APPENDIX A

AIR NAVIGATION REPORTING FORMS

1. AIR NAVIGATION REPORT FORM (ANRF)
Regional and National planning for ASBU Modules

2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-15/RSEQ
Improved Traffic Flow through Runway Sequencing (AMAN/DMAN)

Performance Improvement Area 1: Airport Operations

3. ASBU B0-15/RSEQ: Impact on Main Key Performance Areas (KPA)

	Access & Equity	Capacity	Efficiency	Environment	Safety
Applicable	**N**	**Y**	**Y**	**Y**	**N**

4. ASBU B0-15/RSEQ: Planning Targets and Implementation Progress

5. Elements	6. Targets and Implementation Progress (Ground and Air)
1. AMAN and time-based metering	December 2015
2. Departure management	December 2015
3. Movement Area Capacity Optimization	December 2015

7. ASBU B0-15/RSEQ: Implementation Challenges

Elements	Implementation Area			
	Ground System Implementation	**Avionics Implementation**	**Procedures Availability**	**Operational Approvals**
1. AMAN and time-based metering	Lack of automation system to support synchronization	Nil	Lack of appropriate training. Lack of STARs PBN. Lack of slots assignment	Lack of procedures and inspectors for operational approvals
2. Departure management	Lack of automation system to support synchronization	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 procedures for RWY, TWY & platform capacity calculation. Guidelines for movement area capacity organization.	Lack of procedures and inspectors for operational approvals

8. ASBU B0-15/RSEQ: Performance Monitoring and Measurement
8A. ASBU B0-86/OPFL: Implementation Monitoring

Elements	Performance Indicators / Supporting Metrics
1. AMAN and time-based metering	Indicator: Percentage of international aerodromes with AMAN and time-based metering. Supporting metric: Number of international airports with AMAN and time-based metering.
2. Departure management	Indicator: Percentage of international aerodromes with DMAN. Supporting metric: Number of international airports with DMAN.
3. Movement Area Capacity Optimization	Indicator: Percentage of international aerodromes with Airport-capacity calculated. Supporting metric: Number of international airports with Airport-capacity calculated.

8. ASBU B0-15/RSEQ: Performance Monitoring and Measurement
8B. ASBU B0-15/RSEQ: Performance Monitoring

Key Performance Areas	Metrics (if not , indicate qualitative benefits)
Access & Equity	N/A
Capacity	Improved airport movement area capacity through optimization
Efficiency	Efficiency is positively impacted as reflected by increased runway throughput and arrival rates
Environment	Reduction of carbon emissions
Safety	N/A

1. AIR NAVIGATION REPORT FORM (ANRF)
Regional and National planning for ASBU Modules

2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-65/APTA
Optimization of Approach Procedures Including Vertical Guidance

Performance Improvement Area 1: Airport Operations

3. ASBU B0-65/APTA: Impact on Main Key Performance Areas (KPA)

	Access & Equity	Capacity	Efficiency	Environment	Safety
Applicable	**Y**	**Y**	**Y**	**Y**	**Y**

4. ASBU B0-65/APTA: Planning Targets and Implementation Progress

5. Elements	**6. Targets and Implementation Progress (Ground and Air)**
1. APV with Baro VNAV	December 2016 – Service Providers and users
2. APV with SBAS	December 2017 – As per AFI-GNSS Strategy. Not Applicable
3. APV with GBAS	December 2018 – Initial implementation at some States (service providers)

7. ASBU B0-65/APTA: Implementation Challenges

Elements	**Implementation Area**			
	Ground System Implementation	**Avionics Implementation**	**Procedures Availability**	**Operational Approvals**
1. APV with Baro VNAV	NIL ?	Insufficient number of equipped aircraft	Insufficient appropriate training	Lack of appropriate training
2. APV with SBAS	Network Infrastructure. Not Applicable	Cost of aircraft equipage. Not applicable	Limited to certain States which have implemented. Not Applicable	Lack of knowledge and appropriate training. Not applicable
3. APV with GBAS	Lack of cost-benefit analysis. Adverse ionosphere	Insufficient number of equipped aircraft	Insufficient appropriate training	Lack of appropriate training. Evaluation of a real operation requirement

8. ASBU B0-65/APTA: Performance Monitoring and Measurement
8A. ASBU B0-65/APTA: Implementation Monitoring

Elements	**Performance Indicators / Supporting Metrics**
1. APV with Baro VNAV	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 SBAS	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 GBAS	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

1. AIR NAVIGATION REPORT FORM (ANRF)
Regional and National planning for ASBU Modules

2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-75/SURF
Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2)

Performance Improvement Area 1: Airport Operations

3. ASBU B0-75/SURF: Impact on Main Key Performance Areas (KPA)

	Access & Equity	Capacity	Efficiency	Environment	Safety
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)
1. Surveillance system for ground surface movement (PSR, SSR, ADS-B or Multilateration	December 2017 Service provider
2. Surveillance system on board (SSR transponder, ADS-B capacity)	December 2017 Service provider
3. Surveillance system for vehicle	December 2017 Service provider
4. Visual aids for navigation	December 2015 Service provider
5. Wildlife strike hazard reduction	December 2015 Aerodrome operator / wildlife committee
6. Display and processing information	December 2017 Service provider

7. ASBU B0-75/SURF: Implementation Challenges

Elements	Implementation Area			
	Ground System Implementation	**Avionics Implementation**	**Procedures Availability**	**Operational Approvals**
1. Surveillance system for ground surface movement (PSR, SSR, ADS-B or Multilateration)	Lack of adequate financial resources	Nil	Lack of procedures and training.	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 procedures and training.	Lack of guidance materials for inspectors. Lack of inspectors
3. Surveillance system for vehicle	Lack of adequate financial resources	Nil	Lack of procedures and training.	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 Wildlife Hazard Management Committee.	Nil

			Conflict between aviation law and state environment laws. Lack of training. Lack of community support	

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 hazard reduction	Indicator: Percentage of reduction of wildlife incursions. Supporting metric: Number of runway incursions due to wildlife strike.

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

1. AIR NAVIGATION REPORT FORM (ANRF)
Regional and National planning for ASBU Modules

2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-80/ACDM
Improved Airport Operations through Airport

Performance Improvement Area 1: Airport Operations

3. ASBU B0-80/ACDM: Impact on Main Key Performance Areas (KPA)

	Access & Equity	Capacity	Efficiency	Environment	Safety
Applicable	**Y**	**Y**	**Y**	**Y**	**Y**

4. ASBU B0-80/ACDM: Planning Targets and Implementation Progress

5. Elements	6. Targets and Implementation Progress (Ground and Air)
1. Airport – CDM	December 2015 – Airport Operator, ANSPs, aircraft operators
2. Aerodrome certification	December 2015 – State CAA
3. Airport planning	December 2017 – Airport Operators
4. Heliport operation	December 2017 – State CAA
5. SMS implementation	December 2014 – Aerodrome Operators
6. Development of regulations and technical guidance material for runway safety	December 2014 – State CAA
7. Development and implementation of runway safety programmes and reduce runway-related accidents and serious incidents to no more than eight per year.	December 2014 – State CAA

7. ASBU B0-80/ACDM: Implementation Challenges

Elements	Implementation Area			
	Ground System Implementation	**Avionics Implementation**	**Procedures Availability**	**Operational Approvals**
1. Airport – CDM	Interconnection of ground systems of different partners for Airport – CDM	Nil	Lack for coordination procedures. Lack of commitment from all stakeholders	Nil
2. Aerodrome certification	Lack of effective implementation of Annex 14 SARPs	Nil	Lack of procedures. Lack of training	Lack of adequately trained inspectors
3. Airport planning	Nil	Nil	Lack of procedures	Lack of adequately trained inspectors
4. Heliport operation	Lack of regulations	Nil	Lack of procedures	Lack of trained inspectors
5. SMS implementation	Nil	Nil	Lack of States regulations. Lack of training	Lack of high level management commitment
6. Development of regulations and technical guidance material for runway safety	Nil	Nil	Lack of States regulations	Lack of high level management commitment
7. Development and implementation of runway safety programmes and reduce runway-related accidents and	Nil	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)

8. ASBU B0-80/ACDM: Performance Monitoring and Measurement **8B. ASBU 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

1. AIR NAVIGATION REPORT FORM (ANRF)
Regional and National planning for ASBU Modules

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	**N**	**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

Elements	Implementation Area			
	Ground System Implementation	**Avionics Implementation**	**Procedures Availability**	**Operational Approvals**
1. Complete AMHS implementation at States still not counting with this item	Nil	Nil	Nil	Nil
2. AMHS interconnection	TPDI negotiations between MTAs	Nil	Nil	Nil
3. Implement AIDC/OLDI at some States automated centres	Nil	Nil	Nil	Nil
4. Implement operational AIDC/OLDI between adjacent ACCs	Compatibility between AIDC or OLDI systems from various manufacturers	Nil	Nil	Nil
5. Implement the AFI Comn regional network	Nil	Nil	Nil	Nil

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

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

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

1. AIR NAVIGATION REPORT FORM (ANRF)
Regional and National planning for ASBU Modules

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

3. ASBU B0-105/AMET: Impact on Main Key Performance Areas (KPA)

	Access & Equity	Capacity	Efficiency	Environment	Safety
Applicable	**Y**	**YY**	**Y**	**Y**	**Y**

4. ASBU B0-105/AMET: Planning Targets and Implementation Progress

5. Elements	6. Targets and Implementation Progress (Ground and Air)
1. WAFS	In process of improvement
2. IAVW	In process of improvement
3. Tropical cyclone watch	In process of improvement
4. Aerodrome warnings	In process of improvement
5. Wind shear warnings and alerts	MET provider services / 2015
6. SIGMET	MET provider services / 2015
7. QMS/MET	MET provider services / 2018
8. 8. Other OPMET Information (METAR, SPECI, TAF)	In process of improvement

7. ASBU B0-105/AMET: Implementation Challenges

Elements	Implementation Area			
	Ground System Implementation	**Avionics Implementation**	**Procedures Availability**	**Operational Approvals**
1. WAFS	Connection to the AFS satellite and public internet distribution systems	Nil	Prepare a contingency plan in case of public internet failure	N/A
2. IAVW	Connection to the AFS satellite and public internet distribution systems	Nil	Prepare a contingency plan in case of public internet failure	N/A
3. Tropical cyclone watch	Connection to the AFS satellite and public internet distribution systems	Nil	Prepare a contingency plan in case of public internet failure	N/A
4. Aerodrome warnings	Connection to the AFTN	Nil	Local arrangements for reception of aerodrome warnings	N/A
5. Wind shear warnings and alerts	Connection to the AFTN	Nil	Local arrangements for reception of aerodrome warnings	N/A
6. SIGMET	Connection to the AFTN	Nil	Prepare a contingency plan in case of AFTN systems failure	N/A
7. QMS/MET	Nil	Commitment of top management	N/A	N/A
8. 8. Other OPMET Information (METAR, SPECI, TAF)	Connection to the AFTN	Nil	Prepare a contingency plan in case of AFTN systems failure	N/A

8. ASBU B0-105/AMET: Performance Monitoring and Measurement
8A. ASBU B0-105/AMET: Implementation Monitoring

Elements	Performance Indicators / Supporting Metrics
1. WAFS	Indicator: Percentage of States implementation of WAFS internet File Service (WIFS)

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

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

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

4. ASBU B0-30/DATM: Planning Targets and Implementation Progress	
5. Elements	**6. Targets and Implementation Progress (Ground and Air)**
1. QMS for AIM	December 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				
Elements	**Implementation Area**			
	Ground System Implementation	**Avionics Implementation**	**Procedures Availability**	**Operational Approvals**
1. QMS for AIM 2. e-TOD implementation 3. WGS-84 implementation 4. AIXM implementation 5. e-AIP implementation 6. Digital NOTAM	Lack of electronic database. Lack of electronic access based on internet protocol services	Nil	Lack of procedures to allow airlines provide digital AIS data to on-board devices, in particular electronic flight bags (EFBs). Lack of training for AIS/AIM personnel.	Nil

8. ASBU B0-30/DATM: Performance Monitoring and Measurement **8A. ASBU B0-30/DATM: Implementation Monitoring**	
Elements	**Performance Indicators / Supporting Metrics**
1. QMS for AIM	Indicator: Percentage of States QMS certified Supporting metric: Number of States QMS certification
2. e-TOD implementation	Indicator: Percentage of States e-TOD implemented Supporting metric: Number of States with e-TOD implemented
3. WGS-84 implementation	Indicator: Percentage of 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
6. Digital NOTAM	Indicator: Percentage of States with Digital NOTAM implemented Supporting metric: Number of States with Digital NOTAM implemented

8. ASBU B0-30/DATM: Performance Monitoring and Measurement **8B. ASBU B0-30/DATM: Performance Monitoring**	
Key Performance Areas	**Metrics (if not, indicate qualitative benefits)**
Access & Equity	N/A
Capacity	N/A
Efficiency	Support Instrument procedure design implementation; Support aeronautical chart production and on-board databases; Support the implementation of PBN
Environment	Reduced amount of paper for promulgation of information
Safety	Reduction in the number of possible inconsistencies

1. AIR NAVIGATION REPORT FORM (ANRF)
Regional and National planning for ASBU Modules

2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-10/FRTO
Improved Operations through Enhanced En-route Trajectories
Performance Improvement Area 3: Optimum Capacity and Flexible Flights – Through Global Collaborative ATM

3. ASBU B0-10/FRTO: Impact on Main Key Performance Areas (KPA)

	Access & Equity	Capacity	Efficiency	Environment	Safety
Applicable	**Y**	**Y**	**Y**	**Y**	**N**

4. ASBU B0-10/FRTO: Planning Targets and Implementation Progress

5. Elements	6. Targets and Implementation Progress (Ground and Air)
1. Airspace planning	December 2018
2. Flexible use of airspace	December 2016
3. Flexible routing	December 2018

7. ASBU B0-10/FRTO: Implementation Challenges

Elements	Implementation Area			
	Ground System Implementation	**Avionics Implementation**	**Procedures Availability**	**Operational Approvals**
1. Airspace planning	Lack of organized and managed airspace prior to the time of flight. Lack of AIDC WGS-84 Survey	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	Insufficient number of equipped aircraft / Lack of FANS 1/A. lack of ACARS	Lack of LOAs and procedures	Poor percentage of fleet approvals

8. ASBU B0-10/FRTO: Performance Monitoring and Measurement
8A. ASBU B0-10/FRTO: Implementation Monitoring

Elements	Performance Indicators / Supporting Metrics
1. Airspace planning	Not assigned Indicator and metrics
2. Flexible use of airspace	Indicator: Percentage of time segregated airspaces are available for civil operations in the State Supporting metric: Reduction of delays in time of civil flights
3. Flexible routing	Indicator: Percentage of PBN routes implemented Supporting metric: KG of Fuel savings Supporting metric: Tons of CO2 reduction

8. ASBU B0-10/FRTO: Performance Monitoring and Measurement
8B. ASBU B0-10/FRTO: Performance Monitoring

Key Performance Areas	Metrics (if not , indicate qualitative benefits)
Access & Equity	Better access to airspace by a reduction of the permanently segregated volumes of airspace

Capacity	Flexible routing reduces potential congestion on trunk routes and at busy crossing points. The flexible use of airspace gives greater possibilities to separate flights horizontally. PBN helps to reduce route spacing and aircraft separations.
Efficiency	In particular the module will 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

1. AIR NAVIGATION REPORT FORM (ANRF)
Regional and National planning for ASBU Modules

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: Impact on Main Key Performance Areas (KPA)

	Access & Equity	Capacity	Efficiency	Environment	Safety
Applicable	**Y**	**Y**	**Y**	**Y**	**Y**

4. ASBU B0-35/NOPS: Planning Targets and Implementation Progress

5. Elements	6. Targets and Implementation Progress (Ground and Air)
1. Air Traffic Flow Management	December 2015

7. ASBU B0-35/NOPS: Implementation Challenges

Elements	Implementation Area			
	Ground System Implementation	Avionics Implementation	Procedures Availability	Operational Approvals
1. Air Traffic Flow Management	Lack for system software for ATFM. Lack of ATFM units implemented. Funding	Nil	Lack of ATFM and CDM procedures. Lack of training	….

8. ASBU B0-35/NOPS: Performance Monitoring and Measurement
8A. ASBU B0-35/NOPS: Implementation Monitoring

Elements	Performance Indicators / Supporting Metrics
1. Air Traffic Flow Management	Indicator: Percentage of implemented FMUs Supporting metric: Number of States with ATFM units implemented

8. ASBU B0-35/NOPS: Performance Monitoring and Measurement
8B. ASBU B0-35/NOPS: Performance Monitoring

Key Performance Areas	Metrics (if not, indicate qualitative benefits)
Access & Equity	Improved access and equity in the use of airspace or aerodrome by avoiding disruption of air traffic. ATFM processes take care of equitable distribution of delays
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 a period of time.
Efficiency	Reduced fuel burn due to better anticipation of flow issues; Reduced block times and times with engines on
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	Reduced occurrences of undesired sector overloads

1. AIR NAVIGATION REPORT FORM (ANRF)
Regional and National planning for ASBU Modules

2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-101/ACAS
ACAS Improvements

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

3. ASBU B0-101/ACAS: Impact on Main Key Performance Areas (KPA)

	Access & Equity	Capacity	Efficiency	Environment	Safety
Applicable	**N**	**N**	**Y**	**N**	**Y**

4. ASBU B0-101/ACAS: Planning Targets and Implementation Progress

5. Elements	6. Targets and Implementation Progress (Ground and Air)
1. ACAS II (TCAS Version 7.1)	2013-2018

7. ASBU B0-101/ACAS: Implementation Challenges

Elements	Implementation Area			
	Ground System Implementation	Avionics Implementation	Procedures Availability	Operational Approvals
1. ACAS II (TCAS Version 7.1)	Nil	Equipage	Nil	Nil

8. ASBU B0-101/ACAS: Performance Monitoring and Measurement
8A. ASBU B0-101/ACAS: Implementation Monitoring

Elements	Performance Indicators / Supporting Metrics
1. ACAS II (TCAS Version 7.1)	Indicator: Percentage of aircrafts that are equipped Supporting metric: Reduction in number of RA incidents

8. ASBU B0-101/ACAS: Performance Monitoring and Measurement
8B. ASBU B0-101/ACAS: Performance Monitoring

Key Performance Areas	Metrics (if not, indicate qualitative benefits)
Access & Equity	N/A
Capacity	ACAS improvement will reduce unnecessary resolution advisory (RA) and then reduce trajectory deviations
Efficiency	N/A
Environment	N/A
Safety	Reduced number of potential AIR-PROX. ACAS increases safety in the case of breakdown of separation

1. AIR NAVIGATION REPORT FORM (ANRF)
Regional and National planning for ASBU Modules

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. ASBU B0-84/ASUR: Impact on Main Key Performance Areas (KPA)

	Access & Equity	Capacity	Efficiency	Environment	Safety
Applicable	**N**	**Y**	**N**	**N**	**Y**

4. ASBU B0-84/ASUR: Planning Targets and Implementation Progress

5. Elements	6. Targets and Implementation Progress (Ground and Air)
1. Implementation of ADS-B	June 2018 – Users and service provider
2. Implementation of Multilateration	June 2018 – Users and service provider
3. Automation system (Presentation)	June 2017 – Users and service provider

7. ASBU B0-84/ASUR: Implementation Challenges

Elements	Implementation Area			
	Ground System Implementation	**Avionics Implementation**	**Procedures Availability**	**Operational Approvals**
1. Implementation of ADS-B	Lack of ADS-B systems implementation due to recent implementation of conventional surveillance systems	Lack of ADS-B implementation in general aviation, and old commercial fleet	Lack of procedures	Lack of inspector s with appropriate capability
2. Implementation of Multilateration	Facilities of remote stations. Establishment of communications networks	Nil	Nil	Lack of inspector s with appropriate capability
3. Automation system (Presentation)	Lack of any automation functionality	Nil	Nil	Nil

8. ASBU B0-84/ASUR: Performance Monitoring and Measurement
8A. ASBU B0-84/ASUR: Implementation Monitoring

Elements	Performance Indicators / Supporting Metrics
1. Implementation of ADS-B	Indicator: Percentage of international aerodromes with ADS-B implemented Supporting metric: Number of ADS-B implemented
2. Implementation of Multilateration	Indicator: Percentage of Multilateration system implemented Supporting metric: Number of Multilateration system implemented
3. Automation system (Presentation)	Indicator: Percentage of ATS units with automation system implemented Supporting metric: Number of automation system implemented in ATS units

8. ASBU B0-84/ASUR: Performance Monitoring and Measurement
8B. ASBU B0-84/ASUR: Performance Monitoring

Key Performance Areas	Metrics (if not, indicate qualitative benefits)
Access & Equity	N/A
Capacity	Typical separation minima are 3 NM or 5 NM enabling an increase in traffic density compared to procedural minima. TMA surveillance performance improvements are achieved through high accuracy, better velocity vector and improved coverage.
Efficiency	N/A
Environment	N/A
Safety	Reduction of the number of major incidents. Support to search and rescue

1. AIR NAVIGATION REPORT FORM (ANRF)
Regional and National planning for ASBU Modules

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

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

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 (STCA)	June 2014 / Service provider 2013-2018
2. Area Proximity Warning (APW)	June 2014 / Service provider 2013-2018
3. Minimum Safe Altitude Warning (MSAW)	June 2014
4. Dangerous Area Infringement Warning (DAIW)	2013-2018

7. ASBU B0-102/SNET: Implementation Challenges

Elements	Implementation Area			
	Ground System Implementation	Avionics Implementation	Procedures Availability	Operational Approvals
1. Short Term Conflict Alert (STCA)	Nil Funding	Nil	Nil	Nil
2. Area Proximity Warning (APW)	Nil Funding	Nil	Nil	Nil
3. Minimum Safe Altitude Warning (MSAW)	Nil Funding	Nil	Nil	Nil
4. Dangerous Area Infringement Warning (DAIW)	Funding			

8. ASBU B0-102/SNET: Performance Monitoring and Measurement
8A. ASBU B0-102/SNET: Implementation Monitoring

Elements	Performance Indicators / Supporting Metrics
1. Short Term Conflict Alert (STCA)	Indicator: Percentage of ATS units with ground-based safety nets (STCA) implemented Supporting metric: Number of safety net (STCA) implemented
2. Area Proximity Warning (APW)	Indicator: Percentage of ATS units with ground-based safety nets (APW)implemented Supporting metric: Number of safety net (APW)implemented
3. Minimum Safe Altitude Warning (MSAW)	Indicator: Percentage of ATS units with ground-based safety nets (MSAW) implemented Supporting metric: Number of safety net (MSAW) implemented
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

8. ASBU B0-102/SNET: Performance Monitoring and Measurement
8B. ASBU B0-102/SNET CAS: Performance Monitoring

Key Performance Areas	Metrics (if not, indicate qualitative benefits)
Access & Equity	N/A
Capacity	N/A
Efficiency	N/A
Environment	N/A
Safety	Significant reduction of the number of major incidents

1. AIR NAVIGATION REPORT FORM (ANRF)
Regional and National planning for ASBU Modules

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**	**N**	**Y**	**N**	**NY**

4. ASBU B0-05/CDO: Planning Targets and Implementation Progress

5. Elements	6. Targets and Implementation Progress (Ground and Air)
1. CDO implementation	December 2017
2. PBN STARs implementation	December 2017

7. ASBU B0-05/CDO: Implementation Challenges

Elements	Implementation Area			
	Ground System Implementation	**Avionics Implementation**	**Procedures Availability**	**Operational Approvals**
1. 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	Airspace Design	Nil	LOAs and Training	

8. ASBU B0-05/CDO: Performance Monitoring and Measurement
8A. ASBU B0-05/CDO: Implementation Monitoring

Elements	Performance Indicators / Supporting Metrics
1. CDO implementation	Indicator: Percentage of international aerodromes/TMAs with CDO implemented Supporting metric: Number of international aerodromes/TMAs with CDO implemented
2. PBN STARs implementation	Indicator: Percentage of international aerodromes with PBN STARs implementation Supporting metric: Number of international airport with PBN STARs implementation

8. ASBU B0-05/CDO: Performance Monitoring and Measurement
8B. ASBU B0-05/CDO: Performance Monitoring

Key Performance Areas	Metrics (if not , indicate qualitative benefits)
Access & Equity	N/A
Capacity	Increased Terminal Airspace Capacity N/A
Efficiency	Cost savings through reduced fuel burn. Reduction in the number of required radio transmissions.
Environment	Reduced emissions as a result of reduced fuel burn.
Safety	More consistent flight paths and stabilized approach. Reduction in the number of incidence of controlled flight into terrain (CFIT)

1. AIR NAVIGATION REPORT FORM (ANRF)
Regional and National planning for ASBU Modules

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 & Equity	Capacity	Efficiency	Environment	Safety
Applicable	**Y**	**NY**	**Y**	**NY**	**NY**

4. ASBU B0-20/CCO: Planning Targets and Implementation Progress

5. Elements	6. Targets and Implementation Progress (Ground and Air)
1. CCO implementation	December 2017
2. PBN SIDs implementation	December 2017

7. ASBU B0-20/CCO: Implementation Challenges

Elements	Implementation Area			
	Ground System Implementation	Avionics Implementation	Procedures Availability	Operational Approvals
1. CCO implementation	Nil	Nil		In accordance with applicable requirements
2. PBN SIDs implementation	Airspace Design	Nil		Approvals of procedures

8. ASBU B0-20/CCO: Performance Monitoring and Measurement
8A. ASBU B0-20/CCO: Implementation Monitoring

Elements	Performance Indicators / Supporting Metrics
1. CCO implementation	Indicator: Percentage of international aerodromes with CCO implemented Supporting metric: Number of international airports with CCO implemented
2. PBN SIDs implementation	Indicator: Percentage of international aerodromes with PBN SIDs implemented Supporting metric: Number of international airports with PBN SIDs implemented

8. ASBU B0-20/CCO: Performance Monitoring and Measurement
8B. ASBU B0-20/CCO: Performance Monitoring

Key Performance Areas	Metrics (if not , indicate qualitative benefits)
Access & Equity	…
Capacity	Increased Terminal Airspace Capacity
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.

1. AIR NAVIGATION REPORT FORM (ANRF)
Regional and National planning for ASBU Modules

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 & Equity	Capacity	Efficiency	Environment	Safety
Applicable	**N**	**Y**	**Y**	**Y**	**Y**

4. ASBU B0-40/TBO: Planning Targets and Implementation Progress

5. Elements	6. Targets and Implementation Progress (Ground and Air)
1. ADS-C over oceanic and remote areas	June 2018 – Service provider
2. Continental CPDLC	June 2018 – Service provider

7. ASBU B0-40/TBO: Implementation Challenges

Elements	Implementation Area			
	Ground System Implementation	**Avionics Implementation**	**Procedures Availability**	**Operational Approvals**
1. ADS-C over oceanic and remote areas	Funding and limited link service provider and infrastructure	Implementation of ADS-C in general aviation pending	Implementation 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	Implementation of GOLD procedures pending	Lack of duly trained inspectors for approval of operations

8. ASBU B0-40/TBO: Performance Monitoring and Measurement
8A. ASBU B0-40/TBO: Implementation Monitoring

Elements	Performance Indicators / Supporting Metrics
1. ADS-C over oceanic and remote areas	Indicator: Percentage of FIRs with ADS-C implemented Supporting metric: Number of ADS-C approved procedures over oceanic and remote areas
2. Continental CPDLC	Indicator: Percentage of CPDLC implemented 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
Safety	ADS-C based safety nets supports cleared level adherence monitoring, route adherence monitoring, danger area infringement warning and improved search and rescue. Reduced occurrences of misunderstandings; solution to stuck microphone situations. Increased situational awareness

1. AIR NAVIGATION REPORT FORM (ANRF)
Regional and National planning for ASBU Modules

2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-15/RSEQ
Improved Traffic Flow through Runway Sequencing (AMAN/DMAN)

Performance Improvement Area 1: Airport Operations

3. ASBU B0-15/RSEQ: Impact on Main Key Performance Areas (KPA)

	Access & Equity	Capacity	Efficiency	Environment	Safety
Applicable	**N**	**Y**	**Y**	**Y**	**N**

4. ASBU B0-15/RSEQ: Planning Targets and Implementation Progress

5. Elements	6. Targets and Implementation Progress (Ground and Air)
1. AMAN and time-based metering	December 2015
2. Departure management	December 2015
3. Movement Area Capacity Optimization	December 2015

7. ASBU B0-15/RSEQ: Implementation Challenges

Elements	Implementation Area			
	Ground System Implementation	**Avionics Implementation**	**Procedures Availability**	**Operational Approvals**
1. AMAN and time-based metering	Lack of automation system to support synchronization	Nil	Lack of appropriate training. Lack of STARs PBN. Lack of slots assignment	Lack of procedures and inspectors for operational approvals
2. Departure management	Lack of automation system to support synchronization	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 procedures for RWY, TWY & platform capacity calculation. Guidelines for movement area capacity organization.	Lack of procedures and inspectors for operational approvals

8. ASBU B0-15/RSEQ: Performance Monitoring and Measurement
8A. ASBU B0-86/OPFL: Implementation Monitoring

Elements	Performance Indicators / Supporting Metrics
1. AMAN and time-based metering	Indicator: Percentage of international aerodromes with AMAN and time-based metering. Supporting metric: Number of international airports with AMAN and time-based metering.
2. Departure management	Indicator: Percentage of international aerodromes with DMAN. Supporting metric: Number of international airports with DMAN.
3. Movement Area Capacity Optimization	Indicator: Percentage of international aerodromes with Airport-capacity calculated. Supporting metric: Number of international airports with Airport-capacity calculated.

8. ASBU B0-15/RSEQ: Performance Monitoring and Measurement
8B. ASBU B0-15/RSEQ: Performance Monitoring

Key Performance Areas	Metrics (if not , indicate qualitative benefits)
Access & Equity	N/A
Capacity	Improved airport movement area capacity through optimization
Efficiency	Efficiency is positively impacted as reflected by increased runway throughput and arrival rates
Environment	Reduction of carbon emissions
Safety	N/A

1. AIR NAVIGATION REPORT FORM (ANRF)
Regional and National planning for ASBU Modules

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

4. ASBU B0-65/APTA: Planning Targets and Implementation Progress	
5. Elements	**6. Targets and Implementation Progress (Ground and Air)**
1. APV with Baro VNAV	December 2016 – Service Providers and users
2. APV with SBAS	December 2017 – As per AFI-GNSS Strategy. Not Applicable
3. APV with GBAS	December 2018 – Initial implementation at some States (service providers)

7. ASBU B0-65/APTA: Implementation Challenges				
Elements	**Implementation Area**			
	Ground System Implementation	**Avionics Implementation**	**Procedures Availability**	**Operational Approvals**
1. APV with Baro VNAV	NIL ?	Insufficient number of equipped aircraft	Insufficient appropriate training	Lack of appropriate training
2. APV with SBAS	Network Infrastructure. Not Applicable	Cost of aircraft equipage. Not applicable	Limited to certain States which have implemented. Not Applicable	Lack of knowledge and appropriate training. Not applicable
3. APV with GBAS	Lack of cost-benefit analysis. Adverse ionosphere	Insufficient number of equipped aircraft	Insufficient appropriate training	Lack of appropriate training. Evaluation of a real operation requirement

8. ASBU B0-65/APTA: Performance Monitoring and Measurement **8A. ASBU B0-65/APTA: Implementation Monitoring**	
Elements	**Performance Indicators / Supporting Metrics**
1. APV with Baro VNAV	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 SBAS	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 GBAS	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

1. AIR NAVIGATION REPORT FORM (ANRF)
Regional and National planning for ASBU Modules

2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-75/SURF
Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2)

Performance Improvement Area 1: Airport Operations

3. ASBU B0-75/SURF: Impact on Main Key Performance Areas (KPA)

	Access & Equity	Capacity	Efficiency	Environment	Safety
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)
1. Surveillance system for ground surface movement (PSR, SSR, ADS-B or Multilateration	December 2017 Service provider
2. Surveillance system on board (SSR transponder, ADS-B capacity)	December 2017 Service provider
3. Surveillance system for vehicle	December 2017 Service provider
4. Visual aids for navigation	December 2015 Service provider
5. Wildlife strike hazard reduction	December 2015 Aerodrome operator / wildlife committee
6. Display and processing information	December 2017 Service provider

7. ASBU B0-75/SURF: Implementation Challenges

Elements	Implementation Area			
	Ground System Implementation	**Avionics Implementation**	**Procedures Availability**	**Operational Approvals**
1. Surveillance system for ground surface movement (PSR, SSR, ADS-B or Multilateration)	Lack of adequate financial resources	Nil	Lack of procedures and training.	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 procedures and training.	Lack of guidance materials for inspectors. Lack of inspectors
3. Surveillance system for vehicle	Lack of adequate financial resources	Nil	Lack of procedures and training.	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 Wildlife Hazard Management Committee. Conflict between aviation law and state environment laws. Lack of training. Lack of community support	Nil

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 hazard reduction	Indicator: Percentage of reduction of wildlife incursions. Supporting metric: Number of runway incursions due to wildlife strike.
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

1. AIR NAVIGATION REPORT FORM (ANRF)
Regional and National planning for ASBU Modules

2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-80/ACDM
Improved Airport Operations through Airport

Performance Improvement Area 1: Airport Operations

3. ASBU B0-80/ACDM: Impact on Main Key Performance Areas (KPA)

	Access & Equity	Capacity	Efficiency	Environment	Safety
Applicable	**Y**	**Y**	**Y**	**Y**	**Y**

4. ASBU B0-80/ACDM: Planning Targets and Implementation Progress

5. Elements	6. Targets and Implementation Progress (Ground and Air)
1. Airport – CDM	December 2015 – Airport Operator, ANSPs, aircraft operators
2. Aerodrome certification	December 2015 – State CAA
3. Airport planning	December 2017 – Airport Operators
4. Heliport operation	December 2017 – State CAA
5. SMS implementation	December 2014 – Aerodrome Operators
6. Development of regulations and technical guidance material for runway safety	December 2014 – State CAA
7. Development and implementation of runway safety programmes and reduce runway-related accidents and serious incidents to no more than eight per year.	December 2014 – State CAA

7. ASBU B0-80/ACDM: Implementation Challenges

Elements	Implementation Area			
	Ground System Implementation	**Avionics Implementation**	**Procedures Availability**	**Operational Approvals**
1. Airport – CDM	Interconnection of ground systems of different partners for Airport – CDM	Nil	Lack for coordination procedures. Lack of commitment from all stakeholders	Nil
2. Aerodrome certification	Lack of effective implementation of Annex 14 SARPs	Nil	Lack of procedures. Lack of training	Lack of adequately trained inspectors
3. Airport planning	Nil	Nil	Lack of procedures	Lack of adequately trained inspectors
4. Heliport operation	Lack of regulations	Nil	Lack of procedures	Lack of trained inspectors
5. SMS implementation	Nil	Nil	Lack of States regulations. Lack of training	Lack of high level management commitment
6. Development of regulations and technical guidance material for runway safety	Nil	Nil	Lack of States regulations	Lack of high level management commitment
7. Development and implementation of runway safety programmes and reduce runway-related accidents and	Nil	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)

8. ASBU B0-80/ACDM: Performance Monitoring and Measurement 8B. ASBU 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

1. AIR NAVIGATION REPORT FORM (ANRF)
Regional and National planning for ASBU Modules

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	**N**	**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

Elements	Implementation Area			
	Ground System Implementation	**Avionics Implementation**	**Procedures Availability**	**Operational Approvals**
1. Complete AMHS implementation at States still not counting with this item	Nil	Nil	Nil	Nil
2. AMHS interconnection	TPDI negotiations between MTAs	Nil	Nil	Nil
3. Implement AIDC/OLDI at some States automated centres	Nil	Nil	Nil	Nil
4. Implement operational AIDC/OLDI between adjacent ACCs	Compatibility between AIDC or OLDI systems from various manufacturers	Nil	Nil	Nil
5. Implement the AFI Comn regional network	Nil	Nil	Nil	Nil

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

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

	Supporting metric: Number of AIDC interconnections implemented, as per ***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
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

1. AIR NAVIGATION REPORT FORM (ANRF)
Regional and National planning for ASBU Modules

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

3. ASBU B0-105/AMET: Impact on Main Key Performance Areas (KPA)

	Access & Equity	Capacity	Efficiency	Environment	Safety
Applicable	**Y**	**YY**	**Y**	**Y**	**Y**

4. ASBU B0-105/AMET: Planning Targets and Implementation Progress

5. Elements	6. Targets and Implementation Progress (Ground and Air)
1. WAFS	In process of improvement
2. IAVW	In process of improvement
3. Tropical cyclone watch	In process of improvement
4. Aerodrome warnings	In process of improvement
5. Wind shear warnings and alerts	MET provider services / 2015
6. SIGMET	MET provider services / 2015
7. QMS/MET	MET provider services / 2018
8. 8. Other OPMET Information (METAR, SPECI, TAF)	In process of improvement

7. ASBU B0-105/AMET: Implementation Challenges

Elements	Implementation Area			
	Ground System Implementation	**Avionics Implementation**	**Procedures Availability**	**Operational Approvals**
1. WAFS	Connection to the AFS satellite and public internet distribution systems	Nil	Prepare a contingency plan in case of public internet failure	N/A
2. IAVW	Connection to the AFS satellite and public internet distribution systems	Nil	Prepare a contingency plan in case of public internet failure	N/A
3. Tropical cyclone watch	Connection to the AFS satellite and public internet distribution systems	Nil	Prepare a contingency plan in case of public internet failure	N/A
4. Aerodrome warnings	Connection to the AFTN	Nil	Local arrangements for reception of aerodrome warnings	N/A
5. Wind shear warnings and alerts	Connection to the AFTN	Nil	Local arrangements for reception of aerodrome warnings	N/A
6. SIGMET	Connection to the AFTN	Nil	Prepare a contingency plan in case of AFTN systems failure	N/A
7. QMS/MET	Nil	Commitment of top management	N/A	N/A
8. 8. Other OPMET Information (METAR, SPECI, TAF)	Connection to the AFTN	Nil	Prepare a contingency plan in case of AFTN systems failure	N/A

8. ASBU B0-105/AMET: Performance Monitoring and Measurement
8A. ASBU B0-105/AMET: Implementation Monitoring

Elements	Performance Indicators / Supporting Metrics
1. WAFS	Indicator: Percentage of States implementation of WAFS internet File Service (WIFS)

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

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

2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-30/DATM
Service Improvement through Digital Aeronautical Information Management

Performance Improvement Area 2: Global Interoperable Systems and Data – Through Globally Interoperable System-Wide Information Management

3. ASBU B0-30/DATM: Impact on Main Key Performance Areas (KPA)

	Access & Equity	Capacity	Efficiency	Environment	Safety
Applicable	**N**	**N**	**N**	**Y**	**Y**

4. ASBU B0-30/DATM: Planning Targets and Implementation Progress

5. Elements	6. Targets and Implementation Progress (Ground and Air)
1. QMS for AIM	December 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

Elements	Implementation Area			
	Ground System Implementation	**Avionics Implementation**	**Procedures Availability**	**Operational Approvals**
1. QMS for AIM 2. e-TOD implementation 3. WGS-84 implementation 4. AIXM implementation 5. e-AIP implementation 6. Digital NOTAM	Lack of electronic database. Lack of electronic access based on internet protocol services	Nil	Lack of procedures to allow airlines provide digital AIS data to on-board devices, in particular electronic flight bags (EFBs). Lack of training for AIS/AIM personnel.	Nil

8. ASBU B0-30/DATM: Performance Monitoring and Measurement
8A. ASBU B0-30/DATM: Implementation Monitoring

Elements	Performance Indicators / Supporting Metrics
1. QMS for AIM	Indicator: Percentage of States QMS certified Supporting metric: Number of States QMS certification
2. e-TOD implementation	Indicator: Percentage of States e-TOD implemented Supporting metric: Number of States with e-TOD implemented
3. WGS-84 implementation	Indicator: Percentage of 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
6. Digital NOTAM	Indicator: Percentage of States with Digital NOTAM implemented Supporting metric: Number of States with Digital NOTAM implemented

8. ASBU B0-30/DATM: Performance Monitoring and Measurement
8B. ASBU B0-30/DATM: Performance Monitoring

Key Performance Areas	Metrics (if not, indicate qualitative benefits)
Access & Equity	N/A
Capacity	N/A
Efficiency	Support Instrument procedure design implementation; Support aeronautical chart production and on-board databases; Support the implementation of PBN
Environment	Reduced amount of paper for promulgation of information

Safety	Reduction in the number of possible inconsistencies

1. AIR NAVIGATION REPORT FORM (ANRF)
Regional and National planning for ASBU Modules

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

4. ASBU B0-10/FRTO: Planning Targets and Implementation Progress	
5. Elements	**6. Targets and Implementation Progress (Ground and Air)**
1. Airspace planning	December 2018
2. Flexible use of airspace	December 2016
3. Flexible routing	December 2018

7. ASBU B0-10/FRTO: Implementation Challenges				
Elements	**Implementation Area**			
	Ground System Implementation	**Avionics Implementation**	**Procedures Availability**	**Operational Approvals**
1. Airspace planning	Lack of organized and managed airspace prior to the time of flight. Lack of AIDC WGS-84 Survey	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	Insufficient number of equipped aircraft / Lack of FANS 1/A. lack of ACARS	Lack of LOAs and procedures	Poor percentage of fleet approvals

8. ASBU B0-10/FRTO: Performance Monitoring and Measurement 8A. ASBU B0-10/FRTO: Implementation Monitoring	
Elements	**Performance Indicators / Supporting Metrics**
1. Airspace planning	Not assigned Indicator and metrics
2. Flexible use of airspace	Indicator: Percentage of time segregated airspaces are available for civil operations in the State Supporting metric: Reduction of delays in time of civil flights
3. Flexible routing	Indicator: Percentage of PBN routes implemented Supporting metric: KG of Fuel savings Supporting metric: Tons of CO2 reduction

8. ASBU B0-10/FRTO: Performance Monitoring and Measurement 8B. ASBU B0-10/FRTO: Performance Monitoring	
Key Performance Areas	**Metrics (if not , indicate qualitative benefits)**
Access & Equity	Better access to airspace by a reduction of the permanently segregated volumes of airspace

Capacity	Flexible routing reduces potential congestion on trunk routes and at busy crossing points. The flexible use of airspace gives greater possibilities to separate flights horizontally. PBN helps to reduce route spacing and aircraft separations.
Efficiency	In particular the module will 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

1. AIR NAVIGATION REPORT FORM (ANRF)
Regional and National planning for ASBU Modules

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: Impact on Main Key Performance Areas (KPA)

	Access & Equity	Capacity	Efficiency	Environment	Safety
Applicable	**Y**	**Y**	**Y**	**Y**	**Y**

4. ASBU B0-35/NOPS: Planning Targets and Implementation Progress

5. Elements	6. Targets and Implementation Progress (Ground and Air)
1. Air Traffic Flow Management	December 2015

7. ASBU B0-35/NOPS: Implementation Challenges

Elements	Implementation Area			
	Ground System Implementation	Avionics Implementation	Procedures Availability	Operational Approvals
1. Air Traffic Flow Management	Lack for system software for ATFM. Lack of ATFM units implemented. Funding	Nil	Lack of ATFM and CDM procedures. Lack of training	….

8. ASBU B0-35/NOPS: Performance Monitoring and Measurement
8A. ASBU B0-35/NOPS: Implementation Monitoring

Elements	Performance Indicators / Supporting Metrics
1. Air Traffic Flow Management	Indicator: Percentage of implemented FMUs Supporting metric: Number of States with ATFM units implemented

8. ASBU B0-35/NOPS: Performance Monitoring and Measurement
8B. ASBU B0-35/NOPS: Performance Monitoring

Key Performance Areas	Metrics (if not, indicate qualitative benefits)
Access & Equity	Improved access and equity in the use of airspace or aerodrome by avoiding disruption of air traffic. ATFM processes take care of equitable distribution of delays
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 a period of time.
Efficiency	Reduced fuel burn due to better anticipation of flow issues; Reduced block times and times with engines on
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	Reduced occurrences of undesired sector overloads

1. AIR NAVIGATION REPORT FORM (ANRF)
Regional and National planning for ASBU Modules

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

4. ASBU B0-101/ACAS: Planning Targets and Implementation Progress	
5. Elements	**6. Targets and Implementation Progress (Ground and Air)**
1. ACAS II (TCAS Version 7.1)	2013-2018

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

8. ASBU B0-101/ACAS: Performance Monitoring and Measurement **8A. ASBU B0-101/ACAS: Implementation Monitoring**	
Elements	**Performance Indicators / Supporting Metrics**
1. ACAS II (TCAS Version 7.1)	Indicator: Percentage of aircrafts that are equipped Supporting metric: Reduction in number of RA incidents

8. ASBU B0-101/ACAS: Performance Monitoring and Measurement **8B. ASBU B0-101/ACAS: Performance Monitoring**	
Key Performance Areas	**Metrics (if not, indicate qualitative benefits)**
Access & Equity	N/A
Capacity	ACAS improvement will reduce unnecessary resolution advisory (RA) and then reduce trajectory deviations
Efficiency	N/A
Environment	N/A
Safety	Reduced number of potential AIR-PROX. ACAS increases safety in the case of breakdown of separation

1. AIR NAVIGATION REPORT FORM (ANRF)
Regional and National planning for ASBU Modules

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. ASBU B0-84/ASUR: Impact on Main Key Performance Areas (KPA)

	Access & Equity	Capacity	Efficiency	Environment	Safety
Applicable	**N**	**Y**	**N**	**N**	**Y**

4. ASBU B0-84/ASUR: Planning Targets and Implementation Progress

5. Elements	6. Targets and Implementation Progress (Ground and Air)
1. Implementation of ADS-B	June 2018 – Users and service provider
2. Implementation of Multilateration	June 2018 – Users and service provider
3. Automation system (Presentation)	June 2017 – Users and service provider

7. ASBU B0-84/ASUR: Implementation Challenges

Elements	Implementation Area			
	Ground System Implementation	**Avionics Implementation**	**Procedures Availability**	**Operational Approvals**
1. Implementation of ADS-B	Lack of ADS-B systems implementation due to recent implementation of conventional surveillance systems	Lack of ADS-B implementation in general aviation, and old commercial fleet	Lack of procedures	Lack of inspector s with appropriate capability
2. Implementation of Multilateration	Facilities of remote stations. Establishment of communications networks	Nil	Nil	Lack of inspector s with appropriate capability
3. Automation system (Presentation)	Lack of any automation functionality	Nil	Nil	Nil

8. ASBU B0-84/ASUR: Performance Monitoring and Measurement
8A. ASBU B0-84/ASUR: Implementation Monitoring

Elements	Performance Indicators / Supporting Metrics
1. Implementation of ADS-B	Indicator: Percentage of international aerodromes with ADS-B implemented Supporting metric: Number of ADS-B implemented
2. Implementation of Multilateration	Indicator: Percentage of Multilateration system implemented Supporting metric: Number of Multilateration system implemented
3. Automation system (Presentation)	Indicator: Percentage of ATS units with automation system implemented Supporting metric: Number of automation system implemented in ATS units

8. ASBU B0-84/ASUR: Performance Monitoring and Measurement
8B. ASBU B0-84/ASUR: Performance Monitoring

Key Performance Areas	Metrics (if not, indicate qualitative benefits)
Access & Equity	N/A
Capacity	Typical separation minima are 3 NM or 5 NM enabling an increase in traffic density compared to procedural minima. TMA surveillance performance improvements are achieved through high accuracy, better velocity vector and improved coverage.
Efficiency	N/A
Environment	N/A
Safety	Reduction of the number of major incidents. Support to search and rescue

1. AIR NAVIGATION REPORT FORM (ANRF)
Regional and National planning for ASBU Modules

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

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

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 (STCA)	June 2014 / Service provider 2013-2018
2. Area Proximity Warning (APW)	June 2014 / Service provider 2013-2018
3. Minimum Safe Altitude Warning (MSAW)	June 2014
4. Dangerous Area Infringement Warning (DAIW)	2013-2018

7. ASBU B0-102/SNET: Implementation Challenges

Elements	Implementation Area			
	Ground System Implementation	**Avionics Implementation**	**Procedures Availability**	**Operational Approvals**
1. Short Term Conflict Alert (STCA)	Nil Funding	Nil	Nil	Nil
2. Area Proximity Warning (APW)	Nil Funding	Nil	Nil	Nil
3. Minimum Safe Altitude Warning (MSAW)	Nil Funding	Nil	Nil	Nil
4. Dangerous Area Infringement Warning (DAIW)	Funding			

8. ASBU B0-102/SNET: Performance Monitoring and Measurement
8A. ASBU B0-102/SNET: Implementation Monitoring

Elements	Performance Indicators / Supporting Metrics
1. Short Term Conflict Alert (STCA)	Indicator: Percentage of ATS units with ground-based safety nets (STCA) implemented Supporting metric: Number of safety net (STCA) implemented
2. Area Proximity Warning (APW)	Indicator: Percentage of ATS units with ground-based safety nets (APW)implemented Supporting metric: Number of safety net (APW)implemented
3. Minimum Safe Altitude Warning (MSAW)	Indicator: Percentage of ATS units with ground-based safety nets (MSAW) implemented Supporting metric: Number of safety net (MSAW) implemented
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

8. ASBU B0-102/SNET: Performance Monitoring and Measurement
8B. ASBU B0-102/SNET CAS: Performance Monitoring

Key Performance Areas	Metrics (if not, indicate qualitative benefits)
Access & Equity	N/A
Capacity	N/A
Efficiency	N/A
Environment	N/A
Safety	Significant reduction of the number of major incidents

1. AIR NAVIGATION REPORT FORM (ANRF)
Regional and National planning for ASBU Modules

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**	**N**	**Y**	**N**	**NY**

4. ASBU B0-05/CDO: Planning Targets and Implementation Progress

5. Elements	6. Targets and Implementation Progress (Ground and Air)
1. CDO implementation	December 2017
2. PBN STARs implementation	December 2017

7. ASBU B0-05/CDO: Implementation Challenges

Elements	Implementation Area			
	Ground System Implementation	Avionics Implementation	Procedures Availability	Operational Approvals
1. 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	Airspace Design	Nil	LOAs and Training	

8. ASBU B0-05/CDO: Performance Monitoring and Measurement
8A. ASBU B0-05/CDO: Implementation Monitoring

Elements	Performance Indicators / Supporting Metrics
1. CDO implementation	Indicator: Percentage of international aerodromes/TMAs with CDO implemented Supporting metric: Number of international aerodromes/TMAs with CDO implemented
2. PBN STARs implementation	Indicator: Percentage of international aerodromes with PBN STARs implementation Supporting metric: Number of international airport with PBN STARs implementation

8. ASBU B0-05/CDO: Performance Monitoring and Measurement
8B. ASBU B0-05/CDO: Performance Monitoring

Key Performance Areas	Metrics (if not , indicate qualitative benefits)
Access & Equity	N/A
Capacity	Increased Terminal Airspace Capacity N/A
Efficiency	Cost savings through reduced fuel burn. Reduction in the number of required radio transmissions.
Environment	Reduced emissions as a result of reduced fuel burn.
Safety	More consistent flight paths and stabilized approach. Reduction in the number of incidence of controlled flight into terrain (CFIT)

1. AIR NAVIGATION REPORT FORM (ANRF)
Regional and National planning for ASBU Modules

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 & Equity	Capacity	Efficiency	Environment	Safety
Applicable	**Y**	**NY**	**Y**	**NY**	**NY**

4. ASBU B0-20/CCO: Planning Targets and Implementation Progress

5. Elements	6. Targets and Implementation Progress (Ground and Air)
1. CCO implementation	December 2017
2. PBN SIDs implementation	December 2017

7. ASBU B0-20/CCO: Implementation Challenges

Elements	Implementation Area			
	Ground System Implementation	**Avionics Implementation**	**Procedures Availability**	**Operational Approvals**
1. CCO implementation	Nil	Nil		In accordance with applicable requirements
2. PBN SIDs implementation	Airspace Design	Nil		Approvals of procedures

8. ASBU B0-20/CCO: Performance Monitoring and Measurement
8A. ASBU B0-20/CCO: Implementation Monitoring

Elements	Performance Indicators / Supporting Metrics
1. CCO implementation	Indicator: Percentage of international aerodromes with CCO implemented Supporting metric: Number of international airports with CCO implemented
2. PBN SIDs implementation	Indicator: Percentage of international aerodromes with PBN SIDs implemented Supporting metric: Number of international airports with PBN SIDs implemented

8. ASBU B0-20/CCO: Performance Monitoring and Measurement
8B. ASBU B0-20/CCO: Performance Monitoring

Key Performance Areas	Metrics (if not , indicate qualitative benefits)
Access & Equity	…
Capacity	Increased Terminal Airspace Capacity
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.

1. AIR NAVIGATION REPORT FORM (ANRF)
Regional and National planning for ASBU Modules

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 & Equity	**Capacity**	**Efficiency**	**Environment**	**Safety**
Applicable	**N**	**Y**	**Y**	**Y**	**Y**

4. ASBU B0-40/TBO: Planning Targets and Implementation Progress	
5. Elements	**6. Targets and Implementation Progress (Ground and Air)**
1. ADS-C over oceanic and remote areas	June 2018 – Service provider
2. Continental CPDLC	June 2018 – Service provider

7. ASBU B0-40/TBO: Implementation Challenges				
Elements	**Implementation Area**			
	Ground System Implementation	**Avionics Implementation**	**Procedures Availability**	**Operational Approvals**
1. ADS-C over oceanic and remote areas	Funding and limited link service provider and infrastructure	Implementation of ADS-C in general aviation pending	Implementation 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	Implementation of GOLD procedures pending	Lack of duly trained inspectors for approval of operations

8. ASBU B0-40/TBO: Performance Monitoring and Measurement **8A. ASBU B0-40/TBO: Implementation Monitoring**	
Elements	**Performance Indicators / Supporting Metrics**
1. ADS-C over oceanic and remote areas	Indicator: Percentage of FIRs with ADS-C implemented Supporting metric: Number of ADS-C approved procedures over oceanic and remote areas
2. Continental CPDLC	Indicator: Percentage of CPDLC implemented 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
Safety	ADS-C based safety nets supports cleared level adherence monitoring, route adherence monitoring, danger area infringement warning and improved search and rescue. Reduced occurrences of misunderstandings; solution to stuck microphone situations. Increased situational awareness

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.

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 en-route 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 CO_2 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:

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.