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Eighth North American, Central American and Caribbean Working Group Meeting (NACC/WG/8)
Mexico City, 29 August - 1 September 2023

Agenda Item 3:   **Follow-up of NACC/WG 2022-2023 Action Plan**
         3.8   **Other aspects of Air Navigation Services.**

DEVELOPMENT OF THE AIR NAVIGATION PLANS OF CAR STATES

(Presented by the Secretariat)

<table>
<tr>
<td colspan="2" align="center">EXECUTIVE SUMMARY</td>
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<td colspan="2">This working paper summarizes the strategy proposed by the Secretariat for the development of air navigation plans of the States and, with this, strengthen the national planning of each of them and regional growth.</td>
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<td>Action:</td>
<td>Suggested actions are presented in Section 4.</td>
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<td><i>Strategic Objectives:</i></td>
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- Safety
- Air Navigation Capacity and Efficiency
- Economic Development of Air Transport
- Environmental Protection
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<td><i>References:</i></td>
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- Second Meeting of Rapporteurs of the North American, Central American and Caribbean Working Group (NACC/WG)
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1.   **Introduction**

1.1   The ICAO GANP Aviation System Block Upgrades (ASBU) methodology is a programmatic and flexible global approach that enables all Member States to upgrade their air navigation capabilities based on their specific operational requirements.

1.2   ASBU works according to the following structure:

a) ASBU common thread: three different categories, operational, information and technology.
b) ASBU Module: it is the set of elements of a common thread that, according to the enablers' roadmap, will be available for implementation within the defined term established by the ASBU Block.
c) ASBU Block: This implies that the element and all the enablers associated with it must be available for implementation in the year of the ASBU block.

d) ASBU Element: This module is the set of elements of a common thread that, according to the enablers' roadmap, will be available for implementation within the defined period established by the ASBU Block. It is a specific change in operations designed to improve the performance of the air navigation system under specified operational conditions.

1.3   ASBU elements have different levels of maturity:

a) Ready for implementation: this maturity level focuses on the end of system development and initial operational capability worldwide.
b) Standardization: this level of maturity focuses on the definition of the provisions necessary for the interoperability of the system and the harmonization of procedures.
c) Validation: This maturity level focuses on industry research and validation and includes proof-of-concept validation, standalone prototyping, and testing, testing and prototyping in a representative environment, and feasibility demonstration of complete engineering in the application of the real system.
d) Concept: This maturity level focuses on exploratory research and includes scientific inquiry, investigation of observed and reported basic principles, and concept definition.

1.4   In addition, each ASBU element has an interrelationship with other ASBU elements, this means that the implementation of one element requires that another element is already operating. In the case of operational elements, they require elements of the technology and information thread to enable them.

1.5   The dependencies and relationships between the ASBU Elements are:

a) Required Technology List (Enable Technology)
b) Relation of Necessary Information (Information Enabler)
c) Relationship-operational need (Another Operational element is enabling)

1.6   Examples:

Elements	Types of enablers	Enabler element
ACAS-B1/1 **ACAS Improvements** Operational	Dependencies and relations Relation-technology need	ASUR-B0/1 - Automatic Dependent Surveillance – Broadcast (ADS-B)
ACDM-B0/1 Airport CDM Information Sharing (ACIS) Operational	Dependencies and relations Relation-information need	AMET-B0/1 - Meteorological observations products AMET-B0/2 - Meteorological forecast and warning products
AMET-B0/1 **Meteorological observations products** **Information**	Dependencies and relations Relation-technology need	COMI-B0/7 - ATS Message Handling System (AMHS)
	Dependencies and relations Relation-operational need	RSEQ-B0/1 - Arrival Management

Elements	Types of enablers	Enabler element
		RSEQ-B0/2 - Departure Management
		NOPS-B0/4 - Initial Airport/ATFM slots and A-CDM Network Interface

1.7   Each element has benefits in the different operational and information areas and there is an interrelationship between one element and another.

1.8   Each ASBU element also has enablers that must be implemented as part of the element's commissioning. All enablers must be implemented, before defining the element as operational. There are the types of enablers:

1. Infrastructure on land (technology)
2. Aircraft systems
3. Development of procedures
4. Certifications
5. Regulatory development
6. Staff training
7. Operational authorization
8. Infrastructure of the space system
9. Others according to the item

1.9   There are elements that are due to specific implementation at present, such as operations for maritime spaces, with elements of the COMS module (CPDLC, FANS 1/A, SATVOICE), which do not need to be implemented at this time in the continental area.

2.   Enabling elements in the NAM/CAR region

2.1   In attention to the points indicated above, the following elements are identified as a priority to be implemented in the region, especially CAR, since they are development enablers and support the implementation of other modules:

1. AMET-B0/1: enables other MET elements and operating elements.
2. ASUR-B0/1: it is the number one technological enabler that supports the implementation of the operational modules in Air Traffic Management and Airport Management.
3. FICE-B0/1: Supports capacity and efficiency.
4. COMI-B0/7-ATS: Supports the exchange of aeronautical and meteorological information.

2.2   There are other operational elements, which are in a "Ready to implement" state but that depend on these technological or information enablers, for example:

CSEP-B1/1: Depends on ADS-B

2.3   In the case of SWIM elements, they are enabled by an IP-based communications infrastructure and by aeronautical messaging systems and ATS capabilities.

2.4　　　　　There are control centres in the region already with the operational capacity and start-up of the SNET module that integrates the alarms:

a) SNET-B0/1: Short Term Alert Procedures (STCA)
b) SNET-B0/2: Minimum Safe Altitude Warning (MSAW)
c) SNET-B0/3: Area Proximity Warning (APW)
d) SNET-B0/4: Approach route monitoring (APM)

2.5　　　　　This module depends entirely on the availability of radar and ADS-B data for its implementation and its implementation supports: operational safety, airspace efficiency and its capacity.

2.6　　　　　Example of implementation of the elements of the SNET module:

Alert	Used	Configuration
Short Term Conflict Alert (STCA)	YES	Minimim altitude for STCA (HF) = 160 Maximim Altitude for STCA (HF) = 900 STCA Vertical Separation (min. To 290 FL) = 7 STCA Vertical Separation (290 To 410 FL) = 17 STCA Vertical Separation (410 To max. FL) = 17 STCA RVSM Vertical Separation (290 To 410 FL) = 7 STCA Horizontal distance by sector Dist. = 5 Timeout = 120
Minimum Safe Altitude Warning (MSAW)	YES	Time to prediction sec = 120
Area Proximity Warning (APW)	YES	1. Min Altitude = 0 2. Max Altitude = 820 3. Sec = 120

2.7　　　　　Other modules in a state ready for implementation can be used by the States to solve specific needs and their implementation requires an internal analysis within the State. It is important to indicate that unlike the Basic Constituent Elements (BBB) that are mandatory, the ASBU elements are not mandatory to implement, since different modules can solve a need and it is under the responsibility of the State to carry out the corresponding analyzes to implement the module that best solve your requirements.

2.8　　　　　Based on the information of the items presented in this working paper, it is indicated that the regional priorities are:

1. The regional implementation of ADS-B and ensuring surveillance data coverage throughout the region.
2. The AMHS aeronautical messaging system (Almost implemented in the entire region)
3. Strengthen and ensure the communications infrastructure for the exchange of information between the NAM/CAR States and other regions.
4. Desirable: NAM/ICD and AIDC, provided that the necessary surveillance infrastructure is in place to support this implementation.
5. Go integrating the MET and AIM information.

2.9   It is necessary to establish the regional operational requirements to analyze the desirable operational elements and others required to strengthen the development of the region.

3.   Suggested actions

3.1   The members of the NACC/WG and especially the rapporteurs of the Group are invited to:

a)   support the establishment of the operational objectives of the region;

b)   support the analysis of the ASBU elements of the different modules;

c)   support the regional planning analysis; and

d)   finally, to the different Task Groups, to integrate into their action plan the necessary activities to ensure the implementation of the priority elements of the region.

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