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WORKING PAPER

ANI/WG/3 — WP/11  
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**Third NAM/CAR Air Navigation Implementation Working Group Meeting (ANI/WG/3)**  
Mexico City, Mexico, 4 to 6 April 2016

**Agenda Item 4: Follow-up, Performance Evaluation and Monitoring of the NAM/CAR Regional Performance Based Air Navigation Implementation Plan (NAM/CAR RPBANIP) Targets**

**4.1 Progress Reports of the Task Forces and the ANI/WG**

**PRELIMINARY PROGRESS REPORT BY ADS-B TASK FORCE**

(Presented by ADS-B Task Force Rapporteur)

<b>EXECUTIVE SUMMARY</b>	
In the note the progress of the task force of ADS-B ANIWG is presented.	
<b>Action:</b>	Suggested actions are presented in Section 5.
<i>Strategic Objectives:</i>	<ul style="list-style-type: none"><li>• Safety</li><li>• Air Navigation Capacity and Efficiency</li></ul>
<i>References:</i>	<ul style="list-style-type: none"><li>• Implementation Meeting of the Automatic Dependent Surveillance - Broadcast (ADS-B / IMP) Task Force Working Group on Air Navigation Implementation for the NAM / CAR (ANI / WG), Mexico City, Mexico regions from 27 to April 29, 2015</li><li>• State Letter Ref: EMX475, 20 May 2015, Automatic Dependent Surveillance – Broadcast Implementation Meeting (ADS-B/IMP) of the ADS-B Implementation Task Force of the NAM/CAR Air Navigation Implementation Working Group (ANI/WG)</li></ul>

**1. Introduction**

1.1 The ADS-B Implementation Task Force was created during the First ANI/WG/1 Meeting, it works in order to streamline the implementation activities related to new monitoring systems for air navigation.

1.2 The Task Force supports the testing and implementation activities of ADS-B and Multilateration, as well as update and report its progress to ANI/WG based on regional air navigation plan.

## 2. Members of the Task Force of ADS-B

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### 3. ADS-B Task Force Work programme Status:

TASK NAME	DELIVERABLE	DATE START	DATE END	PERCENTAGE COMPLETED	RESPONSIBLE
Activities Task ADS- B		1/8/13	31/12/18		
1.0 Formation of ADS-B TF	Participant List	1/8/13	1/8/13	100 %	Group Members
2. Terms and references	present Terms of Reference of the Working Group	1/8/13	1/8/13	100 %	Cuba(Rapporteur)
3. Develop Work Plan	Work Plan	2/8/13	14/8/13	100%	Cuba (Rapporteur )
3.1 Provide to OACI the Work Plan		14/8/13	14/8/13	100%	Cuba(Rapporteur)
4.0 Approve Work Plan TF ADS-B		24/01/14	30/10/14	100%	Group Members
5.0 Begin implementation of the Work Plan		31/10/13	31/12/18		Group Members
5.1 Develop ADS-B survey	Survey on the state of ADS-B	23/01/14	14/02/14	100%	COCESNA
5.1.1 Send ICAO survey for distribution to the states of the region		18/02/14	18/02/14	100%	COCESNA
5.2 Surveying information on the implementation of ADS-B aircraft	survey on the status of ADS-B aircraft	23/01/14	30/4/14	100%	IATA
5.2.1 Collect Information on implementation of ADS-B aircraft	ICAO Current Status of ADS- B aircraft	30/04/14	29/05/15		IATA
6.0 Implementation of ADS-B trials	Recommendations / testing improvements towards operational implementation	30/10/13	29/5/15		Group Members
6.1 ADS-B trials are underway	List of states that are making (Progress)	30/10/13	29/5/18	38%	United States, Cuba, México, Canadá, COCESNA, T and T, Dominican Republic, and Jamaica
6.2 Send to the members of the task group the Guide for testing	Guide for testing	13/02/14	13/02/14	100%	Relator
6.3 Begin to ADS-B trials in states that do not yet list of states that implemented and date (Progress)	Support for those who wish to trials	30/10/14	29/5/18	62%	States / Territories in the region that have not yet done
6.4 Sending quarterly reporting ICAO deficiencies in trials	Test results	30/10/13	29/5/18	19%	Cuba, México, Trinidad & Tobago y COCESNA
6.5 Deliver results of comparisons of statistics of ADS-B	results of comparisons of statistics of ADS-B	23/05/14	29/05/18	19%	Cuba, México, Trinidad & Tobago y COCESNA
7.0 Follow-up meeting and Teleconf to the development of ADS-B implementation	Final Report or Minute		At the end of each one	100%	ICAO NACC
8.0 Develop relevant operational requirements for the ADS-B implementation		15/11/13	30/04/14		Group Members
8.1 Creation of ad hoc group for the formation of the proposal	Op AdHoc Group members	23/05/14	23/05/14	100%	CONOPS AdHoc Group
8.2 Development the regional operational concept for the implementation ADS-B	CONOPS DRAFT	23/05/14	30/10/14	100%	CONOPS AdHoc Group
8.3 Deliver the regional operational concept for the implementation ADS-B	CONOPS	27/04/15	15/05/15	100%	CONOPS AdHoc Group Rapporteur
9.0 Develop technical requirements to purchase equipment for ADS-B trials		23/05/14	15/05/15		Group Members
9.1 Creation of ad hoc group for the formation of the proposal	Op AdHoc Group members	23/05/14	23/05/14	100%	Create Spec AdHoc Group

TASK NAME	DELIVERABLE	DATE START	DATE END	PERCENTAGE COMPLETED	RESPONSIBLE
9.2 Development of technical requirements for ADS-B equipment	Technical requirements for ADS-B equipment DRAFT	30/06/14	08/05/15	100%	Spec AdHoc Group
9.3 Deliver technical requirements for ADS-B equipment	Technical requirements for ADS-B equipment	30/06/14	08/05/15	100%	Spec AdHoc Group Rapporteur
10.0 Collect Information on operational implementation of ADS-B	State Compliance	31/10/13	31/12/18		Group Members

#### 4. Activities undertaken by the Task Force of ADS-B ANIWG:

- COCESNA informed on progress made in the implementation of ADS-B to continue its testing and end your station Cerro de Hula settings. He also commented on the test with the new integrated control center CENAMER data; statistics have been carried capabilities of aircraft equipped with ADS-B in the region, improving their Mode S radars and the inclusion of the ability of ADS-B to cover the entire continental area covered by the radar and northern part FIR by 2018, expanding the coverage of ADS-B, south of the FIR which are not covered by radar (Ex. Isla El Coco), and plans to conduct feasibility studies of MLAT systems with ADS-B capability to improve service coverage terminal ATC radar at airports
- Mexico reported the installation of 10 ADS-B stations at strategic locations to feed data ADS-B (DO-260 and DO-260A and Asterix Cat 21) for systems 4 Area Control (ACC) existing, with a view to improving surveillance for ATC in the Valley of Mexico (TMA operations and helicopters), ATC in Monterrey and Merida Airport Terminal Area, redundancy monitoring station Puerto Peñasco and Surveillance helicopters flying from / to the oil rig in the Gulf of Mexico
- United States presented to the Task Force the observed increase in the number of aircraft in United States airspace identified as being equipped with DO-260B and DO-282B ADS-B OUT. Similarly I presented sponsored by the FAA Projects for regulations the mandatory use of version 2 of the ADS-B avionics, analysis of installation problems / relevant settings and corrective action taken, as was the creation of the team responsible for investigating compliance issues of ADS-B and working with owner / operators and industry to solve, as well as the extension programmes related support operational implementation of ADS-B, referring to the specific regulations for the verification of the ADS-B flight
- Canada informed the Meeting of their ADS-B operations, including its current network of ground-based surveillance, the safety study-regulatory, approvals for the provision of services through ADS-B Out, AIP information related to ADS B, reports of anomalies and testing of NAV CANADA satellite link for ADS-B

- Dominican Republic presented a brief overview of the current status of monitoring service in Santo Domingo Flight Information Region (FIR) and his plans for the evaluation and implementation of multilateration and ADS in selected airports. The plans seek to provide ADS-B surveillance in low coverage areas at lower levels with three ADS-B receivers, one for the TMA Cibao, a second receiver in Loma Hoz and a third receiver to complement the radar as a backup security, to meet the high traffic areas in the TMA Americas and Punta Cana.
- Cuba presented its progress and lessons learned from the results of the continuation of the ADS-B trials (late 2014 and early 2015), the development of software for statistical analysis of ADS-B signals with very good results for testing and testing these systems are developing a multilateration system at Varadero airport, with excellent results, both for use in Surveillance and Control Surface Movement and study its implementation in other selected airports (**Appendix B, Project for the definition of the selected airports**)
- Jamaica has an ADS - B receptor, but no data are being analyzed as it is currently in the planning process to improve its automation system and plans to summarize the data collection and statistical processing end of the year
- Trinidad and Tobago presented its ADS-B trial plans, currently supported for only one equipment, which will require its extension to increase its coverage with additional receivers
- In this period, the Task Force held a teleconference in January and will be its annual Meeting on April.

**(Appendix A, State Compliance Task Force ADS-B ANIWG)**

**5. Suggested Actions**

- a) Take note of what is presented in this paper;
- b) review and approve the report of the ADS-B TF;
- c) take any other action as deemed appropriate

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**STATE COMPLIANCE TASK FORCE ADS-B ANIWG**

No.	State/Estado	They are currently conducting ADS-B /Están realizando actualmente ensayos ADS-B	They are collecting statistics ADS-B trials/Están recolectando estadísticas de ensayos con ADS-B	They are sending statistics ADS-B trials with ICAO /Están enviando estadísticas de ensayos con ADS-B a la OACI	They have adopted regional operational concept for implementing ADS-B /Tienen adoptado el concepto operacional regional para la implementación ADS-B	Installed ADS-B receivers that meet the technical requirements approved regional /Receptores ADS-B Instalados que cumplen con los requerimientos técnicos regionales aprobados	Representation automated radar system ready to use ADS-B data/Sistema automatizado de representacion radar listo para usar datos ADS-B	% Coverage of ADS-B FIR installed /% de cobertura ADS-B de la FIR instalada	ADS-B deployed operationally /ADS-B implementado operacionalmente	Date to begin the ADS-B implementation/Fecha para comenzar la implementación de ADS-B
1.	Antigua and Barbuda									
2.	Bahamas									
3.	Barbados									
4.	Belize	N	N	N	N	1 (2016)	N		N	
5.	Canada	Y	N/A	N/A	N/A	Y	Y	10%	Y	Y
6.	Costa Rica	Y	N	N	N	1 (2016)	N		N	
7.	Cuba	Y	Y	Y	N	6	N	100%	N	
8.	Dominican Republic	N	N	N	N	0	Y	0	N	
9.	El Salvador	N	N	N	N	N	Y		N	
10.	Grenada									
11.	Guatemala	N	N	N	N	N	Y		N	
12.	Haiti									
13.	Honduras	N	N	N	N	N	N		N	
14.	Jamaica	Y	N	N	N	1	N	30-40%	N (Trial)	2017/2018
15.	Mexico	Y	Y	Y	Y	10	Y			
16.	Nicaragua	N	N	N	N	N	Y		N	
17.	Saint Kitts and Nevis									
18.	Saint Lucia									
19.	Saint Vincent and the Grenadines									

No.	State/Estado	They are currently conducting ADS-B /Están realizando actualmente ensayos ADS-B	They are collecting statistics ADS-B trials/Están recolectando estadísticas de ensayos con ADS-B	They are sending statistics ADS-B trials with ICAO /Están enviando estadísticas de ensayos con ADS-B a la OACI	They have adopted regional operational concept for implementing ADS-B /Tienen adoptado el concepto operacional regional para la implementación ADS-B	Installed ADS-B receivers that meet the technical requirements approved regional /Receptores ADS-B Instalados que cumplen con los requerimientos técnicos regionales aprobados	Representation automated radar system ready to use ADS-B data/Sistema automatizado de representacion radar listo para usar datos ADS-B	% Coverage of ADS-B FIR installed /% de cobertura ADS-B de la FIR instalada	ADS-B deployed operationally /ADS-B implementado operacionalmente	Date to begin the ADS-B implementation/Fecha para comenzar la implementación de ADS-B
20.	Trinidad and Tobago	N	N	N	Y	1	Y	0%(note4)	N	N
21.	United States	Y	N (note 1)	N (note 1)	N (note 2)	Over 600	Y	Over 100% (note 3)	Y	Y

Note 1 - the US already completed its “trial” phase and is now using ADS-B operationally.

Note 2 - the US ConOps for ADS-B was approved and adopted prior to the existence of the regional ConOps – the US believes that our ConOps is substantially compatible, but has not performed a formal comparison

Note 3 – this coverage percentage is applicable to all US FIR airspace currently covered by SSR or WAM surveillance – it does not include all US-managed oceanic FIR airspace

Note 4 - 1 Single installation supplied with atm system and not operationalized.

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## **APPENDIX B**

### **DEFINITION PROJECT FOR THE SELECTED AIRPORTS RELATE TO ADS-B METRICS**

In response to the ADS-B DECISION/TF/2/7, DEVELOPMENT OF SELECTION CRITERIA TO ADS-B METRICS, which is entrusted the Dominican Republic, Mexico and United States, I quote: "development requirements (criteria) for the definition of the selected airports related to ADS-B metrics" and seen that the use of ADS-B at aerodromes as a surveillance tool for Surface Movement Guidance and Control Systems (SMGCS), whose criteria implementation are defined in Doc. 9476, (Manual of Surface Movement Guidance and Control Systems, SMGCS) and seen that recipients of ADS-B either alone or combined with Surface Movement Radar (SMR ), are part of the elements necessary for the operation of an airport in low visibility conditions, we recommend to accommodate these criteria as a guide for the States when they define in which of its airports should be implemented using ADS-B for the purpose of improving situational awareness on the surface.

#### **OPERATIONAL CONDITIONS**

The SMGCS system to be established at an aerodrome depends on two main operative conditions:

- a) The visibility conditions in which the aerodrome authority plans to maintain the airfield open for operations; and
- b) Traffic density.

Each of these conditions has been defined more extensively in Table 2, in which is established the criteria for the need of a SMGCS System.

Even when one of the criteria is a visibility less than 400 m, it have not been taken into consideration the requirements relating to an aircraft's taxing with zero visibility or close to this value. The operating experience shows that these conditions are not commonly likely to occur and the cost of the necessary equipment that allows carrying out operations of this kind, do not justify to consider it at the moment.

#### **VISIBILITY CONDITIONS AND TRAFFIC**

The Visibility conditions in which the aerodrome administration projects the realization of operations and the traffic density are the two most important factors to consider when choosing the components of a Surface Movement Guidance and Control Systems (SMGC) for an airport. For purposes of examining the SMGCS systems, the visibility and traffic have been sub-divided and defined in accordance with the terms of Table 1. In all cases where these terms are used, their meanings are defined therein.



<b>Table 1. Visibility Conditions and Traffic on the SMGCS systems - Explanation of Terms</b>	
<b>VISIBILITY CONDITIONS</b>	
<b>1</b>	enough for the pilot to taxi and visually avoid collision with other traffic on taxiways and intersections and the personnel control units can visually monitor all traffic visibility;
<b>2</b>	enough for the pilot to taxi and visually avoid any collision on taxiways and intersections, but insufficient for the personnel of control units to visually monitor all traffic visibility; and
<b>3</b>	visibility less than 400 m RVR (low visibility operations)
<b>TRAFFIC DENSITY</b>	
(During rush hour averaged determined by the State)	
<b>Reduced:</b>	less than or equal to 15 movements per runway or less than a total of 20 movements at the aerodrome;
<b>Media:</b>	From 16 to 25 movements per runway or a total of 20 to 35 movements at the aerodrome; and
<b>Vivid:</b>	From 26 or more movements per runway or more than a total of 35 movements at the aerodrome.

<b>Table 2. Guidance for the need of a Surveillance System</b>				<b>Doc. Reference</b>						
<b>Traffic Conditions</b>	Reduced			Medium			Intense			Doc 9476
<b>Visibility Conditions</b>	1	2	3	1	2	3	1	2	3	Doc 9476
<b>Help Required</b>										
<b>System Requirements for the Surveillance and Control of Surface Movement (ADS-B/SMR)</b>						X		X	X	Doc 9426