International Civil Aviation Organization

AIR NAVIGATION SYSTEMS IMPLEMENTATION GROUP

First Meeting (ANSIG/1)
(Cairo, Egypt, 10 – 12 February 2015)

Agenda Item 3:   Air Navigation Global and Regional Developments

DEVELOPMENTS RELATED TO AIR NAVIGATION CAPACITY AND EFFICIENCY
IN OTHER ICAO REGIONS

(Presented by the Secretariat)

SUMMARY
This paper presents the experience of the different ICAO Regions with regard to ASBU implementation. Action by the meeting is at paragraph 3.

1.   INTRODUCTION

1.1   States and planning and implementation regional groups (PIRGs) are transitioning to a performance-based approach to support their air navigation infrastructure planning. The ASBU implementation requires harmonization and inter-regional coordination.

2.   DISCUSSION

2.1   **Asia and Pacific (APAC) Region:**

a) Development of an Asia Pacific Regional ATFM Framework, including the implementation of a sub-regional ATFM/CDM capability in busy city pairs in Northeast Asia, Southeast Asia and Bay of Bengal areas.

b) Development and implementation of the on-line Seamless ATM Reporting and Monitoring process. An internal review of the Seamless ATM Plan is due in 2015 to take into account reporting outcomes and planning for ASBU Block 1 with the Seamless ATM Plan due for update in 2016.

c) Development of the Common Regional VPN (CRV) concept of operations, cost benefit analysis and a framework agreement for collectively funding the assistance to the procurement of network services. CRV will support air navigation services within the Asia/Pacific Region to facilitate the implementation of B0-NOPS (network operations), B0-FICE, VoIP (voice over IP) and to enable SWIM (System Wide Information Management).

d) ADS-B implementation in South China Sea and Bay of Bengal areas in order to increase capacity and improve efficiency.

    e) The Asia Pacific Flight Procedure Programme (FPP) conducted trainings/workshops on airspace design and flight procedures design to support States for effective implementation of PBN and validated PBN procedures in States.

    f) The performance indicators, metrics and targets are shown in **Appendix A**

2.2   **Eastern and Southern African (ESAF)**

    a) Establishment of the AFI Flight Procedure Programme.

    b) Implementation of 107 PBN-based efficient ATS route trajectories to increase the existing PBN based ATS route structure by 124%. The new trajectories will be submitted to the President of the Council in the first quarter of 2015 for approval and integration in the AFI Air Navigation Plan.

    c) Coordination of a new framework of cooperation to be signed by 14 States participating in the NAFISAT Network, IATA and ATNS of South Africa.

    d) The performance indicators, metrics and targets are shown in **Appendix B**

2.3   **European and North Atlantic EUR/NAT**

    a) implementation of new concepts (e.g. Free Route Airspace, User Preferred Flight Profiles), functional airspace blocks (FABs), PBN/CDO and CCO;

    b) Start of the Regional Performance Framework implementation plan in the EUR Region, as defined in the EUR Doc 030 (agreed indicators/metrics in order to measure performance in the 6 defined key performance areas, in line with the European Commission Performance Regulation);

    c) The performance indicators, metrics and targets are shown in **Appendix C**

2.4   **North American, Central American and Caribbean (NACC)**

    a. Update of regional plans on Performance-Based Navigation (PBN), Air traffic services inter-facility data communication(AIDC), Aeronautical message handling system (AMHS), Controller-Pilot Data Link Communication (CPDLC) and Aeronautical Information Management (AIM);

    b. Adoption of the North American (NAM) Interface Control Document (ICD) as the preferred AIDC ICD in the CAR Region;

    c. Regional agreement for Automatic dependent surveillance – broadcast (ADS-B) out implementation in the NAM/CAR Regions by 31 December 2018;

    d. Adoption of the Global Operational Data Link Document (GOLD) document, version 2 for datalink applications in the NAM/CAR Regions;

    e. Agreement on IPV4 Addressing Scheme, Ver. 1.0 for the implementation of the Aeronautical Telecommunication Network (ATN);

    f. The performance indicators, metrics and targets are shown in **Appendix D.**

2.5   **South American (SAM) Office**

    a. 12 ATS Routes optimized applying Flexible Use of Airspace (FUA) concept;

    b. 20% of improvement in QMS implementation in AIM;

    c. 42% of SAM States with e-TOD implementation Area 3 and 4 in major Airports completed;

    d. 21% States with Service Level Agreement implemented with data originators;

    e. The REDDIG II physical installation was successfully completed;

    f. A SAM Regional RAIM Prediction Availability Service was successfully implemented; and

    g. The performance indicators, metrics and targets are shown in **Appendix E.**

3.   ACTION BY THE MEETING

3.1   The meeting is invited to review the information contained in this paper and take into consideration, the experience of the other ICAO Regions in the implementation of the ASBU Modules.

APPENDIX A to the Report on Agenda Item 3.0

APANPIRG Regional Priorities, Targets and Metrics

Priority	ASBU module or SeamlessElement	Targets	Target date (Seamless ATM Phase 1 Plan)	Metric
PBN	B0-APTA	1. <u>Approach</u>: Where practicable, **all high- density aerodromes** with instrument runways serving aeroplanes should have precision approaches or APV or LNAV. *Note 1: High density aerodrome is defined by Asia-Pacific Seamless ATM Plan as aerodromes with scheduled operations in excess of 100,000/year.* *Note 2: the Asia/Pacific PBN Plan Version 3 required RNP APCH with Baro-VNAV or APV in 100% of instrument runways by 2016*	12 November 2015	% of **high density aerodromes** with precision approaches or APV or LNAV.
Network Operations	B0-NOPS	2. **All High Density FIRs** supporting the busiest Asia/Pacific traffic flows and high-density aerodromes should implement ATFM incorporating CDM using operational ATFM platform/s. *Note: **High Density FIRs are defined as:*** *a) South Asia: Delhi, Mumbai;* *b) Southeast Asia: Bangkok, Hanoi, Ho Chi Minh, Jakarta, Kota Kinabalu, Manila, Sanya, Singapore, Vientiane; and* *c) East Asia: Beijing, Fukuoka, Guangzhou, Hong Kong, Kunming, Incheon, Shanghai, Shenyang, Taibei, Wuhan.* [APANPIRG Conclusion 22/8 and 23/5 refer]	12 November 2015	% of **High Density FIRs** supporting the busiest Asia/Pacific traffic flows and high density aerodromes using operational ATFM platforms incorporating CDM
Aeronautical Information Management	B0-DATM	3. ATM systems should be supported by digitally-based AIM systems through implementation of **Phase 1 and 2 of the AIS-AIM Roadmap**	12 November 2015	% of Phase 1 and 2 AIS-AIM elements completed

Flight and Flow Information for a Collaborative Environment (FF-ICE)	B0-FICE	4. All States between ATC units where transfers of control are conducted have implemented the messages ABI, EST, ACP, TOC, AOC as far as practicable.	12 November 2015	% of FIRs within which all applicable ACCs have implemented at least one interface to use AIDC / OLDI with neighbouring ACCs
Civil/Military	B0-FRTO	5. Enhanced En-Route Trajectories: All States should ensure that SUA are regularly reviewed by the appropriate Airspace Authority to assess the effect on civil air traffic and the activities affecting the airspace.	12 November 2015	% of States in which FUA is implemented
Civil/Military	Strategic Civil Military coordination (Regional)	6. Enhanced En-Route Trajectories: All States should ensure that a national civil/military body coordinating strategic civil-military activities is established.	12 November 2015	% of States which have established a national civil/military body that performs strategic civil-military coordination
Civil/Military	Tactical Civil Military coordination (Regional)	7. Enhanced En-Route Trajectories: All States should ensure that formal civil military liaison for tactical response is established.	12 November 2015	% of States which have established a formal civil military liaison for tactical response
Ground Surveillance	B0-ASUR	8. All Category S upper controlled airspace and Category T airspace supporting high density aerodromes should be designated as non-exclusive or exclusive as appropriate ADS-B airspace requiring operation of ADS-B.	12 November 2015	% of FIRs where Category S airspace and Category T airspace supporting high density aerodromes are designated as ADS-B airspace
Ground Surveillance	B0-ASUR	9. ADS-B or MLAT or radar surveillance systems should be used to provide coverage of all Category S-capable airspace as far as practicable, with data integrated into operational ATC aircraft situation displays.	12 November 2015	% of ACCs with ATS Surveillance using ADS-B, MLAT or radar in Category S airspace, and having data integrated into the ATC system situation display

Trajectory-Based Operations-Data Link En-Route	B0-TBO	10. Within Category R airspace, ADS-C surveillance and CPDLC should be enabled to support PBN-based separations.	12 November 2015	% of FIRs using data link applications to support PBN-based separations in Category R airspace

Note 1: **high density aerodromes:** based on 2012 ICAO data, as per Seamless Plan v1.0, the 21 busiest Asia/Pacific aerodromes were:
- Australia (Sydney, Melbourne);
- China (Beijing, Shanghai Pudong and Hong Jiao, Guangzhou, Hong Kong, Xi'an, Shenzhen, Chengdu, Kunming);
- India (New Delhi, Mumbai);
- Indonesia (Jakarta);
- Japan (Haneda, Narita);
- Malaysia (Kuala Lumpur);
- Philippines (Manila);
- Republic of Korea (Incheon);
- Singapore (Changi); and
- Thailand (Suvarnabhumi).

ICAO definition for Aerodrome traffic density included in Annex 14 is:
c) Heavy. Where the number of movements in the mean busy hour is of the order of 26 or more per runway or typically more than 35 total aerodrome movements.
Note 1.— The number of movements in the mean busy hour is the arithmetic mean over the year of the number of movements in the daily busiest hour.
Note 2.— Either a take-off or a landing constitutes a movement.

Responsibility matrix for ASBU modules and corresponding Seamless items

Seamless ATM Specification title	Seamless Reference	Regional Priority	ASBU Module	ASBU - Module title	Endorsing body
Airport Collaborative Decision-Making (ACDM)	70	2	B0-ACDM	Improved Airport Operations through Airport-CDM	ATM SG
Air Traffic Flow Management/Collaborative Decision-Making (ATFM/CDM)	80	1	B0-NOPS	Improved Flow Performance through Planning based on a Network-Wide view	ATM SG
Arrival Manager/Departure Management (AMAN/DMAN)	50	2	B0-RSEQ	Improve Traffic flow through Sequencing (AMAN/DMAN)	ATM SG
Aeronautical Information Management	300	1	B0-DATM	Service Improvement through Digital Aeronautical Information Management	ATM SG
Civil Military use of SUA	360	1	B0-FRTO	Improved Operations through Enhanced En-Route Trajectories	ATM SG
Continuous Descent Operations (CDO)	90	2	B0-CDO	Improved Flexibility and Efficiency in Descent Profiles using Continuous Descent Operations (CDOs)	CNS SG
Continuous Climb Operations (CCO)	100	2	B0-CCO	Improved Flexibility and Efficiency Departure Profiles – Continuous Climb Operations (CCO)	CNS SG
Performance-based Navigation (PBN) Routes	140	2	B0-FRTO	Improved Operations through Enhanced En-Route Trajectories	CNS SG
ATM systems enabling optimal PBN/ATC operations	250	2	B0-APTA	Optimization of Approach Procedures including vertical guidance	CNS SG
UPR and DARP	290	3	B0-FRTO	Improved Safety and Efficiency through the initial application of Data Link En-Route	ATM SG
Nil	440	3	B0-WAKE	Improved Access to Optimum Flight Levels through Climb/Descent Procedures using ADS-B	ATM SG
Nil	450	3	B0-OPFL	Increased Runway Throughput through Optimized Wake Turbulence Separation	ATM SG
Performance-based Navigation (PBN) Approach	110	1	B0-APTA	Optimization of Approach Procedures including vertical guidance	CNS SG
ATS Surveillance	180	1	B0-ASUR	Initial Capability for Ground Surveillance	CNS SG
ATS Inter-facility Data-link Communications (AIDC)	220	1	B0-FICE	Increased Interoperability Efficiency & Capacity through Ground-Ground Integration	CNS SG

ATS surveillance with data integrated	270	1	B0-ASUR	Initial Capability for Ground Surveillance	**CNS SG**
ADS-C and CPDLC	280	1	B0-TBO	Improved Safety and Efficiency through the initial application of Data Link En-Route	**CNS SG**
Standard Instrument Departures/Standard Terminal Arrivals (SID/STAR)	120	2	B0-CCO B0-CDO	Optimization of Approach Procedures including vertical guidance	**CNS SG**
Safety Nets	160	2	B0-SNET	Increased effectiveness of ground-based safety nets	**CNS SG**
Airborne Safety Systems	170	2	B0-ACAS	Airborne Collision Avoidance Systems (ACAS) Improvements	**CNS SG**
Nil	430	2	B0-ASEP	Air Traffic Situational Awareness (ATSA)	**CNS SG**
Safety and Efficiency of Surface Operations	40	3	B0-SURF	Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2)	**CNS SG**
Meteorological Information	310	2	B0-AMET	Meteorological information supporting enhanced operational efficiency and safety	**MET SG**

APPENDIX B

Air Navigation Capacity and Efficiency: ANS Indicators adopted by the AFI Plan Steering Committee (October 2014)

Objective	Performance indicators/Metrics (Targets to be established by APIRG/20)
1. Implement Performance Based Navigation (PBN) ASBU Module B0-APTA	• Number of PBN routes • Number of International Aerodromes/TMAs with PBN SIDs implemented • Number of International Aerodromes/TMAs with PBN STARs implemented • Number of International Aerodromes with Approach Procedures with vertical guidance (APV) • Number of International Aerodromes with Approach Procedures with lateral guidance (LNAV)
2. Implement Continuous Descent Operations (CDO) and Continuous Climb Operations (CCO) ASBU Modules B0-CDO and CCO	• Number of International Aerodromes/TMA with CDO implemented • Number of International Aerodromes/TMAs with CCO implemented • Annual environmental benefits attained (reduced fuel consumption/GHG emissions)
3. Reduce Aircraft Proximity incidents (AIRPROX) due to ANS deficiencies	• Number of Aircraft Proximity incidents (AIRPROX) due to ANS • Number of ACAS Resolution Advisory (RA) events due to ATS deficiencies • Number of States with training programmes for ANS personnel implemented on yearly basis
4. Reduce risk of accidents related to ATM safety	• Number of accidents related to ATM safety
5. Implement Digital ATS Coordination/Transfer ASBU Module B0-FICE	• Number of FIRs within which all applicable ACCs have implemented at least one interface to use ATS Inter-facility Data Communications (AIDC) with neighboring ACCs • Number of reported incidents related to lack of coordination between ACCs
6. Establish effective and operational SAR Organization.	• Number of States with SAR Organization • Number of States with SAR Plans • Number of States with SAR Agreements
7. Implement en route Data Link Applications ASBU Module B0-TBO	• Number of FIRs having implemented Data Link (ADS-C/CPDLC, ADS-B) for en-route operations
8. Implement Aeronautical Information Management (AIM) Quality Management System (QMS)	• Number of States with AIM QMS implemented

Objective	Performance indicators/Metrics (Targets to be established by APIRG/20)
ASBU Module B0-DATM	
9. Implement Aeronautical Meteorology (MET) Quality Management System (QMS) ASBU Module B0-AMET	• Number of States with MET QMS implemented • Number of incidents/accidents with MET conditions as a sole or contributory factor

ASBU Modules – Planning Targets and Implementation Progress (APIRG/19)

ASBU B0-APTA: Planning Targets and Implementation Progress

Elements	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.
3. APV with GBAS	December 2018 – Initial implementation at some States (service providers)

ASBU B0-ASUR: Planning Targets and Implementation Progress

Elements	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

ASBU B0-SURF: Planning Targets and Implementation Progress

Elements	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

ASBU B0-ACAS: Planning Targets and Implementation Progress

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

ASBU B0-FICE: Planning Targets and Implementation Progress

Elements	Targets and Implementation Progress (Ground and Air)
1. Complete AMHS implementation at States still not counting with this system	December 2015 – Services provider
2. AMHS interconnection	December 2015 – Services provider
3. Implement AIDC/OLDI at some States automated centres	June 2014 – Services provider
4. Implement operational AIDC/OLDI between adjacent ACCs	June 2015 – Services provider
5. Implement the AFI Integrated Telecommunication Network	June2015– Services provider

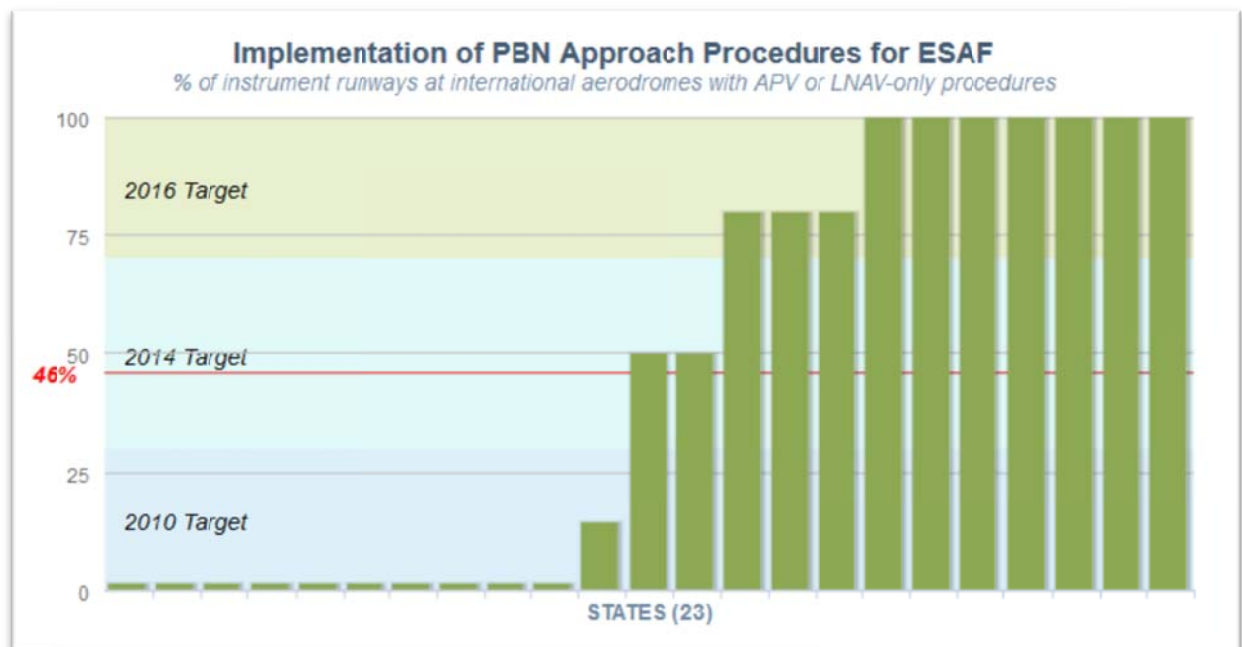### ASBU B0-SNET: Planning Targets and Implementation Progress

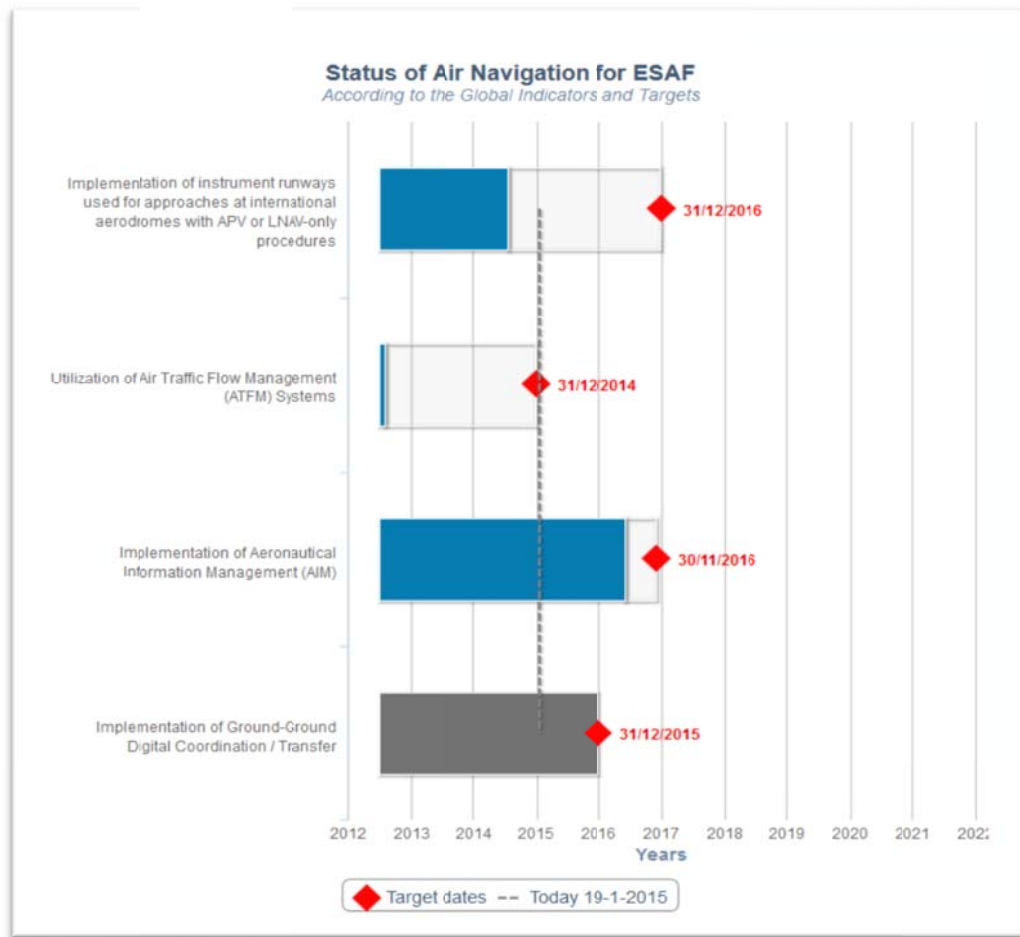| Elements	Targets and Implementation Progress (Ground and Air)
1. Short Term Conflict Alert (STCA)	June 2014 / Service provider 2013-2018
2. Area Proximity Warning (APW)	June 2014 / Service provider 2013-2018
3. Minimum Safe Altitude Warning (MSAW)	June 2014
4. Dangerous Area Infringement Warning (DAIW)	2013-2018

ASBU B0-AMET: Planning Targets and Implementation Progress

Elements	Targets and Implementation Progress (Ground and Air)
1. WAFS	In process of implementation
2. IAVW	In process of implementation
3. Tropical cyclone watch	In process of implementation
4. Aerodrome warnings	In process of implementation
5. Wind shear warnings and alerts	50% by December 2014
6. SIGMET	80% by December 2014
7. QMS/MET	75% by December 2014
8. Other OPMET Information (METAR, SPECI, TAF)	In process of improvement

ASBU B0-DATM: Planning Targets and Implementation Progress

Elements	Targets and Implementation Progress (Ground and Air)
1. QMS for AIM	December 2014
2. e-TOD implementation	December 2016
3. WGS-84 implementation	Implemented
4. AIXM implementation	December 2016
5. e-AIP implementation	December 2014
6. Digital NOTAM	December 2017

Results:

Implementation of PBN Approach Procedures for ESAF
% of instrument runways at international aerodromes with APV or LNAV-only procedures

Status of Air Navigation for ESAF
According to the Global Indicators and Targets

- END -

APPENDIX C

a) Capacity and efficiency targets;

EUR Region

Module Code	Module Title	Applicability Area	Indicator[1]	Target
B0-APTA	Optimization of Approach Procedures including vertical guidance	EUR	% of international aerodromes having at least one instrument runway provided with APV with Baro VNAV procedure implemented	100% in 2018 for applicable aerodromes.
B0-SURF	Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2)	Selected Aerodromes (list to be established in coordination with AU and ANSPs)	% of applicable international aerodromes having implemented A-SMGCS Level 2	100% in 2018 for applicable aerodromes.
B0-FICE	Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration	EUR – AIDC/OLDI	% of FIRs within which all applicable ACCs have implemented at least one interface to use AIDC / OLDI with neighbouring ACCs	100% of FIRs within which all applicable ACCs have implemented AIDC or OLDI by 2015
B0-DATM	Service Improvement through Digital Aeronautical Information Management	EUR	- % States having implemented an integrated aeronautical information database - % States having implemented QMS	- 100% States having implemented an integrated aeronautical information database by 2018 - 100 % States having implemented QMS by 2018
B0-ACAS	ACAS Improvements	EUR	% of aircraft equipped with TCAS v 7.1	All new aircraft in Europe since March 2012 Retrofit: 12/2015
B0-SNET	Increased Effectiveness of Ground-Based Safety Nets	EUR – STCA Level 2	% of States having implemented ground-based safety-nets (STCA, APW, MSAW, etc.)	100% of States having implemented ground-based safety-nets (STCA, APW, MSAW, etc.) by 2018
B0-AMET	Meteorological information supporting enhanced operational efficiency and safety	EUR	% of States having implemented SADIS 2G satellite broadcast or Secure SADIS FTP service	90% by Dec 2015 and 100% by Dec 2017
AMET	VAAC information	EUR	i) status of implementation of volcanic ash advisory	100%

C-2

Module Code	Module Title	Applicability Area	Indicator[1]	Target
			information including in graphical format (EUR includes London, Toulouse, Tokyo and Anchorage Volcanic Ash Advisory Centers)	

NAT Region

Module Code	Module Title	Applicability Area	Indicator[2]	Target
B0-FRTO (RLongSM)	5min longitudinal separation between data link equipped a/c	Phase I - Shanwick and Gander OCA- validation trials 2012 Phase 2 -Full operations (TBD)	Increased capacity	Reduced average fuel burn and CO2 per a/c compare to current separation
B0-FRTO (RLatSM)	½ degree lateral separation between data link and RNP 4 a/c	Phase 1 – Nov 2015(validation trial, 2 tracks) Phase 2 – approx. 2016, all OTS Phase 3- TBD all NAT	Increased capacity	100% OTS capacity increase in Phase 2
B0-TBO B0-SNET (FANS data link impl)	FANS 1/A data link implementation	Phase 1-2013(2 tracks) Phase 2a –Feb 2015 (all OTS FL350-390) Phase 2b – dec 2017 all NAT FL 35-390 Phase 2 c- Jan 2020 All NAT FL290 above	Reduced GNEs and LHDs (see safety targets)	100% equipage
B0-FICE (AIDC)	AIDC implementation	Phase 1 – 2013 Phase 2 -	Reduced GNEs and LHDs (see safety targets)	100% implementation

Module Code	Module Title	Applicability Area	Indicator[2]	Target
B0-FRTO (MNPS to PBN transition)	MNPS to PBN transition plan			
B0-AMET	Meteorological information supporting enhanced operational efficiency and safety	NAT	% of States having implemented SADIS 2G satellite broadcast or Secure SADIS FTP service or WAFS Internet File Service (WIFS)	100% by Dec 2015
AMET	VAAC information	NAT	i) status of implementation of volcanic ash advisory information including in graphical format (EUR includes London, Toulouse, Tokyo and Anchorage Volcanic Ash Advisory Centers)	100%

b) Capacity and efficiency dashboard.

<u>EUR Region</u>

Module Code	Module Title	Current status (assessment)
B0-APTA	Optimization of Approach Procedures including vertical guidance	30% at applicable aerodromes.(CNS 4b Table of the EUR ANP)
B0-SURF	Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2)	TBD (list for applicable aerodromes TBD)
B0-FICE	Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration	80% of FIRs (AFS Table of EUR ANP)
B0-DATM	Service Improvement through Digital Aeronautical Information Management	TBD
B0-ACAS	ACAS Improvements	TBD

C-4

Module Code	Module Title	Current status (assessment)
B0-AMET	Meteorological information supporting enhanced operational efficiency and safety	86.8% WAFS implementation
B0-SNET	Increased Effectiveness of Ground-Based Safety Nets	TBD
AMET VACC	i) status of implementation of volcanic ash advisory information including in graphical format (EUR includes London, Toulouse, Tokyo and Anchorage Volcanic Ash Advisory Centers)	100% - 2014 N/A- 2013

NAT Region

Module Code	Module Title	Current status
B0-FRTO (RLongSM)	5min longitudinal separation between data link equipped a/c	Validation trial ongoing
B0-FRTO (RLatSM)	½ degree lateral separation between data link and RNP 4 a/c	Planned Nov 2015
B0-TBO B0-SNET (FANS data link impl)	FANS 1/A data link implementation	70%
B0-FICE (AIDC)	AIDC implementation	100%
B0-FRTO (MNPS to PBN transition)	MNPS to PBN transition plan	RNAV 10 and RNP 4 equipage assessment ongoing
B0-AMET	Meteorological information supporting enhanced operational efficiency and safety	100% WAFS implementation
AMET VAAC	Status of implementation of volcanic ash advisory information including in graphical format (NAT includes London, Toulouse, Montréal and Washington Volcanic Ash Advisory Centers)	100%- 2014 N/A - 2013

APPENDIX D

a) Capacity and efficiency targets

The Port-of-Spain Declaration (under 2014 – Safety, paragraph 1 item a) includes the Regional Safety and Air Navigation targets that will be presented in the ICAO Regional Performance Dashboard as follows:

1.   Approach - Performance-Based Navigation (PBN)

   - 80% of instrument approach runways to have Approach Procedures with Vertical Guidance (APV) with Barometric Vertical Navigation (Baro VNAV) implemented by service providers and users by December 2016

2.   Air Traffic Flow Management (ATFM)

   - 100% of Flight Information Regions (FIRs) within which all Area Control Centres (ACCs) to have ATFM measures available by December 2018

3.   Aeronautical Information Management Transition (AIM)

   - 100% of Aeronautical Information Services (AIS) to implement AIM Roadmap - Phase I required elements by December 2016

4.   Ground-Ground Digital Coordination/Transfer

   - 50% of FIRs within which all applicable ACCs to have implemented at least one interface to use Air Traffic Services Inter-Facility Data Communication (AIDC)/On-Line Data Interchange (OLDI) with neighbouring ACCs by December 2016

5.   Environmental Benefit

   - Reduce regional CO_2 emissions by 40,000 tons per year through PBN implementation by December 2016

Similarly, with the approval of the NAM/CAR Regional Performance-based Air Navigation Implementation Plan (RPBANIP) version 3.1 by the North American, Central American and Caribbean Directors of Civil Aviation, other ASBU-based key air navigation targets were adopted to accomplish the identified AN regional priorities as follows:

1.   B0-65/APTA: Optimization of Approach Procedures Including Vertical Guidance

   - 20% of instrument runways to have APV with SBAS/WAAS implemented by December 2018– Service Providers and users
   - 20% of instrument runways to have APV with GBAS by December 2018 – Initial implementation at some States (services providers)

- 60% of instrument runways to have LNAV procedure implemented by December 2016 – Service Providers and users as per Assembly Resolution A37-11

2.   B0-15/RSEQ: Improve Traffic Flow Through Runway Sequencing (AMAN/DMAN)

- 10% of selected aerodromes with AMAN and time based metering by Dec. 2016
- 10% of selected aerodromes with DMAN by Dec. 2016
- 20% of selected aerodromes with Airport-capacity calculated by Dec. 2016

3.   B0-75/SURF Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2)

- 30% of selected aerodromes with SMR/ SSR Mode S/ ADS-B/ Multilateration for ground surface movement by June 2018
- 20% of aircraft on the NAM/CAR State registries to have surveillance system on board (SSR transponder, ADS B capacity) by June 2018
- 20% of vehicles at selected aerodromes with a cooperative transponder systems by June 2018
- 70% of selected aerodromes complying with visual aid requirements as per Annex 14 by December 2015
- 70% of selected airports with an aerodrome bird/wildlife organization and control programme by December 2018

4.   B0-80/ACDM Improved Airport Operations through Airport - CDM

- 60% of selected aerodromes with Airport-CDM by Dec. 2018
- 48% of international aerodromes to be certified in the CAR Region by December 2016
- 30% of selected Heliports with operational approval by Dec. 2018

5.   B0-25/FICE: Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration

- 100% implementation of MEVA III IP Network by MEVA Member States by August 2015
- 4 States with Air Traffic Services Message Handling Services (AMHS) interconnected with other AMHS by December 2014
- 70% of ATN router structure implemented by June 2016

6.   B0-30/DAIM: Service Improvement through Digital Aeronautical Information Management

- 10 % of States e-TOD Implemented by Dec.2018
- 40 % of States with AIXM 5.1 implemented by Dec.2018
- 45 % of States with e-AIP implemented by Dec.2018
- 35 % of States with Digital NOTAM implemented by Dec. 2018

7.   B0-105/AMET: Meteorological Information Supporting Enhanced Operational Efficiency and Safety

- 100% of States implementation of WAFS Internet File Service (WIFS) by December 2014
- 70% of MWOs with IAVW procedures implemented by December 2014.
- 100% of MWOs with tropical cyclone watch procedures implemented by December 2014.
- 50% of selected aerodromes/AMOs with Aerodrome warnings implemented by December 2014
- 20% of selected aerodromes/AMOs with wind shear warnings procedures implemented (MET provider services) by December 2015
- 90% of selected aerodromes/MWOs with SIGMET procedures implemented (MET provider services) by Dec. 2014

8.   B0-10/FRTO: Improved Operations through Enhanced En-Route Trajectories

- 100% of States to have completed a PBN plan by Dec. 2018
- 50% of selected segregated airspaces available for civil operations by Dec. 2016

9.   B0-84/ASUR: Initial Capability for Ground Surveillance

- 30% of selected aerodromes with ADS-B implemented by Dec 2018
- 80% of multilateration system implemented in selected aerodromes by June 2018

10.   B0-101/ACAS: ACAS Improvements

- 10% of aircraft on NAM/CAR State registries equipped with ACAS II (TCAS Version 7.1) by Dec 2018

11.   B0-102/SNET: Increased Effectiveness of Ground-Based Safety Nets

- 80% of selected ATS units with ground based safety nets (STCA) implemented by Dec 2015
- 70% of selected ATS units with ground based safety nets (APW) implemented / 70% of selected ATS units with ground based safety nets (MSAW) implemented by Dec 2015
- 80% of selected ATS units with ground based safety nets (MTCA) implemented by Dec 2016

12.   B0-05/CDO: Improved Flexibility and Efficiency in Continuous Descent Operations (CDOs)

- 50% of selected. Aerodromes with continuous descent operations (CDO) implemented by Dec.2016
- 80% of selected. Aerodromes with PBN STARs implemented by Dec.2016

13.   B0-40/TBO: Improved Safety and Efficiency through the initial application of En-Route Data Link

- 80% of selected FIRs with ADS-C implemented by December 2016
- 80% of selected FIRs with CPDLC implemented by June 2018

14.   B0-20/CCO: Improved Flexibility and Efficiency Departure Profiles - Continuous Climb Operations (CCOs)

- 60% of selected aerodromes with continuous climb operations (CCO) implemented by Dec.2016
- 60% of selected aerodromes with PBN SIDs implemented by Dec.2016

APPENDIX E

a) Capacity and efficiency targets

The Bogota Declaration (Bogota, 6 December 2013); issued by SAM States; set ten regional goals for capacity and efficiency for the period 2014 – 2016. In this context the targets are:

− PBN terminal: Full compliance with goals established in ICAO Assembly Resolution A37-11 regarding approach procedure with vertical guidance (APV).

− PBN en-route: 60% of the international aerodromes with standard instrument departure (SID) /standard instrument arrival (STAR) PBN.

− 60% of the routes/airspaces with performance based navigation (PBN).

− CDO: 40% of the international aerodromes / terminal control areas (TMA) with continuous descent operation (CDO).

− CCO: 40% of the international aerodromes / TMAs with continuous climb operations (CCO).

− ATFM: 100% of the area control centre (ACCs) providing air traffic flow management (ATFM).

− AIM: 100% of the required elements in PHASE I (aeronautical information services (AIS) to aeronautical information management (AIM) Roadmap).

− AMHS interconnection: 100% of the Air Traffic Services Message Handling Services (AMHS) regionally interconnected (Total: 26 interconnections)

− Interconnection of automated systems (ATS interfacility data communications (AIDC) exchange): 100% of the automated systems interconnected (Total: 15 interconnections)

− Implementation of national Internet protocol (IP) networks: 80% of the States with national IP communications networks implemented.

− Estimated fuel savings/ C02 emissions reduction based on the ICAO fuel savings estimation tool (IFSET) Reach 40,000 tons of regional CO2 emissions reduction per year in en-route PBN implementation.

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