

INTERNATIONAL CIVIL AVIATION ORGANIZATION

AFI AIR NAVIGATION SYSTEM IMPLEMENTATION ACTION PLAN FOR THE AFRICA-INDIAN OCEAN (AFI) REGION

Version 1.0

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	AMENDMENTS					CORRIGENDA				
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1	November									
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RECORD OF AMENDMENTS AND CORRIGENDA

1. INTRODUCTION

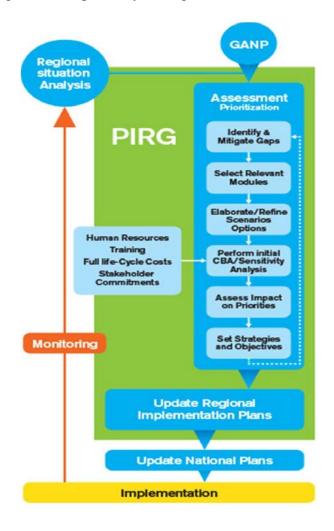
Presentation of the ICAO Global Air Navigation Plan

- 1.1. The ICAO Global Air Navigation Plan (GANP) (Doc 9750) is an overarching framework that includes key civil aviation policy principles to assist ICAO Regions, sub-regions and States with the preparation of their Regional and State air navigation plans.
- 1.2. The objective of the GANP is to increase capacity and improve efficiency of the global civil aviation system whilst improving or at least maintaining safety. The GANP also includes strategies for addressing the other ICAO Strategic Objectives.
- 1.3. The GANP includes the Aviation System Block Upgrade (ASBU) framework, its modules and its associated technology roadmaps covering inter alia communications, surveillance, navigation, information management and avionics.
- 1.4. The ASBUs are designed to be used by the Regions, sub-regions and States when they wish to adopt the relevant Blocks or individual Modules to help achieve harmonization and interoperability by their consistent application across the Regions and the world.
- 1.5. The GANP, along with other high-level ICAO plans, will help ICAO Regions, sub-regions and States establish their air navigation priorities for the next 15 years.
- 1.6. The GANP outlines ICAO's 10 key civil aviation policy principles guiding global, regional and State air navigation planning.

From the GANP to Regional Planning

- 1.7. Although the GANP has a global perspective, it is not intended that all ASBU modules are implemented at all facilities and in all aircraft. Nevertheless, coordination of deployment actions by the different stakeholders, within a State, and within or across regions are expected to deliver more benefits than implementations conducted on an ad hoc or isolated basis. Furthermore, an overall integrated deployment of a set of modules from several threads at an early stage could generate additional benefits downstream.
- 1.8. Guided by the GANP, the Regional planning process as well as National planning should be aligned and used to identify those modules which best provide solutions to the operational needs identified. Depending on implementation parameters such as the complexity of the operating environment, the constraints and the resources available, regional and national implementation plans will be developed in alignment with the GANP. This planning requires interaction between stakeholders including regulators, users of the aviation system, the Air Navigation Service Providers (ANSP's) and Aerodrome operators in order to obtain commitments to implementation.
- 1.9. Accordingly, deployments on a global, regional and sub-regional basis and ultimately at State level should be considered as an integral part of the global and regional planning process through the planning and implementation regional groups (PIRGs). In this way, deployment arrangements including applicability dates can be agreed and collectively applied by all stakeholders involved.

- 1.10. For some modules worldwide applicability will be essential; they may, therefore, eventually become the subject of ICAO Standards with mandated implementation dates.
- 1.11. In the same way, some modules are well suited for regional or sub-regional deployment and the regional planning processes under the PIRG are designed to consider which modules to implement regionally, under which circumstances and according to agreed timeframes.
- 1.12. For other modules, implementation should follow common methodologies defined either as Recommended Practices or Standards in order to leave flexibility in the deployment process but ensure global interoperability at a high level.



Regional situation Analysis

GANP PIRG Human Resources Training Full life-Cycle Costs Stakeholder Commitments

Monitoring

Assessment Prioritization Identify and Mitigate Gaps Select Relevant Modules Elaborate/Refine Scenarios Options Perform initial CBA/Sensitivity Analysis Assess Impact on Priorities Set Strategies and Objectives

Update Regional Implementation Plans

Update National Plans

Implementation

2. AVIATION SYSTEM BLOCK UPGRADES

Introduction: Aviation System Block Upgrades

- 2.1. 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.
- 2.2. ICAO developed the Block Upgrade 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.
- 2.3. The Block Upgrades incorporate a long-term perspective matching that of the three companion 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, equipment manufacturers and ANSPs.
- 2.4. 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.
 - d) Efficient flight paths.
- 2.5. The performance improvement areas and the ASBU Modules associated with each 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 illustrated in **Fig 1** below, depicting Block 0–3 availability milestones, Performance Improvement Areas, and technology/procedure/capability Modules.

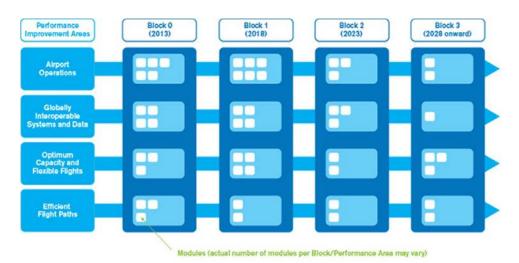


Figure 1

2.6. 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

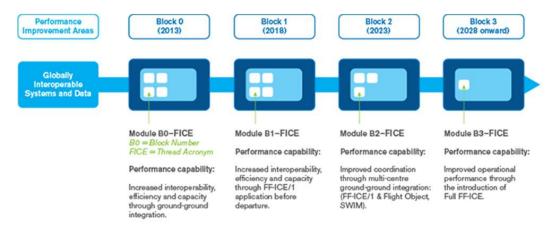
operational need. Blocks 1 through 3 are characterized by both existing and projected performance area solutions, with availability milestones beginning in 2018, 2023 and 2028 respectively.

- 2.7. Associated timescales 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.
- 2.8. 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

- 2.9. 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.
- 2.10. 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 combination of elements selected ensures that each Module serves as a comprehensive and cohesive deployable performance capability.
- 2.11. 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 below.
- 2.12. 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 the Global Air Traffic Management Operational Concept (Doc 9854).

Fig. 2: A Module Thread is associated with a specific performance improvement area. Note that the Modules in each consecutive Block feature the same Thread Acronym (FICE), indicating that they are elements of the same Operational Improvement process.



2.13. Each block includes a target date reference for its availability. Each of the modules that form the Blocks must meet a readiness review that includes the availability of standards (to include 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

2.14. 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 Block Upgrade strategy, ICAO Member States are encouraged to implement those Block 0 Modules applicable to their specific operational needs. **Appendix D** to this document provides a detailed description of Block 0 Modules.

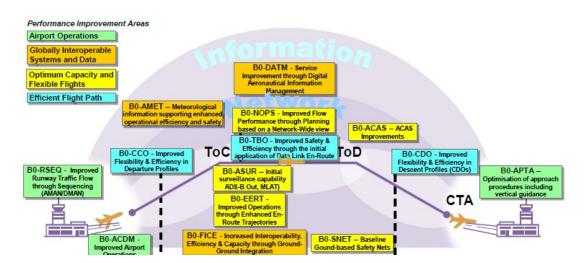


Figure 3. Block 0 in perspective

3. CATEGORIZATION OF ASBU BLOCK 0 MODULES FOR THE AFI REGION

- 3.1. The Fourth Edition of the Global Air Navigation Plan introduces ICAO's ASBU methodology and supporting technology roadmaps based on a rolling fifteen-year planning horizon. Although the GANP has a global perspective, it is not intended that all ASBU modules are to be applied around the globe. Some of the ASBU modules contained in the GANP are specialized packages that should be applied where specific operational requirements or corresponding benefits exist.
- 3.2. 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/flight information regions) may exceed the benefits of the implementations conducted on an ad hoc or isolated basis.
- 3.3. An example of a need for global applicability would be performance-based navigation (PBN). Assembly Resolution A37-11 urges all States to implement approach procedures with vertical guidance in accordance with the PBN concept. Therefore, the ASBU modules on PBN approaches should be seen as required for implementation at all airports. In the same way, some modules are well suited for regional or sub-regional deployment and should take this into account when considering which modules to implement regionally and in what circumstances and agreed timeframes.
- 3.4. Based on the above paragraphs, it is important to clarify how each ASBU module fits into the framework of AFI 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 benefits associated, AFI region has chosen all 18 Block 0 Module for implementation. The categories of 18 Block 0 Modules are as follows:
 - a) Essential (E): These are the ASBU modules that provide substantial contribution towards global interoperability, safety or regularity. The five (5) Modules for all States of AFI region are FICE, DATM; ACAS, FRTO and APTA
 - b) Desirable (D): These are the ASBU modules that, because of their strong business and/or safety case, are recommended for implementation almost everywhere. The eight (8) Modules for all States of AFI region are ACDM, NOPS, ASUR, SNET, AMET, TBO, CDO, and CCO
 - c) Specific (S): These are the ASBU modules that are recommended for implementation to address a particular operational environment in specific countries of AFI region (for example South Africa). The (3) Modules are OPFL, ASEP and WAKE.
 - d) Optional (O): These are the ASBU modules that address particular operational requirements in specific countries of AFI region and provide additional benefits that may not be common everywhere. The two (2) Modules are SURF and RSEQ.
- 3.5. The 18 modules considered and associated to each of the Performance Improvement Areas (PIA) are the following:

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

4. PRIORITIZATION OF ASBU BLOCK 0 MODULES FOR THE AFI REGION

4.1. Table 1 provides the list of Block 0 modules with suggested allocated priority for implementation within the AFI Region. The allocation of priority is based on the following criteria. Priority 1 = immediate implementation; Priority 2 = recommended implementation. Although AFI region has categorized all 18 Block 0 Modules for its implementation, Only 7 Modules will have priori 1 as it covers most of the AFI States. Reaming Modules are priority 2 and applies to only specific State (s) of AFI region.

PIA	Module Description	Module	Priority
PIA	Improve Traffic flow through Runway Sequencing (AMAN/DMAN)	B0-15 RSEQ	2
1		B0-65	1
	Optimization of Approach Procedures including vertical guidance	APTA	-
	Increased Runway Throughput through optimized Wake Turbulence Separation	B0-70	2
		WAKE Do 75	
	Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2)	B0-75 SURF	2
	Lease 1 Alignet Operations that all Alignet CDM	B0-80	1
	Improved Airport Operations through Airport-CDM	ACDM	
PIA 2	Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration	B0-25 FICE	1
2	Service Improvement through Digital Aeronautical Information Management	B0-30	1
		DAIM	
	Meteorological information supporting enhanced operational efficiency and safety	B0-105	1
		AMET	
PIA	Improved Operations through Enhanced En-Route Trajectories	B0-10	1
3		FRTO	2
	Improved Flow Performance through Planning based on a Network-Wide view	B0-35 NOPS	2
		B0-84	2
	Initial capability for ground surveillance	ASUR	
	Air Troffic Situational Awareness (ATSA)	B0-85	2
	Air Traffic Situational Awareness(ATSA)	ASEP	
	Improved access to Optimum Flight Levels through Climb/Descent Procedures using ADS-B	B0-86	2
	Improved access to Optimum I light Levels through Chino/Descent Procedures using ADS-D	OPFL	
	ACAS Improvements	B0-101	1
		ACAS	
	Increased Effectiveness of Ground-Based Safety Nets	B0-102	2
PIA		SNET B0-05	1
	Improved Flexibility and Efficiency in Descent Profiles (CDO)	CDO	1
4		B0-40	2
	Improved Safety and Efficiency through the initial application of Data Link En-Route	TBO	2
	Improved Flexibility and Efficiency Departure Profiles - Continuous Climb Operations	B0-20	1
	(CCO)	CCO	

Table 1: AFI ASBU Block 0 Priority

5. AIR NAVIGATION REPORT FORMS

- 5.1. Air Navigation Report Form (ANRF): This form is nothing but the revised version of Performance Framework Form that was being used by Planning and Implementation Regional Groups (PIRGs)/States until now. The ANRF is a customized tool for Aviation System Block Upgrades (ASBU) Modules which is recommended for application for setting planning targets, monitoring implementation, identifying challenges, measuring implementation/performance and reporting. Also, the PIRGs and States could use this report format for any other air navigation improvement programmes such as Search and Rescue. If necessary, other reporting formats that provide more details may be used but should contain as a minimum the elements described in this 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, amongst other concerns.
- 5.2. Regional/National Performance objective: In the ASBU methodology, the performance objective will be the title of the ASBU module itself. Furthermore, indicate alongside corresponding Performance Improvement area (PIA).
- 5.3. 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 are referred to eleven 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 eleven KPAs shown below are in alphabetical order as they would appear in English. They are access/equity; capacity; cost effectiveness; efficiency; environment; flexibility; global interoperability; participation of ATM community; predictability; safety; and security. However, out of these eleven KPAs, for the present, only five have been selected for reporting through ANRF, which are Access & Equity, Capacity, Efficiency, Environment and Safety. The KPAs applicable to respective ASBU module are to be identified by marking Y (Yes) or N (No). The impact assessment could be extended to more than five KPAs mentioned above if maturity of the national system allows and the process is available within the State to collect the data.
- 5.4. 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.
- 5.5. Elements related to ASBU module: Under this section list elements that are needed to implement the respective ASBU Module. Furthermore, should there be elements that are not reflected in the ASBU Module (example: 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) but at the same time if they are closely linked to the module, ANRF should specify those elements. As a part of guidance to PIRGs/States, every Regional ANP will have the complete list of all 18 Modules of ASBU Block 0 along with corresponding elements, equipage required on the ground and in the air as well as metrics specific to both implementation and benefits.
- 5.6. Targets and implementation progress (Ground and Air): Planned implementation date (month/year) and the current status/responsibility for each element are to be reported in this section. Please provide as much details as possible and should cover both avionics and ground systems. If necessary, use additional pages.
- 5.7. Implementation challenges: Any challenges/problems that are foreseen for the implementation of elements of the Module are to be reported in this section. The purpose of the section is to identify in advance any issues that will delay the implementation and if so, corrective action is to be initiated by the concerned person/entity. The four areas, under which implementation issues, if any, for the ASBU Module to be identified, are as follows:

- Ground System Implementation:
- Avionics Implementation:
- Procedures Availability:
- Operational Approvals:
- 5.8. Should be there no challenges to be resolved for the implementation of ASBU Module, indicate as "NIL".
- 5.9. Performance Monitoring and Measurement: Performance monitoring and measurement is done through the collection of data for the supporting metrics. In other words, metrics are quantitative measure 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 user value and they can provide common criteria for cost benefit analysis for air navigation systems development. The Metrics are of two types:
- 5.10. Implementation Monitoring: Under this section, the indicator supported by the data collected for the metric reflects the status of implementation of elements of the Module. For example- Percentage of international aerodromes with CDO implemented. This indicator requires data for the metric "number of international aerodromes with CDO".
- 5.11. Performance Monitoring: The metric in this section allows to asses benefits accrued as a result of implementation of the module. The benefits or expectations, also known as Key Performance Areas (KPAs), 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 eleven KPAs shown below are in alphabetical order as they would appear in English. They are access/equity; capacity; cost effectiveness; efficiency; environment; flexibility; global interoperability; participation of ATM community; predictability; safety; and security. However, out of these eleven KPAs, for the present, only five have been selected for reporting through ANRF, which are Access & Equity, Capacity, Efficiency, Environment and Safety. It is not necessary that every module contributes to all of the five KPAs. Consequently, a limited number of metrics per type of KPA, serving as an example to measure the module(s)' implementation benefits, without trying to apportion these benefits between module, have been identified below. This approach would facilitate States in collecting data for the chosen metrics. If it is not possible to identify performance metrics for an individual module, mention qualitative benefits under this section.

Key Performance Area	Related Performance Metrics
1. Access & Equity	1. KPA/Access: Number of international aerodromes with APV
	2. KPA/Access: Percentage of time Special Use Airspace (SUA) available to
	Civil Operations
	3. KPA/Access: Percentage of requested flight level
	versus cleared flight level
	4. KPA/Access: Number of access denials due to equipment failure
	5. KPA/Equity: Percentage of aircraft operators by class who consider that equity
	is achieved
	6. KPA/Equity: Percentage of different types of aircraft operating in a particular
	airspace or international aerodrome.

EXAMPLES OF PERFORMANCE METRICS FOR ASBU MODULES RELATED TO THE ELEVEN KPAs (ICAO Doc 9883)

Key Performance Area	Related Performance Metrics
2. Capacity	1. Number of operations (arrivals and departures) per international aerodrome per
	day
	2. Average ATFM delay per flight at an international aerodrome
	3. Number of landings before and after APV per international aerodrome
	4. Average en-route ATFM delay generated by airspace volume
	5. Number of aircraft in a defined volume of airspace for a period of time
3. Cost effectiveness	1. IFR movements per ATCO hour on duty
	2. IFR flights (en-route) per ATCO hour duty
4. Efficiency	1. Kilograms of fuel saved per flight
	2. Average ATFM delay per flight at the international aerodrome
	3. Percentage of PBN routes
5. Environment	1. Kilograms of CO_2 emissions reduced per flight (= KGs fuel saved per flight x
	3.157)
	2. The number of electronic pages dispatched
6. Flexibility	1. Number of backups available in emergency
	2. Number of changes approved to the flight plan
	3. Number of alternatives granted
7. Global Interoperability	1. Number of ATC automated systems that are interconnected
8. Participation of the ATM	1. Level of participation in meetings
Community	2. Level of responses to planning activities
9. Predictability	1. Arrival/departure delay (in minutes) at international aerodrome
10. Safety	1. Number of runway incursions per international aerodrome per year.
	2. Number of incidents/accidents with MET conditions as a sole or as a
	contributory factor.
	3. Number of ACAS RA events.
	4. Number of CFIT accidents.
	5.Number of missed approaches avoided due to use of CDO.
11. Security	Not Applicable.

APPENDIX A: AIR NAVIGATION REPORTING FORMS

1. AMAN and time-based metering automation Nil training. Lack of STARs and inspectors for operational approvals 2. Departure Lack of assignment approvals 2. Departure automation Nil Lack of slots approvals 3. Movement Area automation Nil Lack of procedures for adi inspectors for Capacity Optimization Nil Lack of procedures for adi inspectors for Nil Nil Lack of procedures for adi inspectors for Gapacity Optimization Nil Lack of procedures for adi inspectors for Nil Nil Nil Lack of procedures for adi inspectors for Gapacity Optimization Nil Reac apacity calculation. adi inspectors for Supporting metric Number of international area capacity organization. Lack of procedures ASBU B0-15/RSEQ: Performance Monitoring and Measurement Supporting metric: Number of international airports with AMAN and time-based metering. 1. AMAN and time- Indicator: Percentage of international aerodromes with AMAN and time-based metering. Supporting metric: Number of international airports with DMAN. 3. Movement Area Indicator: Percentage of international airport		REGIONAL /NAT						EQ	
Access & Equity Capacity Efficiency Environment Safety Applicable N Y Y Y N 4. ASBU B0-15/RSEQ: Planning Targets and Implementation Progress 6. Targets and Implementation Progress N 1. AMAN and time-based metering December 2015 - - - 2. Departure management December 2015 - - - - 1. AMAN and time-based metering December 2015 - </th <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>									
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2. APV with SBAS			December 2	2017 -	As per AFI-GN	NSS St	rategy. Not A	Applic	able
3. APV with GBAS			December 2 providers)	2018 –	Initial impleme	entatio	n at some Sta	ates (s	ervice
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2. APV with SBAS		Network Infrastructure. Not Applicable		Cost of aircraft equipage. Not applicable		Limited to certain States which have implemented. Not Applicable		Lack of knowledge and appropriate training. Not applicable	
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Elements		T 1 .			ance Indicator		· · · · · ·		
1. APV with Baro V	NAV	provide defined Suppor Baro V	d with APV) ting metric: I NAV	with B Numbe	ernational aero aro VNAV pro r of internation	cedure al airp	orts having a	d (Wh pprov	ere the % is ed APV with
2. APV with SBAS		provide	d with APV	with S	ernational aero BAS procedure r of internation	imple	mented		•
3 APV with GBAS provide			dicator: Percentage of international aerodromes having instrument runways rovided with APV with GBAS procedure implemented upporting metric: Number of international airports having approved APV with						•
8	8. ASB				nce Monitoring Performance N	-		nt	
Key Performance									
Access & Equity		Increased aerodrome accessibility							
Capacity		Increased runway capacity							
Efficiency		Reduced fuel burn due to lower minima, fewer diversions, cancellations, delays							
Environment					reduced fuel bu		1		
Safety		Increased safety through stabilized approach paths							

	EGIONAL /NATI Safety and Efficie						RF		
					Airport Ope				
3.	ASBU B0-75/SUI	RF: Impa	ct on M	lain Ke	ey Performano	ce Areas (KPA)			
	Access & Equity	Capac	acity Efficiency			Environmen	t Safety		
Applicable	Y	Y			Y	Y	Y		
4.	ASBU B0-75/SU	RF: Planr	ning Ta						
5. I	Elements			6.		Implementation ound and Air)	n Progress		
1. Surveillance system f movement (PSR, SSR, A		eration	Decer	nber 20)17 Service pr	ovider			
2. Surveillance system of			Decer	nber 20)17 Service pr	ovider			
ADS-B capacity)					-				
3. Surveillance system f					17 Service pr				
4. Visual aids for naviga					15 Service pr		11:0		
5. Wildlife strike hazard						e operator / wild	life committee		
6. Display and processing	-)17 Service pr				
	7. ASBU	B0-75/SU		-	ntation Challe	<u> </u>			
Elements	Ground System		vionic		mentation Are	ea	Operational		
Liemenus	Implementation		ementa		Procedures	s Availability	Approvals		
1. Surveillance system for ground surface movement (PSR, SSR, ADS-B or Multilateration)	Lack of adequate financial resources				Lack of procedures and training.		Lack of inspectors for operational approvals		
2. Surveillance system on board (SSR transponder, ADS-B capacity)	Nil	on boa capaci genera and so	ack of urveillance system n board (ADS-B apacity) on eneral aviation nd some ommercial aircraft		Lack of proce training.	edures and	Lack of guidance materials for inspectors. Lack of inspectors		
3. Surveillance system for vehicle	Lack of adequate financial resources	Nil			Lack of proce training.	edures and	Lack of guidance materials for inspectors. Lack of inspectors		
4. Visual aids for navigation		Nil			Nil		Lack of calibration capacity		
5. Wildlife strike hazard reduction	llife strike			Nil Nil Nil		Lack of Wildlife Haz Management Commi Conflict between avia law and state environ laws. Lack of training		Committee. veen aviation environment	Nil
٤	3. ASBU B0-75/S 8A. ASBU	URF: Per B0-75/SU	formar RF: In	nce Mo upleme		Measurement			
Elements						orting Metrics			
1. Surveillance system for ground surface movement (PSR, SSR, ADS-B or Multilateration)	Indicator: Percent Multilateration for Supporting metric Multilateration for	tage of into or ground s c: Number	ernation surface	nal aero movem rnation	dromes with S ent al airports with	MR / SSR Mode			

2. Surveillance system on board (SSR transponder, ADS-B capacity)	Indicator: Percentage of surveillance system on board (SSR transponder, ADS-B capacity). Supporting metric: Number of surveillance system on board (SSR transponder, ADS-B capacity).
3. Surveillance system for vehicle	Indicator: Percentage of international aerodromes with cooperative transponder system on vehicles. Supporting metric: Number of vehicles with transponder system installed.
4. Visual aids for navigation	Indicator: Percentage of international aerodromes complying with visual aid requirements as per Annex 14 Supporting metric: Number of international aerodromes complying with visual aid requirements as per Annex 14
5. Wildlife strike	Indicator: Percentage of reduction of wildlife incursions.
hazard reduction	Supporting metric: Number of runway incursions due to wildlife strike.
8	8. ASBU B0-75/SURF: Performance Monitoring and Measurement
	8B. ASBU B0-75/SURF: Performance Monitoring
Key Performance Areas	Metrics (if not, indicate qualitative benefits)
Access & Equity	Improves portions of the maneuvering area obscured from view of the control tower for vehicles and aircraft. Ensures equity in ATS handling of surface traffic regardless of the traffic's position on the international aerodrome
Capacity	Sustained level of aerodrome capacity during periods of reduced visibility
Efficiency	Reduced taxi times through diminished requirements for intermediate holdings based on reliance on visual surveillance only. Reduced fuel burn
Environment	Reduced emissions due to reduced fuel burn
Safety	Reduced runway incursions. Improved response to unsafe situations. Improved situational awareness leading to reduced ATC workload

2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-80/ACDM Improved Airport Operations through Airport								
			ent Area 1: Airport on Main Key Perfor	Operations mance Areas (KPA)				
Ace	cess & quity	Capacity	Efficiency	Environment	Safety			
Applicable	Y	Y	Y	Y	Y			
4. ASBU	J B0-80/A	CDM: Plannin		ementation Progress				
5. Eleme	ents		6. Targets	and Implementation (Ground and Air)	Progress			
1. Airport – CDM				rport Operator, ANSPs	, aircraft operators			
2. Aerodrome certification			December 2015 – Sta					
3. Airport planning			December 2017 – Air	<u> </u>				
4. Heliport operation			December $2017 - Sta$					
5. SMS implementation			December 2014 – Ae	rodrome Operators				
6. Development of regulations guidance material for runway	safety		December 2014 – Sta	nte CAA				
7. Development and implement safety programmes and reduce accidents and serious incident per year.	e runway-r	elated	December 2014 – Sta	nte CAA				
	7. ASBU	U B0-80/ACD	1: Implementation (Challenges				
			Implement					
Elements		ound System Dementation	Avionics Implementation	Procedures Availability	Operational Approvals			
1. Airport – CDM	groun differ	connection of ad systems of ent partners irport – CDM	Nil	Lack for coordination procedures. Lack of commitment from all stakeholders	Nil			
2. Aerodrome certification	imple	of effective ementation of x 14 SARPs	Nil	Lack of procedures. Lack of training	Lack of adequately trained inspectors			
3. Airport planning	Nil		Nil	Lack of procedures	Lack of adequately trained inspectors			
4. Heliport operation	Lack	of regulations	Nil	Lack of procedures	Lack of trained inspectors			
5. SMS implementation	Nil		Nil	Lack of States regulations. Lack of training	Lack of high level management commitment			
6. Development of regulations and technical guidance material for runway safety			Nil	Lack of States regulations	Lack of high level management commitment			
7. Development and implementation of runway safety programmes and reduce runway-related accidents and serious incidents to no more than eight per year.			Nil	Lack of standards from ICAO. Lack of States regulations. Lack of training.	Lack of high level management commitment			
8. ASI			rmance Monitoring 1: Implementation N					

Elements	Performance Indicators / Supporting Metrics
1. Airport – CDM	Indicator: Percentage of international aerodromes with Airport – CDM Supporting metric: Number of international aerodromes with Airport –
1. Allport – CDM	CDM
2. Aerodrome certification	Indicator: Percentage of certified international aerodromes
	Supporting metric: Number of certified international aerodromes
3. Airport planning	Indicator: Percentage of international aerodromes with Master Plans
	Supporting metric: Number of international aerodromes with Master Plans
4. Heliport operation	Indicator: Percentage of Heliports with operational approval
	Supporting metric: Number of Heliports with operational approval
5. SMS implementation	Indicator: Percentage of aerodrome operators having implemented SMS
6. Development of regulations and	
technical guidance material for runway	Indicator:
safety	
7. Development and implementation of	
runway safety programmes and reduce	Indicator: Percentage of aerodromes with local runway safety teams
runway-related accidents and serious	(LRST)
incidents to no more than eight per year.	
8. ASBU B0-80/A	CDM: Performance Monitoring and Measurement
8B. ASB	U B0-80/ACDM: Performance Monitoring
Key Performance Areas	Metrics (if not, indicate qualitative benefits)
Access & Equity	Enhanced equity on the use of aerodrome facilities
	Enhanced use of existing implementation for gate and stands (unlock latent
Capacity	capacity). Reduced workload, better organization of the activities to
	manage flights. Enhanced aerodrome capacity according to the demand.
	Improved operational efficiency (fleet management); and reduced delay.
Efficiency	Reduced fuel burn due to reduced taxi time and lower aircraft engine run
	time. Improved aerodrome expansion in accordance with Master Plan
Environment	Reduced emissions due to reduced fuel burn
Safety	N/A

2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE - B0-25/FICE Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration Performance Improvement Area 2: Global Interoperable Systems and Data - Through Globally Interoperable System-Wide Information Management 3. ASBU B0-25/FICE: Impact on Main Key Performance Areas (KPA) Access & Capacity Efficiency Environment Safety Equity Y Y Applicable Ν Y Y 4. ASBU B0-25/FICE: Planning Targets and Implementation Progress 6. Targets and Implementation Progress 5. Elements (Ground and Air) 1. Complete AMHS implementation at States still December 2014 – Services provider not counting with this item 2. AMHS interconnection December 2014 – Services provider 3. Implement AIDC/OLDI at some States automated June 2014 – Services provider centres 4. Implement operational AIDC/OLDI between June 2018 – Services provider adjacent ACCs 5. Implement the AFI Comn regional network June xxxx – Services provider 7. ASBU B0-25/FICE: Implementation Challenges **Implementation Area** Procedures **Elements Ground System** Avionics Operational Implementation Implementation Availability Approvals 1. Complete AMHS implementation at States still not Nil Nil Nil Nil counting with this item TPDI negotiations between 2. AMHS interconnection Nil Nil Nil MTAs 3. Implement AIDC/OLDI at some Nil Nil Nil Nil States automated centres nnatibility bat

4. Implement operational	Compatibility between			
AIDC/OLDI between adjacent	AIDC or OLDI systems	Nil	Nil	Nil
ACCs	from various manufacturers			
5. Implement the AFI Comn	Nil	Nil	Nil	Nil
regional network	1111	111	1111	1911

8. ASBU B0-25/FICE: Performance Monitoring and Measurement 8A. ASBU B0-25/FICE: Implementation Monitoring

Elements	Performance Indicators / Supporting Metrics					
1. Complete AMHS implementation at States still not counting with this item	Indicator: Percentage of States with AMHS implemented Supporting metric: Number of AMHS installed					
2. AMHS interconnection	Indicator: Percentage of States with AMHS interconnected with other AMHS Supporting metric: Number of AMHS interconnections implemented					
3. Implement AIDC/OLDI at some	Indicator: Percentage of ATS units with AIDC/OLDI					
States automated centres	Supporting metric: Number of AIDC or OLDI systems installed					
4. Implement operational	Indicator: Percentage of ACCs with AIDC or OLDI systems interconnections					
AIDC/OLDI between adjacent	implemented					
ACCs	Supporting metric: Number of AIDC interconnections implemented.					
5. Implement the AFI Comn regional network	Indicator: Percentage of phases completed for the implementation of the AFI digital network Supporting metric: Number of phases implemented					

8. ASBU B0-25/FICE: Performance Monitoring and Measurement 8B. ASBU B0-25/FICE: Performance Monitoring								
Key Performance Areas Metrics (if not, indicate qualitative benefits)								
Access & Equity	Nil							
Capacity	Reduced controller workload and increased data integrity supporting reduced separations, translating directly to cross-sector or boundary-capacity flow increases							
Efficiency	The reduced separation can also be used to more frequently offer aircraft flight levels closer to the optimum; in certain cases, this also translates into reduced en-route holding.							
Environment	Nil							
Safety	Better knowledge of more accurate flight plan information							

Meteorolog	ical Informati	on Supporting I	Enł	nanced Operation	TIVE – B0-105/AMET nal Efficiency and Safet	У
– Thro	ough Globally	Interoperable S	Syst	tem-Wide Inforn	e Systems and Data nation Management nance Areas (KPA)	
	Access & Equity	Capacity		Efficiency	Environment	Safety
Applicable	Y	YY		Y	Y	Y
4. AS	BU B0-105/A	MET: Planning	Та		nentation Progress	
5.	Elements			6. Targe	ts and Implementation (Ground and Air)	Progress
1. WAFS				In process of im		
2. IAVW				In process of im	•	
3. Tropical cyclone watch				In process of im		
4. Aerodrome warnings	1 1 .			In process of im	provement	
5. Wind shear warnings an	d alerts			MET provider se		
6. SIGMET				MET provider se		
7. QMS/MET				MET provider se		
8. 8. Other OPMET Inform			т	In process of im		
	7. ASBU	B0-105/AME1:	: In	nplementation C Implementation		
Elements	Crown	d System	1	Avionics	Procedures	Operational
Liements		nentation	T	mplementation	Availability	Approvals
1. WAFS	Connection t satellite and	o the AFS public internet	N	•	Prepare a contingency plan in case of public internet failure	N/A
2. IAVW	distribution systemsConnection to the AFSsatellite and public internetdistribution systems			il	Prepare a contingency plan in case of public internet failure	N/A
3. Tropical cyclone watch	Connection t	o the AFS public internet	N	il	Prepare a contingency plan in case of public internet failure	N/A
4. Aerodrome warnings	Connection t	o the AFTN	N	il	Local arrangements for reception of aerodrome warnings	N/A
5. Wind shear warnings and alerts	Connection t	o the AFTN	N	il	Local arrangements for reception of aerodrome warnings	N/A
6. SIGMET	Connection t	o the AFTN	N	il	Prepare a contingency plan in case of AFTN systems failure	N/A
7. QMS/MET	Nil			ommitment of p management	N/A	N/A
8. 8. Other OPMET Information (METAR, SPECI, TAF)			N	il	Prepare a contingency plan in case of AFTN systems failure	N/A
8. A				nce Monitoring a nplementation M	nd Measurement onitoring	
Elements					upporting Metrics	
1. WAFS		rcentage of State	es in	mplementation of	WAFS internet File Serv ion of WAFS internet Fil	
2. IAVW	· · · /	•	nat	ional aerodromes/	MWOs with IAVW proc	edures

	Supporting metric: Number of international aerodromes/MWOs with IAVW procedures						
	implemented						
	Indicator: Percentage of international aerodromes/MWOs with Tropical cyclone watch						
3. Tropical cyclone watch	procedures implemented						
	Supporting metric: Number of international aerodromes/MWOs with Tropical cyclone						
	watch procedures implemented						
	Indicator: Percentage of international aerodromes/AWOs with Aerodrome warnings procedures implemented						
4. Aerodrome warnings							
	Supporting metric: Number of international aerodromes/AWOs with Aerodrome						
	warnings procedures implemented						
5 Windshamming	Indicator: Percentage of international aerodromes/AWOs with IAVW procedures						
5. Wind shear warnings	implemented						
and alerts	Supporting metric: Number of international aerodromes/AWOs with IAVW procedures						
	implemented						
	Indicator: Percentage of international aerodromes/AWOs with SIGMET procedures						
6. SIGMET	implemented						
	Supporting metric: Number of international aerodromes/AWOs with SIGMET procedures						
	implemented						
7. QMS/MET	Indicator: Percentage of MET Provider States with QMS/MET implemented						
	Supporting metric: Number of MET Provider States with QMS/MET certificated						
8. Other OPMET	Indicator: Percentage of OPMET available at international aerodrome AMOs/MWOs						
Information (METAR,	Supporting metric: Number of international aerodromes/MWOs issuing required OPMET						
SPECI, TAF)	information						
8. A	SBU B0-105/AMET: Performance Monitoring and Measurement						
	8B. ASBU B0-105/AMET: Performance Monitoring						
Key Performance Areas	Metrics (if not, indicate qualitative benefits)						
Access & Equity	N/A						
Capacity	Optimized usage of airspace and aerodrome capacity due to MET support						
Efficiency	Reduced arrival/departure holding time, thus reduced fuel burn due to MET support						
Environment	Reduced emission due to reduced fuel burn due to MET support						
Safety	Reduced incidents/accidents in flight and at international aerodromes due to MET support						

1. FORMULAIRE DE RAPPORT DE NAVIGATION AERIENNE (ANRF) Planification Régionale AFI pour les Modules ASBU

Serv Per – 7	ice Improvement formance Improv Fhrough Globally	through I ement Ar Interoper	Digital Ad ea 2: Glo able Syst	eronautica obal Intero tem-Wide 1	l Inform perable Informa	IVE – B0-30/DATM action Management Systems and Data tion Management				
3.	ASBU B0-30/DA Access & Equity	Canacity Efficiency Environment Na								
Applicable	<u> </u>	N	I	N		Y	Y			
4. ASBU B0-30/DATM: Planning Targets and Implementation Progress										
5.	Elements			6. Ta		d Implementation P round and Air)	rogress			
1. QMS for AIM				mber 2015						
2. e-TOD implementat				mber 2016						
3. WGS-84 implement			<u> </u>	emented						
4. AIXM implementation				mber 2018						
5. e-AIP implementation	on			mber 2015						
6. Digital NOTAM				mber 2018						
	7. ASBU	B0-30/DA	ATM: Im	plementat						
		C (Implem	entation	Area				
Elements	Ground Impleme	-		ionics nentation		cedures Availability	Operational Approvals			
1. QMS for AIM						f procedures to allow				
2. e-TOD implementat			ack of data data data data data data data dat			s provide digital AIS				
3. WGS-84 implement						on-board devices, in	NT'1			
4. AIXM implementat					•	lar electronic flight	Nil			
5. e-AIP implementation						EFBs). Lack of g for AIS/AIM				
6. Digital NOTAM	protocors	protocol services			person	-				
	8. ASBU B0-30/I)ATM: Pe	rforman	ce Monito						
				plementat						
Elements						upporting Metrics				
	Indicator:			es QMS cer		1 8				
1. QMS for AIM	Supportin	ig metric: I	Number o	of States QN	MS certif	ication				
2. e-TOD implementat	Indicator:	Indicator: Percentage of States e-TOD implemented								
2. e-10D implementat	Supportin	Supporting metric: Number of States with e-TOD implemented								
3. WGS-84 implement		Indicator: Percentage of WGS-84 implemented								
3. WOD OF Implement	Supportin	Supporting metric: Number of States with WGS-84 implemented								
4. AIXM implementati		Indicator: Percentage of States with AXIM implemented								
. F	Supportin	Supporting metric: Number of States with AXIM implemented Indicator: Percentage of States with e-AIP implemented								
5. e-AIP implementation	on	0			·					
*	Supportin					implemented				
6. Digital NOTAM						AM implemented I NOTAM implemen	tad			
	8. ASBU B0-30/I						leu			
				Performance						
Key Performance A						alitative benefits)				
Access & Equity	N/A			<u></u>	4 4					
Capacity	N/A									
		nstrument	procedure	e design im	plement	ation; Support aerona	utical chart			
Efficiency			•	•	•	implementation of PI				
Environment				promulgat	•	•				
Safety			<u> </u>	ossible inc						

	Regional EGIONAL /NAT Improved Oper	and N IONAI rations	lation L PE s thro	al plan ROFR ough E	nhanced]	ASBU Mo OBJECT En-route '	odules IVE – B0-10 Frajectories		
Per	formance Improv – 7				otimum Ca Collaborat		nd Flexible F	lights	
3.	ASBU B0-10/FR	,	0				nce Areas (K	(PA)	
	Access & Equity	C	apaci	ty	Effic	iency	Environm	nent	Safety
Applicable	Y		Y		-	Y	Y		Ν
	ASBU B0-10/FR Elements	RTO: P	Plann	ing Ta		rgets and	ntation Prog Implementa ound and Air	tion P	rogress
1. Airspace planning					mber 2018				
2. Flexible use of ai 3. Flexible routing	rspace				mber 2016 mber 2018				
5. Flexible fouring	7. ASBU	B0-10)/FR1				lenges		
		2010	<i>,,,</i> ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		nplement				
Elements	Ground System			Avior	nics	Pro	cedures		Operational
	Implementatio		Im	pleme	ntation	Ava	ilability		Approvals
1. Airspace planning	Lack of organized and managed airsp prior to the time o flight. Lack of All WGS-84 Survey	pace of	Nil			Lack of]	Procedures		
2. Flexible use of airspace	Nil		Nil			Lack of implementation FUA Guidance and coordination agreements			
3. Flexible routing	ADS-C/CPDLC		1 11		Lack of LOAs and procedures		fleet	percentage of approvals	
	8. ASBU B0-10/F 8A. ASBU							ent	
Elements					-		rting Metric	s	
1. Airspace planning	Not assigned Ind	icator a	and n	netrics					
2. Flexible use of airspace	Indicator: Percen State	C		0.0				ivil op	perations in the
	Supporting metri Indicator: Percen						flights		
3. Flexible routing	Supporting metri	c: KG	of Fu	el savi	ngs				
	Supporting metri						М	4	
	8. ASBU B0-10/F 8B. ASB				ice Monit Performar			ent	
Key Performance Areas							tive benefits)	
Access & Equity	Better access to a								
Capacity	Flexible routing to The flexible use helps to reduce ro	of airsp oute sp	pace g bacing	gives g g and ai	reater poss ircraft sepa	sibilities to arations.	separate flig	ghts ho	rizontally. PBN
Efficiency	In particular the r module will redu allow avoiding n	ce the	numb	er r of	flight dive				
Environment	Fuel burn and em								
Safety	N/A								

			RMANCE OBJECTI lanning based on a N						
Performance I			ptimum Capacity an Collaborative ATM	d Flexible Flights					
3. ASBU B0				ce Areas (KPA)					
3. ASBU B0-35/NOPS: Impact on Main Key Performance Areas (KPA) Access & Capacity Efficiency Environment Safety									
Equity	-	-	Efficiency	Environment	Safety				
Applicable Y		Y	Y	Y	Y				
4. ASBU B0	-35/NOPS: Plai	nning Ta	argets and Implemen						
5. Elements			(Gro	Implementation Pro und and Air)	ogress				
1. Air Traffic Flow Management			ber 2015						
7.	ASBU B0-35/N	OPS: In	nplementation Chall	<u> </u>					
Elements	Ground Sys	atom	Implementatio Avionics	n Area Procedures	Onenational				
Elements	Implementa		Implementation	Availability	Operational Approvals				
	Lack for system		Implementation	11 vanability					
	software for A			Lack of ATFM an	d				
1. Air Traffic Flow Management	Lack of ATFN	1 units	Nil	CDM procedures.	<u></u>				
	implemented.			Lack of training					
	Funding								
			nce Monitoring and						
Elements	ASBU B0-35/N		nplementation Moni						
Elements	Indicator: Perc		rmance Indicators / S f implemented FMUs						
1. Air Traffic Flow Management			mber of States with A'		nted				
8. ASBUE			nce Monitoring and						
			Performance Monito						
Key Performance Areas		Metr	ics (if not, indicate q	ualitative benefits)					
			quity in the use of airs						
Access & Equity	disruption of air traffic. ATFM processes take care of equitable distribution of								
	delays	on of area	vilable conceiter al 114	to opticizate diffi-	14 aituationa an 1				
Capacity			ailable capacity, abilit ce. Number of aircraf						
Capacity	a period of tim		ce. Number of allerat		le of all'space for				
			to better anticipation	of flow issues: Redu	ced block times				
Efficiency	and times with engines on								
	Reduced fuel b	ourn as d	elays are absorbed on	6	U				
Environment			hrough speed or route	management. Reduc	ced CO2				
	emissions per		<u> </u>	1 1					
Safety	Reduced occur	rrences o	f undesired sector over	erloads					

2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-101/ACAS										
ACAS Improvements										
Pe	Performance Improvement Area 3: Optimum Capacity and Flexible Flights									
- Through Global Collaborative ATM ASPLI PO 101/A CAS: Impact on Main Kay Parformance Areas (KDA)										
	3. ASBU B0-101/ACAS: Impact on Main Key Performance Areas (KPA)									
	Equi		Capa	acity	Efficiency	Environment	Safety			
Applicable	N	<i>v</i>	Ι	N	Y	Ν	Y			
	ASBU BO)-101/ACA	S: Pla	nning Ta	argets and Impleme	ntation Progress	·			
	Elements					Implementation P	rogress			
					(ound and Air)				
1. ACAS II (TCAS V				2013-20						
	7.	ASBU B0)-101/A	CAS: In	nplementation Cha	0				
					Implementatio					
Elements		Groun			Avionics	Procedures	Operational			
		Implementation			Implementation	Availability	Approvals			
1. ACAS II (TCAS V		Nil			Equipage	Nil	Nil			
					nce Monitoring and					
	8 A	. ASBU BO)-101/A		nplementation Mon	<u> </u>				
Elements					mance Indicators / S		8			
1. ACAS II (TCAS V	ersion 7.1)				aircrafts that are equi					
			<u> </u>		ction in number of R.					
					nce Monitoring and					
Vor Dorformon og		B. ASBU B	50-101/		Performance Monit					
Key Performance	Areas	N/A		Metric	es (if not, indicate qu	lantative benefits)				
Access & Equity				nont will	naduaa umnaaaaaamu	magalution advisory	$(\mathbf{D}\mathbf{A})$ and than			
Capacity		ACAS improvement will reduce unnecessary resolution advisory (RA) and then								
Efficiency		N/A	reduce trajectory deviations							
Environment		N/A N/A								
			numbo	r of poter	ntial AIR-PROX. AC	AS increases sofet	in the case of			
Safety		breakdow		-	iuai AIK-FKUA. AU	AS increases safety	in the case of			
	UICAKUOW	in or se	paration							

2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-84/ASUR Improved Flow Performance through Planning based on a Network-Wide view

Performance Improvement Area 3: Optimum Capacity and Flexible Flights – Through Global Collaborative ATM

2	ASRI				Aain Key Performan	re Areas (KDA)				
	Acc	cess & Capa			Efficiency	Environment	Safety			
Applicable		N	Y	Y	Ν	Ν	Y			
4.	ASBU	J B0-84/AS	UR: Plar	ning Ta	argets and Implemen	tation Progress				
5. Elements 6. Targets and Implementation Progress										
5. E	lement	lS			(Grou	und and Air)				
1. Implementation of A				June 2	018 – Users and servic	e provider				
2. Implementation of M					018 – Users and servic					
3. Automation system (Present				017 – Users and servic	<u>^</u>				
		7. ASBU	B0-84/A	SUR: In	nplementation Challe	enges				
					Implementation		•			
Elements			ind Syste		Avionics	Procedures	Operational			
		Impl	ementati	on	Implementation	Availability	Approvals			
1. Implementation of A	DS-B	Lack of ADS-B systems implementation due to recent implementation of conventional surveillance systems			Lack of ADS-B implementation in general aviation, and old commercial fleet	Lack of procedures	Lack of inspector s with appropriate capability			
2. Implementation of Multilateration		Facilities of remote stations. Establishment of communications networks			Nil	Nil	Lack of inspector s with appropriate capability			
3. Automation system (Presentation)		Lack of ar functional		tion	Nil	Nil	Nil			
8	B. ASI				nce Monitoring and I					
		8A. ASBU			nplementation Monit					
Elements					nance Indicators / Su					
1. Implementation of Al	DS-B				ernational aerodromes of ADS-B implement		lemented			
2. Implementation of		Indicator:	Percentag	ge of Mu	Iltilateration system in	plemented				
Multilateration					of Multilateration sys					
3. Automation system		Indicator:	Percentag	ge of AT	S units with automation system implemented					
(Presentation)					r of automation system implemented in ATS units					
8	B. ASI				nce Monitoring and I					
		8B. ASB	U B0-84/.		Performance Monito	0				
Key Performance An	reas			Metrics	s (if not, indicate qua	litative benefits)				
Access & Equity		N/A								
Capacity		compared achieved t	to proced	lural mir	are 3 NM or 5 NM ena nima. TMA surveilland racy, better velocity ve	ce performance im	provements are			
Efficiency		N/A								
Environment		N/A								
Safety		Reduction	of the nu	mber of	major incidents. Supp	ort to search and	rescue			

2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-102/SNET Increased Effectiveness of Ground-based Safety Nets

Performance Improvement Area 3: Optimum Capacity and Flexible Flights – Through Global Collaborative ATM

		Inrough G	flobal Col	labo	rative ATM			
3.	ASBU B0-102/SI	NET: Impa	act on Mai	in K	ev Performa	nce Are	eas (KPA)	
	Access & Equity	Capa		Efficiency		Environment		Safety
Applicable	Ň	Ν			NN		Ν	Y
	ASBU B0-102/S	NET: Plan	ning Targ	gets a	and Impleme	entation	Progress	
5	Elements			6.	0	-	mentation Pro	gress
						round a		
1. Short Term Conflict					ervice provid			
2. Area Proximity War		A 117)			Service provid	der 2013	-2018	
3. Minimum Safe Altitu		,	June 201					
4. Dangerous Area Infr			2013-20		entation Cha	llongog		
	7. ASDU	DU-102/Sr	ver: mp	leme	Implem		Aroo	
Elem	ents	Gro	ound Syste	em	Avioni		Procedures	Operational
Liem	ents		lementati		Implemen		Availability	Approvals
1. Short Term Conflict	Alert (STCA)		Funding		Nil		Nil	Nil
2. Area Proximity War	. ,		Funding		Nil		Nil	Nil
3. Minimum Safe Altitu			0					
(MSAW)	C	N11 F	Nil Funding		Nil		Nil	Nil
4. Dangerous Area Infr	ingement Warning	5 Fund	Funding					
(DAIW)								
3	8. ASBU B0-102/ 8A. ASBU				nitoring and entation Mor		rement	
Elements					licators / Suj		2 Metrics	
1. Short Term Conflict	Indicator: Pe						y nets (STCA)	mplemented
Alert (STCA)	Supporting n	netric: Num	ber of safe	ety n	et (STCA) in	nplemen	ted	-
2. Area Proximity		•			U U		y nets (APW)in	plemented
Warning (APW)	Supporting n	netric: Num	ber of safe	ety n	et (APW)imp	olemente	ed	
3. Minimum Safe	Indicator: Pe	rcentage of	ATS units	s wit	h ground-bas	ed safet	v nets (MSAW)	implemented
Altitude Warning			ge of ATS units with ground-based safety nets (MSAW) implemented Number of safety net (MSAW) implemented					
(MSAW) 4. Dangerous Area				-		-		
Infringement Warning		Ų			Ų		y nets (DAIW)	implemented
(DAIW)	Supporting n	netric: Num	ber of safe	ety n	et (DAIW) ir	nplemer	nted	
· · · /	3. ASBU B0-102	SNET: Per	rformance	e Mo	nitoring and	l Measu	rement	
					ormance Mo			
Key Performance					ot, indicate q			
Access & Equity	N/A							
Capacity	N/A							
Efficiency	N/A							
Environment	N/A	-						
Safety	Signif	icant reduct	tion of the	num	ber of major	incident	S	

						IVE – B0-05/CDC Descent Operatio					
						rajectory-based (Operations				
	3. ASBU B0-05/CDO: Impact on Main Key Performance Areas (KPA)										
	Access & Equity	Canacity Efficiency Environment Safe									
Applicable	N	N	Ν	NY							
Applicable N N Y N NY 4. ASBU B0-05/CDO: Planning Targets and Implementation Progress NY NY <td< td=""></td<>											
5.			gets and I	mplementation P und and Air)	rogress						
1. CDO implementation	on		Decem	per 2017							
2. PBN STARs imple				ber 2017							
	7. A	SBU B0-05/0	CDO: Im	-							
			1		nentation						
Elements		nd System		ionics		rocedures	Operational				
		ementation	Implei	mentation	A	vailability	Approvals				
1. CDO implementation	on traject calcul functi need t	The ground trajectory calculation function will need to able upgraded		CDO Function		nd Training	In accordance with applicable requirements				
2. PBN STARs implementation	Airsp	ace Design	Nil		LOAs a	nd Training					
	8. ASBU B0- 8A. A	05/CDO: Pe SBU B0-05/(
Elements				-		pporting Metrics					
			tage of international aerodromes/TMAs with CDO implemented c: Number of international aerodromes/TMAs with CDO								
2. PBN STARs	Indica	tor: Percenta	ge of inte	ernational ac	erodromes	with PBN STAR	s implementation				
implementation	Suppo	orting metric:	Number	of internati	onal airpo	rt with PBN STAI	Rs implementation				
	8. ASBU B0-	05/CDO: Pe	erforman	ce Monitor	ing and N	leasurement					
		ASBU B0-05									
Key Performance Areas Metrics (if not , indicate qualitative benefits)											
Access & Equity		N/A									
Capacity		Increased Terminal Airspace Capacity N/A Cost savings through reduced fuel burn. Reduction in the number of required radio									
Efficiency		avings throu nissions.	gh reduce	ed fuel burn	. Reductio	on in the number of	t required radio				
Environment	Reduc	ced emissions	s as a resu	ult of reduce	ed fuel bui	m.					
Safety		More consistent flight paths and stabilized approach. Reduction in the number of incidence of controlled flight into terrain (CFIT)									

2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-20/CCO Improved Flexibility and Efficiency in Departure Profiles: Continuous Climb Operations (CCO)											
Performance Improvement Area 4: Efficient Flight Path – Through Trajectory-based Operations											
3. ASBU B0-20/CCO: Impact on Main Key Performance Areas (KPA)											
		ress & Capacity Efficiency Environment Safe									
Applicable	,	Y									
4. ASBU B0-20/CCO: Planning Targets and Implementation Progress											
5.	Element	S	6. Targets and Implementation Progress (Ground and Air)								
1. CCO implementation				Decem	per 2017		·				
2. PBN SIDs impleme	entation			Decem	per 2017						
		7. ASB	U B0-20/0	CCO: Im	plementatio						
				1		entation					
Elements		Ground System Implementation			ionics mentation		rocedures vailability	Operational Approvals			
1. CCO implementation		Nil		Nil				In accordance with applicable requirements			
2. PBN SIDs impleme	entation	Airspace	e Design	Nil				Approvals of procedures			
	8. AS				ce Monitori plementatio		Aeasurement oring				
Elements							pporting Metrics				
1. CCO implementation	on	Indicator: Percentage of international aerodromes with CCO implemented Supporting metric: Number of international airports with CCO implemented									
2. PBN SIDs impleme	entation	Indicator: Percentage of international aerodromes with PBN SIDs implemented Supporting metric: Number of international airports with PBN SIDs implemented									
	8. AS	BU B0-20	/CCO: Pe	rforman	ce Monitori	ing and N	Aeasurement				
		8B. AS	BU B0-20		erformance		0				
Key Performance	Areas			Metrics	(if not, ind	licate qua	alitative benefits)				
Access & Equity											
Capacity		Increased Terminal Airspace Capacity									
EfficiencyCost savings through reduced fuel burn and efficient aircraft operating profiles. Reduction in the number of required radio transmissions.											
Environment	Environment Authorization of operations where noise limitations would otherwise result in operations being curtailed or restricted. Environmental benefits through reduced emissions.										
Safety					. Reduction		mber of required ra	dio transmissions.			

	REGIONAL /NA d Safety and Ef						nute			
-	mprovement A	•	U							
							•			
	Access & Equity	Canacity Efficiency Environment Safety								
Applicable	N									
4	. ASBU B0-40/	TBO: Plann	ing Tar	gets and Imple	mentation Prog	ress				
5. 1		and Implement (Ground and A		rogress						
1. ADS-C over oceanic	and remote area	s	June 2	018 – Service p	rovider					
2. Continental CPDLC			June 2	018 – Service p	rovider					
	7. ASI	BU B0-40/TI	30: Imp	lementation C	hallenges					
				Implementatio	on Area					
Elements	Ground Impleme			Avionics lementation	Procedures Availability	Operational Approvals				
1. ADS-C over oceanic and remote areas	service provi	Funding and limited link service provider and infrastructure		nentation of C in general n pending	Implementati on of GOLD procedures pending		of duly trained tors for approval rations			
2. Continental CPDLC	service provi	Funding and limited link service provider and infrastructure		nentation of C in general n pending	Implementati on of GOLD procedures pending		of duly trained tors for approval rations			
	8. ASBU B0-4 8A. AS			e Monitoring a dementation M		nt				
Elements		Per	formanc	e Indicators / S	Supporting Met	rics				
1. ADS-C over oceanic		÷		ADS-C impler						
and remote areas					procedures over o	oceanic	and remote areas			
2. Continental CPDLC		tor: Percentage of CPDLC implemented								
2. Commentar CI DEC		porting metric: Number of CPDLC approved procedures over continental? areas								
	8. ASBU B0-4					nt				
		SBU B0-40/7		erformance Mo	0					
Key Performance			Metric	Metrics (if not, indicate qualitative benefits)						
Access & Equity N/A										
Capacity			its in a defined airspace for a period of time							
Efficiency			uel saved per flight. Reduction of separation							
Environment				ult of reduced f		<u> </u>	•			
Safety adherence mor rescue. Reduce			afety nets supports cleared level adherence monitoring, route itoring, danger area infringement warning and improved search and d occurrences of misunderstandings; solution to stuck microphone eased situational awareness							

3. Movement Area Capacity Optimization Nil Nil RW 1, 1W 4 & platform capacity calculation. Guidelines for movement area capacity organization. and inspectors for operational approvals 8. ASBU B0-15/RSEQ: Performance Monitoring and Measurement 8A. ASBU B0-86/OPFL: Implementation Monitoring and inspectors for operational approvals 8. ASBU B0-86/OPFL: Implementation Monitoring mand inspectors for operational approvals 9. Elements Performance Indicators / Supporting Metrics 1. AMAN and time- based metering Indicator: Percentage of international aerodromes with AMAN and time-based metering. Supporting metric: Number of international aerodromes with DMAN. 2. Departure management Indicator: Percentage of international aerodromes with DMAN. 3. Movement Area Capacity Optimization Indicator: Percentage of international aerodromes with Airport-capacity calculated. 3. Movement Area Capacity Optimization Supporting metric: Number of international airports with Airport-capacity calculated. 3. Movement Area Capacity Optimization Supporting metric: Number of international aerodromes with Airport-capacity calculated. 3. Movement Area Capacity Optimization Moterics (if not , indicate qualitative benefits) Access & Equity N/A Capacity Improved airport movement area capacity through optimization <th></th> <th>REGIONAL /NAT Improved Traffic</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>EQ</th>		REGIONAL /NAT Improved Traffic						EQ			
Access & Equity Capacity Efficiency Environment Safety Applicable N Y Y Y N 4. ASBU B0-15/RSEQ: Planning Targets and Implementation Progress 5. Elements 6. Targets and Implementation Progress 1. AMAN and time-based metering December 2015 5. 5. 5. 2. Departure management December 2015 5. <th>3</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>	3										
ApplicableNYYN4.ASBU B0-15/RSEQ: Planning Targets and Implementation Progress (Ground and Air)1.AMAN and time-based meteringDecember 20152.Departure managementDecember 20153.Movement Area Capacity OptimizationDecember 20157.ASBU B0-15/RSEQ: Implementation ChallengesImplementation ChallengesIndex of Ground System1.Add System2.Departure1.Add System2.Departure1.Add System2.Departure1.Add System2.Departure3.Movement AreaCapacity OptimizationNil3.Nil3.Nil3.Nil3.Nil3.Nil3.Nil3.Indicator: Percentage of international aerodromes wi	Access & Canacity Efficiency Environment Safety										
4. ASBU B0-15/RSEQ: Planning Targets and Implementation Progress 6. Targets and Implementation Progress (Ground and Air) 1. AMAN and time-based metering December 2015 2. Departure management December 2015 3. Movement Area Capacity Optimization December 2015 7. ASBU B0-15/RSEQ: Implementation Challenges Implementation Challenges Implementation Challenges Implementation Challenges Lack of Ground System Implementation Procedures Availability Approvals 1. AMAN and time-based metering System to support Nil Lack of for colspan="2">Lack of STARs PBN. Lack of slots operational approvals 2. Departure automation system to support synchronization synchronization Nil Lack of for procedures for RWY, TWY & platform capacity calculation. Guidelines for movement area capacity organization. System to support synchronization Lack of procedures for RWY, TWY & platform capacity calculation. Supporting metric: Number of international area capacity organization. System to Support State S	Applicable		Equity								
S. Elements (Ground and Air) 1. AMAN and time-based metering December 2015 2. Departure management December 2015 3. Movement Area Capacity Optimization December 2015 Thepherentation Challenges Implementation Challenges Thepherentation Challenges Thepherentation Challenges Implementation Challenges											
2. Departure management December 2015 3. Movement Area Capacity Optimization December 2015 7. ASBU B0-15/RSEQ: Implementation Area Implementation Area Benents Ground System Implementation Procedures Availability Approvals 1. AMAN and time- based metering Lack of automation system to support synchronization Nil Lack of appropriate training. Lack of S1DS Lack of procedures and inspectors for operational assignment Lack of procedures and inspectors for operational approvals 2. Departure Lack of automation system to support system to support system to support system to support anaagement Nil Lack of S1DS Lack of procedures and inspectors for operational approvals 3. Movement Area Capacity Optimization Nil Nil Lack of procedures for RWY, TWY & platform capacity calculation. Guidelines for movement area capacity organization. Lack of procedures and inspectors for operational approvals 8. ASBU B0-15/RSEQ: Performance Indicators / Supporting Metrics Indicator: Percentage of international aerodromes with AMAN and time-based metering. 1. AMAN and time- based metering Supporting metric: Number of international aerodromes with DMAN. Supporting metric: Number of international airports with DMAN. 3. Movement Area Capacity Optimization Indicator: Percentage of international aerodromes with Airport-capacity calculated. 3. Mo	5 Elements 6. Targets and Implementation Progress										
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7. ASBU B0-15/RSEQ: Implementation Challenges Implementation Challenges Implementation Area Control System Internation Implementation Implem											
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1. AMAN and time- based metering automation system to support synchronization Nil training. Lack of STARs PBN. Lack of slots and inspectors for operational assignment 2. Departure management Lack of automation system to support synchronization Nil Lack of appropriate training. Lack of SIDs Lack of procedures and inspectors for operational assignment approvals 3. Movement Area Capacity Optimization Nil Lack of procedures for RWY, TWY & platform capacity calculation. Guidelines for movement area capacity organization. Lack of procedures and inspectors for operational approvals 8. ASBU B0-15/RSEQ: Performance Monitoring and Measurement 8A. ASBU B0-86/OPFL: Implementation Monitoring Lack of procedures and inspectors for operational approvals 9. AMAN and time- based metering Indicator: Percentage of international aerodromes with AMAN and time- based metering. Supporting metric: Number of international airports with AMAN and time- based metering. 2. Departure Indicator: Percentage of international aerodromes with DMAN. Supporting metric: Number of international airports with DMAN. 3. Movement Area Capacity Optimization Indicator: Percentage of international airports with DMAN. 3. Movement Area Capacity Optimization Indicator: Percentage of international airports with DMAN. 3. Movement Area Capacity Optimization Indicator: Percentage of international airports with DMAN. 3. Movement Area Capacity Optimization	Elements	Implementat				Procedures	s Availability	Approvals			
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2. Departure management automation system to support synchronization Nil training. Lack of SIDs PBN. Lack of SIDs PBN. Lack of slots assignment and inspectors for operational approvals 3. Movement Area Capacity Optimization Nil Lack of procedures for RWY, TWY & platform capacity calculation. Guidelines for movement area capacity organization. Lack of procedures for RWY, TWY & platform capacity calculation. Guidelines for movement area capacity organization. Lack of procedures for RWY, TWY & platform capacity calculation. Guidelines for movement area capacity organization. Lack of procedures and inspectors for operational approvals 8. ASBU B0-15/RSEQ: Performance Monitoring and Measurement 8A. ASBU B0-8/OPFL: Implementation Monitoring Lack of procedures 9. Indicator: Percentage of international aerodromes with AMAN and time-based metering. Supporting metric: Number of international airports with DMAN. Supporting metric: Number of international airports with AMAN and time-based metering. 9. Supporting metric: Number of international airports with Airport-capacity calculated. 9. Supporting metric: Number of international airports with Airport-capacity calculated. 9. Supporting metric: Number of international airports with Airport-capacity calculated. 9. Supporting metric: Number of international airports with Airport-capacity calculated. 9. Supporting metric: Number of international airports with Airport-capacity calculated.						<u> </u>					
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3. Movement Area Capacity Optimization Nil Lack of procedures for RWY, TWY & platform capacity calculation. Guidelines for movement area capacity organization. Lack of procedures and inspectors for operational approvals 8. ASBU B0-15/RSEQ: Performance Monitoring and Measurement 8A. ASBU B0-86/OPFL: Implementation Monitoring Lack of procedures and inspectors for operational approvals 1. AMAN and time- based metering Indicator: Percentage of international aerodromes with AMAN and time-based metering. Supporting metric: Number of international aerodromes with AMAN and time-based metering. 2. Departure management Indicator: Percentage of international aerodromes with AMAN and time-based metering. 3. Movement Area Capacity Optimization Supporting metric: Number of international aerodromes with AMAN. 3. Movement Area Capacity Optimization Supporting metric: Number of international airports with Airport-capacity calculated. Capacity Optimization Supporting metric: Number of international airports with Airport-capacity calculated. 8. ASBU B0-15/RSEQ: Performance Monitoring and Measurement 8B. ASBU B0-15/RSEQ: Performance Monitoring Access & Equity N/A Capacity Improved airport movement area capacity through optimization Efficiency Efficiency is positively impacted as reflected by increased runway throughput and arrival rates	management							-			
3. Movement Area Capacity OptimizationNilRWY, TWY & platform capacity calculation. Guidelines for movement area capacity organization.Lack of procedures and inspectors for operational approvals8. ASBU B0-15/RSEQ : Performance Monitoring and Measurement SA. ASBU B0-15/RSEQ : Performance Indicators / Supporting Metricsapprovals9. AMAN and time- based meteringIndicator: Percentage of international aerodromes with AMAN and time-based metering. Supporting metric: Number of international airports with AMAN and time-based metering.0. Departure managementIndicator: Percentage of international aerodromes with DMAN. Supporting metric: Number of international airports with DMAN.3. Movement Area Capacity OptimizationIndicator: Percentage of international aerodromes with Airport-capacity calculated. Supporting metric: Number of international airports		synchronizatio	n				1 0	approvals			
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area capacity organization. approvals ASBU B0-15/RSEQ: Performance Monitoring and Measurement 8A. ASBU B0-86/OPFL: Implementation Monitoring Elements Performance Indicators / Supporting Metrics 1. AMAN and time- based metering Indicator: Percentage of international aerodromes with AMAN and time-based metering. Supporting metric: Number of international airports with AMAN and time-based metering. 2. Departure Indicator: Percentage of international aerodromes with DMAN. management Supporting metric: Number of international airports with DMAN. 3. Movement Area Indicator: Percentage of international aerodromes with Airport-capacity calculated. Capacity Optimization Supporting metric: Number of international airports with Airport-capacity calculated. Supporting metric: Number of international aerodromes with Airport-capacity calculated. Supporting metric: Number of international airports with Airport-capacity calculated. Capacity Optimization Supporting metric: Number of international airports with Airport-capacity calculated. Supporting metric: Number of international aerodromes with Airport-capacity calculated. ASBU B0-15/RSEQ: Performance Monitoring Access & Equity N/A Capacity N/A Capacity Improved airport movement area capacity through optimization Efficiency is positively impacted as relected by increas	Capacity Optimization		1111	NII				operational			
8. ASBU B0-15/RSEQ: Performance Monitoring and Measurement 8A. ASBU B0-86/OPFL: Implementation Monitoring Elements Performance Indicators / Supporting Metrics 1. AMAN and time- based metering Indicator: Percentage of international aerodromes with AMAN and time-based metering. Supporting metric: Number of international airports with AMAN and time-based metering. 2. Departure Indicator: Percentage of international aerodromes with DMAN. Supporting metric: Number of international airports with DMAN. 3. Movement Area Indicator: Percentage of international aerodromes with Airport-capacity calculated. Supporting metric: Number of international airports with Airport-capacity calculated. Supporting metric: Number of international airports with Airport-capacity calculated. Supporting metric: Number of international airports with Airport-capacity calculated. Supporting metric: Number of international airports with Airport-capacity calculated. Supporting metric: Number of international airports with Airport-capacity calculated. Supporting metric: Number of international airports with Airport-capacity calculated. Supporting metric: Number of international airports with Airport-capacity calculated. Supporting metric: Number of international airports with Airport-capacity calculated. Supporting metric: Number of international airports with Airport-capacity calculated. Supporting metric: Number of international airports with Airport-capacity calculated. Su								approvals			
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ElementsPerformance Indicators / Supporting Metrics1. AMAN and time- based meteringIndicator: Percentage of international aerodromes with AMAN and time-based metering. Supporting metric: Number of international airports with AMAN and time-based metering.2. DepartureIndicator: Percentage of international aerodromes with DMAN. Supporting metric: Number of international airports with DMAN.3. Movement AreaIndicator: Percentage of international aerodromes with Airport-capacity calculated. Supporting metric: Number of international airports with Airport-capacity calculated.8. ASBU B0-15/RSEQ: Performance Monitoring and Measurement BB. ASBU B0-15/RSEQ: Performance MonitoringMetrics (if not , indicate qualitative benefits)Access & EquityN/ACapacityEfficiencyEfficiencyEfficiencyReduction of carbon emissions											
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based meteringSupporting metric: Number of international airports with AMAN and time-based metering.2. DepartureIndicator: Percentage of international aerodromes with DMAN.3. Movement AreaSupporting metric: Number of international airports with DMAN.3. Movement AreaIndicator: Percentage of international aerodromes with Airport-capacity calculated.Capacity OptimizationSupporting metric: Number of international airports with Airport-capacity calculated. ASBU B0-15/RSEQ: Performance Monitoring and Measurement 8B. ASBU B0-15/RSEQ: Performance Monitoring Key Performance AreasMetrics (if not , indicate qualitative benefits)Access & EquityN/ACapacityImproved airport movement area capacity through optimizationEfficiencyEfficiency is positively impacted as reflected by increased runway throughput and arrival ratesEnvironmentReduction of carbon emissions		Indicator: Perc						e-based metering.			
2. DepartureIndicator: Percentage of international aerodromes with DMAN. Supporting metric: Number of international airports with DMAN.3. Movement AreaIndicator: Percentage of international aerodromes with Airport-capacity calculated. Supporting metric: Number of international airports with Airport-capacity calculated.3. Movement AreaIndicator: Percentage of international aerodromes with Airport-capacity calculated. Supporting metric: Number of international airports with Airport-capacity calculated.3. Movement AreaSupporting metric: Number of international airports with Airport-capacity calculated.Capacity OptimizationSupporting metric: Number of international airports with Airport-capacity calculated.8. ASBU B0-15/RSEQ: Performance Monitoring and Measurement BB. ASBU B0-15/RSEQ: Performance MonitoringKey Performance AreasMetrics (if not , indicate qualitative benefits)Access & EquityN/ACapacityImproved airport movement area capacity through optimizationEfficiencyEfficiency is positively impacted as reflected by increased runway throughput and arrival ratesEnvironmentReduction of carbon emissions		Supporting me	tric: Num	ber of int	ternatio	nal airports wi	th AMAN and ti	me-based metering.			
3. Movement Area Capacity OptimizationIndicator: Percentage of international aerodromes with Airport-capacity calculated. Supporting metric: Number of international airports with Airport-capacity calculated.8. ASBU B0-15/RSEQ: Performance Monitoring and Measurement BB. ASBU B0-15/RSEQ: Performance MonitoringKey Performance AreasMetrics (if not , indicate qualitative benefits)Access & EquityN/ACapacityImproved airport movement area capacity through optimizationEfficiencyEfficiency is positively impacted as reflected by increased runway throughput and arrival ratesEnvironmentReduction of carbon emissions								0			
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8. ASBU B0-15/RSEQ: Performance Monitoring and Measurement 8B. ASBU B0-15/RSEQ: Performance Monitoring Key Performance Areas Metrics (if not , indicate qualitative benefits) Access & Equity N/A Capacity Improved airport movement area capacity through optimization Efficiency Efficiency is positively impacted as reflected by increased runway throughput and arrival rates Environment Reduction of carbon emissions	3. Movement Area	Indicator: Perc	entage of	internatio	onal ae	rodromes with	Airport-capacity	calculated.			
Key Performance AreasSB. ASBU B0-15/RSEQ: Performance MonitoringKey Performance AreasMetrics (if not , indicate qualitative benefits)Access & EquityN/ACapacityImproved airport movement area capacity through optimizationEfficiencyEfficiency is positively impacted as reflected by increased runway throughput and arrival ratesEnvironmentReduction of carbon emissions	Capacity Optimization	Supporting me	tric: Num	ber of int	ternatio	nal airports wi	th Airport-capac	eity calculated.			
Key Performance AreasMetrics (if not , indicate qualitative benefits)Access & EquityN/ACapacityImproved airport movement area capacity through optimizationEfficiencyEfficiency is positively impacted as reflected by increased runway throughput and arrival ratesEnvironmentReduction of carbon emissions		8. ASBU B0-15/	RSEQ: Pe	erformar	ice Mo	nitoring and I	Measurement				
AreasMetrics (if not , indicate qualitative benefits)Access & EquityN/ACapacityImproved airport movement area capacity through optimizationEfficiencyEfficiency is positively impacted as reflected by increased runway throughput and arrival ratesEnvironmentReduction of carbon emissions		8B. ASB	U B0-15/	RSEQ: F	Perform	nance Monito	ring				
Access & EquityN/ACapacityImproved airport movement area capacity through optimizationEfficiencyEfficiency is positively impacted as reflected by increased runway throughput and arrival ratesEnvironmentReduction of carbon emissions	-		Μ	letrics (if	not, i	ndicate qualit	ative benefits)				
CapacityImproved airport movement area capacity through optimizationEfficiencyEfficiency is positively impacted as reflected by increased runway throughput and arrival ratesEnvironmentReduction of carbon emissions		N/A	N/A								
EfficiencyEfficiency is positively impacted as reflected by increased runway throughput and arrival ratesEnvironmentReduction of carbon emissions											
Environment Reduction of carbon emissions	· · ·	Efficiency is p	Efficiency is positively impacted as reflected by increased runway throughput and arrival								
	Environment		arbon em	issions							
	Safety	N/A									

	Regiona	l and Nation	nal plaı	EPORT FOR nning for ASB	U Module	s					
	timization of	Approach H	Procedu	MANCE OB. 11res Including Area 1: Airpor	g Vertical (Guidanc		L			
3. A							PA)				
	Access & Equity	Canacity Efficiency Environment Safe									
Applicable								Y			
4. A	SBU B0-65/A	PTA: Plann		rgets and Imp							
5. Element	6. Targets and Implementation Progress (Ground and Air)										
1. APV with Baro VNA	V	December 2016 – Service Providers and usersDecember 2017 – As per AFI-GNSS Strategy. Not Applicable									
2. APV with SBAS 3. APV with GBAS		December 2		As per AFI-GI Initial impleme			~ ~				
5.74 V with OD/15		providers)									
	7. ASB	U B0-65/AP	TA: In	plementation	<u> </u>						
Elements	Crow	nd System	/	Implement Avionics	Ation Area		<u> </u>	perational			
Elements		mentation		ementation	Availal			Approvals			
			Insuff		Insufficie						
1. APV with Baro VNA	V NIL ?		number of		appropria training	ite	Lack of appropriate training				
				equipped aircraft			uuning				
					Limited t		Lack	of knowledge			
2. APV with SBAS		Network Infrastructure. Not Applicable		equipage. Not applicable				ppropriate			
2. AF V WILLI SDAS						have training.					
	rippilet					icable	appli	cable			
	Lack of	Lack of cost-		icient	Insufficie			of appropriate			
3. APV with GBAS		benefit analysis.		number of		appropriate		training. Evaluation of a real operation requirement			
		Adverse ionosphere		equipped aircraft							
Q	<u> </u>			ce Monitorin	-	Guromo	<u> </u>	rement			
0.							IL				
Elements		BA. ASBU B0-65/APTA: Implementation Monitoring Performance Indicators / Supporting Metrics									
	Indicator: Percentage of international aerodromes having instrument runways										
	·	provided with APV with Baro VNAV procedure implemented (Where the % is									
1. APV with Baro VNA		/	T	of into a sti	al almost 1						
	Baro V	Supporting metric: Number of international airports having approved APV with Baro VNAV									
		Indicator: Percentage of international aerodromes having instrument runways									
2. APV with SBAS	-	provided with APV with SBAS procedure implemented Supporting metric: Number of international airports having approved APV with									
	Suppor	ing metric: I	number	of internation	ai airports	naving a	pprove	cu APV with			
		SBAS Indicator: Percentage of international aerodromes having instrument runways									
2 ADV with CDAC				BAS procedure							
3. APV with GBAS	Suppor	Supporting metric: Number of international airports having approved APV with									
	GBAS										
8.				ce Monitorin			nt				
Key Performance Are				erformance N if not , indicat			fite)				
Access & Equity		ed aerodrome			i yuanal	ive bene	110)				
Capacity		ed runway ca									
Efficiency			<u> </u>	wer minima, f	ewer diver	sions, ca	ncellat	tions, delays			
Environment				educed fuel bu							
Safety	Increase	ed safety thro	ough sta	bilized approa	ich paths						

	EGIONAL /NATIO Safety and Efficien						RF		
3.	Performance ASBU B0-75/SUR				: Airport Ope ey Performan				
	Access & Capacity Efficiency Environmen								
Applicable	Y	Y			Y	Y	Y		
4.	ASBU B0-75/SUR	F: Planr	ning Ta	rgets a	nd Implemen	tation Progress			
5. 1	Elements				Targets and	Implementation ound and Air)			
1. Surveillance system f movement (PSR, SSR, 2		ation	Decer	nber 20)17 Service pr	ovider			
2. Surveillance system of ADS-B capacity)	on board (SSR transj	oonder,	Decer	nber 20)17 Service pr	ovider			
3. Surveillance system f	for vehicle		Decer	nber 20)17 Service pr	ovider			
4. Visual aids for naviga			Decer	nber 20	015 Service pr	ovider			
5. Wildlife strike hazard	l reduction					e operator / wild	llife committee		
6. Display and processing)17 Service pr				
	7. ASBUE	80-75/SU	RF: In		ntation Challe				
		-			mentation Ar	ea	1		
Elements	Ground System Implementation		Avionic: lementa		Procedure	s Availability	Operational Approvals		
1. Surveillance system for ground surface movement (PSR, SSR, ADS-B or Multilateration)	Lack of adequate financial resources	Nil	Nil		Lack of proc training.	edures and	Lack of inspectors for operational approvals		
2. Surveillance system on board (SSR transponder, ADS-B capacity)	Nil	surveil on boa capaci genera	Lack of surveillance system on board (ADS-B capacity) on general aviation and some		Lack of proc training.	edures and	Lack of guidance materials for inspectors. Lack of inspectors		
3. Surveillance system for vehicle	Lack of adequate financial resources	Nil			Lack of proc training.	edures and	Lack of guidance materials for inspectors. Lack of inspectors		
4. Visual aids for navigation		Nil			Nil		Lack of calibration capacity		
5. Wildlife strike hazard reduction		Nil			law and state laws. Lack of	Committee. veen aviation e environment	Nil		
8	8. ASBU B0-75/SU				0				
	8A. ASBU E				ntation Monit				
Elements		Performance Indicators / Supporting Metrics							
1. Surveillance system	Indicator: Percenta					MR / SSR Mode	e S /ADS-B		
for ground surface movement (PSR, SSR, ADS-B or	Multilateration for Supporting metric: Multilateration for	Number	of inte	rnation	al airports with	n SMR / SSR Mo	ode S /ADS-B		

Multilateration)					
2. Surveillance system on board (SSR transponder, ADS-B capacity)	Indicator: Percentage of surveillance system on board (SSR transponder, ADS-B capacity). Supporting metric: Number of surveillance system on board (SSR transponder, ADS-B capacity).				
3. Surveillance system for vehicle	Indicator: Percentage of international aerodromes with cooperative transponder system on vehicles. Supporting metric: Number of vehicles with transponder system installed.				
4. Visual aids for navigation	Indicator: Percentage of international aerodromes complying with visual aid requirements as per Annex 14 Supporting metric: Number of international aerodromes complying with visual aid requirements as per Annex 14				
5. Wildlife strike	Indicator: Percentage of reduction of wildlife incursions.				
hazard reduction	Supporting metric: Number of runway incursions due to wildlife strike.				
8	8. ASBU B0-75/SURF: Performance Monitoring and Measurement 8B. ASBU B0-75/SURF: Performance Monitoring				
Key Performance	Metrics (if not, indicate qualitative benefits)				
Areas	wetrics (if not, indicate quantative benefits)				
Access & Equity	Improves portions of the maneuvering area obscured from view of the control tower for vehicles and aircraft. Ensures equity in ATS handling of surface traffic regardless of the traffic's position on the international aerodrome				
Capacity	Sustained level of aerodrome capacity during periods of reduced visibility				
Efficiency Reduced taxi times through diminished requirements for intermediate holdings reliance on visual surveillance only. Reduced fuel burn					
Environment	Reduced emissions due to reduced fuel burn				
Safety	Reduced runway incursions. Improved response to unsafe situations. Improved situational awareness leading to reduced ATC workload				

2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-80/ACDM Improved Airport Operations through Airport								
3. ASB			ent Area 1: Airport on Main Key Perfor	Operations mance Areas (KPA)				
Ac	cess & quity	Capacity	Efficiency	Environment	Safety			
Applicable	Y	Y	Y	Y	Y			
4. ASB	U B0-80/A	CDM: Plannin		ementation Progress				
5. Elem	ents		6. Targets	and Implementation (Ground and Air)	Progress			
1. Airport – CDM				rport Operator, ANSPs	, aircraft operators			
2. Aerodrome certification			December 2015 – Sta					
3. Airport planning			December 2017 – Air					
4. Heliport operation			December 2017 – Sta					
5. SMS implementation			December 2014 – Ae	rodrome Operators				
6. Development of regulation guidance material for runway	safety		December 2014 – Sta	te CAA				
7. Development and impleme safety programmes and reduc accidents and serious inciden per year.	e runway-r	elated	December 2014 – Sta	tte CAA				
	7. ASBU	U B0-80/ACDN	1: Implementation (Challenges				
			Implement					
Elements		ound System Dementation	Avionics Implementation	Procedures Availability	Operational Approvals			
1. Airport – CDM	groun differ	connection of ad systems of ent partners irport – CDM	Nil	Lack for coordination procedures. Lack of commitment from all stakeholders	Nil			
2. Aerodrome certification	imple	of effective mentation of x 14 SARPs	Nil	Lack of procedures. Lack of training	Lack of adequately trained inspectors			
3. Airport planning	Nil		Nil	Lack of procedures	Lack of adequately trained inspectors			
4. Heliport operation	Lack	of regulations	Nil	Lack of procedures	Lack of trained inspectors			
5. SMS implementation	Nil		Nil	Lack of States regulations. Lack of training	Lack of high level management commitment			
6. Development of regulation and technical guidance mater for runway safety			Nil	Lack of States regulations	Lack of high level management commitment			
7. Development and implementation of runway safety programmes and reduc runway-related accidents and serious incidents to no more than eight per year.	1N11		Nil	Lack of standards from ICAO. Lack of States regulations. Lack of training.	Lack of high level management commitment			
8. AS			rmance Monitoring 1: Implementation N					

Elements	Performance Indicators / Supporting Metrics
1. Airport – CDM	Indicator: Percentage of international aerodromes with Airport – CDM Supporting metric: Number of international aerodromes with Airport –
1. Allport – CDM	CDM
2. Aerodrome certification	Indicator: Percentage of certified international aerodromes
	Supporting metric: Number of certified international aerodromes
3. Airport planning	Indicator: Percentage of international aerodromes with Master Plans
	Supporting metric: Number of international aerodromes with Master Plans
4. Heliport operation	Indicator: Percentage of Heliports with operational approval
	Supporting metric: Number of Heliports with operational approval
5. SMS implementation	Indicator: Percentage of aerodrome operators having implemented SMS
6. Development of regulations and	
technical guidance material for runway	Indicator:
safety	
7. Development and implementation of	
runway safety programmes and reduce	Indicator: Percentage of aerodromes with local runway safety teams
runway-related accidents and serious	(LRST)
incidents to no more than eight per year.	
8. ASBU B0-80/A	CDM: Performance Monitoring and Measurement
8B. ASB	U B0-80/ACDM: Performance Monitoring
Key Performance Areas	Metrics (if not, indicate qualitative benefits)
Access & Equity	Enhanced equity on the use of aerodrome facilities
	Enhanced use of existing implementation for gate and stands (unlock latent
Capacity	capacity). Reduced workload, better organization of the activities to
	manage flights. Enhanced aerodrome capacity according to the demand.
	Improved operational efficiency (fleet management); and reduced delay.
Efficiency	Reduced fuel burn due to reduced taxi time and lower aircraft engine run
	time. Improved aerodrome expansion in accordance with Master Plan
Environment	Reduced emissions due to reduced fuel burn
Safety	N/A

2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE - B0-25/FICE Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration Performance Improvement Area 2: Global Interoperable Systems and Data - Through Globally Interoperable System-Wide Information Management 3. ASBU B0-25/FICE: Impact on Main Key Performance Areas (KPA) Access & Capacity Efficiency Environment Safety Equity Y Y Applicable Ν Y Y 4. ASBU B0-25/FICE: Planning Targets and Implementation Progress 6. Targets and Implementation Progress 5. Elements (Ground and Air) 1. Complete AMHS implementation at States still December 2014 – Services provider not counting with this item 2. AMHS interconnection December 2014 – Services provider 3. Implement AIDC/OLDI at some States automated June 2014 – Services provider centres 4. Implement operational AIDC/OLDI between June 2018 – Services provider adjacent ACCs 5. Implement the AFI Comn regional network June xxxx – Services provider 7. ASBU B0-25/FICE: Implementation Challenges **Implementation Area** Procedures **Elements Ground System** Avionics Operational Implementation Implementation Availability Approvals 1. Complete AMHS implementation at States still not Nil Nil Nil Nil counting with this item TPDI negotiations between 2. AMHS interconnection Nil Nil Nil MTAs 3. Implement AIDC/OLDI at some Nil Nil Nil Nil States automated centres

4. Implement operational	Compatibility between	N:1	Nil	Nil
AIDC/OLDI between adjacent ACCs	AIDC or OLDI systems from various manufacturers	Nil	IN11	INII
5. Implement the AFI Comn regional network	Nil	Nil	Nil	Nil

8. ASBU B0-25/FICE: Performance Monitoring and Measurement 8A. ASBU B0-25/FICE: Implementation Monitoring

Elements	Performance Indicators / Supporting Metrics
1. Complete AMHS implementation at States still not counting with this item	Indicator: Percentage of States with AMHS implemented Supporting metric: Number of AMHS installed
2. AMHS interconnection	Indicator: Percentage of States with AMHS interconnected with other AMHS Supporting metric: Number of AMHS interconnections implemented
3. Implement AIDC/OLDI at some	Indicator: Percentage of ATS units with AIDC/OLDI
States automated centres	Supporting metric: Number of AIDC or OLDI systems installed
4. Implement operational AIDC/OLDI between adjacent ACCs	Indicator: Percentage of ACCs with AIDC or OLDI systems interconnections implemented Supporting metric: Number of AIDC interconnections implemented, as per <u>CAR/SAM FASID Table CNS 1Bb</u>
5. Implement the AFI Comn regional network	Indicator: Percentage of phases completed for the implementation of the AFI digital network

Supporting metric: Number of phases implemented							
8. ASBU B0-25/FICE: Performance Monitoring and Measurement							
	8B. ASBU B0-25/FICE: Performance Monitoring						
Key Performance Areas	Metrics (if not, indicate qualitative benefits)						
Access & Equity	Nil						
Capacity	Reduced controller workload and increased data integrity supporting reduced						
Capacity	separations, translating directly to cross-sector or boundary-capacity flow increases						
	The reduced separation can also be used to more frequently offer aircraft flight levels						
Efficiency	closer to the optimum; in certain cases, this also translates into reduced en-route						
	holding.						
Environment	Nil						
Safety	Better knowledge of more accurate flight plan information						

Meteorolog	ical Informatio	on Supporting I	Enh	anced Operation	TIVE – B0-105/AMET nal Efficiency and Safe	ty
– Thre	ough Globally	Interoperable S	Syste	em-Wide Inforn	e Systems and Data nation Management	
	Access &	Capacity		Efficiency	nance Areas (KPA) Environment	Safety
Applicable	Equity Y	YY		Y	Y	Y
**			Tai	-	nentation Progress	-
	Elements				ts and Implementation (Ground and Air)	Progress
1. WAFS				In process of im		
2. IAVW				In process of im		
3. Tropical cyclone watch				In process of im	-	
4. Aerodrome warnings				In process of im		
5. Wind shear warnings an	d alerts			MET provider s		
6. SIGMET				MET provider s		
7. QMS/MET				MET provider s		
8. 8. Other OPMET Inform			-	In process of im		
	7. ASBU	B0-105/AMET:		plementation C	<u> </u>	
		10 4		Implementation		
Elements		d System nentation	T.	Avionics	Procedures A voilability	Operational
	A		11	nplementation	Availability Prepare a contingency	Approvals
1. WAFS	Connection to the AFS satellite and public internet			1	plan in case of public	N/A
1. WAIS	distribution s		Ni	1	internet failure	
	Connection to the AFS				Prepare a contingency	
2. IAVW				1	plan in case of public	N/A
2	distribution s		1 11	•	internet failure	1.011
	Connection t				Prepare a contingency	
3. Tropical cyclone watch			Ni	1	plan in case of public	N/A
	distribution s				internet failure	
		•			Local arrangements	
4. Aerodrome warnings	Connection to the AFTN		Ni	1	for reception of	N/A
-					aerodrome warnings	
5. Wind shear warnings					Local arrangements	
and alerts	Connection t	o the AFTN	Ni	1	for reception of	N/A
					aerodrome warnings	
					Prepare a contingency	
6. SIGMET	Connection t	o the AFTN	Ni	1	plan in case of AFTN	N/A
			~		systems failure	
7. QMS/MET	Nil			ommitment of	N/A	N/A
			top	o management		
8. 8. Other OPMET	Corrections	o the APTNI	NT.	1	Prepare a contingency	NT/A
Information (METAR, SPECI, TAF)	Connection t	o the AFIN	Ni	1	plan in case of AFTN systems failure	N/A
	 	AMET. Doufour	nor	oo Monitorina a	nd Measurement	
0. <i>I</i>				plementation M		
Elements				•	upporting Metrics	
	Indicator: Pe				WAFS internet File Ser	vice (WIFS)
1. WAFS					ion of WAFS internet Fi	
· · · · · ·	(WIFS)			T		
		rcentage of inter	nati	onal aerodromes/	MWOs with IAVW pro	cedures
2. IAVW	implemented				r	

	Supporting metric: Number of international aerodromes/MWOs with IAVW procedures
	implemented
	Indicator: Percentage of international aerodromes/MWOs with Tropical cyclone watch
	procedures implemented
3. Tropical cyclone watch	Supporting metric: Number of international aerodromes/MWOs with Tropical cyclone
	watch procedures implemented
	Indicator: Percentage of international aerodromes/AWOs with Aerodrome warnings
4. Aerodrome warnings	procedures implemented
	Supporting metric: Number of international aerodromes/AWOs with Aerodrome
	warnings procedures implemented
5 XX' 1 1	Indicator: Percentage of international aerodromes/AWOs with IAVW procedures
5. Wind shear warnings	implemented
and alerts	Supporting metric: Number of international aerodromes/AWOs with IAVW procedures
	implemented
	Indicator: Percentage of international aerodromes/AWOs with SIGMET procedures
6. SIGMET	implemented
	Supporting metric: Number of international aerodromes/AWOs with SIGMET procedures
	implemented
7. QMS/MET	Indicator: Percentage of MET Provider States with QMS/MET implemented
	Supporting metric: Number of MET Provider States with QMS/MET certificated
8. Other OPMET	Indicator: Percentage of OPMET available at international aerodrome AMOs/MWOs
Information (METAR,	Supporting metric: Number of international aerodromes/MWOs issuing required OPMET
SPECI, TAF)	information
8. A	SBU B0-105/AMET: Performance Monitoring and Measurement
	8B. ASBU B0-105/AMET: Performance Monitoring
Key Performance Areas	Metrics (if not, indicate qualitative benefits)
Access & Equity	N/A
Capacity	Optimized usage of airspace and aerodrome capacity due to MET support
Efficiency	Reduced arrival/departure holding time, thus reduced fuel burn due to MET support
Environment	Reduced emission due to reduced fuel burn due to MET support
Safety	Reduced incidents/accidents in flight and at international aerodromes due to MET support

1. FORMULAIRE DE RAPPORT DE NAVIGATION AERIENNE (ANRF) Planification Régionale AFI pour les Modules ASBU

1. QMS for AIM Lack of electronic database. Lack of electronic database. Lack of electronic access based on internet protocol services Lack of procedures to allow airlines provide digital AIS data to on-board devices, in particular electronic flight based on internet protocol services Nil Data to on-board devices, in particular electronic flight based on internet protocol services Nil 8. ASBU B0-30/DATM: Performance Monitoring and Measurement 8A. ASBU B0-30/DATM: Implementation Monitoring Nil Nil Elements Performance Indicators / Supporting Metrics Nil 1. QMS for AIM Indicator: Percentage of States QMS certified Supporting metric: Number of States QMS certification 2. e-TOD implementation Indicator: Percentage of States e-TOD implemented Supporting metric: Number of States with e-TOD implemented 3. WGS-84 implementation Indicator: Percentage of States with QS-84 implemented Indicator: Percentage of States with QS-84 implemented 4. AIXM implementation Indicator: Percentage of States with AXIM implemented Supporting metric: Number of States with AXIM implemented 5. e-AIP implementation Indicator: Percentage of States with e-AIP implemented Supporting metric: Number of States with AXIM implemented 6. Digital NOTAM Indicator: Percentage of States with Digital NOTAM implemented Supporting metric: Number of States with CAIP implemented 6. Digital NOTAM Indicator:				-			IVE – B0-30/DATM ation Management				
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Environment Reduced amount of paper for promulgation of information	Environment	-				-					
Safety Reduction in the number of possible inconsistencies											

2. R		and N IONA	Nation L PE	al pla ROFR		ASBU M OBJECT	odules IVE – B0-10		0	
Performance Improvement Area 3: Optimum Capacity and Flexible Flights – Through Global Collaborative ATM										
3.	3. ASBU B0-10/FRTO: Impact on Main Key Performance Areas (KPA)									
	Access & Equity	С	apaci	ity	Effic	iency	Environm	nent	Safety	
Applicable	Y									
4. ASBU B0-10/FRTO: Planning Targets and Implementation Progress										
	Elements					Gro (Gro	Implementa ound and Air		rogress	
1. Airspace planning					mber 2018					
2. Flexible use of ai	rspace				mber 2016					
3. Flexible routing	7. ASBU	DA 1			mber 2018		longog			
	7. ASDU	DU-1	U/ F K .		nplementa					
Elements	Ground Syster	m		Avior			a cedures	(Operational	
Elements	Implementatio		Im				ilability		Approvals	
1. Airspace planning	Lack of organized and managed airsp prior to the time o flight. Lack of All WGS-84 Survey	ed rspace of Nil Lack of Procedures AIDC								
2. Flexible use of airspace	Nil		Nil			Lack of implementation FUA Guidance and coordination agreements				
3. Flexible routing	ADS-C/CPDLC		of eq / Lac 1/A.	uipped k of FA lack of	ACARS	procedur		fleet	percentage of approvals	
	8. ASBU B0-10/F 8A. ASBU							ent		
Elements					-		rting Metric	s		
1. Airspace	Not assigned Ind					••				
planning2. Flexible use of airspace	Indicator: Percen State	itage o	of time	e segreg				vivil op	perations in the	
	Supporting metri Indicator: Percen	itage o	of PBN	V route	s impleme		flights			
3. Flexible routing	Supporting metri Supporting metri				÷					
<u> </u>	8. ASBU B0-10/F					oring and	Measureme	ent		
					Performar					
Key Performance Areas							tive benefits)		
Access & Equity	Better access to a	airspac	e by a	a reduc	tion of the	permaner	ntly segregate	ed volu	mes of airspace	
Capacity	Flexible routing reduces potential congestion on trunk routes and at busy crossing points. The flexible use of airspace gives greater possibilities to separate flights horizontally. PBN helps to reduce route spacing and aircraft separations.									
Efficiency	In particular the module will reduallow avoiding networks	ce the	numt ensitiv	oer r of /e areas	flight dive s.					
Environment	Fuel burn and em	nission	ns will	be red	uced					
Safety	N/A									

			RMANCE OBJECTI lanning based on a N						
Performance I			ptimum Capacity an Collaborative ATM	d Flexible Flights					
3. ASBU B0			Jain Key Performan	ce Areas (KPA)					
Equity	-	-	Efficiency	Environment	Safety				
Applicable Y		Y	Y	Y	Y				
4. ASBU B0	-35/NOPS: Plai	nning Ta	argets and Implement						
5. Elements			(Gro	Implementation Pro und and Air)	ogress				
1. Air Traffic Flow Management			ber 2015						
7.	ASBU B0-35/N	OPS: In	nplementation Chall	<u> </u>					
Elements	Ground Sys	atom	Implementation Avionics	n Area Procedures	Onenational				
Elements	Implementa		Implementation	Availability	Operational Approvals				
	Lack for system		Implementation	11 vanability					
	software for A			Lack of ATFM an	d				
1. Air Traffic Flow Management	Lack of ATFM	1 units	Nil	CDM procedures.	<u></u>				
	implemented.			Lack of training					
	Funding								
			nce Monitoring and						
	ASBU B0-35/N		nplementation Moni						
Elements	Indiantor Dara		rmance Indicators / f implemented FMUs						
1. Air Traffic Flow Management			nber of States with A		nted				
8. ASBU F			nce Monitoring and						
			Performance Monito						
Key Performance Areas			ics (if not, indicate q						
	Improved acce	ess and ea	quity in the use of airs	space or aerodrome b	y avoiding				
Access & Equity	disruption of air traffic. ATFM processes take care of equitable distribution of								
	delays								
Better utilization of available capacity, ability to anticipate difficult situations a mitigate them in advance. Number of aircrafts in a defined volume or airspace									
Capacity	a period of tim		ce. Number of aircraf	ts in a defined volum	e or airspace for				
			to better anticipation	of flow issues: Redu	ced block times				
Efficiency	Reduced fuel burn due to better anticipation of flow issues; Reduced block times and times with engines on								
		-	elays are absorbed on	the ground, with shu	it engines; or at				
Environment			hrough speed or route						
	emissions per		_	-					
Safety	Reduced occur	rrences o	f undesired sector over	erloads					

2. R	2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-101/ACAS							
	ACAS Improvements							
	0	•		• •				
Pe	rformance				otimum Capacity an	d Flexible Flights		
2	ASDUD		<u> </u>		Collaborative ATM Main Key Performa	nao Anoog (KDA)		
	ASDUBU		.s. mj	Dact off N	ani Key Feriorina	lice Areas (KFA)		
	Equi		Capa	acity	Efficiency	Environment	Safety	
Applicable	N	·	Ι	N	Y	Ν	Y	
	ASBU BO)-101/ACA	S: Pla	nning Ta	argets and Impleme	ntation Progress	·	
5	Elements				6. Targets and	Implementation P	rogress	
						ound and Air)		
1. ACAS II (TCAS V				2013-20				
	7.	ASBU BO)-101/A	CAS: In	nplementation Cha	0		
		Implementation Area						
Elements		Ground System			Avionics	Procedures	Operational	
		-	mentat		Implementation	Availability	Approvals	
1. ACAS II (TCAS V		Nil			Equipage	Nil	Nil	
					nce Monitoring and			
	8 A	. ASBU BO)-101/A		nplementation Mon	<u> </u>		
Elements					mance Indicators / S		S	
1. ACAS II (TCAS V	ersion 7.1)				aircrafts that are equ			
	,		<u> </u>		ction in number of R.			
					nce Monitoring and			
Vor Dorformon og		B. ASBU B	30-101/		Performance Monit			
Key Performance	e Areas	N/A		Metric	cs (if not, indicate qu	uantative benefits)		
Access & Equity				nont will	naduca unnaccomu	magalution advisory	$(\mathbf{D}\mathbf{A})$ and than	
Capacity			.		reduce unnecessary	resolution advisory	(RA) and then	
Efficiency		reduce trajectory deviations N/A						
Environment		N/A N/A						
			numbo	r of poter	ntial AIR-PROX. AC	AS increases sofety	in the case of	
Safety		breakdow		-	illai AIK-FKUA. AU	AS increases safety	in the case of	
		UICAKUOW	in or se	paration				

2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-84/ASUR 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	ASRI				Aain Key Performan	ce Areas (KPA)	
	Acc	ess & uity		acity	Efficiency	Environment	Safety
Applicable		N	Y	Y	Ν	Ν	Y
I	ASBU	J B0-84/AS	UR: Plar	ning Ta	argets and Implemen	tation Progress	
					6. Targets and I		Progress
5. El	lement	I.S			(Gro	und and Air)	0
1. Implementation of ADS-B Ju				June 20	018 – Users and servic	e provider	
2. Implementation of M	ultilate	ration		June 20	018 – Users and servic	e provider	
3. Automation system (I	Present	ation)		June 20	017 – Users and servic	e provider	
		7. ASBU	B0-84/A	SUR: Ir	nplementation Challe	enges	
					Implementation	Area	
Elements		Grou	nd Syste	m	Avionics	Procedures	Operational
		Imple	ementatio	on	Implementation	Availability	Approvals
1. Implementation of AI	DS-B	Lack of ADS-B systems implementation due to recent implementation of conventional surveillance systems		e to ion of	Lack of ADS-B implementation in general aviation, and old commercial fleet	Lack of procedures	Lack of inspector s with appropriate capability
2. Implementation of Multilateration		Facilities of remote stations. Establishment of communications networks		nent of tworks	Nil	Nil	Lack of inspector s with appropriate capability
3. Automation system (Presentation)		Lack of an functional		tion	Nil	Nil	Nil
8	. ASE	BU B0-84/A	SUR: Pe	erforma	nce Monitoring and I	Measurement	
		8A. ASBU			nplementation Monit		
Elements					nance Indicators / Suj		
1. Implementation of AI	DS-B				ernational aerodromes of ADS-B implement		lemented
2. Implementation of		Indicator:	Percentag	ge of Mu	Itilateration system in	plemented	
Multilateration		Supporting	g metric:	Number	of Multilateration sys	tem implemented	
3. Automation system		Indicator:	Percentag	ge of AT	'S units with automatic	on system implem	ented
(Presentation)					of automation system		ATS units
8	ASE	BU B0-84/A	SUR: Pe	erforma	nce Monitoring and I	Measurement	
					Performance Monito		
Key Performance Ar	eas			Metrics	s (if not, indicate qua	litative benefits)	
Access & Equity		N/A					
Capacity		compared	to proced	lural mir	are 3 NM or 5 NM ena nima. TMA surveillanc racy, better velocity ve	ce performance in	provements are
Efficiency		N/A					
Environment		N/A					
Safety		Reduction of the number of major incidents. Support to search and rescue					

2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-102/SNET Increased Effectiveness of Ground-based Safety Nets

Performance Improvement Area 3: Optimum Capacity and Flexible Flights – Through Global Collaborative ATM

		i in ougn o		llavu	rative ATM			
3.	ASBU B0-102/SI	NET: Impa	act on Ma	in K	ey Performa	nce Are	eas (KPA)	
	Access & Equity	Capa			fficiency		ironment	Safety
Applicable	N	N			NN		Ν	Y
4.	ASBU B0-102/SI	NET: Plan	ning Targ	gets a	and Impleme	entation	Progress	
5 F	lements			6.	0	-	mentation Pro	ogress
						nd Air)		
1. Short Term Conflict A				Service provid				
2. Area Proximity Warni					Service provid	ler 2013	3-2018	
3. Minimum Safe Altitud			June 201					
4. Dangerous Area Infrin	• •		2013-20		mtation Cha	11.000.000		
	7. ASBU	BU-102/Sr	ver: imp	neme	entation Cha Implem	<u> </u>	A m 00	
Eleme	nte	Cro	ound Syste	om	Avioni		Procedures	Operational
Elenie	ints		olementati		Implemen		Availability	-
1. Short Term Conflict A	Alert (STCA)		Funding		Nil		Nil	Nil
2. Area Proximity Warni			Nil Funding		Nil		Nil	Nil
3. Minimum Safe Altitud			8					
(MSAW)	C	N11 F	Funding		Nil		Nil	Nil
4. Dangerous Area Infrin	ngement Warning	Fund	ling					
(DAIW)			ę					
8.	ASBU B0-102/							
Elements	OA. ASDU				entation Mor licators / Suj			
1. Short Term Conflict	Indicator: Per						y nets (STCA)	implemented
Alert (STCA)	Supporting m							Impromotion
2. Area Proximity							y nets (APW)i	mplemented
Warning (APW)	Supporting m	netric: Num	ber of safe	ety n	et (APW)imp	lemente	ed	*
3. Minimum Safe	Indicator: Per	rcentage of	ATS unit	s wif	h oround-has	ed safet	v nets (MSAW) implemented
Altitude Warning	Supporting m) implemented
(MSAW)						p		
4. Dangerous Area	Indicator: Per	rcentage of	ATS unit	s wit	h ground-bas	ed safet	y nets (DAIW)	implemented
Infringement Warning	Supporting n							•
(DAIW)	ASBU B0-102/	CNET. Do	ufarmana		nitoring on		nomont	
ð.					ormance Mo			
Key Performance A		JU-102 /011			ot, indicate q			
Access & Equity	· · · · · · · · · · · · · · · · · · ·							
Capacity	N/A							
Efficiency	N/A							
Environment	N/A							
Safety	Signifi	cant reduct	tion of the	num	ber of major	incident	S	

Improved Fl	exibility and	Efficiency in E	Descent P	Profiles: Co	ntinuous]	IVE – B0-05/CDC Descent Operatio	ons (CDO)	
						rajectory-based (Operations	
`	3. ASBU B0-05/CDO: Impact on Main Key Performance Areas (KPA) Access & Equity Capacity Efficiency Environment Safety							
Applicable	N	Ň	I	Y		Ν	NY	
4. ASBU B0-05/CDO: Planning Targets and Implementation Progress								
	5. Elements				gets and I	mplementation P und and Air)	rogress	
1. CDO implementation				ber 2017				
2. PBN STARs imple				ber 2017				
	7.	ASBU B0-05/0	CDO: Im					
			1		nentation			
Elements		round System		rionics		rocedures	Operational	
		nplementation	Implei	mentation	A	vailability	Approvals	
1. CDO implementation	. CDO implementation The ground trajectory calculation function will need to able upgraded		CDO Function		LOAs and Training		In accordance with applicable requirements	
2. PBN STARs implementation	Ai	rspace Design	Nil		LOAs and Training			
		B0-05/CDO: Pe ASBU B0-05/0						
Elements			Perform	ance Indica	ators / Su	pporting Metrics		
1. CDO implementation	on Su					/TMAs with CDO lromes/TMAs with		
2. PBN STARs		A	ge of inte	ernational ac	erodromes	with PBN STAR	s implementation	
implementation							Rs implementation	
		B0-05/CDO: Pe					-	
	81	B. ASBU B0-05	/CDO: P	erformance	e Monitor	ring		
Key Performance			Metrics	(if not, ind	licate qua	litative benefits)		
Access & Equity	N/.							
Capacity		creased Termina	.	<u> </u>				
Efficiency	Cost savings through reduced fuel burn. Reduction in the number of required radio transmissions.						f required radio	
Environment		duced emissions						
Safety		ore consistent fli cidence of contro				ach. Reduction in t	he number of	

	2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-20/CCO Improved Flexibility and Efficiency in Departure Profiles: Continuous Climb Operations (CCO)							
Improved PA	caromey		iency in D	eparture	, i i onnes. e	ommuot	is child operation	
Performance Improvement Area 4: Efficient Flight Path – Through Trajectory-based Operations 3. ASBU B0-20/CCO: Impact on Main Key Performance Areas (KPA)								
		<u>J B0-20/C</u> ess &	CO: Imp	act on M	ain Key Pei	rformanc	e Areas (KPA)	1
		uity	Capa	ncity	Efficie	ency	Environment	Safety
Applicable								NY
	4. ASBU	U B0-20/C	CO: Plan	ning Ta			tation Progress	
5.	Element	S			6. Targ	·	(mplementation P)	rogress
1. CCO implementation	าท			Deceml	per 2017	(GLO)	und and Air)	
2. PBN SIDs implementation					ber 2017			
		7. ASB	U B0-20/0		plementatio	on Challe	enges	
						entation		
Elements			l System	Av	ionics		rocedures	Operational
		Implem	entation	Implei	mentation	Α	vailability	Approvals
		N 711						In accordance
1. CCO implementation	on	Nil		Nil				with applicable
								requirements
2. PBN SIDs impleme	entation	Airspace	e Design	Nil				Approvals of procedures
	8. AS	BU B0-20	/CCO: Pe	rforman	ce Monitori	ing and N	Aeasurement	1
		8A. ASB	U B0-20/0		plementatio			
Elements							pporting Metrics	
1. CCO implementation	on						with CCO implem	
							rts with CCO impl	
2. PBN SIDs impleme	entation						with PBN SIDs in	
	8 15						rts with PBN SIDs Jeasurement	Implemented
	0. A5				erformance			
Key Performance	Areas						alitative benefits)	
Access & Equity		<u></u>						
Capacity					e Capacity			
Efficiency							ient aircraft operati	ng profiles.
					required rad			
D arasing and the							ns would otherwise	
Environment		emission	-	urtailed o	r restricted.	Environn	nental benefits thro	ugn reduced
				aht natha	Reduction	in the nu	mber of required ra	dio transmissions
Safety	Safety More consistent flight paths. Reduction in the number of required radio transmission Lower pilot and air traffic control workload.							

						ECTIVE – B0-4 ion of Data Lin		nute
-			•	0				
Performance Improvement Area 4: Efficient Flight Path – Through Trajectory-based Operations 3. ASBU B0-40/TBO: Impact on Main Key Performance Areas (KPA)								
	Access Equit	&	Capao		Efficiency	Environ		Safety
Applicable	N	U	Y		Y	Y		Y
4	. ASBU B	30-40/T	BO: Plann	ing Targ	gets and Imple	mentation Prog	ress	
5. Elements 6. Targets and Implementation Progress (Ground and Air)					rogress			
1. ADS-C over oceanic	and remot	e areas		June 20	018 – Service p	rovider		
2. Continental CPDLC				June 20	018 – Service p	rovider		
	7.	ASBU	J B0-40/TH	BO: Imp	lementation C	hallenges		
					Implementatio	on Area		
Elements		ound Sy plemen			Avionics lementation	Procedures Availability		Operational Approvals
1. ADS-C over oceanic and remote areas	Fundin service	Funding and limited link service provider and infrastructure		Implen ADS-C	nentation of C in general n pending	Implementati on of GOLD procedures pending	Lack o	of duly trained tors for approval
2. Continental CPDLC		provide	mited link er and	Implementation of CPDLC in general aviation pending		Implementati on of GOLD procedures pending		of duly trained tors for approval rations
					e Monitoring a lementation M	nd Measureme Ionitoring	nt	
Elements			Per	formanc	e Indicators / S	Supporting Met	rics	
1. ADS-C over oceanic			•		ADS-C impler			
and remote areas						procedures over o	oceanic	and remote areas
2. Continental CPDLC					mplemented			
	Suppor					procedures over		ntal? areas
						nd Measureme	nt	
		BB. ASE	BU B0-40/1		rformance Mo	0		
Key Performance	Areas			Metrics	s (if not, indica	te qualitative be	enefits)	
Access & Equity N/A								
Capacity								
Efficiency		0					tion	
Environment								
Environment Reduced emission as a result of reduced fuel burn Safety ADS-C based safety nets supports cleared level adherence monitoring, route adherence monitoring, danger area infringement warning and improved search and rescue. Reduced occurrences of misunderstandings; solution to stuck microphone situations. Increased situational awareness					roved search and			

6. PERFORMANCE-BASED PLANNING FRAMEWORK IN THE AFI REGION

The ICAO Special Regional Air Navigation Meeting (November 2008) supported the need to adopt a performance-based approach to regional and national air navigation planning in the AFI Region, which was aligned with the Global Air Navigation Plan (Doc 9750, GANP). The GANP was developed to assist States and regional planning groups in identifying the most appropriate operational improvements to achieve near- and medium-term benefits on the basis of current and foreseen aircraft capabilities and ATM infrastructure while the Global Air Traffic Management Operational Concept (Doc 9854) provided the overall vision of a performance based ATM system.

Several other ICAO documents are available to support the planning process including the Manual on Air Traffic Management System Requirements (Doc 9882) which converted the overall vision of the operational concept into material specifying the functional evolution of ATM, and the Manual on Global Performance of the Air Navigation System (Doc 9883) which provided a broad overview of the tasks that needed to be undertaken to transition to such a system. This approach would support the further evolution of the communication, navigation surveillance/air traffic management (CNS/ATM) transition plans that were already in place, which should be integrated with the performance-based approach to planning.

The AFI Planning and Implementation Regional Group (APIRG) uses the performance framework forms (PFFs) developed by the ICAO Special AFI RAN of 2008 as amended from time to time through the regional planning process, to identify individual parties responsible for achieving the performance objectives as well as to establish timeframes for implementation.

States should develop national plans, using the PFFs, harmonized and aligned with the regional PFFs, and that associated tasks should include the necessary, detailed actions to successfully achieve national performance objectives.

The PFFs developed by the APIRG are provided as **Appendix B** to this document. These PFFs need to be reviewed and aligned with the ICAO Aviation System Block Upgrade (ASBU) Block 0 Modules. **Appendix C** to this document shows the relationship between the existing PFFs and ASBU Block 0 modules.

APPENDIX B : AFI REGIONAL PERFORMANCE FRAMEWORK FORMS

1.	OPERATIONAL SAFETY ASSESSME	NT METHODOL	OGY FOR RVSM				
	Benefits						
Environment	Reduction in fuel consumption						
Efficiency	 Ability of aircraft to conduct flight more closely to preferred trajectories Facilitate utilization for advanced technologies (e.g. improved altimetry systems) thereby increasing efficiency 						
Safety	• Enhance safety by wider distribution						
	Strategy	-					
ATM OC COMPONENT S	TASKS	TIMEFRAME START-END	RESPONSIBILIT Y	STATU S			
~~~~	a) use Safety Programmes and SMS methodologies in control and mitigation of risks in the region.	2009 – December 2015	States	VALID			
AOM	<ul> <li>b) carry out yearly analysis. The initial acceptability of a collision risk to be determined by experts of the scrutiny group. Meeting the TLS of 2.5xx10-9 fatal accidents per aircraft flying hour for technical risk be maintained as a requirement to continue with RVSM operations.</li> </ul>	2009 – ongoing	ARMA/States	VALID			
	c) to provide yearly reports to APIRG about the status of operations safety in the region.	2009 – ongoing	ARMA	Ongoing			
Linkage to GPIs	GPI/2: Support implementation of RVSM	[					

2. OPT	<u>IMIZATION OF THE ATS ROUTE S</u> Benefit		EN-ROUTE AIRSPA	CE				
Environment Efficiency	<ul> <li>Reduction in gas emissions</li> <li>Ability of aircraft to conduct flight more closely to preferred trajectories</li> <li>Increase in airspace capacity</li> <li>Facilitate utilization of advanced technologies (e.g. FMS-based arrivals) and ATC decision support tools (e.g. metering and sequencing), thereby increasing efficiency</li> </ul>							
	Strateg	<u> </u>						
ATM OC COMPONENT S	TASKS	TIMEFRAME START-END	RESPONSIBILIT Y	STATUS				
	a) all States in AFI Region to develop Nation PBN implementation plans in relation to AFI PBN plan.	Oct 2013 – Dec 2015	States	On-going				
	b) create a National A-CDM implementation plan based on key access points	Oct 2013 – Dec 2020	States	On-going				
	c) establish collaborative decision making (CDM) process for creating CDM process within the State	Oct 2013 – Dec 2016	States	Valid				
АОМ	d) develop airspace concept based on AFI PBN regional implementation plan, in order to design and implement a trunk route network, connecting major city pairs in the upper airspace and for transit to/from aerodromes, on the basis of PBN: RNAV 10 implementation taking into account interregional harmonization	2010-2012	APIRG/States	Complete d (RNAV 10 implement ed in oceanic airspace (Route network group establishe d 2010)				
AOM	e) develop airspace concept based on AFI PBN regional implementation plan, in order to design and implement a trunk route network, connecting major city pairs in the upper airspace and for transit to/from aerodromes, on the basis of PBN: RNAV 5 implementation and taking into account interregional harmonization	2013 – Dec 2017	APIRG/States	On going (Route network group establishe d 2010)				
	<ul> <li>f) harmonize national and regional PBN implementation plans</li> </ul>	2013-Dec 2016	APIRG/States	On-going				
	g) develop performance measurement plan	2010- Dec 2015	States	On-going				
	h) formulate PBN safety plan to obtain acceptable level of safety	2010- Dec 2015	States	On-going				
	i) identify training needs and develop corresponding guidelines	2010- Dec 2015	States	On-going				
	j) use Safety Programmes and SMS methodologies in control and mitigation of risks in the region.	2010-Dec 2015	States	On-going				
	k) identify training programmes and	2010- Dec	APIRG/States	On-going				

	develop corresponding guidelines	2015					
	1) formulate system performance						
	monitoring plan (PBN	2010-Dec 2016	APIRG/States	On-going			
	Implementation)						
	m) implementation of en-route PBN ATS/RNAV routes	2010-2014	APIRG/States	In progress			
	n) monitor implementation progress in accordance with AFI PBN implementation plan and State implementation plan	2010 and beyond	APIRG/States	On-going			
Linkage to GPIs	GPI/2: 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; GPI/12 FMS-based arrival						
01 15	procedures	SIDS and STARS,	01 1/ 12 19415-0ased all	1 v a1			

	Benefit	S						
Environment	Reduction in gas emissions							
Efficiency	Ability of aircraft to conduct flight more	closely to preferred	trajectories					
	Increase in airspace capacity							
	Improved availability of procedures							
	• Facilitate utilization of advanced technologies (e.g. FMS-based arrivals) and ATC decision							
	support tools (e.g. metering and sequence		sing efficiency					
ATM OC	Strateg TASKS	y TIMEFRAME	RESPONSIBILIT	STATU				
COMPONENT	IASKS	START-END	Y	SIATU				
S		START-END	1					
6	a) All States in AFI Region to develop							
	National PBN implementation	Dec 2015	States	On going				
	plans in relation to AFI PBN plan	200 2010		011 80112				
	b) establish collaborative decision	2012 D						
	making (CDM) process within the	2013 – Dec	States	On going				
	State	2020		88				
	c) develop airspace concept based on							
	AFI PBN roadmap, in order to							
	design and implement an optimized							
	standard instrument departures	2009- Dec						
	(SIDs), standard instrument arrivals	2009 Dec 2017	PBN TF/States	On goin				
	(STARs), holding and associated	2017						
	instrument flight procedures, on the							
	basis of PBN and, in particular							
	RNAV 1 and Basic-RNP 1							
	d) develop performance measurement plan	2010-Dec 2015	States	On going				
		2010- Dec						
AOM	e) formulate safety plan	2010 Dec 2015	States	On going				
	f) publish national regulations for							
	aircraft and operators approval	2010- Dec	States	On going				
	using PBN manual as guidance	2015						
	material							
	g) identify training needs and develop	2010- Dec	States	On going				
	corresponding guidelines	2015	States	On going				
	h) identify training programmes and	2010- Dec	APIRG	On going				
	develop corresponding guidelines	2015		On going				
	i) formulate system performance	2010- Dec	APIRG/States	On going				
	monitoring plan	2016		on going				
	j) develop a regional strategy and	2009- Dec						
	work programme implementation	2015	APIRG/States	On going				
	of SIDs and STARs							
	k) monitor implementation progress in accordance with AFI PBN	2010 and						
		2010 and beyond	APIRG/States	On going				
	implementation roadmap and State implementation plan	Deyona		Sin Sound				
	GPI/5: performance-based navigation; C	PI/7. dynamic and	flexible ATS route m	anagement				
Linkage to	GPI/8: collaborative airspace design and							
GPIs	management; GPI/11: RNP and RNAV	e		•				
	procedures.	~ mig \$171103,	21 1 12, 1 1115 Oubed al.					

4	4. OPTIMIZATION OF VERTICALL	Y GUIDED RNP	APPROACHES							
	Benefit	S								
Environment	Reduction in gas emissions									
Efficiency	Ability increased accessibility to aerodre	omes, including cont	inuity of access							
	<ul><li>increased runway capacity</li><li>reduced pilot workload</li></ul>									
	• availability of reliable lateral and vertical navigation capability									
	Strateg	y								
ATM OC COMPONENT S	TASKS	TIMEFRAME START-END	RESPONSIBILIT Y	STATUS						
2	a) All States in AFI Region to develop National PBN implementation plans in relation to AFI PBN plan	Dec 2015	States	On going						
	b) establish collaborative decision making (CDM) process within the state	2013 – Dec 2020	States	On going						
	c) develop airspace concept based on AFI PBN implementation plan, in order to design and implement RNP APCH with Baro-VNAV or LNAV only (see note 1) in accordance with relevant Assembly resolutions, and RNP AR APCH where beneficial	2009 – Dec 2017	APIRG/States	On going						
AOM	d) develop performance measurement plan	2010- Dec 2015	States	On going						
	e) formulate safety plan	2010- Dec 2015	States	On going						
	<ul> <li>f) publish national regulations for aircraft and operators approval using PBN manual as guidance material</li> </ul>	2010- Dec 2015	States	On going						
	g) identify training needs and develop corresponding guidelines	2010- Dec 2015	States	On going						
	h) identify training programmes and develop corresponding guidelines	2010- Dec 2015	APIRG/States	On going						
	i) implementation of APV procedures	2010 – Dec 2016	APIRG/States	On going						
	j) Formulate system performance monitoring plan	2010-Dec 2017	APIRG/States	On going						
Linkage to GPIs	GPI/8: collaborative airspace design and management; GPI/11: RNP and RNAV procedures									

Note 1: States that have not already done so should complete preparation of their national PBN implementation plans as soon as possible.

Note 2: Where altimeter setting does not exist or aircraft are not suitably equipped for APV.

#### 5. ESTABLISHMENT OF SUB-REGIONAL SAR ARRANGEMENTS **Benefits** cost-efficient use of accommodation and RCC equipment on a shared basis **Environment** ٠ Efficiency service provision more uniform across a geographic area defined by risk • proficient services provided near and within States with limited resources harmonization of aviation / maritime procedures inter-operability of life-saving equipment • development of a pool of experienced SAR mission coordinators skilled across both aviation and maritime domains thus reducing coordination and fragmentation Strategy ATM OC TASKS RESPONSIBILI **STATUS** TIMEFRAME **COMPONENT** TY **START-END** S a) conduct AFI Regional SAR On going workshop to assist states to (Certain states develop National and already **Regional SAR** every year **ICAO/States** started with Implementation plans National (Workshop to include all Implement relevant stakeholders of each ation plans) state) b) Collaboration between states 2013 - Dec 2017 **ICAO/States** On going (signed MoU) c) Nominate a focal point within each state/organization to 2013 - Dec 2015 On going States coordinate SAR issues d) develop needs assessment and 2011 - 2015**APIRG**/States On going gap analysis 2011 - Dec 2015 e) conduct self-audits States On going f) develop regional action plan 2011 - Dec 2015 APIRG/States On going to resolve the deficiencies g) conduct regional SAR Administrators training and 2013– Dec 2017 ICAO/State On going SAR Mission Coordinators N/A training h) determine regional and subregional organization, functions and responsibilities, accommodation and 2011 – Dec 2017 APIRG/ States On going equipment needs for the establishment of regional SAR Centres i) produce draft legislation, regulations, operational procedures, letters of agreement, SAR plans and 2010 – Dec 2017 **APIRG/States** On going safety management policies for regional SAR provision using IAMSAR manual as guidance j) determine future training Implementatio needs and develop training 2010 n on a **APIRG/States** plans and conduct training as continuous permanent required basis k) develop SAR plan 2011 - 2016On-going States alerting procedures 1)

	m) resource databases			
	n) interface procedures with			
	aerodrome emergency			
	procedures and generic			
	disaster response providers			
	o) RCC check lists			
	· · · · · · · · · · · · · · · · · · ·			
	<ul> <li>p) staffing, proficiency and certification plans</li> </ul>			
	q) preventive SAR programmes			
	r) quality programmes			
	s) education and awareness			
	,			
	programmes			
	t) in-flight emergency response			
	procedures			
	u) conduct SAR exercises	2012		
	required:	2012 -	States	On-going
	-National	Permanent		0 0
	-Multinational			
	v) monitor implementation	2012-on-going	ICAO/States	On-going
	process	on 80m8	_0110,00000	0
Linkage to GPIs	N/A			

Notes:

3.

Enablers: Regional Organizations like SADC, ECOWAS, CEMAC, EAC etc.
 The Task Force has identified the following groups of RCCs as potential base

The Task Force has identified the following groups of RCCs as potential base for regional/sub-regional SAR close co-operation e.g. SAR exercise, training, meetings etc..

- Casablanca, Canarias, Dakar, Roberts, Sal,
- Algiers, Asmara, Cairo, Tripoli, Tunis,
- Accra, Brazzaville, Kano, Kinshasa, Ndjamena, Niamey,
- Addis, Entebbe, Khartoum, Mogadishu, Nairobi,
- Southern African States,
- Antananarivo, Mauritius, Seychelles.
- All work requires close cooperation with all States affected, ICAO, IMO, COSPAS-SARSAT and other worldwide bodies as required.

	6. AERODROME OPERAT		MENT			
Access &	Benefit		w of the control torrest	n vobial		
Access & Equity	<ul> <li>Improve portions of the manoeuvring area obscured from view of the control tower for vehicles and aircraft</li> </ul>					
Equity	<ul> <li>Ensure equity in ATC handling of surface</li> </ul>	ce traffic regardless (	of the traffic's position of	ı the		
	international aerodrome	ee traine regulatess (	of the traine s position of			
	• Enhanced equity on the use of aerodrom	ne facilities				
Capacity	Increased airport movement area capacity through optimization					
	• Sustained level of aerodrome capacity d	• •	-			
	• Enhanced use of existing Implementation	-	· · · ·			
	• Reduced workload, better organization of		anage flights			
	Enhanced aerodrome capacity according					
Efficiency	<ul> <li>Ensure aerodrome operators comply wit regulations</li> </ul>	th relevant ICAO SA	RPs and/or applicable na	tional		
	<ul> <li>Continued provision of safe and efficier</li> </ul>	nt aircraft operations	at aerodromes			
	<ul> <li>Efficiency is positively impacted as refl.</li> </ul>	-		ival rates		
	<ul> <li>Reduced taxi times through diminished</li> </ul>	•				
	on visual surveillance only. Reduced fue		8			
	• Improved operational efficiency (fleet n					
	• Reduced fuel burn due to reduced taxi ti					
	Improved aerodrome expansion in according to the second seco		Plan			
Environment	Reduced emissions due to reduced fuel					
Safety	Strengthen States' safety oversight response	onsibility on aerodro	me operations			
	<ul> <li>Reduced runway incursions</li> <li>Improved response to upsafe situations</li> </ul>					
	<ul> <li>Improved response to unsafe situations</li> <li>Improved situational awareness leading to reduced ATC workload</li> </ul>					
	Strateg		Kload			
ATM OC	TASKS	TIMEFRAME	RESPONSIBILIT	STATUS		
COMPONENT		START-END	Y			
S						
	a) Analyze Annex 14, Volume I					
	provisions on aerodrome					
	certification vis-a-vis national	2013-Dec.	~			
	legislations and regulations to	2014	States	Ongoing		
	develop and/or complete national					
	regulations on aerodrome					
	<ul><li>certification as necessary</li><li>b) Analyze guidance in the Manual on</li></ul>					
	Certification of Aerodromes (Doc	2013-Dec.	States	Ongoing		
	9774) vis-à-vis national regulations	2014	States	Ongoing		
	c) Train aerodrome inspectors	Dec 2015	States	Ongoing		
			Aerodrome			
	d) Implement SMS	Dec 2015	operators	Ongoing		
AOM	e) Develop regulations and technical					
	guidance materials for runway	Dec 2015	States	Ongoing		
	safety					
	f) Develop and implement runway		ICAO			
	safety programs and reduce runway		Aerodrome			
	related accidents and serious	Dec 2015	operators	Ongoing		
	incidents to no more than eight per		ANSPs			
	year					
	$(1, 1)$ $(\mathbf{D}_{1}, \dots, 1)$ $(1, \dots, 1)$ $(1, \dots, 1)$ $(1, \dots, 1)$					
	g) Develop and implement an action	2015 States	1	1		
	plan for certifying all remaining	2015	States	Ongoing		
	plan for certifying all remaining aerodromes used for international	2015	States	Ongoing		
	plan for certifying all remaining aerodromes used for international operations		States	Ongoing		
	plan for certifying all remaining aerodromes used for international	2015 Jan. 2014 - Dec. 2015	States	Ongoing Ongoing		

	implementation of aerodrome certification			
	<ul><li>i) Develop and implement an action plan for AMAN and DMAN</li></ul>	Dec. 2015	States	Ongoing
	<ul> <li>j) Implement Surveillance system for ground surface movement (PSR, SSR, ADS B or Multilateration)</li> </ul>	Dec. 2017	Service provider (ANSPs/aerodrome operators)	Ongoing
	<ul> <li>k) Install Surveillance system on board (SSR transponder, ADS B capacity</li> </ul>	Dec. 2017	Aircraft operators	Ongoing
	<ol> <li>Install Surveillance system for vehicle</li> </ol>	Dec. 2017	Aerodrome operators	Ongoing
	m) Implement Visual aids for navigation	December 2015	Service provider (ANSPs/aerodrome operators)	Ongoing
	n) Establish mechanism for wild life strike hazard reduction	December 2015	Aerodrome operator/wildlife committee	Ongoing
	o) Implement system for displaying and processing information	December 2017	Aerodrome operator	Ongoing
	p) Implement Airport – CDM	Dec. 2015 –	Airport Operator ANSP Aircraft operators	Ongoing
	q) Develop/review airport planning	December 2017	Aerodrome operators	Ongoing
	r) Develop/review regulations for Heliport Operations	December 2017	States	Ongoing
Linkage to GPIs	GPI/13: Aerodrome design and manager	nent; GPI/14: Run	way operations	

	7. AERONAUTICAL TELE		IONS			
	Benefit					
Safety	• Improvement of safety in airspace and a	t aerodromes				
Efficiency	<ul><li>Enhanced safety in flight operation</li><li>Improved ATS coordination</li></ul>					
Efficiency	<ul> <li>Increased availability of communications</li> </ul>					
	<ul> <li>Avoid misunderstanding in communicat</li> </ul>					
	<ul> <li>Facilitate the utilization of advanced tech</li> </ul>					
	Strateg					
ATM OC COMPONENT S	TASKS	TIMEFRAME START-END	RESPONSIBILIT Y	STATUS		
	Aeronautical mobile service (AMS)					
	a) provision of VHF in FIRs Luanda, Khartoum, Somalia	2013-Dec 2016	Luanda, Khartoum, Somalia	Ongoing Implemen t		
	<ul> <li>b) provision of controller-pilot data link communications (CPDLC) procedures</li> </ul>	2013-Dec 2018	States	On-going		
	c) Implementation of CNS elements for Reporting Agencies and similar	2013-Dec 2016	State	Valid		
	d) development of regional guidance for required communication performance (RCP)	2013-Dec 2016	APIRG	On-going Global Operation al Data Link Document (GOLD) adopted		
	e) implementation of RCP	2013- Dec 2018	States	Not started		
	Aeronautical fixed service (AFS)					
AO, TS, CM, AUO, AOM,	f) implementation of bit-oriented protocol (BOP) between AFTN main centres	2013- Dec 2016	States	On going		
SDM	g) IP Based: IPV6	2013- Dec 2028	States	On going		
	h) implementation of Aeronautical Message Handling System (AMHS)	2013- Dec 2018	States	On going		
	i) implementation of ATS Inter- facility Data Communications (AIDC)	2013- Dec 2018	States	On going		
	Navigation			1		
	<ul><li>j) implementation of navigational aids to increase safety at terminal areas (Conventional)</li></ul>	2013- Dec 2018	States	Ongoing		
	<ul> <li>k) implementation of GNSS – carry out survey to determine the implementation status and identify the specific assistance needed if any</li> </ul>	2013- Dec 2018	States	Ongoing. Coordinat e with PBN		
	Surveillance					
	<ol> <li>implementation of AFI surveillance plan for en-route operations, including provision of automatic dependent surveillance (ADS-C) procedures</li> </ol>	2013- Dec 2018	States	Ongoing		

	m) development of State implementation action plan based on AFI surveillance plan	2013- Dec 2016	APIRG	ongoing
	Aeronautical spectrum			
	n) implementation of automation support tools to enhance frequency management	2013-2015	ICAO	Implemen tation in progress (VHF, HF/HFDL ,
				SURVEIL LANCE)
	o) Aeronautical Spectrum availability (VSAT C-BAND)	2013 - Dec 2015	States/ ICAO	Ongoing WRC 15
	Performance measurement			
	<ul> <li>p) Development of performance measurement plan for CNS services:</li> <li>Communication(Air ground and ground-ground)</li> <li>Navigation</li> <li>Surveillance</li> </ul>	2010 - Dec 2015	APIRG	Not started
Linkage to GPIs	GPI/9: Situational awareness; GPI/10: Terminal area design and management; GPI/17: Implementation of data link applications; - GPI/21: Navigation systems; GPI/22: Communication network infrastructure; GPI/23 – Aeronautical spectrum			PI/17:

	8. TRANSITION FR	OM AIS TO AIM				
	Benefi	ts				
Environment	• reductions in fuel consumption					
Efficiency	improved planning and management o	of flights				
	efficient use of airspace					
Safety	· · ·	improved safety				
KPI	Status of implementation of the AIRAC system in the AFI Region					
	• Status of implementation of QMS in the	-				
	Status of implementation of AIS Auto		•			
	Status of implementation of the Centra		n the AFI Region			
Proposed metric		-				
	Number of Posting of AIS information					
	• Number of States having developed ar	nd signed service Lev	vel Agreements between A	AIS and data		
	originators					
	Number of States having organized Ql		aigns and training progra	mmes		
	Number of States having implemented	-				
	Number of States with AIM QMS Cer					
	Number of States having developed eA					
	Number of States having developed a			IM		
	Number of states having implemented		l			
	Strateg		2015			
	Short term (2010-2011) : Mo					
ATM OC	TASKS	TIMEFRAME	RESPONSIBILIT	STATUS		
COMPONENT		START-END	Y			
S						
				т		
	a) Improve the compliance with the	Ongoing	States & APIRG	In		
	<ul><li>AIRAC system</li><li>b) Use of the internet, including the</li></ul>	2009 - 2015	States & ICAO	progress In		
	ICAO AFI Forum, for the advance	2009 - 2013	States & ICAO			
	posting of the aeronautical			progress		
	information considered of					
	importance to users;					
	c) Signing of service Level	2009 - 2015	States	On going		
	Agreements between AIS and data	2007 - 2015	States	On going		
	originators;					
	d) Foster the implementation of AFI	2009 - 2014	ICAO & APIRG &	On going		
	QMS based on the AFI Region	2009 2011	States	on going		
	Methodology for the					
	implementation of QMS;					
AUO, ATM	e) Monitor the implementation of	2008 - 2014	ICAO & APIRG	On going		
SDM	QMS until complete			88		
	implementation of the					
	requirements by all AFI States;					
	f) Monitor QMS certification &	2013 -	States, APIRG &	Ongoing		
	maintenance by the AFI states	Ongoing	ICAO	0 0		
	g) Foster the development of eAIPs	2009 - 2014	States & APIRG	On going		
	by AFI States;			0 0		
	h) Monitor the implementation of	2008 - 2016	ICAO & APIRG	On going		
	AIS automation that shall enable					
	digital aeronautical data exchange					
	and use aeronautical information					
	exchange models and data					
	exchange models designed to be					
	globally interoperable.					
	i) Monitor the Implementation of the	2014 - 2017	ICAO & APIRG &	On going		

	digital NOTAM		States	
	j) Foster the development of	2010 - 2015	ICAO & APIRG &	In
	National and/or regional AIS		States	progress
	databases;			
Linkage to	GPI-5: performance-based navigation; C	GPI-11: RNP and R	NAV SIDs and STARS	s; GPI-8:
GPIs	Aeronautical Information			

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	9. REGIONAL/NATIONAL PE			
	IMPLEMENTATION OI Benef		-10D	
Environment	Supporting benefits described in perf		for PBN	
Efficiency	• WG8 -84 is a prerequisite for perform			performance
	objectives for PBN			
	support approach and departure proc		plementation	
	improve aircraft operating limitation			
C o f o f o	support aeronautical chart production	n and on-board datab	ases	
Safety	<ul><li> improve situational awareness</li><li> support determination of emergency</li></ul>	contingency procedu	1700	
	<ul> <li>support determination of emergency</li> <li>support technologies such as ground</li> </ul>			reveteme
	<ul> <li>support technologies such as ground</li> <li>see benefits described in performance</li> </ul>			s systems
KPI	<ul> <li>Status of implementation of WGS-84</li> </ul>			
	<ul> <li>status of implementation of (* OB e</li> <li>status of implementation of e-TOD in</li> </ul>		r Areas 1 & 4)	
Proposed metric				
	Number of States having organized e		mpaigns and training prog	grammes
	Number of states having implemente			
	Strate Short term (2010-2012) : M		2 - 2016)	
ATM OC COMPONENT S	TASKS	TIMEFRAME START-END	RESPONSIBILIT Y	STATUS
5	Electronic terrain and obstacle data	(e-TOD)		
ATM CM	a) share experience and resources in			e-TOD WG
	the implementation of e-TOD	2008 - 2011	APIRG	has been
	through the establishment of an	2000 - 2011	States	established
	e-TOD working group			estuensneu
	b) report requirements and monitor	2008 - ongoing	APIRG	
	implementation status of e-TOD		States	
	c) develop a high level policy for the management of a national e-	2008 - 2014	States	In progress
ATM, AUO	TOD programme	2000 - 2014	States	
	d) Provide Terrain and Obstacle			
	data for area 1	2009 - 2014	States	Complete
	e) Provide Terrain and Obstacle			
	data for area 4 in airports where it	2008 - 2014	States	In progress
	is applicable			
	f) assessment of Annex 15			
	requirements related to the	2013 -	States	Complete
	provision of e-TOD for area 2 and 3	Ongoing		1
	g) development of an action plan for the provision of e-TOD for	2009 - 2014	States	In progress
ATM, AUO	area 2 and 3 as applicable	2009 2011	States	in progress
	h) provide necessary Terrain and			
	Obstacle data for area 2 as	2008 - 2016	States	In progress
	applicable			1 0
	i) provide necessary Terrain and	2014 - 2017	States	In progress
	Obstacle data for area 3	2014 - 2017	States	in progress
	WGS-84	1		1
	j) establish WGS-84			
	implementation goals in coordination with the national	2008-2012	States	In progress
	PBN implementation plan			

	<ul> <li>k) report requirements and monitor implementation status of WGS- 84</li> </ul>	2011- 2013	APIRG States	In progress
	l) completeWGS-84 implementation	2014	States	On going
	m) Monitor the maintenance of WGS-84	2013 - Ongoing	APIRG States	On going
Linkage to 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			

10, FUS	TER THE IMPLEMENTATION OF S Benef		TVIS IIV I TEL AFI KEU		
Environment	• contribution in the reduction in fuel consumption through optimized departure and arrival/ scheduling resulting in CO2 emissions reductions				
Efficiency	Harmonize arriving and departing air traffic will translate to eliminate or minimize holding time     and thus reduce fuel burn				
Safety	• improvement of efficiency of meteorological services to aircraft in flight				
	ensure timely preparation and provisi meteorological hazards ensure timely				
	for en-route meteorological hazards	preparation and pro	DVISION to annues of aviati	ion warnings	
	ensure quality and timely provision of	of meteorological da	ta for air navigation servi	ces through	
	the quality management system (QM				
	• minimize encounters by aircraft of ha	-	ical conditions		
	Strate	egy			
ATM OC COMPONENT S	TASKS	TIMEFRAME START-END	RESPONSIBILIT Y	STATUS	
	SIGMET		1		
	a) assessment on the current level of implementation through periodic SIGMET trials in the AFI Region	2014 - 2016			
AOM, DCB, AO, TS, AUO	b) establishment of an updated list of deficiencies including States not compliant with SIGMET format	2014 - 2016	ICAO/WMO, States		
	c) provision of details guidance to States not issuing SIGMET as required	2014		Valid	
	<ul> <li>d) Establishment of an implementation project in terms of seminars through special implementation projects (SIPs) and Safety Fund-ICAO (SAFE) for Aviation Safety (IFFAS) projects for States not meeting their obligation</li> </ul>	2014 – 2016	ICAO/WMO		
	QMS e) establishment of an updated list of States not implementing or partially implemented the QMS	2014			
	f) Enhance the training of met personnel in States that have not implemented QMS	2014 - 2016	ICAO/WMO, States		
	g) States to be encouraged to institute mechanism for cost recovery to support QMS maintenance	2014		Valid	
	<ul> <li>h) Establishment of an implementation project in terms of seminars and consultancy services through projects during the initial stages of QMS implementation for States</li> </ul>	2014 - 2016	ICAO/WMO		
Linkage to GPIs	GPI/19: Meteorological systems				

	THE IMPLEMENTATION OF TER DF WAFS FORECASTS AND OPTIN THE AFI H	<b>AIZATION OF O</b>		,	
	Bene	fits			
Environment	• contribution in the reduction in fuel or greenhouse gases	consumption; the ber	efits will lead to reduction	n in	
Efficiency	• improvement of efficiency in meteorological services to aircraft in flight				
	ensure timely preparation and provi meteorological hazards	ision to airlines of a	aviation warnings for terr	minal area	
	improvement in the efficiency of flight expected meteorological conditions a			iling and	
Safety	• minimize encounters by aircraft of l	hazardous meteorolo	gical conditions		
	Strate Short term (2010-2012) : M		2 - 2016)		
ATM OC COMPONENT S	TASKS	TIMEFRAME START-END	RESPONSIBILIT Y	STATUS	
	Terminal area warnings and forecas	sts			
	a) Assessment of the current level of implementation of facilities at aerodromes for monitoring hazardous meteorological conditions	2014-Dec 2016	States/ICAO/WMO		
	<ul> <li>b) Mission to States with longstanding deficiencies not compliant with required facilities stipulated in Annex 3 and the AFI ANP</li> </ul>	2014-2016	ICAO		
	c) For States to develop action plans to eliminate the MET related deficiencies	2014-2016	States		
	d) Provision of details guidance to States not issuing terminal area warnings and forecasts	2014	ICAO/WMO		
AOM, DCB, AO, TS, AUO	e) Establishment of an implementation project in terms of seminars and consultancy services through special implementation projects (SIP) and Safety Fund-ICAO projects respectively for States not meeting their obligation	2014-2016	ICAO	Valid	
	f) a) Implementations of aerodrome warnings, wind shear warnings/alerts and water thickness on the runway to support safety Volcanic Ash contingency plans	2014-2016	States		
	g) provision of details guidance to States not issuing SIGMET as required				
	World area forecast system (WAFS)	)			
	h) Conduct seminars in French and English on new WAFS gridded forecasts				
	i) Establishment of an updated list of States not receiving WAFS	2014 - 2016		<u> </u>	

	<ul> <li>products and areas of constraints in implementing SADIS VSAT and FTP service and States concerned to develop remedial action plans</li> <li>j) Establishment of an implementation project in terms</li> </ul>								
	of seminars and consultancy services through SIPs and Safety Fund projects respectively	2014 - 2016	ICAO/WMO, States						
	Optimization of OPMET data, Exchange and implementation of OPMET databanks								
	<ul> <li>k) Undertake an assessment of the availability and quality of OPMET data in the region and States not meeting the required levels of implementation to develop remedial action plans</li> <li>1) Two seminars in French and English on AMBEX and OPMET AFI data banks procedures</li> </ul>	2014-Dec 2016	ICAO/WMO, States	Valid					
	m) Establishment of an implementation project in terms of seminars and consultancy services through SIPs and Safety Fund-ICAO (SAFE) projects respectively obligation								
Linkage to GPIs	GPI/19: Meteorological systems								

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APPENDIX C RELATIONSHIP BETWEEN AFI PFFS AND ASBU BLOCK 0 MODULES SELECTED FOR THE AFI REGION

APPENDIX C RELATIONSHIP BETWEEN AFI PFFS AND ASBU BLOCK 0 MODULES SELECTED FOR THE AFI REGION

	PIA1					PIA2		PIA3						PIA4			
	B0-15 RSEQ	B0-65 APTA	B0-70 WAKE		B0-80 ACDM	B0-25 FICE	B0-30 DATM		B0-10 FRTO	B0-35 NOPS	B0-84 ASUR	B0-86 OPFL	B0- 101 ACAS		B0-05 CDO	B0-20 CCO	B0-40 TBO
PFF AFI ATM/01									Х			Х					
PFFAFI ATM/02									Х								Х
PFFAFI ATM/03		Х							Х						Х	Х	Х
PFF AFI ATM/04									Х						Х	Х	Х
PFF AFI CNS/01						Х		Х		Х							Х
PFFAFI MET/01								Х									
PFF AFI MET/02				Х				Х									
PFFAFI SAR/01																	
PFF AFI AIM/01							Х										
PFF AFI AIM/02							Х	Х									
PFF AFI AGA/01				Х	Х												

## **APPENDIX D:**

## DETAILED DESCRIPTION OF ASBU BLOCK 0 MODULES (AS PER ICAO GLOBAL AIR NAVIGATION PLAN, DOC 9750, 4TH EDITION)

#### -77-PERFORMANCE IMPROVEMENT AREA 1: AIRPORT OPERATIONS

#### **B0-APTA** Optimization of Approach Procedures including Vertical Guidance

The use of performance-based navigation (PBN) and ground-based augmentation system (GBAS) landing system (GLS) procedures to enhance the reliability and predictability of approaches to runways, thus increasing safety, accessibility and efficiency. This is possible through the application of basic global navigation satellite system (GNSS), Baro-vertical navigation (VNAV), satellite-based augmentation system (SBAS) and GLS. The flexibility inherent in PBN approach design can be exploited to increase runway capacity.

Applicability

This Module is applicable to all instrument, and precision instrument runway ends, and to a limited extent, non-instrument runway ends.

Benefits

Access and Equity: Increased aerodrome accessibility.

Capacity: In contrast with instrument landing systems (ILS), the GNSS-based approaches (PBN and GLS) do not require the definition and management of sensitive and critical areas. This results in increased runway capacity where applicable.

Efficiency: Cost savings related to the benefits of lower approach minima: fewer diversions, over flights, cancellations and delays. Cost savings related to higher airport capacity in certain circumstances (e.g. closely spaced parallels) by taking advantage of the flexibility to offset approaches and define displaced thresholds.

Environment: Environmental benefits through reduced

fuel burn.

Safety: Stabilized approach paths.

Cost: Aircraft operators and Air Navigation Service Providers (ANSPs) can quantify the benefits of lower minima by using historical aerodrome weather observations and modelling airport accessibility with existing and new minima. Each aircraft operator can then assess benefits against the cost of any required avionics upgrade. Until there are GBAS (CAT II/III) Standards, GLS cannot be considered as a candidate to globally replace ILS. The GLS business case needs to consider the cost of retaining ILS or MLS to allow continued operations during an interference event.

## **B0-WAKE** Increased Runway Throughput through Optimized Wake Turbulence Separation

Improves throughput on departure and arrival runways through optimized wake turbulence separation minima, revised aircraft wake turbulence categories and procedures.

Applicability

Least complex – Implementation of revised wake turbulence categories is mainly procedural. No changes to automation systems are needed.

Benefits

Access and Equity: Increased aerodrome

accessibility. Capacity:

a) Capacity and departure/arrival rates will increase at capacity constrained aerodromes as wake categorization changes from three to six categories.

b) Capacity and arrival rates will increase at capacity constrained aerodromes as specialized and tailored procedures for landing operations for on-parallel runways, with centre lines spaced less than 760 m (2 500 ft) apart, are developed and implemented.

c) Capacity and departure/arrival rates will increase as a result of new procedures which will reduce the current two-three minutes delay times. In addition, runway occupancy time will decrease as a result of these new procedures.

Flexibility Aerodromes can be readily configured to operate on three (i.e. existing H/M/L) or six wake turbulence categories, depending on demand.

Cost: Minimal costs are associated with the implementation in this Module. The benefits are to the users of the aerodrome runways and surrounding airspace, ANSPs and operators. Conservative wake turbulence separation standards and associated procedures do not take full advantage of the maximum utility of runways and airspace. U.S. air carrier data shows that, when operating from a capacity- constrained aerodrome, a gain of two extra departures per hour has a major beneficial effect in reducing delays.

The ANSP may need to develop tools to assist controllers with the additional wake turbulence categories and decision support tools. The tools necessary will depend on the operation at each airport and the number of wake turbulence categories implemented.

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

Basic advanced-surface movement guidance and control systems (A-SMGCS) provides surveillance and alerting of movements of both aircraft and vehicles at the aerodrome, thus improving runway/aerodrome safety. Automatic dependent surveillance-broadcast (ADS-B) information is used when available (ADS-B APT).

Applicability

A-SMGCS is applicable to any aerodrome and all classes of aircraft/vehicles. Implementation is to be based on requirements stemming from individual aerodrome operational and cost-benefit assessments. ADS-B APT, when applied is an element of A-SMGCS, is designed to be applied at aerodromes with medium traffic complexity, having up to two active runways at a time and the runway width of minimum 45 m.

#### Benefits

Access and Equity: A-SMGCS improves access to portions of the manoeuvring area obscured from view of the control tower for vehicles and aircraft. Sustains an improved aerodrome capacity during periods of reduced visibility. Ensures equity in ATC handling of surface traffic regardless of the traffic's position on the aerodrome.

ADS-B APT, as an element of an A-SMGCS system, provides traffic situational awareness to the controller in the form of surveillance information. The availability of the data is dependent on the aircraft and vehicle level of equipage.

Capacity: A-SMGCS: sustained levels of aerodrome capacity for visual conditions reduced to minima lower than would otherwise be the case.

ADS-B APT: as an element of an A-SMGCS system, potentially improves capacity for medium complexity aerodromes.

Efficiency: A-SMGCS: reduced taxi times through diminished requirements for intermediate holdings based on reliance on visual surveillance only.

ADS-B APT: as an element of an A-SMGCS, potentially reduces occurrence of runway collisions by assisting in the detection of the incursions.

Environment: Reduced aircraft emissions stemming from improved efficiencies.

Safety: A-SMGCS: reduced runway incursions. Improved response to unsafe situations. Improved situational awareness leading to reduced ATC workload.

ADS-B APT: as an element of an A-SMGCS system, potentially reduces the occurrence of occurrence of runway collisions by assisting in the detection of the incursions.

Cost: A-SMGCS: a positive CBA can be made from improved levels of safety and improved efficiencies in surface operations leading to significant savings in aircraft fuel usage. As well, aerodrome operator vehicles will benefit from improved access to all areas of the aerodrome, improving the efficiency of aerodrome operations, maintenance and servicing.

ADS-B APT: as an element of an A-SMGCS system less costly surveillance solution for medium complexity aerodromes.

#### **B0-ACDM** Improved Airport Operations through Airport-CDM

Implements collaborative applications that will allow the sharing of surface operations data among the different stakeholders on the airport. This will improve surface traffic management reducing delays on movement and manoeuvring areas and enhance safety, efficiency and situational awareness.

Applicability

Local for equipped/capable fleets and already established airport surface infrastructure.

Benefits

Capacity: Enhanced use of existing infrastructure of gate and stands (unlock latent capacity). Reduced workload, better organization of the activities to manage flights.

Efficiency: Increased efficiency of the ATM system for all stakeholders. In particular for aircraft operators: improved situational awareness (aircraft status both home and away); enhanced fleet predictability and punctuality; improved operational efficiency (fleet management); and reduced delay.

Environment: Reduced taxi time; reduced fuel and carbon emission; and lower aircraft

engine run time.

Cost: The business case has proven to be positive due to the benefits that flights and the

other airport operational stakeholders can obtain. However, this may be influenced

depending upon the individual situation (environment, traffic levels investment cost, etc.).

A detailed business case has been produced in support of the EU regulation which was solidly positive.

## **B0-RSEQ** Improve Traffic Flow through Sequencing (AMAN/DMAN)

Manage arrivals and departures (including time-based metering) to and from a multi-runway aerodrome or locations with multiple dependent runways at closely proximate aerodromes, to efficiently utilize the inherent runway capacity.

## Applicability

Runways and terminal manoeuvring area in major hubs and metropolitan areas will be most in need of these improvements.

The improvement is least complex – runway sequencing procedures are widely used in aerodromes globally. However some locations might have to confront environmental and operational challenges that will increase the complexity of development and implementation of technology and procedures to realize this Module.

## Benefits

Capacity: Time-based metering will optimize usage of terminal airspace and runway capacity. Optimized utilization of terminal and runway resources.

Efficiency: Efficiency is positively impacted as reflected by increased runway throughput and arrival rates. This is achieved through:

a) Harmonized arriving traffic flow from en-route to terminal and aerodrome. Harmonization is achieved via the sequencing of arrival flights based on available terminal and runway resources.

b) Streamlined departure traffic flow and smooth transition into en-route airspace. Decreased lead time for departure request and time between call for release and departure time. Automated dissemination of departure information and clearances.

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Predictability: Decreased uncertainties in aerodrome/terminal demand

prediction.

Flexibility: By enabling dynamic scheduling.

Cost: A detailed positive business case has been built for the time-based flow management programme in the United States. The business case has proven the benefit/cost ratio to be positive. Implementation of time-based metering can reduce airborne delay. This capability was estimated to provide over 320,000 minutes in delay reduction and \$28.37 million in benefits to airspace users and passengers over the evaluation period.

Results from field trials of DFM, a departure scheduling tool in the United States, have been positive. Compliance rate, a metric used to gauge the conformance to assigned departure time, has increased at field trial sites from sixty-eight to seventy-five per cent. Likewise, the EUROCONTROL DMAN has demonstrated positive results. Departure scheduling will streamline flow of aircraft feeding the adjacent center airspace based on that center's constraints. This capability will facilitate more accurate estimated time of arrivals (ETAs). This allows for the continuation of metering during heavy traffic, enhanced efficiency in the NAS and fuel efficiencies. This capability is also crucial for extended metering.

#### -82-PERFORMANCE IMPROVEMENT AREA 2: GLOBALLY INTEROPERABLE SYSTEMS AND DATA

# **B0-FICE Increased Interoperability, Efficiency and Capacity though Ground-Ground Integration**

Improves coordination between air traffic service units (ATSUs) by using ATS interfacility data communication (AIDC) defined by ICAO's *Manual of Air Traffic Services Data Link Applications* (Doc 9694). The transfer of communication in a data link environment improves the efficiency of this process, particularly for oceanic ATSUs.

## Applicability

Applicable to at least two area control centres (ACCs) dealing with en-route and/or terminal control area (TMA) airspace. A greater number of consecutive participating ACCs will increase the benefits.

## Benefits

Capacity: Reduced controller workload and increased data integrity supporting reduced separations translating directly to cross sector or boundary capacity flow increases.

Efficiency: The reduced separation can also be used to more frequently offer aircraft flight levels closer to the flight optimum; in certain cases, this also translates into reduced en-route holding.

Interoperability: Seamlessness: the use of standardized interfaces reduces the cost of development, allows air traffic controllers to apply the same procedures at the boundaries of all participating centres and border crossing becomes more transparent to flights.

Safety: Better knowledge of more accurate flight plan information.

Cost: Increase of throughput at ATS unit boundary and reduced ATCO workload will outweigh the cost of FDPS software changes. The business case is dependent on the environment.

## **B0-DATM** Service Improvement through Digital Aeronautical Information Management

The initial introduction of digital processing and management of information through, aeronautical information service (AIS)/aeronautical information management (AIM) implementation, use of aeronautical exchange model (AIXM), migration to electronic aeronautical information publication (AIPO and better quality and availability of data.

Applicability

Applicable at State level with increased benefits as more States

participate.

Benefits

Environment: Reducing the time necessary to promulgate information concerning airspace status will allow for more effective airspace utilization and allow improvements in trajectory management.

Safety: Reduction in the number of possible inconsistencies. Module allows reducing the number of manual entries and ensures consistency among data through automatic data checking based on commonly agreed business rules.

Interoperability: Essential contribution to interoperability.

Cost: Reduced costs in terms of data inputs and checks, paper and post, especially when considering the overall data chain, from originators, through AIS to the end users. The business case for the aeronautical information conceptual model (AIXM) has been conducted in Europe and in the United States and has shown to be positive.

The initial investment necessary for the provision of digital AIS data may be reduced through regional cooperation and it remains low compared with the cost of other ATM systems. The transition from paper products to digital data is a critical pre-requisite for the implementation of any current or future ATM or Air Navigation concept that relies on the accuracy, integrity and timeliness of data.

## **B0-AMET** Meteorological Information Supporting Enhanced Operational Efficiency and Safety

Global, regional and local meteorological information:

a) Forecasts provided by world area forecast centres (WAFCs), volcanic ash advisory centres (VAACs) and tropical cyclone advisory centres (TCAC).

b) Aerodrome warnings to give concise information of meteorological conditions that could adversely affect all aircraft at an aerodrome, including wind shear.

c) SIGMETs to provide information on occurrence or expected occurrence of specific enroute weather phenomena which may affect the safety of aircraft operations and other operational meteorological (OPMET) information, including METAR/SPECI and TAF, to provide routine and special observations and forecasts of meteorological conditions occurring or expected to occur at the aerodrome.

This information supports flexible airspace management, improved situational awareness and collaborative decision-making, and dynamically-optimized flight trajectory planning. This Module includes elements which should be viewed as a subset of all available meteorological information that can be used to support enhanced operational efficiency and safety

#### Applicability

Applicable to traffic flow planning, and to all aircraft operations in all domains and flight phases, regardless of level of aircraft equipage.

Benefits

Capacity: Optimized use of airspace capacity. Metric: ACC and aerodrome throughput.

Efficiency: Harmonized arriving air traffic (en-route to terminal area to aerodrome) and harmonized departing air traffic (aerodrome to terminal area to en-route) will translate to reduced arrival and departure holding times and thus reduced fuel burn. Metric: Fuel consumption and flight time punctuality.

Environment: Reduced fuel burn through optimized departure and arrival profiling/scheduling. Metric: Fuel burn and emissions.

Safety: Increased situational awareness and improved consistent and collaborative decision making. Metric: Incident occurrences.

Interoperability: Gate-to-gate seamless operations through common access to, and use of, the available WAFS, IAVW and tropical cyclone watch forecast information. Metric: ACC throughput.

Predictability: Decreased variance between the predicted and actual air traffic schedule. Metric: Block time variability, flight-time error/buffer built into schedules.

Participation: Common understanding of operational constraints, capabilities and needs, based on expected (forecast) meteorological conditions. Metric: Collaborative decision-making at the aerodrome and during all phases of flight.

Flexibility: Supports pre-tactical and tactical arrival and departure sequencing and thus dynamic air traffic scheduling. Metric: ACC and aerodrome throughput.

Cost: Reduction in costs through reduced arrival and departure delays (viz. reduced fuel burn). Metric: Fuel consumption and associated costs.

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#### -85-PERFORMANCE IMPROVEMENT AREA 3: OPTIMUM CAPACITY AND FLEXIBLE FLIGHTS

#### **B0-FRTO** Improved Operations through Enhanced En-route Trajectories

Allow the use of airspace which would otherwise be segregated (i.e. Special Use Airspace) along with flexible routing adjusted for specific traffic patterns. This will allow greater routing possibilities, reducing potential congestion on trunk routes and busy crossing points, resulting in reduced flight lengths and fuel burn.

Applicability

Applicable to en-route airspace. Benefits can start locally. The larger the size of the concerned airspace the greater the benefits, in particular for flex track aspects. Benefits accrue to individual flights and flows. Application will naturally span over a long period as traffic develops. Its features can be introduced starting with the simplest ones.

Benefits

Access and Equity: Better access to airspace by a reduction of the permanently segregated

volumes. Capacity: The availability of a greater set of routing possibilities allows reducing

#### potential congestion on

trunk routes and at busy crossing points. The flexible use of airspace gives greater possibilities to separate flights horizontally. PBN helps to reduce route spacing and aircraft separations. This in turn allows reducing controller workload by flight.

Efficiency: The different elements concur to trajectories closer to the individual optimum by reducing constraints imposed by permanent design. In particular the Module will reduce flight length and related fuel burn and emissions. The potential savings are a significant proportion of the ATM related inefficiencies. The Module will reduce the number of flight diversions and cancellations. It will also better allow avoidance of noise sensitive areas.

Environment: Fuel burn and emissions will be reduced; however, the area where emissions and contrails will be formed may be larger.

Predictability: Improved planning allows stakeholders to anticipate on expected situations and be better prepared.

Flexibility: The various tactical functions allow rapid reaction to changing conditions.

Cost: FUA: In the United Arab Emirates (UAE) over half of the airspace is military. Opening up this airspace could potentially enable yearly savings in the order of 4.9 million litres of fuel and 581 flight hours. In the United States a study for NASA by Datta and Barington showed maximum savings of dynamic use of FUA of \$7.8M (1995\$).

Flexible routing: Early modelling of flexible routing suggests that airlines operating a 10-hour intercontinental flight can cut flight time by six minutes, reduce fuel burn by as much as 2% and save 3,000 kilograms of CO2 emissions. In the United States RTCA NextGen Task Force Report, it was found that benefits would be about 20% reduction in operational errors; 5-8% productivity increase (near term; growing to 8-14% later); capacity increases (but not quantified).

Annual operator benefit in 2018 of \$39,000 per equipped aircraft (2008 dollars) growing to \$68,000 per aircraft in 2025 based on the FAA Initial investment Decision. For the high throughput, high capacity benefit case (in 2008 dollars): total operator benefit is \$5.7B across programme lifecycle (2014-2032, based on the FAA initial investment decision).

# **B0-NOPS** Improved Flow Performance through Planning based on a Network-wide view

Air traffic flow management (ATFM) is used to manage the flow of traffic in a way that minimizes delays and maximizes the use of the entire airspace. ATFM can regulate traffic flows involving departure slots, smooth flows and manage rates of entry into airspace along traffic axes, manage arrival time at waypoints or flight information region (FIR)/sector boundaries and reroute traffic to avoid saturated areas. ATFM may also be used to address system disruptions including crisis caused by human or natural phenomena.

Applicability: Region or subregion. Benefits

Access and Equity: Improved access by avoiding disruption of air traffic in periods of demand higher than capacity. ATFM processes take care of equitable distribution of delays.

Capacity: Better utilization of available capacity, network-wide; in particular the trust of ATC not being faced by surprise to saturation tends to let it declare/use increased capacity levels; ability to anticipate difficult situations and mitigate them in advance.

Efficiency: Reduced fuel burn due to better anticipation of flow issues; a positive effect to reduce the impact of inefficiencies in the ATM system or to dimension it at a size that would not always justify its costs (balance between cost of delays and cost of unused capacity). Reduced block times and times with engines on.

Environment: Reduced fuel burn as delays are absorbed on the ground, with shut engines; rerouting however generally put flight on a longer distance, but this is generally compensated by other airline operational benefits.

Safety: Reduced occurrences of undesired sector overloads.

Predictability: Increased predictability of schedules as the ATFM algorithms tend to limit the number of large delays.

Participation: Common understanding of operational constraints, capabilities and needs.

Cost: The business case has proven to be positive due to the benefits that flights can obtain in terms of delay reduction.

## **B0-ASUR** Initial Capability for Ground Surveillance

Provides initial capability for lower cost ground surveillance supported by new technologies such as ADS-B OUT and wide area multilateration (MLAT) systems. This capability will be expressed in various ATM services, e.g. traffic information, search and rescue and separation provision.

## Applicability

This capability is characterized by being dependent/cooperative (ADS-B OUT) and independent/cooperative (MLAT). The overall performance of ADS-B is affected by avionics performance and compliant equipage rate.

## Benefits

Capacity: Typical separation minima are 3 NM or 5 NM enabling a significant increase in traffic density compared to procedural minima. Improved coverage, capacity, velocity vector performance and accuracy can improve ATC performance in both radar and non-radar environments. Terminal area surveillance performance improvements are achieved through high accuracy, better velocity vector and improved coverage.

Efficiency: Availability of optimum flight levels and priority to the equipped aircraft and operators. Reduction of flight delays and more efficient handling of air traffic at FIR boundaries. Reduces workload of air traffic controllers.

Safety: Reduction of the number of major incidents. Support to search and rescue.

Cost: Either comparison between procedural minima and 5 NM separation minima would allow an increase of traffic density in a given airspace; or comparison between installing/renewing SSR Mode S stations using Mode S transponders and installing ADS-B OUT (and/or MLAT systems).

### **B0-ASEP** Air Traffic Situational Awareness (ATSA)

Two air traffic situational awareness (ATSA) applications which will enhance safety and efficiency by providing pilots with the means to enhance traffic situational awareness and achieve quicker visual acquisition of targets:

a) AIRB (basic airborne situational awareness during flight

operations). b) VSA (visual separation on approach).

Applicability

These are cockpit-based applications which do not require any support from the ground hence they can be used by any suitably equipped aircraft. This is dependent upon aircraft being equipped with ADS-B OUT. Avionics availability at low enough costs for GA is not yet available.

#### Benefits

Efficiency: Improve situational awareness to identify level change opportunities with current separation minima (AIRB) and improve visual acquisition and reduction of missed approaches (VSA).

Safety: Improve situational awareness (AIRB) and reduce the likelihood of wake turbulence encounters (VSA). Cost: The cost benefit is largely driven by higher flight efficiency and consequent savings in contingency fuel. The benefit analysis of the EUROCONTROL CRISTAL ITP project of the CASCADE Programme and subsequent update had shown that ATSAW AIRB and ITP together are capable of providing the following benefits over North Atlantic: -88-

- a) Saving 36 million Euro (50K Euro per aircraft) annually.
- b) Reducing carbon dioxide emissions by 160,000 tonnes annually.

The majority of these benefits are attributed to AIRB. Findings will be refined after the completion of the pioneer operations starting in December 2011.

## **B0-OPFL** Improved Access to Optimum Flight Levels through Climb/Descent Procedures using ADS B)

Enables aircraft to reach a more satisfactory flight level for flight efficiency or to avoid turbulence for safety. The main benefit of ITP is significant fuel savings and the uplift of greater payloads.

#### Applicability

This can be applied to routes in procedural airspaces.

Benefits

Capacity: Improvement in capacity on a given air route.

Efficiency: Increased efficiency on oceanic and potentially continental en-route.

Environment: Reduced emissions.

Safety: A reduction of possible injuries for cabin crew and passengers.

#### **B0-ACAS** Airborne Collision Avoidance Systems (ACAS) Improvements

Provides short-term improvements to existing airborne collision avoidance systems (ACAS) to reduce nuisance alerts while maintaining existing levels of safety. This will reduce trajectory deviations and increase safety in cases where there is a breakdown of separation.

Applicability

Safety and operational benefits increase with the proportion of

equipped aircraft. Benefits

Efficiency: ACAS improvement will reduce unnecessary resolution advisory (RA) and then reduce trajectory deviations.

Safety: ACAS increases safety in the case of breakdown of separation.

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## **B0-SNET** Increased Effectiveness of Ground-Based Safety Nets

Monitors the operational environment during airborne phases of flight to provide timely alerts on the ground of an increased risk to flight safety. In this case, short-term conflict alert, area proximity warnings and minimum safe altitude warnings are proposed. Ground-based safety nets make an essential contribution to safety and remain required as long as the operational concept remains human centred.

#### Applicability

Benefits increase as traffic density and complexity increase. Not all ground-based safety nets are relevant for each environment. Deployment of this Module should be accelerated.

### Benefits

Safety: Significant reduction of the number of major incidents.

Cost: The business case for this element is entirely made around safety and the application of ALARP (as low as reasonably practicable) in risk management.

### **Performance Improvement Area 4: Efficient Flight Paths**

## **B0-CDO** Improved Flexibility and Efficiency in Descent Profiles using Continuous Descent Operations (CDOs)

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

#### Applicability

Regions, States or individual locations most in need of these improvements. For simplicity and implementation success, complexity can be divided into three tiers:

a) Least complex – regional/States/locations with some foundational PBN operational experience that could capitalize on near-term enhancements, which include integrating procedures and optimizing performance.

b) More complex – regional/State/locations that may or may not possess PBN experience, but would benefit from introducing new or enhanced procedures. However, many of these locations may have environmental and operational challenges that will add to the complexities of procedure development and implementation.

c) Most complex – regional/State/locations in this tier will be the most challenging and complex to introduce integrated and optimized PBN operations. Traffic volume and airspace constraints are added complexities that must be confronted. Operational changes to these areas can have a profound effect on the entire State, region or location.

#### Benefits

Efficiency: Cost savings and environmental benefits through reduced fuel burn. Authorization of operations where noise limitations would otherwise result in operations being curtailed or restricted. Reduction in the number of required radio transmissions. Optimal management of the top-of-descent in the en-route airspace.

Safety: More consistent flight paths and stabilized approach paths. Reduction in the incidence of controlled flight into terrain (CFIT). Separation with the surrounding traffic (especially free-routing). Reduction in the number of conflicts.

Predictability: More consistent flight paths and stabilized approach paths. Less need for vectors.

Cost: It is important to consider that CDO benefits are heavily dependent on each specific ATM environment. Nevertheless, if implemented within the ICAO CDO manual framework, it is envisaged that the benefit/cost ratio (BCR) will be positive. After CDO implementation in Los Angeles TMA (KLAX) there was a 50% reduction in radio transmissions and fuel savings averaging 125 pounds per flight (13.7 million pounds/year; 41 million pounds of CO2 emission).

The advantage of PBN to the ANSP is that PBN avoids the need to purchase and deploy navigation aids for each new route or instrument procedure.

#### **B0-TBO Improved Safety and Efficiency through the Initial Application of Data Link En**route

Implements an initial set of data link applications for surveillance and communications in air traffic control (ATC), supporting flexible routing, reduced separation and improved safety.

Applicability

Requires good synchronization of airborne and ground deployment to generate significant benefits, in particular to those equipped. Benefits increase with the proportion of equipped aircraft.

Benefits

Capacity: Element 1: A better localization of traffic and reduced separations allow increasing the offered capacity.

Element 2: Reduced communication workload and better organization of controller tasks allowing increased sector capacity.

Efficiency: Element 1: Routes/tracks and flights can be separated by reduced minima, allowing flexible routings and vertical profiles closer to the user-preferred ones.

Safety: Element 1: Increased situational awareness; ADS-C based safety nets like cleared level adherence monitoring, route adherence monitoring, danger area infringement warning; and better support to search and rescue.

Element 2: Increased situational awareness; reduced occurrences of misunder-standings; solution to stuck microphone situations.

Flexibility: Element 1: ADS-C permits easier route change.

Cost: Element 1: The business case has proven to be positive due to the benefits that flights can obtain in terms of better flight efficiency (better routes and vertical profiles; better and tactical resolution of conflicts).

To be noted, the need to synchronize ground and airborne deployments to ensure that services are provided by the ground when aircraft are equipped, and that a minimum proportion of flights in the airspace under consideration are suitably equipped.

Element 2: The European business case has proved to be positive due to:

a) the benefits that flights obtain in terms of better flight efficiency (better routes and vertical profiles; better and tactical resolution of conflicts); and

b) reduced controller workload and increased capacity.

A detailed business case has been produced in support of the EU regulation which was solidly positive. To be noted, there is a need to synchronize ground and airborne deployments to ensure that services are provided by the ground when aircraft are equipped, and that a minimum proportion of flights in the airspace under consideration are suitably equipped.

## **B0-CCO** Improved Flexibility and Efficiency Departure Profiles – Continuous Climb Operations (CCO)

Implements continuous climb operations (CCO) in conjunction with performance-based navigation (PBN) to provide opportunities to optimize throughput, improve flexibility, enable fuel-efficient climb profiles, and increase capacity at congested terminal areas.

### Applicability

Regions, States or individual locations most in need of these improvements. For simplicity and implementation success, complexity can be divided into three tiers:

a) Least complex – regional/States/locations with some foundational PBN operational experience that could capitalize on near-term enhancements, which include integrating procedures and optimizing performance.

b) More complex – regional/State/locations that may or may not possess PBN experience, but would benefit from introducing new or enhanced procedures. However, many of these locations may have environmental and operational challenges that will add to the complexities of procedure development and implementation.

c) Most complex – regional/State/locations in this tier will be the most challenging and complex to introduce integrated and optimized PBN operations. Traffic volume and airspace constraints are added complexities that must be confronted. Operational changes to these areas can have a profound effect on the entire State, region or location.

#### Benefits

Efficiency: Cost savings through reduced fuel burn and efficient aircraft operating profiles. Reduction in the number of required radio transmissions.

Environment: Authorization of operations where noise limitations would otherwise result in operations being curtailed or restricted. Environmental benefits through reduced emissions.

Safety: More consistent flight paths. Reduction in the number of required radio transmissions. Lower pilot and air traffic control workload.

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-92-Cost: It is important to consider that CCO benefits are heavily dependent on the specific ATM environment. Nevertheless, if implemented within the ICAO CCO manual framework, it is envisaged that the benefit/cost ratio (BCR) will be positive.

**APPENDIX E:** 

ACRONYMS

#### -94-ACRONYMS

A

- ATFCM Air traffic flow and capacity management
- AAR Airport arrival rate
- ABDAA Airborne detect and avoid algorithms
- ACAS Airborne collision avoidance system ACC Area control centre
- A-CDM Airport collaborative decision-making
- ACM ATC communications management
- ADEXP ATS data exchange presentation
- ADS-B Automatic dependent surveillance-broadcast
- ADS-C Automatic dependent surveillance-contract
- AFIS Aerodrome flight information service
- AFISO Aerodrome flight information service officer
- AFTN Aeronautical fixed telecommunication network
- AHMS Air traffic message handling System
- AICM Aeronautical information conceptual model
- AIDC ATS inter-facility data communications
- AIP Aeronautical information publication
- AIRB Enhanced traffic situational awareness during flight operations
- AIRM ATM information reference model
- AIS Aeronautical information services
- AIXM Aeronautical information exchange model
- AMA Airport movement area
- AMAN/DMAN Arrival/departure management
- AMC ATC microphone check

- AMS(R)S Aeronautical mobile satellite (route) service
- ANM ATFM notification message
- ANS Air navigation services
- ANSP Air navigation services provider
- AO Aerodrome operations/Aircraft operators
- AOC Aeronautical operational control
- AOM Airspace organization management
- APANPIRG Asia/Pacific air navigation planning and implementation regional group
- ARNS Aeronautical radio navigation Service
- ARNSS Aeronautical radio navigation Satellite Service
- ARTCCs Air route traffic control centers
- AS Aircraft surveillance
- ASAS Airborne separation assistance systems
- ASDEX Airport surface detection equipment
- ASEP Airborne separation ASEP-ITF – Airborne separation in trail follow
- ASEP-ITM Airborne separation in trail merge
- ASEP-ITP Airborne separation in trail procedure
- ASM Airspace management
- A-SMGCS Advanced surface movement guidance and control systems
- ASP Aeronautical surveillance plan
- ASPA Airborne spacing
- ASPIRE Asia and South Pacific initiative to reduce emissions
- ATC Air traffic control
- ATCO Air traffic controller
- ATCSCC Air traffic control system command center

- ATFCM Air traffic flow and capacity management
- ATFM Air traffic flow management
- ATMC Air traffic management control
- ATMRPP Air traffic management requirements and performance panel
- ATN Aeronautical Telecommunication Network
- ATOP Advanced technologies and oceanic procedures
- ATSA Air traffic situational awareness
- ATSMHS Air traffic services message handling services

ATSU - ATS unit

- AU Airspace user
- AUO Airspace user operations

#### В

Baro-VNAV – Barometric vertical navigation BCR – Benefit/cost ratio B-RNAV – Basic area navigation

С

- CSPO Closely spaced parallel operations
- CPDLC Controller-pilot data link communications
- CDO Continuous descent operations
- CBA Cost-benefit analysis
- CSPR Closely spaced parallel runways
- CM Conflict management
- CDG Paris Charles de Gaulle airport

- CDM Collaborative decision-making
- CFMU Central flow management unit
- CDQM Collaborative departure queue management
- CWP Controller working positions
- CAD Computer aided design
- CTA Control time of arrival
- CARATS Collaborative action for renovation of air traffic systems
- CFIT Controlled flight into terrain
- CDTI Cockpit display of traffic information
- CCO Continuous climb operations
- CAR/SAM Caribbean and South American region

COSESNA - Central American civil aviation agency.

#### D

- DAA Detect and avoid
- DCB Demand capacity balancing
- DCL Departure clearance
- DFM Departure flow management
- DFS Deutsche Flugsicherung GmbH
- DLIC Data link communications initiation capability
- DMAN Departure management
- DMEAN Dynamic management of European airspace network
- D-OTIS Data link operational terminal information service
- DPI Departure planning information
- D-TAXI Data link TAXI
- EAD European AIS database
- e-AIP Electronic AIP
- EGNOS European GNSS navigation overlay service
- ETMS Enhance air traffic management system
- EVS Enhanced vision systems

## F

- FABEC Functional Airspace Block Europe Central
- FAF/FAP Final approach fix/final approach point
- FANS Future air navigation systems
- FDP Flight data processing
- FDPS Flight data processing system

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- FF-ICE Flight and flow information for the collaborative environment
- FIR Flight information region
- FIXM Flight information exchange model
- FMC Flight management computer
- FMS Flight management system
- FMTP Flight message transfer protocol
- FO Flight object
- FPL Filed flight plan
- FPS Flight planning systems
- FPSM Ground delay program parameters selection model
- FRA Free route airspace
- FTS Fast time simulation
- FUA Flexible use of airspace
- FUM Flight update message
- G
- GANIS Global Air Navigation Industry Symposium
- GANP Global air navigation plan
- GAT General air traffic
- GBAS Ground-based augmentation system
- GBSAA Ground based sense and avoid
- GEO satellite Geostationary satellite
- GLS GBAS landing system
- GNSS Global navigation satellite system
- GPI-Global plan initiatives
- GPS Global positioning system
- GRSS Global runway safety symposium

GUFI – Globally unique flight identifier

Η

HAT - Height above threshold

HMI – Human-machine interface

HUD – Head-up display

## Ι

IDAC -- Integrated departure/arrival capability

IDC – Interfacility data communications

IDRP - Integrated departure route planner

IFR – Instrument flight rules IFSET – ICAO Fuel Savings Estimation Tool

ILS - Instrument landing system

IM -- Interval Management

IOP – Implementation and Interoperability

IP – Internetworking protocol

IRR – Internal rate of return

ISRM – Information service reference model

ITP – In-trail-procedure

#### K

KPA – Key performance areas

#### L

LARA - Local and sub-regional airspace management support system

LIDAR - Aerial laser scans

LNAV - Lateral navigation

LoA – Letter of agreement

LoC - Letter of coordination

LPV - Lateral precision with vertical guidance OR localizer performance with vertical guidance

LVP - Low visibility procedures

Μ

- MASPS Minimum aviation system performance standards
- MILO Mixed integer linear optimization

MIT – Miles-in-trail

MLS - Microwave landing system

MLTF - Multilateration task force

MTOW - Maximum take-off weight

Ν

NADP - Noise abatement departure procedure

NAS – National airspace system

NAT - North Atlantic

NDB - Non-directional radio beacon

NextGen - Next generation air transportation system

NMAC - Near mid-air collision

NOP - Network operations procedures (plan)

NOTAM - Notice to airmen

NPV – Net present value

0

OLDI – On-line data interchange

OPD - Optimized profile descent

OSED - Operational service & environment definition

 $\ensuremath{\text{OTW}}-\ensuremath{\text{Out}}$  the window

P(NMAC) - Probability of a near mid-air collision

- PACOTS Pacific organized track system
- PANS-OPS Procedures for air navigation services aircraft operations
- PBN Performance based navigation
- PENS Pan-European Network Service
- PETAL Preliminary EUROCONTROL test of air/ground data link
- PIA Performance improvement area
- PRNAV Precision area navigation

#### R

- RA Resolution advisory
- RAIM Receiver autonomous integrity monitoring
- RAPT Route availability planning tool
- **RNAV** Area navigation
- RNP Required navigation performance RPAS – Remotely-piloted aircraft system
- RTC-Remote tower centre
- S
- SARPs Standards and recommended practices
- SASP Separation and airspace safety panel
- SATCOM Satellite communication
- SBAS Satellite-based augmentation system
- SDM Service delivery management
- SESAR Single European sky ATM research
- SEVEN System-wide enhancements for versatile electronic negotiation
- SFO San Francisco international airport

- SIDS Standard instrument departures
- SMAN Surface management
- SMS Safety management systems
- SPRs Special programme resources
- SRMD Safety risk management document
- SSEP Self-separation
- SSR Secondary surveillance radar
- STA Scheduled time of arrival
- STARS Standard terminal arrivals
- STBO Surface trajectory based operations
- SURF Enhanced traffic situational awareness on the airport surface
- SVS Synthetic visualization systems
- SWIM System-wide information management
- Т
- TBFM Time-based flow management
- TBO Trajectory-based operations
- TCAS Traffic alert and collision avoidance system
- TFM Traffic flow management
- TIS-B Traffic information service-broadcast
- TMA Trajectory management advisor
- TMIs Traffic management initiatives
- TMU Traffic management unit
- TOD Top of Descent
- TRACON Terminal radar approach control
- TS Traffic synchronization
- TSA Temporary segregated airspace

TSO - Technical standard order

TWR – Aerodrome control tower

U

UA - Unmanned aircraft

UAS - Unmanned aircraft system

UAV - Unmanned aerial vehicle

UDPP - User driven prioritization process

V

VFR – Visual flight rules

VLOS – Visual line of sight

VNAV - Vertical navigation

VOR - Very high frequency (VHF) omnidirectional radio range

VSA – Enhanced visual separation on approach

W

WAAS – Wide area augmentation system

WAF – Weather avoidance field

WGS-84 - World geodetic system - 1984

WIDAO - Wake independent departure and arrival operation

WTMA - Wake turbulence mitigation for arrivals

WTMD - Wake turbulence mitigation for departures

WXXM – Weather exchange model