NAM/CAR Regional Performance-Based Air Navigation Implementation Plan (RPBANIP)

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International Civil Aviation Organization

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Document Revision History

Date	Description of Changes	Version
May 2008	First version of the Regional Performance-Based Implementation Plan	1.0
May 2011	Incorporates changes to the Regional Performance Objectives (RPOs) related to the ICAO model Flight Plan format and the CAR Region PBN Airspace Concept	2.0
April 2014	Incorporates changes in accordance with ASBU methodology and adopted ASBU B0 modules for the NAM/CAR Regions, traffic forecast updates, revision to acronyms, and agreed targets of the Port-of-Spain Declaration and the ASBU selection criteria.	3.0

AMENDMENTS

Amendments will be submitted to all NAM/CAR States/Territories and stakeholders by the ICAO NACC Regional Office and an electronic version will be available on the ICAO NACC Regional Office website. The stakeholders should submit any Change Proposal to the ICAO NACC Regional Office who will conduct the appropriate coordination. The table below provides a means to record such amendments.

RECORD OF AMENDMENTS AND CORRIGENDA

AMENDMENTS			
No.	Date applicable	Date entered	Entered by

CORRIGENDA			
No.	Date applicable	Date entered	Entered by

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FOREWORD

ICAO Global Air Navigation Plan (GANP)

The *Global Air Navigation Plan* - Doc 9750 provides ICAO´s vision to achieve sustainable growth of the global civil aviation system, including increased capacity and improved efficiency of the global civil aviation system while improving or at least maintaining safety where ICAO acts as the global forum for States regarding international civil aviation. ICAO develops policies, standards, undertakes compliance audits, performs studies and analyses, provides assistance, and builds aviation capacity through the cooperation of Member States and stakeholders. The GANP represents a rolling 15-year strategic methodology, which leverages existing technologies and anticipates future developments based on State/industry agreed operational objectives.

The GANP describes a strategy aimed at achieving near, medium, and long-term ATM benefits on the basis of available and foreseen aircraft capabilities and ATM infrastructure, as well as offering a long-term vision that will assist ICAO, States, and industry to ensure continuity and harmonization among their modernization programmes. It contains guidance on ATM improvements necessary to support a uniform transition to the ATM system envisioned in Doc 9854 - *Global Air Traffic Management Operational Concept.* The operational concept presents the ICAO vision of an integrated, harmonized, and globally interoperable ATM system.

The 4th edition of the GANP includes the Aviation System Block Upgrade (ASBU) framework, its modules, and its associated technology roadmaps covering communications, surveillance, navigation, information management, and avionics, *inter alia*.

The GANP, along with other high-level ICAO plans, will help ICAO Regions, subregions and States establish their air navigation priorities for the next 15 years. The GANP also outlines ICAO's 10 key civil aviation policy principles guiding global, regional, and State air navigation planning.

NAM/CAR Regional Planning

Having a strategic geographical location at the confluence of ATS routes connecting the major destinations, airspace has become a vital link to smooth the flow of traffic between major airspaces in the NAM and CAR Regions.

Civil, commercial, military, general aviation, research, hobby and adventure flying, flight training, helicopter flights, and "remotely piloted" aircraft have been constantly increasing and thereby the airspace has become more congested day by day. Technological innovations provide more simple and flexible solutions not only for transportation needs but also for national security and economic development.

More challenges are on the horizon to achieve a seamless ATM system in the CAR and NAM Regions. The forecasted increases in air operations in the CAR and NAM Regions will require gradual operational improvements in the ATM system to ensure an optimum air traffic flow throughout certain areas during periods in which the demand exceeds or is foreseen to exceed available capacity.

The complexities of the Caribbean airspace are unique in nature. Based on the topography, various types of aircraft from helicopters to large jet aircraft are being operated in various sectors. Restricted airspace for military operations and the mixed type of aircraft with unmatched capabilities occupy the airspace, and the conflicting demands need to be accommodated.

New aircraft are capable of extremely accurate navigation during all phases of flight, and many are equipped with satellite-based communication. Airline operational growth has also resulted in a relatively young airline fleet, equipped mostly with some or all available enhanced capabilities.

Considering that the Eleventh Air Navigation Conference urged ICAO to develop a Performance Framework for Air Navigation Systems, the 35th Session of the ICAO Assembly, through Resolution A35-15, App B, urged ICAO to also ensure that the future global ATM system is performance-based and that the performance objectives and targets for the future system are developed in a timely manner, following GREPECAS Conclusion 15/1, in order to harmonize the implementation of the different air navigation solutions. The Third Meeting of North American, Central American and Caribbean Directors of Civil Aviation (NACC/DCA/3), held in Punta Cana, Dominican Republic, in September 2008, approved the *NAM/CAR Regional Performance-Based Air Navigation Implementation Plan (NAM/CAR RPBANIP)* and agreed that the RPBANIP would be the valid reference for air navigation implementation activities for the NAM and CAR Regions.

The RPBANIP was updated to Version 3 as reviewed and analyzed by the NAM/CAR Air Navigation Implementation Working Group (ANI/WG) in July 2013, aligning the activities and strategies of the RPBANIP with the ICAO ASBU methodology. The final version 3 was finalized by the Third Meeting of the North America, Central America and Caribbean Working Group (NACC/WG/03) in March 2014. The Fifth Meeting of North American, Central American and Caribbean Directors of Civil Aviation (NACC/DCA/5), held in Port of Spain, Trinidad and Tobago, in April 2014, approved the RPBANIP Version 3.

ICAO Aviation System Block Upgrades (ASBUs)

ICAO ASBUs are organized in five-year time increments starting in 2013 and continuing through 2028 and beyond. This structured approach provides a basis for sound investment strategies and will generate commitment from States, equipment manufacturers, operators, and service providers.

The ASBUs are designed to be used by the Regions, sub-regions and States when adopting the relevant Blocks or individual Modules to help achieve harmonization and interoperability by their consistent application across the regions and the world.

Appendix A to this Plan presents a briefing on the ASBU methodology and concepts.

Scope and Purpose

The RPBANIP establishes the NAM/CAR regional priorities described as Regional Performance Objectives (RPO) to be accomplished during the period 2013 to 2018, aligned with the global air navigation priorities, agreed regional performance-based metrics and indicators, and the ICAO ASBU Air Navigation Reporting Forms (ANRFs).

Even though the NAM/CAR Regions adopted, in principle, the 18 Block 0 (B0) modules resulting from the categorization analysis as described in **Appendix B** to this Plan, 15 of the modules are those described in this RPBANIP with the understanding that the remaining 3 ASBU B0 modules - ASEP, OFPL and WAKE - shall be included in future reviews of the RPBANIP, if required.

The RPBANIP is a living document that can be reviewed every three years, allowing more periodic amendments in order to maintain the validity, accuracy, and applicability of the Plan.

The RPBANIP shall be used as guidance and reference for the national plans of NAM/CAR States, Territories, and stakeholders, and should be aligned and used to identify those ASBU modules that best provide solutions to the identified operational needs. This planning requires interaction among stakeholders, including regulators, aviation system users, Air Navigation Service Providers (ANSPs) and aerodrome operators in order to achieve commitments to implementation.

Accordingly, RPBANIP implementations in the NAM/CAR Regions from its regional approach, subregional basis, and ultimately at the State level should be considered as an integral part of the global and regional ICAO planning process. In this regard, the necessary implementation measures, including applicability dates, can be agreed and collectively applied by all involved stakeholders.

Implementation

Further detailed actions plans for the RPOs shall be developed by the regional implementation groups as needed.

NAM/CAR States/Territories and stakeholders shall develop their own national plans or implementation plans taking into account the NAM/CAR RPBANIP.

Changes to the document

This document is maintained as a regional document in coordination with all ICAO regional planning and implementation groups. Participants established a mechanism for submitting and administering Change Proposals (CPs).

CPs shall be submitted to the ICAO NACC Regional Office. The ICAO NACC Regional Office will coordinate the CP with all NAM/CAR Regions stakeholders, other regions, and ICAO Headquarter, as needed, to determine the acceptability of the CP. Once the ICAO NACC Regional Office has completed coordination process with all stakeholders, the RPBANIP will be uploaded on its website.

Chapter 1. Growth and Distribution of Air Traffic in NAM/CAR Regions

1.1 Based on Caribbean/South American Regional Traffic Forecasts 2011-2031 developed by the Ninth Meeting of the CAR/SAM Traffic Forecasting Group (CAR/SAM TFG), the economy has recovered from the declines registered in 2009; nevertheless, the growth is projected to be somewhat slower. Therefore, the air passenger traffic forecasts on the routes associated with North America and Europe are somewhat lower. The rest of the route groups in the region are projected to grow faster mainly due to better economic performance expected in the future. Figure 1 shows the aircraft movements forecast for 2011 to 2031.

1.2 Overall passenger traffic to, from, and within the region is projected to grow at an average annual rate of 6.1 %. It is anticipated that the average annual growth rates for the Central American/Caribbean route groups will be 8.9%. Figure 2 shows the passenger traffic forecast for 2011 to 2031.

1.3 The overall number of movements is forecasted to increase from about 1.2 million in 2011 to slightly over 3.7 million in 2031, which reflects an average annual growth rate of 5.9%. The average growth rates for the route groups will range from 4.5% (between North America and CAR/SAM routes) to 8% (between South America and Central America/Caribbean).

								Average Annual Growth (%)			
Major Route Groups	2011	2012	2013	2014	2016	2021	2031	2011-2016	2016-2021	2021-2031	2011-2031
South Atlantic	38.49	40.62	42.94	45.39	50.90	62.57	97.85	5.7	4.2	4.6	4.8
Mid Atlantic	60.49	64.29	68.32	72.61	81.70	102.16	173.80	6.2	4.6	5.5	5.4
Intra-South America	147.99	162.33	178.06	195.31	230.74	317.83	614.95	9.3	6.6	6.8	7.4
Between South America and Central America/ Caribbean	76.70	83.81	92.43	101.93	123.96	172.22	357.43	10.1	6.8	7.6	8.0
Intra-Central America/Caribbean	266.44	292.26	320.58	351.64	410.72	561.59	1072.08	9.0	6.5	6.7	7.2
Between North America and South America/Central America/Caribbean	595.73	636.07	680.28	729.62	821.20	975.69	1446.78	6.6	3.5	4.0	4.5
TOTAL	1185.84	1279.38	1382.60	1496.50	1719.22	2192.06	3762.89	7.7	5.0	5.6	5.9

* OAG data

Figure 1 Aircraft movements forecast 2011-2031 (in thousands)

								Average Annual Growth (%)			
Major Route Groups	2011	2012	2013	2014	2016	2021	2031	2011-2016	2016-2021	2021-2031	2011-2031
South Atlantic	8.89	9.39	9.92	10.49	11.76	14.83	23.35	5.7	4.7	4.6	4.9
Mid Atlantic	9.10	9.67	10.28	10.93	12.29	15.71	26.79	6.2	5.0	5.5	5.5
Intra-South America	19.99	21.93	24.06	26.39	31.17	45.11	93.31	9.3	7.7	7.5	8.0
Between South America and Central America/ Caribbean	5.45	5.90	6.45	7.05	8.42	12.58	30.17	9.1	8.4	9.1	8.9
Intra-Central America/Caribbean	4.65	5.10	5.59	6.13	7.17	10.24	21.00	9.0	7.4	7.4	7.8
Between North America and South America /Central America/Caribbean	65.38	69.48	73.96	78.96	88.03	108.93	175.26	6.1	4.4	4.9	5.1
TOTAL	113.47	121.48	130.27	139.94	158.85	207.39	369.88	7.0	5.5	6.0	6.1

Figure 2 Passenger Traffic forecast 2011-2031 (in millions)

1.4 ***Intra-Central America/Caribbean:*** Passenger traffic increased from about 3.4 million in 2001 to 4.7 million in 2011, which reflects an average annual growth rate of 3.3%. For the period 2011-2031, passenger traffic is forecast to grow at an average annual rate of 7.8%, reaching 21 million by 2031. The aircraft movements for the period 2011-2031 are projected to increase at an average annual growth rate of 7.2%, bringing total movements to 1.1 million by 2031.

1.5 ***Between South America and Central America/Caribbean:*** Passenger traffic increased from about 2.6 million in 2001 to almost 5.5 million in 2011, which reflects an average annual growth rate of 7.8%. For the period 2011 to 2031, passenger traffic is forecasted to increase at an average annual growth rate of 8.9%, reaching over 30 million passengers in 2031. The number of aircraft movements for the same period is projected to increase at an average annual growth rate of 8%, reaching just over 357,000 movements in 2031.

1.6 ***Between North America and South America and Central America/Caribbean:*** Passenger traffic increased from 43.3 million in 2001 to over 65 million passengers in 2011, which reflects an average annual growth rate of 4.2%. The corresponding number of trips for the same period is projected to be around 1.5 million, which represents a growth rate of 4.5% per year. For the period 2011-2031, passenger traffic is expected to increase at an average annual growth rate of 5.1%, bringing total traffic to slightly over 175 million passengers by 2031.

Chapter 2. Regional Performance Objectives (RPOs)

2.1 Regional Performance Objectives (RPOs) have been developed using a performance approach to reflect the necessary implementation activities needed to support the air navigation regional priorities.

2.2 The RPOs may be updated depending on the air navigation regional priorities; therefore, these should be coordinated with and available to all interested parties within the ATM community in order to achieve timely communication throughout the implementation process. The establishment of Collaborative Decision-Making (CDM) processes ensures that all stakeholders are involved in and concur with the requirements, tasks, and timelines. The implementation of the RPO should address requirements on the basis of assessments and studies.

2.3 The RPOs provide the high-level tasks for implementing the regional priorities, establishing the expected operational benefits and the metrics for progress measurements, benefits and achievements. The following sections describe aspects pertaining to the RPOs and required changes, and the relation of the RPOs and the Global Air Navigation Plan elements. The complete RPOs are shown at the end of this chapter.

Benefits

2.4 Each RPO establishes a group of common benefits for all stakeholders that can be achieved through the implementation strategies. These benefits should be in accordance with the ICAO strategic objectives and ATM community expectations.

Strategy

2.5 Air navigation system evolution requires a progressive strategy with tasks and actions that best represent national and regional implementation in accordance with the global planning framework. The final goal is to achieve harmonized regional implementation with continuous evolution towards a global seamless ATM system.

2.6 This means there is a need to develop implementation activities focused on the necessary system operational improvements in which a clear work commitment will be carried out by the parties involved.

2.7 Each strategy defines those tasks and activities that maintain a direct relationship to ATM system components, such as airspace organization, civil-military coordination, human factors, aeronautical regulations, operational safety management systems, and environmental protection, among others.

2.8 The framework for regional activities should also include coordination of activities with the military authorities, who play an important role in helping to ensure that the best use is made of available airspace resources by all users while still safeguarding national security.

2.9 The following principles should be considered when developing implementation tasks and activities:

- Work should be organized using project management techniques.
- Implementation activities should be in accordance with the progress, characteristics, and regional implementation needs.
- All activities involved in accomplishing the RPOs should be designed following strategies, concepts, action plans, and roadmaps in order to align the regional work programme with the fundamental objective of bringing interoperability and seamlessness to the highest levels.
- The implementation tasks should encourage human resource optimization, as well as promote the use of electronic communications means, such as the Internet, videoconferences, teleconferences, e-mails, telephone and fax. It should be ensured that all the resources will be used efficiently, avoiding any duplication or unnecessary work.
- It should be ensured that RPOs can be measured against deliverables and timelines, and that their progress can be easily reported to the Air Navigation Commission and ICAO Council.

Identification of tasks

2.10 Each task should first be identified by the activity associated with components of the ATM system when describing the tasks. According to Doc 9854, the designators for ATM components are as follows:

- **AOM** — Airspace Organization and Management
- **DCB** — Demand and Capacity Balancing
- **AO** — Aerodrome Operations
- **TS** — Traffic Synchronization
- **CM** — Conflict Management
- **AUO** — Airspace User Operations
- **SDM** — ATM Service Delivery Management

2.11 Each designator looks towards linking ATM system components pertaining to tasks and activities related to all phases of flight operations: (en-route, terminal, approach and airport), capacity management; airspace management including its flexible use, provision of meteorological service, and aeronautical information management.

2.12 The infrastructure includes the ground/air technical systems and capacity required to support operations, such as communications, navigation and surveillance, data processing, inter-operability of systems, information management systems and spectrum management, including both civil and military systems. The following figure shows the ATM components in relation to the phases of flight:

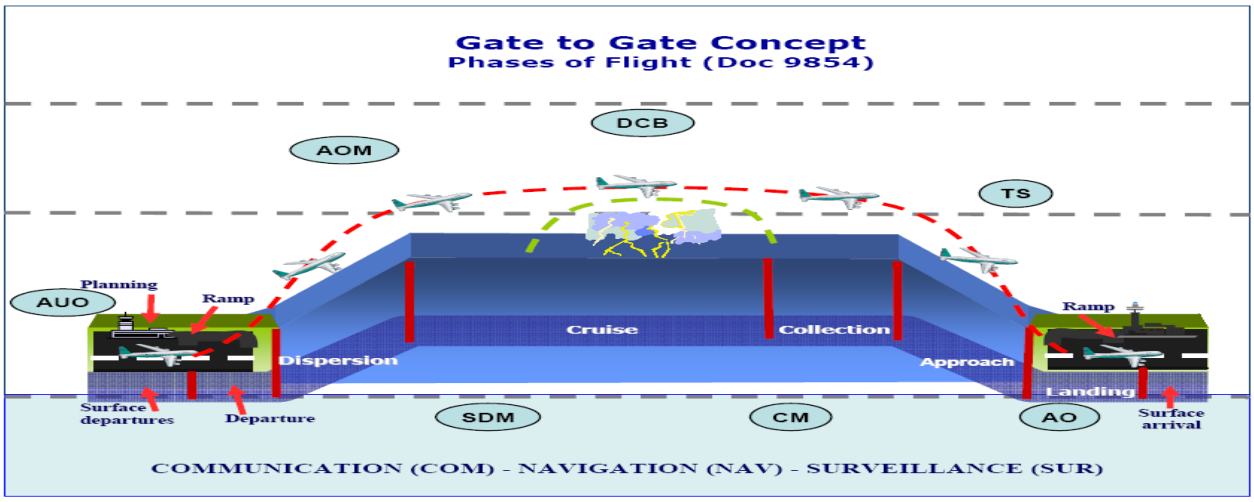

Figure 3: Gate to Gate Operational Concept

Status

2.13 The status is mainly focused on monitoring the progress of the implementation activity as it progresses towards a specific completion date. The status of the activity is defined as follows:

- **Valid/ongoing** — The feasibility and benefits of an activity has been confirmed, work has been initiated but the activity itself has not been finalized
- **Completed** — Implementation of the activity has been finalized by the involved parties

Relationship between RPOs and Global Plan Initiatives (GPIs)

2.14 The GPIs provide a global strategic framework and are designed to contribute to achieve the RPOs and support the logical progression of the regional implementation programmes. The GPIs are:

GPIs

GPI-1	Flexible use of airspace	GPI-13	Aerodrome design and management
GPI-2	Reduced vertical separation minima	GPI-14	Runway operations
GPI-3	Harmonization of level systems	GPI-15	Match IMC and VMC operating capacity
GPI-4	Alignment of upper airspace classifications	GPI-16	Decision support systems and alerting systems
GPI-5	RNAV and RNP (Performance-based navigation)	GPI-17	Data link applications
GPI-6	Air traffic flow management	GPI-18	Aeronautical information
GPI-7	Dynamic and flexible ATS route	GPI-19	Meteorological systems
GPI-8	Collaborative airspace design and	GPI-20	WGS-84
GPI-9	Situational awareness	GPI-21	Navigation systems
GPI-10	Terminal area design and management	GPI-22	Communication infrastructure
GPI-11	RNP and RNAV SIDs and STARs	GPI-23	Aeronautical radio spectrum
GPI-12	Functional integration of ground systems with airborne systems		

2.15 Each RPO should be referenced to the pertinent GPI. The goal is to ensure that the work process will be integrated into the global planning framework.

RPO and ASBU Methodology

2.16 In many cases, the RPOs contain the baseline elements to be implemented for the different B0 ASBU modules adopted by the NAM/CAR Regions.

2.17 Initially for the 5-year term of the RPBANIP, 15 ASBU B0 modules have been adopted as described in Table 1. The ASBU B0 modules - ASEP, OFPL and WAKE - will be included in future reviews of the RPBANIP based on the maturity of tasks and regional priorities.

ASBU / RPO	PIA1 Airport Operations					PIA2 SWIM			PIA3 Global Collaborative ATM							PIA4 Trajectory-based Operations		
	B015 RSEQ	B0 65 APTA	B070 WAKE	B075 SURF	B0 80 ACDM	B025 FICE	B030 DAIM	B0105 AMET	B010 FRTO	B035 NOPS	B084 ASUR	B085 ASEP	B086 OPFL	B0101 ACAS	B102 SNET	B005 CDO	B020 CCO	B040 TBO
PBN Implementation		X							X							X	X	
FUA									X									
DCB	X									X								
ATM Situational Awareness	X			X							X				X			X
Improve SAR																		
Improve Cap/Efficiency Aerodrome Operations				X	X													
COM					X	X								X				X
AIM							X											
MET								X										

Table 1 RPO and ASBU Block 0 relationship

2.18 The ASBU acronyms are as follows:

Old ASBU Modules Numbering System	New ASBU Modules Identifiers	
65	APTA	Airport Accessibility
70	WAKE	Wake Turbulence Separation
15	RSEQ	Runway Sequencing
75	SURF	Surface Operations
80	ACDM	Airport Collaborative Decision Making
81	RATS	Remote Air Traffic Services
25	FICE	FF/ICE
30	DATM	Digital Aeronautical Information Management
31	SWIM	System Wide Information Management
105	AMET	Advanced Meteorological Information
10	FRTO	Free Route Operations
35	NOPS	Network Operations
84	ASUR	Alternative Surveillance
85	ASEP	Airborne Separation
86	OPFL	Optimum Flight Levels
101	ACAS	Airborne Collision Avoidance Systems
102	SNET	Ground-Based Safety Nets

Old ASBU Modules Numbering System	New ASBU Modules Identifiers	
05	**CDO**	**Continuous Descent Operations**
40	**TBO**	**Trajectory-Based Operations**
20	**CCO**	**Continuous Climb Operations**
90	**RPAS**	**Remotely Piloted Aircraft Systems**

Figure 4: ASBU Module Designations

National Plans

2.19 States should develop their own national plan. The national plans will reflect the specific activities or tasks along with expected benefits to be obtained and the date by which each should be completed according to national needs and based on the RPOs.

2.20 National plans should identify the individuals or teams responsible for achieving the RPOs and the means for monitoring and eventually reporting progress on actions to ICAO. The responsibilities and timelines should be clearly defined so that the involved parties are aware of their commitments throughout the implementation process.

2.21 National plans should include adequate means to report on implementation progress achieved through a periodic reporting process using ICAO Air Navigation Reporting Forms (ANRFs). Detailed action plans or implementation plans for the national plan shall be developed as needed.

NAM/CAR Regional Performance Objectives

1. IMPLEMENTATION OF PERFORMANCE BASED NAVIGATION (PBN)				
Benefits				
Environment	• Reductions in fuel consumption			
Efficiency	• Ability of aircraft to conduct flight more closely to preferred trajectories • Increase in airspace capacity • Facilitate the utilization of advanced technologies (e.g., FMS based arrivals) and ATC decision support tools (e.g., metering and sequencing)			
Strategy				
ATM Component	**TASK DESCRIPTION**	**START-END**	**RESPONSIBLE**	**STATUS**
AOM	a) Implement Collaborative Decision-Making (CDM) process in coordination with stakeholders	2013- 2016	States, Territories, Int. Orgs	Valid
	b) Implement PBN airspace concept for oceanic, continental and terminal areas in accordance with the ICAO PBN Manual	2013- 2016	States, Territories, Int. Orgs	Valid
	c) Update Letters of Agreement between ATC units	2013- 2016	States, Territories, Int. Orgs	Valid
	d) Publish regulations and procedures for PBN operational approval	2013- 2016	States, Territories, Int. Orgs	Valid
	e) Evaluate and implement PBN requirements for ATC automated systems, as required	2013- 2016	States, Territories, Int. Org	Valid
	f) Analyze and enhance air communication, navigation (ground navaids GNSS) and surveillance infrastructure in accordance with PBN requirements	2013- 2018	States, Territories, Int. Orgs	Valid
	g) Develop and implement PBN training programme for pilots, ATCOs, operators and regulators, as well as implementation of GNSS technologies	2013- 2018	States, Territories, Int. Orgs	Valid
	h) Optimize the ATS route structure through implementation of RNAV routes between major city pairs with navigation specification RNAV-5 /2 for en-route operations	2013- 2016	States, Territories, Int. Orgs	Valid
	i) Implement CDOs/CCOs for SIDs/STARS in terminal areas based on RNAV 1-2 and RNP 1-/2 navigation specification, as required	2013- 2016	States, Territories, Int. Org	Valid
	j) Design and implement PBN APV in accordance with Assembly Resolution A37-11	2013- 2016	States, Territories, Int. Orgs	Valid
	k) Conduct PBN safety assessment based ATC simulations (fast time and/or real time), live trials, etc., as required	2013- 2016	States, Territories, Int. Orgs	Valid
	l) Develop performance measurement programme	2013- 2016	States, Territories, Int. Orgs	Valid
	m) Develop post-implementation PBN Safety Assessment Programme	2013- 2016	States, Territories, Int. Orgs	Valid
	n) Monitor implementation progress	2013- 2018	States, Territories, Int. Orgs	Valid
GPIs	GPI/5: Performance-Based Navigation; GPI/7: Dynamic And Flexible ATS Route Management; GPI/8: Collaborative Airspace Design And Management; GPI/10: Terminal Area Design and Management; GPI/11: RNP and RNAV SIDS and STARS; and GPI/12: FMS-Based Arrival Procedures			

2. IMPLEMENTATION OF FLEXIBLE USE AIRSPACE (FUA)				
Benefits				
Efficiency **Continuity**	• Increase airspace capacity • Improve ATS route structure efficiency • Ensure safe and efficient action in the event of unlawful interference • Make available military restricted airspace more hours of the day so that aircraft can fly on their preferred trajectories • Improve search and rescue services			
Strategy				
ATM Component	**TASK DESCRIPTION**	**START-END**	**RESPONSIBLE**	**STATUS**
AOM	a) Establish civil/military coordination bodies	2013- 2016	States, Territories	Valid
	b) Arrange for permanent liaison and close cooperation between civil ATS units and appropriate air defence units	2013- 2016	States, Territories	Valid
	c) Conduct a regional review of Special Use Airspace: i. assess use of airspace management processes; ii. improve current national airspace management to adjust dynamic changes in tactical stage to traffic flows; and iii. introduce improvements in ground support systems and associated procedures for the extension of FUA with dynamic airspace management processes	2013- 2016	States, Territories, Int. Orgs, ICAO	Valid
	d) implement dynamic ATC sectorization in order to provide the best balance between demand and capacity to respond in real-time to changing situations in traffic flows and to accommodate the preferred routes of users in short-term	2013-2018	States, Territories, Int. Orgs, ICAO	Valid
	e) Develop performance measurement programme	2013- 2016	States, Territories, Int. Orgs	Valid
	f) Monitor implementation progress	2013-2016~~8~~	ICAO	Valid
GPIs	GPI/1: Flexible Use Airspace			

3. IMPROVE DEMAND AND CAPACITY BALANCING (DCB)				
Benefits				
Environment **Efficiency**	• Reduced weather and traffic-induced holding leading to reduced fuel consumption and emissions • Improved and smoother traffic flows • Improved predictability • Improved management of excess demand for service in ATC sectors and aerodromes • Improved aerodrome and airspace operational efficiency			
Strategy				
ATM Component	**TASK DESCRIPTION**	**START-END**	**RESPON-SIBLE**	**STATUS**
DCB	a) Identify key stakeholders (ATC service providers and users, military authorities, airport authorities, aircraft operators and relevant organizations) for purposes of coordination and cooperation - using a CDM process	2013- 2016	States, Territories, Int. Orgs	Valid
	b) Analyze traffic flow problems and develop methods for improving efficiencies on a gradual basis, as needed for: i. Aerodrome capacity ii. ATS capacity iii. ATS letters of agreement	2013- 2016	States, Territories, Int. Orgs	Valid
	c) Define common elements of situational awareness between FMUs: i. Common traffic displays ii. Common weather displays iii. Communications (teleconferences, web) iv. Daily teleconference/messages methodology advisories	2013- 2016	States, Territories, Int. Orgs	Valid
	d) Develop methods to establish demand/capacity forecasting	2013- 2016	States, Territories, Int. Orgs	Valid
	e) Define common electronic information and minimum databases required for decision support and alerting systems for interoperable situational awareness between centralized ATFM units	2013- 2016	States, Territories, Int. Orgs	Valid
	f) Develop regional procedures for efficient and optimum use of aerodrome and runway capacity	2013- 2016	States, Territories, Int. Orgs	Valid
	g) Develop a national ATFM Procedures Manual to manage demand/capacity balancing	2013- 2016	GREPECAS	Completed
	h) Develop regional coordination for implementation of ATFM units	2013- 2016	States, Territories, Int. Orgs	Valid
	i) Develop operational agreements between ATFM units for interregional demand/capacity balancing	2013- 2016	States, Territories, Int. Orgs	Valid
	j) Monitor implementation progress	2013- 2016	ICAO	Valid
GPIs	GPI/1: Flexible Use Airspace; GPI/6: Air Traffic Flow Management; GPI/7: Dynamic and Flexible ATS Route Management; GPI/9: Situational Awareness; GPI/13: Aerodrome Design and Management; GPI/14: Runway Operations; and GPI/16: Decision Support Systems and Alerting Systems			

4. IMPROVE SITUATIONAL AWARENESS				
Benefits				
Efficiency **Safety**	• Enhanced traffic surveillance • Enhanced collaboration between flight crews and the ATM system • Improved collaborative decision-making through electronic aeronautical data sharing • Reduced workload for both pilots and controllers • Improved operational efficiency • Improved implementation on a cost-effective basis • Improved available electronic terrain and obstacle data in the cockpit • Reduced number of controlled flight into terrain related accidents • Improved safety management			
Strategy				
ATM Component	**TASK DESCRIPTION**	**START-END**	**RESPON-SIBLE**	**STATUS**
SDM	a) Identify the automation level required according to the ATM service provided in airspace and international aerodromes, assessing: i. Operational architecture design ii. Characteristics and attributes for interoperability iii. Data bases and software iv. Technical requirements	2013- 2018	States, Territories, Int. Orgs	Valid
	b) Implement flight plan data processing systems and electronic transmission tools	2013- 2018	States, Territories, Int. Orgs	Valid
	c) Implement radar data sharing programmes where benefits can be obtained	2013- 2017	States, Territories, Int. Orgs	Valid
	d) Develop situational awareness training programmes	2013- 2018	States, Territories, Int. Orgs	Valid
	e) Identify and implement additional ATM surveillance systems to improve accuracy and coverage of traffic situational information (ADS-B, MLAT, etc.) and associated procedures	2013- 2018	States, Territories, Int. Orgs	Valid
	f) Implement ATS automated message exchanges as required (FPL, CPL, CNL, DLA, etc.)	2013- 2018	States, Territories, Int. Orgs	Valid
	g) Implement automated radar handoffs where possible	2013- 2017	States, Territories, Int. Orgs	Valid
	h) Implement ground and air electronic warnings as needed: i. Conflict prediction ii. Terrain proximity iii. MSAW iv. DAIW v. Surveillance system for surface movement	2013- 2017	States, Territories, Int. Orgs	Valid
	i) Implement data link surveillance technologies and applications as required: ADS , CPDLC, AIDC	2014- 2018	States, Territories, Int. Orgs	Valid

SDM	j) Implement additional/advanced automation support tools to increase aeronautical information sharing i. ETMS or similar ii. MET information iii. AIS/NOTAM dissemination iv. Surveillance tools to identify airspace sector constraints	2014- 2018	States, Territories, Int. Orgs	Valid
	k) Training in the application and implementation of automated surveillance technologies and ATS system automation	2013-2018	States, Territories, Int. Orgs	Valid
	l) Enhance the training infrastructure of the region and the training programmes related to surveillance and automated systems	2013-2018	States, Territories, Int. Orgs	Valid
	m) Implement ACAS 7.1	2013-2018	States, Territories	Valid
	n) Monitor implementation progress	2013-2018	ICAO	Valid
GPIs	GPI/1: Flexible Use Airspace; GPI/6: Air Traffic Flow Management; GPI/7: Dynamic and Flexible ATS Route Management; GPI/9: Situational Awareness; GPI/13: Aerodrome Design and Management; GPI/14: Runway Operations; GPI/16: Decision Support and Alerting Systems; GPI/17: Implementation of Data Link Applications; GPI/18: Aeronautical Information; GPI/19: Meteorological Systems			

5. ENHANCE CAPACITY AND EFFICIENCY OF AERODROME OPERATIONS				
Benefits				
Safety	• Increased number of certified aerodromes in the region • Increased safety of aerodromes operations • Efficient use of aerodrome resources • Safe manoeuvering in all weather conditions • Precision surface movement and guidance in the movement area • Reduced incident/accident factors • Reduced number of deficiencies • Increased runway usability factors • Reduced number of bird/wildlife events • Enhanced land-use management around aerodromes			
Strategy				
ATM Components	**TASK DESCRIPTION**	**Start – End**	**Responsible**	**Status**
AO	a) Monitor and ensure promulgation of national standards for aerodromes, including the aerodrome certification requirement, in accordance with established criteria and certification process	2013 -2018	ICAO, States, Territories	Valid
	b) Monitor and ensure that the aerodrome certification process includes procedures for dealing with non-compliance with the established requirements, including aeronautical studies, a risk assessment mechanism, and notification procedure	2013 -2018	ICAO, States, Territories	Valid
	c) Provide training to personnel from the regulatory staff dealing with aerodrome certification and the aerodrome operator	2013 -2018	ICAO	Valid
	d) Monitor the development and implementation of an SMS with agreed performance objectives by States, and ensure clearly defined lines of safety accountability throughout a certified aerodrome	2013 -2018	ICAO, States, Territories	Valid
	e) Implement Airport Collaborative Decision-Making (CDM), prioritizing the following aspects: • Collaborative management of then CDM airport capacity during periods of predicted or unpredicted reduced capacity • Determination of turnaround and variable taxi times • Apron congestion	2014 -2018	States, Territories	Valid
	f) Implement Advanced Surface Movement Guidance and Control System (A-SMGCS) according to needs	2014 -2018	States, Territories	Valid
	g) Monitor ~~and~~ implement*ation progress* ~~wildlife/bird hazard reduction measures by States~~	2013 -2018	ICAO States, Territories	Valid
GPIs	GPI/6 Air Traffic Flow Management; GPI/9 Situational Awareness; GPI/13 Aerodrome Design and Management; GPI/14 Runway Operations; GPI/15 Match IMC and VMC Operating Capacity; GPI/18 Aeronautical Information			

6. OPTIMIZATION AND MODERNIZATION OF COMMUNICATION INFRASTRUCTURE

Benefits

Efficiency	• Improved ATS coordination • Increased communications availability • Communication misunderstandings avoided • Facilitated utilization of advanced technologies
Continuity	• Improved airspace interoperability and seamlessness • Improved provision of air traffic control services to all aircraft operations
Safety	• Improved airspace and aerodrome safety

Strategy

ATM Component	TASK DESCRIPTION	START-END	RESPON-SIBLE	STATUS
AO, TS, CM, AUO AOM, SDM	a) Review the performance status of current AFS services and identify deficiencies or improvements (AFTN, oral ATS services, A/G communications)	2013-2015	States, Territories	Valid
	b) Implement communication service improvements as required to support current and planned Air Navigation applications, including Required Communication Performance (RCPs).	2014-2018	States, Territories	Valid
	c) Develop regional ATN planning documents	2013-2015	GREPECAS	Valid
	d) Coordinate and test ATN G-G application implementation aspects (AMHS, AIDC, etc.)	2013-2018	States, Territories	Valid
	e) Conduct planning, trial and implementation activities for A-G data applications (DCL, D-ATIS, etc.)	2014-2018	States, Territories	Valid
	f) Carry out technical review of regional telecommunication networks for ATN implementation	2013-2015	States, Territories	Valid
	g) Implement available technologies in order to facilitate ground and airborne applications (CPDLC, ADS-C, ADS-B)	2013-2018	States, Territories	Valid
	h) Implement the necessary communications network for ACDM	2014-2018	States, Territories	Valid
	i) Support ICAO position during the ITU WRC and ensure regional coordination for the protection of the aviation spectrum	2013-2018	States, Territories	Valid
	j) Ensure participation of civil aviation experts in State delegations to ITU WRC meetings	2013-2018	States, Territories	Valid
	k) Disseminate ICAO policy statements on aeronautical radio frequency spectrum requirements	2013-2018	States, Territories	Valid
	l) Implement frequency spectrum management for protection and new services	2013-2018	States, Territories	Valid
	m) Support training on the application and implementation of advanced communication related technologies and ATN	2013-2018	States, Territories	Valid
	n) Enhance the regional training infrastructure and training programmes related to communications	2013-2018	States, Territories	Valid
	o) Monitor implementation and improvement of telecommunications and ATN application issues	2013-2018	ICAO	Valid

GPIs	GPI/1: Flexible Use Airspace; GPI/6: Air Traffic Flow Management; GPI/7: Dynamic Flexible ATS Route Management; GPI/9: Situational Awareness; GPI/14: Runway Operations; GP1-17: Data Link Application; GPI-21: Navigation Systems; GPI-22: Communications Infrastructure

7. IMPLEMENTATION OF AERONAUTICAL INFORMATION MANAGEMENT (AIM)

Benefits

Efficiency	• Implemented SARPs from Annex 15 and Doc 8126 that apply to the wide range of aeronautical information products of the Integrated Aeronautical Information Package (IAIP), services, and electronic aeronautical information technologies • Generated and distributed aeronautical information that serves to improve the safety, accessibility and cost-effectiveness of ATS • Support PBN • Improved aircraft operating limitations analysis
Safety	• Support Electronic aeronautical chart production and on-board FMS database • Improved situational awareness • Harmonized and integrated aeronautical information safety solutions • Improved cockpit display electronic terrain and obstacle data and electronic aeronautical chart data • Reduced CFIT accidents • Support Ground Proximity (GPWS) and Minimum Safe Altitude Warning (MSAW) system

Strategy

ATM Component	TASK DESCRIPTION	START END	RESPON-SIBLE	STATUS
CM, AUO, DCB, TS, AOM, AO, SDM	The tasks to implement the identified steps in the roadmap must be specified and conducted in accordance with the phases for the transition from AIS to AIM as follows: a) Comply with the process to introduce and implement Annex15 and 4 amendments to the Chicago Convention	2013–2015	States / Territories	Valid
	b) Periodically report on the generation and distribution of Integrated IAIP aeronautical information that improves the safety of ATS in the Region to the ICAO NACC Office	2013–2016	States / Territories	Valid
	c) Develop a method to measure the performance and outcomes from States, Territories and international organizations with distribution of quality aeronautical information to improve recognition of ATM requirements, safety, and effectiveness related to the electronic distribution of information	2013–2016	ICAO, GREPECAS	Valid
	d) Assist States, Territories and international organizations to improve decision making related to their transition to AIM	2013–2016	ICAO	Valid
	e) Assist States, Territories and international organizations with the AIM, in order to implement ICAO Standards for aeronautical information products, services, and technologies in electronic format, as required	2013–2018	ICAO, GREPECAS	Valid
	f) Support AIM developments to achieve the ATM system improvements in the *Global Air Traffic Management Operational Concept*; including NOTAM contingency plans	2013–2018	States / Territories	Valid

CM, AUO, DCB, TS, AOM, AO, SDM	g) Ensure that AIM requirements harmonize and integrate at a regional and international level, on-board electronic management of aeronautical information for the requirements or the use of ground systems	2013–2018	ICAO States / Territories	Valid
	h) Share experience and resources with implementation of e-TOD through establishment of an e-TOD regional working group	2013-2018	GREPECAS States / Territories	Valid
	i) Implement ICAO Doc 9881 technical requirements as required	2013-2018	States / Territories	Valid
	j) Report requirements to the ICAO NACC Regional Office and monitor implementation status of e-TOD using electronic media	2013-2018	States / Territories	Valid
	k) Develop a high-level agreement for the management of a national e-TOD programme	2013-2018	States / Territories	Valid
	l) Monitor implementation progress	*2013-2018*	*ICAO, States/ Territories*	*Valid*
GPIs	GPI-5: Performance-Based Navigation; GPI-9: Situational Awareness; GPI-11: RNP and RNAV SIDS and STARS; GPI-18: Aeronautical Information; GPI-20: WGS-84; GPI-21: Navigation Systems			

8. IMPROVE AVAILABILITY OF METEOROLOGICAL INFORMATION				
Benefits				
Efficiency • Improved aerodrome and airspace capacity • Reduced consumption of fuel and unnecessary delays due to aerodrome minimum meteorological conditions **Safety** • Increased flights in areas of fair weather conditions and prevention or reduced flights in areas of adverse meteorological conditions and volcanic ash clouds • Prevented landing operations at aerodromes under minimum meteorological conditions				
Strategy				
ATM Component	**TASK DESCRIPTION**	**START - END**	**RESPON-SIBLE**	**STATUS**
AOM, DCB, AO, TS, AUO	a) Increase facilities to disseminate and exchange aeronautical meteorological information: i) Increase AFTN and Internet facilities to disseminate OPMET data at meteorological offices and stations ii) Increase AFTN communications facilities to relay aircraft special reports from the ATC units to the meteorological offices iii) Maintain and expand the number of workstations used to receive meteorological World Area Forecast System products	2013- 2016	States, Territories	iii) Completed Valid
	b) Increase availability, timeliness, and quality of OPMET data: i) Improve use of METAR and TAF codes/templates to disseminate meteorological reports and aerodrome forecasts ii) Enhance preparation and availability of SIGMET information on hazardous meteorological conditions and volcanic ash clouds iii) Enhance availability of landing forecasts, TREND, considering user requirements	2013- 2015	States, Territories	Valid
	c) Ensure continuous operation of meteorological and communications equipment at meteorological offices and stations through the implementation of lightning, voltage spike, and line protections to prevent damage to automatic meteorological stations	2013- 2015	States, Territories	Valid
	d) Establish contingency procedures to disseminate OPMET data via Internet in case of AFTN or WAFS facilities failure	2013 - 2015	States, Territories, ICAO	Completed
AO	e) Improve the quality of data provided by meteorological sensors used in meteorological reports:Establish data verification and calibration programmes provided by aerodrome meteorological instruments and automated weather systems	2013 - 2015	States, Territories	Valid
AUO	f) Implement oversight programmes to ensure availability and quality of OPMET data issued by CAR States and Territories and provide assistance if required	2013 - 2015	States, Territories	Valid
	g) Improve States/Territories participation in the International Airways Volcano Watch and provide assistance if necessary	2013 - 2015	ICAO, Washington VAAC	Valid
	h) Improve States/Territories participation in the International Tropical Cyclone Watch and provide assistance if necessary	2013 - 2015	ICAO, Miami TCAC	Valid
AOM, DCB,AO, TS, AUO	i) Implement Quality Assurance System programmes for aeronautical meteorological service	2013-2015	States, Territories	Valid

AUO	j) Develop a yearly staffing analysis and training programme on aeronautical meteorological matters for operational personnel	2013-2016	States, Territories, ICAO, WMO AR IV	Valid
	k) Prepare monthly satellite and radar climatological images to detect low frequency cumulonimbus and thunderstorm areas for air traffic flow planning	2013-2016	States, Territories, ICAO	Valid
AO, TS	l) Increase the number of automated weather systems at aerodromes	2013 - 2015	States, Territories	Completed
	m) Implement meteorological data downlinks at MET and ATS units	2013--2016	States, Territories	Valid
	n) Implement meteorological data uplinks for aircraft from automated meteorological stations and MET and ATS units	2013--2016	States, Territories	Valid
SDM	o) Monitor implementation progress	2013-201~~5~~*6*	ICAO*, States/ Territories*	Valid
GPIs	GPI/6: Air Traffic Flow Management; GPI/7: Flexible/Dynamic ATS Route Management; GPI/9: Situational Awareness; GPI/14: Runway Operations; GPI/17: Implementation of Data link Applications; GPI/18: Aeronautical Information; GPI 19: Meteorological Systems			

9. IMPROVE SEARCH AND RESCUE (SAR) SERVICES				
Benefits				
Efficiency	• Enhanced traffic surveillance • Enhanced collaboration among stakeholders • Improved operational efficiency			
Safety	• Improved safety management			
Strategy				
ATM Component	**TASK DESCRIPTION**	**START-END**	**RESPON-SIBLE**	**STATUS**
SDM	a) Conduct comprehensive analysis of State SAR requirements based on risk assessment and quality assurance principles	2013- 2016	States, Territories, Int. Orgs, ICAO	Valid
	b) Foster the harmonization of policies, regulations, practices, and procedures of the aeronautical/maritime SAR services in accordance with ICAO and IMO provisions	2013- 2016	States, Territories, Int. Orgs, ICAO	Valid
	c) Develop and update SAR agreements between Rescue Coordination Centres (RCCs) of adjacent States and SAR service international agencies, as required	2013- 2016	States, Territories, Int. Orgs	Valid
	d) Foster the establishment of joint aeronautical/maritime SAR Committees, including the integration of voluntary SAR organizations as well as the development of agreements between all stakeholders of the national SAR service	2013- 2016	States, Territories, Int. Orgs, ICAO	Valid
	e) Develop human resource and training planning strategy in line with ICAO SAR provisions	2013- 2016	States, Territories, Int. Orgs, ICAO	Valid
	f) Monitor implementation progress	2013- 2016	ICAO, *States/ Territories*	Valid
GPIs	GPI/6: Air Traffic Flow Management; GPI/9: Situational Awareness			

Chapter 3. Aviation System Block Upgrade (ASBU) Air Navigation Reporting Forms (ANRFs)

3.1 **Air Navigation Report Form (ANRF):** the revised version of the Performance Framework Form previously used by PIRGs/States. The ANRF is a customized tool for ASBU modules, which is recommended for setting planning targets, monitoring implementation, identifying challenges, measuring implementation/performance, and reporting. Also, GREPECAS and the States could use this report format for any other air navigation improvement programmes, such as SAR. If necessary, other reporting formats that provide more details may be used but should contain as a minimum the elements described in the ANRF template. The results will be analyzed by ICAO and aviation partners and utilized in developing the Regional Performance Dashboard and the annual Global Air Navigation Report. The conclusions from the Global Air Navigation Report will serve as the basis for future policy adjustments, aiding safety practicality, affordability, and global harmonization, among other concerns.

3.2. **Regional/National Performance Objectives:** in the ASBU methodology, the performance objective will be the title of the ASBU module itself. The corresponding Performance Improvement Area (PIA) is shown to indicate the relationship between the respective ASBU module and ICAO PIA.

3.3. **Impact on Main Key Performance Areas:** key to the achievement of a globally interoperable ATM system is a clear statement of the expectations/benefits to the ATM community. The expectations/benefits refer to 11 Key Performance Areas (KPAs) and are interrelated and cannot be considered in isolation since all are necessary for the achievement of the objectives established for the system as a whole. It should be noted that while safety is the highest priority, the 11 KPAs shown below are in alphabetical order as they would appear in English. They include: access/equity; capacity; cost effectiveness; efficiency; environment; flexibility; global interoperability; participation of the ATM community; predictability; safety; and security. However, presently out of these 11 KPAs, only 5 have been selected for reporting through ANRF. These are access/equity, capacity, efficiency, environment and safety. The KPAs applicable to respective ASBU modules are to be identified by marking Y (Yes) or N (No). The impact assessment could be extended to more than the 5 mentioned KPAs if maturity of the national system allows and the process is available within the State to collect the data.

3.4. **Planning Targets and Implementation Progress:** this section indicates planning targets and status of progress in the implementation of different elements of the ASBU Module for both air and ground segments.

3.5. **Elements Related to ASBU Modules:** this section lists elements that are needed to implement the respective ASBU module. Furthermore, should there be elements that are not reflected in the ASBU module, e.g., in ASBU B0-ACDM, aerodrome certification and data link applications D-VOLMET, D-ATIS, D-FIS are not included. Similarly, in ASBU B0-DATM note that WGS-84 and eTOD are not included; however, if they are closely linked to the module, ANRF should specify those elements. As a part of guidance to GREPECAS/States, every Regional ANP will include the complete list of all 18 ASBU Block 0 modules along with corresponding elements, required ground and air avionics as well as metrics specific to both implementation and benefits.

3.6. **Targets and Implementation Progress (Ground and Air):** the planned implementation date (month/year) and current status/responsibility for each element are to be reported in this section. This should cover both avionics and ground systems.

3.7. **Implementation Challenges:** any challenges/problems that are foreseen for the implementation of module elements are to be reported in this section. The purpose of the section is to identify any issues that will delay the implementation in advance, and if so, corrective action is to be initiated by the concerned person/entity. The four areas under which ASBU module implementation issues are to be identified, if any, are as follows:

- Ground System Implementation
- Avionics Implementation
- Procedures Availability
- Operational Approvals

3.8. Should be there no ASBU module implementation challenges to be resolved, indicate as "NIL."

3.9. **Performance Monitoring and Measurement:** performance monitoring and measurement is done through the collection of data for the supporting metrics. In other words, metrics are the quantitative measurement of system performance – how well the system is functioning. The metrics fulfill three functions. They form a basis for assessing and monitoring the provision of ATM services, they define what ATM services users value, and they can provide common criteria for cost benefit analysis for air navigation system development. The metrics are of two types:

a) **Implementation Monitoring:** under this section, the indicator supported by the data collected for the metric reflects the implementation status of module elements. For example: percentage of international aerodromes with CDO implemented. This indicator requires data for the metric "number of international aerodromes with CDO."

b) **Performance Monitoring:** the metric in this section allows assessment of benefit(s) accrued as a result of module implementationThis approach would facilitate collecting data for the chosen metrics. If it is not possible to identify performance metrics for an individual module, qualitative benefits are to be reflected.

AIR NAVIGATION REPORT FORM (ANRF)

NAM/CAR Regional Planning for ASBU Modules

1. AIR NAVIGATION REPORT FORM (ANRF)

2. REGIONAL PERFORMANCE OBJECTIVE – B0-65/APTA: Optimization of Approach Procedures Including Vertical Guidance **Performance Improvement Area 1: Airport Operations**					
3. ASBU B0-65/APTA: Impact on Main Key Performance Areas (KPA)					
	Access and Equity	**Capacity**	**Efficiency**	**Environment**	**Safety**
Applicable	Y	Y	Y	Y	Y

4. ASBU B0-65/APTA: Planning Targets and Implementation Progress	
5. Elements	**6. Targets and Implementation Progress (Ground and Air)**
1. APV with Baro VNAV	80% of ~~international~~ *selected* aerodromes having instrument runways ~~provided with~~*to have* APV with Baro VNAV procedure implemented by December 2016 – Service Providers and users
2. APV with SBAS (WAAS)	20% of ~~international~~ *selected* aerodromes having instrument runways ~~provided with~~*to have* APV with SBAS/WAAS procedure implemented by December 2018– Service Providers and users
3. APV with GBAS	20% of ~~international~~ *selected* aerodromes having instrument runways ~~provided with~~*to have* APV GBAS procedure ~~implemented~~ by December 2018 – Initial implementation at some States (services providers)
4 . LNAV	60% of ~~international~~ *selected* aerodromes having instrument runways ~~with~~ *to have* LNAV procedure implemented by December 2016 – Service Providers and users as per Assembly Resolution A37-11

7. ASBU B0-65/APTA: Implementation Challenges				
Elements	**Implementation Area**			
	Ground system Implementation	**Avionics Implementation**	**Procedures Availability**	**Operational Approvals**
1. APV with Baro VNAV	NIL	Insufficient number of equipped aircraft	Lack of training and funding	Lack of procedures design training
2. APV with SBAS (WAAS)	Degradation of augmentation signal due to ionosphere	Lack of funding	NIL	Lack of training
3. APV with GBAS	Lack of cost benefit analysis	Insufficient number of equipped aircraft	Lack of training	Lack of training.
4. LNAV	NIL	Insufficient number of equipped aircraft	Lack of funding	Lack of training

8. ASBU B0-65/APTA: Performance Monitoring and Measurement 8A. B0-65/APTA: Implementation Monitoring	
Elements	**Performance Indicators/Supporting Metrics**
1. APV with Baro VNAV	**Indicator:** Percentage of ~~international~~ *selected* aerodromes having instrument runways ~~provided~~ with APV with Baro VNAV procedures implemented **Supporting metric:** Number of runways at ~~international~~ *selected* aerodromes ~~having~~ *with* approved APV with Baro VNAV procedures implemented
2. APV with SBAS (WAAS)	**Indicator:** Percentage of ~~international~~ *selected* aerodromes having instrument runways ~~provided~~ with APV with SBAS/WAAS procedures implemented **Supporting metric:** Number of runways at ~~international~~ *selected* aerodromes ~~having~~ *with* approved APV with SBAS/WAAS procedures implemented
3. APV with GBAS	**Indicator:** Percentage of ~~international~~ *selected* aerodromes having instrument runways ~~provided~~ with APV GBAS procedures implemented **Supporting metric:** Number of runways at international aerodromes having APV GBAS procedures implemented
4. LNAV	**Indicator:** Percentage of ~~international~~ *selected* aerodromes having instrument runways ~~provided~~ with LNAV procedures implemented **Supporting metric:** Number of runways at ~~international~~ *selected* aerodromes ~~having~~ *with* LNAV procedures implemented

8. ASBU B0-65/APTA: Performance Monitoring and Measurement 8 B. ASBU B0-65/APTA: Performance Monitoring	
Key Performance Areas	**Metrics (if not indicate qualitative benefits)**
Access & Equity	Increased aerodrome accessibility
Capacity	Increased runway capacity
Efficiency	Reduced fuel burn due to lower minima, fewer diversions, cancellations, delays
Environment	Reduced emissions due to reduced fuel burn
Safety	Increased safety through stabilized approach paths

1. AIR NAVIGATION REPORT FORM (ANRF)

2. REGIONAL PERFORMANCE OBJECTIVE – B0-15/RSEQ: Improve Traffic Flow Through Runway Sequencing (AMAN/DMAN) **Performance Improvement Area 1: Airport Operations**					
3. ASBU B0-15/RSEQ: Impact on Main Key Performance Areas					
	Access & Equity	**Capacity**	**Efficiency**	**Environment**	**Safety**
Applicable	N	Y	Y	N	N

4. ASBU B0-15/RSEQ: Planning Targets and Implementation Progress	
5. Elements	**6. Targets and Implementation Progress (Ground and Air)**
1. AMAN and Time-Based Metering	10% of ~~international~~ *selected* aerodromes with AMAN and time based metering by Dec. 2016
2. Departure Management	10% of *selected* ~~international~~ aerodromes with DMAN by Dec. 2016
3. Movement Area Capacity Optimization	20% of *selected* ~~international~~ aerodromes with Airport-capacity calculated by Dec. 2016

7. ASBU B0-15/RSEQ: Implementation Challenges				
Elements	**Implementation Area**			
	Ground System Implementation	**Avionics Implementation**	**Procedures Availability**	**Operational Approvals**
1. AMAN and Time-Based Metering	Lack of automation system to support synchronization	NIL	-Lack of appropriate training -Lack of slot assignments	NIL
2. DepartureManagement	Lack of automation system to support synchronization	NIL	-Lack of slot assignments -Lack of appropriate training	NIL
3. Movement Area Capacity Optimization	NIL	NIL	-Lack of capacity calculation procedures for RWY, TWY and platform -Lack of operational procedures for movement area capacity optimization	NIL

8. ASBU B0-15/RSEQ Performance Monitoring and Measurement 8A. ASBU B0-15/RSEQ: Implementation Monitoring	
Elements	**Performance Indicators/Supporting Metrics**
1. AMAN and Time-Based Metering	**Indicator:** Percentage of *selected* ~~international~~ aerodromes with AMAN and time-based metering **Supporting metric:** Number of *selected* ~~international~~ airports with AMAN and time-based metering
2. Departure Management	**Indicator:** Percentage of *selected* ~~international~~ aerodromes with DMAN **Supporting metric**: Number of *selected* ~~international~~ airports *with* DMAN
3. Movement Area Capacity Optimization	**Indicator:** Percentage of *selected* ~~international~~ aerodromes with calculated airport-capacity **Supporting metric:** Number of *selected* ~~international~~ aerodromes with calculated airport capacity

8. ASBU B0-15/RSEQ. Performance Monitoring and Measurement 8 B. ASBU B0-15/RSEQ: Performance Monitoring	
Key Performance Areas	**Metrics (if not indicate qualitative benefits)**
Access & Equity	Not applicable
Capacity	Increase airport capacity through movement area optimization
Efficiency	Efficiency is positively impacted as reflected by increased runway throughput arrival rates
Environment	Not applicable
Safety	Not applicable

1. AIR NAVIGATION REPORT FORM (ANRF)

2. REGIONAL PERFORMANCE OBJECTIVE – B0-75/SURF Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2) Performance Improvement Area 1: Airport Operation					
3. ASBU B0-75/SURF: Impact on Main Key Performance Areas (KPAs)					
	Access and Equity	**Capacity**	**Efficiency**	**Environment**	**Safety**
Applicable	Y	Y	Y	Y	Y

4. B0-75/SURF: Planning Targets and Implementation Progress	
5. Elements	**6. Targets and Implementation Progress (Ground and Air)**
1. Surveillance System for Ground Surface Movement (PSR, SSR, ADS-B or Multilateration)	30% of *selected* ~~international~~ aerodromes with SMR/ SSR Mode S/ ADS-B Multilateration for ground surface movement ~~airports~~ by June 2018 States/airport operator
2. On-board Surveillance Systems (SSR transponder, ADS B capacity)	20% of *aircraft on the NAM/CAR State registries ~~-~~to have* surveillance system on board (SSR transponder, ADS B capacity) by June 2018 Aircraft operators
3. Surveillance System for Vehicles	20% of vehicles at *selected* ~~international~~ aerodromes with a cooperative transponder systems ~~Selected airports~~ by June 2018 Vehicle operators
4. Visual Aids for Navigation	70% of *selected* ~~international~~ aerodromes complying with visual aid requirements as per Annex 14 by December 2015 States/Airport operators
5. Aerodrome Bird/Wildlife Organization and Control Programme	70% of *selected* ~~international~~ airports with an aerodrome bird/wildlife organization and control programme by December 2018 Airport operators

7. ASBU B0-75/SURF: Implementation Challenges				
Elements	**Implementation Area**			
	Ground System Implementation	**Avionics Implementation**	**Procedures Availability**	**Operational Approvals**
1. Surveillance System for Ground Surface Movement (PSR, SSR, ADS-B or Multilateration)	NIL	NIL	Lack of procedures and training	Lack of inspectors for operational approvals
2. On-board Surveillance Systems (SSR transponder, ADS B capacity)	NIL	Lack of funding - particularly for general aviation	Lack of procedures and training	NIL
3. Surveillance Systems for Vehicles	Lack of funding for vehicle operators	NIL	Lack of procedures and training	NIL
4. Visual Aids for Navigation	NIL	NIL	NIL	NIL

7. ASBU B0-75/SURF: Implementation Challenges				
Elements	**Implementation Area**			
	Ground System Implementation	**Avionics Implementation**	**Procedures Availability**	**Operational Approvals**
5. Reduction of Bird/Wildlife Related Events	NIL	NIL	Lack of training Implementation programme	NIL

8. ASBU B0-75/SURF: Performance Monitoring and Measurement 8A. ASBU B0-15/SURF: Implementation Monitoring	
Elements	**Performance Indicators/Supporting Metrics**
1. Surveillance System for Ground Surface Movement (PSR, SSR, ADS-B or Multilateration)	**Indicator:** Percentage of *selected* ~~international~~ aerodromes with SMR/ SSR Mode S/ ADS-B Multilateration for ground surface movement **Supporting metric:** Number of *selected* ~~international~~ aerodromes with SMR/ SSR Mode S/ ADS-B Multilateration for ground surface movement
2. On-board Surveillance Systems (SSR transponder, ADS B capacity)	**Indicator:** Percentage of *aircraft on the NAM/CAR State registries with* on-board surveillance systems (SSR transponder, ADS-B capacity) **Supporting metric:** Number of aircraft *on the NAM/CAR State registries* with on- board surveillance systems (SSR transponder, ADS-B capacity)
3. Surveillance Systems for Vehicles	**Indicator:** Percentage of vehicles at ~~international~~ *selected* aerodromes with cooperative transponder systems **Supporting metric:** Number of vehicles at *selected*~~international~~ aerodromes with surveillance systems installed
4. Visual Aids for Navigation	**Indicator:** Percentage of *selected* ~~international~~ aerodromes complying with visual aid requirements as per Annex 14 **Supporting metric:** Number of *selected* ~~international~~ aerodromes complying with visual aid requirements as per Annex 14
5. Aerodrome Bird/Wildlife Organization and Control Programme	**Indicator:** Percentage of *selected* ~~international~~ aerodromes with an aerodrome bird/wildlife organization and control programme **Supporting metric:** Number of *selected* ~~international~~ aerodromes with an aerodrome bird/wildlife organization and control programme

8. ASBU B0-75/SURF: Performance Monitoring and Measurement 8 B. ASBU B0-15/SURF: Performance Monitoring	
Key Performance Areas	**Metrics (if not indicate qualitative benefits)**
Access and Equity	Improves portions of the manoeuvring area obscured from control tower view of vehicles and aircraft. Ensures equity in ATC handling of surface traffic regardless of vehicle location on the international aerodrome. Provides traffic situational awareness to the controller in the form of surveillance information.
Capacity	Sustained level of aerodrome capacity during all weather conditions and peak hours.
Efficiency	Reduced taxi times due to reduced requirements for intermediate holding. Reduced fuel burn.
Environment	Reduced emissions due to reduced fuel burn.
Safety	Reduced runway incursions. Improved situational awareness leading to reduced ATC workload.

1. AIR NAVIGATION REPORT FORM (ANRF)

2. REGIONAL PERFORMANCE OBJECTIVE – B0-80/ACDM **Improved Airport Operations through Airport - CDM** **Performance Improvement Area 1: Airport Operations**					
3. ASBU B0-80/ACDM: Impact on Main Key Performance Areas (KPA)					
	Access and Equity	**Capacity**	**Efficiency**	**Environment**	**Safety**
Applicable	N	Y	Y	Y	N

4. ASBU B0-80/ACDM: Planning Targets and Implementation Progress	
5. Elements	**6. Targets and Implementation Progress (Ground and Air)**
1. Airport – CDM	60% of *selected* ~~international~~ aerodromes with Airport-CDM by Dec. 2018 – Airport Operator, Stakeholders
2. Aerodrome Certification	48% of ~~*selected* international~~ aerodromes *identified as international* to be certified by December 2016– State CAA
3. Heliport Operations	30% of *selected* Heliports with operational approval by Dec. 2018 – State CAA

7. ASBU B0-80/ACDM: Implementation Challenges				
Elements	**Implementation Area**			
	Ground System Implementation	**Avionics Implementation**	**Procedures Availability**	**Operational Approvals**
1. Airport – CDM	Lack of funding	NIL	Lack of A-CDM guidance material and training	NIL
2. Aerodrome Certification	NIL	NIL	Lack of promulgation	Lack of certified inspectors
3. Heliport Operations	NIL	NIL	Lack of promulgation	Lack of certified inspectors

8. ASBU B0-80/ACDM: Performance Monitoring and Measurement **8A. ASBU B0-80/ACDM: Implementation Monitoring**	
Elements	**Performance Indicators/Supporting Metrics**
1. Airport –CDM	**Indicator:** Percentage of *selected* ~~international~~ aerodromes with Airport-CDM **Supporting metric:** Number of *selected* ~~international~~ aerodromes with Airport-CDM
2. Aerodrome Certification	**Indicator:** Percentage of ~~*selected* international~~ aerodromes *identified as international* to be certified **Supporting metric:** Number of ~~*selected* international~~ aerodromes *identified as international* to be certified
3. Heliport Operations	**Indicator:** Percentage of *selected* heliports with operational approval **Supporting metric:** Number of *selected* heliports with operational approval

8A. ASBU B0-80/ACDM: Performance Monitoring and Measurement 8 B. ASBU B0-80/ACDM: Performance Monitoring	
Key Performance Areas	**Metrics (if not indicate qualitative benefits)**
Access and Equity	Not applicable
Capacity	-Enhanced use of existing gate and stands implementation (unlock latent capacity) -Reduced workload, better organization of activities to manage flights -Enhanced aerodrome capacity in accordance with demand
Efficiency	-Improved operational efficiency (fleet management) and reduced delays -Reduced fuel burn due to reduced taxi time and lower aircraft engine run time -Improved aerodrome expansion in accordance with the Master Plan
Environment	Reduced emissions due to reduced fuel burn
Safety	Not applicable

1. AIR NAVIGATION REPORT FORM (ANRF)

2. REGIONAL PERFORMANCE OBJECTIVE – B0-25/FICE: Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration Performance Improvement Area 2: Globally Interoperable Systems and Data – Through Globally Interoperable System Wide Information Management					
3. ASBU B0-25/FICE: Impact on Main Key Performance Areas (KPA)					
	Access and Equity	**Capacity**	**Efficiency**	**Environment**	**Safety**
Applicable	N	Y	Y	N	Y

4. ASBU B0-25/FICE: Planning Targets and Implementation Progress	
5. Elements	**6. Targets and Implementation Progress (Ground and Air)**
1. MEVA III IP Network Implementation	100% implementation of MEVA III IP Network by *MEVA Member States by* August 2015
2. AMHS Implementation	4 States with Air Traffic Services Message Handling Services (AMHS) interconnected with other AMHS by December 2014
3. AIDC Implementation	50% of FIRs within which all applicable ACCs have implemented at least one interface to use AIDC/OLDI with *a* neighbouring ACC~~s~~ by December 2016.
4. ATN Router Structure Implementation	70% of ATN router structure implemented by June 2016

7. ASBU B0-25/FICE: Implementation Challenges				
Elements	**Implementation Area**			
	Ground System Implementation	**Avionics Implementation**	**Procedures Availability**	**Operational Approvals**
1. MEVA III Implementation	Local site readiness	NIL	NIL	NIL
2. Full AMHS Operation and Transition from AFTN	Training and funding issues	NIL	Update procedures	NIL
3. AMHS Interconnection	Network bandwidth availability and last mile connection	NIL	NIL	NIL
4. Implement AIDC	Training and funding issues	NIL	Update procedures	NIL

8. ASBU B0-25/FICE: Performance Monitoring and Measurement 8A. ASBU B0-25/FICE: Implementation	
Elements	**Performance Indicators/Supporting Metrics**
1. MEVA III IP Network Implementation	**Indicator:** Percentage of MEVA Members with MEVA III implemented **Supporting metric:** Number of States with MEVA III Services contracted
2. AMHS Implementation	**Indicator:** Percentage of States with AMHS interconnected with other AMHS **Supporting metric:** Number of AMHS interconnections implemented
3. AIDC Implementation	**Indicator:** Percentage of FIRs within which all applicable ACCs have implemented at least one interface to use AIDC/OLDI with *a* neighbouring ACC~~s~~ **Supporting metric:** Number of AIDC systems installed *in applicable ACCs*
4. ATN Router Structure Implementation	**Indicator:** Percentage of ATN infrastructure implemented **Supporting metric:** Number of ATN routers implemented

8A. ASBU B0-25/FICE: Performance Monitoring and Measurement 8 B. ASBU B0-25/FICE: Performance Monitoring	
Key Performance Areas	**Metrics (if not indicate qualitative benefits)**
Access and Equity	NA
Capacity	• Reduced controller workload • Increased data integrity supporting separation reduction and • Increased boundary capacity flow
Efficiency	-Optimum aircraft flight levels Enabled -Less aircraft holding
Environment	NA
Safety	Increased timely and accurate flight plan information for ATC

1. AIR NAVIGATION REPORT FORM (ANRF)

2. REGIONAL PERFORMANCE OBJECTIVE – B0-30/DATM: Service Improvement through Digital Aeronautical Information Management **Performance Improvement Area 2: Globally Interoperable Systems and Data – Through Globally Interoperable System Wide Information Management**					
3. ASBU B0-30/DATM: Impact on Main Key Performance Areas					
	Access and Equity	**Capacity**	**Efficiency**	**Environment**	**Safety**
Applicable	N	N	N	Y	Y

4. ASBU B0-30/DATM: Planning Targets and Implementation Progress	
5. Elements	**6. Targets and Implementation Progress (Ground and Air)**
1. QMS - AIM	100 % of States QMS Certified by Dec.2016
2. e.TOD Implementation	10 % of States e-TOD Implemented by Dec.2018
3. AIXM *5.1* Implementation	40 % of States with AIXM *5.1* implemented by Dec.2018
4. e-AIP Implementation	45 % of States with e-AIP implemented by Dec.2018
5. Digital NOTAM	35 % of States with Digital NOTAM implemented by Dec. 2018

7. ASBU B0-30/DATM: Implementation Challenges				
Elements	**Implementation Area**			
	Ground System Implementation	**Avionics Implementation**	**Procedures Availability**	**Operational Approvals**
1. QMS - AIM	Lack of electronic access based on Internet protocol services	NIL	-Lack of procedures to allow airlines to provide digital AIS data to on-board devices; in particular, electronic flight bags (EFBs) -Lack of training for AIS/AIM personnel	NIL
2. e-TOD Implementation				
3. AIXM *5.1* Implementation				
4. e-AIP Implementation				
5. Digital NOTAM				

8. ASBU B0-30/DATM: Performance Monitoring and Measurement **8A. ASBU B0-30/DATM: Implementation**	
Elements	**Performance Indicators/Supporting Metrics**
1. QMS - AIM	**Indicator:** Percentage of States QMS Certified **Supporting metric:** Number of States QMS Certification
2. e-TOD Implementation	**Indicator:** Percentage of States with e-TOD implemented **Supporting metric:** Number of States with e-TOD implemented
3. AIXM *5.1* Implementation	**Indicator:** Percentage of States with AIXM *5.1* implemented **Supporting metric:** Number of States with AIXM *5.1* implemented
4. e-AIP Implementation	**Indicator:** Percentage of States with e-AIP implemented **Supporting metric:** Number of States with e-AIP implemented
5. Digital NOTAM	**Indicator:** Percentage of States with Digital NOTAM implemented **Supporting metric:** Number of States with Digital NOTAM implemented

8A. ASBU B0-30/DATM: Performance Monitoring and Measurement 8 B. ASBU B0-30/DATM: Performance Monitoring	
Key Performance Areas	**Metrics (if not indicate qualitative benefits)**
Access and Equity	NA
Capacity	NA
Efficiency	NA
Environment	Reduced time for promulgation of information concerning airspace status to allow for more effective airspace utilization and improvements in trajectory management
Safety	Reduced number of data/information inconsistencies. Module allows reduction of manual entries and ensures data consistency through automatic data checking based on commonly agreed business rules

1. AIR NAVIGATION REPORT FORM (ANRF)

2. REGIONAL PERFORMANCE OBJECTIVE – Module N° B0-105/AMET: Meteorological Information Supporting Enhanced Operational Efficiency and Safety **Performance Improvement Area 2: Globally Interoperable Systems and Data – Through Globally Interoperable System Wide Information Management**					
3. ASBU B0-105/AMET: Impact on Main Key Performance Areas (KPAs)					
	Access and Equity	**Capacity**	**Efficiency**	**Environment**	**Safety**
Applicable	N	Y	Y	Y	Y

4. ASBU B0-105/AMET: Planning Targets and Implementation Progress	
5. Elements	**6. Targets and Implementation Progress (Ground and Air)**
1. WAFS	100% of States implementation of WAFS Internet File Service (WIFS) by December 2014
2. IAVW	70% of MWOs with IAVW procedures implemented by December 2014. Volcanic Ash Advisory Centre, Washington USA *and VAAC Montréal, Montréal, Canada*
3. Tropical Cyclone Watch	100% of MWOs with tropical cyclone watch procedures implemented by December 2014. Tropical Cyclone Advisory Centre, Miami, USA
4. Aerodrome Warnings	50% of *selected* ~~international~~ aerodromes/AMOs with Aerodrome warnings implemented by December 2014
5. Wind Shear Warnings and Alerts	20% of *selected* ~~international~~ aerodromes/AMOs with wind shear warnings procedures implemented (MET provider services) by December 2015
6. SIGMETs	90% of *selected* ~~international~~ aerodromes/MWOs with SIGMET procedures implemented (MET provider services) by Dec. 2014

7. ASBU B0-105/AMET: Implementation Challenges				
Elements	**Implementation Area**			
	Ground System Implementation	**Avionics Implementation**	**Procedures Availability**	**Operational Approvals**
1. WAFS	Connection to the AFS satellite and Internet distribution systems	NIL	Prepare a contingency plan in case of Internet failure	N/A
2. IAVW	Connection to the AFS satellite and Internet distribution systems	NIL	Prepare a contingency plan in case of Internet failure	N/A
3. Tropical Cyclone Watch	Connection to the AFS satellite and Internet distribution systems	NIL	Prepare a contingency plan in case of Internet failure	N/A

7. ASBU B0-105/AMET: Implementation Challenges				
Elements	**Implementation Area**			
	Ground System Implementation	**Avionics Implementation**	**Procedures Availability**	**Operational Approvals**
4. Aerodrome Warnings	Connection to AFTN and /or AMHS	NIL	-Local arrangements for reception of aerodrome warnings -Timely delivery of information to users	N/A
5. Wind Shear Warnings and Alerts	Connection to AFTN and /or AMHS	NIL	-Local arrangements for reception of wind shear warnings and alerts -Timely delivery of information to users	N/A
6. SIGMETs	Connection to AFTN and /or AMHS	NIL	Timely delivery of information to users	N/A

8. ASBU B0-105/AMET: Performance Monitoring and Measurement 8A. ASBU B0-105/AMET: Implementation Monitoring	
Elements	**Performance Indicators/Supporting Metrics**
1. WAFS	**Indicator:** Percentage of States implementing the WAFS Internet File Service (WIFS) **Supporting metric:** Number of States implementing the WAFS Internet File Service (WIFS)
2. IAVW	**Indicator:** Percentage of *selected* ~~international~~ aerodromes/MWOs with IAVW procedures implemented **Supporting metric:** Number of international aerodromes/MWOs with IAVW procedures implemented
3. Tropical Cyclone Watch	**Indicator:** Percentage of *selected* ~~international~~ aerodromes/MWOs with Tropical Cyclone Watch procedures implemented **Supporting metric:** Number of *selected* ~~international~~ aerodromes/MWOs with Tropical Cyclone Watch implemented
4. Aerodrome Warnings	**Indicator:** Percentage of *selected* ~~international~~ aerodromes/AMOs with Aerodrome Warnings implemented **Supporting metric:** Number of international aerodromes/AMOs with Aerodrome Warnings implemented
5. Wind Shear Warnings and Alerts	**Indicator:** Percentage of *selected* ~~international~~ aerodromes/AMOs with wind shear warning procedures implemented **Supporting metric:** Number of *selected* ~~international~~ aerodromes/AMOs with wind shear warnings and alerts implemented
6. SIGMETs	**Indicator:** Percentage of *selected* ~~international~~ aerodromes/MWOs with SIGMET procedures implemented **Supporting metric:** Number of *selected* ~~international~~ aerodromes/MWOs with SIGMET procedures implemented

ASBU B0-105/AMET: Performance Monitoring and Measurement **8 B. ASBU B0-105/AMET: Performance Monitoring**	
Key Performance Areas	**Metrics (if not indicate qualitative benefits)**
Access and Equity	NA
Capacity	Optimized airspace and aerodrome capacity due to MET support **Metric:** ACC and aerodrome throughput
Efficiency	Air traffic harmonization (from en-route to aerodrome landing/from aerodrome departure to en-route) will translate into reduced arrival and departure delays and thus reduced fuel burn **Metric:** Fuel consumption and efficient flight times
Environment	Reduced fuel burn through optimized departure and arrival profiling /scheduling. **Metric:** Fuel burn and CO_2 emissions
Safety	Increased situational awareness and improved Collaborative Decision- Making (CDM) processes **Metric:** Number of incident occurrences

1. AIR NAVIGATION REPORT FORM (ANRF)

2. REGIONAL PERFORMANCE OBJECTIVE – ASBU B0-10/FRTO: Improved Operations through Enhanced En-Route Trajectories Performance Improvement Area 3: Optimum Capacity and Flexible Flights – Through Global Collaborative ATM					
3. ASBU B0-10/FRTO: Impact on Main Key Performance Areas (KPA)					
	Access and Equity	**Capacity**	**Efficiency**	**Environment**	**Safety**
Applicable	Y	Y	Y	Y	N

4. ASBU B0-10/FRTO: Planning Targets and Implementation Progress	
5. Elements	**6. Targets and Implementation Progress (Ground and Air)**
1. Airspace Planning	~~3.1.1.1.1.1.1.1~~ 100% *of States to have completed a* PBN ~~Airspace~~ plan~~ning~~ by Dec. 2018
2. Flexible Use Airspace	~~3.1.1.1.1.1.1.2~~ 50% of *selected* segregated airspaces available for civil operations by Dec. 2016
~~3. Flexible Routing~~	~~50% of *planned* PBN routes implemented by Dec. 2018~~

7. ASBU B0-10/FRTO: Implementation Challenges				
Elements	**Implementation Area**			
	Ground System Implementation	**Avionics Implementation**	**Procedures Availability**	**Operational Approvals**
1. Airspace Planning	- Lack of organized and managed airspace prior to the time of flight -Lack of AIDC		Lack of procedures, training, and LOAs	
2. Flexible Use Airspace	NIL		Lack of CDM between ANSPs and military *Lack of LOAs*	
~~3. Flexible Routing~~	~~ADS-C/CPDLC~~	~~Lack of FANS 1/A~~ ~~Lack of ACARS~~	~~Lack of LOAs, procedures, and training~~	~~Poor percentage of fleet approvals~~

8. ASBU B0-10/FRTO: Performance Monitoring and Measurement **8A. ASBU B0-10/FRTO: Implementation Monitoring**	
Elements	**Performance Indicators/Supporting Metrics**
1. Airspace Planning	% of *States with* ~~airspace redesign~~*PBN plans* completed
2. Flexible Use Airspace	**Indicator:** % of *selected* segregated airspaces available for civil operations **Supporting Metric:** Reduced civil flight delays
~~3. Flexible Routing~~	~~**Indicator:** % of *planned* PBN routes implemented~~ ~~**Supporting Metric:** Kg of fuel savings~~ ~~**Supporting Metric**: *Metric* Tons of CO_2 *emissions* reduction~~

8. ASBU B0-10/FRTO: Performance Monitoring and Measurement **8 B. ASBU B0-10/FRTO: Performance Monitoring**	
Key Performance Areas	**Metrics (if not indicate qualitative benefits)**
Access and Equity	Better access to airspace by reducing permanently segregated airspace
Capacity	-Flexible routing reduces potential congestion on trunk routes and at busy crossing points. Flexible Use Airspace provides greater opportunities to separate flights horizontally. -PBN helps to reduce route spacing and aircraft separation.
Efficiency	-The module will reduce flight length and related fuel burn and emissions. -The module will reduce the number of flight diversions and cancellations. It will also support avoiding noise sensitive areas.
Environment	Fuel burn and emissions will be reduced
Safety	NA

1. AIR NAVIGATION REPORT FORM (ANRF)

2 REGIONAL PERFORMANCE OBJECTIVE – ASBU B0-35/NOPS: Improved Flow Performance through Planning Based on a Network-Wide View Performance Improvement Area 3: Optimum Capacity and Flexible Flights – Through Global Collaborative ATM					
3. ASBU B0-35/NOPS: Impact on Main Key Performance Areas (KPA)					
	Access and Equity	**Capacity**	**Efficiency**	**Environment**	**Safety**
Applicable	Y	Y	Y	Y	Y

4. ASBU B0-35/NOPS: Planning Targets and Implementation Progress	
5. Elements	**6. Targets and Implementation Progress (Ground and Air)**
1. Air Traffic Flow Management	100% of FIRs within which all ACCs ~~utilise~~ *have* ATFM measures *available* by Dec. 2018

7. ASBU B0-35/NOPS: Implementation Challenges				
Elements	**Implementation Area**			
	Ground System Implementation	**Avionics Implementation**	**Procedures Availability**	**Operational Approvals**
1. Air Traffic Flow Management	-Lack of system software for ATFM -Lack of implemented ATFM units -Lack of human resources	NIL	Lack of ATFM and CDM procedures Lack of training	NIL

8. ASBU B0-35/NOPS: Performance Monitoring and Measurement **8A. ASBU B0-35/NOPS: Implementation Monitoring**	
Elements	**Performance Indicators/Supporting Metrics**
1. Air Traffic Flow Management	**Indicator:** Percentage of FIRs within which all ACCs ~~utilise~~ *have* ATFM measures *available* by Dec. 2018 **Supporting metric:** Number of FIRs with implemented ATFM ~~units~~*initiatives*

8. ASBU B0-35/NOPS: Performance Monitoring and Measurement **8 B. ASBU B0-35/NOPS: Performance Monitoring**	
Key Performance Areas	**Metrics (if not indicate qualitative benefits)**
Access and Equity	Improved access and equity of airspace or aerodrome use by reduced disruption of air traffic. ATFM processes support equitable distribution of delays
Capacity	Better utilization of available capacity, ability to anticipate difficult situations, and advanced mitigation of capacity constraints
Efficiency	Reduced fuel burn due to improved traffic flow, reduced block times and times with engines on
Environment	Reduced fuel burn as delays are absorbed on the ground with engines off or at optimum flight levels through speed or route management
Safety	Reduced occurrences of undesired sector overloads

1. AIR NAVIGATION REPORT FORM (ANRF)

2. REGIONAL PERFORMANCE OBJECTIVE – ASBU B0-84/ASUR: Initial Capability for Ground Surveillance Performance Improvement Area 3: Optimum Capacity and Flexible Flights – Through Global Collaborative ATM					
3. ASBU B0-84/ASUR: Impact on Main Key Performance Areas (KPA)					
	Access and Equity	**Capacity**	**Efficiency**	**Environment**	**Safety**
Applicable	N	Y	N	N	Y

4. ASBU B0-84/ASUR: Planning Targets and Implementation Progress	
5. Elements	**6. Targets and Implementation Progress (Ground and Air)**
~~a.~~*1.* Implementation of ADS-B	30% of selected ~~international~~ aerodromes with ADS-B implemented by Dec 2018
~~b.~~*2.* Implementation of Multilateration	80% of multilateration system implemented in selected ~~airports~~ *aerodromes* by June 2018
~~2. Automation System (Presentation)~~	~~70% of ACCs *serving selected aerodromes* with automation system *capable of processing ADS-B or multilateration data, as appropriate,* implemented ACCs by Dec 2017~~

7. ASBU B0-84/ASUR: Implementation Challenges				
Elements	**Implementation Area**			
	Ground System Implementation	**Avionics Implementation**	**Procedures Availability**	**Operational Approvals**
1. Implementation of ADS-B	Lack of training and funding for ATM system upgrades	Lack of ADS-B implementation in general aviation and old commercial fleets	Lack of procedures	Lack of regulations
2. Implementation of Multilateration	Lack of efficient communications networks for MLAT	NIL	NIL	NIL
~~3. Automation System (Presentation)~~	~~Lack of funding for system upgrades~~	~~NIL~~	~~NIL~~	~~NIL~~

8. ASBU B0-84/ASUR: Performance Monitoring and Measurement 8A. ASBU B0-84/ASUR: Implementation Monitoring	
Elements	**Performance Indicators/Supporting Metrics**
1. Implementation of ADS-B	**Indicator:** Percentage of selected ~~international~~ aerodromes with ADS-B implemented **Supporting metric:** Number of selected ~~international~~ aerodromes with ADS-B implemented
2. Implementation of Multilateration	**Indicator:** Percentage of *planned* multilateration systems implemented **Supporting metric:** Number of *planned* multilateration systems implemented
~~3. Automation System (Presentation)~~	~~**Indicator:** Percentage of ACCs *serving selected aerodromes* with automation systems implemented~~ ~~**Supporting metric:** Number of automation systems implemented in ACCs~~

8. ASBU B0-84/ASUR: Performance Monitoring and Measurement 8 B. ASBU B0-84/ASUR: Performance Monitoring	
Key Performance Areas	**Metrics (if not indicate qualitative benefits)**
Access and Equity	NA
Capacity	-Typical separation minima are 3 NM or 5 NM enabling an increase in traffic density compared to procedural minima -TMA surveillance performance improvements are achieved through high accuracy, better velocity vectors and improved coverage
Efficiency	NA
Environment	NA
Safety	Reduced number of major incidents. Search and rescue support

1. AIR NAVIGATION REPORT FORM (ANRF)

2. REGIONAL PERFORMANCE OBJECTIVE – B0-101/ACAS: ACAS Improvements Performance Improvement Area 3: Optimum Capacity and Flexible Flights – Through Global Collaborative ATM					
3. ASBU B0-101/ACAS: Impact on Main Key Performance Areas (KPA)					
	Access and Equity	**Capacity**	**Efficiency**	**Environment**	**Safety**
Applicable	N	N	Y	N	Y

4. ASBU B0-101/ACAS: Planning Targets and Implementation Progress	
5. Elements	**6. Targets and Implementation Progress (Ground and Air))**
1. ACAS II (TCAS Version 7.1)	10% of aircraft *on NAM/CAR State registries* equipped *with ACAS II (TCAS Version 7.1)* by Dec 2018

7. ASBU B0-101/ACAS: Implementation Challenges				
Elements	**Implementation Area**			
	Ground System Implementation	**Avionics Implementation**	**Procedures Availability**	**Operational Approvals**
1. ACAS II (TCAS Version 7.1)	NIL	Lack of funding	NIL	NIL

8. ASBU B0-101/ACAS: Performance Monitoring and Measurement 8A. ASBU B0-101/ACAS: Implementation Monitoring	
Elements	**Performance Indicators/Supporting Metrics**
1. ACAS II (TCAS Version 7.1)	Percentage of equipped aircraft *with ACAS II (TCAS Version 7.1) on NAM/CAR State registries*

8. ASBU B0-101/ACAS: Performance Monitoring and Measurement 8 B. ASBU B0-101/ACAS: Performance Monitoring	
Key Performance Areas	**Metrics (if not indicate qualitative benefits)**
Access and Equity	NA
Capacity	NA
Efficiency	ACAS improvement will reduce unnecessary resolution advisor~~y~~*ie*s (RAs) and therefore reduce trajectory deviations
Environment	NA
Safety	ACAS increases safety in the case of loss of separation

1. AIR NAVIGATION REPORT FORM (ANRF)

2. REGIONAL PERFORMANCE OBJECTIVE – B0-102/SNET: Increased Effectiveness of Ground-Based Safety Nets **Performance Improvement Area 3: Optimum Capacity and Flexible Flights – Through Global Collaborative ATM**					
3. ASBU B0-102/SNET: Impact on Main Key Performance Areas (KPA)					
	Access and Equity	**Capacity**	**Efficiency**	**Environment**	**Safety**
Applicable	N	N	N	N	Y

4. ASBU B0-102/SNET: Planning Targets and Implementation Progress	
5. Elements	**6. Targets and Implementation Progress (Ground and Air)**
1. Short Term Conflict Alert Implementation (STCA)	80% of *selected* ATS units with ground based safety nets (STCA) implemented by Dec 2015
2. Area Proximity Warning (APW)/ Minimum Safe Altitude Warning (MSAW)	70% of *selected* ATS units with ground based safety nets (APW) implemented / ~~Percentage~~ *70%* of *selected* ATS units with ground based safety nets (MSAW) implemented by Dec 2015
3. Medium Term Conflict Alert (MTCA)	80% of *selected* ATS units with ground based safety nets (MTCA) implemented by Dec 2016

7. ASBU B0-102/SNET: Implementation Challenges				
Elements	**Implementation Area**			
	Ground System Implementation	**Avionics Implementation**	**Procedures Availability**	**Operational Approvals**
1. Short Term Conflict Alert implementation (STCA)	ATM System upgrade	NIL	Procedure updates and approval	NIL
2. Area Proximity Warning (APW)/ Minimum Safe Altitude Warning (MSAW)	ATM System upgrade	NIL	Procedure updates and approval	NIL
3. Medium Term Conflict Alert (MTCA)	ATM System upgrade	NIL	Procedure updates and approval	NIL

8. ASBU B0-102/SNET: Performance Monitoring and Measurement **8A. ASBU B0-102/SNET: Implementation Monitoring**	
Elements	**Performance Indicators/Supporting Metrics**
1. Short Term Conflict Alert implementation (STCA)	**Indicator:** Percentage of *selected* ATS units with ground-based safety nets (STCA) implemented **Supporting metric:** Number of safety NETs (STCA) implemented
2. Area Proximity Warning (APW)/ Minimum Safe Altitude Warning (MSAW)	**Indicator:** Percentage of *selected* ATS units with ground-based safety nets (APW) implemented/Percentage of *selected* ATS units with ground-based safety nets (MSAW) implemented **Supporting metric:** Number of safety nets (APW) implemented/Number of safety NET (MSAW)
3. Medium Term Conflict Alert (MTCA)	**Indicator:** Percentage of *selected* ATS units with ground-based safety nets (MTCA) implemented **Supporting metric:** Number of Safety NETs (MTCA)

8. ASBU B0-102/SNET: Performance Monitoring and Measurement 8 B. ASBU B0-102/SNET: Performance Monitoring	
Key Performance Areas	**Metrics (if not indicate qualitative benefits)**
Access and Equity	NA
Capacity	NA
Efficiency	NA
Environment	NA
Safety	Reduction in the number of major incidents

1. AIR NAVIGATION REPORT FORM (ANRF)

2. REGIONAL PERFORMANCE OBJECTIVE – B0-05/CDO: Improved Flexibility and Efficiency in Continuous Descent Operations (CDOs) **Performance Improvement Area 4: Efficient Flight Path – Through Trajectory-based Operations**					
3. ASBU B0-05/CDO: Impact on Main Key Performance Areas (KPA)					
	Access & Equity	**Capacity**	**Efficiency**	**Environment**	**Safety**
Applicable	N	N	Y	Y	Y

4. ASBU B0-05/CDO: Planning Targets and Implementation Progress	
5. Elements	**6. Targets and Implementation Progress (Ground and Air)**
1. CDO implementation	50% of *selected* ~~Int~~. Aerodromes with continuous descent operations (CDO) implemented by Dec.2016
2. PBN STARs	80% of *selected* ~~Int~~. Aerodromes with PBN STARs implemented by Dec.2016

7. ASBU B0-05/CDO: Implementation Challenges				
Elements	**Implementation Area**			
	Ground System Implementation	**Avionics Implementation**	**Procedures Availability**	**Operational Approvals**
1. CDO implementaion	The ground trajectory calculation function will need to be upgraded	Lack of aircraft avionics	LOAs, training, and airspace complexity	In accordance with application requirements
2. PBN STARs	Airspace design	Lack of aircraft avionics	LOAs and training	

8. ASBU B0-05/CDO: Performance Monitoring and Measurement **8A. ASBU B0-05/CDO: Implementation Monitoring**	
Elements	**Performance Indicators/Supporting Metrics**
1. CDO implementation	**Indicator:** % of *selected* ~~International~~ Aerodromes/TMA with CDO implemented
2. PBN STARs	**Indicator:** % of *selected* ~~International~~ Aerodromes/TMA with PBN STAR implemented

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 and Equity	NA
Capacity	NA
Efficiency	Cost savings through reduced fuel burn
Environment	Reduced emissions as a result of reduced fuel burn (IFSET)
Safety	Reduction in Controlled Flight Into Terrain (CFIT) occurrences

1. AIR NAVIGATION REPORT FORM (ANRF)

2. REGIONAL PERFORMANCE OBJECTIVE – B0-40/TBO: Improved Safety and Efficiency through the initial application of En-Route Data Link Performance Improvement Area 4: Efficient Flight Path – Through Trajectory-based Operations					
3. ASBU B0-40/TBO : Impact on Main Key Performance Areas (KPA)					
	Access and Equity	**Capacity**	**Efficiency**	**Environment**	**Safety**
Applicable	N	Y	Y	Y	Y

4. ASBU B0-40/TBO: Planning Targets and Implementation Progress	
5. Elements	**6. Targets and Implementation Progress (Ground and Air)**
1. ADS-C Over Oceanic and Remote Areas	80% of *selected* FIRs with ADS-C implemented by December 2016
2. CPDLC	80% of *selected FIRs with* CPDLC implemented ~~at Oceanic/remote area FIRs~~ by June 2018

7. ASBU B0-40/TBO: Implementation Challenges				
Elements	**Implementation Area**			
	Ground System Implementation	**Avionics Implementation**	**Procedures Availability**	**Operational Approvals**
1. ADS-C Over Oceanic and Remote Areas	NIL	Implementation of pending ADS-C commercial and general aviation	Implementation of pending GOLD procedures	Lack of duly trained inspectors for operational approval
2. Continental CPDLC	NIL	Implementation of pending CPDLC - commercial and general aviation	Implementation of pending GOLD procedures	Lack of duly trained inspectors for operational approval

8. ASBU B0-40/TBO: Performance Monitoring and Measurement 8A. ASBU B0-40/TBO: Implementation Monitoring	
Elements	**Performance Indicators/Supporting Metrics**
1. ADS-C Pending	**Indicators**: Percentage of *selected* FIRs with ADS-C implemented **Supporting metric**: ~~Number of ADS-C approved procedures over oceanic and remote areas~~
2. CPDLC	**Indicators**: Percentage of *selected FIRs with* CPDLC implemented ~~in oceanic/remote area FIRs~~ **Supporting metric**: ~~Number of CPDLC approved procedures in remote areas~~

8. ASBU B0-40/TBO: Performance Monitoring and Measurement 8 B. ASBU B0-40/TBO: Performance Monitoring	
Key Performance Areas	**Metrics (if not indicate qualitative benefits)**
Access and Equity	NA
Capacity	-Better localization of traffic and reduced separation allows increased capacity -Reduced communication and better organization of controller workload allows improved sector capacity
Efficiency	Routes/tracks and flights can be separated by reduced minima, allowing application of flexible routings and vertical profiles closer to user-preferred
Environment	Reduced emissions as a result of reduced fuel burn.
Safety	-ADS-C based safety nets supports cleared level adherence monitoring, route adherence monitoring, danger area infringement warnings and improved search and rescue -Reduced occurrences of misunderstandings; solution to stuck microphone situations

1. AIR NAVIGATION REPORT FORM (ANRF)

2. REGIONAL PERFORMANCE OBJECTIVE – B0-20/CCO: Improved Flexibility and Efficiency Departure Profiles - Continuous Climb Operations (CCOs) **Performance Improvement Area 4: Efficient Flight Path – Through Trajectory-based Operations**					
3. ASBU B0-20/CCO: Improved Flexibility and Efficiency in Departure Profiles (CCO)					
	Access & Equity	**Capacity**	**Efficiency**	**Environment**	**Safety**
Applicable	N	N	Y	Y	Y

4. ASBU B0-20/CCO: Planning Targets and Implementation Progress	
5. Elements	**6. Targets and Implementation Progress (Ground and Air)**
1. CCO Implementation	60 % of *selected* ~~international~~ aerodromes with continuous climb operations (CCO) implemented by Dec.2016
2. PBN SIDs Implementation	60% of *selected* ~~international~~ aerodromes with PBN SIDs implemented by Dec.2016

7. ASBU B0-20/CCO: Implementation Challenges				
Elements	**Implementation Area**			
	Ground System Implementation	**Avionics Implementation**	**Procedures Availability**	**Operational Approvals**
1. CCO Implementation	NIL	NIL	LOAs and training	In accordance with application requirements
2. PBN SIDs Implementation	Airspace design	Lack of aircraft equippage	LOAs and training	In accordance with application requirements

8. ASBU B0-20/CCO: Performance Monitoring and Measurement **8A. ASBU B0-20/CCO: Implementation Monitoring**	
Elements	**Performance Indicators/Supporting Metrics**
1. CCO Implementation	**Indicator:** Percentage of *selected* ~~international~~ aerodromes with CCO implemented **Supporting metric:** Number of *selected* ~~international~~ aerodromes with CCO implemented
2. PBN SIDs Implementation	**Indicator:** Percentage of *selected* ~~international~~ aerodromes with PBN SIDs implemented **Supporting metric:** Number of *selected* ~~international~~ aerodromes with PBN SIDs implemented

8. ASBU B0-20/CCO: Performance Monitoring and Measurement 8 B. ASBU B0-20/CCO: Performance Monitoring	
Key Performance Areas	**Metrics (if not indicate qualitative benefits)**
Access and Equity	NA
Capacity	NA
Efficiency	-Cost savings through reduced fuel burn and efficient aircraft operating profiles. -Reduced number of required radio transmissions
Environment	-Authorized operations where noise limitations would otherwise result in operations being curtailed or restricted -Environmental benefits through reduced emissions (IFSET)
Safety	-More consistent flight paths. - Reduced number of required radio transmissions -Reduced pilot and air traffic control workload

Based on PBN implementation enhancements, the following environment target was agreed upon:

Reach 40,000 ton~~s~~ of CO_2 emission reduction in the region per year through ~~en route~~ PBN implementation by December 2016

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APPENDIX A

Aviation System Block Upgrades

A.1 The Global Air Navigation Plan introduces a systems engineering planning and implementation approach, which has been the result of extensive collaboration and consultation between ICAO, its Member States and industry stakeholders. ICAO developed the ASBU global framework primarily to ensure that aviation safety will be maintained and enhanced, that ATM improvement programmes are effectively harmonized, and that barriers to future aviation efficiency and environmental gains can be removed at reasonable cost.

A.2 The ASBUs incorporate a long-term perspective matching all ICAO air navigation planning documents. They coordinate clear aircraft and ground-based operational objectives together with the avionics, data link. and ATM system requirements needed to achieve them. The overall strategy serves to provide industry-wide transparency and essential investment certainty for operators, equGPIent manufacturers, and ANSPs.

A.3 The core of the concept is linked to four specific and interrelated aviation performance improvement areas, namely: a) airport operations; b) globally-interoperable systems and data; c) optimum capacity and flexible flights; and d) efficient flight paths. The performance improvement areas and the ASBU modules associated with each of them have been organized into a series of four Blocks (Blocks 0, 1, 2 and 3) based on timelines for the various capabilities they contain, as illustratedin **Figure A-1** below.

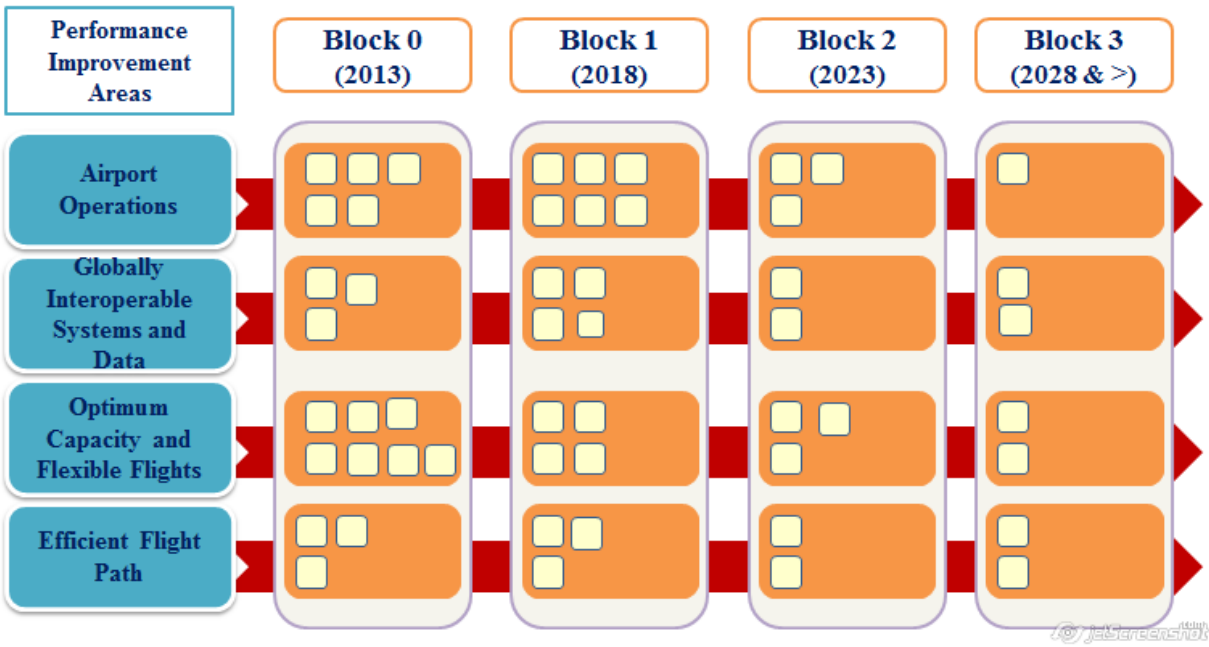

Figure A1

A.4 Block 0 features modules characterized by technologies and capabilities, which have already been developed and implemented in many parts of the world today. It therefore features a near term availability milestone or Initial Operating Capability (IOC) of 2013 based on regional and State operational needs. Blocks 1 through 3 are characterized by both existing and projected performance area solutions with availability milestones beginning in 2018, 2023, and 2028, respectively.

A.5 Associated timelines are intended to depict the initial deployment targets along with the readiness of all components needed for deployment. It must be stressed that a Block's availability milestone is not the same as a deadline. Though Block 0's milestone is set at 2013, for example, it is expected that the globally harmonized implementation of its capabilities (as well as the related Standards supporting them) will be achieved over the 2013 to 2018 timeframe. The same principle applies for the other Blocks and therefore provides for significant flexibility with respect to operational need, budgeting, and related planning requirements.

A.6 While the traditional air navigation planning approach addresses only ANSP needs, the ASBU methodology calls for addressing regulatory as well as user requirements. The ultimate goal is to achieve an interoperable global system whereby each State has adopted only those technologies and procedures corresponding to its operational requirements.

Understanding Modules and Threads

A.7 Each Block is made up of distinct modules as shown in the previous illustrations and those below. Modules only need to be implemented if and when they satisfy an operational need in a given State, and they are supported by procedures, technologies, regulations, or Standards, as necessary, as well as a business case.

A.8 A module is generally made up of a grouping of elements, which define required CNS upgrade components intended for aircraft, communication systems, Air Traffic Control (ATC) ground components, decision support tools for controllers, etc. The selected combination of elements ensures that each module serves as a comprehensive and cohesive deployable performance capability.

A.9 A series of dependent modules across consecutive Blocks is therefore considered to represent a coherent transition 'Thread' in time, from basic to more advanced capability and associated performance. Modules are therefore identified by both a Block number and a Thread acronym, as illustrated in Figure 2.

A.10 Each Thread describes the evolution of a given capability through the successive Block timelines as each module is implemented realizing a performance capability as part of Doc 9854 - *Global Air Traffic Management Operational Concept*.

A module Thread is associated with a specific performance improvement area. The modules in each consecutive Block feature the same Thread, indicating that they are elements of the same operational improvement process. Figure A-2 illustrates this association.

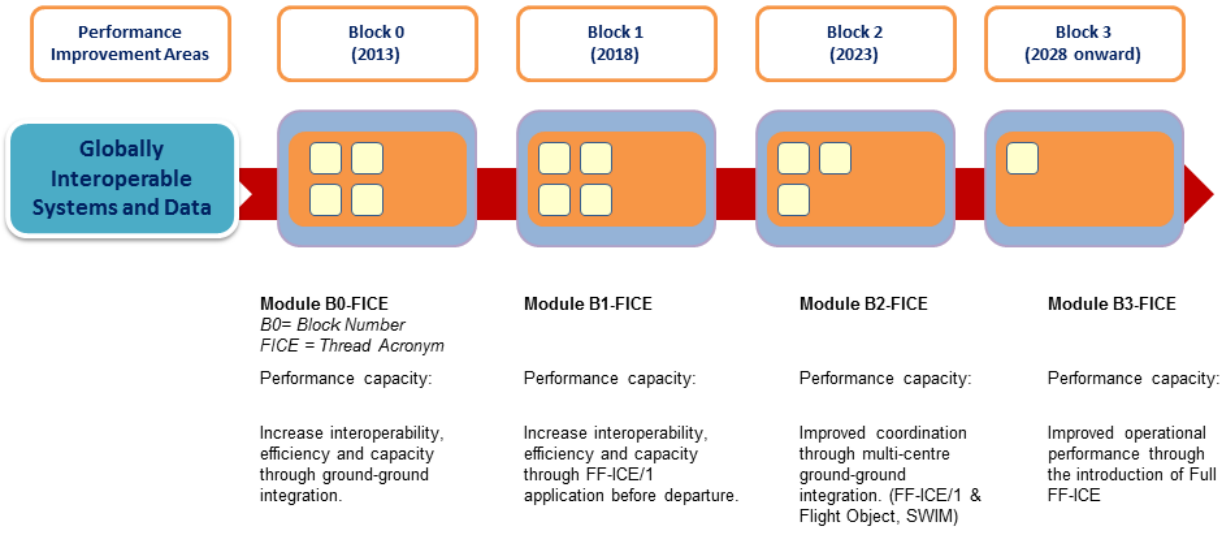

Figure A-2

A.11 Each block has a target date reference for availability. Each of the modules that form the Blocks must meet a readiness review that includes the availability of Standards (performance standards, approvals, advisory/guidance documents, etc.), avionics, infrastructure, ground automation, and other enabling capabilities. In order to provide a community perspective, each module should have been fielded in two regions and include operational approvals and procedures. This allows States wishing to adopt the Blocks to draw on the experiences gained by those already employing those capabilities.

Aviation System Block Upgrade (ASBU) Block 0

A.12 Block 0 is composed of modules containing technologies and capabilities, which have already been developed and can be implemented from 2013. Based on the milestone framework established under the overall ASBU strategy, ICAO Member States are encouraged to implement those Block 0 modules applicable to their specific operational needs. Figura A-3 shows an overview of all Block 0 modules for all phases of flight.

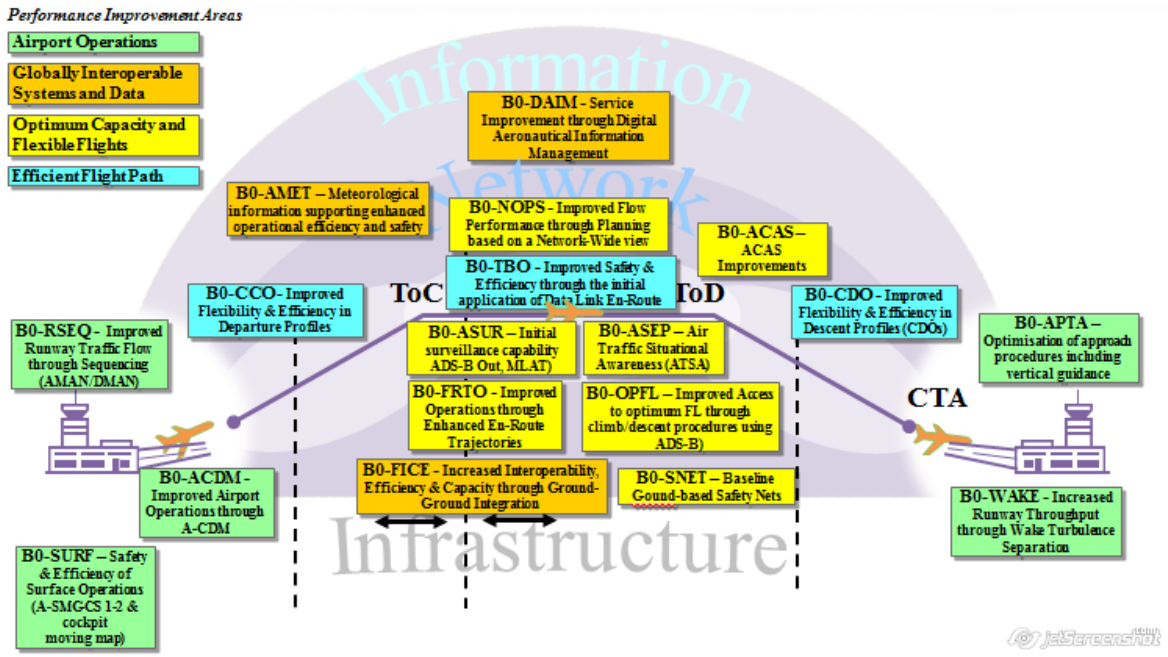

Figure A-3. Block 0 modules in perspective

APPENDIX B

Categorization of ASBU Block 0 Modules for the NAM/CAR Regions

B.1 Although the GANP has a global perspective, it is not intended that all ASBU modules are to be applied world-wide. Some of the ASBU modules contained in the GANP are specialized packages that should be applied where specific operational requirements or corresponding benefits exist. Although some modules are suitable for entirely stand-alone deployment, an overall integrated deployment of a number of modules could generate additional benefits. The benefits from an integrated implementation of a number of modules may be greater than the benefits from a series of isolated implementations. Similarly, the benefits from the coordinated deployment of one module simultaneously across a wide area (e.g., a number of proximate airports or a number of contiguous airspaces/FIRs) may exceed the benefits of implementation conducted on an ad hoc or isolated basis.

B.2 It is important to clarify how each ASBU module fits into the framework of the NAM/CAR regional air navigation system. To assist in this regard, a module categorization has been developed below with the objective of ranking each module in terms of implementation priority. On the basis of operational requirements and taking into account associated benefits, the NAM/CAR Regions have chosen all 18 Block 0 modules for implementation; however, 15 are foreseen for the RPBANIP 5 year-term - 2013-2018. The 18 Block 0 module categories are as follows:

- **Essential (E)**: These are the ASBU modules that provide substantial contribution towards global interoperability, safety, or regularity. The (3) modules for all States/Territories of NAM/CAR Regions are FICE, DATM and ACAS.

- **Desirable (D):** These are the ASBU modules that, because of their strong business and/or safety case, are recommended for implementation almost everywhere. The (9) modules for all States/Territories of NAM/CAR Regions are APTA, ACDM, NOPS, ASUR, SNET, AMET, TBO, CDO, and CCO.

- **Specific (S):** These are the ASBU modules that are recommended for implementation to address a particular operational environment in specific countries of the NAM/CAR Regions. The (3) modules are OPFL, ASEP and WAKE. These modules shall be included in future editions of the RPBANIP once the Regions complete evaluation on the feasibility of their implementation in the RPBANIP.

- **Optional (O):** These are the ASBU modules that address particular operational requirements in specific countries of NAM/CAR Regions and provide additional benefits that may not be common everywhere. The (3) modules are SURF, RSEQ and FRTO.

B.3 The modules considered by and associated to each of the Performance Improvement Areas (PIAs) are shown in Table B-1.

Performance Improvement Areas (PIA)	Performance Improvement Area Name	Module	Module Name	Category
PIA 1	Airport Operations	B0-15 RSEQ	Improved Traffic flow through Runway Sequencing (AMAN/DMAN)	O
		B0-65 APTA	Optimization of Approach Procedures including Vertical Guidance	D
		B0-70 WAKE	Increased Runway Throughput through Optimized Wake Turbulence Separation	S
		B0-75 SURF	Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2)	O
		B0-80 ACDM	Improved Airport Operations through Airport-CDM	D
PIA 2	Globally Interoperable Systems and Data - Through Globally Interoperable System Wide Information Management	B0-25 FICE	Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration	E
		B0-30 DATM	Service Improvement through Digital Aeronautical Information Management	E
		B0-105 AMET	Meteorological Information Supporting Enhanced Operational Efficiency and Safety	D
PIA 3	Optimum Capacity and Flexible Flights – Through Global Collaborative ATM	B0-10 FRTO	Improved Operations through Enhanced En-Route Trajectories	O
		B0-35 NOPS	Improved Flow Performance through Planning Based on a Network-Wide View	D
		B0-84 ASUR	Initial Capability for Ground Surveillance	D
		B0-85 ASEP	Air Traffic Situational Awareness(ATSA)	S
		B0-86 OPFL	Improved Access to Optimum Flight Levels through Climb/Descent Procedures using ADS-B	S
		B0-101 ACAS	ACAS Improvements	E
		B0-102 SNET	Increased Effectiveness of Ground-Based Safety Nets	D
PIA 4	Efficient Flight Path – Through Trajectory-based Operations	B0-05 CDO	Improved Flexibility and Efficiency in Descent Profiles (CDOs)	D
		B0-40 TBO	Improved Safety and Efficiency through the Initial Application of Data Link En-Route	D
		B0-20 CCO	Improved Flexibility and Efficiency in Departure Profiles - Continuous Climb Operations (CCOs)	D

Table B-1

Prioritization of ASBU Block 0 Modules for the NAM/CAR Regions

B.4 Table B-2 provides the list of Block 0 modules with suggested allocated priority for implementation within the NAM/CAR Regions. The allocation of priority is based on the following criteria: Priority 1 = immediate implementation; Priority 2 = recommended implementation.

PIA	Module Description	Module	Priority
PIA 1	Improve Traffic Flow through Runway Sequencing (AMAN/DMAN)	B0-15 RSEQ	2
	Optimization of Approach Procedures including Vertical Guidance	B0-65 APTA	1
	Increased Runway Throughput through optimized Wake Turbulence Separation	B0-70 WAKE	2
	Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2)	B0-75 SURF	2
	Improved Airport Operations through Airport-CDM	B0-80 ACDM	1
PIA 2	Increased Interoperability, Efficiency, and Capacity through Ground-Ground Integration	B0-25 FICE	1
	Service Improvement through Digital Aeronautical Information Management	B0-30 DATM	1
	Meteorological Information Supporting Enhanced Operational Efficiency and Safety	B0-105 AMET	1
PIA 3	Improved Operations through Enhanced En-Route Trajectories	B0-10 FRTO	1
	Improved Flow Performance through Planning Based on a Network-Wide View	B0-35 NOPS	1
	Initial Capability for Ground Surveillance	B0-84 ASUR	1
	Air Traffic Situational Awareness(ATSA)	B0-85 ASEP	2
	Improved Access to Optimum Flight Levels through Climb/Descent Procedures using ADS-B	B0-86 OPFL	2
	ACAS Improvements	B0-101 ACAS	2
	Increased Effectiveness of Ground-Based Safety Nets	B0-102 SNET	2
PIA 4	Improved Flexibility and Efficiency in Descent Profiles (CDOs)	B0-05 CDO	2
	Improved Safety and Efficiency through the Initial Application of Data Link En-Route	B0-40 TBO	2
	Improved Flexibility and Efficiency in Departure Profiles - Continuous Climb Operations (CCOs)	B0-20 CCO	2

Table B-2: NAM/CAR ASBU Block 0 Priority

ANNEX C
TERMS AND DEFINITIONS

When the following terms are used in this document they have the following meanings. Where the term has "(ICAO)" annotated, the term has already been defined as such in SARPs and/or PANS.

Acronym	Description
ACARS	Aircraft communications addressing and reporting system
ACAS	Aircraft collision avoidance system
ACC	Area Control Centre
ADS	Automatic Dependent Surveillance (retained for reference with non-updated documents. This term would normally be used to refer to ADS-C)
ADS-B	Automatic Dependent Surveillance – broadcast
ADS-C	Automatic Dependent Surveillance – contract
AFTN	Aeronautical Fixed Telecommunication Network
AIDC	ATS Interfacility Data Communications
AIP	Aeronautical Information Publication
ANSP	Air Navigation Service Provider
APV	An instrument procedure that utilizes lateral and vertical guidance but does not meet the requirements established for precision approach and landing operations
ATC	Air Traffic Control
ATM	Air Traffic Management
ATN	Aeronautical Telecommunication Network
ATS	Air Traffic Service
ATSU	ATS Unit
CNS	Communications, Navigation And Surveillance
CPDLC	Controller-Pilot Data Link Communications
CPL	Current Flight Plan
D-ATIS	Data link – Automatic Terminal Information Service (data link service)
FANS	Future Air Navigation System
FANS 1/A	Future Air Navigation System
FIR	Flight Information Region
FMS	Flight Management System
FPL	The Flight Plan as filed with an ATS unit by the pilot or a designated representative, without any subsequent changes
NOTAM	A notice distributed by means of telecommunication containing information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations.
RCP	Required Communication Performance
RNAV	Area navigation
RNP	Required Navigation Performance
PBN	Performance-Based Navigation
SARPs	Standards and Recommended Practices
SBAS	Satellite-Based Augmentation System
SID	Standard Instrument Departure
STAR	Standard Instrument Arrival Route

REFERENCES

ICAO Annexes
ICAO PANS-OPS (Doc 8168, Doc 9905)
ICAO Global Air Navigation Plan (Doc 9750)
ICAO Global Navigation Satellite System (GNSS) Manual (Doc 9849)
ICAO Global Air Traffic Management Operational Concept (Doc 9854)
ICAO Manual on Required Communication Performance /RCP (Doc 9869)
ICAO Manual on Air Traffic Management System Requirements (Doc 9882)
ICAO Manual on Global Performance of the Air Navigation System /PBN (Doc 9883)
ICAO Required Navigation Performance Authorization Required (RNP AR) Procedure Design Manual (Doc 9905)
ICAO Quality Assurance Manual for Flight Procedure Design (Doc 9906)
ICAO Continuous Descent Operations /CDO (Doc 9931)
ICAO Continuous Climb Operation /CCO (Doc 9933)
ICAO CAR/SAM Traffic Forecasts 2009–2030 (Doc 9940)
ICAO Manual on Flight and Flow — Information for a Collaborative Environment (Doc 9965)
ICAO Manual on Collaborative Air Traffic Flow Management (Doc 9971)
ICAO PBN Operational Approval (Doc 9997)
ICAO PBN airspace design (Doc 9992)