



Agenda Item 2: Review of Air Navigation Matters
2.2 Air Navigation specific activities:
2.2.2 Communications, Navigation and Surveillance (CNS)

**NAVIGATION AND SURVEILLANCE RELATED ACTIVITIES FOR AIR NAVIGATION
IMPROVEMENTS AND IMPLEMENTATION IN THE E/CAR REGION**

(Presented by the Secretariat)

SUMMARY	
Considering the performance objectives contained in the Performance Based Air Navigation Implementation Plan for the NAM/CAR Regions, this paper proposes two action plans on navigation and surveillance related activities that will support and enable the currently approved performance objectives. These action plans are to be implemented and followed-up by the E/CAR Region States/Territories/International Organizations.	
References:	
• ICAO Global Air Navigation Plan (Doc 9750) • NACC/WG/2 Meeting Final Report (Ocho Rios, Jamaica, May 2008) • NACC/DCA/3 Meeting Final Report (Punta Cana, Dominican Republic, September 2008) • GREPECAS/15 Meeting Final Report (Rio de Janeiro, Brazil, October 2008)	
Strategic Objectives	<i>This working paper is related to Strategic Objectives A and D.</i>

1. Introduction

1.1 Under the ICAO performance-based approach, the CNS elements are architecture components and enablers of the operational concept, whose coverage may be global, regional or local. They also seek seamlessness and interoperability of the different systems, employing digital technologies and various levels of automation. Navigation and surveillance are part of the CNS elements that are needed to implement and support the performance objective activities.

1.2 The NACC Working Group prepared a regional performance-based implementation Plan for the NAM/CAR Regions, which was approved by the Third Meeting of North American, Central American and Caribbean Directors of Civil Aviation (NACC/DCA/3) through Decisions 3/2 – *Approval of the North American, Central American and Caribbean Working Group (NACC/WG)* and 3/3 – *Approval of the NAM/CAR Implementation Plan*, which are applicable to the NAM/CAR Regions. These Performance objectives are the same as those approved by the GREPECAS/15 Meeting.

1.3 Performance objectives are based on foreseen operational improvements, benefits and desired/required results; whose measure should rely on facts and data. Performance objectives may be defined locally or regionally, always ensuring the seamlessness, harmonization and interoperability on a global basis as proposed by the ATM Global operational concept and the Global Air Navigation Plan. In this regard, the E/CAR/WG may define new performance objectives for the E/CAR Region.

2. Discussion

2.1 To accomplish and enable several of the performance objectives, the evolution of the navigation and surveillance infrastructure is important, as defined in the strategies of the Global Air Navigation Plan:

- GPI-09 – *Situational Awareness*: Operational implementation of data link-based surveillance. The implementation of equipment that allows traffic information to be displayed in aircraft, thus, supporting implementation of conflict prediction and collaboration between flight crew and the ATM system. Improve situational awareness in the cockpit by making available electronic terrain and obstacle data of required quality.
- GPI 17 – *Data Link Applications*: Increase the use of data link applications such as ADS-C, ADS-B and CPDLC.
- GPI 21 – *Navigation Systems*: Enable the introduction and evolution of performance-based navigation supported by a robust navigation infrastructure providing an accurate, reliable and seamless global positioning capability.

2.2 Considering the performance objectives on the *Performance-Based Air Navigation Implementation Plan for the NAM/CAR Regions* and that this plan should encompass identification of other regional performance objectives and completion of performance framework forms for all air navigation areas such as ATM, CNS, AIM, MET and AGA/AOP, ICAO proposes for the E/CAR Region, the inclusion of two detailed action plans for the navigation and surveillance related activities which is presented in the **Appendix** to this paper:

2.3 The proposed action plans will support the implementation of the following performance objectives:

- Optimize the ATS route structure in en-route airspace
- Optimize the ATS route structure in terminal airspace
- Implement RNP Approaches
- Improve demand and capacity balancing
- Improve ATM Situational awareness

Action Plan on Follow-Up and Implementation of Navigation Systems

2.4 This action plan proposes several navigation-related activities that are necessary to enable the different navigation specification as defined in the CAR/SAM PBN Roadmap, as well as other future activities for GNSS elements and systems.

Action Plan on Follow-Up and Implementation of Surveillance Systems

2.5 This action plan proposes several surveillance-related activities to implement a common situational awareness, facilitate ATFM and seek improvements to the current status of the surveillance system, by means of sharing surveillance data and assessing new technologies.

2.6 References to the corresponding performance objectives are included as part of each plan. All the reference documentation included in the Action Plans is available on the ICAO NACC Regional Office website under e-Documents, CNS (<http://www.mexico.icao.int/CNS.html>).

3. Suggested Action

3.1 The meeting is invited to:

- a) take note of the information presented;
- b) analyse the proposal of the action plans as presented in section 2, considering the current performance objectives and any new performance objective formulated by the meeting;
- c) approve its inclusion in the Performance Based Air Navigation Implementation Plan for the NAM/CAR Regions applicable to the E/CAR Region, and
- d) determine other actions deemed pertinent.

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2009-2014
FOLLOW-UP AND IMPLEMENTATION ACTION PLAN
NAVIGATION SYSTEMS

No.	Performance Objective Task	Action Description	Responsible	Begin date	End date	Deliverables	Observations
1	2	3	4	5	6	7	8
1	1 b)	Evaluation of required navigation infrastructure to satisfy the PBN based navigation requirements, identifying improvements and deficiencies	States/ Territories coordinated by E/CAR/WG-CNS Committee	Oct 2009	Dec 2010	1. Analysis of required navigation infrastructure for example: DME-DME coverages for selected ATS routes for RNAV 5 2. Identification of deficiencies 3. Corresponding corrective Action plan	Reference to CNS table 3
2	1 b), 2c), 3 b)	Development of a regional strategy for the implementation of navigation systems	CNS/ATM/SG	Sep 2009	Dec 2009	Regional Strategy for Navigation Systems	Navigation Infrastructure alternatives for PBN
3	1 b), 2c), 3 b)	Develop recommendations for training in GNSS elements	CNS/ATM/SG	Sep 2009	Dec 2009	recommendations for training in GNSS elements	Navigation Infrastructure alternatives for PBN
4	1 b), 2c), 3 b)	Plans on GNSS systems (SBAS y GBAS) and trial conduction.	States/ Territories coordinated by E/CAR/WG-CNS Committee	Oct 2009	Dec 2014	GNSS trial plan	Navigation Infrastructure alternatives for PBN

2009-2011
FOLLOW-UP AND IMPLEMENTATION ACTION PLAN
SURVEILLANCE SYSTEMS

No.	Performance Objective Task	Action Description	Responsible	Begin date	End date	Deliverables	Observations
1	2	3	4	5	6	7	8
1	7 e)	Evaluation of radar coverage and identification of improvements to satisfy operative requirements.	States/ Territories coordinated by E/CAR/WG-CNS Committee	Oct 2009	April 2010	• Identification of improvements and • Respective Action Plan	Reference to CNS table 4A
2	7 e)	Radar Data Sharing implementation	French Antilles, Trinidad & Tobago, Saint Lucia, ...	Oct 2009	Dec 2010	Agreements and implementation of radar data sharing	
3	1 b)	Evaluation of surveillance infrastructure to satisfy navigation requirements for PBN	States/ Territories coordinated by E/CAR/WG-CNS Committee	Oct 2009	Dec 2010	Analysis of surveillance infrastructure	
4	7 k)	Implementation of 24 bits Address registry	States/ Territories coordinated by E/CAR/WG-CNS Committee	Oct 2009	Dec 2010	24 bits Address registry	
5	11 g), 7 k)	ADS-B, ADS-C and MLAT trials	States/ Territories coordinated by E/CAR/WG-CNS Committee	Oct 2009	Dec 2010	Trials on ADS-B, MLAT and ADS-C	
6	11 g), 7 k)	ADS-B cost – benefit analysis	States/ Territories coordinated by E/CAR/WG-CNS Committee	Oct 2009	Dec 2010	ADS-B cost-benefit analysis	
7	7e), 7 k)	<i>Development of a regional strategy for surveillance systems</i>	CNS/ATM/SG	July 2009	Oct 2009	Regional Strategy for Surveillance Systems	
8	7 k)	Mode S radar implementation and update to Regional Plan on Surveillance Systems	States/ Territories coordinated by E/CAR/WG-CNS Committee	Oct 2009	Dec 2011	Information on Mode S Radar implementation and updates to Regional Plan	Reference to CNS table 4A

Note: The reference given in column 2, labelled “11” referred to the new proposed Performance objective on OPTIMIZATION AND MODERNIZATION OF COMMUNICATION INFRASTRUCTURE.

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