# **APPENDIX A**

# AIR NAVIGATION REPORTING FORMS

2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-15/RSEQ Improved Traffic Flow through Runway Sequencing (AMAN/DMAN)							
					Airport Ope		
3.	ASBU B0-15/RS	SEQ: Im	pact on N	Iain Ke	ey Performan	ce Areas (KPA)	
	Access & Equity	Cap	oacity	E	fficiency	Environmen	t Safety
Applicable	Ν		Y		Y Y		Ν
4.	ASBU B0-15/R	SEQ: Pla	anning Ta				
5. Elements 6. Targets and Implementation Progress (Ground and Air)					Progress		
1. AMAN and time-base	ed metering		Decem	ber 201	5		
2. Departure management	nt		Decem	ber 201	5		
3. Movement Area Capa	city Optimization	n	Decem	ber 201	5		
			RSEQ: In	npleme	ntation Chall	enges	
				Imple	ementation Ar	ea	-
Elements	Ground Syst Implementat		Avionio mplement		Procedure	s Availability	Operational Approvals
1. AMAN and time- based metering	Lack of automation system to supp synchronizatio	oort Ni	Nil		Lack of appropriate training. Lack of STARs PBN. Lack of slots assignment		Lack of procedures and inspectors for operational approvals
2. Departure management	Lack of automation system to supp synchronization	oort Ni	Nil		Lack of appropriate training. Lack of SIDs PBN. Lack of slots assignment		Lack of procedures and inspectors for operational approvals
3. Movement Area Capacity Optimization	Nil	Nil			Lack of proc RWY, TWY capacity calc Guidelines for area capacity	& platform ulation.	Lack of procedures and inspectors for operational approvals
8	. ASBU B0-15/	RSEO: I	Performa	nce Mo	· ·	-	<u> </u>
J J J J J J J J J J J J J J J J J J J					ntation Monit		
Elements						orting Metrics	
1. AMAN and time-	Indicator: Pero						e-based metering.
based metering	Supporting me	etric: Nui	nber of in	ternatio	nal airports wi	th AMAN and the	ime-based metering.
2. Departure	Indicator: Pero	centage o	f internati	onal ae	rodromes with	DMAN.	
management	Supporting me	etric: Nui	nber of in	ternatio	nal airports wi	th DMAN.	
3. Movement Area						Airport-capacity	
Capacity Optimization	Supporting me	etric: Nui	nber of in	ternatio	nal airports wi	th Airport-capac	city calculated.
8	. ASBU B0-15/						
	8B. ASE	BU B0-15	/RSEQ: I	Perforn	nance Monito	ring	
Key Performance Areas		N	Metrics (if	f not , i	ndicate qualit	ative benefits)	
Access & Equity	N/A						
Capacity	Improved airp	ort move	ment area	capacit	ty through opti	mization	
Efficiency				-			ughput and arrival
Environment	Reduction of a	carbon er	nissions				
Safety	N/A						

2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-65/APTA Optimization of Approach Procedures Including Vertical Guidance									
	- Pe	rformat	 nce Improve	ment	Area 1. Airna	ort ()	nerations		
3.	Performance Improvement Area 1: Airport Operations 3. ASBU B0-65/APTA: Impact on Main Key Performance Areas (KPA)								
		ess & Capaci uity		ty Efficiency		Environme		ent	Safety
Applicable		Y	Y		Y		Y		Y
4.	ASBU I	80-65/A	PTA: Plann		argets and Im argets and Im				
5. Elei	ments			0. 1	(Grour			Ugrea	00
1. APV with Bar		V			- Service Provi				
2. APV with SB.	AS				- As per AFI-G		~ .		
3. APV with GB	AS		providers)	2018 -	- Initial implen	nenta	ition at some	State	s (service
	7	. ASBI		TA: Iı	nplementation	n Ch	allenges		
					Împlementat	tion	Area	I	
Elements			nd System		Avionics		rocedures		perational
		Imple	mentation		lementation ficient		vailability ufficient	Lac	Approvals
1. APV with Bar	0	NIL ?			ber of		propriate		ropriate
VNAV				equij	oped aircraft		ining	train	-
2. APV with SB.	AS				of aircraft page. Not cable	cer wh imp No	nited to tain States ich have plemented. t plicable	appı traiı	k of wledge and ropriate ning. Not licable
3. APV with GB	AS	Lack of cost- benefit analys Adverse ionosphere		num	fficient ber of oped aircraft	Ins app	ufficient propriate ning	train Eva real	k of ropriate ning. luation of a operation nirement
8.					nce Monitorir			nent	
		A. ASBI			nplementation			tu:	
Elements 1. APV with Bar VNAV		Performance Indicators / Supporting MetricsIndicator: Percentage of international aerodromes having instrumentrunways provided with APV with Baro VNAV procedure implemented(Where the % is defined)Supporting metric: Number of international airports having approved APVwith Baro VNAV					emented		
2. APV with SB.	AS	Indicator: Percentage of international aerodromes having instrument runways provided with APV with SBAS procedure implemented Supporting metric: Number of international airports having approved APV with SBAS					ed proved APV		
3. APV with GB	AS	Indicator: Percentage of international aerodromes having instrument runways provided with APV with GBAS procedure implemented Supporting metric: Number of international airports having approved APV with GBAS							
8. ASBU B0-65/APTA: Performance Monitoring and Measurement 8B. ASBU B0-65/APTA: Performance Monitoring									

Key Performance Areas	Metrics (if not , indicate qualitative benefits)
Access & Equity	Increased aerodrome accessibility
Capacity	Increased runway capacity
Efficiency	Reduced fuel burn due to lower minima, fewer diversions, cancellations, delays
Environment	Reduced emissions due to reduced fuel burn
Safety	Increased safety through stabilized approach paths

2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-75/SURF Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2)							
3	Performance Improvement Area 1: Airport Operations 3. ASBU B0-75/SURF: Impact on Main Key Performance Areas (KPA)						
	Access & Equity	Capaci			fficiency	Environmen	
Applicable	Y	Y			Y	Y	Y
4. ASBU B0-75/SURF: Planning Targets and Implementation Progress							
5. Elements 6. Targets and Implementation Progress (Ground and Air)					n Progress		
1. Surveillance system f movement (PSR, SSR,		ration	Decen	nber 20	)17 Service pr	ovider	
2. Surveillance system ( ADS-B capacity)			Decen	nber 20	)17 Service pr	ovider	
3. Surveillance system f	for vehicle		Decen	nber 20	)17 Service pr	ovider	
4. Visual aids for navig					)15 Service pr		
5. Wildlife strike hazard					1	e operator / wild	llife committee
6. Display and processing					)17 Service pr		
	<u> </u>	<b>B0-75/SU</b>			ntation Challe		
					mentation Ar		
Elements	Ground System Implementation		Avionics lementa		Procedures Availability		Operational Approvals
1. Surveillance system for ground surface movement (PSR, SSR, ADS-B or Multilateration)	Lack of adequate financial resources			Lack of proc training.	edures and	Lack of inspectors for operational approvals	
2. Surveillance system on board (SSR transponder, ADS-B capacity)	Nil	Lack of surveillance system on board (ADS-B capacity) on general aviation and some commercial aircraft		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			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			Lack of Wild Management		Nil

	Conflict between aviation			
	law and state environment			
	laws. Lack of training.			
	Lack of community support			
8	8. ASBU B0-75/SURF: Performance Monitoring and Measurement			
	8A. ASBU B0-75/SURF: Implementation Monitoring			
Elements	Performance Indicators / Supporting Metrics			
1. Surveillance system for ground surface movement (PSR, SSR, ADS-B or Multilateration)	Indicator: Percentage of international aerodromes with SMR / SSR Mode S /ADS-B Multilateration for ground surface movement Supporting metric: Number of international airports with SMR / SSR Mode S /ADS-B Multilateration for ground surface movement.			
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.			
	3. 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							
3			ent Area 1: Airport on Main Key Perfor				
	ASDC D0-30// Access & Equity	Capacity	Efficiency	Environment	Safety		
Applicable	Y	Y	Y	Y	Y		
4.	ASBU B0-80/	ACDM: Planni	ng Targets and Imple				
5.	Elements		0	and Implementation (Ground and Air)	0		
1. Airport – CDM				rport Operator, ANSPs	, aircraft operators		
2. Aerodrome certifica	ation		December 2015 – Sta				
3. Airport planning			December 2017 – Ai				
4. Heliport operation			December 2017 – Sta				
5. SMS implementation			December 2014 – Ae	erodrome Operators			
6. Development of reg		nnical	December 2014 – Sta	ate CAA			
guidance material for		C					
7. Development and in safety programmes an accidents and serious a per year.	d reduce runway	-related	December 2014 – Sta	ate CAA			
	7. ASI	BU B0-80/ACD	M: Implementation (	Challenges			
			Implementation Area				
Elements		round System nplementation	Avionics Implementation	Procedures Availability	Operational Approvals		
1. Airport – CDM	Interconnection of ground systems of		Nil	Lack for coordination procedures. Lack of commitment from all stakeholders	Nil		
2. Aerodrome certifica	ation imp	k of effective lementation of nex 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	Lac	k of regulations	Nil	Lack of procedures	Lack of trained inspectors		
5. SMS implementation	on Nil		Nil	Lack of States regulations. Lack of training	Lack of high level management commitment		
6. Development of reg and technical guidance for runway safety			Nil	Lack of States regulations	Lack of high level management commitment		
7. Development and implementation of run safety programmes an runway-related accide	d reduce NII		Nil	Lack of standards from ICAO. Lack of States regulations. Lack of training.	Lack of high level management commitment		

serious incidents to no more					
than eight per year.					
8. ASBU B0-80/ACDM: Performance Monitoring and Measurement					
8A. ASBU B0-80/ACDM: Implementation Monitoring					
Elements	Performance Indicators / Supporting Metrics				
1. Airport – CDM	Indicator: Percentage of international aerodromes with Airport – CDM Supporting metric: Number of international aerodromes with Airport – 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 safety	Indicator:				
7. Development and implementation of runway safety programmes and reduce runway-related accidents and serious incidents to no more than eight per year.	Indicator: Percentage of aerodromes with local runway safety teams (LRST)				
	ACDM: Performance Monitoring and Measurement				
	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				
Capacity	Enhanced use of existing implementation for gate and stands (unlock latent capacity). Reduced workload, better organization of the activities to manage flights. Enhanced aerodrome capacity according to the demand.				
Efficiency	Improved operational efficiency (fleet management); and reduced delay. 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 & Equity	Capacity	Efficiency	Environment	Safety
Applicable	Ν	Y Y Y Y			

#### 4. ASBU B0-25/FICE: Planning Targets and Implementation Progress

5. Elements	6. Targets and Implementation Progress (Ground and Air)
1. Complete AMHS implementation at States still not counting with this item	December 2014 – Services provider
2. AMHS interconnection	December 2014 – Services provider
3. Implement AIDC/OLDI at some States automated centres	June 2014 – Services provider
4. Implement operational AIDC/OLDI between adjacent ACCs	June 2018 – Services provider
5. Implement the AFI Comn regional network	June xxxx – Services provider

### 7. ASBU B0-25/FICE: Implementation Challenges

		Implementation Are	ea	
Elements	Ground System	Avionics	Procedures	Operational
	Implementation	Implementation	Availability	Approvals
1. Complete AMHS				
implementation at States still not	Nil	Nil	Nil	Nil
counting with this item				
2. AMHS interconnection	TPDI negotiations between	Nil	Nil	Nil
2. AMHS Interconnection	MTAs	INII	INII	INII
3. Implement AIDC/OLDI at some	Nil	Nil	Nil	Nil
States automated centres	1911	1111	INII	INII
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	1111	1111	1111

### 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.

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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							

#### 2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE - B0-105/AMET Meteorological Information Supporting Enhanced Operational Efficiency and Safety **Performance Improvement Area 2: Global Interoperable Systems and Data** - Through Globally Interoperable System-Wide Information Management ASBU B0-105/AMET: Impact on Main Key Performance Areas (KPA) 3. Access & Environment Safety Capacity Efficiency Equity Y YY Y Y Y Applicable 4. ASBU B0-105/AMET: Planning Targets and Implementation Progress 6. Targets and Implementation Progress 5. Elements (Ground and Air) In process of improvement 1. WAFS 2. IAVW In process of improvement In process of improvement 3. Tropical cyclone watch 4. Aerodrome warnings In process of improvement MET provider services / 2015 5. Wind shear warnings and alerts 6. SIGMET MET provider services / 2015 MET provider services / 2018 7. QMS/MET 8.8. Other OPMET Information (METAR, SPECI, TAF) In process of improvement 7. ASBU B0-105/AMET: Implementation Challenges **Implementation Area** Avionics Elements **Ground System** Procedures **Operational** Implementation Implementation **Approvals Availability** Connection to the AFS Prepare a contingency N/A 1. WAFS satellite and public internet Nil plan in case of public distribution systems internet failure Connection to the AFS Prepare a contingency plan in case of public 2. IAVW satellite and public internet Nil N/A internet failure distribution systems Connection to the AFS Prepare a contingency plan in case of public 3. Tropical cyclone watch satellite and public internet Nil N/A distribution systems internet failure Local arrangements for reception of 4. Aerodrome warnings Connection to the AFTN Nil N/A aerodrome warnings Local arrangements 5. Wind shear warnings Connection to the AFTN Nil for reception of N/A and alerts aerodrome warnings Prepare a contingency plan in case of AFTN 6. SIGMET Connection to the AFTN Nil N/A systems failure Commitment of 7. QMS/MET Nil N/A N/A top management 8.8. Other OPMET Prepare a contingency plan in case of AFTN Information (METAR, Nil N/A Connection to the AFTN SPECI. TAF) systems failure 8. ASBU B0-105/AMET: Performance Monitoring and Measurement 8A. ASBU B0-105/AMET: Implementation Monitoring **Performance Indicators / Supporting Metrics Elements**

Indicator: Percentage of States implementation of WAFS internet File Service (WIFS)

1. WAFS

	Supporting metric: Number of States implementation of WAFS internet File Service (WIFS)
2. IAVW	Indicator: Percentage of international aerodromes/MWOs with IAVW procedures implemented
2. IA V W	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
	Indicator: Percentage of international aerodromes/AWOs with IAVW procedures
5. Wind shear warnings and alerts	implemented
	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

-12 **1. FORMULAIRE DE RAPPORT DE NAVIGATION AERIENNE (ANRF)** Planification Régionale AFI pour les Modules ASBU

Performance Improvement Area 2: Global Interoperable Systems and Dat – Through Globally Interoperable System-Wide Information Management 3. ASBU B0-30/DATM: Impact on Main Key Performance Areas (KPA)	nt										
Access & Capacity Efficiency Environment											
Applicable N N N Y	Y										
4. ASBU B0-30/DATM: Planning Targets and Implementation Progress											
5. Elements 6. Targets and Implementation Progress (Ground and Air)											
1. QMS for AIMDecember 2015											
2. e-TOD implementation December 2016											
3. WGS-84 implementation Implemented											
4. AIXM implementation December 2018											
5. e-AIP implementation December 2015											
6. Digital NOTAM December 2018											
7. ASBU B0-30/DATM: Implementation Challenges											
Implementation Area											
ElementsGround SystemAvionicsImplementationImplementationProcedures Availabil	lity Operational Approvals										
1. QMS for AIM Lack of procedures to al											
2. e-TOD implementation Lack of electronic airlines provide digital A											
3. WGS-84 implementation database. Lack of data to on-board devices	-										
4. AIXM implementation electronic access Nil particular electronic flight	ht Nil										
5. e-AIP implementation based on internet bags (EFBs). Lack of											
6. Digital NOTAMprotocol servicestraining for AIS/AIMpersonnel.											
8. ASBU B0-30/DATM: Performance Monitoring and Measurement											
8A. ASBU B0-30/DATM: Implementation Monitoring											
Elements Performance Indicators / Supporting Metric	cs										
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 a TOD implemented											
Supporting metric. Number of States with e-TOD implemented											
3. WGS-84 implementation Indicator: Percentage of WGS-84 implemented											
Supporting metric: Number of States with wGS-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 e-AIP implemented											
Indicator: Percentage of States with Digital NOTAM implemented	d										
6. Digital NOTAM Indicator. Fercentage of States with Digital NOTAM Implemented Supporting metric: Number of States with Digital NOTAM implemented											
8. ASBU B0-30/DATM: Performance Monitoring and Measurement	mented										
8B. ASBU B0-30/DATM: Performance Monitoring and Measurement											
Key Performance Areas         Metrics (if not, indicate qualitative benefits)	3)										
Access & Equity N/A	<u>/</u>										
Capacity N/A											
Support Instrument procedure design implementation: Support aer	ronautical chart										
HTTICIANCV A											
production and on-board databases; Support the implementation of PBN											
EnvironmentReduced amount of paper for promulgation of informationSafetyReduction in the number of possible inconsistencies											

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1. AIR NAVIGATION REPORT FORM (A	NRF)
Regional and National planning for ASBU M	odules

2 DEC	Regional a						10/FI					
	ional /na i ic mproved Opera		-	. –								
	mance Improve							hts				
			gh Global (				0					
3. A	SBU B0-10/FRT	O: In	npact on N	Iain Key	Perform	ance Areas	(KPA	.)				
Access & Equity     Capacity     Efficiency     Environment     Safety												
Applicable   Y   Y   Y   N												
4. ASBU B0-10/FRTO: Planning Targets and Implementation Progress												
5. Elements 6. Targets and Implementation Progress (Ground and Air)												
1. Airspace planni				ember 201								
2. Flexible use of 3. Flexible routing				ember 201 ember 201								
5. Flexible fouring	7. ASBUI	R0_10				allenges						
		00-10		plementa								
Elements	Ground Syste	em	Avio	-		cedures	0	perational				
	Implementati		Implem	entation	Ava	ailability		Approvals				
1. Airspace planning	Lack of organiz and managed airspace prior to time of flight. L of AIDC WGS- Survey	o the ack	ed the ack 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	2	Insufficien number of equipped Lack of F 1/A. lack ACARS	f aircraft / ANS		f LOAs ocedures		e percentage eet approvals				
8.	ASBU B0-10/FH	RTO:	Performa	nce Monit	oring a	nd Measure	ment					
	8A. ASBU I			<b>A</b>		<u> </u>						
Elements		Per	formance	Indicators	s / Supp	orting Metri	ics					
1. Airspace planning	Not assigned Ir											
2. Flexible use of airspace	Indicator: Perce operations in the Supporting met	ne Stat	te		-		e for c	ivil				
3. Flexible routing	Indicator: Perce Supporting met Supporting met	tric: K	G of Fuel	savings								
8.	ASBU B0-10/FH	RTO:	Performa	nce Monit	oring a		ment					
Key Performance Areas	8B. ASBU B0-10/FRTO: Performance Monitoring Metrics (if not , indicate qualitative benefits)											
Access & Equity	Better access to airspace	o airsp	bace by a re	duction of	the peri	nanently seg	regate	d volumes of				

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 reduce flight length and related fuel burn and emissions. The module will reduce the number r of flight diversions and cancellations. It will also better allow avoiding noise-sensitive areas.
Environment	Fuel burn and emissions will be reduced
Safety	N/A

2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-35/NOPS Improved Flow Performance through Planning based on a Network-Wide view											
Performance Improvement Area 3: Optimum Capacity and Flexible Flights – Through Global Collaborative ATM											
3.	ASBU BO	-35/NOPS: Imp	act on N	Main Key Performan	ce Areas (KPA)						
Access & EquityCapacityEfficiencyEnvironmentSafety											
ApplicableYYYY											
4	. ASBU BO	-35/NOPS: Plar	ning Ta	argets and Implemen	0						
5.	Elements				(mplementation Pro und and Air)	gress					
1. Air Traffic Flow Ma	anagement		Decem	ber 2015							
	7.	ASBU B0-35/N	OPS: L	nplementation Chall							
				Implementatio	on Area						
Elements		Ground Sys		Avionics	Procedures	Operational					
		Implementa		Implementation	Availability	Approvals					
1. Air Traffic Flow Ma	anagement	Lack for system software for A Lack of ATFM	TFM.	Nil	Lack of ATFM and CDM procedures.						
	anagement	implemented. Funding	i units		Lack of training	·····					
	8. ASBUE	80-35/NOPS: Pe	erforma	nce Monitoring and I	Measurement	•					
	8A.	ASBU B0-35/N		nplementation Monit							
Elements				rmance Indicators / S	Supporting Metrics						
1. Air Traffic Flow Ma	0	Supporting me	tric: Nu	of implemented FMUs mber of States with A		ed					
				nce Monitoring and I Performance Monito							
Key Performance	e Areas			rics (if not, indicate q							
Access & Equity		disruption of a		quity in the use of airs ATFM processes tak	•	0					
Capacity			in advan	ailable capacity, abilit ice. Number of aircraft							
Efficiency		Reduced fuel b and times with	ourn due engines								
Environment		optimum flight emissions per f	t levels t flight	lelays are absorbed on hrough speed or route	management. Reduce	•					
Safety		Reduced occur	rences of	of undesired sector over	rloads						

2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-101/ACAS										
ACAS Improvements										
D	e	T A								
Pe	riormance			Optimum Capacity an Collaborative ATM	d Flexible Flights					
3	ASRUR				nce Areas (KPA)					
3. ASBU B0-101/ACAS: Impact on Main Key Performance Areas (KPA)										
	Equi		apacity	Efficiency	Environment	Safety				
Applicable	N	2	Ν	Y	Ν	Y				
	ASBU BO	)-101/ACAS:	Planning '	<b>Fargets and Impleme</b>	ntation Progress					
5	Elements				Implementation P	rogress				
				· · · · · · · · · · · · · · · · · · ·	ound and Air)					
1. ACAS II (TCAS V	,		2013-							
	7.	ASBU B0-10	1/ACAS:	Implementation Cha	<u> </u>					
				Implementatio						
Elements		Ground S		Avionics	Procedures	Operational				
		Implementation		Implementation	Availability	Approvals				
1. ACAS II (TCAS V	/	Nil		Equipage	Nil	Nil				
				ance Monitoring and						
	<b>8</b> A	. ASBU B0-10		Implementation Mon						
Elements				rmance Indicators / S		S				
1. ACAS II (TCAS V	ersion 7 1)		U	f aircrafts that are equ	* *					
		<u> </u>		uction in number of R.						
				ance Monitoring and						
		<b>B. ASBU B0-</b> 1		: Performance Monit	<u>v</u>					
Key Performance	e Areas		Meti	rics (if not, indicate q	ualitative benefits	)				
Access & Equity		N/A								
Capacity				ll reduce unnecessary	resolution advisory	(RA) and then				
		reduce trajectory deviations								
Efficiency		N/A								
Environment		N/A	1 0							
Safety			-	ential AIR-PROX. AC	CAS increases safet	y in the case of				
breakdown of separation										

#### 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		0		Lonaborative A IM	no Arong (KDA)						
	Access & Equity		acity	Main Key Performand           Efficiency	Environment	Safety					
Applicable	<u> </u>	Ŋ	Y	N	Ν	Y					
	ASBU B0-84/AS	SUR: Plar	nning Ta	argets and Implemen	tation Progress						
				6. Targets and I		Progress					
5. Elements (Ground and Air)											
1. Implementation of AD				018 – Users and servic							
2. Implementation of Mu	ltilateration			018 – Users and servic							
3. Automation system (P				017 – Users and servic	A						
	7. ASBU	J <b>B0-84/A</b>	SUR: In	nplementation Challe	enges						
				Implementation		•					
Elements		und Syste		Avionics	Procedures	Operational					
	Imp	ementati	on	Implementation	Availability	Approvals					
	Lack of A	DS-B sys	stems	Lack of ADS-B		Lack of					
	implemen	itation due	e to	implementation in	Lack of	inspector s with					
1. Implementation of AD	S-B recent im	plementati	ion of	general aviation,		-					
	conventio	nal survei	illance	and old	procedures	appropriate					
	systems			commercial fleet		capability					
2. Implementation of Multilateration	stations. I communi	of remote Establishm cations ne	nent of etworks	Nil	Nil	Lack of inspector s with appropriate capability					
3. Automation system (Presentation)	Lack of a functiona	ny automa	ation	Nil	Nil	Nil					
			rformo	nce Monitoring and I	Magguramant						
0.				nplementation Monit							
Elements				nance Indicators / Su							
1. Implementation of AD		Percentag	ge of inte	ernational aerodromes	with ADS-B impl						
2 Implementation of				of ADS-B implement							
2. Implementation of Multilateration				of Multilateration system in							
3. Automation system											
(Presentation)			-	ATS units with automation system implemented per of automation system implemented in ATS units							
				nce Monitoring and I							
0.				Performance Monito							
Key Performance Are		0 20 0 11		s (if not, indicate qua	0						
Access & Equity	N/A			(							
Capacity	Typical second	to proced	lural mir	are 3 NM or 5 NM ena nima. TMA surveilland racy, better velocity ve	ce performance in	provements are					
Efficiency	N/A	<u> </u>	<u> </u>		F ····	0					
Environment											
Environment	IN/A			N/A Reduction of the number of major incidents. Support to search and rescue							



2. RH						CE OBJECT		30-102/SNET			
Perf	ormance					Capacity a rative ATM	nd Flexi	ble Flights			
3.	ASBU B	0-102/SNET	': Impa	act on Ma	in K	ev Performa	nce Are	eas (KPA)			
3. ASBU B0-102/SNET: Impact on Main Key Performance Areas (KPA)         Access & Equity       Capacity       Efficiency       Environment       Safety											
Applicable N N NN N Y											
4. ASBU B0-102/SNET: Planning Targets and Implementation Progress											
5. Elements 6. Targets and Implementation Progress (Ground and Air)											
1. Short Term Conflict	Alert (ST	CA)		June 201	14/5	Service provid	der 2013	-2018			
2. Area Proximity Warr						Service provid	der 2013	-2018			
3. Minimum Safe Altitu				June 201							
4. Dangerous Area Infri	<u> </u>	<b>U</b> :		2013-20							
	7.	ASBU B0-	102/SN	NET: Imp	leme	entation Cha	<u> </u>				
						Implem			1		
Elem	ents			ound Syste		Avioni		Procedures	Operational		
		7.4.)	-	olementati	ion	Implemen	tation	Availability	Approvals		
1. Short Term Conflict		,	Nil Funding			Nil		Nil	Nil		
2. Area Proximity Warr	-		N11 F	Funding		Nil		Nil	Nil		
3. Minimum Safe Altitu (MSAW)		C	Nil F	Nil Funding		Nil		Nil	Nil		
4. Dangerous Area Infri (DAIW)	ngement	Warning	Fund	Funding							
8						nitoring and entation Mor		irement			
Elements				-		licators / Suj	0	g Metrics			
1. Short Term Conflict	Indic	ator: Percen						y nets (STCA)	implemented		
Alert (STCA)		<u> </u>				et (STCA) in					
2. Area Proximity			•			•		y nets (APW)in	nplemented		
Warning (APW)	Supp	orting metric	c: Num	ber of saf	ety n	et (APW)imp	olemente	ed			
3. Minimum Safe	Indic	ator: Percent	tage of	ATS unit	s wit	h ground-bas	ed safet	v nets (MSAW	) implemented		
Altitude Warning (MSAW)			•			et (MSAW) i			, <b>F</b>		
4. Dangerous Area	India	ator Percen	tage of	ATS unit	e wit	h ground-bas	ed safet	y nets (DAIW)	implemented		
Infringement Warning (DAIW)			0			et (DAIW) in	•		Implemented		
						onitoring and ormance Mo					
Key Performance A						ot, indicate q					
Access & Equity		N/A									
Capacity N/A											
Efficiency		N/A									
Environment		N/A									
Safety		Significant	reduct	ion of the	num	ber of major	incident	S			

2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-05/CDO Improved Flexibility and Efficiency in Descent Profiles: Continuous Descent Operations (CDO)											
Performance Improvement Area 4: Efficient Flight Path – Through Trajectory-based Operations											
3. ASBU B0-05/CDO: Impact on Main Key Performance Areas (KPA)         Access & Equity       Capacity       Efficiency       Environment       Safety											
Applicable	N										
4. ASBU B0-05/CDO: Planning Targets and Implementation Progress											
5. H	Elements			6. Targ	<i>_</i>	Implementation P und and Air)	rogress				
1. CDO implementation				ber 2017							
2. PBN STARs implem				ber 2017							
	7. AS	BU B0-05/0	CDO: Im								
_			· · ·		entation						
Elements		nd System		vionics		rocedures	Operational				
		mentation	Imple	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	Airspa	ce Design	Nil LOAs a			nd Training					
	8. ASBU B0- 8A. AS	05/CDO: Pe SBU B0-05/0									
Elements			Perform	ance Indica	ators / Su	pporting Metrics					
1. CDO implementation	n Suppo					s/TMAs with CDO dromes/TMAs with					
2. PBN STARs	Indica	tor: Percenta	ge of inte	ernational ac	erodromes	with PBN STAR	s implementation				
implementation	Suppo	rting metric:	Number	of internation	onal airpo	rt with PBN STAI	Rs implementation				
	8. ASBU B0-										
		<b>SBU B0-05</b>									
Key Performance A			Metrics	(if not, ind	licate qua	alitative benefits)					
Access & Equity	N/A										
Capacity		sed Termina									
Efficiency		avings throu nissions.	gh reduce	ed fuel burn	. Reductio	on in the number of	f required radio				
Environment	Reduc	ed emissions	s as a resi	ult of reduce	d fuel but	m.					
Safety		consistent fli	•			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)													
Performance Improvement Area 4: Efficient Flight Path – Through Trajectory-based Operations													
3. ASBU B0-20/CCO: Impact on Main Key Performance Areas (KPA)													
Access & EquityCapacityEfficiencyEnvironmentSafety													
Applicable		Y											
4. ASBU B0-20/CCO: Planning Targets and Implementation Progress													
5.	Element	S			6. Targ	,	mplementation P und and Air)	rogress					
1. CCO implementation	on			Deceml	per 2017	````	,						
2. PBN SIDs impleme				Decem	per 2017								
		7. ASB	U B0-20/0	CCO: Im	plementatio	on Challe	nges						
						entation							
Elements			l System	-	ionics		rocedures	Operational					
		Implem	entation	Implei	nentation	A	vailability	Approvals					
1. CCO implementation	on	Nil		Nil				In accordance with applicable requirements					
2. PBN SIDs impleme		Airspace	U	Nil				Approvals of procedures					
	8. AS						<b>leasurement</b>						
		8A. ASB			plementatio								
Elements							pporting Metrics						
1. CCO implementation	on						with CCO implements with CCO implements						
			-				with PBN SIDs in						
2. PBN SIDs impleme	ntation						rts with PBN SIDs						
	8. AS						leasurement	<b>^</b>					
		8B. AS	BU B0-20	/CCO: P	erformance	Monitor	ring						
Key Performance	Areas			Metrics	(if not, ind	licate qua	litative benefits)						
Access & Equity		<u></u>											
Capacity					e Capacity								
Efficiency			•	e e			ent aircraft operat	ng profiles.					
					required rad								
				•			ns would otherwis						
Environment		<b>^</b>	•	urtailed o	r restricted.	Environn	nental benefits thro	ugh reduced					
		emission		1, 3	D 1 .!	• .1	1 6	1					
Safety							mber of required ra	adio transmissions.					
Lower pilot and air traffic control workload.													

#### 2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE - B0-40/TBO Improved Safety and Efficiency through the initial application of Data Link en-Route Performance Improvement Area 4: Efficient Flight Path – Through Trajectory-based Operations 3. ASBU B0-40/TBO: Impact on Main Key Performance Areas (KPA) Access & Capacity Efficiency Environment Safety Equity Applicable Ν Y Y Y Y 4. ASBU B0-40/TBO: Planning Targets and Implementation Progress 6. Targets and Implementation Progress 5. Elements (Ground and Air)

 1. ADS-C over oceanic and remote areas
 June 2018 – Service provider

 2. Continental CPDLC
 June 2018 – Service provider

 **7. ASBU B0-40/TBO: Implementation Challenges** 

 Implementation Area

	Implementation Area					
Elements	Ground System	Avionics	Procedures	Operational		
	Implementation	Implementation	Availability	Approvals		
1. ADS-C over oceanic and remote areas	Funding and limited link service provider and infrastructure	Implementation of ADS-C in general aviation pending	Implementati on of GOLD procedures pending	Lack of duly trained inspectors for approval of operations		
2. Continental CPDLC	Funding and limited link service provider and infrastructure	Implementation of CPDLC in general aviation pending	Implementati on of GOLD procedures pending	Lack of duly trained inspectors for approval of operations		
8.	ASBU B0-40/TBO: Perf			nt		
		<b>BO: Implementation M</b>				
Elements	Per	formance Indicators / S	Supporting Met	trics		
1. ADS-C over oceanic	Indicator: Percentage of F	tor: Percentage of FIRs with ADS-C implemented				
and remote areas	Supporting metric: Numb	orting metric: Number of ADS-C approved procedures over oceanic and remote areas				
2. Continental CPDLC	e	ator: Percentage of CPDLC implemented orting metric: Number of CPDLC approved procedures over continental? areas				
8.	ASBU B0-40/TBO: Perf	U B0-40/TBO: Performance Monitoring and Measurement				
	8B. ASBU B0-40/7	<b>FBO: Performance Mo</b>	nitoring			
Key Performance A	reas	Metrics (if not, indicate qualitative benefits)				
Access & Equity	N/A					
Capacity	Number of aircraft	Number of aircrafts in a defined airspace for a period of time				
Efficiency	Kilogrammes of f	Kilogrammes of fuel saved per flight. Reduction of separation				
Environment		Reduced emission as a result of reduced fuel burn				
Safety		ety nets supports cleared oring, danger area infring		e monitoring, route and improved search and		

situations. Increased situational awareness

rescue. Reduced occurrences of misunderstandings; solution to stuck microphone

Safety

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	EGIONAL /NAT nproved Traffic						EQ
	Performan	ce Impro	vement A	Area 1:	Airport Ope	rations	
3.	ASBU B0-15/RS Access &	SEQ: Imp Capa			ey Performano fficiency	ce Areas (KPA) Environmen	
A	Equity	Cupa	, ,				
Applicable		NYYU B0-15/RSEQ: Planning Targets and Implementation Progress			N		
						mplementation	
5. E	lements			0.	0	und and Air)	Tigross
1. AMAN and time-bas	ed metering		Decem	ber 201	× ×		
2. Departure manageme	2		Decem	ber 201	5		
3. Movement Area Cap	acity Optimization	1	Decem	ber 201	5		
	7. ASBU	J <b>B0-15/R</b>	SEQ: In	npleme	ntation Challe	enges	
					mentation Ar	ea	
Elements	Ground Syst		Avionio		Procedure	s Availability	Operational
	Implementat	ion Im	plement	ation		Ľ	Approvals
1	Lack of				Lack of appr		Lack of procedures
1. AMAN and time-		automation system to support synchronization		PBN. Lack of assignment			and inspectors for
based metering						I Slots	operational
	•						approvals
2 Departure	Lack of automation				Lack of appr training. Lac		Lack of procedures
2. Departure		system to support synchronization		Nil		f slots	and inspectors for operational
management						1 SIOLS	approvals
	synchronizatio	011			assignment Lack of proc	aduras for	approvais
					RWY, TWY		Lack of procedures
3. Movement Area	Nil	Nil	Nil		capacity calc		and inspectors for
Capacity Optimization						or movement	operational
						organization.	approvals
8	3. ASBU B0-15/2	RSEO: Pe	erformar	nce Mo		0	
					ntation Monit		
Elements						orting Metrics	
1. AMAN and time-	Indicator: Perc	centage of	internati	onal aei	rodromes with	AMAN and tim	e-based metering.
based metering	Supporting me	etric: Num	ber of in	ternatio	nal airports wi	th AMAN and t	ime-based metering.
2. Departure	Indicator: Perc	centage of	internati	onal aei	rodromes with	DMAN.	
management	Supporting me						
3. Movement Area						Airport-capacity	
Capacity Optimization	Supporting me	etric: Num	ber of in	ternatio	nal airports wi	th Airport-capac	city calculated.
8	B. ASBU B0-15/2						
	8B. ASB	<u>SU B0-15/</u>	RSEQ: I	Perforn	nance Monito	ring	
Key Performance Areas		Metrics (if not , indicate qualitative benefits)					
Access & Equity	N/A						
Capacity	Improved airp			A			
Efficiency	Efficiency is p rates	Efficiency is positively impacted as reflected by increased runway throughput and arrival					
Environment	Reduction of c	arbon em	issions				
Safety	N/A						

	Regional and National planning for ASBU Modules									
	2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-65/APTA Optimization of Approach Procedures Including Vertical Guidance									
					Area 1: Airpo			ncc		
3.					Main Key Perf			KPA	)	
		ess & uity	Capaci	ty Efficiency		Environm		ient Safety		
Applicable		Y	Y		Y		Y		Y	
	ASBU I	30-65/A	PTA: Plann	ing Ta	argets and Im	plem	entation Pro	ogress	5	
5. Eler	ments			6. T	argets and Im (Grour)			ogres	S	
1. APV with Bar	o VNA	V	December	2016 -	- Service Provi					
2. APV with SB	AS				- As per AFI-G					
3. APV with GB	AS		December ( providers)	2018 -	- Initial implen	nentat	tion at some	States	s (service	
	7	. ASBU	U <b>B0-65/AP</b>	TA: Iı	nplementation					
		~		1	Implementat	1		-		
Elements			nd System		Avionics		rocedures		perational	
1. APV with Bar VNAV	°O	NIL ?	mentation	Insut num	blementation fficient ber of oped aircraft	Insu appr	Availability Insufficient appropriate training		Approvals Lack of appropriate training	
2. APV with SB	AS		rk ructure. oplicable	Cost of aircraft equipage. Not applicable		Limited to certain States which have implemented. Not Applicable		Lack of knowledge and appropriate training. Not applicable		
3. APV with GB	AS	Lack o benefit Advers ionospl	analysis. se	num	fficient ber of pped aircraft	app	ifficient ropriate ning	train Eval real	opriate	
8.					nce Monitorir			nent		
		A. ASBU			mplementation					
Elements		Indiant			ce Indicators					
1. APV with Bar VNAV	ro	Indicator: Percentage of international aerodromes having instrument runways provided with APV with Baro VNAV procedure implemented (Where the % is defined) Supporting metric: Number of international airports having approved APV with Baro VNAV								
2. APV with SB.	AS	Indicator: Percentage of international aerodromes having instrument runways provided with APV with SBAS procedure implemented Supporting metric: Number of international airports having approved APV with SBAS								
3. APV with GB	B. APV with GBAS Indicator: Percentage of international aerodromes having instrument surveys provided with APV with GBAS procedure implemented Supporting metric: Number of international airports having approved APV with GBAS				ed					
8.					nce Monitorir Performance I			nent		
Key Perform Areas					f not , indicate			fits)		

Access & Equity	Increased aerodrome accessibility
Capacity	Increased runway capacity
Efficiency	Reduced fuel burn due to lower minima, fewer diversions, cancellations, delays
Environment	Reduced emissions due to reduced fuel burn
Safety	Increased safety through stabilized approach paths

2. R	EGIONAL /NATIO Safety and Efficien					RF
2				1: Airport Ope		
	ASBU BU-75/SUR Access & Equity	Canacity Efficiency Environment			Safety	
Applicable	Y	Y		Y	Y	Y
4.	ASBU B0-75/SUR	F: Plann	<u> </u>			D
5. 1	Elements		(	0	Implementation ound and Air)	rogress
1. Surveillance system	for ground surface		Desember	×	/	
movement (PSR, SSR,			December	2017 Service p	rovider	
2. Surveillance system	on board (SSR transp	onder,	December	2017 Service p	rovider	
ADS-B capacity)	c 1:1			•		
<ol> <li>Surveillance system :</li> <li>Visual aids for navig</li> </ol>				2017 Service pr		
4. Visual aids for navigationDecember 2015Service provider5. Wildlife strike hazard reductionDecember 2015Aerodrome operator / wildlife committee						
	6. Display and processing informationDecember 2015Fieroaronic operatory when the committee					
		0-75/SU		nentation Chall		
				lementation Ar	ea	
Elements	Ground System Implementation		vionics ementation	Procedure	s Availability	Operational Approvals
1. Surveillance system for ground surface movement (PSR, SSR, ADS-B or Multilateration)	Lack of adequate financial resources	Nil		Lack of proc training.	edures and	Lack of inspectors for operational approvals
2. Surveillance system on board (SSR transponder, ADS-B capacity)	Nil	on boa capacit genera and sor	lance systen rd (ADS-B ty) on l aviation	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		Nil Conflict betw law and state laws. Lack o		t Committee. ween aviation e environment	Nil
	8. ASBU B0-75/SU 8A. ASBU B	0-75/SU	RF: Implen	nentation Moni	toring	
Elements		Perfe	ormance In	dicators / Supp	orting Metrics	

1. Surveillance system for ground surface movement (PSR, SSR, ADS-B or Multilateration)	Indicator: Percentage of international aerodromes with SMR / SSR Mode S /ADS-B Multilateration for ground surface movement Supporting metric: Number of international airports with SMR / SSR Mode S /ADS-B Multilateration for ground surface movement.			
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							
3.			nent Area 1: Airport on Main Key Perfor				
	Access & Equity	Capacity	Efficiency	Environment	Safety		
Applicable	Y	Y Y Y		Y			
4.	ASBU B0-80/A	ACDM: Planni	ng Targets and Imple				
5.	Elements			and Implementation (Ground and Air)			
1. Airport – CDM				rport Operator, ANSPs	, aircraft operators		
2. Aerodrome certifica	ation		December 2015 – Sta				
3. Airport planning			December 2017 – Ai				
4. Heliport operation			December 2017 – Sta				
5. SMS implementation			December 2014 – Ae	erodrome Operators			
6. Development of reg guidance material for	runway safety		December 2014 – Sta	ate CAA			
7. Development and ir safety programmes and accidents and serious in per year.	d reduce runway-	related	December 2014 – State CAA				
<u>r · J · · · ·</u>	7. ASB	U B0-80/ACD	M: Implementation (	Challenges			
			Implement	0			
Elements		ound System plementation	Avionics Implementation	Procedures Availability	Operational Approvals		
1. Airport – CDM	Inter grou diffe	rconnection of nd systems of erent partners Airport – CDM	Nil	Lack for coordination procedures. Lack of commitment from all stakeholders	Nil		
2. Aerodrome certifica	ation impl	c of effective ementation of ex 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	Lacl	c of regulations	Nil	Lack of procedures	Lack of trained inspectors		
5. SMS implementation	on Nil		Nil	Lack of States regulations. Lack of training	Lack of high level management commitment		
6. Development of reg and technical guidance for runway safety			Nil	Lack of States regulations	Lack of high level management commitment		
7. Development and implementation of run safety programmes and runway-related accide	d reduce N11		Nil	Lack of standards from ICAO. Lack of States regulations. Lack of training.	Lack of high level management commitment		

serious incidents to no more						
than eight per year.						
8. ASBU B0-80/A	ACDM: Performance Monitoring and Measurement					
8A. ASBU B0-80/ACDM: Implementation Monitoring						
Elements	Performance Indicators / Supporting Metrics					
	Indicator: Percentage of international aerodromes with Airport – CDM					
1. Airport – CDM	Supporting metric: Number of international aerodromes with Airport –					
	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					
5. Anport planning	Supporting metric: Number of international aerodromes with Master Plans					
4. Heliport operation	Indicator: Percentage of Heliports with operational approval					
4. memport operation	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	ACDM: Performance Monitoring and Measurement					
	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 & EquityCapacityEfficiencyEnvironmentSafety				Safety		
ſ	Applicable	Ν	Y	Y	Y	Y

#### 4. ASBU B0-25/FICE: Planning Targets and Implementation Progress

5. Elements	6. Targets and Implementation Progress (Ground and Air)
1. Complete AMHS implementation at States still not counting with this item	December 2014 – Services provider
2. AMHS interconnection	December 2014 – Services provider
3. Implement AIDC/OLDI at some States automated centres	June 2014 – Services provider
4. Implement operational AIDC/OLDI between adjacent ACCs	June 2018 – Services provider
5. Implement the AFI Comn regional network	June xxxx – Services provider

### 7. ASBU B0-25/FICE: Implementation Challenges

	Implementation Area						
Elements	Ground System	Avionics	Procedures	Operational			
	Implementation	Implementation	Availability	Approvals			
1. Complete AMHS							
implementation at States still not	Nil	Nil	Nil	Nil			
counting with this item							
2. AMHS interconnection	TPDI negotiations between	Nil	NF1	NI:1			
2. AMINS Interconnection	MTAs	1111	Nil	Nil			
3. Implement AIDC/OLDI at some	Nil	Nil	Nil	Nil			
States automated centres	1911	INII	INII	INII			
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	1111	1111	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

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	Supporting metric: Number of AIDC interconnections implemented, as per CAR/SAM FASID Table CNS 1Bb				
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					

#### 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				
Canacity	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				

# 2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-105/AMET Meteorological Information Supporting Enhanced Operational Efficiency and Safety

3. AS	BU B0-105/AI	MET: Impact of	n Main Key Perfori	nance Areas (KPA)		
	Access & Capacity		Efficiency	Environment	Safety	
Applicable	Y	YY	Y	Y	Y	
4. AS	BU B0-105/A	MET: Planning	<b>Targets and Imple</b>	mentation Progress		
5.	Elements		6. Targe	ets and Implementation	Progress	
				(Ground and Air)		
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 and	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			
	<b>7. ASBU</b>	B0-105/AMET	: Implementation C	8		
	~		Implementation			
Elements		d System	Avionics	Procedures	Operationa	
	Connection t	nentation	Implementation	Availability	Approvals	
1. WAFS		public internet	Nil	Prepare a contingency plan in case of public	N/A	
1. WAP5			1911	internet failure	1N/A	
	distribution systems Connection to the AFS			Prepare a contingency		
2. IAVW		public internet	Nil	plan in case of public	N/A	
	distribution s		1111	internet failure	1N/A	
	Connection t			Prepare a contingency		
3. Tropical cyclone watch		public internet	Nil	plan in case of public	N/A	
5. Hopical cyclone water	distribution s		1 11	internet failure	14/11	
	distribution	y stems		Local arrangements		
4. Aerodrome warnings	Connection t	o the AFTN	Nil	for reception of	N/A	
4. Refouronce warnings	Connection		1 11	aerodrome warnings	14/11	
				Local arrangements		
5. Wind shear warnings	Connection to the AFTN		Nil	for reception of	N/A	
and alerts	connection		1 111	aerodrome warnings	1 1/ 2 1	
				Prepare a contingency		
6. SIGMET	Connection t	o the AFTN	Nil	plan in case of AFTN	N/A	
0. SIGNET				systems failure		
			Commitment of			
7. QMS/MET	Nil		top management	N/A	N/A	
8. 8. Other OPMET				Prepare a contingency		
Information (METAR,	Connection t	o the AFTN	Nil	plan in case of AFTN	N/A	
SPECI, TAF)				systems failure		
8. A	SBU B0-105/	AMET: Perform	nance Monitoring a	and Measurement		
	8A. ASBU		: Implementation M			
Elements		Perform	nance Indicators / S	upporting Metrics		
1. WAFS	Indicator: Pe	rcentage of State	es implementation of	WAFS internet File Serv	ice (WIFS)	

	Supporting metric: Number of States implementation of WAFS internet File Service (WIFS)				
	Indicator: Percentage of international aerodromes/MWOs with IAVW procedures implemented				
2. IAVW	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				
C XX/: 1 1 .	Indicator: Percentage of international aerodromes/AWOs with IAVW procedures				
5. Wind shear warnings and alerts	implemented 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				

# -34 1. FORMULAIRE DE RAPPORT DE NAVIGATION AERIENNE (ANRF) Planification Régionale AFI pour les Modules ASBU

						IVE – B0-30/DATM			
	-	0	0			ation Management			
						Systems and Data tion Management			
	3. ASBU B0-30/DATM: Impact Access & Capacit Equity					Environment	Safety		
Applicable	N N	ľ	N	N		Y	Y		
4.	ASBU B0-30/DA	TM: Pla	nning T						
5.	Elements					d Implementation P round and Air)	rogress		
1. QMS for AIM				cember 2015					
2. e-TOD implementat				cember 2016					
3. WGS-84 implement				plemented					
4. AIXM implementat				cember 2018					
5. e-AIP implementation	on			cember 2015					
6. Digital NOTAM		DACOT		cember 2018					
	7. ASBU	B0-30/D	ATM:	Implementat					
		<b>C</b> 4			entation	Area			
Elements	Ground Impleme			vionics ementation		edures Availability	Operational Approvals		
1. QMS for AIM						f procedures to allow			
2. e-TOD implementat						provide digital AIS			
3. WGS-84 implement			NT:1			on-board devices, in	NT:1		
4. AIXM implementat			Nil	1		lar electronic flight	Nil		
5. e-AIP implementation						EFBs). Lack of g for AIS/AIM			
6. Digital NOTAM	protocors	protocol services				-			
	8. ASBU B0-30/I		orform	ance Monito	person				
				Implementat					
Elements						pporting Metrics			
	Indicator:			ates QMS cer					
1. QMS for AIM			-	r of States QN		ication			
	Indicator	<u> </u>		ates e-TOD in					
2. e-TOD implementat	Supportin	g metric:	Numbe	r of States wi	th e-TOI	) implemented			
3. WGS-84 implement	Indicator:	Percentag	ge of W	GS-84 impler	mented				
5. WOS-64 Implement	Supportin					84 implemented			
4. AIXM implementat	100	Indicator: Percentage of States with AXIM implemented							
4. 7 MANI Implementat	Supportin	Supporting metric: Number of States with AXIM implemented							
5. e-AIP implementation		Indicator: Percentage of States with e-AIP implemented							
	Supportin	Supporting metric: Number of States with e-AIP implemented							
6. Digital NOTAM		Indicator: Percentage of States with Digital NOTAM implemented							
0						l NOTAM implemen	ted		
	8. ASBU B0-30/I 8B. ASB			ance Monito Performance:					
Key Performance A			Metric	es (if not, ind	icate qua	alitative benefits)			
Access & Equity	N/A								
Capacity	N/A								
Efficiency	production	Support Instrument procedure design implementation; Support aeronautical chart production and on-board databases; Support the implementation of PBN							
Environment	Reduced a	amount of	paper f	for promulgat	ion of in	formation			

Safety	Reduction in the number of possible inconsistencies
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1. AIR NAVIGATION REPORT FO	ORM (ANRF)
Regional and National planning for A	SBU Modules

1 DEC	Regional a		ational pla				10/FT		
	IONAL /NA I IC Improved Opera							ao	
	mance Improved		0					nte	
I CHOIL			gh Global (				c i ngi	105	
3. A	SBU B0-10/FRT						(KPA	.)	
	Access & Equity		Capacity Efficiency			Environment		Safety	
Applicable	Y		Y	Y	Y		N		
4. A	SBU B0-10/FR1	<b>CO: P</b>	lanning Ta	<u> </u>			<u> </u>		
5. Elements 6. Targets and Implementation Progress (Ground and Air)								rogress	
1. Airspace planni				ember 201					
2. Flexible use of				ember 201					
3. Flexible routing		DA 10		ember 201		11			
	7. ASBUI	80-10	/FRTO: In	nplementa iplementa					
Elements	Ground Syste	m	Avio	-	1	ocedures	nog Onerational		
Elements	Implementati		Implem			ailability		Operational Approvals	
	Lack of organize							-FL- 3 ( MD	
	and managed airspace prior to the time of flight. Lack								
1. Airspace			Nil		Lack of Procedures				
planning									
	of AIDC WGS-	84							
	Survey				Loglag	£			
	Nil		Nil			Lack of implementation			
2. Flexible use					FUA Guidance				
of airspace					and coordination				
					agreements				
		Insufficient							
3. Flexible			number of equipped aircraft / Lack of FANS 1/A. lack of ACARS		Lack of LOAs and procedures		Deer		
routing	ADS-C/CPDLC	1						eet approvals	
Touting							01 11	of field approvais	
8.	ASBU B0-10/FF	RTO:	Performa	nce Monit	toring a	nd Measure	ment		
	8A. ASBU I								
Elements		Per	formance	Indicators	s / Supp	orting Metri	ics		
1. Airspace planning	Not assigned Indicator and metrics								
2. Flexible use	Indicator: Perce	-		gregated a	irspaces	are available	e for c	ivil	
of airspace		operations in the State Supporting metric: Reduction of delays in time of civil flights							
						ervn mgnus			
3. Flexible	Indicator: Percentage of PBN routes implemented Supporting metric: KG of Fuel savings								
Supporting metric: Tons of CO2 reduction									
8.	ASBU B0-10/FF	RTO:	Performa	nce Monit	toring a		ment		
	8B. ASBU	<b>B0-1</b>	0/FRTO:	Performa	nce Mor	nitoring			
Key Performance Areas	Metrics (if not , indicate qualitative benefits)								
Access & Equity	Better access to airspace	o airsp	bace by a re	eduction of	f the peri	nanently seg	regate	d volumes of	

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 reduce flight length and related fuel burn and emissions. The module will reduce the number r of flight diversions and cancellations. It will also better allow avoiding noise-sensitive areas.
Environment	Fuel burn and emissions will be reduced
Safety	N/A

2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-35/NOPS Improved Flow Performance through Planning based on a Network-Wide view											
Performance Improvement Area 3: Optimum Capacity and Flexible Flights – Through Global Collaborative ATM											
3.	ASBU B0	-35/NOPS: Imp	act on N	Main Key Performan	ce Areas (KPA)						
Access & EquityCapacityEfficiencyEnvironmentSafety											
ApplicableYYYY											
4.	ASBU BO	-35/NOPS: Plan	ning Ta	argets and Implemen	0						
5. I	5. Elements 6. Targets and Implementation Progress (Ground and Air)										
1. Air Traffic Flow Ma	nagement		Decem	ber 2015							
	7.	ASBU B0-35/N	OPS: I	nplementation Chall	enges						
				Implementatio	on Area						
Elements		Ground Sys		Avionics	Procedures	Operational					
		Implementa		Implementation	Availability	Approvals					
1. Air Traffic Flow Ma	nagomont	Lack for system software for A Lack of ATFM	TFM.	Nil	Lack of ATFM and CDM procedures.						
	nagement	implemented. Funding	i units		Lack of training	·····					
	8. ASBUE	- V	erforma	nce Monitoring and	Measurement						
				nplementation Monit							
Elements				rmance Indicators / S							
1. Air Traffic Flow Ma	nagement			of implemented FMUs mber of States with A	FFM units implement	ed					
				nce Monitoring and 1							
		<b>B. ASBU B0-35</b> /		Performance Monito							
Key Performance	Areas	Turn normal oppose		rics (if not, indicate q							
Access & Equity		disruption of a		quity in the use of airs . ATFM processes tak	•	U					
		delays	on of arr	ailable consister ability	u to opticipate difficu	It aituations and					
Capacity		Better utilization of available capacity, ability to anticipate difficult situations and mitigate them in advance. Number of aircrafts in a defined volume or airspace for									
Capacity		a period of tim		ice. Truinioci of anelali							
Efficiency			ourn due	to better anticipation	of flow issues; Reduc	ed block times					
			<u> </u>		the ground with shu	engines: or at					
Environment	Environment Reduced fuel burn as delays are absorbed on the ground, with shut engines; or at optimum flight levels through speed or route management. Reduced CO2 emissions per flight										
Safety				of undesired sector over	rloads						

2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-101/ACAS											
ACAS Improvements											
De	Performance Improvement Area 3: Optimum Capacity and Flexible Flights										
re	riormance				a Flexible Flights						
– Through Global Collaborative ATM 3. ASBU B0-101/ACAS: Impact on Main Key Performance Areas (KPA)											
	Access & EquityCapacityEfficiencyEnvironmentSafety										
Applicable	Ň	•	Ν	Y	Ν	Y					
4.	ASBU BO	)-101/ACAS: H	lanning T	argets and Impleme	<u> </u>						
5.	Elements				Implementation P	rogress					
					ound and Air)						
1. ACAS II (TCAS V			2013-2								
	7.	ASBU B0-102	ACAS: I	mplementation Chal	<u> </u>						
				Implementatio							
Elements		Ground S		Avionics Procedures		Operational					
		Implementation		Implementation	Availability	Approvals					
1. ACAS II (TCAS V	,	Nil		Equipage	Nil	Nil					
				ance Monitoring and							
<b>E</b> l	δA	. ASBU B0-10.		mplementation Mon	<u> </u>	_					
Elements		Lullardam Da		mance Indicators / S		S.					
1. ACAS II (TCAS V	ersion 7.1)		0	f aircrafts that are equ action in number of R.							
	8 ASBII	<u> </u>		ance Monitoring and							
				Performance Monit							
Key Performance				ics (if not, indicate q	<u>v</u>	)					
Access & Equity		N/A		1							
<b>x *</b>		ACAS improv	vement wil	l reduce unnecessary	resolution advisory	(RA) and then					
Capacity		reduce traject	ory deviati	ons	2	· · ·					
Efficiency		N/A	•								
Environment		N/A									
Cofety		Reduced num	ber of pote	ential AIR-PROX. AC	CAS increases safety	y in the case of					
Safety breakdown of separation											

#### 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 . A		0		Lonaborative A IM	no Arong (KDA)					
3. A	Access & Equity	cess & Cana		Main Key Performand           Efficiency	Environment	Safety				
Applicable	N	Y	7	N	Ν	Y				
	ASBU B0-84/AS	UR: Plan	ning Ta	argets and Implemen	tation Progress					
				6. Targets and I		Progress				
5. Eler	ments			(Grou	und and Air)					
1. Implementation of ADS				2018 – Users and service provider						
2. Implementation of Mul	tilateration			2018 – Users and service provider						
3. Automation system (Pr				017 – Users and servic	A					
	<b>7.</b> ASBU	B0-84/AS	SUR: In	nplementation Challe	enges					
				Implementation						
Elements		ind Syster		Avionics	Procedures	Operational				
	Impl	ementatio	on	Implementation	Availability	Approvals				
	Lack of A	DS-B syst	tems	Lack of ADS-B		Lack of				
	implemen	tation due	to	implementation in	Lack of					
1. Implementation of ADS	S-B recent imp	olementati	on of	general aviation,		inspector s with				
_	conventio	nal surveil	llance	and old	procedures	appropriate				
	systems			commercial fleet		capability				
2. Implementation of Multilateration	Facilities stations. E communic	Establishme cations net	works	Nil	Nil	Lack of inspector s with appropriate capability				
3. Automation system (Presentation)	Lack of an functional	•	tion	Nil	Nil	Nil				
· · · · · ·			rformo	nce Monitoring and I	Magguramant					
0.				nplementation Monit						
Elements				nance Indicators / Su	<u> </u>					
1. Implementation of ADS				ernational aerodromes		emented				
2 Invalancestation of				of ADS-B implement						
2. Implementation of Multilateration				Itilateration system in of Multilateration sys						
						antad				
3. Automation system		v		TS units with automation system implemented r of automation system implemented in ATS units						
(Presentation)						ATS units				
0.				nce Monitoring and I Performance Monito						
Key Performance Area				s (if not, indicate qua	0					
Access & Equity	N/A			<b>_</b>						
Capacity	compared	Typical separation minima are 3 NM or 5 NM enabling an increase in traffic density compared to procedural minima. TMA surveillance performance improvements are achieved through high accuracy, better velocity vector and improved coverage.								
Efficiency	N/A		<u> </u>		F	0				
		N/A								
Environment	N/A									

2. RI						CE OBJECT		0-102/SNET			
Perf	formance					Capacity an rative ATM	nd Flexi	ble Flights			
3.	ASBU B(	)-102/SNET	': Impa	act on Ma	in K	ev Performa	nce Are	as (KPA)			
	3. ASBU B0-102/SNET: Impact on Main Key Performance Areas (KPA)         Access & Equity       Capacity       Efficiency       Environment       Safety										
Applicable	Applicable N N NN N Y										
4.	ASBU BO	0-102/SNET	<b>:</b> Plan	ning Targ	gets a	and Impleme	entation	Progress			
5.	Elements				6.		l Implei round a	nentation Pro nd Air)	gress		
1. Short Term Conflict	Alert (STC	CA)		June 201	14 / S	Service provid	der 2013	-2018			
2. Area Proximity War						Service provid	der 2013	-2018			
3. Minimum Safe Altitu		<u> </u>		June 201							
4. Dangerous Area Infr				2013-20							
	7.	ASBU B0-	<u>102/SN</u>	NET: Imp	leme	entation Cha					
<b>E</b> l			C	10 4		Implem					
Elem	ents			ound Syste		Avioni		Procedures Availability	Operational Approvals		
1. Short Term Conflict	Alort (ST(	۲ <u>۸</u> )		olementati	1011	Implemen Nil		Nil	Nil		
2. Area Proximity War	`````	,	-	Nil Funding		Nil		Nil	Nil		
3. Minimum Safe Altitu	0			Nil Funding				1111			
(MSAW)		-	Nil F	Nil Funding		Nil		Nil	Nil		
4. Dangerous Area Infr (DAIW)	•		Fund	ding							
8						nitoring and entation Mor		rement			
Elements			Per	rformanc	e Ind	licators / Sup	oporting	g Metrics			
1. Short Term Conflict								y nets (STCA)	implemented		
Alert (STCA)	* *				-	et (STCA) in					
2. Area Proximity			•			÷		y nets (APW)in	nplemented		
Warning (APW) 3. Minimum Safe	Supp	orting metric	c: Num	iber of safe	ety n	et (APW)imp	piemente	a			
Altitude Warning			•			÷			) implemented		
(MSAW)	Supp	orting metric	c: Num	ber of safe	ety n	et (MSAW) i	mpleme	nted			
4. Dangerous Area Infringement Warning (DAIW)		Indicator: Percentage of ATS units with ground-based safety nets (DAIW) implemented Supporting metric: Number of safety net (DAIW) implemented							implemented		
						nitoring and ormance Mo					
Key Performance						ot, indicate q					
Access & Equity		N/A				,		· ····,			
Capacity		N/A									
Efficiency N/A											
Environment	Environment N/A										
Safety		Significant	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       Capacity       Efficiency       Environment       Safety											
Applicable	Equ N		N	Ţ	Y		N	NY			
4. ASBU B0-05/CDO: Planning Targets and Implementation Progress											
5. Elements       6. Targets and Implementation Progress (Ground and Air)								rogress			
1. CDO implementation					per 2017						
2. PBN STARs implem					per 2017						
	г	7. ASB	U B0-05/0	CDO: Im	plementatio						
	F	0			-	entation					
Elements			System		ionics		rocedures	Operational			
		The grou	entation	Imple	nentation	A	vailability	Approvals			
1. CDO implementation		trajector calculati function need to a upgraded	y on will ıble	CDO Function		LOAs and Training		In accordance with applicable requirements			
2. PBN STARs implementation		Airspace		Nil	LOAs and Training						
					ce Monitori plementatio		/leasurement oring				
Elements							pporting Metrics				
1. CDO implementation			ng metric:				/TMAs with CDO lromes/TMAs with				
2. PBN STARs		<u> </u>		ge of inte	ernational ac	erodromes	with PBN STARS	s implementation			
implementation		Supporti	ng metric:	Number	of internation	onal airpo	rt with PBN STAF	Rs implementation			
	8. ASB						<b>leasurement</b>				
		<b>8B. AS</b>	BU B0-05		erformance						
Key Performance A	reas			Metrics	(if not, ind	licate qua	litative benefits)				
Access & Equity		N/A	1	1	<u> </u>	<b>T</b> / A					
Capacity					e Capacity N		• .1 •	c · 1 · ·			
Efficiency		Cost savings through reduced fuel burn. Reduction in the number of required radio transmissions.									
Environment					ult of reduce						
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)											
Access & EquityCapacityEfficiencyEnvironmentSafety											
Applicable		Y	N	Y	Y		NY	NY			
4	4. ASB	U <b>B0-20/C</b>	CO: Plan	ning Ta			ation Progress				
5. Elements     6. Targets and Implementation Progress (Ground and Air)											
1. CCO implementation	on			Deceml	per 2017	````	,				
2. PBN SIDs impleme				Decem	per 2017						
		7. ASB	U B0-20/0	CCO: Im	plementatio	on Challe	nges				
					<u> </u>	entation					
Elements			System		ionics		rocedures	Operational			
		Implem	entation	Implei	nentation	A	vailability	Approvals			
1. CCO implementation	1. CCO implementation			Nil				In accordance with applicable requirements			
2. PBN SIDs impleme		Airspace	U	Nil				Approvals of procedures			
	8. AS						<b>leasurement</b>				
		8A. ASB			plementatio						
Elements							pporting Metrics				
1. CCO implementation	on						with CCO implements with CCO implements				
			-				with PBN SIDs in				
2. PBN SIDs impleme	ntation						rts with PBN SIDs				
	8. AS						leasurement				
		<b>8B. AS</b>	BU B0-20	/CCO: P	erformance	Monitor	ring				
Key Performance	Areas			Metrics	(if not, ind	licate qua	litative benefits)				
Access & Equity		<u></u>									
Capacity				<u> </u>	e Capacity						
Efficiency		-	-			ent aircraft operati	ing profiles.				
					required rad						
							ns would otherwis				
Environment		<b>^</b>	÷	urtailed o	r restricted.	Environm	nental benefits thro	ugh reduced			
		emission			<b></b>						
Safety							mber of required ra	adio transmissions.			
Lower pilot and air traffic control workload.											

#### 2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE - B0-40/TBO Improved Safety and Efficiency through the initial application of Data Link en-Route Performance Improvement Area 4: Efficient Flight Path – Through Trajectory-based Operations 3. ASBU B0-40/TBO: Impact on Main Key Performance Areas (KPA) Access & Capacity Efficiency Environment Safety Equity Applicable Ν Y Y Y Y 4. ASBU B0-40/TBO: Planning Targets and Implementation Progress 6. Targets and Implementation Progress 5. Elements (Ground and Air) 1. ADS-C over oceanic and remote areas June 2018 – Service provider 2. Continental CPDLC June 2018 – Service provider 7. ASBU B0-40/TBO: Implementation Challenges **Implementation Area** Procedures Ground System **Elements** Avionics **Operational** Implementation Implementation Availability Approvals Implementati Funding and limited link Implementation of Lack of duly trained on of GOLD 1. ADS-C over oceanic service provider and ADS-C in general inspectors for approval and remote areas procedures infrastructure aviation pending of operations pending Implementati Funding and limited link Implementation of Lack of duly trained on of GOLD CPDLC in general 2. Continental CPDLC service provider and inspectors for approval procedures infrastructure aviation pending of operations pending 8. ASBU B0-40/TBO: Performance Monitoring and Measurement 8A. ASBU B0-40/TBO: Implementation Monitoring **Elements Performance Indicators / Supporting Metrics** Indicator: Percentage of FIRs with ADS-C implemented 1. ADS-C over oceanic Supporting metric: Number of ADS-C approved procedures over oceanic and remote areas and remote areas Indicator: Percentage of CPDLC implemented 2. Continental CPDLC Supporting metric: Number of CPDLC approved procedures over continental? areas 8. ASBU B0-40/TBO: Performance Monitoring and Measurement 8B. ASBU B0-40/TBO: Performance Monitoring **Key Performance Areas** Metrics (if not, indicate qualitative benefits) Access & Equity N/A Capacity Number of aircrafts in a defined airspace for a period of time Efficiency Kilogrammes of fuel saved per flight. Reduction of separation Environment Reduced emission as a result of reduced fuel burn ADS-C based safety nets supports cleared level adherence monitoring, route adherence monitoring, danger area infringement warning and improved search and

situations. Increased situational awareness

rescue. Reduced occurrences of misunderstandings; solution to stuck microphone

Safety

#### 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.

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.

#### -50 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 (AIP0 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.

#### 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:

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- 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.

#### **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.

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.