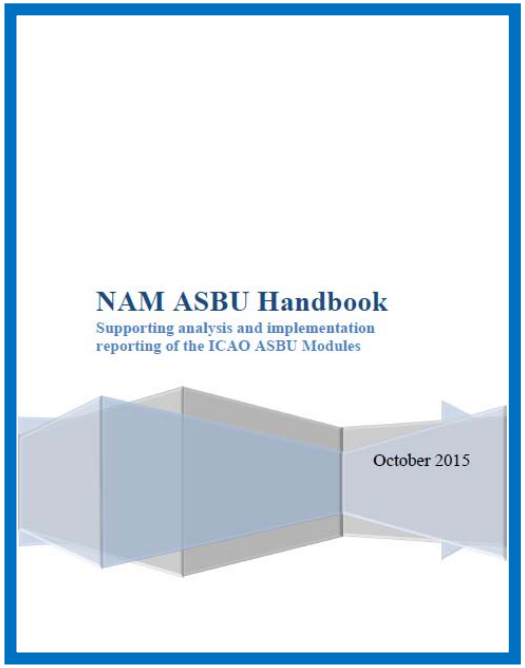
ASBU Structure: (1) Performance Improvement Areas (PIA), (2) Blocks, (3) Threads, (4) Modules, and (5) **Elements**



Elements Identification



- Identification of Elements is completed based on the ASBU document
- Collaboration with NavCANADA and ICAO NACC Office via North American ANP
- Creation of ASBU Handbook – emphasis on Elements



- ICAO North Atlantic (NAT) and North American, Central American and Caribbean (NACC) ROs have adopted the ASBU Handbook
- Regions and States can add their specific requirements as Elements
- Need to work with ICAO HQ to agree on the definition of elements

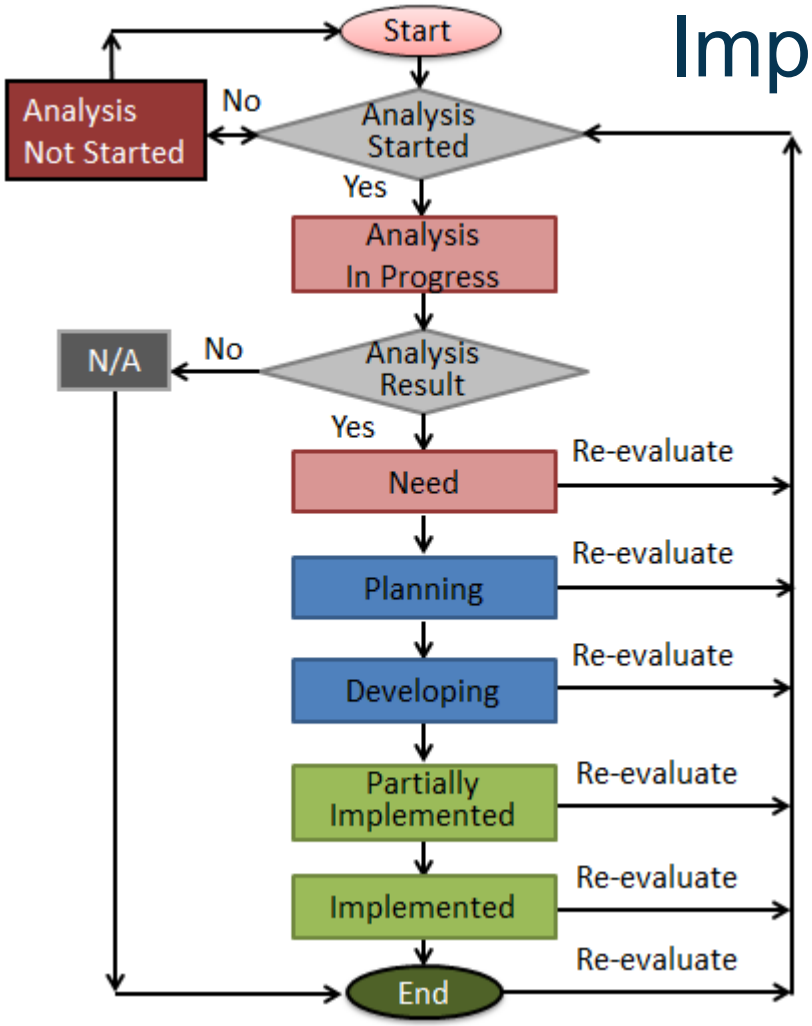
Aerodrome Centric Elements vs. Organization Centric Elements

- Example of Aerodrome Centric
  - (WAKE) Dependent diagonal paired approach procedures for parallel runways with centerlines spaced less than 760 meters apart
  - (DATM) eTOD;
  - (ASUR) Maltilateration (MLAT)
  - (CCO/CDO) PBN SIDs/PBN STARs

30 Core Airports

- Example of Organization Centric
  - (DATM) Standardized Aeronautical Information Exchange Model
  - (NOPS) Sharing prediction of traffic load for next day
  - (TBO) ADS-C over oceanic and remote areas

ASBU Element Analysis and Implementation Process



- Evaluate Elements one by one
  - Understand environments
  - Understand needs
  - Understand status
  - Prioritize
  - Plan accordingly
- Report
- If it fails…
  - Analysis Not Started

Metrics and Targets

- Aerodrome Centric Elements

Block 0 Modules	Elements	Metrics	Targets	Status & Remarks
Performance Improvement Area 1: Airport Operations				
ACDM	**1.** Interconnection between aircraft operator & ANSP systems to share surface operations information	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-ACDM-1 Target 1:** Assessed in Sep 2017 **a.** Yes **b.** 1 (TLPL) **B0-ACDM-1 Target 2:** Implement by Dec 2019 **c.** None	Status – Planning Only TLPL needs this capability.

- State/Organization Centric Elements

Block 0 Modules	Elements	Metrics	Targets	Status & Remarks
Performance Improvement Area 4: Efficient Flight Paths				
TBO	**1.** ADS-C over oceanic and remote areas	**a.** Do we assessed the need? *Yes or No* **b.** Do we need this capability? *Yes or No* **c.** Have you implemented this capability? *Yes or No*	**B0-TBO-1. Target 1:** Assessed in Dec 2016 **a.** Yes **b.** None **B0-TBO-1. Target 2:** **c.** N/A	Status - N/A

Simplified ANRF

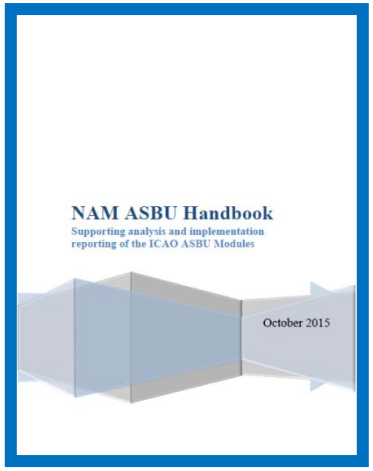
1. AIR NAVIGATION REPORT FORM (ANRF) MY STATE Planning for ASBU Modules 2. REGIONAL/NATIONAL PERFORMANCE OBJECTIVE – B0-05/CDO: Improved Flexibility and Efficiency in Descent Profiles (CDO) Performance Improvement Area 4: Efficient Flight Path					
3. ASBU B0-05/CDO: Impact on Main Key Performance Areas (KPA)					
	Access & Equity	Capacity	Efficiency	Environment	Safety
Applicable					
4. ASBU B0-05/CDO: Planning Targets and Implementation Progress					
5. Elements	6. Targets and implementation progress (Ground and Air)				
1. CDO Implementation					
2. PBN STARs					
7. ASBU B0-05/CDO: Implementation Challenges					
Elements	Implementation Area				
	Ground System Implementation	Avionics Implementation	Procedures Availability	Operational Approvals	
1. CDO Implementation					
2. PBN STARs					
8. ASBU B0-05/CDO: Performance Monitoring and Measurement 8A. ASBU B0-05/CDO: Implementation Monitoring					
Elements	Performance Indicators/Supporting Metrics				
1. CDO Implementation					
2. PBN STARs					
8. ASBU B0-05/CDO: Performance Monitoring and Measurement 8 B. ASBU B0-05/CDO: Performance Monitoring					
Key Performance Areas	Metrics (if not indicate qualitative Benefits)				
Access & Equity					
Capacity					
Efficiency					
Environment					
Safety					

Before

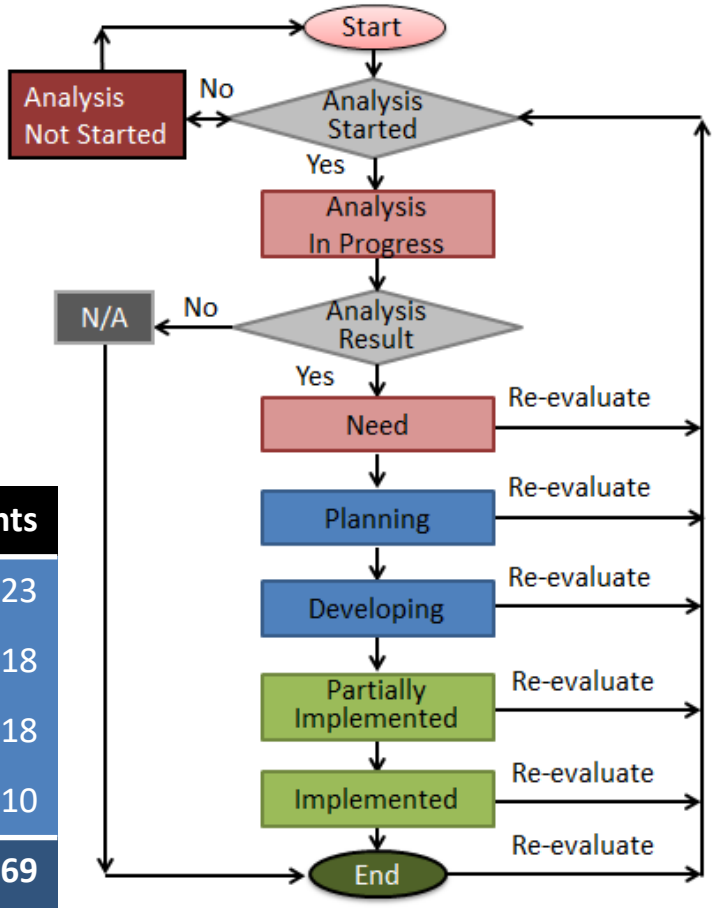
[STATE] ASBU Air Navigation Reporting Form (ANRF)					
PIA	4	Block - Module	B0 - CDO	Date	Month Day, 2016
Module Description: Performance-based airspace and arrival procedures allowing aircraft to fly their optimum profile using continuous descent operations (CDOs). This will optimize throughput, allow fuel efficient descent profiles, and increase capacity in terminal areas.					
Element Implementation Status					
1	**Element Description:** (Derived from Element 1) Procedure changes to facilitate CDO			**Date Planned/Implemented**	**Status**
	Status Details				
2	**Element Description:** (Derived from Element 1) Route changes to facilitate CDO			**Date Planned/Implemented**	**Status**
	Status Details				
3	**Element Description:** (Derived from Element 2) PBN STARs			**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					

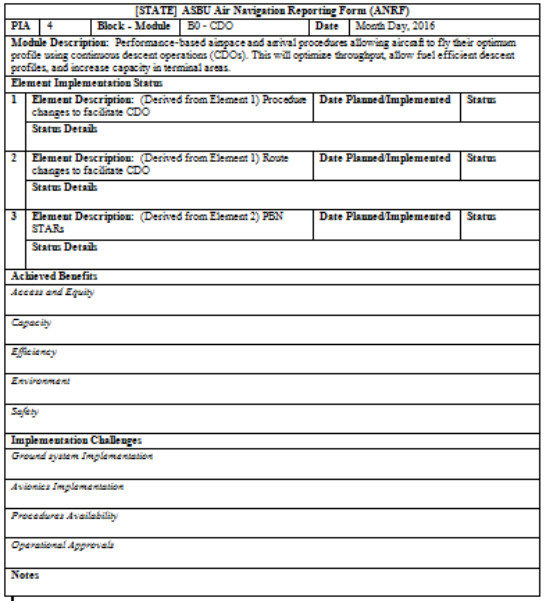
After

Process and Tools



B0 PIA	Modules	Elements
PIA 1	5	23
PIA 2	3	18
PIA 3	7	18
PIA 4	3	10
Total	**18**	**69**





[STATE] ASBU Air Navigation Reporting Form (ANRF)

PIA	4	Block - Module	B0 - CDO	Date	Month Day, 2016

Module Description: Performance-based airspace and arrival procedures allowing aircraft to fly their optimum profile using continuous descent operations (CDOs). This will optimize throughput, allow fuel efficient descent profiles, and increase capacity in terminal areas.

Element Implementation Status

1	**Element Description:** (Derived from Element 1) Procedure changes to facilitate CDO	**Date Planned/Implemented**	**Status**
	Status Detail:		
2	**Element Description:** (Derived from Element 1) Route changes to facilitate CDO	**Date Planned/Implemented**	**Status**
	Status Detail:		
3	**Element Description:** (Derived from Element 2) PBN STARs	**Date Planned/Implemented**	**Status**
	Status Detail:		

Achieved Benefits

Access and Equity

Capacity

Efficiency

Environment

Safety

Implementation Challenges

Ground system Implementation

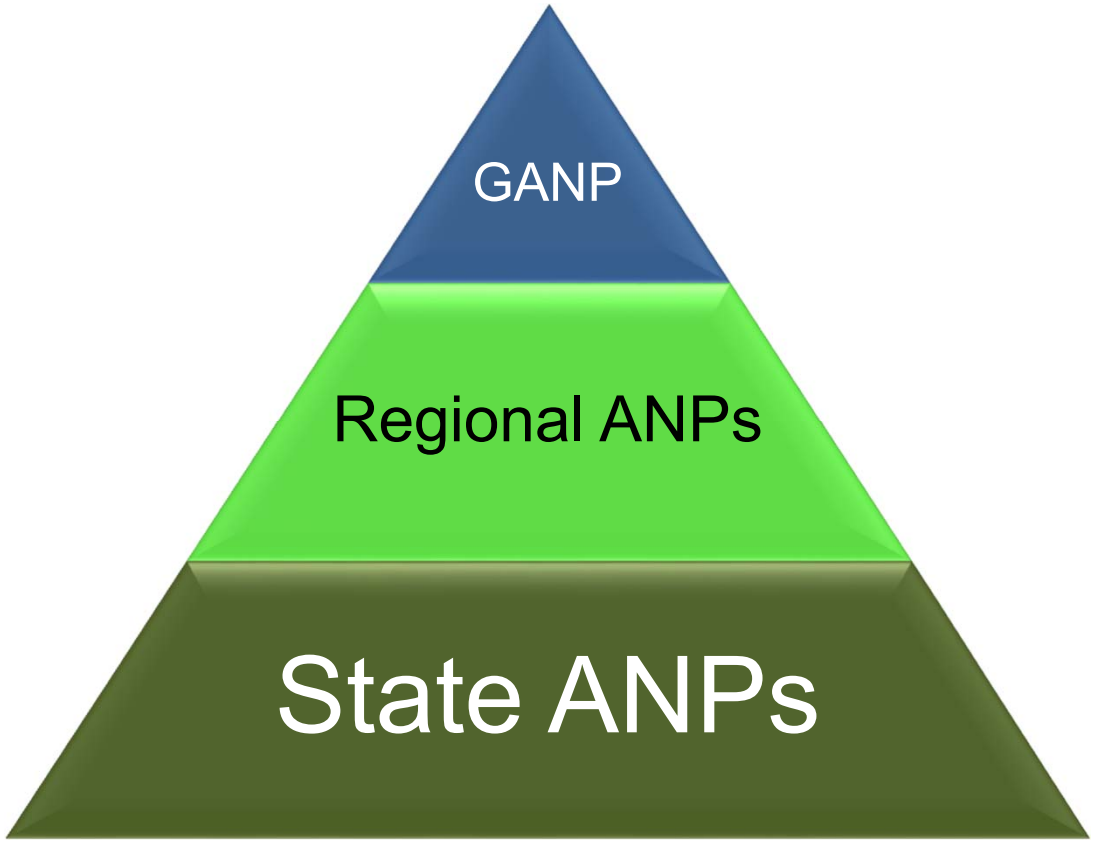
Avionics Implementation

Procedures Availability

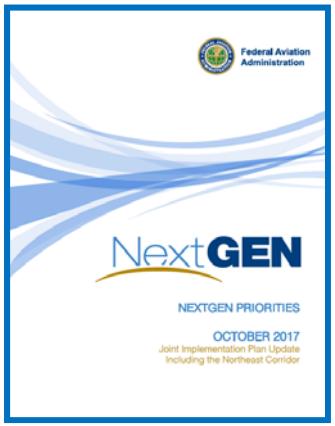
Operational Approvals

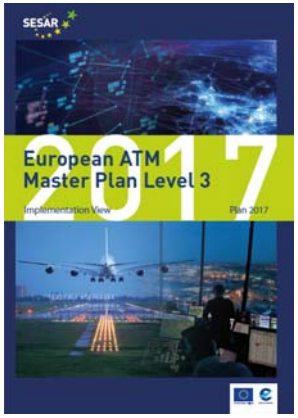
Notes

We are together to



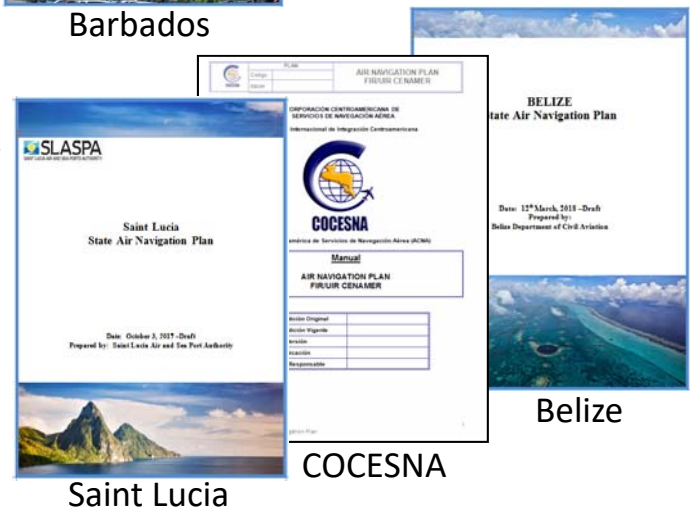
State ANPs





Barbados Mexico Curacao

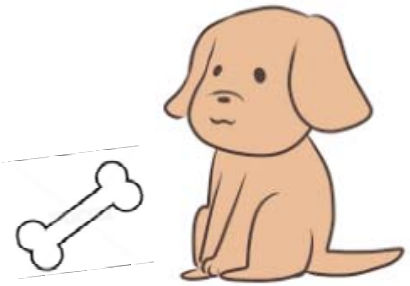
- FAA's State ANP is "NextGen Implementation Plan"
- Europe has "European ATM Master Plan"
- Some other states has aviation system modernization programs and plans
- Some Caribbean and Central America states have State ANPs



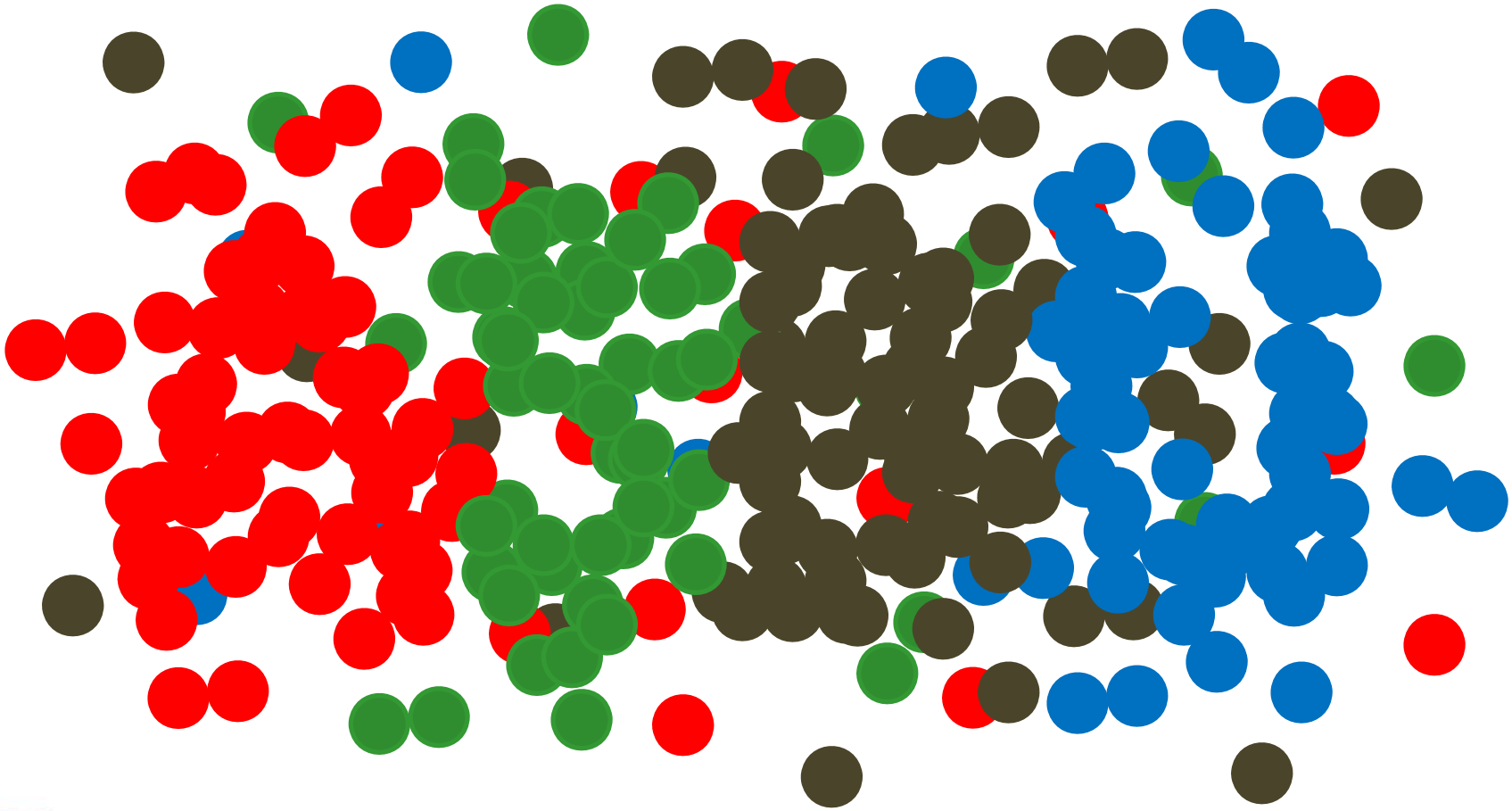
Saint Lucia COCESNA Belize

2019 version of GANP/ASBU

- Big changes are expected
  - Will define Block 1 Modules and Elements
  - Will redefine Block 0 Elements
  - May include new modules, new threads, and a new Block
  - Will introduce a new framework – Basic Building Blocks (BBBs)
  - Will introduce the global strategic level of the Multilayer Structure of GANP
- Wait and see
- Apply the same process



Collecting and Connecting Dots



Thank you!

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