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INFORMATION PAPER

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Agenda Item 4: **Follow-up, Performance Evaluation and Monitoring of the NAM/CAR Regional Performance Based Air Navigation Implementation Plan (NAM/CAR RPBANIP) Targets**
4.3 Progress Report by States of Adopted Aviation System Block Upgrades (ASBU) B0 Modules

U.S. IMPLEMENTATION OF THE AVIATION SYSTEM BLOCK UPGRADES (ASBU) BLOCK 0 MODULES

(Presented by United States)

EXECUTIVE SUMMARY

This paper presents information on the United States' implementation of the ICAO Aviation System Block Upgrades (ASBUs), in support of the Global Air Navigation Plan (GANP). It describes areas of ASBU implementation in the United States, and its broader effects on international aviation.

Strategic Objectives:	• Safety • Air Navigation Capacity and Efficiency • Environmental Protection
References:	• *Global Air Navigation Plan*, ICAO Doc 9750, Fourth Edition • Working Document for the Aviation System Block Upgrades, The Frame work for Global Harmonization, issued on 28 March 2013 • NAM ASBU Handbook

1. Introduction

1.1 The Global Air Navigation Plan (GANP) and the Aviation System Block Upgrades (ASBUs) concept and documents were developed to provide the framework and strategic direction for a global and harmonized aviation system. With endorsement and approval from the 12th Air Navigation Conference and the 38th Assembly, the GANP and ASBUs provide the strategic direction and define measurable operational improvements for the next 15 years. It also includes key civil aviation policy principles to assist ICAO regions, sub-regions and States with the preparation and implementation of their air navigation plans. The benefit of the GANP and ASBU program is that modernization can be implemented based on a State's needs, capabilities, and resources.

1.2 During the ANI/WG/2, the U.S. presented the status of U.S. implementation of the ASBUs in support of the GANP. Since then the North American Project Team (NAM) team has created the NAM ASBU Handbook by clarifying and articulating the Block 0 Elements. In addition, a new Element has been identified during the preparation of NAT process and added to the NAM ASBU Handbook.

1.3 The U.S. has reviewed and re-evaluated the ASBU B0 implementation status based on the NAM ASBU Handbook and the result is presented in this paper.

2 Analysis and Implementation Workflow and Status Definitions

2.1 The analysis and implementation workflow of ASBU Elements is depicted in the Figure 2.1 below.

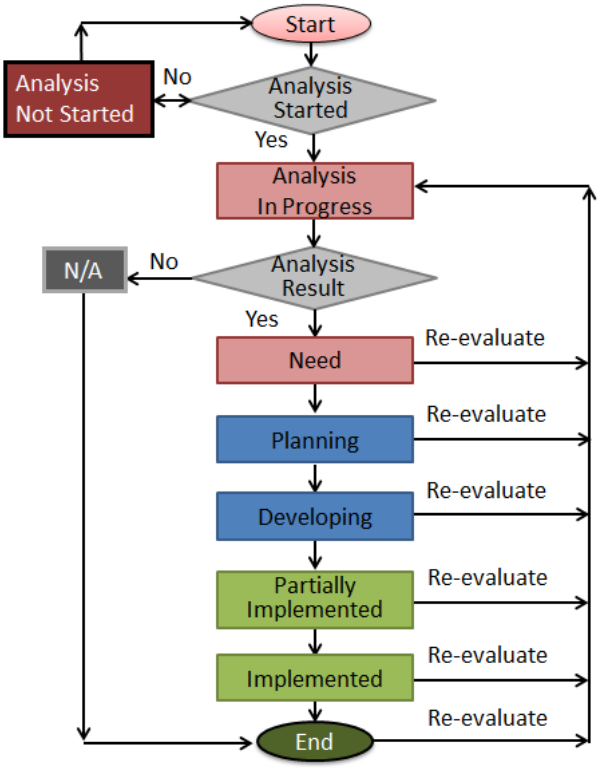

Figure 2.1: Analysis and Implementation Workflow

2.2 The significance of each step in the workflow is as follows: Note that the status definitions are written from the Regional view (i.e., NACC) consisting multiple States. From the State view (i.e., United State of America), the exact same definitions are applicable, however only the State determines its own status.

- Analysis Not Started – The requirement to implement this ASBU Element has not yet been assessed by any State in the Region
- Analysis In Progress – A Need Analysis as to whether or not this ASBU Element is required is in progress by at least one State in the Region
- N/A – The Region has decided not to implement this ASBU Element

- Need - One or more States in the Region have determined the ASBU Element is required, but none have begun planning for the implementation
- Planning – Implementation of this ASBU Element is planned, but not started
- Developing – Implementation of this ASBU Element is in the development phase, but not yet operational
- Partially Implemented – Implementation of this ASBU Element is partially completed and/or operational in at least one area of the Region
- Implemented - Implementation of this ASBU Element has been completed and/or is fully operational in all areas of the Region where the need was identified

3 Information on the U.S. ASBU Block 0 Implementation Status

3.1 The analysis and implementation status determined in accordance with the Analysis and Implementation Workflow and Status Definitions are collected into the Air Navigation Report Forms (ANRFs). There are 18 Modules and 63 Elements in Block 0. Table 3.1 provided in the summary status information.

Table 3.1: Summary of U.S. ASBU B0 Element Implementation Status (As of February 2016)

Performance Improvement Area (PIA)	N/A	Planning	Developing	Partially Implemented	Implemented	Total
PIA 1: Airport Operations	2	0	2	3	13	**20**
PIA 2: Interoperable Systems & Data	0	1	0	0	17	**18**
PIA 3: Globally Collaborative ATM	3	0	0	0	14	**17**
PIA 4: Efficient Flight Paths	0	0	0	0	8	**8**
Total	**5**	**1**	**2**	**3**	**52**	**63**

3.2 The Table 3.2 shows the U.S. ASBU B0 Element implementation status at the Element level. For the Element description, "Derived from" indicates the paragraph number of Working Document for the Aviation System Block Upgrades, The Frame work for Global Harmonization, issued on March 28, 2013, where the source concept was described. "Defined" indicates the Element number as per the Working Document. "Identified" indicates the Region or State which developed the Element.

Table 3.1: U.S. ASBU B0 Element Implementation Status (As of February 2016)

Block 0 Modules	Elements	Need Analysis of Module Elements				Implementation Status (if Element is needed)			
		Not Started	In Progress	Need	N/A	Planning	Developing	Partially Implemented	Implemented
Performance Improvement Area 1: Airport Operations									
ACDM	1. (Derived from 1.2.1 and 1.2.2) Airport CDM procedures							X	
	2. (Derived from 1.2.1 and 1.2.2) Airport CDM tools								X
	3. (Derived from 3.1 & 7.2.1) Collaborative departure queue management						X		
APTA	1. (Derived from 4.1.1) PBN Approach Procedures with vertical guidance (LPV, LNAV/VNAV minima, using SBAS and Baro VNAV)								X
	2. (Derived from 4.1.1) PBN Approach Procedures without vertical guidance (LP, LNAV minima; using SBAS)								X

Block 0 Modules	Elements	Need Analysis of Module Elements				Implementation Status (if Element is needed)			
		Not Started	In Progress	Need	N/A	Planning	Developing	Partially Implemented	Implemented
	3. (Derived from 1.3.2) GBAS Landing System (GLS) Approach procedures								X
RSEQ	1. (Derived from Element 1) AMAN via controlled time of arrival to a reference fix								X
	2. (Derived from Element 1) AMAN via controlled time of arrival at the aerodrome								X
	3. (Defined: Element 2) Departure management							X	
	4. (Derived from Element 2) Departure flow management						X		
	5. (Defined: Element 3) Point merge				**X**				
SURF	1. (Derived from Element 1) A-SMGCS with at least one cooperative surface surveillance system								X
	2. (Derived from Element 1) Including ADS-B APT as an element of A-SMGCS								X
	3. (Derived from Element 2) A-SMGCS alerting with flight identification information								X
	4. (Derive from 1.4.1) Airport vehicles equipped with transponders								X
WAKE	1. (Defined: Element 1) New PANS-ATM wake turbulence categories and separation minima				X				
	2. (Derived from Element 2) Dependent diagonal paired approach procedures for parallel runways with centrelines spaced less than 760 meters (2,500 feet) apart								X
	3. (Derived from Element 3) Wake independent departure and arrival procedures for parallel runways with centrelines spaced less than 760 meters (2,500 feet) apart							X	
	4. (Derived from Element 3) Wake turbulence mitigation for departures procedures for parallel runways with centrelines spaced less than 760 meters (2,500 feet) apart								X
	5. (Identified by the United States) 6 wake turbulence categories and separation minima								X
Performance Improvement Area 2: Globally Interoperable Systems and Data									
AMET	1. (Defined: Element 1) WAFS								X
	2. (Defined: Element 2) IAVW								X
	3. (Defined: Element 3) TCAC forecasts								X
	4. (Defined: Element 4) Aerodrome warnings								X
	5. (Defined: Element 5) Wind shear warnings and alerts								X
	6. (Defined: Element 6) SIGMET								X
	7. (Defined: Element 6) Other OPMET information (METAR, SPECI and/or TAF)								X
	8. (Identified by NAT) QMS for MET								X
DATM	1. (Derived from 1.1.1) Aeronautical Information Exchange Model (AIXM)								X
	2. (Derived from 3.1.3) eAIP								X
	3. (Derived from 7.1) Digital NOTAM								X
	4. (Identified by NACC) eTOD								X
	5. (Identified by NAT) WGS-84								X
	6. (Identified by NAT) QMS for AIM								X

Block 0 Modules	Elements	Need Analysis of Module Elements				Implementation Status (if Element is needed)			
		Not Started	In Progress	Need	N/A	Planning	Developing	Partially Implemented	Implemented
FICE	1. (Derived from 1.1.4) AIDC to provide initial flight data to adjacent ATSUs								X
	2. (Derived from 1.1.5) AIDC to update previously coordinated flight data								X
	3. (Derived from 1.1.5) AIDC for control transfer								X
	4. (Derived from 1.1.6) AIDC to transfer CPDLC logon information to the Next Data Authority					**X**			
Performance Improvement Area 3: Optimum Capacity and Flexible Flights									
ACAS	1. (Derived from 1.3.2) ACAS II (TCAS version 7.1)				X				
	2. (Derived from 1.3.7 a) Auto Pilot/Flight Director (AP.FD) TCAS				X				
	3. (Derived from 1.3.7 b) TCAS Alert Prevention (TCAP)				X				
ASEP	1. (Defined: Element 1) ATSA-AIRB								X
	2. (Defined: Element 2) ATSA-VSA								X
ASUR	1. (Defined: Element 1) ADS-B								X
	2. (Defined: Element 2) Multilateration (MLAT)								X
FRTO	1: (Derived from Element 1) CDM incorporated into airspace planning								X
	2: (Defined: Element 2) Flexible Use of Airspace (FUA)								X
	3. (Defined: Element 3) Flexible route system								X
	4: (Derived from Element 3) CPDLC used to request and receive re-route clearances								X
NOPS	1. (Derived from 1.1.1) ATFM								X
OPFL	1. (Derived from 1.3.1) ITP using ADS-B								X
SNET	1. (Defined: Element 1) Short Term Conflict Alert implementation (STCA)								X
	2. (Defined: Element 2) Area Proximity Warning (APW)								X
	3. (Defined: Element 3) Minimum Safe Altitude Warning (MSAW)								X
	4. (Identified by NAT) Medium Term Conflict Alert (MTCA)								X
Performance Improvement Area 4: Efficient Flight Paths									
CCO	1. (Defined: Element 1) Procedure changes to facilitate CCO								X
	2. (Defined: Element 1) Route changes to facilitate CCO								X
	3. (Defined: Element 2) PBN SIDs								X
CDO	1. (Derived from Element 1) Procedure changes to facilitate CDO								X
	2. (Derived from Element 1) Route changes to facilitate CDO								X
	3. (Derived from Element 2) PBN STARs								X
TBO	1. (Defined: Element 1) ADS-C over oceanic and remote areas								X
	2. (Defined: Element 2) Continental CPDLC								X
	All Elements: 63	**0**							

4 Conclusion

4.1 In order to coordinate the modernization of the global air navigation system, it is imperative to have a harmonized plan for aviation regulators, operators and industry to follow. The planning, development, training and implementation of a globally harmonized system are contingent on a framework that includes scalable plans and provides operational, economic, and safety benefits.

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