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(NACC/WG/4)**

Ottawa, Canada, 24 to 28 March 2014

**Agenda Item 3: Follow-up on the NAM/CAR Regional Performance-Based Air Navigation
Implementation Plan (NAM/CAR RPBANIP) Progress
3.5.2 Regional level implementation monitoring through the Air
Navigation Report Form (ANRF)**

**IMPLEMENTATION MONITORING THROUGH THE AIR NAVIGATION REPORT FORM
(ANRF)**

(Presented by the Secretariat)

EXECUTIVE SUMMARY	
This working paper presents a briefing on the monitoring and reporting mechanism adopted with the performance-based framework within the RPBANIP, and the need to agree on the way the monitoring and reporting of Air Navigation implementation shall be conducted at regional, sub-regional and national levels.	
Action:	See paragraph 3
<i>Strategic Objectives:</i>	<ul style="list-style-type: none">• Safety• Air Navigation Capacity and Efficiency• Environmental Protection
<i>References:</i>	<ul style="list-style-type: none">• Third North American, Central American and Caribbean Working Group Meeting (NACC/WG/3) Guatemala City, Guatemala, 9 to 13 May 2011• First NAM/CAR Air Navigation Implementation Working Group Meeting (ANI/WG/1), Mexico City, Mexico, 29 July to 1 August 2013• NAM/CAR Regional Performance Based Air Navigation Implementation Plan (NAM/CAR RPBANIP). version 3.0• Declaración de Puerto España

1. Introduction

1.1 The NACC/DCA/3 Meeting adopted the NAM/CAR Regional Performance Based Air Navigation Implementation Plan (RPBANIP) versions 1.0 and 2.0, as the regional work programme, and invited States to adopt a national performance framework. In this regard, the performance framework included the national performance objectives, taking into consideration the users expectations and the State's needs for all air navigation fields. The RPBANIP established the regional priorities and the working scheme for the CAR Region and the different implementation Groups and the States/Territories.

1.2 During the Third Meeting of the North American, Central American and Caribbean Working Group (NACC/WG/3) and following the performance framework for monitoring principles, metrics and achievements on safety and efficiency obtained up-to May 2011 of the NAM/CAR Regions implementation works were presented, sample form is presented as **Appendix A** to this working paper.

1.3 With the implementation of the ICAO Aviation System Block Upgrades (ASBU) Methodology, the RPBANIP evolved into its version 3.0, where the Regional Performance objectives were aligned with the ASBU block 0 modules adopted by the NAM/CAR Regions.

1.4 Similarly the ANI/WG/1 Meeting formulated Conclusion 1/14 *-Adoption of a Performance Monitoring and Measuring Programme in the NAM/CAR Regions*, where the States, Territories and International Organizations of the NAM/CAR Regions were invited to adopt a group of metrics on access and equity, capacity, efficiency; environment and safety related to the Key Performance Areas (KPAs) in the Air Navigation Reporting Forms (ANRFs), incorporate these metrics in their performance monitoring programmes, collect pertinent data and present them on a regular basis to the ICAO NACC Regional Office; coordinate with the ATM community members in order to encourage data and information collection; and inform the ICAO NACC Regional Office on their progress by 30 January each year.

1.5 The implementation of the Electronic Air navigation Plan will include a third Volume for the purpose of reflecting every regional adopted ASBU module, and the way the monitoring reporting of their implementation is going to be made.

2. Air Navigation Reporting Forms (ANRFs)

2.1 The Air Navigation Report Form (ANRF): is a customized tool for ASBU modules, which is recommended for setting planning targets, monitoring implementation, identifying challenges, measuring implementation/performance, and reporting. Also, GREPECAS and the States could use this report format for any other air navigation improvement programmes, such as SAR. If necessary, other reporting formats that provide more details may be used but should contain as a minimum the elements described in the ANRF template. The results will be analyzed by ICAO and aviation partners and utilized in developing the Regional Performance Dashboard and the annual Global Air Navigation Report. The conclusions from the Global Air Navigation Report will serve as the basis for future policy adjustments, aiding safety practicality, affordability, and global harmonization, among other concerns.

2.2. The ANRFs (sample form presented in **Appendix B** to this paper), include the following information:

- Regional/National Performance Objectives
- Impact on Main Key Performance Areas
- Elements Related to ASBU Modules
- Targets and Implementation Progress (Ground and Air): Establishment of targets to be achieved. This should cover both avionics and ground systems.
- Implementation Challenges
- Performance Monitoring and Measurement: performance monitoring and measurement is done through the collection of data for the supporting metrics. This include Implementation Monitoring (progress achieved) and Performance Monitoring (benefits achieved)

2.3 A detailed description of the ANRF is included in Chapter 3 of the RPBANIP.

2.4 All States and Territories of the NAM/CAR regions are urged to develop their national implementation Plans in accordance to the RPBANIP. The National Plans translate the key operational improvement activities related with topics and strategic approaches, expected output, key performance indicators (KPIs), the assignment of specialists and the estimation of required resources.

2.5 All the NAM/CAR States/Territories have committed to achieve the targets and goals defined in the RPBANIP and the core targets reflected in the Port of Spain Declaration.

2.6 Based on the above and to harmonize the collection of information following the implementation and benefits achieved with the RPBANIP, the following Draft Conclusion is proposed:

DRAFT CONCLUSION
NACC/WG/04/XX

**AIR NAVIGATION REPORTING/ MONITORING IN THE
NAM/CAR REGIONS**

That no later than December 2014 for the harmonization and efficient collection of data for reporting and monitoring the Air Navigation implementation progress and performance/benefits achieved, NAM/CAR States/Territories to:

- a) invite all Air Navigation stakeholders in the data collection and reporting process ;
- b) use the RPBANIP ANRFs as a minimum to report their national, sub-regional and regional progress in implementation and performance; and
- c) report periodically to the ICAO NACC Office to reflect the NAM/CAR Regions status in the different forums as needed.

3. Suggested action

3.1 The meeting is invited to:

- a) take note of the information presented in this working paper;
- b) adopt the draft conclusion suggested in para. 2.6; and
- c) analyze other considerations as deemed necessary.

APPENDIX/APÉNDICE A

**SAMPLE FORM
MONITORING OF AIR NAVIGATION SYSTEMS PERFORMANCE
METRICS AND ACHIEVEMENTS: C/CAR SUBREGION - May 2011**

Key Performance Area and Corresponding Metrics	FIR							
	Central America	CURACAO (Aruba, Curacao, Bonaire)	HAVANA	Port-au-Prince	Kingston	United States (Houston Miami)	Santo Domingo	Mexico
<p>Efficiency</p> <ul style="list-style-type: none"> Estimated fuel savings (year 2000 as baseline); Percent of flights departing on-time; Percentage of instrument runway ends with an approach procedure with vertical guidance (APV), (BARO-VNAV and/or augmented GNSS) either as the primary approach or as a back-up for precision approaches; PBN Routes implemented and published in en-route; Number of certified aircrafts and pilots for PBN operations for en-route and TMA; Percent of flights with normal flight duration; implemented. 	<p>Costa Rica: 2009=191, 227.152 litres</p> <p>18 RNAV implemented Routes.</p>	<p>RNAV route network will be reviewed in 2011</p>	<p>-5 RNAV routes will be implemented – by June 2010.</p> <p>- Analysis of delays for more than 15 minutes due to operational errors in progress</p>	<p>2 RNAV routes extended from WATRS airspace</p>	<p>RNAV route network will be reviewed in 2011</p>	<p>RNAV Routes network in the Gulf of Mexico to be reviewed in April 2012.</p>	<p>16 RNAV routes implemented, 3 extended from the WATRS airspace.</p>	<p>3,638,931 tons.</p> <p>10 RNAV Routes</p> <p>8 Automated systems: Tijuana, Guadalajara, Mexico, Puerto Vallarta, Cancun, Monterrey, Merida, Mazatlan.</p>
<p>Safety</p> <ul style="list-style-type: none"> Number of runway incursions per year; Number of operational errors per year; Number of accidents per 100,000 departures; Number of fatalities per 100,000 departures; Number of LHD reports 	<p>Based on implemented comprehensive quality system, analysis ongoing of statistics, operational errors and incident occurrences for continuous improvements in air navigation services</p>	<p>-- Aruba: collecting information ongoing - NA: analysis of statistics ongoing regarding LHDs and Runway incursions.</p>	<p>Percentage of 0.02% Incidents per number of air operations</p>	<p>Analysis of LHDs ongoing to mitigate occurrences.</p>	<p>Analysis of LHDs ongoing</p>	<p>Extensive matured evaluation process based on quality assurance principles. Operational improvements based on SMS risk analysis to ensure level of air navigation services in the airports and national air space system</p>	<p>Analysis ongoing of operational errors and incident occurrences reported by users</p>	



SAMPLE TEMPLATE

1. AIR NAVIGATION REPORT FORM (ANRF)

(This template demonstrates how ANRF to be used.

The data inserted here refers to ASBU B0-CDO as an example only)

Regional and National planning for ASBU Modules

<p>2. REGIONAL/NATIONAL PERFORMANCE OBJECTIVE – B0-CDO: Improved Flexibility and Efficiency in Descent Profiles</p> <p>Performance Improvement Area 4: Efficient Flight Path – Through Trajectory-based Operations</p>					
<p>3. ASBU B0-CDO: Impact on Main Key Performance Areas (KPA)</p>					
	Access & Equity	Capacity	Efficiency	Environment	Safety
Applicable	N	N	Y	Y	Y
<p>4. ASBU B0-CDO: Planning Targets and Implementation Progress</p>					
5. Elements			6. Targets and implementation progress (Ground and Air)		
1. CDO					
2. PBN STARs					
<p>7. ASBU B0-CDO: Implementation Challenges</p>					
Elements	Implementation Area				
	Ground system Implementation	Avionics Implementation	Procedures Availability	Operational Approvals	
1. CDO					
2. PBN STARs					

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8. Performance Monitoring and Measurement 8A. ASBU B0-CDO: Implementation Monitoring	
Elements	Performance Indicators/Supporting Metrics
1. CDO	Indicator: Percentage of international aerodromes/TMAs with CDO implemented Supporting metric: Number of international aerodromes/TMAs with CDO implemented
2. PBN STARs	Indicator: Percentage of international aerodromes/TMAs with PBN STARs implemented Supporting metric: Number of international aerodromes/TMAs with PBN STARs implemented

8. Performance Monitoring and Measurement 8 B. ASBU B0-CDO: Performance Monitoring	
Key Performance Areas	Metrics (if not indicate qualitative Benefits)
Access & Equity	Not applicable
Capacity	Not applicable
Efficiency	Kilograms of fuel saved per flight
Environment	Kilograms of CO ₂ emissions reduced per flight (= KGs fuel saved per flight x 3.157)
Safety	Number of controlled flight into terrain (CFIT) incidents/accidents

AIR NAVIGATION REPORT FORM HOW TO USE - EXPLANATORY NOTES

1. **Air Navigation Report Form (ANRF):** This form is nothing but the revised version of Performance Framework Form that was being used by Planning and Implementation Regional Groups (PIRGs)/States until now. The ANRF is a customized tool for Aviation System Block Upgrades (ASBU) Modules which is recommended for application for setting planning targets, monitoring implementation, identifying challenges, measuring implementation/performance and reporting. Also, the PIRGs and States could use this report format for any other air navigation improvement programmes such as Search and Rescue. If necessary, other reporting formats that provide more details may be used but should contain as a minimum the elements described in this ANRF template. The results will be analysed by ICAO and aviation partners and utilized in developing the Regional Performance Dashboard and the Annual Global Air Navigation Report. The conclusions from the Global Air Navigation Report will serve as the basis for future policy adjustments, aiding safety practicality, affordability and global harmonization, amongst other concerns.
2. **Regional/National Performance objective:** In the ASBU methodology, the performance objective will be the title of the ASBU module itself. Furthermore, indicate alongside corresponding Performance Improvement area (PIA).
3. **Impact on Main Key Performance Areas:** Key to the achievement of a globally interoperable ATM system is a clear statement of the expectations/benefits to the ATM community. The expectations/benefits are referred to eleven Key Performance Areas (KPA) and are interrelated and cannot be considered in isolation since all are necessary for the achievement of the objectives established for the system as a whole. It should be noted that while safety is the highest priority, the eleven KPAs shown below are in alphabetical order as they would appear in English. They are access/equity; capacity; cost effectiveness; efficiency; environment; flexibility; global interoperability; participation of ATM community; predictability; safety; and security. However, out of these eleven KPAs, for the present, only five have been selected for reporting through ANRF, which are Access & Equity, Capacity, Efficiency, Environment and Safety. The KPAs applicable to respective ASBU module are to be identified by marking Y (Yes) or N (No). The impact assessment could be extended to more than five KPAs mentioned above if maturity of the national system allows and the process is available within the State to collect the data.
4. **Planning Targets and Implementation Progress:** This section indicates planning targets and status of progress in the implementation of different elements of the ASBU Module for both air and ground segments.
5. **Elements related to ASBU module:** Under this section list elements that are needed to implement the respective ASBU Module. Furthermore, should there be elements that are not reflected in the ASBU Module (example: In ASBU B0-ACDM, Aerodrome certification and data link applications D-VOLMET, D-ATIS, D-FIS are not included; Similarly in ASBU B0-DATM, note that WGS-84 and eTOD are not included) but at the same time if they are closely linked to the module, ANRF should specify those elements. As a part of guidance to PIRGs/States, every Regional ANP will have the complete list of all 18 Modules of ASBU Block 0 along with corresponding elements, equipment required on the ground and in the air as well as metrics specific to both implementation and benefits.

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6. **Targets and implementation progress (Ground and Air):** Planned implementation date (month/year) and the current status/responsibility for each element are to be reported in this section. Please provide as much details as possible and should cover both avionics and ground systems. If necessary, use additional pages.
7. **Implementation challenges:** Any challenges/problems that are foreseen for the implementation of elements of the Module are to be reported in this section. The purpose of the section is to identify in advance any issues that will delay the implementation and if so, corrective action is to be initiated by the concerned person/entity. The four areas, under which implementation issues, if any, for the ASBU Module to be identified, are as follows:
 - Ground System Implementation:
 - Avionics Implementation:
 - Procedures Availability:
 - Operational Approvals:

Should be there no challenges to be resolved for the implementation of ASBU Module, indicate as “NIL”.

8. **Performance Monitoring and Measurement:** Performance monitoring and measurement is done through the collection of data for the supporting metrics. In other words, metrics are quantitative measure of system performance – how well the system is functioning. The metrics fulfil three functions. They form a basis for assessing and monitoring the provision of ATM services, they define what ATM services user value and they can provide common criteria for cost benefit analysis for air navigation systems development. The Metrics are of two types:
 - A. **Implementation Monitoring:** Under this section, the indicator supported by the data collected for the metric reflects the status of implementation of elements of the Module. For example- Percentage of international aerodromes with CDO implemented. This indicator requires data for the metric “number of international aerodromes with CDO”.
 - B. **Performance Monitoring:** The metric in this section allows to asses benefits accrued as a result of implementation of the module. The benefits or expectations, also known as Key Performance Areas (KPA), are interrelated and cannot be considered in isolation since all are necessary for the achievement of the objectives established for the system as a whole. It should be noted that while safety is the highest priority, the eleven KPAs shown below are in alphabetical order as they would appear in English. They are access/equity; capacity; cost effectiveness; efficiency; environment; flexibility; global interoperability; participation of ATM community; predictability; safety; and security. However, out of these eleven KPAs, for the present, only five have been selected for reporting through ANRF, which are Access & Equity, Capacity, Efficiency, Environment and Safety. It is not necessary that every module contributes to all of the five KPAs. Consequently, a limited number of metrics per type of KPA, serving as an example to measure the module(s)’ implementation benefits, without trying to apportion these benefits between module, have been identified below. This approach would facilitate States in collecting data for the chosen metrics. If it is not possible to identify performance metrics for an individual module, mention qualitative benefits under this section.

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**LIST OF PERFORMANCE METRICS FOR ASBU MODULES RELATED TO
ELEVEN KPAs - EXAMPLES**

Key Performance Area	Related Performance Metrics
1. Access & Equity	1. KPA/Access: Number of international aerodromes with APV
	2. KPA/Access: Percentage of time Special Use Airspace (SUA) available to Civil Operations
	3. KPA/Access: Percentage of requested flight level versus cleared flight level
	4. KPA/Access: Number of access denials due to equipment failure
	5. KPA/Equity: Percentage of aircraft operators by class who consider that equity is achieved
	6. KPA/Equity: Percentage of different types of aircraft operating in a particular airspace or international aerodrome.
2. Capacity	1. Number of operations (arrivals+departures) per international aerodrome per day
	2. Average ATFM delay per flight at an international aerodrome
	3. Number of landings before and after APV per international aerodrome
	4. Average en-route ATFM delay generated by airspace volume
	5. Number of aircraft in a defined volume of airspace for a period of time
3. Cost effectiveness	1. IFR movements per ATCO hour on duty
	2. IFR flights (en-route) per ATCO hour duty
4. Efficiency	1. Kilograms of fuel saved per flight
	2. Average ATFM delay per flight at the international aerodrome
	3. Percentage of PBN routes
5. Environment	1. Kilograms of CO ₂ emissions reduced per flight (= KGs fuel saved per flight x 3.157)
	2. The number of electronic pages dispatched
6. Flexibility	1. Number of backups available in emergency
	2. Number of changes approved to the flight plan
	3. Number of alternatives granted
7. Global Interoperability	1. Number of ATC automated systems that are interconnected
8. Participation of the ATM Community	1. Level of participation in meetings
	2. Level of responses to planning activities
9. Predictability	1. Arrival/departure delay (in minutes) at international aerodrome
10. Safety	1. Number of runway incursions per international aerodrome per year
	2. Number of incidents/accidents with MET conditions as a sole or as a contributory factor
	3. Number of ACAS RA events
	4. Number of CFIT accidents
	5. Number of missed approaches avoided due to use of CDO
11. Security	Not Applicable

— END —