ICAO International Civil Aviation Organization
North American, Central American and Caribbean Office

Seventh North American, Central American and Caribbean Working Group Meeting

(NACC/WG/7)

Final Report

Mexico City, Mexico, 29 August to 1 September 2022

Prepared by the Secretariat

January 2023

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HISTORICAL

ii.1 Place and Date of the Meeting

The Seventh North American, Central American and Caribbean Working Group Meeting (NACC/WG/07) was held at the ICAO NACC Regional Office in Mexico City, Mexico, from 29 August to 1 September 2022.

ii.2 Opening Ceremony

Mr. Melvin Cintron, Regional Director of the North American, Central American and Caribbean (NACC) Office of the International Civil Aviation Organization (ICAO) provided opening remarks, highlighting the importance of the timely participation of all States and Territories for the continuous and successful implementation of Air Navigation (AN) matters in the region, following specific targets and goals as required in the regional and global AN plans, and finally welcomed the participants to the ICAO NACC Regional Office, and officially opened the meeting. The NACC/WG Chairperson Mr. Julio Mejia, also welcomed the NACC/WG Members and briefed on the meeting's expectations.

ii.3 Officers of the Meeting

The NACC/WG/07 Meeting was held with the participation of the Chairperson, Mr. Julio Mejia, who chaired the meeting plenary. Mrs. Mayda Ávila, Regional Officer, Communications, Navigation and Surveillance (CNS) and Mr. Eddian Mendez, Regional Officer, Air Traffic Management and Search and Rescue (ATM/SAR) served as Secretary and Co-Secretary of the Meeting, assisted by Mr. Raúl Martínez, Regional Officer, Aeronautical Information Management (AIM), Mr. Luis Sánchez, Regional Officer, Aeronautical Meteorology and Environment (MET/ENV), and Mrs. Fabiana Todesco, Regional Officer, Aerodromes and Ground Aids (AGA) all from the ICAO NACC Regional Office.

ii.4 Working Languages

The working languages of the Meeting were English and Spanish. The working papers, information papers and draft report of the meeting were available to participants in both languages. Presentations were available in the original language provided.

ii.5 Schedule and Working Arrangements

It was agreed that the working hours for the sessions of the meeting would be from 09:00 to 16:00 hours daily with adequate breaks. Ad hoc Groups were created during the Meeting to do further work on specific items of the Agenda.

ii.6 Agenda

Agenda Item 1: Review and Approval of the Meeting Agenda, Work Modality and Schedule

Agenda Item 2: Follow-up to the Conclusions and Previous Agreements of NACC/WG, CAR/SAM Planning and Implementation Regional Group (GREPECAS) and Other Related Matters

2.1 Review of valid meeting conclusions/decisions impacting NACC/WG activities
2.2 Status of operation of the States after COVID-19.
2.3 Development status of the GREPECAS Projects.
2.4 Follow-up to the Air Navigation Services (ANS) support projects
2.5 ANS training needs

Agenda Item 3: Follow-up of the Activities of the NACC/WG Task Forces

3.1 Progress of the NACC/WG on Aeronautical Information Management (AIM), Air Traffic Management (ATM) and Communications, Navigation and Surveillance (CNS)
3.2 Progress of Aerodromes and Ground Aids (AGA), Meteorology (MET) and other regional implementation groups
3.3 Improvements to the ATS Voice Link (MEVA) reports and the new communication network CANSNET, the Eastern Caribbean Civil Aviation Technical Group (E/CAR/CATG), and the Eastern Caribbean Aeronautical Fixed Service Network Technical Group (E/CAR AFS NTG)

Agenda Item 4: NACC/WG Work Programme Update to 2024

4.1 Review of the Terms of Reference (ToRs) and update of the NACC/WG Working programme
4.2 Development of the Electronic Air Navigation Plan e-ANP Volume III
4.3 Implementation of mechanisms for measuring the performance of air navigation services
4.4 Development/updating of national air navigation plans
4.5 Emerging technologies and regional challenges

Agenda Item 5: Other Business

ii.7 Attendance

The Meeting was attended by 14 States/Territories from the NAM and CAR Regions, 3 International Organizations and 4 representatives of the industry, totalling 59 delegates as indicated in the list of participants.

ii.8 Conclusions and Decisions

The Meeting recorded its activities as Conclusions and Decisions as follows:

CONCLUSIONS: Activities requiring endorsement by the Directors of Civil Aviation of North America, Central America and Caribbean (NACC/DCA).

DECISIONS: Internal activities of the NACC Working Group (NACC/WG).

An executive summary of these conclusions/decisions is presented in **Appendix A** to this report.

ii.8.1 List of Conclusions

Number	Title	Page
C/01	**IMPLEMENTATION AND SUPPORT OF MINIMUM ATFM REQUIREMENTS**	3-5
C/04	**NACC/WG TASK GROUP MEMBERSHIP UPDATE**	3-10
C/08	**DEFINITION OF THE LIMITS AND RESPONSIBILITIES OF THE SEARCH AND RESCUE REGIONS OF THE CAR REGION**	3-18
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C/11	**AGA TASK FORCE (NACC/WG TF/AGA)**	3-23
C/12	**AGA CONTACT INFORMATION**	3-24
C/14	**AERONAUTICAL FREQUENCY MANAGEMENT TASK FORCE**	3-30

ii.8.2 List of Decisions

Number	Title	Page
D/02	**APPROVAL OF THE REVISED WORK PROGRAM OF THE ATFM TASK FORCE**	3-6
D/03	**NACC/WG/ASBU TASK GROUP WORK PLAN UPDATE**	3-7
D/05	**GUIDE FOR STATES ON PARAMETERS TO MONITOR THE PERFORMANCE OF ADS-B SYSTEMS**	3-11
D/06	**AD HOC WORKING GROUP TO CATEGORIZE TERMINAL AIRSPACE PROCEDURES**	3-16
D/07	**UPDATE OF CAR REGION AIRSPACE OPTIMIZATION DEVELOPMENT CONCEPT DOCUMENT**	3-17
D/10	**CENTRAL AMERICAN EXPERIENCE FOR PLANNING AND RESPONSE TO CONTINGENCIES**	3-20

ii.9 List of Working and Information Papers and Presentations

Refer to the Meeting web page:
https://www.icao.int/NACC/Pages/meetings-2022-naccwg7.aspx

WORKING PAPERS

Number	Agenda Item	Title	Date	Prepared and Presented by
WP/01	1	Provisional agenda and schedule	24/08/22	Secretariat
WP/02	2.1	Conclusions and Decisions of previous meetings that impact the activities of the NACC/WG	25/08/22	Secretariat
WP/03	2.3	Developments in grepecas projects	02/08/22	Secretariat
WP/04	3	North American, Central American and Caribbean Working Group (NACC/WG)	02/08/22	Secretariat
WP/05	3.1	Status of activities of the AIDC Task Force	26/08/22	AIDC Task Force Rapporteur
WP/06	3.1	AIM TF Progress Report	28/08/22	Secretariat
WP/07	3.1	Progress report by the Air traffic flow management (ATFM) Task Force	25/08/22	ATFM Task Force Rapporteur
WP/08	3.1	Preparation for the Seventh Edition of GANP/ASBU	02/08/22	ASBU Task Force Rapporteur.
WP/09	3.1	The ASBU Task Force: Recommendations The Terms of Reference (TOR), work program, and membership Point of Contact (POC) list	02/08/22	ASBU Task Force Rapporteur
WP/10	3.1	Progress report on Surveillance Task Force Work Programme	08/08/22	Surveillance Task Force Rapporteur

WORKING PAPERS

Number	Agenda Item	Title	Date	Prepared and Presented by
WP/11	3.1	Guide for States on parameters to monitor the performance of ADS-B systems	02/08/22	Surveillance Task Force Rapporteur
WP/12	3.1	Technical assistance and collaboration for the installation of statistical analysis software of ADS-B aeronautical surveillance systems	08/08/22	Cuba
WP/13	3.1	Air Space Optimization	29/08/22	AO Task Force Rapporteur
WP/14	3.1	Progress report of the Search and Rescue Implementation Task Force (SAR/TF)	02/08/22	SAR/TF Rapporteur
WP/15	3.1	Verification of the Basic Building Blocks (BBB) for MET in the CAR region	29/08/22	Secretariat
WP/16	3.2	Status of activities in Aerodromes and Ground Aids	21/08/22	Secretariat
WP/17	3.3	Operation and performance of the MEVA III Network in the period 06/2021 – 07/2022	28/08/22	MEVA/TMG Rapporteur
WP/18	3.1	E/CAR/NTG/11 - E/CAR/RD/9 Meetings Ad-hoc groups report	28/07/22	E/CAR/NTG Rapporteur
WP/20	4.3	AIM/CAR Workshop on datasets and electronic aeronautical charts (eCharts)	04/08/22	Secretariat
WP/21	3.1	New 7th Edition of the 8126 Aeronautical Information Services Manual	08/08/22	Secretariat
WP/22	3.1	AIM Deficiencies	10/08/22	Secretariat
WP/23 REV	4.3	AIM regional guidance and planning - AIM partnership plan (CAR) - AIM TRACKING WEBSITE	29/08/22	Secretariat
WP/24	4.3	Human Performance and Human Factors In AIM	26/08/22	Secretariat
WP/25	3.1	Progress report on CAR region contingency planning and response	29/08/22	Secretariat
WP/27	3.1	Follow up on the activities for better frequency management in the region	26/08/22	Frequency Management Rapporteur
WP/28	4.2	Report on the progress in the formulation and management of Volume III of the Air Navigation Plan of the CAR/SAM Regions/replacement of the RPBANIP	29/08/22	Secretariat
WP/29	4.3	States' Action Plans (SAP) on CO2 emissions reduction activities	30/08/22	Secretariat
WP/30	4.3	Dashboards for Air Navigation Services	29/08/22	Secretariat

WORKING PAPERS

Number	Agenda Item	Title	Date	Prepared and Presented by
WP/33	4.4	Development and updating of air navigation plans of CAR States	29/08/22	Secretariat
WP/34	4.5	Cybersecurity in Air Navigation Services	30/08/22	Secretariat
WP/35	4.5	Integration of Unmanned Aircraft Systems	30/08/22	Secretariat
WP/36	3.1	Green ATM Accreditation Programme - Supporting operational measures for green aviation	03/08/22	CANSO
WP/37	3.1	Emergency and contingency response planning in Central America	11/08/22	COCESNA
WP/38	2.2	Central American experience on the continuity of aeronautical services through COCESNA during the COVID-19 PANDEMIC	11/08/22	COCESNA
WP/39	3.1	Interferences due to 5-G implementation in Central America	11/08/22	COCESNA

INFORMATION PAPERS

Number	Agenda Item	Title	Date	Prepared and Presented by
IP/02	3.3	Caribbean Air Navigation Services Network (CANSNET)	22/08/22	Cuba

PRESENTATIONS

Number	Agenda Item	Title	Presented by
P/01	5	Satellite-based VHF voice and data communications	Startical
P/02	3.1	ASBU TF Report	ASBU TF Rapporteur
P/03	3.1	ASBU TF Terms of Reference, Work Program, and Membership Point of Contact List	ASBU TF Rapporteur
P/04	3.1	ATFM Task Force	ASBU TF Rapporteur
P/05	3.1	Airspace Optimization	ASBU TF Rapporteur
P/06	3.2	Estado de actividades en Aeródromos y ayudas terrestres (*available in Spanish only*)	Secretariat

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Agenda Item 1 Review and approval of the meeting agenda, work modality and schedule

1.1 The Secretariat presented WP/01 inviting the Meeting to approve the provisional agenda, schedule and working method, and referred to IP/01 with the list of documentation and associated presentations. The Meeting approved the agenda, work method and schedule, which are presented in the Historical of this report.

Agenda Item 2 **Follow-up to the Conclusions and Previous Agreements of NACC/WG, CAR/SAM Planning and Implementation Regional Group (GREPECAS) and Other Related Matters**

2.1 Review of Valid Meeting Conclusions/Decisions Impacting NACC/WG Activities

2.1.1 Under WP/02, the Secretariat presented a review of the valid list of conclusions/decisions, derived from previous meetings of the NACC/WG, the CAR/SAM Regional Planning and Implementation Group), GREPECAS and other related matters.

2.1.2 WP/02 reported that, of the NACC/WG, of eleven valid conclusions/decisions, seven of them are reported as completed as follows:

Number	Title	Status
DECISION NACC/WG/06/01	REVIEW DECISION AND CONCLUSION OF PREVIOUS MEETINGS	**Completed**
DECISION NACC/WG/06/02	ELIMINATION OF AIR NAVIGATION DEFICIENCIES IN THE ANS FIELDS	**Completed**
DECISION NACC/WG/06/03	AMENDMENT OF THE PBN TASK FORCE NAME AND TERMS OF REFERENCE	**Completed**
DECISION NACC/WG/06/04	COORDINATION FOR THE EXPANSION OF CANSO CADENA INTERREGIONAL ROUTES OPTIMIZATION TESTS	**Completed**
CONCLUSION NACC/WG/06/05	DATA ON THE STATES AIM IMPLEMENTATION STATUS	**Completed**
CONCLUSION NACC/WG/06/07	NAM/CAR OPERATIONS CONCEPT DOCUMENT (CONOPS) FOR ADS-B IMPLEMENTATION	**Completed**
CONCLUSION NACC/WG/06/11	REPLACEMENT OF ANI/WG BY THE NACC/WG	**Completed**

2.1.3 In relation to the conclusions and decisions of the fourth virtual meeting of the GREPECAS Programmes and Projects Review Committee (PPRC), the four conclusions are activities that have already been worked on by the NACC/WG Task Force and their progress percentage would be reported to GREPECAS.

2.1.4 With regard to the Tenth North American, Central American and Caribbean Directors of Civil Aviation Meeting (NACC/DCA/10), held in June 2022, seven conclusions were agreed that directly impact the work of the NACC/WG, from which NACC/WG will inform on its implementation to the next NACC/DCA meeting.

2.1.5 The Meeting and the different Task Forces were invited to incorporate the necessary actions in their action plans to complete the work requested by the Directors of the NAM and CAR Regions.

2.1.6 **Appendix B** of this report shows the Conclusions and Decisions that are still valid.

2.2 Status of operation of the States after COVID-19

2.2.1 The Secretariat informed the Meeting on the post COVID-19 aviation recovery actions and activities, and the lessons learned as a result of the pandemic would be discussed through the different working papers that presented the activities of the different air navigation areas during the course of the meeting.

2.2.2 Under WP/38, the Air Navigation Services Corporation (COCESNA) summarized the experience obtained in Central America, the measures adopted during the Coronavirus pandemic and COVID-19, with the purpose of ensuring the continuity of the aeronautical services provided by COCESNA despite the unprecedented economic impact, and maintain the safety levels required by each of its Member States and civil aviation.

2.2.3 In order to mitigate the probability and impact of contagion and the spread of the virus among the air traffic controllers of the CENAMER control centre, biosafety protocols and action plans were prepared, as well as the implementation of aircraft flow planning in the Central American airspace.

2.2.4 In the area of maintenance of aeronautical systems, a comprehensive analysis of maintenance management was developed, taking into account the routines and the periodicity with which they were executed to make changes in those cases that would allow it and, with this, ensure the operability of the systems and comply with the availability and reliability requirements established by the industry.

2.2.5 Proactively, COCESNA took measures to reduce expenses, reviewing projects underway as part of its Comprehensive Investment Plan and immediately freezing strategic and operational projects that had not started and did not represent a commitment for the organisation, leaving only those critical investments that already had a contract and that were essential for the continuity of COCESNA and its Member States.

2.2.6 COCESNA indicated that, despite the economic crisis, it had continued executing critical projects for the benefit of COCESNA and its Member States.

2.3 Development status of the GREPECAS Projects

2.3.1 The Secretariat reported, through WP/03, the status of the GREPECAS Programmes and Projects for the CAR Region, indicating the improvements associated with the review of the Air Navigation Services (ANS) Projects, referring to the Aviation System Block Upgrades (ASBU) and the implementation of the CAR/SAM Air Navigation Plan (ANP) Vol. III, currently under development. The Meeting suggested the continuous review of the Projects in support of the implementation of ICAO Standards and Recommended Practices (SARPs) in the CAR/SAM Regions.

2.3.2 Likewise, the Meeting mentioned on the validity status of the Projects as follows:

- ATM projects A1, B1 and B2 are still valid.
- CNS projects C and D continue to be valid.

- A new Project F, on airport collaborative decision making (CDM) and aerodrome maintenance on safety management (SM) and AGA Programme certification.
- The AIM Project for the implementation of the AIM Collaborative Plan.
- MET Projects H2, H3 and H4 were completed and no new Project was proposed.
- Concerning SAR, the subscription of Distance Letters of Agreements and Effective Implementation of SAR Services were proposed.

2.3.3 The Secretariat informed the Meeting on the Dashboard, to indicate the progress in the ANS implementation of the GREPECAS Regions and the monitoring of Programmes and Projects as a mechanism for control and measurement of the efficiency of ANS Projects, with the goals for the second semester of 2022, presented in previous Meetings, as follows:

INITIAL GOALS TO THE YEAR 2022
Goal 1) Increase the annual percentage of effective implementation of the projects proposed in the Working Groups.
Goal 2) Link the needs of the CAR/SAM States with the implementation projects of the Regions, contributing to regional initiatives, through the training of Human Resources.
Goal 3) Establish an effective work methodology that guarantees the continuity of the work and the fulfilment of current and future goals.
Goal 4) Establish a program for the exchange of good practices among the States, based on the objectives of the Global Air Navigation Plan (GANP) and the ICAO Global Aviation Safety Plan (GASP), through the GREPECAS and the Regional Aviation Safety Group–Pan America (RASG-PA) implementation projects.

2.4 Follow-up to the Air Navigation Services (ANS) support projects

2.4.1 The Secretariat indicated that States should benefit from the Multi-Regional Civil Aviation Assistance Programme (MCAAP) Project and propose activities within it that support regional implementation activities. Additionally, it was reported that the activities that had been postponed due to the COVID-19 Pandemic were being resumed.

2.5 ANS training needs

2.5.1 The Secretariat invited the Task Forces to identify regional training needs as part of their action plan, within the framework of regional objectives.

Agenda Item 3 Follow-up of the Activities of the NACC/WG Task Forces

3.1 Progress of the NACC/WG on Aeronautical Information Management (AIM), Air Traffic Management (ATM) and Communications, Navigation and Surveillance (CNS)

3.1.1 The Secretariat presented WP/04 to provide information on the decision to update the information regarding the structure of the NACC Working Group.

3.1.2 During the NACC/WG/06 meeting, the NACC/WG/06/11 CONCLUSION "REPLACEMENT OF ANI/WG BY THE NACC/WG" was adopted with the aim of making ANS work more efficient and integrated among the States of the NAM/CAR Regions, and merge the on-going ANS implementation work of the States of.

3.1.3 Consequently, the NACC/WG Working Group will be the sole regional implementation Group on AN matters for the NAM and CAR Regions, integrating all ANS and AGA areas. The new terms of reference of the NACC/WG and the Group's website have been updated and can be found at the following link:

https://www.icao.int/NACC/Pages/nacc-regionalgroups-naccwg_en.aspx

3.1.4 The rapporteurs of the NACC/WG Task Forces were updated:

1)	NACC/WG/AIM Task Force:	Ms. Natasha Belefanti (Curaçao)
2)	NACC/WG/AIDC Task Force:	Mr. Fernando Casso (Dominican Republic)
3)	NACC/WG//ASBU Task Force:	Ms. Midori Tanino (United States)
4)	NACC/WG/ATFM Task Force:	Mr. Vern Payne (United States)
5)	NACC/WG/SURV Task Force:	Mr. Alejandro Rodriguez (United States)
6)	NACC/WG/AO Task Force:	Mr. Riaaz Mohammed (Trinidad and Tobago)
7)	NACC/WG/SAR Task Force:	Mr. Calvin Zuniga (COCESNA)

3.1.5 In addition, it was reported that the NACC/WG worked jointly with the following groups: the Eastern Caribbean Network Technical Group (E/CAR/NTG), the Ad hoc Group on Radar Data Sharing (E/CAR/RD), the MEVA Technical Management Group (MEVA/TMG), and the Eastern Caribbean Civil Aviation Technical Group (E/CAR/CATG), and in coordination with the CAR/SAM Planning and Implementation Regional Group (GREPECAS) and the Regional Aviation Safety Group–Pan America (RASG-PA), as well as other regional groups such as the NAM/CAR Civil Aviation Training Centres Working Group (NAM/CAR/CATC/WG), etc.

3.1.6 The Meeting was also informed that, at the level of the ICAO NACC Regional Office, the Air Navigation Officers support the activities of the Group, as follows:

1) Regional Officer, Aeronautical Information Management (AIM): Mr. Raul Martinez.
2) Regional Officer, Aeronautical Meteorology and Environment (MET/ENV): Mr. Luis Sanchez.

3) Regional Officer, Communications, Navigation and Surveillance (CNS): Mrs. Mayda Avila.
4) Regional Officer, Air Traffic Management and Search and Rescue (ATM/SAR/1): Mr. Eddian Méndez.
5) Regional Officer, Aerodromes and Ground Aids (AGA): Mrs. Fabiana Todesco.
6) Regional Officer, Air Traffic Management and Search and Rescue (ATM/SAR/2): Mr. Ernie Snyder.

3.1.7 The NACC/WG was also informed on the

a)	**Chairman:**	Mr. Julio Mejía	(Dominican Republic)
b)	**Vice-Chairman:**	Mr. Rohan Garib	(Trinidad and Tobago)
c)	**Secretary**	Mrs. Mayda Ávila and	ICAO
	Co-Secretary	Mr. Eddian Méndez	

3.1.8 Due to the new structure of the NACC/WG, to the new reality resulting from the COVID-19 pandemic, and to the need to restart the regional implementation work in a more organized manner, the Meeting agreed that States, Territories and International Organizations would update the information of the NACC/WG, as well as the membership of the different Task Forces.

AIDC Task Force

3.1.9 Under WP/05, the AIDC Task Force rapporteur reported that during the Pandemic there was reduced implementation activity of AIDC automated protocols in the region, due to the fact that several members of the Task Force had retired and their replacements were beginning to take over the effort of their predecessors.

3.1.10 The AIDC/TF rapporteur reported on the results of the last meeting held by the TF in June 2022 and on the need to focus on supporting States that were already in the process of implementing automated channels so that they could be placed into operation as soon as possible.

AIM Task Force

3.1.11 WP/06 presented by the AIM/TF reminded the Meeting that it has the main task of completing the implementation of the ICAO Roadmap for the transition from the aeronautical information service (AIS) to AIM, the application of the Procedures for Air Navigation Services (PANS) AIM (Doc 10066), with the methodology and procedures that support the implementation and management of data sets in the electronic and digital environment, as well as the 7th Edition of the Aeronautical Information Services Manual (Doc 8126 – in 4 sections), which reinforces the AIM processes, aligned to the Global Air Navigation Plan (GANP) 6th Edition.

3.1.12 States were also asked to provide information on the implementation of the steps for the Transition to AIM, which would soon be reflected in the information of all, through the AIM website, which will be available at the end of the year 2022 or the beginning of the year 2023. It is very important to implement and certify the Quality Management System (QMS)/AIM and to support and actively participate in the AIM Collaborative Plan for the CAR Region. The latter provides guidelines to the States

for the implementation of the 21 steps of the Roadmap, as well as the related requirements from Annex 15 and the PANS - AIM, which will be represented on the AIM monitoring website (under development).

3.1.13 The Secretariat emphasized the importance of the implementation of the Digital Data Sets (DDS), the Data Catalogue and the Aeronautical Information Exchange Standard Model (AIXM) to develop an environment oriented to the System wide information management (SWIM). On the other hand, the Workshop on "Data Sets and Electronic Aeronautical Charts" was reported.

3.1.14 Following up on the issue of the AIM Tracking Website, States are expected to actively participate and share their information to the AIM/TF and the ICAO Secretariat. This site will also contain guides to support the transition to AIM. A preview of said monitoring website would be presented during the GREPECAS/20 Meeting, in Salvador Bahía, Brazil, from 16 to 18 November 2022.

3.1.15 It was determined that Conclusion NACC/WG/06/06 "IMPLEMENTATION OF THE DIGITAL DATA SETS (DDS), OF THE e-AIP DATA AND AERONAUTICAL INFORMATION EXCHANGE MODEL (PANS AIM)" was valid, with an estimated date for the implementation of the Transition to AIM by the end of the year 2025.

3.1.16 WP/21 from the Secretariat informed the Meeting on the new 7th Edition of Doc 8126 *Aeronautical Information Services Manual* that now contains four sections and its objective is to guide the legacy AIS processes and new AIM practices and integrate future technological developments within the SWIM context. This document guides AIM/AIS operational personnel, management bodies and regulatory authorities.

3.1.17 The document considers the need for better access to timely and meaningful information in support of autonomy in decision-making, based on digital AIM, focused on data. This organization seeks the collection of data that will facilitate the modernization of the ATM environment in accordance with SWIM requirements. A summary of the four sections of the new edition of Doc. 8126 was presented to the attendees, as follows:

- Part I — Regulatory framework for aeronautical information services explains the responsibilities and functions of AIS and provides guidance for the organizational development of AIS, including the transition to AIM (see Roadmap for the transition from AIS to AIM - ICAO).

- Part II — Aeronautical Data Processing, provides guidance for the processing of aeronautical data and aeronautical information when considering operational arrangements for aeronautical information management in data-centric environments.

- Part III — Aeronautical Information in a Standardized Presentation and related services provides guidance for aeronautical information to be distributed in a standardized presentation.

- Part IV — Digital Aeronautical Information Products and Related Services provides guidance for the distribution of digital products and services (under development).

3.1.18 The Secretariat presented, under WP/22, information on the importance of periodic review to update the Manual of the World Geodetic System 1984 (WGS-84) network of points Primary and Secondary Airport Control Points (PAC and SAC) (WGS-84 – Doc 9674), and publish the updates in the aeronautical charts of the Aeronautical Information Publications (AIPs), as well as the certification of the QMS AIM (Doc 9839, Manual on the management system of quality for aeronautical information services), in the CAR Region, which are two of the deficiencies identified in the AIM field. Its objective is to demonstrate to GREPECAS that it is important to complete the necessary work to rectify these two significant deficiencies in the CAR States, requesting an appropriate Conclusion or Decision.

3.1.19 In both subjects, the Secretariat and the user community have identified potential safety risks for Area navigation (RNAV) PBN navigation projects, especially precision approaches, and other aspects of navigation and in controlled airspaces , etc. It would seek to propose a joint Action Plan at the regional and inter-regional level, in order to resolve the deficiencies, both with geodetic surveys and with the associated post-processes for new updated coordinate data, such as the QMS AIM certification.

ATFM Task Force

3.1.20 The Rapporteur of the ATFM Task Force presented WP/07 with information on the progress made) since its previous progress report. This report included the results of previously identified deliverables and recommendations to improve the role and coordination of the task force.

3.1.21 The ATFM Task Force held monthly online meetings. The meetings included information on the response to the global pandemic, impacts on flight operations, and forecasts for future operations. These online meetings included briefings by working group members and discussions on the benefits of sharing traffic data for the region.

3.1.22 The role of the ATFM Task Force rapporteur underwent a change in the first quarter of this year. The new rapporteur of the ATFM Task Force is Mr. Vern Payne (United States).

3.1.23 The ATFM Task Force prepared a proposal to include the minimum ATFM Requirements for the CAR Region, which are found in Appendix B of the report of the Third North American, Central American and Caribbean Working Group (NACC/WG) Air Traffic Flow Management (ATFM) Implementation Task Force Meeting (ATFM/TF/3): https://www.icao.int/NACC/Pages/meetings-2022-atfm03.aspx. Due to the importance of its application and its interaction with adjacent regions, such as the SAM Region, the need for it to be included as part of the CAR/SAM Regional Plan was seen. This proposal includes:

- requirements for the establishment of Flow Management Units (FMU) in the CAR Region;
- basic strategic and tactical functions of the ATFM service;
- regional actions to mitigate the impact of ATFM measures; and
- State responsibility for the provision and supervision of ATFM.

3.1.24 Based on the discussions of the Meeting, the following conclusion was reached:

<table>
<tr><td colspan="3">CONCLUSION
NACC/WG/07/01 IMPLEMENTATION AND SUPPORT OF MINIMUM ATFM REQUIREMENTS</td></tr>
<tr><td colspan="2">What:
That, in order to ensure proper implementation and support for its harmonized regional operation:
a) the Secretariat continue developing the proposal for amendment for the inclusion in the CAR/SAM Regions Air Navigation Plan of minimum requirements for ATFM in the CAR Region, in accordance with the required levels of services and their interrelation in the Regional ATM network by April 2023; and
b) States support the implementation and operation of ATFM in the CAR Region, promoting decision-making from a regional perspective in order to collaborate to reduce the impact of air traffic management measures taken by any State/Territory or ANSP.</td><td>Expected impact:
☐ Political / Global
☒ Inter-regional
☐ Economic
☐ Environmental
☒ Operational/Technical</td></tr>
<tr><td colspan="3">Why:
To allow a harmonized ATFM in the CAR Region.</td></tr>
<tr><td>When:</td><td>a) PPRC/05 - April 2023 and
b) immediate</td><td>Status: ☒ Valid / ☐ Superseded / ☐ Completed</td></tr>
<tr><td>Who:</td><td>☒ States ☐ ICAO ☒ Other:</td><td>NACC/WG Secretariat</td></tr>
</table>

3.1.25 The ATFM Task Force requested the Secretariat for more direct support and practical guidance on data collection and analysis mechanisms, acknowledging the different capabilities among service providers.

3.1.26 Additionally, the ATFM Task Force requested the Secretariat to report on the actions to make guidance material on the determination process of the capacity of the Air Traffic Control (ATC) sectors available to States, Territories and Air Navigation Service Providers (ANSPs) of the CAR Region, as well as organizing training activities, taking into account the different ATC capacity calculation methodologies available and used in the region.

3.1.27 In response to this regional need, CANSO will coordinate with the ATFM Task Force to support and provide training in capacity calculation methodology through CANSO Air Traffic Flow Management Data Exchange Network for the Americas (CADENA). In addition, CANSO will offer the CADENA Procedural Handbook to the Task Force, which includes the functions and responsibilities of ATFM personnel and FMUs.

3.1.28 The ATFM Task Force decided to approve the use of CADENA as a mechanism to facilitate data exchange and promote a common situational awareness that is vital for the safe, efficient and harmonized flow of air traffic.

3.1.29 The ATFM Task Force reviewed its current work programme to update those activities that were completed and those that needed to be reviewed to maintain their validity (**Appendix C** of this report), and therefore, the Meeting adopted the following:

<table>
<tr><td colspan="3">DECISION
NACC/WG/07/02</td><td colspan="2">APPROVAL OF THE REVISED WORK PROGRAMME OF THE ATFM TASK FORCE</td></tr>
<tr><td colspan="3">What:
That, in the interest of keeping the tasks and activities of the ATFM Task Force up-to-date and in line with the reality of the current operational environment, the NACC/WG approve the revised work programme of the ATFM Task Force as presented in Appendix C to this report.</td><td colspan="2">Expected impact:
☐ Political / Global
☒ Inter-regional
☐ Economic
☐ Environmental
☒ Operational/Technical</td></tr>
<tr><td colspan="5">Why:
To renew the efforts in support of the ATFM in the NAM/CAR Regions.</td></tr>
<tr><td colspan="2">When: Immediately</td><td colspan="3">Status: ☒ Valid / ☐ Superseded / ☐ Completed</td></tr>
<tr><td colspan="2">Who: ☒ States ☒ ICAO ☐ Other:</td><td colspan="3"></td></tr>
</table>

ASBU Task Force

3.1.30 Under WP/09, the NACC/WG/ASBU Task Group rapporteur indicated that the global pandemic temporarily slowed down the work of the Aviation System Block Upgrades (ASBU) Task Force (TF) in 2020 and 2021 and that in order to start resuming the work of the ASBU TF, it was necessary to update its main documents, namely, the Terms of Reference (ToRs), work programme and the Membership Points of Contact (PoCs). The WP provided recommendations for modifying these documents and seeks suggestions and concurrence from TF members.

3.1.31 The ASBU TF work programme covers the basis for preparation and maintenance of the National Air Navigation Plans (NANPs) by the Member States, organizations and ICAO territories in the region. To prepare and maintain NANPs, States should understand the GANP/ASBU as well as their States' needs for current and future aviation technologies. The NANP should be used by States to strategically plan what capability will be implemented and when to implement it.

3.1.32 The Meeting agreed that the following components of the NACC/WG/ASBU TF should be updated:

- ToRs;
- work programme; and
- list of PoCs of the Task Force members.

3.1.33 In addition, the rapporteur recommended developing effective methods to determine the status of regional implementation of the ASBU Block 0 and Block 1 elements and the performance monitoring of the regional ANS, on a 3-year cyclical basis, as a regional contribution to the Global Annual Air Navigation Report and feedback to the Global Air Navigation Plan and the Regional Dashboard.

3.1.34 The work programme of this TF will be jointly reviewed between the rapporteur of the TF and the Secretariat in accordance with the new version of the GANP, Version 7, the development of the work programme of the electronic Air Navigation Plan (e-ANP) Volume III. In this sense, the following decision was adopted:

<table>
<tr><td colspan="3">DECISION
NACC/WG/07/03 NACC/WG/ASBU TASK FORCE WORK PROGRAMME UPDATE</td></tr>
<tr><td colspan="2">What:
That, with the interest of updating the development activities of the air navigation plans of the CAR States in line with the new version of the Global Air Navigation Plan (GANP), the ASBU Task Force update its action plan by the NACC/WG/08:
a) for the integration of regional objectives and support for the development of the electronic Air Navigation Plan (e-ANP) III;
b) to work jointly on common issues between the GANP and the Global Safety Plan (GASP); and
c) to carry out an implementation analysis of the Basic Building Blocks (BBB) with the Protocol Questions (PQ) of the Universal Safety Oversight Audit Programme (USOAP).</td><td>Expected impact:
☐ Political / Global
☒ Inter-regional
☐ Economic
☐ Environmental
☒ Operational/Technical</td></tr>
<tr><td colspan="3">Why:
Air navigation plans are important tools for regional and States’ national planning and clear guidelines must be available for their development.</td></tr>
<tr><td>When: NACC/WG/08 Meeting</td><td colspan="2">Status: ☒ Valid / ☐ Superseded / ☐ Completed</td></tr>
<tr><td>Who: ☐ States ☒ ICAO ☐ Other:</td><td colspan="2">NACC/WG/ASBU</td></tr>
</table>

3.1.35 The rapporteur of the ASBU TF, under WP/08, presented the status of activities related to the GANP/ASBU and recommended the revision of the NANPs. The specific areas that were discussed were:

1) the expected release of the 7th edition of the GANP/ASBU after the 41st Session of the ICAO Assembly (A41);
2) changes from the seventh edition to the sixth edition of ASBU;
3) NANP status in the NAM/CAR Regions;
4) changes between ASBU’S 5th and 6th editions; and
5) plans to revise the NANP.

3.1.36 In accordance with the activities carried out between the ICAO NACC Regional Office and the Federal Aviation Administration (FAA) of the United States, it was determined that 22 States/Territories/Organizations in the CAR Region needed a NANP and two for the NAM Region: "Air Navigation System Plan (ANAP)" from Canada, through NAV CANADA, and the "NextGen Implementation Plan" from United States.

3.1.37 The status of the NANP in the CAR Region is shown below:

https://www.icao.int/NACC/Pages/regional-group-ASBUb.aspx

3.1.38 The ICAO GANP Study Group prepared the ASBU 7th Edition, with the support of the ASBU Expert Group Project Team (ASBU PPT) and the GANP Performance Expert Group, which would be presented for its approval on the A41, carried out from 27 September to 7 October 2022.

3.1.39 The main update topics of the 7th edition of the ASBU campaign are shown below:

- development of the link between the Strategic Level of the GANP and the ASBU Framework;
- integration of innovation opportunities in the ASBU Framework;
- alignment between Global Strategic Plans;
- improvement of performance outlook;
- development of evolution scenarios;
- updating of information; and
- updates were also made regarding certain ASBU elements and four new key performance indicators (KPIs) were added.

3.1.40 The performance-based approach is the one of ICAO's to guide the implementation of old and new technologies. The use of the KPIs defined in the ASBU Performance Framework section of the GANP Portal website (https://www4.icao.int/ganpportal/ASBU/KPI) plays an essential role. The ASBU TF plans to change the NANP template offered by ICAO Headquarters when it becomes available.

3.1.41 The Secretariat indicated that an activity aimed at supporting ten CAR States in the development/update of their national Air Navigation Plans had been approved under the ICAO Regional Technical Cooperation Project - Implementation of Performance-based Air Navigation Systems (RLA/09/801) in the CAR Region.

3.1.42 The Secretariat also indicated that it was working in coordination with the NACC/WG/ASBU TF to integrate into its work plan the essential points to take into account, such as:

- the analysis of the state of implementation of the BBBs;
- the regional objectives through the e-ANP III;
- the implementation of KPIs.

SURV Task Force

3.1.42 Under WP/10, the rapporteur of the Surveillance TF (NACC/WG/SURV) presented an update on the progress of the Group, including an update on the status of surveillance implementation of the States of the CAR Region (**Appendix D** of this report).

3.1.44 As part of the progress, the report of the SURV TF Meeting was presented, meeting which was held in Mexico City, Mexico, from 13 to 15 July 2022. The report was sent to the NAM/ CAR States for the follow-up on its recommendations, listed below:

1) Recommendation 1: ICAO States will work with stakeholders to determine a date for the equipment and implementation of Automatic Dependent Surveillance - Broadcast (ADS-B).
2) Recommendation 2: States should take advantage of current surveillance capabilities and mainly ADS-B technology and adopt the mandatory use of ADS-B as regulations.
3) Recommendation 3: Take advantage of the use of ADS-B as the primary way to obtain aircraft parameters and complement the information using Mode S interrogations.

3.1.45 Finally, the rapporteur of the SURV TF requested that the Meeting take formal action for each State to identify the representatives that would participate in future SURV TF meetings. It was recognized that all the NACC/WG TFs had identified the need for States to update their representatives. In this sense, the Meeting agreed on the following conclusion:

CONCLUSION NACC/WG/07/04	**NACC/WG TASK GROUP MEMBERSHIP UPDATE**
What:	**Expected impact:**
That,	☒ Political / Global

a) States update the membership of the different Points of Contact (PoC) of all the Task Forces of the NACC/WG; b) the selected people have the technical profile (for example for the SURV/TF as radar experts) with knowledge, experience and, above all, that they currently work in the work areas designated to integrate the different Task Forces; and c) the States send this information **by 15 February 2023**.	☒ Inter-regional ☐ Economic ☐ Environmental ☐ Operational/Technical
Why: Since in recent years the region has undergone a series of changes in terms of its personnel and structures, and as it has been shown that, as a result of the COVID-19 pandemic, there are no personnel who previously made up the TF of the NACC/WG, the need to integrate within the TF trained and suitable personnel to discuss issues of regional interest and development of the region is identified.	
When: 15 February 2023	**Status:** ☒ Valid / ☐ Superseded / ☐ Completed
Who: ☒ States ☐ ICAO ☐ Other:	NAM/CAR States

3.1.46 Under WP/11, the NACC/WG/SURV TF rapporteur presented a document to monitor the performance of ADS-B Systems developed in collaboration with NACC/WG/SURV TF members during their meeting held in July 2022.

3.1.47 The purpose of said document is to help NACC States with a guide of elements to consider when developing a tool to monitor the performance of the ADS-B system in their respective airspaces. The document identifies the general parameters that must be included to adequately evaluate the performance of automatic dependent surveillance – broadcast (ADS- B) OUT and perform statistical analysis of the ADS-B information received by a monitoring system.

3.1.48 The document would not only support States in the development of their ADS-B monitoring tool, but would also identify a minimum set of parameters to be captured and analysed, improving harmonization in data reporting throughout the region.

3.1.49 The Meeting highlighted the benefits of this document, especially because the parameters of the surveillance systems, not only of the ADS-B systems but of the radars, can be evaluated regionally under the same criteria, thereby supporting the technical development and regional evaluation of the performance of ADS-B systems under the same language. In this regard, the Meeting made the following decision:

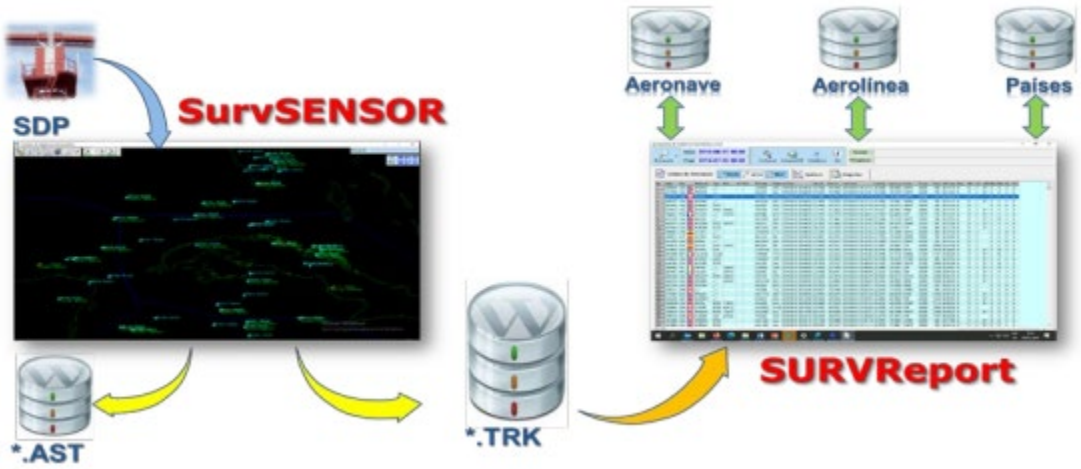
DECISION **NACC/WG/07/05**	**GUIDE FOR STATES ON PARAMETERS TO MONITOR THE PERFORMANCE OF ADS-B SYSTEMS**
What: That, in order to facilitate and adequately evaluate the performance of Automatic Dependent Surveillance – Emission (ADS-B OUT) and perform statistical analysis of the ADS-B	**Expected impact:** ☒ Political / Global ☐ Inter-regional ☐ Economic

information received by a surveillance data monitoring system (**Appendix E**), the document for the evaluation of ADS-B data be adopted, with the objective that States have a guide that allows them to evaluate the performance of ADS-B stations and make decisions based on the data obtained.	☐ Environmental ☒ Operational/Technical
Why: It is important to identify the general parameters to evaluate the performance of the Automatic Dependent Surveillance System – Emission (ADS-B OUT) and perform statistical analysis of the ADS-B information provided by aircraft using a performance monitoring system.	
When: Immediately	**Status:** ☒ Valid / ☐ Superseded / ☐ Completed
Who: ☒ States ☐ ICAO ☐ Other:	NAM/CAR States

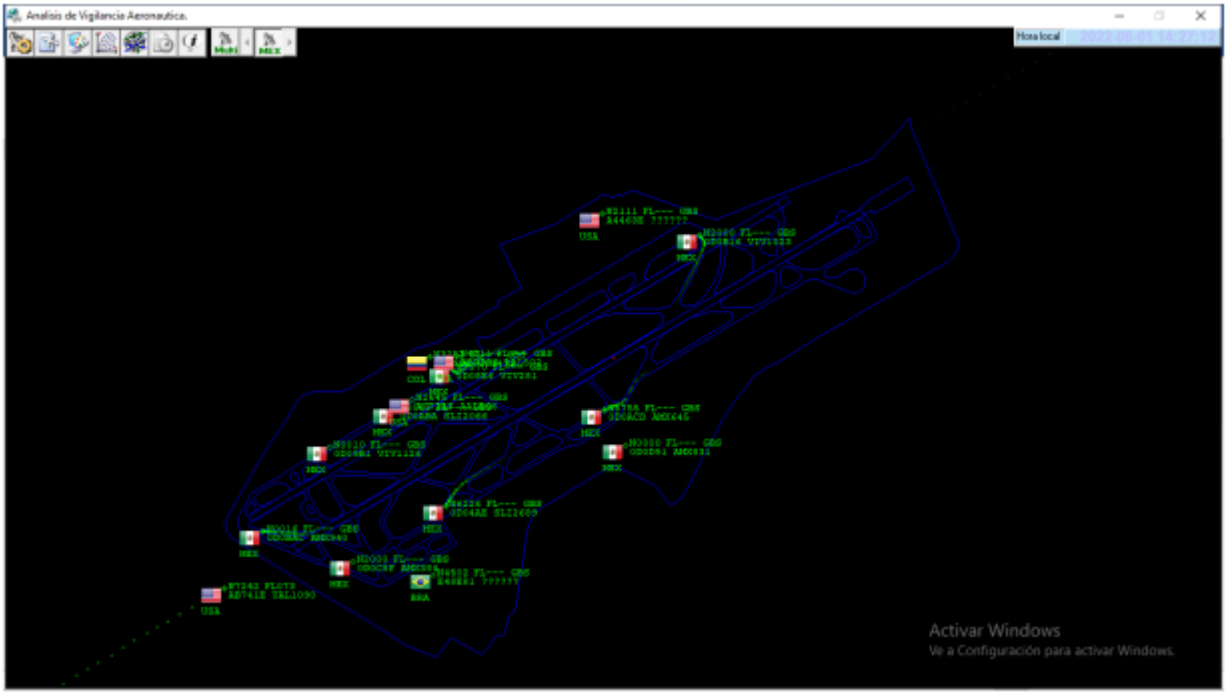
3.1.50 Under WP/12, Cuba presented the results of the technical assistance mission developed through the Project RLA/09/801 – MCAAP, which supported the collaboration between Cuba and Mexico with the installation of the statistical analysis system of ADS-B developed by Cuba.

3.1.51 The ICAO NACC Regional Office and Mexico, through the Federal Civil Aviation Agency (AFAC), coordinated this technical assistance Mission based on the offer made at the Automatic Dependent Surveillance – Broadcast OUT Implementation Meeting for the NAM/CAR Regions (ADS-B/OUT/M), held in Ottawa, Canada, from 21 to 23 August 2019, by the rapporteur of the SURV TF to provide software developed by Cuba for the monitoring and statistical compilation of the performance of the ADS-B systems for the monitoring of the ADS-B receivers installed, which was of interest to Mexico, making this request official in the year 2020, an action that was postponed due to the COVID-19 pandemic and being executed from 15 to 21 May 2022.

3.1.52 The installation of the developed tools (SURVSensor-SurvReport) was carried out in the control area (CTA) of Mexico, achieving the coupling between the software and 7 available ADS-B receivers to begin their storage and statistical processing, which was achieved thanks to management and configurations of system technicians.



3.1.53 The information received, processed and stored is represented on a screen that reflects the map of the selected area and the actual flight position of each aircraft, based on the data received in ADS-B.



3.1.54 According to the data obtained from Mexico, the tool identified that:

1) 99.2% of the aircraft that fly in Mexican space had DO-260B version transponders installed;
2) most of the aircraft had Navigation integrity category (NIC) greater than 8 and navigational accuracy category (NAC) greater than 9;
3) errors were identified for aircraft which registration was from the State of Mexico, which had the 24 code encoding incorrectly configured.

3.1.55 The Secretariat congratulated Cuba for its support for the development of the region and emphasized that these cooperation agreements benefit the region.

3.1.56 Cuba also communicated that the software developed for the monitoring of ADS-B data not only supported the evaluation of the performance of ADS-B, but also of other surveillance systems. It also informed that the tool is available to CAR States free of charge.

3.1.57 Dominican Republic and Trinidad and Tobago expressed their interest in entering into a cooperation agreement with Cuba that would allow them to benefit from the implementation of this application and take the benefits that the MCAAP project provides, so that the implementation of this tool be carried out under the same conditions as with Mexico.

3.1.58 The Secretariat indicated that it would coordinate with the aforementioned States the request of the Technical Assistance Mission under the MCAAP project, as was done with Mexico.

AO Task Force

3.1.59 Under WP/13, the rapporteur of the Airspace Optimization TF (NACC/WG TF/AO) presented the progress made by the Group during 2021 and the first half of 2022.

3.1.60 The information submitted indicated that, during the pandemic, airlines carrying items vital to the pandemic, such as vaccines, requested more efficient routes from the CADENA. CADENA developed a process, Planned Airways System Alternative (PASA) E2E, in which the airline would submit a request to CADENA and CADENA would then pass this request through the States and ANSPs for approval. The International Air Transport Association (IATA) and ICAO joined CADENA resulting in CADENA CANSO IATA ICAO Free Route Airspace (CIIFRA). The process has been extended to the permanent optimization of end-to-end routes.

3.1.61 In this sense, work was done on the optimization of the airspace based on the optimization of point-to-point routes and optimization of free routes, obtaining:

1) Track A results. There are currently 12 tracks that have been tested, of which six have good metrics:

Estimated 1-year savings of the 6 completed PASA Optimized Routes

KATL↔SPJC
KATL↔SBGR
TTPP↔KMIA
KIAH↔MMPR
SAEZ ↔KATL
KATL ↔SAEZ

Savings	
Flight min:	13,126
Fuel (lb):	2,583,088
CO2 (kg):	3,702,477
Cost ($):	2,107,410

2) Track B Results. There is currently 1 route that has been approved and is flying a User Preferred Route (UPR). This route between Atlanta and Lima constitutes the first step towards Free Route Airspaces (FRA). There are good metrics in this route as shown below:

	Baseline vs UPR	
Savings	12 Day	1 Year
Flight min:	116	3,528
Fuel (lb):	12,479	379,570
CO2 (kg):	17,887	544,057
Cost ($):	15,325	466,138

Estimation of 1-year savings based on 12 days

3.1.62 The TF is also working on an optimized airspace concept for the CAR region, which includes harmonized separation standards, airspace restructuring, performance-based navigation and FRA. Goals are being established for airspace optimization to allow continuous flow in the upper and lower airspace of contiguous Flight Information Regions (FIRs) and Terminal Areas (TMAs). A draft was presented

at the 41st session of the ICAO Assembly (A41) and work will continue with another draft to be presented at the Second Meeting of the North American, Central American and Caribbean Working Group (NACC/WG) Airspace Optimization Task Force (AO/TF/2), Fourth Meeting of the NACC/WG Air Traffic Flow Management Implementation Task Force (ATFM/TF/4) and Sixth Meeting of the CANSO IATA ICAO Free Route Airspace (CIIFRA/6) Team (AO/TF/2/ATFM/TF/4/CIIFRA/6) that will take place in Miami, United States, from 13 to 17 February 2023.

3.1.63 The development of a draft of the CAR Airspace Optimization Concept document was initiated through a sub-project of the ICAO NACC Regional Office (26-29 July 2022) in which various experts participated in airspace design of the region. The draft concept was discussed at the TF meeting and it was recognized that input from more experts in the areas of CNS and AIM was needed.

3.1.64 Dominican Republic noted the importance of this project and the need to include other working groups in the discussions to ensure a holistic approach. The rapporteur of the TF AO supported this opinion and reported that a meeting with all rapporteurs of the operational groups had been requested. The Secretariat suggested that, due to time constraints, an online meeting would be the best method for this meeting. The Meeting agreed.

3.1.65 CANSO stated that this was the first stage of a very large project and informed that the NACC/WG TF/AO had already contacted the ATFM TF and would commit with the other TFS in the spirit of collaboration. An Ad hoc meeting was held in which the two ATM/SAR Regional Officers and the ATFM and AO TFs rapporteurs participated, and it was agreed that it would be beneficial to hold at least one joint meeting per year, in addition to the face-to-face or virtual ones that are normally scheduled.

3.1.66 Trinidad and Tobago thanked the work of the previous PBN TF, specifically Mr. Eddian Méndez, ATM/SAR Regional Officer of the ICAO NACC Regional Office for having laid the foundations for the evolution of PBN TF towards the TF of Airspace Optimization, broader and more complete.

3.1.67 The rapporteur of the E/CAR CATG ATM Committee informed the Meeting that during the E/CAR/CATG/6 meeting, held from 17 to 19 August 2022, it was emphasized that the terminal airspace design and aerodrome efficiency should be included as part of the NACC/WG/AO TF airspace optimization considerations.

3.1.68 The NACC/WG/AO TF rapporteur informed the Meeting that the CAR airspace optimization concept project would consider all flight phases, including airport operations. He also mentioned that two Ad hoc Groups were being created under the AO TF to produce guidance material, both on terminal airspace design and on the efficiency of airport operations.

3.1.69 Jamaica mentioned that hotel hours have an impact on their Air Traffic Services (ATS) operations, as air carriers generally operate between specific times between check-in and check-out, creating an imbalance between demand and capacity. The NACC/WG/AO TF advised that it would try to include hoteliers in the Airport Efficiency Ad hoc Group discussions to determine if there was the possibility of shifting/staggering hotels check-in/check-out times.

3.1.70 CANSO asked about the FRA publication process. The NACC/WG/AO TF reported that Task Group F was focusing on end-to-end at this time, but was looking into publishing FRA/Direct Routing (DCT) type routes. The TF has contacted the ICAO Regional Office for Europe and the North Atlantic (EUR/NAT), who have published these types of routes. IATA added that there were also some examples from South America that could be considered.

3.1.71 The Secretariat noted that the Medium Term Conflict Detection (MTCD) alert and the ability of ATM systems (via AIDC) to accept random entry/exit coordinates were very critical for the transition to FRA. The NACC/WG Chairperson concluded the discussions by supporting the development of a regional airspace optimization concept, but stressed the importance of ensuring safety during the transition to FRA.

3.1.72 The NACC/WG/AO TF rapporteur assured that a safety assessment template had been sent to States currently participating in operational route trials and that this safety management process would be maintained throughout any airspace optimization initiative. He concluded by asking all stakeholders to continue to communicate and collaborate to ensure that the goal of regional airspace optimization is achieved.

3.1.73 Based on the discussion, the Meeting made the following decision:

DECISION **NACC/WG/07/06**	**AD HOC GROUP TO CATEGORIZE TERMINAL AIRSPACE PROCEDURES**
What: That, a) the NACC/WG/AO TF create an Ad hoc Group to categorize terminal airspace procedures and list the criteria/benefits of each one **by 15 February 2023**, composed by members of the NACC/WG/AO TF, as well as relevant stakeholders added as needed; b) the group will compile a list of different terminal airspace procedures used globally to develop a resource guide for the CAR Region. It will consist of criteria that should be considered for each procedure and will highlight the potential benefits; and c) the Resource Guide for the CAR Region will be presented by the NACC/WG/08 for future distribution to all NACC States/International Organizations.	**Expected impact:** ☒ Political / Global ☒ Inter-regional ☐ Economic ☐ Environmental ☒ Operational/Technical
Why: To ensure that the benefits derived from upper/lower airspace optimizations are not restricted by airport inefficiencies.	

When:	a) by 15 February 2023, and b) communicate results at NACC/WG/08	**Status:** ☒ Valid / ☐ Superseded / ☐ Completed
Who:	☒ States ☒ ICAO ☒ Other:	NACC/WG/AO, relevant Subject Matter Expert(s) (SME) as required

3.1.74 As with the other Task Forces of the NACC/WG, the AO TF requested that States update their members to carry out better management.

3.1.75 It was also reported that work was being done to update the optimized airspace concept document for the CAR Region, that include harmonized separation standards, airspace restructuring, performance-based navigation and FRA. Goals are being established for the optimization of the airspace to allow the continuous flow in the upper and lower airspace of contiguous FIRs and TMAs, based on this the Meeting made the following:

DECISION NACC/WG/07/07	**UPDATE OF CAR REGION AIRSPACE OPTIMIZATION DEVELOPMENT CONCEPT DOCUMENT**
What: That, the updated airspace concept for the CAR Region will be developed and distributed as follows: a) the new version of the document to be completed and distributed to all PoCs of the TF **by 15 February 2023**; b) all PoCs review and provide comments/recommendations **by 28 February 2023**; and c) the final document to be presented at the NACC/WG AO/TF meeting to be held in February 2023.	**Expected impact:** ☒ Political / Global ☒ Inter-regional ☐ Economic ☐ Environmental ☒ Operational/Technical
Why: To implement the optimization of the Airspace of the CAR region that ensures continuous high levels of safety together with better economic and environmental efficiencies.	

When:	a) by 15 February 2023 b) by 28 February 2023	**Status:** ☒ Valid / ☐ Superseded / ☐ Completed
Who:	☐ States ☐ ICAO ☒ Other:	NACC/WG AO/TF

<u>SAR Task Force</u>

3.1.76 The rapporteur of the Search and Rescue Implementation TF (NACC/WG/SAR/TF) presented WP/14 with information on the progress achieved by the Group since its previous progress report.

3.1.77 The Second Meeting of the SAR/TF (ANI/WG/SAR/TF/2) was held on-line from 7 to 9 September 2021 and addressed different topics such as the review of the SAR part of the Air Navigation Plan for the CAR/SAM Regions, the revision of the SAR Plan of the CAR Region and the SAR agreements.

3.1.78 Regarding the review of the SAR part of the Air Navigation Plan of the CAR/SAM Regions, States and Territories of the CAR Region have the task of updating the information of the Search and Rescue Regions (SRR) of which they are responsible, as well as incorporating the coordinates in the description of the lateral limits of the same in Volume I of the aforementioned Plan. In this regard, the following conclusion was formulated:

<table>
<tr><td colspan="3">CONCLUSION
NACC/WG/07/08 DEFINITION OF THE LIMITS AND RESPONSIBILITIES OF THE SEARCH AND RESCUE REGIONS OF THE CAR REGION</td></tr>
<tr><td colspan="2">What:
That, in order to support the project to review and update the CAR/SAM ANP the Secretariat:
a) request States/Territories of the CAR Region:
i. Updated information regarding the Search and Rescue Regions (SRR) and Search and Rescue Subregions (SRS) for which they are responsible, including the description of the lateral limits with coordinates; and
ii. Updated information regarding their Rescue Coordination Centres (RCCs) and Rescue Sub-centres (RSCs), including the SAR points of contact (SPOC) and other supplementary information; and
b) present to the NACC/WG/SAR/TF the information received to evaluate and take the appropriate actions to develop a proposal to amend the CAR/SAM ANP.</td><td>Expected impact:
☒ Political / Global
☒ Inter-regional
☐ Economic
☐ Environmental
☒ Operational/Technical</td></tr>
<tr><td colspan="3">Why:
In order to update the CAR/SAM ANP Vol. I Table SAR-I-1 and Vol. II Table SAR-II-1.</td></tr>
<tr><td colspan="2">When: By NACC/WG/08</td><td>Status: ☒ Valid / ☐ Superseded / ☐ Completed</td></tr>
<tr><td colspan="2">Who: ☒ States ☒ ICAO ☐ Other:</td><td></td></tr>
</table>

3.1.79 In addition, the update of the ICAO Global Aeronautical Distress and Safety System (GADSS) was discussed, in search of content that should be included in the next update of the SAR Plan for the Caribbean Region. In this regard, the Meeting requested the Secretariat to organize a Regional Workshop on the GADSS with the objective of raising awareness and providing initial information on this system. This Workshop was held virtually, and was attended by 122 representatives from 23 States/Territories and 4 International Organizations from the NAM/CAR Regions.

3.1.80 Regarding the SAR agreements, the Meeting took note of several States and Territories of the CAR Region that have the signing of the corresponding SAR agreements pending. After the Meeting,

Cuba's and Mexico's authorities resumed their talks regarding the signing of their SAR agreement, which could be finalized in 2022.

3.1.81 Attention is paid to the implementation date of the Emergency Locator Transmitters (ELT) Autonomous Monitoring in Hazardous Situations (ADT) (ELT/ADT), which would have to be postponed to the year 2024, according to the information that would have been collected and that would have been confirmed before April 2023.

3.1.82 Support for the implementation of SAR services continues to be a relevant need in the CAR Region. Resource restrictions as a result of budget cuts due to COVID-19 have further affected the difficult situation of SAR services in our region. The rotation of key personnel in this area remains one of the main difficulties.

3.1.83 The training of SAR personnel, at its different Basic, Intermediate and Advanced levels, must be reinforced to attend to the rotation of personnel in the first response units to the RSCs, which is where one of the biggest problems due to the non-replication of knowledge to the personnel that replaces them. In this regard, the following conclusion formulated:

<table>
<tr><td colspan="3">CONCLUSION
NACC/WG/07/09 HIGH-LEVEL SUPPORT FOR SEARCH AND RESCUE ACTIVITIES IN THE CAR REGION</td></tr>
<tr><td colspan="2">What:
That, taking into consideration the importance of the adequate provision of SAR services for the maintenance of a safe and sustainable air navigation system, States and Territories of the CAR Region:

a) pay attention to the signing and updating of the SAR agreements necessary for the proper coordination of these services by the NACC/DCA/11 Meeting; and

b) request provide the necessary resources for the operation of the SAR services, as well as the adequate endowment and training of the necessary personnel for said services.</td><td>Expected impact:
☒ Political / Global
☐ Inter-regional
☒ Economic
☐ Environmental
☒ Operational/Technical</td></tr>
<tr><td colspan="3">Why:
To ensure adequate provision of SAR services in the CAR Region.</td></tr>
<tr><td colspan="2">When: NACC/DCA/11 Meeting</td><td>Status: ☒ Valid / ☐ Superseded / ☐ Completed</td></tr>
<tr><td colspan="2">Who: ☒ States ☐ ICAO ☐ Other:</td><td>CAR States/Territories</td></tr>
</table>

3.1.84 Belize, Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua, members of COCESNA presented WP/37 to address the challenges related to emergency and contingency response planning in Central America.

3.1.85 Since 2018, together with ICAO and with the support of United States' FAA, IATA and CANSO, COCESNA has been working with the Central American States to establish, document and socialize the response to contingencies and emergency situations.

3.1.86 Additionally, COCESNA has a backup control centre located in El Salvador for the provision of air traffic services in the event that the CENAMER Area Control Center (ACC) located in Honduras is not available.

3.1.87 Currently, COCESNA and its Member States have a plan in case of experiencing "ATC zero". However, planning cannot be carried out if contingency agreements have not been previously established and documented in the adjacent units. Due to the above, COCESNA has operational agreements with the Belize Civil Aviation Department and the Honduran Civil Aviation Agency for the coordination of transits in their respective airspaces in emergency and/or contingency situations (technical/operational failures).

3.1.88 Regarding the provision of the services of the COCESNA NOTAM office, to guarantee its continuity, a contingency plan has been defined and contingency operational agreements have been established with Cuba and Dominican Republic, likewise, coordination with Panama is being carried out for the signing of operational agreements. It is worth mentioning that COCESNA has developed an application for the centralized processing of flight plans at the Central American subregional level, which serves as a backup for receiving and sending flight plans in order to guarantee the fluidity of aeronautical information.

3.1.89 The Meeting took note of the Central American experience and approved the following decision:

<table>
<tr><td colspan="2">DECISION
NACC/WG/07/10 CENTRAL AMERICAN EXPERIENCE FOR PLANNING AND RESPONSE TO CONTINGENCIES</td></tr>
<tr><td>What:
That, considering the experiences of the Central American States in aspects of planning for emergencies and contingencies, that the NACC/WG:
a) request States and Territories of the CAR Region to keep the contingency plans updated for the execution of the most efficient response to emergency and contingency situations in the CAR Region by the NACC/WG/08 ; and
b) promote actions to establish operational agreements between dependencies and adjacent FIRs that contain the operating procedures in accordance with the CNS/ATM capabilities that must be implemented in response to emergencies, with the purpose of guaranteeing the continuity of air traffic services.</td><td>Expected impact:
☒ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Operational/Technical</td></tr>
<tr><td colspan="2">Why:
To improve the effectiveness of the response to emergencies and contingency situations.</td></tr>
</table>

When:	NACC/WG/08	**Status:**	☒ Valid / ☐ Superseded / ☐ Completed
Who:	☒ States ☐ ICAO ☐ Other:		NACC/WG

ATS Contingency Group

3.1.90 The Secretariat presented WP/25 to provide an update on the situation regarding contingency planning and response for ANS in the CAR Region and request support to improve compliance with Annex 11 contingency arrangements.

3.1.91 The regional contingency planning strategy has been addressed by GREPECAS, with the establishment of an action plan for the development of ATM contingency plans in the CAR and SAM Regions since 2005. More recently, through the NAM/CAR Air Navigation Implementation Working Group (ANI/WG), States and Territories approved the CAR REGION AIR TRAFFIC MANAGEMENT CONTINGENCY PLAN (Version 1.3 July 2020).

3.1.92 The Second Regional Contingency and Emergency Planning and Response Meeting (NAM/CAR/CONT/2) was held at the ICAO NACC Regional Office in Mexico City, Mexico and on-line from 20 to 22 April 2022, attended by 23 States/Territories of the NAM/CAR Regions and 2 International Organizations, totalling 65 delegates.

3.1.93 The main contingencies that occurred during the years from 2019 to 2021 can be classified into the following categories:

- hurricanes and tropical storms
- social demonstration and civil unrest
- ATC strikes
- failures in CNS systems
- earthquakes and volcanic eruptions
- COVID-19 pandemic

3.1.94 The lack of adequate planning and implementation of contingency procedures is the main limitation for several States/Territories and Service Providers, mainly in the CAR Region, as well as the lack of trials or tests of the plans already developed.

3.1.95 The implementation of contingency procedures is a vital function for the continuity of air navigation services, which must include the adequate evaluation of all related elements necessary for the operation of these services. The CAR Region must keep its attention on planning and responding to contingencies and emergency situations, evaluating the specific capabilities of each service provider, sharing experiences and, above all, complying with ICAO Standards and regional agreements.

3.1.96 The Meeting took note of the Working Paper and made additional comments to encourage the integration of contingency planning as part of the civil aviation master plan and national emergency response systems. The importance of sharing resources in response to contingencies was emphasized.

3.1.97 IATA added the importance of collaboration between the CAR and SAM Regions, the publication of contingency plans in the corresponding AIPs, which are available in English and include clear procedures that air operators and crews must follow in case of contingencies.

3.2 Progress of Aerodromes and Ground Aids (AGA), Meteorology (MET) and Other Regional Implementation Groups

Activities on Aerodromes and Ground Aids (AGA)

3.2.1 The Secretariat, through WP/16, presented the progress of the aerodrome programme activities under GREPECAS and RASG-PA.

3.2.2 In relation to GREPECAS, for the "F1 Project: Certification and Safety of Aerodromes" the CAR Region shows a slight increase in the number of certified aerodromes, with 63% in January 2022.

3.2.3 For the "F2 Project: Aerodrome Planning", with the entry into force of the new Amendment 15 to Annex 14, Volume I, the ICAO NACC Regional Office intends to prepare a questionnaire for States and Territories to define together the next actions.

3.2.4 “Project F3: Implementation of A-CDM” has the Implementation Guide for Collaborative Decision Making at the Airport Level (A-CDM), for which States must define an implementation criteria at airports. Similarly, the ICAO NACC Regional Office intends to prepare a questionnaire for States and Territories on the criteria defined for airports to implement A-CDM.

3.2.5 Regarding RASG-PA, the Thirty Seventh Regional Aviation Safety Group — Pan America Executive Steering Committee Meeting (RASG-PA ESC/37) approved Conclusion RASG-PA/ESC/37/C3, which approves the project to support the implementation of the RASG-PA Security Team (RST) at selected international aerodromes in the CAR and SAM Regions. The project is in its initial phase and more information about the project can be found at: https://www.icao.int/RASGPA/Pages/MeetingsDocumentation.aspx?m=2022-ESC37.

3.2.6 From the discussion, the Meeting agreed to create an AGA Task Force (NACC/WG/AGA TF) and that States and Territories send the information of the AGA focal points to the ICAO NACC Regional Office.

3.2.7 Cuba requested a limit on the progress report of the AGA TF, prior to NACC/WG/08 due to the importance and complexity of the AGA subject.

3.2.8 Trinidad and Tobago mentioned the importance of the AGA TF and the need for coordination of the issue within the States, since it involves other parties within each State.

3.2.9 Finally, IATA reinforced the importance of harmonization in the implementation of A-CDM at aerodromes. In this sense, the Meeting reached the following conclusion to create a new AGA/TF within NACC/WG for States approval:

CONCLUSION NACC/WG/07/11	**AGA TASK FORCE (NACC/WG/AGA TF)**
What: That, a) States to approve the creation of an AGA Task Force (NACC/WG/AGA TF) for the coordination, preparation and implementation of projects, activities and development of guidance material in the region with the objective of increasing the safety, capacity and efficiency of navigation in the area of aerodromes and ground aids; b) States to nominate members to the AGA Task Force; c) NACC/WG/AGA TF to develop its Terms of Reference (ToRs) and work programme of the NACC/WG/AGA TF for the report prior to the NACC/WG/08 meeting.	**Expected impact:** ☐ Political / Global ☒ Inter-regional ☐ Economic ☐ Environmental ☒ Operational/Technical
Why: Considering the implementation difficulties in some AGA sub-areas and PQs in the Continuous Monitoring Approach (CMA) of the ICAO USOAP by CAR Region and the need for coordination in the CAR Region for the planning and execution of tasks and activities related to GREPECAS and RASG-PA projects.	
When: Immediately and report progress by NACC/WG/08	**Status:** ☒ Valid / ☐ Superseded / ☐ Completed
Who: ☒ States ☒ ICAO ☒ Other:	NAM/CAR States, NACC/WG/AGA/TF

3.2.10 Moreover, the Meeting adopted the following conclusion:

CONCLUSION NACC/WG/07/12	**AGA CONTACT INFORMATION**
What: That, States and Territories send the complete contact information through a format (name, title, email, telephone) of State/Territory's AGA focal points to the ICAO NACC Regional Office (NACC-AGA@icao.int) **by 15 February 2023**.	**Expected impact:** ☐ Political / Global ☐ Inter-regional ☐ Economic ☐ Environmental ☒ Operational/Technical
Why: To collect the information, States will be sent an online request (**Appendix F**) on: a) Amendment 15 to Annex 14, Volume I, for the timely response of Airport Operators/Civil Aviation Authorities (CAA);	

b) criteria defined by States and Territories for airports to implement A-CDM; and c) other AGA implementation issues	
When: 15 February 2023	**Status:** ☒ Valid / ☐ Superseded / ☐ Completed
Who: ☒ States ☒ ICAO ☐ Other:	NAM/CAR States

Activities on Meteorology

3.2.11 Under WP/04, the Secretariat recognized the efforts that the NACC/WG has made to integrate the Aeronautical Meteorology (MET) field and create a structure capable of streamlining and aligning the work and guaranteeing the creation of a more efficient air navigation system among the States of the NAM/CAR Regions, and indicated the importance of collaborative work in the framework of the construction of Volume 3 of the Regional Air Navigation Plan, which will guide the work and specify the expectations of the NACC/WG for work on MET. An initial MET programme is presented in **Appendix G** to this report. Thus, the Meeting agreed on the following decision:

DECISION **NACC/WG/07/13**	**ADOPTION OF THE MET PROGRAMME AND THE MET TASK FORCE (MET/TF) OF THE NACC/WG**
What: That, a) States approve that a MET Task Force (TF) be established within the NACC/WG structure, to support MET implementation in the regions and lead MET assistance activities that support compliance with the NACC/WG Terms of Reference (ToRs) and work programme; b) the MET programme (Appendix G refers) be used , as an initial guidance tool for regional MET implementation planning in accordance with the requirements of ICAO Annex 3; and c) the ICAO NACC Regional Office take the necessary measures (creation of ToRs, work programme and other measures associated with the establishment of a TF) to ensure the proper establishment of the NACC/WG MET TF and convene its first virtual meeting **by 15 February 2023**.	**Expected impact:** ☐ Political / Global ☐ Inter-regional ☐ Economic ☐ Environmental ☒ Operational/Technical
Why: Conclusion NACC/DCA/10/10: "Participation of States in the implementation of air navigation issues", in order to promote MET implementation initiatives in the NAM/CAR Regions and streamline the MET assistance mechanism to regional level.	
When: by 15 February 2023	**Status:** ☒ Valid / ☐ Superseded / ☐ Completed
Who: ☐ States ☒ ICAO ☐ Other:	

3.2.12 The Secretariat presented, under WP/15, the progress and a prototype of the necessary forms to report, monitor and follow up on the implementation of the BBBs of the Meteorological Service for International Air Navigation as part of the CAR/SAM Regional Dashboard, in accordance with Conclusion GREPECAS 19/09 on the establishment of a regional dashboard to be implemented by GREPECAS/20, and GREPECAS Conclusion 19/02 on the determination of mechanisms necessary to verify the effective implementation of the BBBs corresponding to the Meteorological Service for international air navigation (MET).

3.2.13 The Meeting was informed on the review of the BBB framework for MET services: https://www4.icao.int/ganpportal/BBB of the GANP and on the determination of the metrics and indicators that could be more relevant to be measured and visualized, as well as the configuration of the form necessary to facilitate the data entry through the *Power BI* platform as part of the CAR/SAM regional dashboard.

Environmental Protection Activities related to Air Navigation

3.2.14 Under WP/29, the Secretariat presented the status of implementation of States' Corrective Action Plans (CAP) for activities to reduce CO2 emissions from International Civil Aviation and made reference to the set of measures to limit or reduce emissions from international civil aviation. The paper invited the Meeting to consider that the national actions and activities implemented at the regional level associated with the set of measures, be included in the preparation and/or update of the States' CAPs in accordance with the Consolidated statement of continuing ICAO policies and practices related to environmental protection.

3.2.15 The Meeting was informed on the establishment of the ICAO Global Coalition for Sustainable Aviation with the objective of providing a forum of stakeholders to facilitate the development of new ideas and accelerate the implementation of innovative environmental solutions. Similarly, ICAO "Tracker Tools" website was mentioned, where the most recent information on initiatives to reduce CO2 emissions from aviation is updated based on three streams: technology, operations and fuels, as well as net zero aviation emissions initiatives. The following websites present the information:

- Environmental Reports 2022 - ICAO Aviation CO2 Reduction Initiative Trackers
- In-sector aviation CO2 emissions reduction initiatives - Tracker tool - Operations

3.2.16 Under WP/36, CANSO presented the operational measures for green aviation that are not only necessary for the sustainability of aviation, but also help the air transport industry to save costs. Whilst there have been several initiatives on green operational measures, it is timely to have a more structured way of recognizing such measures. CANSO is launching an environmental accreditation programme for ANSPs. This programme will validate the individual ANSP level of maturity in climate friendly measures. Green aviation should become the mainstream. For this to be successful, we need the support of States, ICAO, IATA and various stakeholders, including pilots and air traffic controllers (ATCO).

3.2.17 ICAO has generated a basket of sustainability initiatives focused on aircraft technology, operational improvements, sustainable aviation fuels and market-based measures. International organizations such as CANSO, IFATCA, and IFALPA believe that, while promoting the highest level of aviation safety throughout the world, a viable and expanding air transport industry can only be achieved on sustainable grounds. At IATA's 77th Annual General Meeting (AGM), member airlines adopted a

resolution with the collective goal of achieving net zero carbon emissions by 2050 in support of the Paris Agreement goal.

3.2.18 CANSO launched its new strategic direction in 2021. While the current recovery is a pivotal moment for us, CANSO recognized that we have a critical role to play in recalibrating our trajectory towards a more sustainable future for aviation. CANSO's vision centres on three key focus areas: creating a blueprint for future skies, delivering a sustainable future for aviation, and raising the bar by connecting the ATM industry.

3.2.19 The CANSO Green ATM accreditation programme will provide ANSPs with an independent, industry-backed environmental accreditation system. It will recognize their efforts to make it easier for airspace users to reduce emissions and their own environmental footprint and provide a path to continuous improvement. It is an objective and transparent validation and will enhance the credibility of ANSPs' efforts. It will provide a framework for engagement with stakeholders such as airlines and regulators.

3.2.20 This CANSO programme for ANSPs would have five levels of accreditation reflecting different levels of green ATM maturity. The level achieved by an ANSP is a weighted average of achievement in four categories. The categories are, namely, Governance, Enhanced ATM, Public Infrastructure and Services, and others.

3.2.21 Finally CANSO proposed to discuss ways to support the CANSO Green ATM accreditation program.

3.3 Improvements to the ATS Voice Link (MEVA) Reports and the New Communication Network CANSNET, The Eastern Caribbean Civil Aviation Technical Group (E/CAR/CATG), and the Eastern Caribbean Aeronautical Fixed Service Network Technical Group (E/CAR AFS NTG)

3.3.1 Under WP/17, the MEVA/TMG Coordinator summarized the work carried out by the MEVA Technical Management Group, from June 2021 to July 2022. She reported on the development of the CANSNET communications network, which will replace the MEVA network and will provide efficient support to air navigation services in the region. This will become a digital network that will allow not only to expand communications and services among States of the NAM/CAR Regions, but with other regions with which our States have operations such as the regions of South America, Europe and Africa (this is the main role of the MEVA TMG), which will change to manage CANSNET.

3.3.2 In this regard, the need to support the development of the CANSNET project was emphasized, providing the necessary technical information to develop the technical and/or operational specifications of the new network.

3.3.3 There was also an extensive discussion on Conclusion MEVA/TMG/37/01 " CREATION OF A REGIONAL TASK GROUP SPECIALIZED IN THE MANAGEMENT OF AERONAUTICAL FREQUENCIES" considering that frequencies are a limited resource used by companies around the world to provide services in different areas; frequencies that had previously been allocated for aeronautical services have been gradually allocated to other services and the region needs to work hard to protect and ensure that aeronautical services have the frequencies necessary to safely provide the current and future aeronautical

services. Specialized work is required that should be managed by specialists in this area. In this sense, the MEVA/TMG will coordinate the creation of a specialized TF in this area with the NACC/WG, who will lead the activities and management of the spectrum to ensure that the frequencies necessary to provide current and future aeronautical services are available and thereby ensure zero interference with other services.

3.3.4 It was emphasized that it is necessary to properly and timely manage aeronautical frequencies and carry out the necessary analyses so that CAR States support ICAO's positions regionally before the World Radiocommunication Conference (WRC) of the International Telecommunications Union (ITU), support the timely allocation of frequencies in the CAR Region and assist in the protection of aeronautical frequencies by each State.

3.3.5 Under WP/27, the rapporteur of the MEVA Ad hoc Group for Aeronautical Frequency Management provided information on the activities that were carried out in the NAM/CAR Regions during 2021 and the first semester of 2022 to raise awareness among the Member States on the Improvements on the management and protection of the aeronautical frequency spectrum.

3.3.6 Since the 36th meeting of the MEVA TMG (MEVA/TMG/36) last year, where the MEVA Frequency Management Ad hoc Group listed a set of actions that States should monitor to ensure that the radio spectrum used for current and future air navigation services is available, in addition, many activities were carried out to emphasize the fact that current and future CNS/ATM systems are highly dependent on availability of sufficient adequately protected radio spectrum that can support the high integrity and availability requirements associated with aeronautics.

3.3.7 The rapporteur of the Ad hoc Group indicated that many activities were carried out by ICAO through the NACC Regional Office since October of last year and throughout the year to emphasize the attention of Member States on the importance of supporting ICAO's position for the next ITU WRC-23, through the respective coordination and participation with their National Frequency Spectrum Authorities to ensure that the results of WRC-23 reflect the continued need for radio frequency spectrum of the civil aviation in support of current and future flight safety applications.

3.3.8 ICAO also shared its concerns about possible interference to radio altimeters operating in the 4 200-4 400 MHz frequency band, due to the deployment of 5G mobile service systems planned to operate in frequency bands adjacent to or close to the 4200-4400 MHz frequency band. ICAO is requesting States to take appropriate actions to mitigate operational risks. Radio altimeter interference is a major problem for aviation because it decreases operational safety, especially in descent and ascent procedures at different airports.

3.3.9 It was discussed that the management of aeronautical frequencies in charge of the MEVA Task Force does not have the expected results, because this work requires a greater number of work hours and specialists with experience in this area who can carry out the analysis and recommendations corresponding to States to ensure the correct management of the frequencies necessary to support the protection of frequencies for aeronautical use.

3.3.10 In this sense, the Meeting supported Conclusion MEVA/TMG/37/02 for the creation of a specialized Group part of the NACC/WG responsible for the management of a regional approach for the management of aeronautical frequencies, to support activities aimed at protecting the frequencies of aeronautical use for current and future air navigation services.

3.3.11 This Group would be responsible for the management, analysis of the ITU agenda for the WRCs, of the impact of assigning frequencies to areas other than aeronautics, and providing recommendations at the regional level to ensure that the frequencies necessary for aeronautical use are protected and available for the needs of aviation.

3.3.12 Under WP/39, COCESNA presented information on the actions to be taken by Central American States and COCESNA to mitigate the possibility of interference in aeronautical operations due to the implementation of 5G technology in the Central American subregion.

3.3.13 COCESNA indicated that it had taken note of the information published by ICAO on this serious problem and had initiated mitigation actions by informing the civil aviation authorities of each Member State through an official note, it also indicated the need to take specific mitigation actions as soon as possible to minimize possible interference due to the implementation of 5G technology within the Central American sub-region.

3.3.14 Given the above, the following actions are being coordinated with the Central American States in order for their aeronautical operations to maintain safety levels:

- Carry out an analysis that includes the national aircraft fleet, telecommunications companies and entities in charge of spectrum management to assess the impact of this technology on aviation operations.
- According to the results of said impact analysis, develop and implement necessary mitigation mechanisms to avoid interference in the operations of the radio altimeters.
- Follow up and evaluate the mitigation measures implemented.
- Inform the ICAO NACC and SAM Regional Offices at the GREPECAS/20 meeting held between 15 and 18 November 2022.

3.3.15 The Secretariat emphasized the importance of States carrying out an analysis of the implementation of 5G technology at their international airports, and coordinating with communications companies, entities responsible for assigning electromagnetic frequencies and airlines to implement proactively the appropriate mitigating measures.

3.3.16 The Secretariat also indicated that it is important that aviation begin to take stronger care of the frequencies assigned to aeronautical operations to prevent other services from causing interference on aeronautical communications.

3.3.17 The Meeting, after an arduous discussion, agreed to support conclusion MEVA/TMG/37/02 since it is very important that the region work more actively within aviation mechanisms to ensure that the frequencies for aeronautical use be available and protected, therefore the following Conclusion was formulated for States approval:

<table>
<tr><td colspan="3">CONCLUSION
NACC/WG/07/14 AERONAUTICAL FREQUENCY MANAGEMENT TASK FORCE (NACC/WG/AFM TF)</td></tr>
<tr><td colspan="2">What:
That, considering that the radio spectrum is a limited natural resource on which the aviation industry directly depends to provide air traffic control services, the Aeronautical Frequency Management Task Force under the NACC/WG (NACC/WG/AFM/TF) is established:

a) the TF is responsible for the support on frequency management, the analysis of the ITU agenda for the WRCs, the analysis of the impact of the allocation of frequencies to an area other than aeronautics, and for providing recommendations at the regional level to ensure that the necessary frequencies for aeronautical use are protected and available for the needs of aviation;

b) the NAM/CAR States nominate the suitable personnel to support the NACC/WG/AFM/TF’s tasks; and

c) the NACC/WG and its members to develop the NACC/WG/AFM/TF Terms of Reference (ToR) and the Work Programme by 15 March 2023.</td><td>Expected impact:
☒ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Operational/Technical</td></tr>
<tr><td colspan="3">Why:
It is important to have suitable personnel in terms of knowledge and experience for the Group and to lead regional analyses and recommendations for frequency management and help States with their recommendations on frequency protection for aeronautical services.</td></tr>
<tr><td>When: 15 March 2023</td><td colspan="2">Status: ☒ Valid / ☐ Superseded / ☐ Completed</td></tr>
<tr><td>Who: ☒ States ☒ ICAO ☐ Other:</td><td colspan="2">Estados NAM/CAR, NACC/WG</td></tr>
</table>

3.3.18 Under NI/02 Cuba invited to follow up on the activities developed by the Ad hoc Group part of MEVA/TMG that is developing the activities of the CANSNET Project.

3.3.19 CANSNET will become the fourth phase of MEVA and will replace MEVA from March 2025; In this sense, it is planned that the project will be carried out under the arm of the ICAO Technical Cooperation Bureau (TCB).

3.3.20 CANSNET has been designed to support all the requirements of the CAR Region Aeronautical Telecommunications Network (ATN), with its interconnection with adjacent ICAO regions in a cost-effective manner, achieving the required quality, redundancy and reliability by the evolution of air navigation services.

3.3.21 Under WP/18, the rapporteur of the ECAR/NTG and ECAR/RD groups provided the results of the Eleventh Eastern Caribbean Network Technical Group (E/CAR/NTG/11) and Eighth Eastern Caribbean Radar Data Sharing Ad hoc Group (E/CAR/RD/9) Meetings.

3.3.22 According to the results of the meeting, the following conclusions were obtained:

ECARNTG10–ECARRD8/01	REVIEW OF THE CAR/SAM REGIONAL AIR NAVIGATION PLAN (ANP) TO ENSURE UPDATED INFORMATION ON INFRASTRUCTURE
ECARNTG10–ECARRD8/02	EVALUATION OF NEEDS FOR BACKUP COMMUNICATION FOR EASTERN CARIBBEAN STATE
ECARNTG10–ECARRD8/03	REGIONAL AVIATION CAPACITY AND INFRASTRUCTURE INTEGRATION
ECARNTG10–ECARRD8/04	SUPPORT TO DOMINICA, SAINT KITTS AND NEVIS AND SAINT VINCENT AND THE GRENADINES IN THEIR SURVEILLANCE INFRASTRUCTURE
ECARNTG10–ECARRD8/05	REVISION OF E/CAR ATFM LETTER OF AGREEMENT FOR RADAR DATA SHARING
ECARNTG10–ECARRD8/06	ANTIGUA PLANNING FOR RADAR DATA
ECARNTG10–ECARRD8/07	SURVEILLANCE DATA REQUIREMENTS FOR ANGUILLA AND MONTSERRAT
ECARNTG10–ECARRD8/08	INCREASE THE RELIABILITY OF THE E/CAR NETWORK AND ITS NODES
ECARNTG10–ECARRD8/09	CYBER SECURITY VULNERABILITY ASSESSMENT

3.3.23 The Secretariat, together with the Rapporteur of the Group, will review each one of the conclusions of the report and will integrate the corresponding actions to support the different Task Forces of the NACC/WG.

Agenda Item 4 **NACC/WG Work Programme Update to 2024**

4.1 Review of the Terms of Reference (ToRs) and Update of the NACC/WG Working Programme

AIM/TF

4.1.1 Under WP/20, the Secretariat presented the summary and recommendations of the NAM/CAR Workshop on Dataset Management and Electronic Aeronautical Charts (eCharts), which was developed in collaboration with Group EAD, Frequentis-Comsoft and M -AIS (FLIGHT7), as a follow-up to the activities of the AIM TF and the NACC/WG, and held on-line, from 23 to 24 November 2021. The recommendations of said Workshop were presented to the Meeting and a second Workshop on Data Sets and eCharts in the second half of 2023 was mentioned.

4.1.2 GREPECAS will be informed on the recommendations of the Workshop participants, as follows:

1.	**More training is required on eAIP, AIXM and data set issues in the CAR Region, particularly, the first step is to have a robust eAIP with constant updates in order for States to maintain skills, since a topic of concern are States that implement an initial eAIP but do not make periodic amendments (AMDT). This includes proper maintenance of the information in the database.**
2.	**Reducing the number of old and permanent NOTAMs, as a consequence of the above, it would also help to achieve an awareness that currently does not yet exist in many States regarding adequate knowledge, to discuss more advanced SWIM topics, such as the Digital NOTAM .**
3.	**Promote the availability of eAIPs on States' websites, so that it is easily accessible to the aeronautical community and to be able to start with the distribution of certain information in a suitable format to be processed by computer systems, such as at least a Comma-Separated Values (CSV) or an Excel file, etc. Regarding obstacles, Brazil is a very good example in Latin America.**
4.	**To also include the PANS OPS subject is quite relevant since it is something that is closely related to aeronautical cartographers and probably everyone who works with a Geographic Information System (GIS) database should have at least an introduction to Doc 8168 Volumes I, II, and III, in order to work more completely and effectively.**
5.	**Continue with Workshops and Seminars activities or Courses of this type is very important for the CAR Region, and advance in the different AIM topics.**
6.	**Current status of AIM implementation: this aspect was commented by RO/AIM (Mr. Raúl Martínez, rmartinez@icao.int) in relation to a new monitoring and supervision system, it is important that the status of implementation of States in the region be made public in order to raise**

	awareness and promote decision-making and actions, through the AIM Collaborative Plan (CAR AIM Collaborative Plan) and its AIM tracking web-site.
7.	**<u>Regional training</u>: this is an action in which COCESNA has a lot of experience through ICCAE and which, additionally, was recently tested virtually in South America sponsored by the ICAO SAM Regional Office with good results.**
8.	**<u>Regional approximation in terms of digital data sets</u>: although many guidelines regarding the implementation of Digital Data Sets (DDS) are still in the development process, a homogeneous implementation of these data in the region could be considered. This requires knowledge of current systems and their compatibility and developing an implementation strategy starting with what is proposed by PANS AIM.**
9.	**<u>The duration of the Workshop was short</u>: due to the amount of information to be provided, a second part is recommended to extend more on the topics and to include others that have not yet been treated.**

4.1.3 Under WP/23, the Secretariat informed about the AIM Collaborative Plan with basic information and orientation, analysis of the status of the implementation on the transition from AIS to AIM in the CAR Region. A central place of information and procedures related to elements of the 21-step roadmap for the transition to AIM is provided, showing the progress of States, their proposals and requests on the AIM tracking website.

4.1.4 The performance objectives of the CAR AIM Collaborative Plan was commented, which are organized in AIM capacity phases and aligned regionally, presented to be observed by the CAR States, when feasible together with the ATM implementation as follows:

- **Phase I** - AIM regional capacity, which is expected to be implemented immediately, in particular Legislation, Policy and Regulations;
- **Phase II** - AIM regional capacity, which is expected to be implemented by the end of the year 2023, and
- **Phase III** - AIM regional capacity, which is expected to be implemented by the end of the year 2025 (to be developed).

4.1.5 The Secretariat insisted that States should develop policies and enact primary laws and supporting regulations for AIS/AIM and PANS-AIM Annex 4 and Annex 15 procedures and Standards and Recommended Practices (SARPs), including:

a) establishment of an organizational structure for safety oversight of aeronautical information service providers;

b) requirements for tracking differences with respect to Annex 4 and Annex 15 SARPS;

c) requirements for originators of aeronautical information/data; and

d) the requirement that all entities in the end-to-end AIS data chain establish processes and AIS/AIM Quality Management Systems (QMS).

4.1.6 The Meeting was informed of the performance expectations that were structured for each Phase of the Regional AIM Capacity, when it corresponds to each Phase as mentioned above in terms as quoted below:

- Legislation, Policy and Regulation;
- Human Performance and Human Factors;
- Quality Management; and
- AIM Systems and Processes.

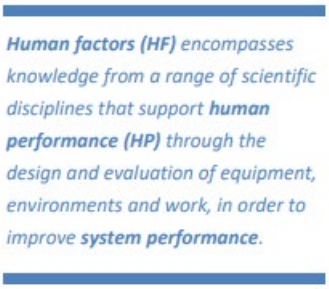
4.1.7 Finally, on this topic, the Secretariat mentioned that regular engagement programmes should be established with all stakeholders, including education on:

a) Status, organization and individual obligations under the Chicago Convention
b) State Legislation and State Regulations
c) ICAO AIM-related annexes to the Chicago Convention, Procedures for Air Navigation Services (PANS) and guidance material
d) Quality Management
e) Data quality monitoring
f) Monitoring of AIRAC adherence
g) Quality Control

4.1.8 The Meeting was requested to review, fill out and send to the ICAO Secretariat the follow-up and report form of the Regional AIM Plan, AIM Performance Indicators, which was attached to WP/23 in its Appendix B.

4.1.9 Under WP/24, information related to current Resolution A40-4 (Doc 10140) was presented, which requests States to ensure the integration of Human Performance considerations (Doc 10151) in the planning, design, and implementation of new technologies, systems, and processes, such as in the AIM field, which, as is evident, is becoming more and more technical and shares a safety management approach with the rest of the ANS matters, especially with the important transformation of the global Air traffic management (ATM) performance.

4.1.10 The Secretariat mentioned that Human Performance (HP) (Doc 10151 *Manual on Human Performance [HP] for Regulators*) is based on Human Factors (HF), which deals with the abilities, characteristics and limitations of humans, by considering the design of the equipment they use, the environments in which they operate, and the jobs they perform, as shown below:



4.1.11 In the discussion during the Meeting, it was commented that in Annex 15, paragraph 3.7.1 “The organization of an AIS, as well as the design, content, processing and distribution of aeronautical data and aeronautical information, must take into consideration the principles of the human factor, which facilitate its optimum use”.

4.1.12 Also in the new 7th Edition of Doc 8126, in Part II, Chapter 7 Automation, Paragraphs 7.2.5 and 7.2.6 the relevance of Human Factors is considered, which implies the concepts and principles of Human Performance in the context of the requirements and demands of technological environments developed by AIM.

4.1.13 Additionally, Doc 10066 defines the Principles related to Human Factors as: "Principles that apply to aeronautical design, certification, training, operations and maintenance and whose purpose is to establish a safe interface between the human component and the other components of the system through due consideration of Human Performance.”

4.1.14 The Secretariat highlighted the importance of the five principles of Human Action (Doc 10151 *Manual on Human Performance [HP] for Regulators*), which synthesize the way in which people's performance is influenced by different factors. These principles are:

- Principle 1: Human performance is determined by the capacities and limitations of people;
- Principle 2: People interpret situations differently and act according to what makes sense to them;
- Principle 3: People adapt to meet the demands of a complex and dynamic work environment;
- Principle 4: People assess risks and make concessions before making a decision; and
- Principle 5: People’s performance is influenced by working with other people, technology and the environment.

4.2 Development of the Electronic Air Navigation Plan (e-ANP) Volume III

4.2.1 The Secretariat presented WP/28 to report the status of the project for the formulation and management of Volume III of the CAR/SAM Regions Air Navigation Plan and proposed actions to integrate into the normal activities of the NACC working groups the tasks aimed at implementing a framework for the performance management of air navigation services.

4.2.2 The Programmes and Projects Review Committee (PPRC/5), through Conclusion PPRC/05-10, entrusted the Secretariat to process the approval of Volume III of the CAR/SAM e-ANP by the third quarter of 2020. ICAO formed an Interregional Working Group for the preparation of a Standardized Template for Volume III of ANPs with Performance-based approach (PBA). The GREPECAS Secretariat carried out activities to disseminate, prior to and during the pandemic, the standardized Template proposed by ICAO, in order to build Volume III of the CAR/SAM Regional Air Navigation Plan (CAR/SAM e-ANP) and observed the following:

a) regarding the BBBs, not all of them were implemented in the States;

b) lack of uniformity of criteria;
c) different interpretations in the States of the application of the proposed template; and
d) need to review and update Volumes I and II.

4.2.3 The Secretariat, considering the previous points, decided to prepare a Project to align the CAR/SAM ANP with the 6th Edition of the GANP, which includes the review of Volumes I and II of the ANP and the processes related to the preparation and management of the CAR/SAM ANP Volume III. This approach will ensure a consistent and systemic update of the CAR/SAM ANP.

4.2.4 The CAR Region, with the support of the ASBU TF and the Secretariat, has carried out important support work for the preparation of the National Air Navigation Plans for CAR States. These plans contain valuable information that will support the population of the tables in Volume III.

4.2.5 The implementation of the PBA implies, in a simple way, the development of state and regional capacities for the collection of data, the use of this data to identify problems/opportunities for improvements, selection of solutions and being able to verify through performance measurement the effectiveness (or not) of the implemented solutions.

4.2.6 The transition of the Regional Performance-Based Air Navigation Implementation Plan (RPBANIP) to Volume III of the CAR/SAM ANP should be a gradual process, which will imply a clear differentiation of the prescriptive elements based on monitoring implementation and those based on performance measurement.

4.2.7 The Meeting considered that the implementation of the requirements for Volume III should be integrated into the normal activities of the NACC/WG in a simple and effective way, so that it can be applied to States with different levels of maturity. The link with the National Air Navigation Plans was also emphasized.

4.2.8 Based on the discussion, the Meeting made the following decision:

DECISION **NACC/WG/07/15**	**VOLUME III OF THE CAR/SAM AIR NAVIGATION PLAN AD HOC GROUP**
What: That, in order to evaluate the actions required by the different NACC/WG Task Forces to comply with the requirements of the ANP CAR/SAM Volume III an Ad hoc Group be established, made up of the rapporteurs of each NACC/WG TF, with the objective of evaluating the activities required for the implementation of the requirements of the CAR/SAM ANP Volume III, identifying the existing gaps and determining the level of support required by the different States to promote the transition into a performance-based environment for air navigation services by the NACC/WG/08, led by the Rapporteur of the ASBU TF and	**Expected impact:** ☐ Political / Global ☒ Inter-regional ☐ Economic ☐ Environmental ☒ Operational/Technical

including support from the Secretariat for the AIM, MET and AGA fields.	
Why: To promote the transition into a performance-based environment for ANS.	
When: NACC/WG/08	**Status:** ☒ Valid / ☐ Superseded / ☐ Completed
Who: ☒ States ☒ ICAO ☐ Other:	Ad-hoc group

4.3 Implementation of mechanisms for measuring the performance of air navigation services

4.3.1 Under WP/30, the Secretariat presented information related to the development and establishment of a dashboard for air navigation services, corresponding to the year 2022, for the NACC and SAM Regional Offices through GREPECAS, in the e-ANP update, Volume III, as well as in the update of the information of e-ANP, Volumes I and II.

4.3.2 Likewise, this ICAO analysis platform will focus on updating the ANS implementation information that is carried through the different implementation and project groups of the ANS areas, to manage the status and progress information and reflect in the system for the NAM/CAR/SAM Regions, said Dashboard is still under construction with the support of ICAO Headquarters.

4.3.3 It was indicated that this system would expect to have a functional version to be presented during the GREPECAS/20 meeting. In this regard, the Meeting made the following Decision:

DECISION **NACC/WG/07/16**	**ICAO NACC DASHBOARDS IMPLEMENTATION**
What: That, in order to provide relevant information on the aeronautical areas, providing important data and information for planning, decision-making and development of future activities based on coherent and easy-to-use information established in the ICAO NACC Dashboard: a) the NACC/WG support in the provision of the necessary data to feed the dashboards; b) the NACC/WG Members provide a Point of Contact (PoC) to access the NACC dashboards, take actions on the tasks and works of these dashboards and their procedures for their operation **by 30 May 2023**; and c) the NACC/WG support any action required from States and other interested parties.	**Expected impact:** ☐ Political / Global ☐ Inter-regional ☐ Economic ☐ Environmental ☒ Operational/Technical
Why:	

The Dashboards will allow the implementation of a metric measurement system that allows the State to visualize the current status of implementation, expectations and/or implementation goals.	
When: 30 May 2023	**Status:** ☒ Valid / ☐ Superseded / ☐ Completed
Who: ☒ States ☒ ICAO ☐ Other:	

4.4 Development/updating of national air navigation plans

4.4.1 Under WP/33, the Secretariat presented a summary of the activities that the ICAO NACC Regional Office is developing to support States in the process of updating and/or developing their air navigation plans.

4.4.2 The air navigation plans of each one of the States represent an important tool for the planning and development of air aviation and the development of the item. It was reported that, during the A41, the new version of the GANP would be approved in its 7th edition and with it the opportunity to work on updating these national plans using this new version would arise.

4.4.3 The GANP is a planning tool that provides instruments to facilitate operations in all phases of flight, with recommended compliance requirements for safety, environmental benefits, optimal operations, economic operations.

4.4.4 The Secretariat informed that during the latest Meeting of the RLA09801 Project Evaluation Commission (MCAAP/PEC), the project for the development of National Air Navigation Plans (NANP) was approved, which has the objective of helping 10 MCAAP Members to develop the following activities:

a) evaluation of the BBBs and identification of priority projects;

b) evaluation of the ASBU elements of Blocks 0 and 1 and identification of priority ASBU implementation;

c) evaluation of the ASBU elements of Block 2; and

d) support to States in the development of their NANPs integrating the e-ANP Volume III and other regional objectives, also integrating the KPIs that will measure the benefits of implementation.

4.4.5 The process has begun with Central America, the Caribbean States and soon Cuba, with the objective of finalizing the status of implementation of their aviation systems by December 2022 and begin to carry out their air navigation plans in 2023.

4.4.6 The process with all CAR States is planned for the year 2023, taking into account the new version of Doc 9750, its associated documents and the regional objectives embodied in the e-ANP, Volume III.

4.4.7 The Secretariat will coordinate with the NACC/WG/ASBU TF regarding the project and the reply to all States, so that the entire CAR Region benefits from this initiative.

4.5 Emerging technologies and regional challenges

Cybersecurity

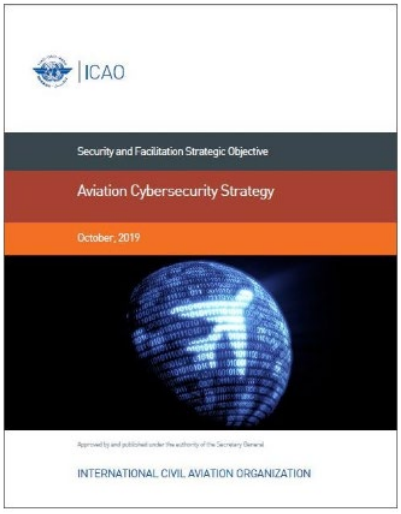
4.5.1 Under WP/34, the Secretariat provided a summary of the information available on cybersecurity for ANS. ANS have evolved in recent decades, implementing highly digital and automated technologies that require the implementation of other security mechanisms that we have known to date.

4.5.2 Cyber technology and systems have become essential to modern society, being a component of many activities that have become dependent on information technology. Along with the benefit of cyber technologies, insecurities arise that affect all systems and infrastructures.

4.5.3 The aviation industry uses a wide range of computer-based interconnected systems, ranging from air navigation, control and communication systems on board aircraft, airport ground systems, flight information systems, security controls and many others that are used on a daily basis and for all aviation related operations. The trend in the aviation sector is to become more and more digitized. Digitization brings new dangers, as the interactions between people and systems make risk more difficult to predict.

4.5.4 Recognizing the urgency and importance of protecting critical civil aviation infrastructure, information and communication technology systems and data against cyber threats, ICAO is committed to developing a robust cybersecurity framework. The A40 adopted Resolution A40-10 - Addressing cybersecurity in civil aviation. The aviation cybersecurity strategy rests on seven pillars:

1. International cooperation;
2. Governance;
3. Effective legislation and regulations;
4. Cybersecurity policy;
5. Information sharing;
6. Incident management and emergency planning; and
7. Capacity building, training and cybersecurity culture



4.5.5 Since 2021, the ICAO NACC Regional Office made an alliance with CANSO and AIRBUS and focused on the development of guidance documentation that would allow States to evaluate air

navigation systems and, based on this, develop their own cybersecurity policy tailored to their operations. The document is a manual called: Cybersecurity Policy Template for Air Traffic Management.

4.5.6 The objectives of this document are:

1. Contribute to the resilience of the State aviation system.
2. Provide support for the integrity, availability and confidentiality of information.
3. Protect the hardware/software that supports the infrastructure of the aviation system to reduce the risks for all State services.
4. Support the implementation of cybersecurity procedures and processes for all infrastructure and services.
5. Support cybersecurity and civil aviation resilience.

4.5.7 It was indicated that cybersecurity required a commitment from States to allocate resources in all areas, from human to financial. However, it is necessary that States, prior to the development of projects aimed at this area, carry out an analysis of their operations, and the Cybersecurity Policy Template for Air Traffic Management supports this activity.

4.5.8 After discussing the issue of cybersecurity in air navigation, the Meeting made the following decision:

<table>
<tr><td colspan="3">DECISION
NACC/WG/07/17 CYBERSECURITY POLICY TEMPLATE FOR AIR TRAFFIC MANAGEMENT</td></tr>
<tr><td colspan="2">What:
That, since air navigation services now depend on digital systems and cybernetic technologies that benefit the operation and efficiency of operations but that open the doors to cyber-threats and cyber-attacks, it is necessary for States to take the corresponding measures to strengthen their sources of protection, and it is decided that the Secretariat coordinate with GREPECAS that the document "Cybersecurity Policy Template for Air Traffic Management" (Appendix H) be adopted as a regional guide for the evaluation of cybersecurity aspects of air navigation services, based on pillar 4 of ICAO "Aviation Cybersecurity Strategy" with the aim of supporting the analysis of cybersecurity risks in air navigation operations.</td><td>Expected impact:
☐ Political / Global
☒ Inter-regional
☒ Economic
☐ Environmental
☒ Operational/Technical</td></tr>
<tr><td colspan="3">Why:
Because aviation must immediately incorporate activities that support decision-making in terms of cybersecurity.</td></tr>
<tr><td>When: Immediately</td><td colspan="2">Status: ☒ Valid / ☐ Superseded / ☐ Completed</td></tr>
<tr><td>Who: ☒ States ☒ ICAO ☐ Other:</td><td colspan="2">NACC/WG Secretariat, CAR States</td></tr>
</table>

Unmanned Aircraft (UAS)/Remotely Piloted Aircraft System (RPAS)

4.5.9 Under WP/35, the Secretariat presented information on unmanned aircraft. Unmanned Aircraft Systems (UAS) are being used more and more around the world to support emergency and rescue missions, urban fires, wildfires, floods, earthquakes, UAS operations help firefighters, police, paramedics/doctors and during the COVID-19 pandemic we have seen its applications in many activities, from socialization, sanitation, medicine delivery, etc.

4.5.10 UAS operations and the services they offer are growing exponentially and one of the fundamental concerns is that States are not prepared for these operations and all that they imply. One of the biggest challenges that States face is the establishment of a regulatory framework for UAS operations that integrates state regulation and civil aeronautics regulation, especially the establishment between the regulation and requirements of RPAS and UAS operations, as well as preparation and capacity development of national inspectors.

4.5.11 ICAO has established the following documentation for the operation of unmanned aircraft:

- Categorization:

  a) Open category and specific categories: ICAO model for UAS regulations Part 101 and Part 102, which is an example for ICAO Member States to establish regulations for unmanned aircraft operations. Document under the following link: https://bit.ly/3e46ayN.
  b) Certified category: All ICAO annexes apply.
  c) Approval of aviation organizations (AAO): For operators of unmanned aircraft, example for the development of the regulation: ICAO Model for UAS regulations Part-149: https://bit.ly/3RqPaB4.
  d) In addition to information and guidance material that ICAO has developed to support States to face the operation of UAS due to the diversity of applications.

4.5.12 The Secretariat indicated that all ICAO Annexes are affected by these operations, therefore, when developing national regulations, procedures and others, these requirements must be integrated and their applicability analysed according to the type of operation and thus establish mechanisms within the States that ensure covering the different needs to regulate the operations of the UAS systems.

Agenda Item 5 Other business

5.1 No other business were discussed under this Agenda item.

APPENDIX A
EXECUTIVE LIST OF CONCLUSIONS/DECISIONS

Number	Conclusion/Decision	Responsible for action	Deadline
C/01	**IMPLEMENTATION AND SUPPORT OF MINIMUM ATFM REQUIREMENTS** That, in order to ensure proper implementation and support for its harmonized regional operation: a) the Secretariat continue developing the proposal for amendment for the inclusion in the CAR/SAM Regions Air Navigation Plan of minimum requirements for ATFM in the CAR Region, in accordance with the required levels of services and their interrelation in the Regional ATM network **by April 2023**; and b) States support the implementation and operation of ATFM in the CAR Region, promoting decision-making from a regional perspective in order to collaborate to reduce the impact of air traffic management measures taken by any State/Territory or ANSP.	States	a) PPRC/05 - April 2023 and b) immediate
D/02	**APPROVAL OF THE REVISED WORK PROGRAMME OF THE ATFM TASK FORCE** That, in the interest of keeping the tasks and activities of the ATFM Task Force up-to-date and in line with the reality of the current operational environment, the NACC/WG approve the revised work programme of the ATFM Task Force as presented in **Appendix C** to this report.	States and ICAO	Immediately

Number	Conclusion/Decision	Responsible for action	Deadline
D/03	**NACC/WG/ASBU TASK FORCE WORK PROGRAMME UPDATE** That, with the interest of updating the development activities of the air navigation plans of the CAR States in line with the new version of the Global Air Navigation Plan (GANP), the ASBU Task Force update its action plan by the NACC/WG/08: a) for the integration of regional objectives and support for the development of the electronic Air Navigation Plan (e-ANP) III; b) to work jointly on common issues between the GANP and the Global Safety Plan (GASP); and c) to carry out an implementation analysis of the Basic Building Blocks (BBB) with the Protocol Questions (PQ) of the Universal Safety Oversight Audit Programme (USOAP).	ICAO	NACC/WG/08
C/04	**NACC/WG TASK GROUP MEMBERSHIP UPDATE** That, a) States update the membership of the different Points of Contact (PoC) of all the Task Forces of the NACC/WG; b) the selected people have the technical profile (for example for the SURV/TF as radar experts) with knowledge, experience and, above all, that they currently work in the work areas designated to integrate the different Task Forces; and c) the States send this information **by 15 February 2023**.	States	15 February 2023
D/05	**GUIDE FOR STATES ON PARAMETERS TO MONITOR THE PERFORMANCE OF ADS-B SYSTEMS** That, in order to facilitate and adequately evaluate the performance of Automatic Dependent Surveillance – Emission (ADS-B OUT) and perform statistical analysis of the ADS-B information received by a surveillance data monitoring system (**Appendix E**), the document for the evaluation of ADS-B data be adopted, with the objective that States have a guide that allows them to evaluate the performance of ADS-B stations and make decisions based on the data obtained.	States	Immediately

Number	Conclusion/Decision	Responsible for action	Deadline
D/06	**AD HOC GROUP TO CATEGORIZE TERMINAL AIRSPACE PROCEDURES** That, a) the NACC/WG/AO TF create an Ad hoc Group to categorize terminal airspace procedures and list the criteria/benefits of each one **by 15 February 2023**, composed by members of the NACC/WG/AO TF, as well as relevant stakeholders added as needed; b) the group will compile a list of different terminal airspace procedures used globally to develop a resource guide for the CAR Region. It will consist of criteria that should be considered for each procedure and will highlight the potential benefits; and c) the Resource Guide for the CAR Region will be presented by the NACC/WG/08 for future distribution to all NACC States/International Organizations.	States, ICAO and others	a) by 15 February 2023, and b) communicate results at NACC/WG/08
D/07	**UPDATE OF CAR REGION AIRSPACE OPTIMIZATION DEVELOPMENT CONCEPT DOCUMENT** That, the updated airspace concept for the CAR Region will be developed and distributed as follows: a) the new version of the document to be completed and distributed to all PoCs of the TF **by 15 February 2023**; b) all PoCs review and provide comments/recommendations **by 28 February 2023**; and c) the final document to be presented at the NACC/WG AO/TF meeting to be held in February 2023.	Other: NACC/WG AO/TF	a) by 15 February 2023 b) by 28 February 2023

Number	Conclusion/Decision	Responsible for action	Deadline
C/08	**DEFINITION OF THE LIMITS AND RESPONSIBILITIES OF THE SEARCH AND RESCUE REGIONS OF THE CAR REGION** That, in order to support the project to review and update the CAR/SAM ANP the Secretariat: a) request States/Territories of the CAR Region: i. Updated information regarding the Search and Rescue Regions (SRR) and Search and Rescue Subregions (SRS) for which they are responsible, including the description of the lateral limits with coordinates; and ii. Updated information regarding their Rescue Coordination Centres (RCCs) and Rescue Sub-centres (RSCs), including the SAR points of contact (SPOC) and other supplementary information; and a) present to the NACC/WG/SAR/TF the information received to evaluate and take the appropriate actions to develop a proposal to amend the CAR/SAM ANP.	States and ICAO	NACC/WG/08
C/09	**HIGH-LEVEL SUPPORT FOR SEARCH AND RESCUE ACTIVITIES IN THE CAR REGION** That, taking into consideration the importance of the adequate provision of SAR services for the maintenance of a safe and sustainable air navigation system, States and Territories of the CAR Region: a) pay attention to the signing and updating of the SAR agreements necessary for the proper coordination of these services by the NACC/DCA/11 Meeting; and b) request provide the necessary resources for the operation of the SAR services, as well as the adequate endowment and training of the necessary personnel for said services.	States and ICAO	NACC/DCA/11

Number	Conclusion/Decision	Responsible for action	Deadline
D/10	**CENTRAL AMERICAN EXPERIENCE FOR PLANNING AND RESPONSE TO CONTINGENCIES** That, considering the experiences of the Central American States in aspects of planning for emergencies and contingencies, that the NACC/WG: a) request States and Territories of the CAR Region to keep the contingency plans updated for the execution of the most efficient response to emergency and contingency situations in the CAR Region by the NACC/WG/08 ; and b) promote actions to establish operational agreements between dependencies and adjacent FIRs that contain the operating procedures in accordance with the CNS/ATM capabilities that must be implemented in response to emergencies, with the purpose of guaranteeing the continuity of air traffic services.	States	NACC/WG/08
C/11	**AGA TASK FORCE (NACC/WG/AGA TF)** That, a) States to approve the creation of an AGA Task Force (NACC/WG/AGA TF) for the coordination, preparation and implementation of projects, activities and development of guidance material in the region with the objective of increasing the safety, capacity and efficiency of navigation in the area of aerodromes and ground aids; b) States to nominate members to the AGA Task Force; c) NACC/WG/AGA TF to develop its Terms of Reference (ToRs) and work programme of the NACC/WG/AGA TF for the report prior to the NACC/WG/08 meeting.	States, ICAO and other: NAM/CAR States, ICAO NACC, NACC/WG	Immediately and report progress by NACC/WG/08
C/12	**AGA CONTACT INFORMATION** That, States and Territories send the complete contact information through a format (name, title, email, telephone) of State/Territory's AGA focal points to the ICAO NACC Regional Office (NACC-AGA@icao.int) **by 15 February 2023**.	States and ICAO	15 February 2023

Number	Conclusion/Decision	Responsible for action	Deadline
D/13	**ADOPTION OF THE MET PROGRAMME AND THE MET TASK FORCE (MET/TF) OF THE NACC/WG** That, a) States approve that a MET Task Force (TF) be established within the NACC/WG structure, to support MET implementation in the regions and lead MET assistance activities that support compliance with the NACC/WG Terms of Reference (ToRs) and work programme; b) the MET programme (Appendix G refers) be used , as an initial guidance tool for regional MET implementation planning in accordance with the requirements of ICAO Annex 3; and c) the ICAO NACC Regional Office take the necessary measures (creation of ToRs, work programme and other measures associated with the establishment of a TF) to ensure the proper establishment of the NACC/WG MET TF and convene its first virtual meeting **by 15 February 2023**.	States and ICAO	15 February 2023
C/14	**AERONAUTICAL FREQUENCY MANAGEMENT TASK FORCE (NACC/WG/AFM/TF)** That, considering that the radio spectrum is a limited natural resource on which the aviation industry directly depends to provide air traffic control services, the Aeronautical Frequency Management Task Force under the NACC/WG (NACC/WG/AFM/TF) is established: a) the TF is responsible for the support on frequency management, the analysis of the ITU agenda for the WRCs, the analysis of the impact of the allocation of frequencies to an area other than aeronautics, and for providing recommendations at the regional level to ensure that the necessary frequencies for aeronautical use are protected and available for the needs of aviation; b) the NAM/CAR States nominate the suitable personnel to support the NACC/WG/AFM/TF's tasks; and c) the NACC/WG and its members to develop the NACC/WG/AFM/TF Terms of Reference (ToR) and the Work Programme **by 15 March 2023**.	States and ICAO	15 March 2023

Number	Conclusion/Decision	Responsible for action	Deadline
D/15	**VOLUME III OF THE CAR/SAM AIR NAVIGATION PLAN AD HOC GROUP** That, in order to evaluate the actions required by the different NACC/WG Task Forces to comply with the requirements of the ANP CAR/SAM Volume III an Ad hoc Group be established, made up of the rapporteurs of each NACC/WG TF, with the objective of evaluating the activities required for the implementation of the requirements of the CAR/SAM ANP Volume III, identifying the existing gaps and determining the level of support required by the different States to promote the transition into a performance-based environment for air navigation services by the NACC/WG/08, led by the Rapporteur of the ASBU TF and including support from the Secretariat for the AIM, MET and AGA fields.	States and ICAO	NACC/WG/08
D/16	**ICAO NACC DASHBOARDS IMPLEMENTATION** That, in order to provide relevant information on the aeronautical areas, providing important data and information for planning, decision-making and development of future activities based on coherent and easy-to-use information established in the ICAO NACC Dashboard: a) the NACC/WG support in the provision of the necessary data to feed the dashboards; b) the NACC/WG Members provide a Point of Contact (PoC) to access the NACC dashboards, take actions on the tasks and works of these dashboards and their procedures for their operation **by 30 May 2023**; and c) the NACC/WG support any action required from States and other interested parties.	States and ICAO	30 May 2023

Number	Conclusion/Decision	Responsible for action	Deadline
D/17	**CYBERSECURITY POLICY TEMPLATE FOR AIR TRAFFIC MANAGEMENT** That, since air navigation services now depend on digital systems and cybernetic technologies that benefit the operation and efficiency of operations but that open the doors to cyber-threats and cyber-attacks, it is necessary for States to take the corresponding measures to strengthen their sources of protection, and it is decided that the Secretariat coordinate with GREPECAS that the document "Cybersecurity Policy Template for Air Traffic Management" (**Appendix H**) be adopted as a regional guide for the evaluation of cybersecurity aspects of air navigation services, based on pillar 4 of ICAO "Aviation Cybersecurity Strategy" with the aim of supporting the analysis of cybersecurity risks in air navigation operations.	States and ICAO	Immediately

APPENDIX B
FOLLOW UP TO VALID CONCLUSIONS AND AGREEMENTS

1. NACC/WG Conclusions/Decisions

Number	Conclusion/Decision	Status
CONCLUSION NACC/WG/06/06	IMPLEMENTATION OF THE DIGITAL DATA SETS (DDS), OF THE e-AIP DATA AND AERONAUTICAL INFORMATION EXCHANGE MODEL (PANS AIM)	**Valid** Its development will continue until December 2024.
CONCLUSION NACC/WG/6/08	ICAO ANNEX 3 SARPS IMPLEMENTATION	**Valid** In process
DECISION NACC/WG/06/09	OPERATIONAL NEEDS TO IMPROVE COMMUNICATION NETWORK FOR FUTURE SERVICE IMPLEMENTATION AND BACKUP COMMUNICATION	**Valid** In process
DECISION NACC/WG/06/10	SUPPORT FOR THE DEVELOPMENT OF THE CAR/SAM ANP VOL III: OPERATIONAL IMPROVEMENTS	**Valid** In process
CONCLUSION NACC/WG/6/12	IMPLEMENTATION OF THE MITIGATION MEASURES TO ADDRESS CO2 EMISSIONS FROM INTERNATIONAL AVIATION	**Valid** In process

2. GREPECAS Programmes and Projects Committee (PPRC)

Number	Conclusion/Decision	Status
eCRPP/04/03	REVIEW OF THE MET PROJECTS TO ANALYSE THE EXTENSION OF THEIR SCOPE TO THE CAR REGION	**Valid** In process.

2.1 The progress on the other conclusions and decisions regarding this area will be communicated to GREPECAS/20.

3. Tenth North American, Central American and Caribbean Directors of Civil Aviation Meeting (NACC/DCA/10)

Number	Conclusion/Decision	Status
CONCLUSION NACC/DCA/10/3	ENHANCE PREPAREDNESS OF AIR NAVIGATION SERVICES	**Valid**
CONCLUSION NACC/DCA/10/5	DEPLOYMENT OF NACC DASHBOARDS	**Valid** In process
CONCLUSION NACC/DCA/10/9	STATE PARTICIPATION ON AIR NAVIGATION IMPLEMENTATION FOR THE NAM/CAR REGIONS	**Valid**
CONCLUSION NACC/DCA/10/11	AIRPORT TO AIRPORT MUTUAL ASSISTANCE PROGRAMME	**Valid**
CONCLUSION NACC/DCA/10/12	EXPERIENCE, LESSONS AND GOOD PRACTICES EXCHANGE ON MITIGATIONS TO THE 5G RADIO ALTIMETER INTERFERENCE	**Valid**
CONCLUSION NACC/DCA/10/16	STATES ACTIVE PARTICIPATION AND INVOLVEMENT ON ENVIRONMENTAL MATTERS	**Valid** In process

3.1 Results and progress will be reported during NACC/DCA/11.

APPENDIX C
REVISED ATFM TASK FORCE WORK PROGRAMME
Updated August 2022

ATFM Mission Statement
The ATFM Work Programme provides specific initiatives for the development of a regional concept of ATFM implementation in NAM/CAR Regions. This is consistent with Annex 11, PANS-ATM, ICAO Doc. 9971, the CAR/SAM Air Navigation Plan and the CAR/SAM ATFM CONOPS. It takes into consideration the execution of a simple, basic, and incremental approach of promoting, sharing and implementing a regional, interoperable ATFM framework for global harmonization.

INTRODUCTION
People, automation, technology and collaboration with system stakeholders (inclusive of academia) will be the core principles of this project. The Work Programme seeks to:

1. Establish consistent regional ATFM planning and operating practices
2. Encourage a collaborative and harmonized approach to ATFM amongst States and regions
3. Foster a systemic approach to ATFM, inclusive of all ATM community members

The document takes into consideration the diverse range of experience, technology and available resources.

Note 1: This document shall be a guideline for establishing ATFM NAM/CAR goals and reviewed periodically throughout the year. A formal review each calendar year shall be conducted during the NACC/WG meeting, so as to update/revise/modify its content for currency and applicability.

No	Activity	Objective	Deliverable	Responsible/Lead	Date
1	**Trainings and Workshops** • Develop an ATFM Training Programme, including training requirements for each ATFM position. (Several ATFM related training courses have been developed and delivered prior to Aug 2022 e.g. ATFM Basic Training by the FAA, CADENA annual Hurricane Trainings, CADENA contingency trainings, CADENA aerodromes/airspace capacity assessment trainings.) • Training Program should include every level of training and objectives in line with ICAO TRAINAIR Plus Methodology. (ATFM/TF) • Provide refresher training courses. • Training Program shall be included as Appendix to the CAR/SAM ATFM CONOPS. • Organize appropriate workshops as needed.	Provide a core foundation to build upon for regional participants	Trainings and workshops		31 December 2023
	Status/Remarks: • Much of the initial training work has already accomplished, the effort needs to continue and refresher training integrated.				
2	• **CAR/SAM ATFM Concept of Operation Document** • Include the guideline for the ATFM Contingency Plan in the CAR/SAM ATFM Concept of Operations Document. • Include agreed regional KPIs in the CAR/SAM ATFM Concept of Operations Document. • Create the proposal on the subject of ATFM Minimum requirements to be included in the CAR/SAM Air Navigation Plan (ANP)	Create the ATFM Concept of Operation (CONOPS) Document that encompasses CAR and SAM to improve safety and efficiency of traffic flow between two regions.	CAR/SAM CONOPS doc		31 December 2024
	Status/Remarks: • Work initiated. • CADENA created and maintains the CADENA ATFM and CDM Procedures Manual in July 2017. This document guides the regional ATFM implementation. This document is updated as the regional ATFM operation matures.				

No	Activity	Objective	Deliverable	Responsible/Lead	Date
3	**Contingency Plans** • Develop guidelines for ATFM Contingency Plans to be included in the CAR/SAM ATFM Concept of Operations Document. • Establish a clear differentiation between the ATM Contingency Plans and the ATFM Contingency Plans. • Consider interoperability and seamless continuity plan into the ATFM Contingency Plans	This Work Item will provide an adequate regional response to contingencies, and will reduce the harmful impact of these contingencies to the continuous flow of air traffic.	Contingency Plans		31 December 2023
	Status/Remarks: • CADENA OIS provides structure for real time operational contingency events.				

No	Activity	Objective	Deliverable	Date
4	**ATFM Regional Performance Measurement** • Establish Key Performance Indicators (KPIs) to be measured. For example, operational counts for airports and airspace, take-off time, departure delays. • Identify when and how the KPIs will be measured, and with whom the information will be shared. • Establish the guidelines of KPIs. • Include the KPIs and associated guidelines into the CAR/SAM ATFM Concept of Operations Document.	Understand operational performance and develop means and methods to improve performance.	KPI identification, definition, and associated guidelines	31 December 2023
	Status/Remarks: •Ongoing discussion about capabilities to gather and calculate data			
5	**Supporting ICAO NACC Regional Work Associated with ATFM** • Support GREPECAS eANP Volume III creation/revision in the areas of ATFM • Support the GREPECAS Data Analysis Working Group (DAWG) • Support ICAO NACC Airspace Optimization Task Force for its mission/goals • Support CANSO ATFM Data Exchange Network for Americas (CADENA) for its mission/goals o Facilitate data sharing, and promote a common situational awareness. o Operational support via CADENA ad-hoc contingency web conference as well as the CADENA OIS chat	Support ICOA NACC RO to accomplish ATFM related tasks by collaborating with other groups' mission/goals. The ICAO NACC ATFM Task Force contribute to the synergy that improves ATFM performance in the region.	Necessary inputs, letters, papers, and reports.	Ongoing
	Status/Remarks: • States will report to ICAO NACC on their accomplishments related to ATFM implementation			
6	**Evaluation and identification of GANP/ASBU NOPS Threads applicable to CAR region** • As revision of GANP/ASBU comes available, the workgroup will review the NOPS thread and determine if any of the Elements are applicable to our region. If applicable, specify implementation strategies. • Recommendation to update the CAR/SAM Regional Air Navigation Plan and related documents.	Global and Regional Harmonization	Implementation strategies for emerging ASBU requirements	Ongoing
	Status/Remarks:			

No	Activity	Objective	Deliverable	Date
7	**NACC/WG Decision and ATFM TF Organization** • Provide progress report/update for Chairperson reference NACC/WG • Keep this Work Programme updated • Keep ATFM TF PoC list updated • Facilitate ATFM TF Web Conferences as needed • Facilitate ATFM TF Meeting as needed • Coordinate ATFM matters with CADENA and stakeholders as needed	Liaison with regional coordination groups	Work Programme and ToR to ICAO RO	Ongoing (ATFM/TF Meetings)
	Status/Remarks:			

References:

- Annex 11
- Doc 4444 - *Procedures for Air Navigation Services — Air Traffic Management* (PANS-ATM)
- Doc 9971 - *Manual on Collaborative Decision-Making (CDM)*
- CAR/SAM Air Navigation Plan.
- Caribbean/South American Air Traffic Flow Management Concept of Operation (CAR/SAM CONOPS ATFM)
- Doc 9854 -Global Air Traffic Management Operational Concept
- Doc 9882 -Manual on Air Traffic Management System Requirements
- Doc 9883 - Manual on Global Performance of the Air Navigation System
- Doc 9965 - Manual on Flight and Flow – Information for a Collaborative Environment
- Civil/Military Cooperation in Air Traffic Management (Cir 330-AN/189)
- NOPS
- FRTO: FRTO-B1/3 Advanced FUA and management of real time airspace data
- APTA
- FICE

APPENDIX D
SURVEILLANCE DATA IMPLEMENTATION STATUS

State	Surveillance Data	ADS-B IMPLEMENTATION								
		ADS-B Stations	ATM Integration	Human machine interface (HMI) support interface	Airborne System Version	Training	Technical Performance requirements	Regulations	Operational (yes/no)	Comment
Antigua and Barbuda	No	0	No	No	No	No	No	No	No	
Aruba	Yes	Yes	Yes	Yes	No	No	No	No	No	Aruba has a WAM System and ADS-B antenna for TWR/APP ATC service
Bahamas	Yes	0	No	No	No	No	No	No	No	Proposed: 1 Radar A/C/S/ADS-B
Barbados	Yes	2	Yes	Yes	No	No	No	No	No	Two MLAT with ADS-B
Belize	Yes	1	Yes	Yes	V0,V1,V2	No	No	No	No	
Canada	Yes	x	Yes	Yes	V2	Yes	Yes	Yes	Yes	
Costa Rica	Yes	3	Yes	Yes	V0,V1,V2	No	No	No	No	
Cuba	Yes	8	No	No	V0, V1 (6), V2 (2)	No	No	No	No	
Curaçao	Yes	0	No	No		No	No	No	No	Space based ADS-B not integrated

State	Surveillance Data	ADS-B IMPLEMENTATION								
		ADS-B Stations	ATM Integration	Human machine interface (HMI) support interface	Airborne System Version	Training	Technical Performance requirements	Regulations	Operational (yes/no)	Comment
										with ATC system
Dominica	No	0	No	No		No	No	No	No	
Dominican Republic	Yes	0	No	No		No	No	No	No	
El Salvador	Yes	1	Yes	Yes	V0,V1,V2	No	No	No	No	
Grenada	No	0	No	No	No	No	No	No	No	
Guatemala	Yes	3	Yes	Yes	V0,V1,V2	No	No	No	No	
Guadeloupe	Yes	0	No	No	No	No	No	No	No	
Haiti	Yes	0	No	No	No	No	No	No	No	Proposed: 1 Mode A/C/S Radar and 2 ADS-B
Honduras	Yes	3	Yes	Yes	V0,V1,V2	No	No	No	No	
Jamaica	Yes	0	No	No	No	No	No	No	No	
Martinique	Yes	0	No	No	No	No	No	No	N	Radar SSR
Mexico	Yes	10	No	Yes	V0,V1,V2	No	No	No	Yes (1)	AFAC CO AV-91.2/19 (Aircraft)
Nicaragua	Yes	3	Yes	Yes	V0,V1,V2	No	No	No	No	
Saint Kitts and Nevis	No	0	No	No	No	No	No	No	No	
Saint Lucia	No	0	No	No	No	No	No	No	No	Plan ADS-B
Saint Vincent and the Grenadines	No	0	No	No	No	No	No	No	No	

State	Surveillance Data	ADS-B IMPLEMENTATION								
		ADS-B Stations	ATM Integration	Human machine interface (HMI) support interface	Airborne System Version	Training	Technical Performance requirements	Regulations	Operational (yes/no)	Comment
Trinidad and Tobago	Yes	1	Yes	No	No	No	No	No	No	Radar SSR
United States	Yes	710	Yes	Yes	V2	Yes	Yes	Yes	Yes	

PARAMETERS TO MONITOR THE PERFORMANCE OF ADS-B SYSTEMS

FIRST EDITION, JULY 2022

Approved by the ICAO NACC Regional Office for use in the CAR region

INTERNATIONAL CIVIL AVIATION ORGANIZATION

INTERNATIONAL CIVIL AVIATION ORGANIZATION
ICAO NACC

PARAMETERS TO MONITOR THE PERFORMANCE OF ADS-B SYSTEMS

FIRST EDITION

MEXICO

JULY 2022

Disclosure

This document has been developed by members of the Surveillance Task Force (NACC/WG/SURV), part of the North American, Central American and Caribbean Working Group (NACC/WG) based on the ADS-B implementation and monitoring experience in the NAM/CAR region and for use by CAR States.

CONTENT

AMENDMENTS

No	DATE	DESCRIPTION

1 GLOSARY

ADS-B: Automatic dependent surveillance - broadcast

ADS-B OUT: automatic dependent surveillance – broadcast

ANSP: Air Navigation Service Provider

ASTERIX: All-purpose structured Eurocontrol radar information exchange IP/UDP: Internet protocol/User Datagram Protocol

NTP: network time protocol

SAC: Fields System Area Code

SIC: System Identification Code

UAP: User Application Profile

2 INTRODUCTION

2.1 The purpose of this document is to identify the general parameters to evaluate the performance of the Automatic Dependent Surveillance - Broadcast (ADS-B OUT)[1] and to perform statistical analyses of the ADS-B information provided by aircraft using a performance monitoring system.

2.2 The above-mentioned is based on the following needs:

a) Permanently, periodically and automatically monitor the performance of the ground and/or satellite-based ADS-B systems, as well as the information provided by the aircraft, ensuring compliance with the requirements established by the States for the use of ADS-B in its defined airspaces in accordance with its procedures and systems to guarantee operational safety.

b) Use minimum standardized criteria to perform ADS-B statistical analyses, including technical and operational criteria based on the requirements of each airspace.

c) Use ADS-B performance levels to filter data based on the different parameters to be measured.

d) Allow a common language of interpretation of the criteria and results of the statistical analysis of the ADS-B.

e) Identify the items required for statistical analysis; and

f) Support technical-operational decision-making.

2.3 The information collected may provide air navigation providers (ANSP), requesting aircraft, aircraft owners, operators, and companies responsible for installing and maintaining on-board equipment of statistical information on the capabilities, performance and data of position received by ground- or satellite-based ADS-B receivers, as an additional method of verifying the proper operation of the related ADS-B and on-board navigation systems.

[1] ADS-B OUT: Automatic Dependent Surveillance – Broadcast system is a function in an aircraft or vehicle that periodically transmits its vector state (position and speed) and other information derived from airborne systems in a format suitable for ADS - B IN. ICAO Doc 9924.

2.4 The data is useful to air navigation providers to monitor aircraft capabilities, conduct research and support with safety case analyses, and to aircraft avionics maintainers to perform post-installation and isolation conformance/configuration checks of failures.

2.5 Examples of existing ADS-B performance monitors created by Cuba, United States and COCESNA can be found in Appendix A, Appendix B and Appendix C of this document.

3 REFERENCE DOCUMENTS

[1]. Annex 10, Aeronautical Telecommunications; Volume II, ICAO Communication Procedures, 7th Edition, July 2016.

[2]. EUROCONTROL Specification for ASTERIX Surveillance Data Exchange, Part 12 Category 021, ADS-B Target Reports, 22 December 2021.

https://www.eurocontrol.int/sites/default/files/2021-12/asterix-adsbtr-cat021-part12-v2-6.pdf

[3]. Specification for Surveillance Data Exchange – Part 16 - ASTERIX (CNS/ATM Earth Stations and Station Status Reports) Cat 023, Edition 1.3, 27 September 2021.

https://www.eurocontrol.int/sites/default/files/content/documents/nm/asterix/cat023-asterix-cns-atm-ground-station-service-messages-part-16.pdf

[4]. Minimum operational performance standards for 1090 MHz Automatic Dependent Surveillance - Broadcast (ADS-B), EUROCAE ED-102A/RTCA DO-260B) RTCA/EUROCAE January 2012.

4 DATA RECORDING

4.1 The system should allow real-time data recording of ADS-B Version 0, 1 and 2 messages, received in Asterix CAT[2] 021 edition 0.23, 2.1, 2.4 and/or 2.6 format. Version 0.23 only allows formatting Version 0 messages and from edition 2.1 it is possible to additionally format versions 1 and 2. In the case of version 2.6 it will allow formatting ADS-B messages, Version 3. The recording must be done in the version that the server processes the surveillance data of the Control Centre Automation system.

4.2 Cat. 23 will be used to determine the technical status of each of the ground or satellite stations.

4.3 The system must process and decode all the fields and data items of the standard UAP (User Application Profile) for Asterix Cat. 21 and Cat. 23 in the latest implemented edition.

4.4 Data recording should be done over LAN, using IP/UDP and Unicast/Multicast protocols over redundant networks.

4.5 Each message should identify the ground and satellite based ADS-B sensor through the System Area Code (SAC) and System Identification Code (SIC) fields of the Asterix message. In the case of multiple ADS-B sensors, a server may be required to merge the information received.

NOTE: The SAC is established for each of the States at the following address:

https://www.eurocontrol.int/asterix

The SIC is established by the authority of each civil aviation of each State.

4.6 Both terrestrial and satellite-based systems and recording servers will need to be synchronized with Network Time Protocol (NTP) clocks for data formatting and data latency determination.

[2] CAT: Category

4.7 Recordings should be made continuously. Once the recording is finished and the data has been processed by the system, it should be available to users to generate the queries that are required from a suitable interface.

NOTE: Each state has to define the configurable recording time interval and data backup time.

5 GENERAL FILTERS FOR QUERIES

Queries or reports should be generated from the following information:

FIELD	DESCRIPTION
24-bit ICAO address:	Unique six-character ICAO 24-bit hexadecimal address assigned to an aircraft at the time of registration. The ICAO code is the same as the Mode S address.
Flight ID or aircraft registration:	Unique number assigned to the flight (call sign/registration), it should coincide with the call sign of the aircraft used in ATC communication. The air carrier could be identified for commercial aviation.
Mode A code:	Received by the aircraft in octal format and assigned by ATC
Emitter Category:	Indication of aircraft characteristics (type/size/weight/performance), important to identify wake turbulence.
Start time:	Time of the first monitored report of the flight in UTC time.
Ending time:	Time of last flight report in UTC.
Start date:	Flight starting date.
Aircraft location area	Select area of interest/volume of airspace.

NOTA: It should be related by means of the ICAO address, the aircraft registry and the make and model of the ADS-B and GPS transmitter. Related information should include aircraft type and model (see DOC 8643) and operators (see DOC 8585).

6 GENERAL SPECIFICATIONS OF ADS-B DATA PROCESSING

6.1 The system must have the capacity to process and identify all versions of ADS-B (DO-260, DO-260A, DO-260B and the new version DO-260C), with the correct processing of the figures of merit for each version[3].

6.2 The system shall process WGS-84 position data including high resolution, geometric height, flight level and enhanced aircraft intent information for each message.

6.3 Decode the different identifications of the aircraft: ICAO 24-bit address, flight ID, Mode 3/A and emitter category.

6.4 For each report, the different times of the message will be stored: time of reception of the position and speed, time of applicability of the position and speed, including the times of high precision of the message.

6.5 For each report, the UTC date and time of recording of the message is stored for the purpose of performing message latency analysis.

6.6 The system must process the aircraft status fields, the aircraft report description fields, ACAS resolution, and the power amplitude of the message.

6.7 Data should be collected and identified for the following phases of flight whenever there is coverage of ADS-B receivers:

a) 1090 – In the air

b) 1090 – On ground

The surface information depends on whether a service volume covered by a ground- or satellite-based ADS-B receiver exists.

[3] The versions of ADS-B, Version 0, 1, 2, and 3, refer to the DO-260, DO-260A, DO-260B, or DO-260C operational performance standards that were used by avionics manufacturers.

6.8 Identify the capacity or type of transmitted link for the ADS-B capacity (1090). The 1090ES is the standard used internationally and recommended by the ICAO. Using UAT is not recommended.

6.9 Process and store for each message the following figures of merit according to the version of the ADS-B standard, identifying the messages that do not comply with the criteria or rules defined for each State:

a) NACp (Navigation Accuracy Category for Position): This field indicates the accuracy of the position of the aircraft being transmitted.
b) NACv (Navigation Accuracy Category for Velocity): This field indicates the navigation accuracy for the velocity of the aircraft being transmitted.
c) NIC (Navigation Integrity Category): The NIC coding is used to indicate the containment radius around the aircraft.
d) SDA (System Design Assurance): Measures the probability of incorrect data being sent.
e) SIL (Surveillance/Source Integrity Level): Measurement of the probability of not being within the containment radius.
f) SILs (Surveillance/Source Integrity Level Supplement): This is a one-bit field that informs the system if the SIL is administered per hour or per sample. It is not considered a priority parameter.
g) SQL (Signal Quality Level): Measurement of the integrity of the data sent.

6.10 Identification of the classes of airspace in which the aircraft operated during the flight, as long as the system allows the processing of geographic information and the airspaces are defined.

6.11 Define and configure different types of performance rules depending on the ADS-B version and the combination of Figures of Merit (for example, NIC, NACp, etc.) and airspace.

6.12 Duration of the flight in the different reports, must indicate the total flight time measured in hours, minutes and seconds.

6.13 Calculate the availability and reliability of the ADS-B surveillance sensor, taking into account the information on the status of the ground station provided in Asterix CAT 023, which indicates when the information provided can be used for operational use.

6.14 Process the other fields of the UAP Standard CAT 21 and CAT 23 according to the implemented version.

7 PERFORMANCE EVALUATION OF ADS-B SENSORS

The system must allow the evaluation of the general performance of the ground- and/or satellite-based ADS-B systems independently and using multi-sensor information, which allows the determination of the following parameters:

a) Total ADS-B reports
b) Average update rate of ADS-B reports in seconds
c) Update Probability (Pd) in general and by aircraft, according to the volume of traffic and type of airspace.
d) Probability of false targets
e) Mode A code detection probability
f) Mode C code detection probability
g) Size of the maximum and average gaps
h) Unassociated reports

NOTE: Target information does not correspond to other aircraft information (eg: flight plan).

i) Position error (RMS)
j) Latency
k) Availability based on the operational status of the sensors.
l) Maximum, minimum and average time delays of communications.
m) Coverage based on opportunity traffic, multi-sensor track and terrain elevation information.

8 STATISTICS GENERATION

The system through a user interface must allow the generation of the following statistics:

a) Total number of ASTERIX ADS-B messages historically processed by the system.
b) Number of aircraft with ADS-B capability filtered by date and time.

c) Number of operations with ADS-B capacity per day.

d) Percentage of aircraft with a different ADS-B version (DO-260, DO-260A, DO-260B or DO-260C). The number of aircraft with erroneous versions must be identified.

e) Percentage of aircraft according to the value of each figure of merit.

f) Percentage of aircraft that comply with the performance rule established for each airspace.

g) Additionally, the system must use filters to obtain flight information according to date, time and selectable fields.

h) Aircraft trajectory reports.

9 PROBLEM REPORTS

The system should make it possible to identify, for the different flights, common problems of erroneous information and poor ADS-B performance in order to carry out risk analysis, identify their possible causes and mitigate them. Such reports should include the following:

a) Number and size of intervals due to loss of message during the flight or with data interruption.

b) List of aircraft and duration of the flight in which erroneous information was transmitted.

c) List of aircraft and duration of the flight with wrong or missing identification (aircraft ID) due to not being configured in the avionics. Including aircraft where the three-letter operator identifier is missing.

d) List of aircraft and flight duration with mode 3/A identification assigned, during the entire flight or part of it.

e) List of aircraft and flight duration with an incorrect ICAO 24-bit address or duplicate address.

f) List of aircraft and duration of the flight with the emitter category missing or not configured in the avionics.

g) List of aircraft and flight duration with missing figures of merit or with NIC, NACv, NACp, SIL and/or SDA category problems.

h) List of aircraft and duration of the flight in which the ADS-B rule was breached. The ADS-B rule defines a combination of required figure of merit values.

i) List of aircraft and flight duration with inconsistent ADS-B version and reported figure

of merit value.

j) List of aircraft and flight duration with loss of data from the barometric pressure altitude source (BARO ALT).

k) Lists of aircraft and flight duration with loss of geometric altitude data (GEO ALT).

l) List of aircraft with inconsistency in the reported flight phase (In Flight or Surface)

m) List of aircraft in ACAS resolution.

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Communications, Navigation and Surveillance.

Appendix A

Cuba ADS-B Analysis Tool

Cuba has developed through the Institute of Civil Aeronautics of Cuba (IACC) a Software that contains two applications that provide monitoring and statistical analysis of Radar Surveillance Systems.

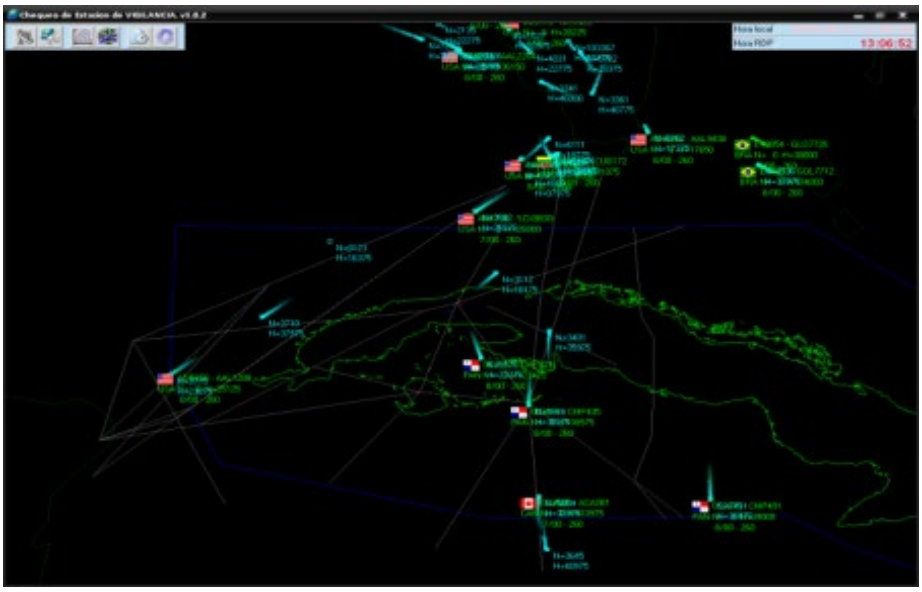
The tool is operating in Cuba and Mexico.

1. **SurvSENSOR App:**

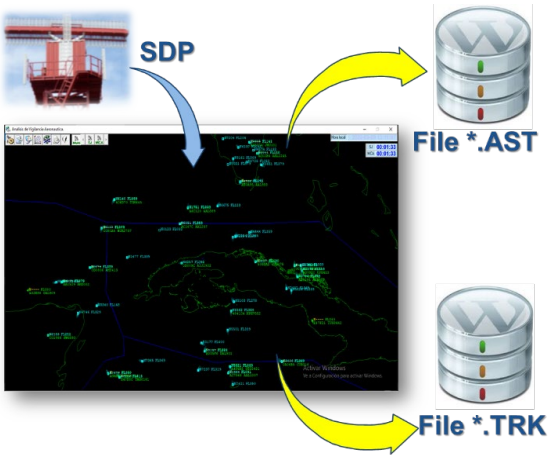
Application that receives data from aeronautical surveillance sensors (RADAR, ADS-B and/or MLAT) in ASTERIX format through a communications channel (RS-232, Ethernet UDP). Description of the system for the statistical analysis of Cuban aeronautical surveillance data.

The system developed in C++ consists of two applications with the following functionality:

Application that receives data from aeronautical surveillance sensors (RADAR, ADS-B and/or MLAT) in ASTERIX format through a communications channel (RS-232, Ethernet UDP).



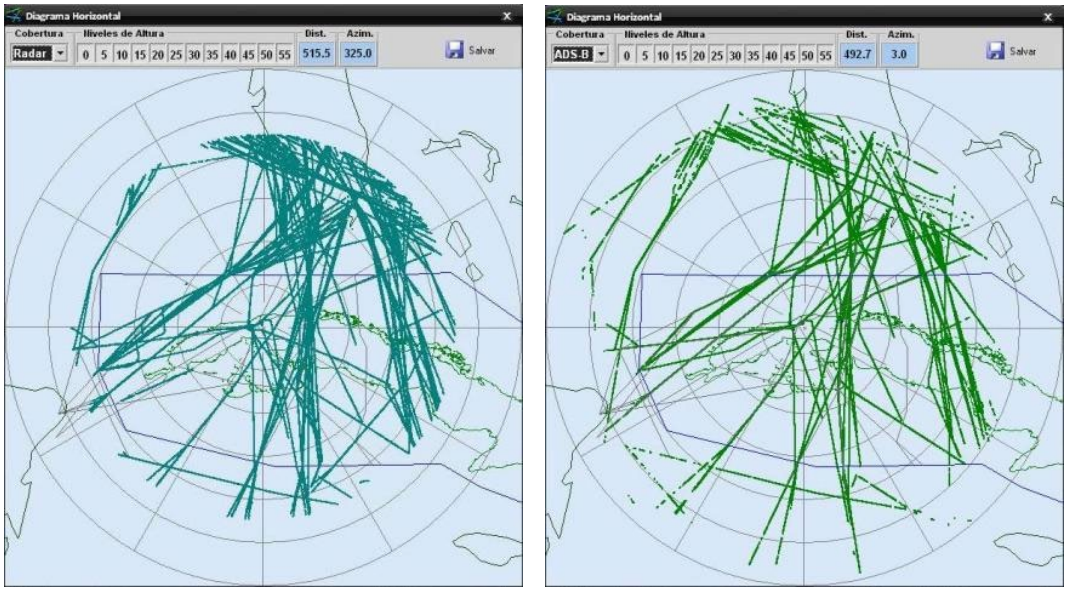
SurvSENSOR has the functionality of representing, storing, and processing the information received, allowing in addition for the retransmission of the information.



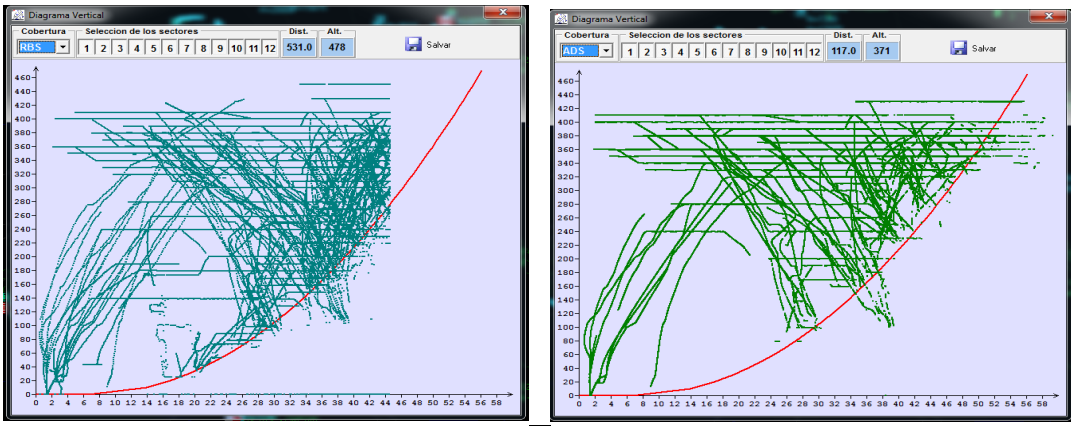
First, a constant monitoring of the technical status of each of the coupled sensors is carried out, allowing to determine their operational status, calculating availability and reliability over time.

It calculates the number of bytes per second received by the data from each sensor having a reference of the channel bandwidth.

It contains the possibility of performing a horizontal and vertical coverage analysis, both as an independently coupled sensor and as a multi-sensor analysis.

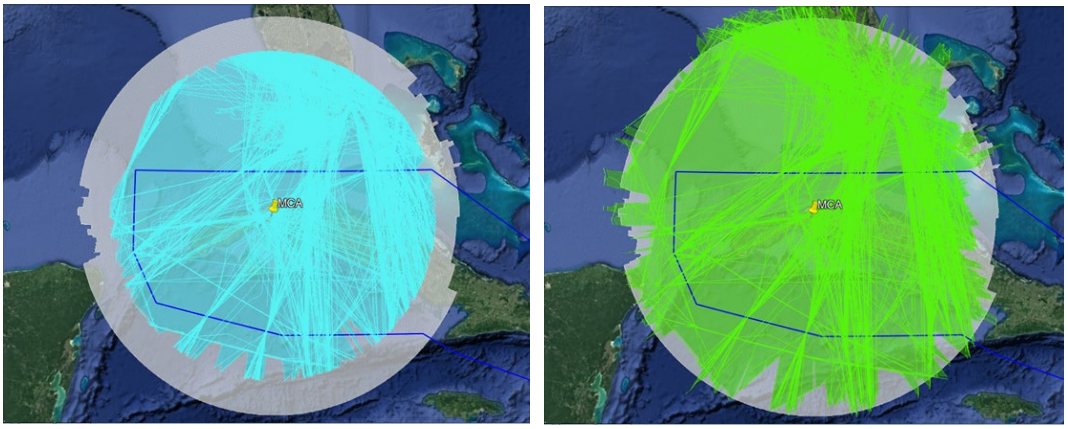


Horizontal Coverage. (a) RADAR (b) ADS-B.



Vertical Coverage. (a) RADAR (b) ADS-B.

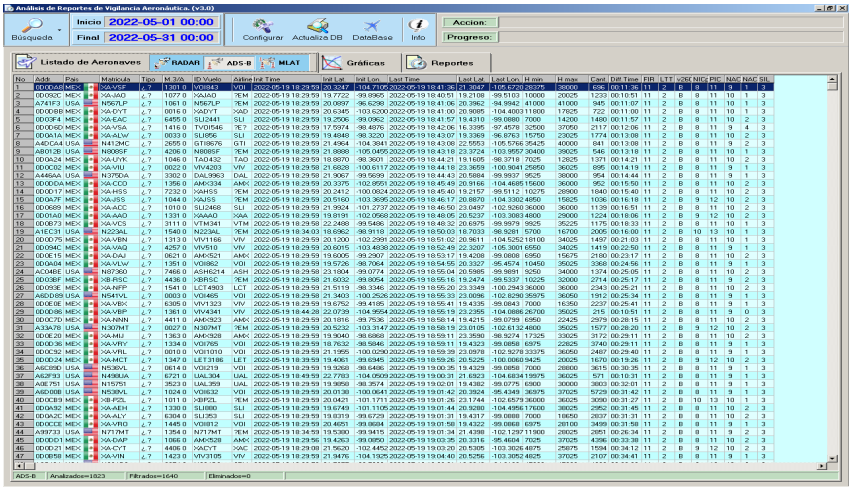
Having the representation of the real coverage of the detected data, the information can be correlated with the calculated theoretical coverage of each sensor at a determined flight level as shown in the following figure, making it possible to determine the possible zones of low or null probability of detection.



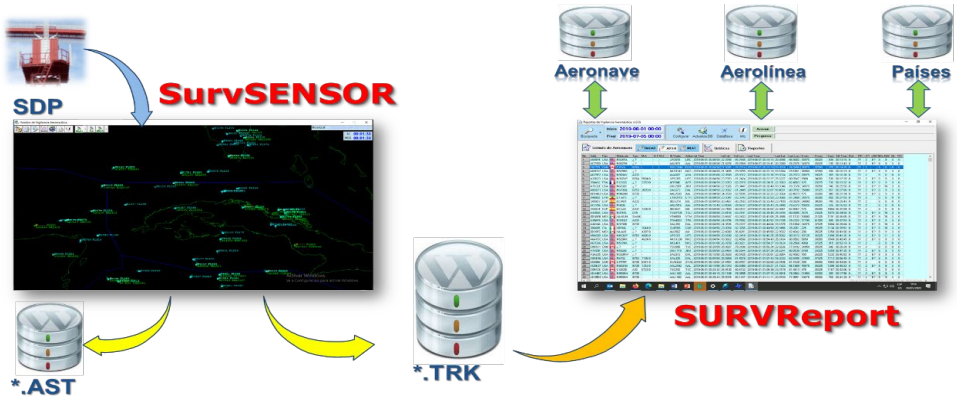
Correlation between theoretical and actual coverage. (a) RADAR (b) ADS-B.

2. SurvReport Application:

The application that statistically analyzes the information processed and stored from the SurvSENSOR application.



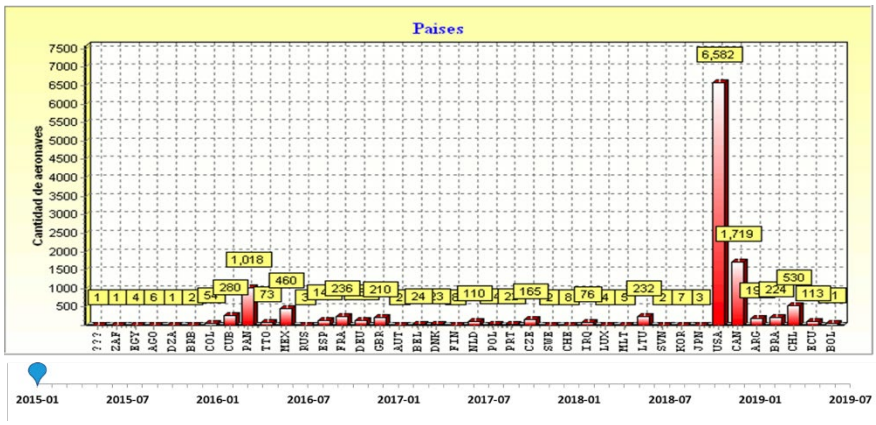
SurvREPORT has the functionality of processing, storing, correlating, and creating different statistical analysis reports of the aeronautical surveillance data, generating a list and/or graphic.



First, a search is conducted in the stored data (TRK) with a filter of the parameters of a time interval, specific region, flight level, identification code, 24-bit mode S code, flight identification, and quality parameters (e.g., ADS-B: version, NIC, NACp, SIL). The search criteria is fully configurable, and are used for the processing that will define the tracking of each aircraft, allowing a quantitative assessment of the aircraft detected by each surveillance system.

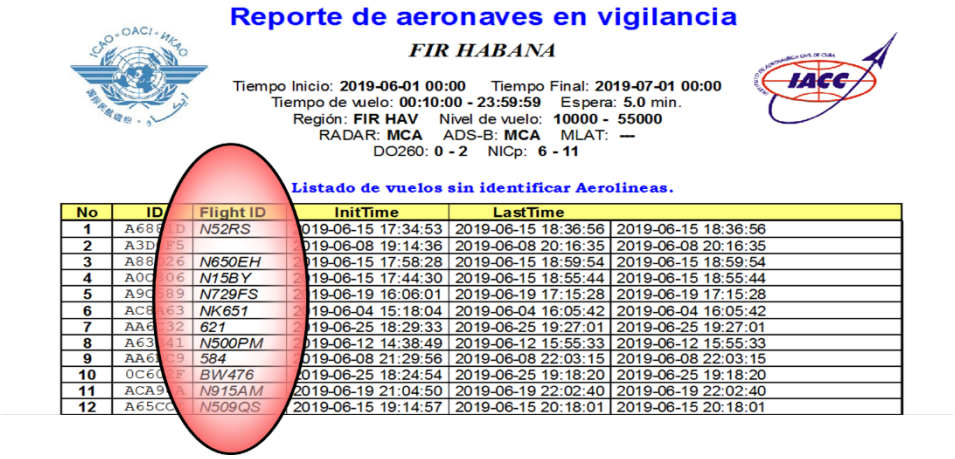
This application allows a correlation to be made between the data received by the different surveillance systems, whether RADAR, ADS-B, and/or MLAT within a given region, calculating the percentage of aircraft detection between the different surveillance systems.

A correlation of the filtered data between the 24 bit Mode S address data with the database of the countries (Annex 10, Vol III, Table 9-1. Attributions to the States of aircraft addresses), the base data from registration records and the aircraft type designator (Doc 8643), identifying the countries, registrations, and the type designator of each aircraft.



Country Correlation

The correlation between the flight identifier (FlightID) and the airline registry (Doc. 8585) is also accomplished, allowing for identification of the airline for the specific flight or the possible errors in the inputting of the FlightID data.



Reporte de aeronaves en vigilancia

FIR HABANA

Tiempo Inicio: **2019-06-01 00:00** Tiempo Final: **2019-07-01 00:00**
Tiempo de vuelo: **00:10:00 - 23:59:59** Espera: **5.0** min.
Región: **FIR HAV** Nivel de vuelo: **10000 - 55000**
RADAR: **MCA** ADS-B: **MCA** MLAT: **—**
DO260: **0 - 2** NICp: **6 - 11**

Listado de vuelos sin identificar Aerolineas.

No	ID	Flight ID	InitTime	LastTime	
1	A688 D	*N52RS*	019-06-15 17:34:53	2019-06-15 18:36:56	2019-06-15 18:36:56
2	A3D F5		019-06-08 19:14:36	2019-06-08 20:16:35	2019-06-08 20:16:35
3	A88 26	*N650EH*	019-06-15 17:58:28	2019-06-15 18:59:54	2019-06-15 18:59:54
4	A0 06	*N15BY*	019-06-15 17:44:30	2019-06-15 18:55:44	2019-06-15 18:55:44
5	A9 89	*N729FS*	019-06-19 16:06:01	2019-06-19 17:15:28	2019-06-19 17:15:28
6	AC 63	*NK651*	019-06-04 15:18:04	2019-06-04 16:05:42	2019-06-04 16:05:42
7	AA 32	*621*	019-06-25 18:29:33	2019-06-25 19:27:01	2019-06-25 19:27:01
8	A63 41	*N500PM*	019-06-12 14:38:49	2019-06-12 15:55:33	2019-06-12 15:55:33
9	AA6 C9	*584*	019-06-08 21:29:56	2019-06-08 22:03:15	2019-06-08 22:03:15
10	0C6 F	*BW476*	019-06-25 18:24:54	2019-06-25 19:18:20	2019-06-25 19:18:20
11	ACA9	*N915AM*	2019-06-19 21:04:50	2019-06-19 22:02:40	2019-06-19 22:02:40
12	A65C	*N509QS*	2019-06-15 19:14:57	2019-06-15 20:18:01	2019-06-15 20:18:01

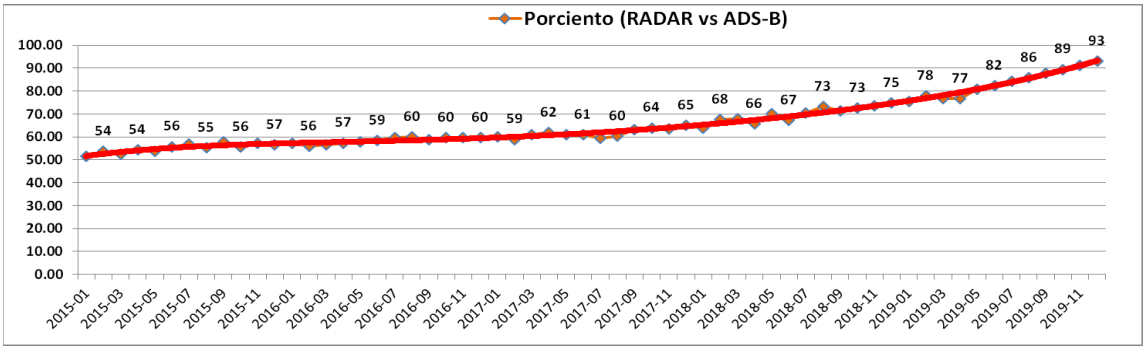
It is possible to create a list of the aircraft that do not comply with a determined set of criteria or airspace regulation by the user (e.g., NIC >= 7, NACp >= 8).

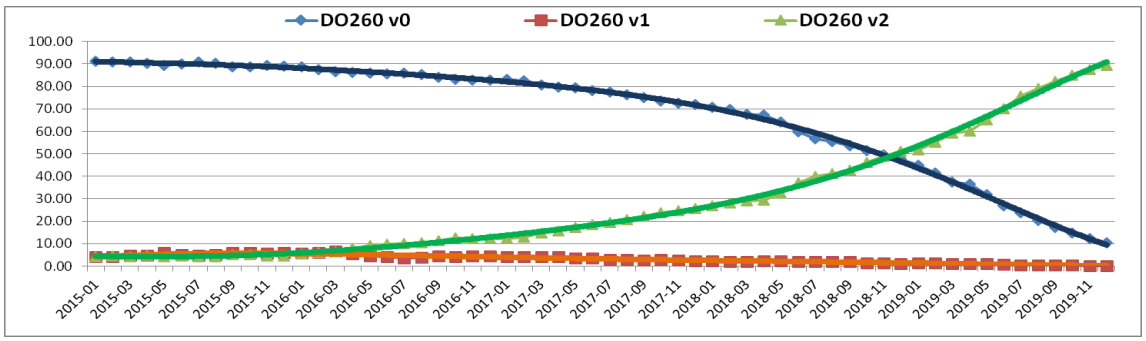
From the conception of the applications explained above, a web interface was not developed since both applications are installed in a closed network environment having only connectivity with the sensors, restricting the ability to create an interface. The export of the results in the form of statistical analysis reports generated by the user is done in PDF format.

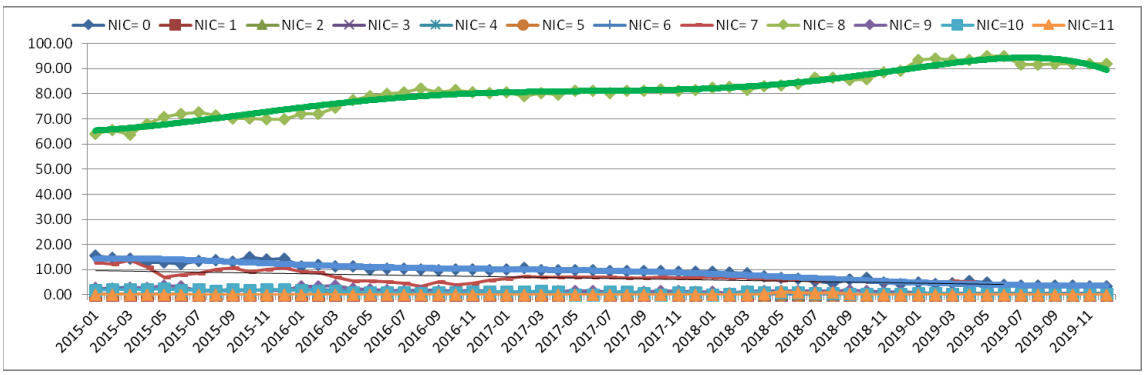
3. Statistical Analysis of the generated results.

From 2015 to 2020, the statistical analysis of the surveillance data was carried out, on a monthly basis, comparing the data between RADAR and ADS-B, demonstrating the evolution

that the different versions and quality parameters of ADS-B systems has introduced over these years.





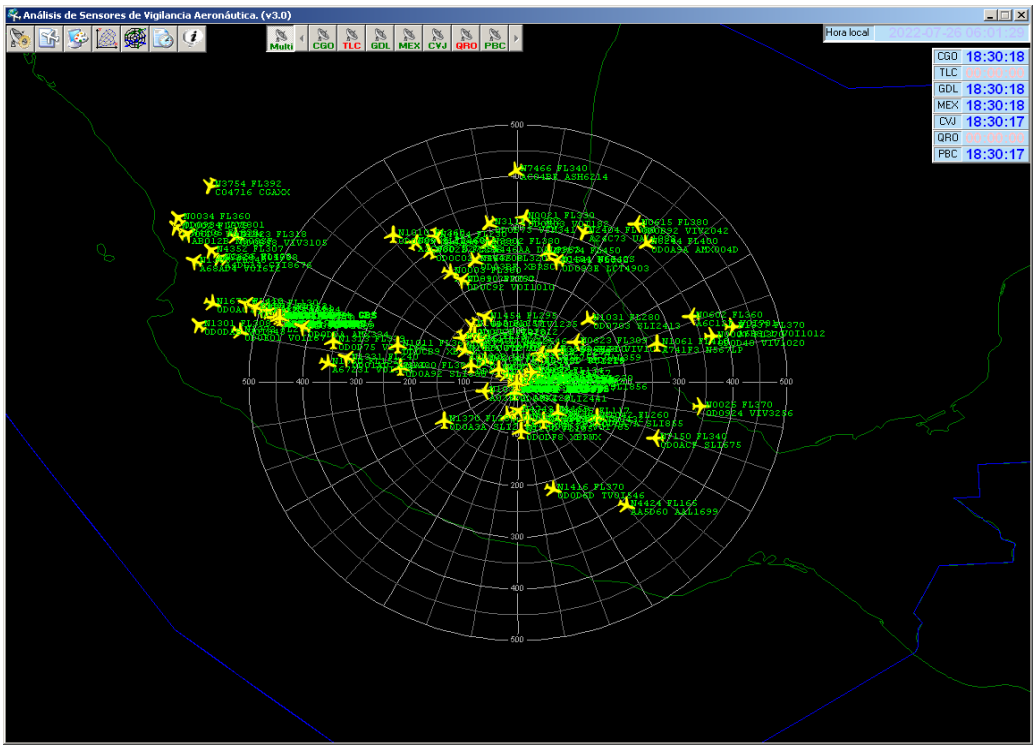


It has been shown in this analysis:

- A sustained growth of aircraft with ADS-B message transmissions.
- A decrease in transponders with the DO-260 / DO-260A versions, and an increase in the DO-260B Version.
- The predominant Navigation Integrity Category (NIC) is NIC =8.
- The predominant Navigation Accuracy Category (NAC) is NACp=9.
- Different errors and inconsistencies have been detected in the information correlation of the 24-bit Mode S codes.
- A high percentage of errors has been seen related to user input of the flight identification parameter on board the aircraft, not allowing the determination of the airline to which the flight belongs when the flight identification does not correspond to the registration.

4. Collaboration and installation project in Mexico's Air Traffic Control Center (AFAC – SENEAM 2022-05)

In May 2022, through a collaborative project with AFAC-SENEAM, the statistical analysis tool was installed in Mexico, coupling several ADS-B sensors detecting the ADS-B message transmissions in a region of Mexico's FIR.



This scenario was fundamental for testing the stability of the system due to the high volume of available information.

The system continues to be dynamically developed with new possibilities arising from this collaborative project.

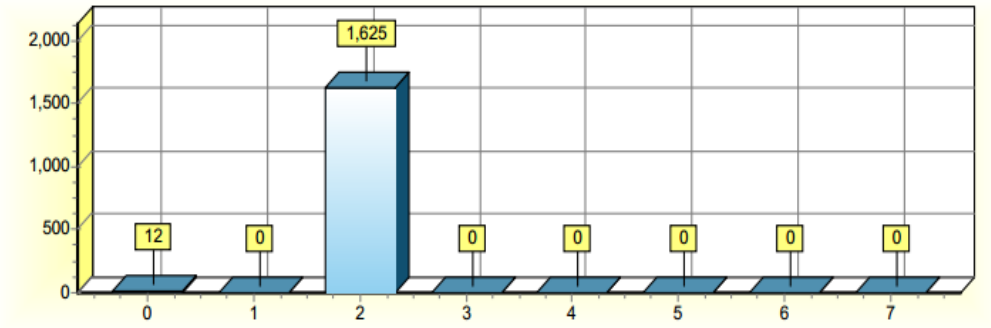
Below are examples of reports of the statistical analysis for some of the parameters.

Reporte de Sistemas de Vigilancia

FIR México

Tiempo Inicio: **2022-05-01 00:00** Tiempo Final: **2022-05-31 00:00**
Tiempo de vuelo: **00:10:00 - 23:59:59** Espera: **20.0** min.
Región: **---** Nivel de vuelo: **10000 - 55000**
Cobertura RADAR: **---** ADS-B: **---** MLAT: **---**
M3/A: **0000 - 7777** Addr: **000000 - FFFFFF** ID:
DO260: **0 - 7** NICp: **6 - 11** NACp: **0 - 15** NACv: **0 - 7** SIL: **0 - 3 (Ave)**

Análisis por versión DO-260.



Análisis de los datos según versión DO-260

Parámetros	Cantidad	Porciento
DO-260 = 0 :	12	(0.7%)
DO-260 = 1 :	0	(0.0%)
DO-260 = 2 :	1625	(99.1%)
DO-260 = 3 :	0	(0.0%)
DO-260 = 4 :	0	(0.0%)
DO-260 = 5 :	0	(0.0%)
DO-260 = 6 :	0	(0.0%)
DO-260 = 7 :	0	(0.0%)
Filtro :	**1637**	

DO-260 Version

Reporte de Sistemas de Vigilancia

FIR México

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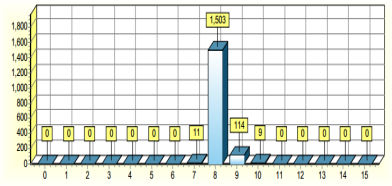
Región: **---** Nivel de vuelo: **10000 - 55000**
Cobertura RADAR: **---** ADS-B: **---** MLAT: **---**
M3/A: **0000 - 7777** Addr: **000000 - FFFFFF** ID:
DO260: **0 - 7** NICp: **6 - 11** NACp: **0 - 15** NACv: **0 - 7** SIL: **0 - 3 (Ave)**

Análisis por (NICp) Categoria de Integridad de la Navegación por posición.



Análisis de los datos según NICp

Parámetros	Cantidad	Porciento
NICp = 0 :	0	(0.0%)
NICp = 1 :	0	(0.0%)
NICp = 2 :	0	(0.0%)
NICp = 3 :	0	(0.0%)
NICp = 4 :	0	(0.0%)
NICp = 5 :	0	(0.0%)
NICp = 6 :	0	(0.0%)
NICp = 7 :	11	(0.7%)
NICp = 8 :	1503	(91.8%)
NICp = 9 :	114	(7.0%)
NICp = 10 :	9	(0.5%)
NICp = 11 :	0	(0.0%)
NICp = 12 :	0	(0.0%)
NICp = 13 :	0	(0.0%)
NICp = 14 :	0	(0.0%)
NICp = 15 :	0	(0.0%)
Filtro :	1637	

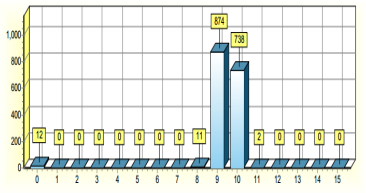
NIC

Reporte de Sistemas de Vigilancia

FIR México

Tiempo Inicio: **2022-05-01 00:00** Tiempo Final: **2022-05-31 00:00**
Tiempo de vuelo: **00:10:00 - 23:59:59** Espera: **20.0** min.
Región: **---** Nivel de vuelo: **10000 - 55000**
Cobertura RADAR: **---** ADS-B: **---** MLAT: **---**
M3/A: **0000 - 7777** Addr: **000000 - FFFFFF** ID:
DO260: **0 - 7** NICp: **6 - 11** NACp: **0 - 15** NACv: **0 - 7** SIL: **0 - 3 (Ave)**

Análisis por (NACp) Categoria de Precisión de la Navegación por posición.



Análisis de los datos según NACp

Parámetros	Cantidad	Porciento
NACp = 0 :	12	(0.7%)
NACp = 1 :	0	(0.0%)
NACp = 2 :	0	(0.0%)
NACp = 3 :	0	(0.0%)
NACp = 4 :	0	(0.0%)
NACp = 5 :	0	(0.0%)
NACp = 6 :	0	(0.0%)
NACp = 7 :	0	(0.0%)
NACp = 8 :	11	(0.7%)
NACp = 9 :	874	(53.3%)
NACp = 10 :	738	(45.0%)
NACp = 11 :	2	(0.1%)
NACp = 12 :	0	(0.0%)
NACp = 13 :	0	(0.0%)
NACp = 14 :	0	(0.0%)
NACp = 15 :	0	(0.0%)
Filtro :	1637	

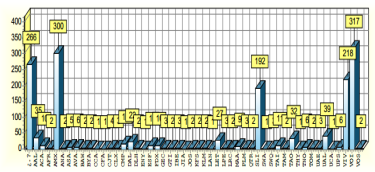
NACp

Reporte de Sistemas de Vigilancia

FIR México

Tiempo Inicio: **2022-05-01 00:00** Tiempo Final: **2022-05-31 00:00**
Tiempo de vuelo: **00:10:00 - 23:59:59** Espera: **20.0** min.
Región: **---** Nivel de vuelo: **10000 - 55000**
Cobertura RADAR: **---** ADS-B: **---** MLAT: **---**
M3/A: **0000 - 7777** Addr: **000000 - FFFFFF** ID:
DO260: **0 - 7** NICp: **6 - 11** NACp: **0 - 15** NACv: **0 - 7** SIL: **0 - 3 (Ave)**

Análisis por Aerolíneas.



Listado por Aerolíneas / Sistemas

No	Code	Airline Name	Count.	RADAR	ADSB	MLAT
1	¿.?	¿.?	266	0	266	0
2	AAL	American Airlines	35	0	35	0
3	ACA	Air Canada	10	0	10	0
4	AFR	Air France	2	0	2	0
5	AMX	Aeromexico	300	0	300	0
6	ANA	ANA - All Nippon Airways	2	0	2	0
7	ASA	Alaska Airlines	5	0	5	0
8	AVA	Avianca	6	0	6	0
9	BAW	British Airways	2	0	2	0
10	BYA	Berry Aviation	2	0	2	0
11	CCA	Air China	1	0	1	0
12	CFA	China Flying Dragon Aviation	1	0	1	0
13	CJT	Cargojet Airways	4	0	4	0
14	CLX	Cargolux	3	0	3	0
15	CMP	Copa Airlines	15	0	15	0
16	DAL	Delta Air Lines	22	0	22	0
17	DLH	Lufthansa	2	0	2	0
18	ENY	Envoy Air	1	0	1	0
19	ESF	Estafeta Carga Aérea	11	0	11	0
20	FDX	FedEx Express	10	0	10	0
21	GEC	Lufthansa Cargo	3	0	3	0
22	GTI	Atlas Air	2	0	2	0
23	IBE	Iberia	3	0	3	0

By Airline

Reporte de Sistemas de Vigilancia

FIR México

Tiempo Inicio: **2022-05-01 00:00** Tiempo Final: **2022-05-31 00:00**
Tiempo de vuelo: **00:10:00 - 23:59:59** Espera: **20.0** min.
Región: **---** Nivel de vuelo: **10000 - 55000**
Cobertura RADAR: **---** ADS-B: **---** MLAT: **---**
M3/A: **0000 - 7777** Addr: **000000 - FFFFFF** ID:
DO260: **0 - 7** NICp: **6 - 11** NACp: **0 - 15** NACv: **0 - 7** SIL: **0 - 3 (Ave)**

Análisis por Aerolíneas.

Listado de vuelos por Aerolíneas.
(¿.?)

No	Address	Register	Flight ID	Code	Cnt	260	NICp	NACp	NACv	SIL	SDA	GVA	Cumple
1	0D0680	¿.?	XAAFA	?E?	1	2	8	10	2	3	2	2	SI
2	0D0D00	¿.?	XBPBT	?E?	1	2	9	10	2	3	2	2	SI
3	0B0CBD	¿.?	XBRFZ	?E?	1	2	9	10	2	3	2	2	SI
4	0C0920	¿.?	XALOB	?E?	1	2	8	10	2	3	2	2	SI
5	0D0115	XATZF	XATZI	?E?	1	2	9	10	2	3	3	2	SI
6	0D0157	¿.?	XAAVO	?E?	1	2	9	10	2	3	2	2	SI
7	0D01A0	¿.?	XAAAO	?E?	3	2	9	10	2	3	2	2	SI
8	0D0270	¿.?	XBPGP	?E?	2	2	9	10	2	3	2	2	SI
9	0D0285	XAFAF	XAFAF	?EM	1	2	8	10	2	3	2	2	SI
10	0D0356	¿.?	XAALE	?E?	2	2	9	10	2	3	2	2	SI
11	0D0366	¿.?	XCBJG	?E?	1	2	10	10	1	3	2	2	SI
12	0D03BF	XBRSC	XBRSC	?EM	2	2	8	9	2	3	2	2	SI
13	0D03FD	¿.?	XAGIU	?E?	1	2	8	10	2	3	2	2	SI
14	0D0425	XAGMX	XAGMX	?EM	1	2	8	10	2	3	2	2	SI
15	0D0501	¿.?	XAORO	?E?	2	2	9	10	2	3	2	2	SI
16	0D055F	XAAVZ	XAAVZ	?EM	1	2	8	10	1	3	2	2	SI
17	0D05F6	XAONE	XAONE127	?EM	2	2	8	10	1	3	2	2	SI
18	0D05FD	XABUX	XABUX	?EM	1	2	9	10	2	2	2	2	SI
19	0D060F	XAACR	ACW2400	?E?	1	2	8	10	1	3	2	2	SI
20	0D065F	ANX1203|AN	N61WF	?E#	2	2	8	10	2	3	2	2	SI
21	0D067F	XAEGL	1201	?E#	1	2	9	10	2	3	2	2	SI
22	0D067F	XAEGL	ACW1200	?E?	1	2	9	10	2	3	2	2	SI
23	0D06A4	¿.?	XANDR	?E?	1	2	9	10	2	3	2	2	SI
24	0D06C6	XAXTR	XAGSL000	?E?	1	2	10	10	1	3	2	2	SI
25	0D071A	XAATI	XAATI	?EM	1	2	8	10	2	3	2	2	SI
26	0D0731	¿.?		?EX	1	2	8	9	2	3	2	2	SI
27	0D073D	XAGAT	XAGAT	?EM	1	2	8	10	1	3	2	2	SI
28	0D075A	XAELX	XAELX	?EM	1	2	8	10	2	3	2	2	SI
29	0D076A	XAANA	XAANA	?EM	1	2	8	10	1	3	2	2	SI
30	0D0796	XAUSZ	XAUSZ	?EM	1	2	8	10	1	3	2	2	SI
31	0D07AA	XACAR|XAKU	ACW1602	?E?	2	2	8	10	2	3	2	2	SI
32	0D07D1	XAMMA	XAMMA	?EM	1	2	8	10	2	3	2	2	SI
33	0D07E2	¿.?	XALCD	?E?	1	2	8	10	1	3	2	2	SI

by Complying Criteria

Appendix B

Public ADS-B Performance Report (PAPR) User's Guide

Flight Standards Service

ADS-B Focus Team

Aircraft Maintenance Division

Avionics Branch

March 2020

Background – Public ADS-B Performance Report

The purpose of the Public ADS-B Performance Report (PAPR) is to provide aircraft owners, operators, and avionics installers/maintainers with an additional method of verifying proper operation of ADS-B Out equipment.

The purpose of this User's Guide is to provide information to aid in the interpretation of data associated with a PAPR and to provide general guidance to help resolve avionics issues identified within a PAPR.

PAPR data provides information on the performance of an aircraft's ADS-B system for a specific flight and will verify proper ADS-B system operation or identify specific parameters received by the FAA's ground system which failed to comply with established standards. ADS-B system performance data identified within a PAPR will be useful to aircraft avionics maintainers when performing post-installation compliance/configuration checks and fault isolation.

A PAPR is typically available 1 hour after the end of the flight at the following web address https://adsbperformance.faa.gov/PAPRRequest.aspx. However, the availability of a PAPR may be delayed due to system maintenance or outages. unexpected. In cases where a PAPR is not available at the web address, the user must send an email to the following address 9-AWA-AFS-300-ADSBAvionicsCheck@faa.gov, and include the following information:

1. Aircraft registration number (N number) in the subject line;

2. In the body of the email include

a. Flight identification code;

b. Date and time of the flight;

c. ADS-B transmitter and GPS make/model; Y

d. Any ADS-B avionics malfunction observed or reported during the associated flight.

Part 1 – Public ADS-B Performance Report Explanation

The FAA collects data in the following flight phases by ADS-B link type (See Figure 1):

1. 1090 – Airborne
2. 1090 - Surface 4(Outside RWY/Taxi area)
3. 1090 - Surface RWY/Taxi
4. UAT - Airborne
5. UAT - Surface (Outside RWY/Taxi area)
6. UAT - Surface RWY/Taxi

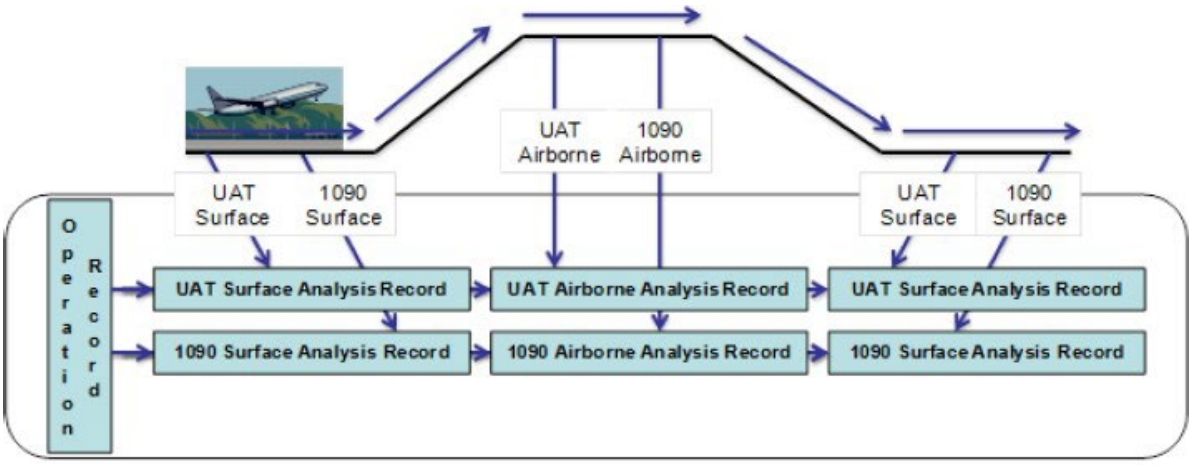


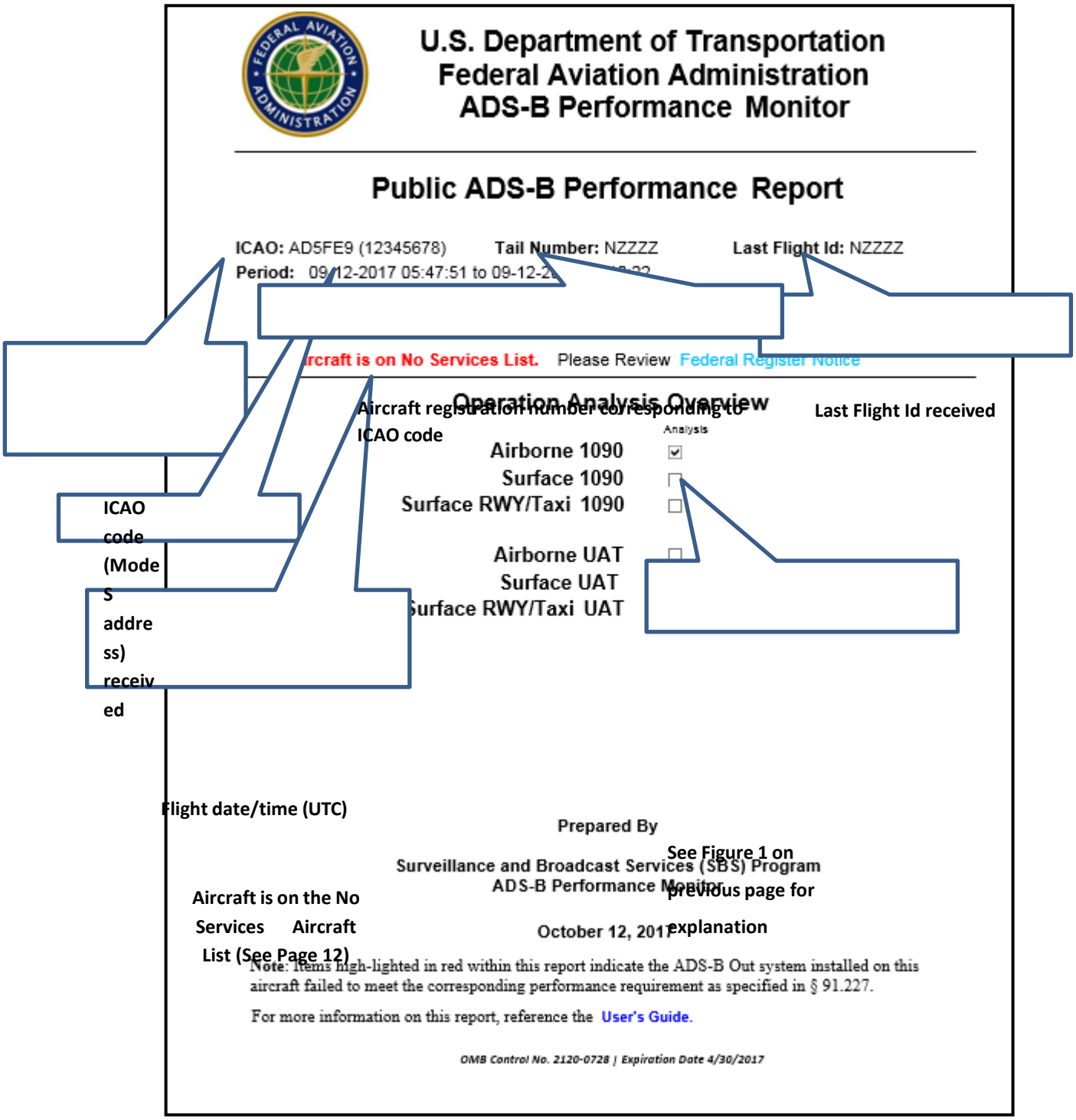
Illustration of how data is collected in operation and analysis records

Figure 1

[4] Surface information is only provided at U.S. locations where a surface service volume exists. As of this writing, this is limited to the 35 airports with an ASDE-X system and KSFO. Eight additional surface service volumes will be added as the Airport Surface Surveillance Capability (ASSC) is deployed.

PAPR Cover Page

The cover page contains basic information about the aircraft, flight date/time, and the type of ADS-B information received (1090, UAT, airborne/surface). Verify this information is correct.



Each PAPR begins with an Operation Summary with specific information about the aircraft and flight. An example of an Operation Summary Table and definitions are provided below.

Operation Summary Table Example

Operation Summary

Operation Id:	55555555	**Start Time:** 09-12-2017 05:47:51		
ICAO Reported:	AAABBB (12345678)	**End Time:** 09-12-2017 07:10:22		
ICAO Assigned:	AAABBB (12345678)	**Duration:** 01:22:31	**Mod:** 01:22:31	**Rule:** 01:14:51
Tail Number:	NZZZZ	**Reports:** 10419	**Best Msg:** 9033	**TIS-B Client %:** 0.0%
Country:	United States - Civil	**Stationary:** No	**Baro Alt (ft):** 36975	- 37000

Detection: ☑ **Airborne** ☐ **Surface**

Link Version: 2	**Out Capability:** 1090	**In Capability:**
Last Flight Id: NZZZZ		
Operator: ABC		

Operation Summary Explanation Table

Operation Id: Unique number assigned to the flight record.		**Start Time:** Time flight was first monitored.
ICAO Reported & ICAO Assigned: The 24- bit ICAO address (hexadecimal & octal formats) received from the aircraft.		**End time:** Time flight was last monitored.
Tail Number: The N-number associated with the aircraft's reported 24-bit ICAO code.	**Duration:** Duration of the monitored flight in hours, minutes, and seconds.	**Mod:** Flight duration minus any data gaps greater than 36 seconds.
Country: Country associated with aircraft registration (identified via received ICAO hexadecimal code).	**Reports:** Number of ADS-B downlinks received during this operation.	**BestMSG**: Total reports minus any duplicate reports.
Detection: Flight mode(s) where aircraft was monitored (airborne and/or surface).	**Stationary Only: "**No" indicates aircraft was not stationary. "Yes" indicates aircraft was stationary for duration of this Operation.	**TIS-B Client %:** Percentage of operation time TIS-B data was provided to the aircraft by the ADS-B ground system.
Link Version: Link version of ADS-B transmitter. Link Version 2 is required by 14 CFR 91.225 and 14 CFR 91.227.	**Baro Alt (ft):** The minimum and maximum Barometric Pressure altitude reported by the aircraft.	**Rule:** Time spent within ADS-B Out Rule Airspace. Rule Airspace is defined in 14 CFR Part 91.225.
Last Flight Id: Last flight identification code received. This should be identical to the aircraft call sign used by ATC.	**Out Capability** Frequency used to transmit ADS-B data (i.e. 1090, 978/UAT, or Dual) or ADS-B OUT system type (UAT or 1090)	

Operator: Unique air operator identification code.		**In Capability:** Indication of capability to receive ADS- B data on specified link

Dual-Out Inconsistencies

If an aircraft is equipped with a 1090 and a UAT system and transmitting on both frequencies (referred to as Dual-Out), the following table will be provided to identify any differences in the data received from each system. In the table below, the FAA ground system is receiving length/width codes from the 1090 and UAT avionics that do not match (LWC field is highlighted in red) for a Dual-Out equipped aircraft. See Part 3 of this report for table header definitions.

Dual Out Inconsistencies:

Category	Emit Cat	Flight ID	Mode 3A	SAF	LWC	GPS Pos
% Fail	0.00%	0.00%	0.03%	0.00%	100.00%	100.00%
Max dT	00:00:00	00:00:00	00:00:04	00:00:00	00:02:56	00:02:56
MCF	0	0	4	0	338	338

Performance Analysis Summary Tables

Analysis Summary tables are presented in the PAPR for some, or all, of the following categories depending on the installed ADS-B avionics configuration (1090 only, UAT only, or Dual-Out), areas of operation, and availability of ADS-B coverage:

- Airborne - 1090
- Surface - 1090 (Outside RWY/Taxi area)
- Surface RWY/Taxi - 1090
- Airborne - UAT
- Surface - UAT (Outside RWY/Taxi area)
- Surface RWY/Taxi UAT

The following definitions apply to all tables in each performance assessment category:

Category	Definitions
% Fail	**Percentage of flight that corresponding category element failed performance assessment.**
Max dT	**Total time during flight the message element failed performance assessment.**
MCF	**Maximum number of consecutive received ADS-B messages in which the element failed Performance assessment.**

Note: An example of a Performance Analysis Summary table and summary term definitions are provided on the next page.

Analysis Summary Example (Airborne 1090)

Airborne 1090 Analysis Summary

Start Time: 11-26-2015 20:25:18 **End Time:** 11-26-2015 22:06:55
Duration(s): 01:41:37 **Mod:** 01:24:47 **Processed Reports:** 13444 **Total Reports:** 13491

Link Version: 2 **Out Capability:** 1090 **In Capability:** UAT
Emitter Category: 1 - Light (<15,500lbs) **Antenna(s):** 1 - Single
Last Flight Id: NZZZZ
Last Mode 3A: 4511
Exceptions:

NIC	NACp	NACv	SIL	SDA
Yes	Yes	Yes	Yes	No

Analysis Summary Explanation

Start Time: The start time of the flight as observed by ground monitoring.			**End Time:** The end time of the flight as observed by ground monitoring.
Duration(s): Duration of flight in hours, minutes, and seconds.	**Mod**: Duration minus any data gaps greater than 36 seconds.	**Processed Reports:** Number of reports processed by the ADS-B Ground system.	**Total Reports:** Total reports including duplicates.
Link Version: Indicates which 1090/UAT standard the ADS-B equipment complies with. (For 1090 DO-260 = 0, DO-260A = 1, DO-260B = 2, etc.)	**Out Capability:** ADS-B OUT system type (UAT or 1090).		**In Capability:** ADS-B IN system type (UAT or 1090).
Emitter Category: Code associated With the aircraft's size, weight, or performance characteristics.	**Antenna(s):** Single or Dual (top and bottom) ADS-B antenna installed.		
Last Flight Id: The last reported Flight ID received from the aircraft.			
Last Mode 3A: Last discrete Mode 3/A code received.			
Exceptions: **NIC/NAC/NACp/SIL/SDA Value:** Indicates if aircraft failed to meet performance requirements of identified parameter: **Yes = Fail** **No = Pass**			

Performance Assessment Tables

ADS-B equipment performance is divided into the following 4 major assessment categories:

1. **Required Message Elements Checks (Missing Elements):** Check of 14 CFR §91.227 (d) specified message elements required for broadcast by ADS-B Out avionics.
2. **Integrity and Accuracy Checks:** Check of ADS-B Out NIC/NACp/NACv/SDA/SIL performance requirements specified by 14 CFR §91.227(c) (Ref. latest version of Advisory Circular (AC) 20-165 for additional information).
3. **Kinematics:** Includes reasonableness checks of changes in Baro/Geo altitude, horizontal position, and velocity.
4. **Other Checks:** Checks of specific message parameters for values outside an expected range or fields that are improperly formatted (24-bit ICAO address, Mode 3A, emitter category, etc.).

See Part 3 of this report for table header definitions.

1. **Missing Elements:** Missing elements will be highlighted in red by category if aircraft failed to meet performance requirements.

Missing Elements[5]

Category	NACp	NACv	Vel[2]	Flight Id	Mode 3A	Emit Cat
% Fail	0.00%	0.00%	27.15%	0.00%	0.00%	0.00%
Max dT	00:00:00	00:00:00	00:01:13	00:00:00	00:00:00	00:00:00
MCF	0	0	68	0	0	0

2. **Integrity & Accuracy:** Failed Integrity & Accuracy categories will be highlighted in red if aircraft failed to meet performance requirements. The FAA has not approved, or otherwise evaluated, any ADS- B position source with the horizontal velocity accuracy performance required to transmit a NACv value greater than 2 (NACv of 2 = Estimated Velocity Uncertainty <3 m/s). When NACv MIN and/or AVG are highlighted yellow in the Integrity & Accuracy table of the report (i.e. transmitted NACv MIN/AVG is 3 or 4) you are advised to contact your installer and/or applicable ADS-B avionics manufacturer for guidance on how to change the NACv value to that approved by the FAA at certification, or for non- certified equipment, a NACv value not to exceed 2 without FAA evaluation.

[5] Note: The ADS-B Performance Monitor (APM) expects track angle data to be present in Velocity (Vel) messages when aircraft are moving on the surface above 10kts. Some avionics manufacturers have determined their system's track angle is unreliable at ground speeds above 10kts and withhold the data from the Vel message based on this determination. When this occurs an associated PAPR will indicate failures for Missing Element Vel within the Surface UAT/1090 Analysis section. Users are advised to contact their ADS-B equipment installer/avionics manufacturer for guidance when a PAPR indicates a failure for Missing Element Vel on the surface to determine if corrective action is required.

Integrity & Accuracy

Category	NIC	NACp	NACv	SIL	SDA
% Fail	100.00%	100.00%	100.00%	100.00%	0.00%
Max dT	01:36:25	01:36:25	01:36:25	01:36:25	00:00:00
MCF	13444	13444	13444	13444	0

Category	NIC	NACp	NACv	SIL	SDA
Avg	0.0	0.0	0.0	1.0	2.0
Min	0	0	0	1	2
Max	0	0	0	1	2

Integrity & Accuracy Note: If using an uncertified GPS (or portable transmitter) the system must report as SIL = 0 (zero). SIL=0 transmitters do not meet the requirements to become a TIS-B Service Client.

3. **Kinematics:** A reasonableness check is made of changes in Baro/Geo Altitude, Position, and Velocity. Items highlighted in red were identified with position changes outside the range expected for normal aircraft performance.

Kinematics

	Velocity	Position Δ
% Fail	0.00%	0.00%
MCF	0	0

Baro Alt	Baro Alt Δ	Geo Alt	Geo Alt Δ
0.00%	0.00%	0.00%	0.00%
0	0	0	0

4. **Other Checks:** A percentage of the total operation (% Fail) and the maximum consecutive failures (MCF) that the ADS-B avionics failed to correctly broadcast these message elements.

Other Checks

	Emitter Cat	Mode 3A
% Fail	0.00%	0.00%
Max dT	00:00:00	00:00:00
MCF	0	0

	Flight ID	Tail # Mismatch	Non-US	No "N"	Only "N"	Partial	Spaces	All Spaces	Illegal Char	Unavail Char	FP ID Mismatch
% Fail	0.13%	0.00%	0.00%	0.00%	0.00%	0.00%	0.13%	0.00%	0.13%	0.00%	0.00%
Max dT	00:00:02	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:02	00:00:00	00:00:02	00:00:00	
MCF	2	0	0	0	0	0	2	0	2	0	

	Air on Ground
% Fail	0.00%
Max dT	00:00:00
MCF	0

Other Checks table header definitions (See Part 3 of this guide):

Emitter Category: Percent, total time, and max consecutive reports aircraft reported an Emitter Category = 0.

Mode 3A: Percent, total time, and max consecutive reports aircraft was flagged as having an invalid Mode 3/A. In the majority of cases, this indicates if the aircraft did not report Mode 3/A via ADS-B for some or all of the flight.

Flight ID: The received Flight ID code is assessed in the following ways:

1. **Flight ID** = Percent, total time, and max consecutive reports aircraft reported an incorrect Flight ID (any flight ID error)
2. **Tail # Mismatch** = Percent, total time, and max consecutive reports aircraft reported a N-Number Flight ID that doesn't match the N-Number derived from the 24-bit ICAO (U.S. aircraft only) code.
3. **No-US** = Percent, total time, and max consecutive reports aircraft reported an N-Number Flight ID with an 24-bit ICAO address outside the U.S. block.
4. **No "N"** = Percent, total time, and max consecutive reports aircraft reported an N Number Flight ID without the leading "N" (e.g., 123AB vs N123AB).
5. **Only "N"** = Percent, total time, and max consecutive reports aircraft reported just "N" for flight ID.
6. **Partial** = Mostly for Air Carriers, percent, total time, and max consecutive reports aircraft reported a Flight ID missing the leading three letter identifier (e.g. 1234 vs JBU1234).
7. **Spaces** = Percent, total time, and max consecutive reports aircraft including a space within a Flight ID.
8. **All Spaces** = Percent, total time, and max consecutive reports aircraft reported a Flight ID with eight spaces.
9. **Illegal Character** = Percent, total time, and max consecutive reports aircraft reported a Flight ID with an Illegal Character.
10. **Unavail Character** = Percent, total time, and max consecutive reports aircraft reported a Flight ID with an Unavailable Character.
11. **FP ID Mismatch** = Percent of total flight the aircraft's transmitted Flight ID did not match

the aircraft identification information filed on the applicable flight plan.

Note: The FP ID Mismatch field can be disregarded when no flight plan was filed for the flight associated with the PAPR.

12. **Air on Ground** = Percent, total time, and max consecutive reports the FAA ground system received airborne formatted messages while the aircraft was on the ground.

Part 2 – Guidance for PAPR Faults

This section provides general guidance on common ADS-B performance issues and their possible causes. The information in this section is based on observations and feedback from avionics manufacturers, repair stations, and individual aircraft owner/operators. While the information is not specific to any make/model of ADS-B transmitter or GPS, users may find it helpful in determining a course of action to resolve issues identified within a PAPR.

PAPR Fault Table

PAPR Fault (Red Field)	Possible Causes
Missing Elements and Integrity & Accuracy Category Problems	
NIC, NACv, NACp, SIL and/or SDA (100% fail)	• Component and/or software compatibility with position source • Improper system configuration
NIC, NACv, NACp, SIL and/or SDA (partial failure)	• Intermittent loss of GPS service • Antenna masking caused by maneuvering • Portion(s) of flight at fringe of ADS-B coverage • Component software issue
Flight ID (100% fail)	• Flight ID not configured in avionics or Flight ID transmit is inhibited
Flight ID missing (partial fail)	• Flight at fringe of ADS-B coverage
Mode 3/A (100% fail)	• Because the FAA ground system auto-populates ADS-B messages with 1200 when the Mode 3/A code is missing to prevent risk associated with potential ATC conflict alerts this field should always show as passed. Refer to “Other Checks” below for guidance on Mode 3/A issues.
Mode 3/A (partial failure)	• See “Other Checks” below
Baro Alt	• Loss of data from barometric pressure altitude source (encoder)
Geo Alt	• Loss of geometric altitude data from GPS
Emitter Category (Missing and Other)	• Emitter category not configured into avionics or misconfigured
Flight Identification Code errors	• Flight ID not properly entered
Kinematics	
All parameters	• Component and/or software (version) compatibility
Other Checks	

Air on Ground (ADS-B system transmitting in Air mode while on the ground)	• Squat switch issue
	• GPS stall speed setting incorrect
	  ○ Too low a stall speed will result in avionics transitioning to Air mode during high speed taxi or takeoff-roll
	  ○ Avionics initializing in Air mode at startup

PAPR Fault Table (continued)	
PAPR Fault (red)	**Possible Causes**
Other Checks (continued)	
Emitter Cat	• Inappropriate emitter category transmitted. e.g., many "Light" aircraft (<15,500 lbs) incorrectly transmit as "Small" aircraft (15,500 – 75K lbs). • Rotorcraft transmitting fixed-wing emitter category
Mode 3A (100% fail)	• Mode 3/A or Call-sign logic transmit function disabled (UAT specific) • Mode 3/A code input device not providing data to UAT system
Mode 3A (partial failure)	• Portion(s) of flight at fringes of ADS-B coverage • Improper pilot input (late turn on/early turn off of transponder)
No flight data found for specified date	• Aircraft transmitting wrong 24-bit ICAO address • Late day flight (flight times are recorded in UTC) • Flight with UAT system operated in anonymous mode. • Possible ADS-B service outage • Aircraft not transmitting ADS-B data

ADS-B No Services Aircraft List (NSAL) Information

Background: Reference FAA Notice Docket Number: FAA-2017-1194. To reduce the potential hazard presented by ADS-B non-performing equipment (NPE) aircraft, the FAA began filtering individual 24-bit ICAO address codes (also known as Mode S codes) for certain NPE aircraft from the FAA's operational ADS-B network on January 2, 2018. The filtering process is managed through an exclusion list referred to as the No Services Aircraft List (NSAL) which prevents processing of data within ATC systems transmitted by aircraft contained on the list. Aircraft on the NSAL cannot be provided ATC services (via ADS-B data) and are excluded from the provision of TIS-B services. If authorized by ATC, traffic services for aircraft on the NSAL may be supported via the backup transponder/radar surveillance system. The NSAL has no impact on an ADS- B equipped aircraft's air-to-air capabilities.

Aircraft on the NSAL are identified by "Aircraft is on No Services List" on the cover page of an applicable PAPR. Since aircraft on the NSAL cannot be detected by ATC via their transmitted ADS-B data, each operation conducted in §91.225 airspace by applicable aircraft on the NSAL must be authorized by ATC before flight using the ADS-B Deviation Authorization Preflight Tool (ADAPT).

Procedures for removal of aircraft from the NSAL: The FAA provides written notice of NPE aircraft (with applicable NSAL information) to the person/entity and address associated with the aircraft's registration.

Owner/operators receiving an NPE notification should contact the FAA representative identified on the letter as soon as possible. When a PAPR indicates an aircraft is on the NSAL but a NPE notification letter has not been received by the owner/operator, contact the FAA at the following email address: 9-AWA-AFS-300-ADSB- AvionicsCheck@faa.gov providing the PAPR associated with the aircraft's

most recent flight. An FAA representative will contact you as soon as possible to discuss details associated with the performance of subject ADS-B equipment.

Part 3

ADS-B TERMS, DESCRIPTIONS AND REFERENCES

Parameter Description

Field Name	Full name	Description
Airborne Msgs on Surface		Indication that airborne specific messages were received by the FAA ground system while aircraft was on the surface
All Spaces	Flight ID	Flight identification code contains all spaces
Anonymous		Indicates whether the unit is in Anonymous mode or not.
Baro Alt/ Baro Alt Δ	Barometric Altitude	Barometric altitude is sent and checked against aircraft performance criteria and flagged as invalid if determined to be incorrect or unreasonable. In general, if the reported baro or geo alt is greater than 20,000 meters (65,616ft) or less than -200 meters (-656ft), the report is flagged for investigation. If there's a change in baro alt greater than 656 feet/sec (200m/s), then the report is flagged for investigation.
Class A		Field marks classes of airspace the aircraft operated in during the flight. Part 91 Appendix D is a special class of airspace for certain airports.
Class B		
Class C		
Class D		
Class E		
Part 91AppD		
Country		Field Identifies the country of origin for the aircraft and the type of registration (e.g. United States- Civil, Military, etc.)
Dup ICAO	Duplicate ICAO	Each aircraft is assigned a unique 24-bit ICAO address. When two or more aircraft are monitored operating simultaneously with the same 24-bit ICAO address both aircraft (correct & incorrect 24-bit ICAO) will be flagged for Dup ICAO.
Dup ICAO Duration	Duration Dup ICAO operation occurred	This field marks the duration that a duplicate 24-bit ICAO address is observed.
Duration		Total flight time measured in hours, minutes, and seconds.

Emitter Category		Indication of aircraft characteristics (type/size/weight/performance. Used by future ADS-B IN applications e.g., wake avoidance. Set A 0 = No ADS-B Emitter Category Information 1 = Light (< 15500 lbs) 2 = Small (15500 to 75000 lbs) 3 = Large (75000 to 300000 lbs) 4 = High Vortex Large (aircraft such as B-757) 5 = Heavy (> 300000 lbs) 6 = High Performance (> 5g acceleration and 400 kts) 7 = Rotorcraft
Flight ID	Flight Identification Code	This should match the aircraft call sign used in ATC communication. Must match the aircraft call sign in any filed flight plan.
Geo Alt/Geo Alt Δ	Geometric Altitude	Received geometric altitude is checked against aircraft performance criteria and flagged as invalid if determined to be incorrect or unreasonable. In general, if the reported baro or geo alt is greater than 20,000 meters (65,616ft) or less than -200 meters (-656ft), the report is flagged. If there's a change in geo alt greater than 656 feet/sec (200m/s), this field will also be flagged.
ICAO Assigned		Unique six character ICAO address assigned to an aircraft at registration. ICAO code is the same as the Mode S address.
ICAO Reported		Unique six character ICAO address transmitted by the aircraft.
Illegal Char	Flight ID illegal character	Flight ID contains an incorrect character (e.g., letter O in place of the number zero, etc.)
In capability		Indicates the link type transmitted for the ADS-B IN capability (1090/UAT).
Int/Acc	Integrity and Accuracy	Category of values including NIC, NACp, and NACv.
Kin	Kinematics	Category of exceptions that includes Baro Alt, Baro Alt Δ, Geo Alt, Geo Alt Δ, Velocity, Position Δ. Position error checks.
Length/Width Code		Code received that indicates the length and width of the aircraft.
Link Version		Field marking what version of ADS-B the transponder is using. §91.225 and §91.227 require Link Version 2.
MCF	Maximum Consecutive Failures	The number of non-performing reports received that occur in a row (consecutively). If an MCF exceeds its threshold, an MCF exception is identified for that parameter.
Mismatch		Percent, total time, and max consecutive reports aircraft reported a N-Number Flight ID that doesn't match the N-Number derived from the 24-bit ICAO address.
Missing report duration		Time period of flight segment that ADS-B data was not received from the aircraft. This can be caused by failure of the avionics or transiting in and out of ADS-B coverage.

<table>
<tr><td>Mode 3/A</td><td></td><td>Four digit code (ATC assigned or 1200) set by the pilot</td></tr>
<tr><td>NACp</td><td>Navigation Accuracy Category for Position</td><td>This field indicates the accuracy of the aircraft position being transmitted.
§91.227 requires a minimum NACp of 8. A PAPR will be flagged red if the NACp of <8 duration exceeds the allowable threshold.

Table A-13: Encoding of Navigation Accuracy Category for Position (NAC_P)
<table><tr><th colspan="2">Coding</th><th rowspan="2">Meaning = 95% Horizontal Accuracy Bounds (EPU)</th></tr><tr><th>(Binary)</th><th>(Decimal)</th></tr><tr><td>0000</td><td>0</td><td>EPU ≥ 18.52 km (10 NM) - Unknown accuracy</td></tr><tr><td>0001</td><td>1</td><td>EPU < 18.52 km (10 NM) - RNP-10 accuracy</td></tr><tr><td>0010</td><td>2</td><td>EPU < 7.408 km (4 NM) - RNP-4 accuracy</td></tr><tr><td>0011</td><td>3</td><td>EPU < 3.704 km (2 NM) - RNP-2 accuracy</td></tr><tr><td>0100</td><td>4</td><td>EPU < 1852 m (1NM) - RNP-1 accuracy</td></tr><tr><td>0101</td><td>5</td><td>EPU < 926 m (0.5 NM) - RNP-0.5 accuracy</td></tr><tr><td>0110</td><td>6</td><td>EPU < 555.6 m (0.3 NM) - RNP-0.3 accuracy</td></tr><tr><td>0111</td><td>7</td><td>EPU < 185.2 m (0.1 NM) - RNP-0.1 accuracy</td></tr><tr><td>1000</td><td>8</td><td>EPU < 92.6 m (0.05 NM) - e.g., GPS (with SA)</td></tr><tr><td>1001</td><td>9</td><td>EPU < 30 m - e.g., GPS (SA off)</td></tr><tr><td>1010</td><td>10</td><td>EPU < 10 m - e.g., WAAS</td></tr><tr><td>1011</td><td>11</td><td>EPU < 3 m - e.g., LAAS</td></tr><tr><td>1100 - 1111</td><td>12 - 15</td><td>Reserved</td></tr></table>
NACp values < 8 will be flagged red.</td></tr>
<tr><td>NACv</td><td>Navigation Accuracy Category for velocity</td><td><table><tr><th colspan="3">Navigation Accuracy Category for Velocity</th></tr><tr><th colspan="2">Coding</th><th rowspan="2">Horizontal Velocity Error</th></tr><tr><th>(Binary)</th><th>(Decimal)</th></tr><tr><td>000</td><td>0</td><td>≥ 10 m/s</td></tr><tr><td>001</td><td>1</td><td>< 10 m/s</td></tr><tr><td>010</td><td>2</td><td>< 3 m/s</td></tr><tr><td>011</td><td>3</td><td>< 1 m/s</td></tr><tr><td>100</td><td>4</td><td>< 0.3 m/s</td></tr></table>
Navigation Accuracy Category for Velocity (NACv). NACv is based on design data provided by the position source manufacturer. The NACv may be updated dynamically from the position source, or set statically based on qualification of the position source.

(a) A NACv = 1 (< 10 m/s) may be permanently set at installation for GNSS equipment passing the tests identified in appendix 2, or may be set dynamically from velocity accuracy output of a position source qualified in accordance with the AC 20-165B appendix B guidance.
(b) A NACv = 2 (< 3 m/s) may be set dynamically from velocity accuracy output of a position source qualified in accordance with the</td></tr>
</table>

<table>
<tr><td></td><td></td><td>Appendix 2 guidance. NACv = 2 should not be permanently preset at installation, even if the position source has passed the tests identified in AC 20-165B appendix B.
A NACv = 3 or NACV = 4 should not be set based on GNSS velocity accuracy unless you can demonstrate to the FAA that the velocity accuracy
actually meets the requirement.</td></tr>
<tr><td>NIC</td><td>Navigation Integrity Category</td><td>NIC encoding is used to indicate the radius of containment around the aircraft. §91.227 requires a minimum NIC of 7. NIC values of <7 will be flagged red within a PAPR when the MCF threshold is exceeded.
<table>
<tr><th rowspan="2">NIC Value</th><th rowspan="2">Radius of Containment (R_C)</th><th colspan="3">Airborne</th><th colspan="3">Surface</th></tr>
<tr><th>Airborne Position TYPE Code</th><th colspan="2">NIC Supplement Codes</th><th>Surface Position TYPE Code</th><th colspan="2">NIC Supplement Codes</th></tr>
<tr><th></th><th></th><th></th><th>A</th><th>B</th><th></th><th>A</th><th>C</th></tr>
<tr><td>0</td><td>R_C unknown</td><td>0, 18 or 22</td><td>0</td><td>0</td><td>0, 8</td><td>0</td><td>0</td></tr>
<tr><td>1</td><td>R_C < 20 NM (37.04 km)</td><td>17</td><td>0</td><td>0</td><td>N/A</td><td>N/A</td><td>N/A</td></tr>
<tr><td>2</td><td>R_C < 8 NM (14.816 km)</td><td>16</td><td>0</td><td>0</td><td>N/A</td><td>N/A</td><td>N/A</td></tr>
<tr><td>3</td><td>R_C < 4 NM (7.408 km)</td><td>16</td><td>1</td><td>1</td><td>N/A</td><td>N/A</td><td>N/A</td></tr>
<tr><td>4</td><td>R_C < 2 NM (3.704 km)</td><td>15</td><td>0</td><td>0</td><td>N/A</td><td>N/A</td><td>N/A</td></tr>
<tr><td>5</td><td>R_C < 1 NM (1852 m)</td><td>14</td><td>0</td><td>0</td><td>N/A</td><td>N/A</td><td>N/A</td></tr>
<tr><td rowspan="3">6</td><td>R_C < 0.6 NM (1111.2 m)</td><td>13</td><td>1</td><td>1</td><td>8</td><td>0</td><td>1</td></tr>
<tr><td>R_C < 0.5 NM (926 m)</td><td>13</td><td>0</td><td>0</td><td>N/A</td><td>N/A</td><td>N/A</td></tr>
<tr><td>R_C < 0.3 NM (555.6 m)</td><td>13</td><td>0</td><td>1</td><td>8</td><td>1</td><td>0</td></tr>
<tr><td>7</td><td>R_C < 0.2 NM (370.4 m)</td><td>12</td><td>0</td><td>0</td><td>8</td><td>1</td><td>1</td></tr>
<tr><td>8</td><td>R_C < 0.1 NM (185.2 m)</td><td>11</td><td>0</td><td>0</td><td>7</td><td>0</td><td>0</td></tr>
<tr><td>9</td><td>R_C < 75m</td><td>11</td><td>1</td><td>1</td><td>7</td><td>1</td><td>0</td></tr>
<tr><td>10</td><td>R_C < 25m</td><td>10 or 21</td><td>0</td><td>0</td><td>6</td><td>0</td><td>0</td></tr>
<tr><td>11</td><td>R_C < 7.5m</td><td>9 or 20</td><td>0</td><td>0</td><td>5</td><td>0</td><td>0</td></tr>
<tr><td>12</td><td colspan="7">Reserved</td></tr>
<tr><td>13</td><td colspan="7">Reserved</td></tr>
<tr><td>14</td><td colspan="7">Reserved</td></tr>
<tr><td>15</td><td colspan="7">Reserved</td></tr>
</table>
</td></tr>
<tr><td>NIC Baro</td><td></td><td>NIC baro is a one-bit field that is used to report if the altitude is being checked against another source of pressure altitude.
<table>
<tr><th>Coding</th><th>Meaning</th></tr>
<tr><td>0</td><td>The barometric altitude that is being reported in the Airborne Position Message is based on a Gilham coded input that has not been cross-checked against another source of pressure altitude</td></tr>
<tr><td>1</td><td>The barometric altitude that is being reported in the Airborne Position Message is either based on a Gilham code input that has been cross-checked against another source of pressure altitude and verified as being consistent, or is based on a non-Gilham coded source</td></tr>
</table>
</td></tr>
<tr><td>No “N”</td><td></td><td>Percent, total time, and max consecutive reports aircraft reported a N Number Flight ID without the leading “N”</td></tr>
<tr><td>Non-US</td><td></td><td>Percent, total time, and max consecutive reports aircraft reported a N Number
Flight ID and a 24-bit ICAO address outside the U.S. block</td></tr>
<tr><td>Operation Id</td><td></td><td>Unique flight identification number that is shown in the report to allow users to return to that operation to look at it again.</td></tr>
<tr><td>Other Checks</td><td></td><td>Category of checks that looks at assorted issues such as illegal characters in your flight ID, improper/missing Mode 3/A code, and Duplicate 24-bit ICAO
addresses. See Other Checks section in Part 1 of this document.</td></tr>
</table>

<table>
<tr><td>Only “N”</td><td></td><td>Percent, total time, and max consecutive reports aircraft reported just “N” for flight ID</td></tr>
<tr><td>Out Capability</td><td></td><td>Indicates the type of ADS-B Out link the transmitter operates on i.e., 1090,
UAT, Dual (both links)</td></tr>
<tr><td>Partial</td><td></td><td>Mostly for Air Carriers, percent, total time, and max consecutive reports aircraft reported a Flight ID missing the leading three letter identifier</td></tr>
<tr><td>Processed reports</td><td></td><td>Number of ADS-B reports actually processed by the FAA ground system</td></tr>
<tr><td>Rule</td><td></td><td>This overall category fails if you fail any of the categories mandated. If this box is labeled no, the test was a success.</td></tr>
<tr><td>SDA</td><td>System Design Assurance</td><td>Measures the likelihood of bad data being sent. Pass for values 2 and 3
<table>
<tr><th colspan="2">SDA Value</th><th rowspan="2">Supported Failure Condition Note 2</th><th rowspan="2">Probability of Undetected Fault causing transmission of False or Misleading Information Note 3,4</th><th rowspan="2">Software & Hardware Design Assurance Level Note 1,3</th></tr>
<tr><th>(decimal)</th><th>(binary)</th></tr>
<tr><td>0</td><td>00</td><td>Unknown/ No safety effect</td><td>$> 1x10^{-3}$ per flight hour or Unknown</td><td>N/A</td></tr>
<tr><td>1</td><td>01</td><td>Minor</td><td>$\leq 1x10^{-3}$ per flight hour</td><td>D</td></tr>
<tr><td>2</td><td>10</td><td>Major</td><td>$\leq 1x10^{-5}$ per flight hour</td><td>C</td></tr>
<tr><td>3</td><td>11</td><td>Hazardous</td><td>$\leq 1x10^{-7}$ per flight hour</td><td>B</td></tr>
</table></td></tr>
<tr><td>SIL</td><td>Source Integrity Level</td><td>Measurement of the probability of not being within the containment radius. Pass for value 3 only
<table>
<tr><th colspan="2">SIL Coding</th><th rowspan="2">Probability of Exceeding the NIC Containment Radius (R_C)</th></tr>
<tr><th>(Binary)</th><th>(Decimal)</th></tr>
<tr><td>00</td><td>0</td><td>Unknown or $> 1 \times 10^{-3}$ per flight hour or per sample</td></tr>
<tr><td>01</td><td>1</td><td>$\leq 1 \times 10^{-3}$ per flight hour or per sample</td></tr>
<tr><td>10</td><td>2</td><td>$\leq 1 \times 10^{-5}$ per flight hour or per sample</td></tr>
<tr><td>11</td><td>3</td><td>$\leq 1 \times 10^{-7}$ per flight hour or per sample</td></tr>
</table></td></tr>
<tr><td>SILs</td><td>Source Integrity Level Supplement</td><td>This is a one bit field that informs the system if the SIL is being given on a per hour or a per sample basis, assigned as 0 or 1 respectively</td></tr>
<tr><td>SQL</td><td>Signal Quality Level</td><td>Measure of integrity of data sent. Not used to determine if an operation makes it onto the exception list</td></tr>
<tr><td>Stationary only</td><td></td><td>Field that marks if the recorded flight was stationary (ground only)</td></tr>
<tr><td>Tail Number</td><td></td><td>Number assigned to the aircraft at registration (N-number)</td></tr>
<tr><td>TIS-B Client %</td><td></td><td>% of flight time that the aircraft was provided TIS-B data.</td></tr>
<tr><td>Total reports</td><td></td><td>Total reports broadcast by the ADS-B transmitter</td></tr>
<tr><td>Type Registration</td><td></td><td>Type of registration associated with aircraft e.g. civil, military, etc.</td></tr>
<tr><td>UAT Only above 18k</td><td></td><td>When flagged, indicates UAT-Only equipped aircraft operating in Class A airspace (above 18K feet) where 1090 ADS-B equipment is required by 91.225.</td></tr>
</table>

Unavail Char		Percent, total time, and max consecutive reports aircraft reported a Flight ID with an Unavailable Character
Vel/ Position Δ	Velocity & Position delta	Velocity is encoded in ADS-B messages. The performance monitor checks these values against aircraft performance and flags a PAPR if the velocity is greater than 300 meters/sec (583 knots or a position is greater than 1,312 feet/sec (400m/s).
Vertical Velocity		Vertical Velocity is encoded in ADS-B messages. The performance monitor checks these values against aircraft performance and flags any unusual or unreasonable values

Additional information about ADS-B can be found in the following documents:

1. Advisory Circular (AC) 90-114(current version), Automatic Dependent Surveillance-Broadcast (ADS-B) Operations
2. AC 20-165(current version), Airworthiness Approval of Automatic Dependent Surveillance – Broadcast (ADS-B) OUT Systems in Aircraft (guidance on ADS-B system design, certification, and installation).
3. Aeronautical Information Manual
4. 14 CFR §91.225 and 91.227

Appendix C

ADS-B STATISTICAL ANALYSIS SYSTEM

Central American Corporation of Air Navigation Services

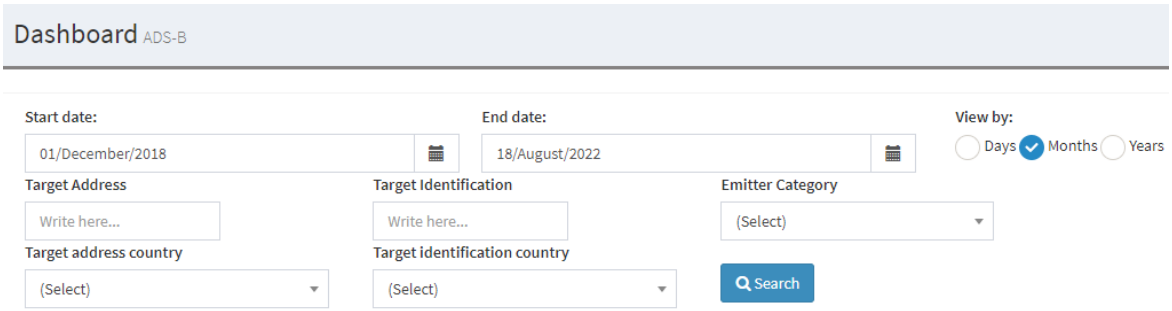
July 2022

ADS-B STATISTICAL ANALYSIS SYSTEM

Hereunder, the ADS-B Dashboard developed by COCESNA is illustrated, which allows, from the continuous recordings of ADS-B data, to graphically present the statistical results of the ADS-B messages that are formatted in Asterix Category 21, for each one of the ADS-B sensors installed in Central America.

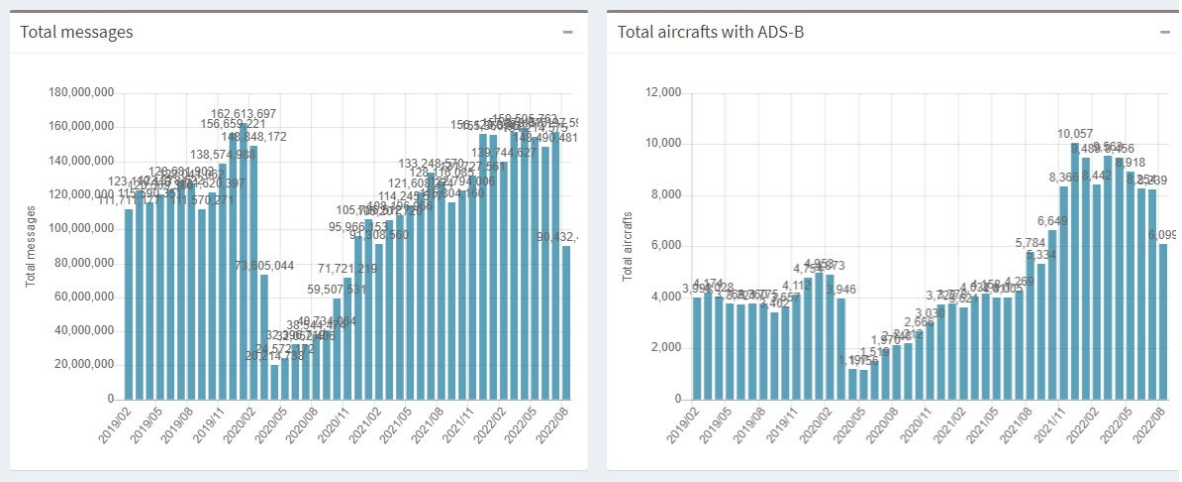
The main statistics of the Dashboard can be filtered by date and by the different identifiers of the aircraft and consolidated by time periods, see the following figure.

Fig 1. Main filters of the ADS-B Dashboard



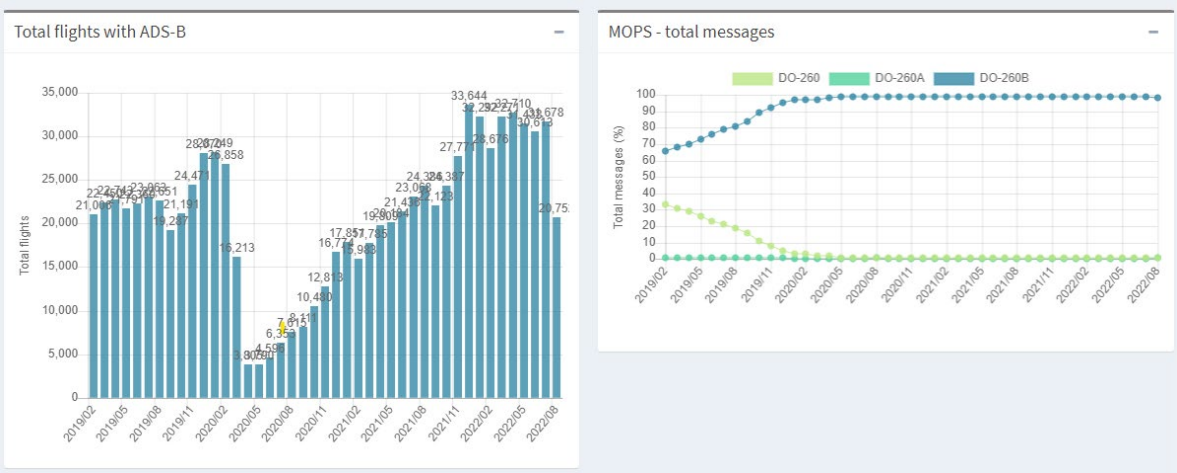
The following figure illustrates the statistics of total ADS-B decoded messages since 2019, including the number of aircraft with ADS-B.

Fig. 2. Total, de Mensajes decodificados y aeronaves con capacidad ADS-B



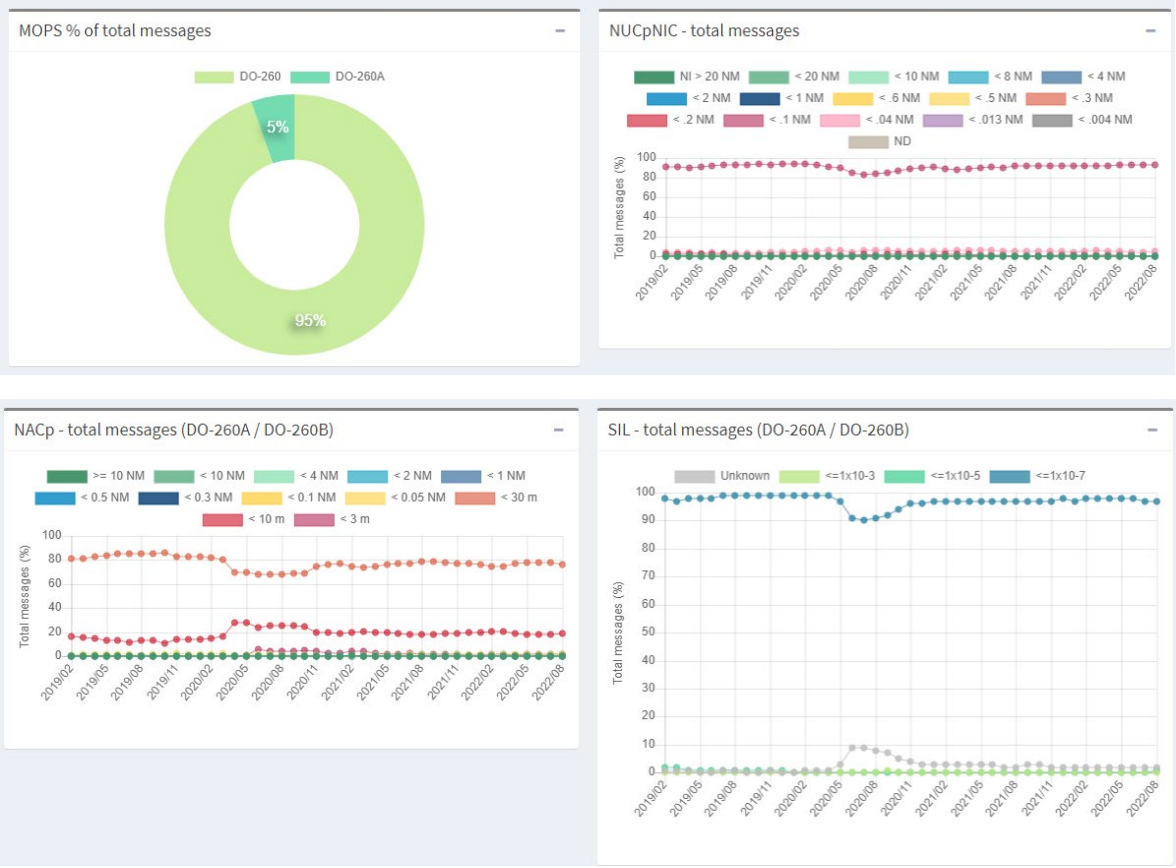
The above information can also be obtained by flight. The following figure illustrates the evolution of ADS-B avionics, where it can be seen how the DO-260B capacity grew significantly throughout 2019, due to the ADS-B mandate established by the FAA for January 1, 2020.

Fig. 3.- Statistics of flights with ADS-B capacity and evolution of ADS-B capacity (MOPS)



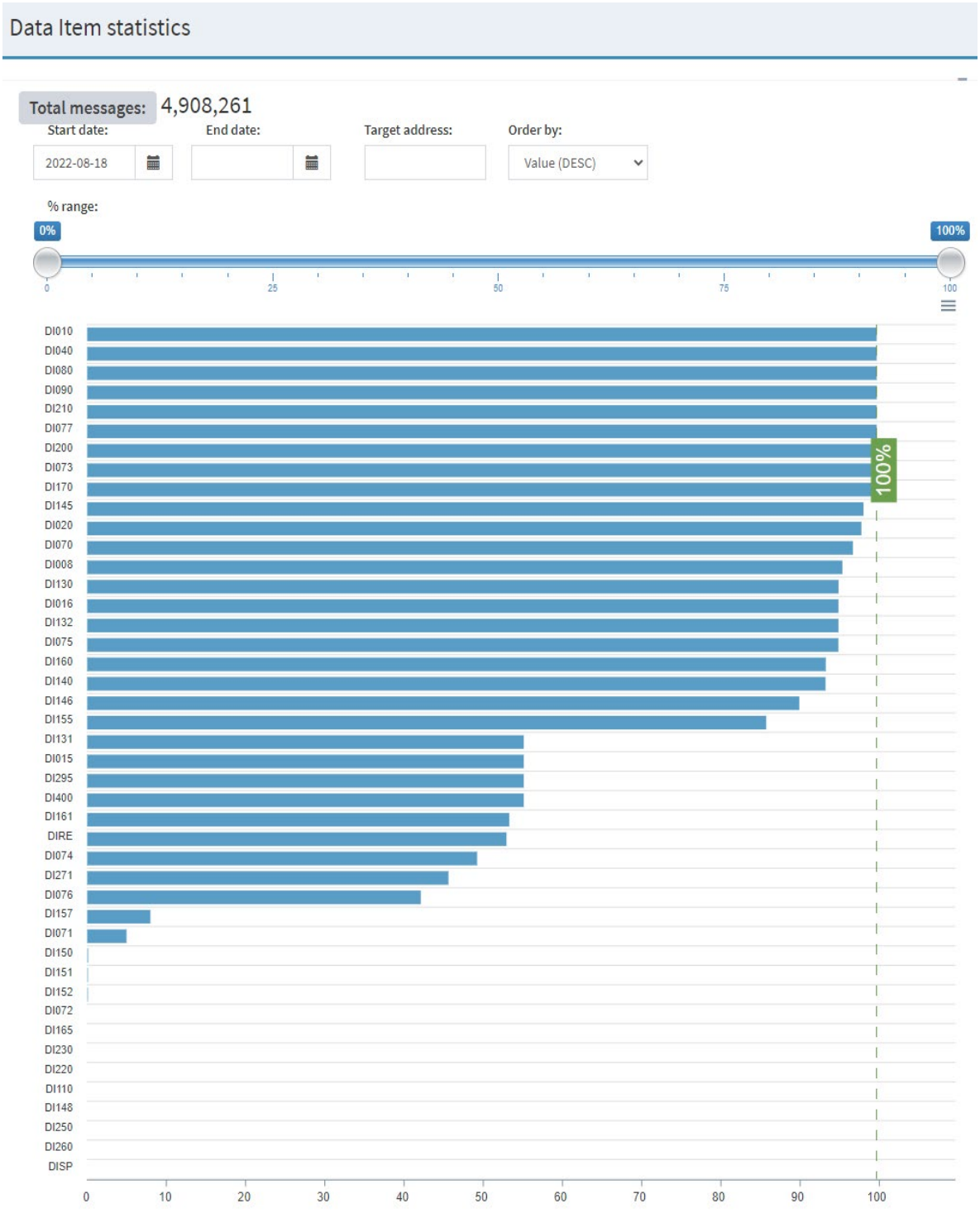
The following figures illustrate the statistics for the different figures of merit for ADS-B messages.

Fig. 4.- Statistics of the main ADS-B figures of merit



The system also allows an analysis of the main items of the messages formatted in CAT 21 and filtered by date and aircraft address.

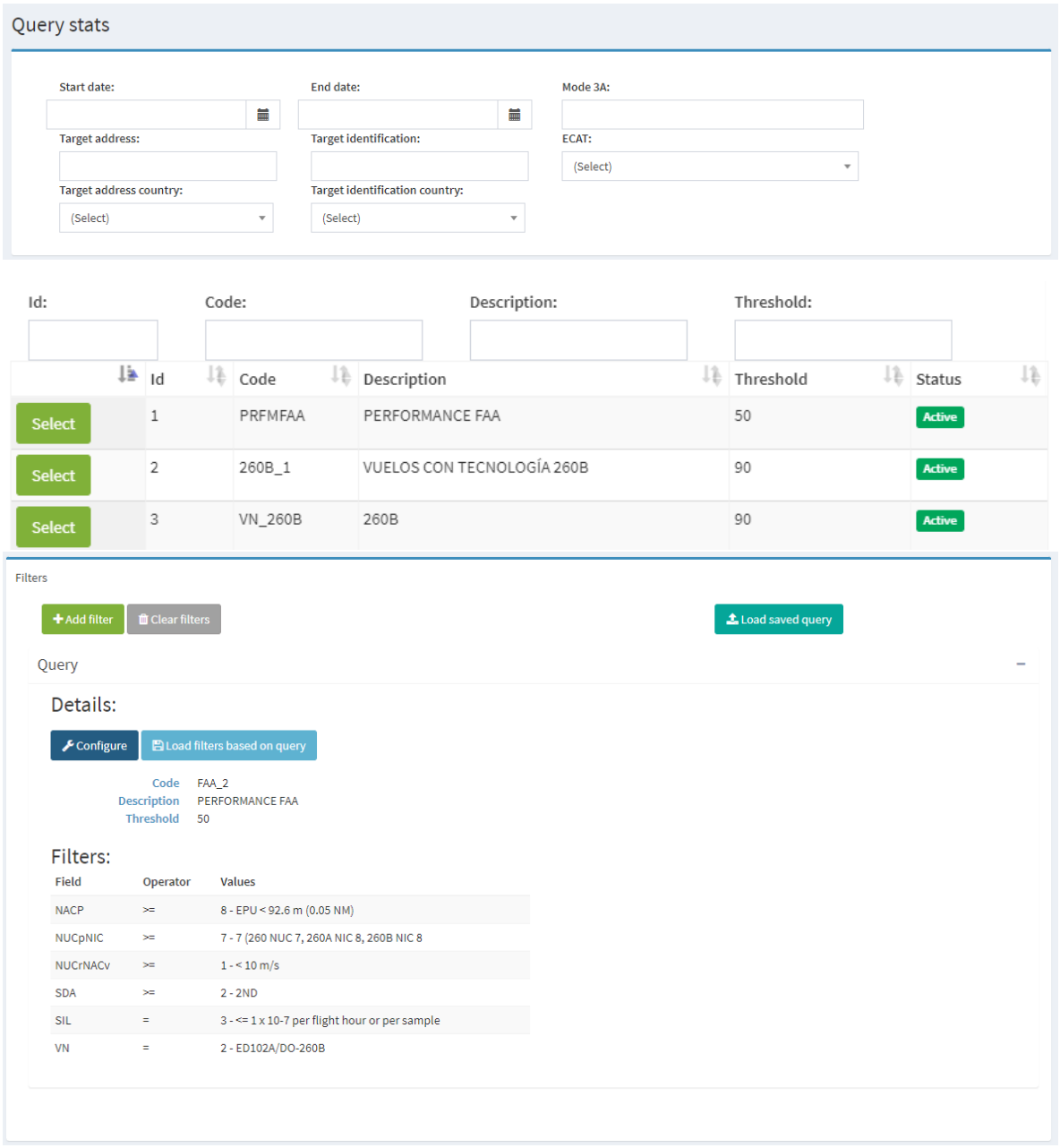
Fig. 5.- Data item statistics of ADS-B messages



One of the main functions is to carry out analyzes filtered by dates and by the different identifiers of the aircraft, of the information obtained from the ADS-B messages.

This allows performance rules to be defined based on a selection of figures of merit and compliance thresholds according to the requirement of the airspace to be analyzed. An example is illustrated in the following figure to show the capabilities of such functionality.

Fig. 6. Data filtering by performance rules formed by ADS-B figures of merit.



Search

Search

Export to Excel

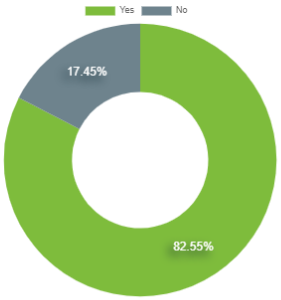
Export to Excel all the source messages of this query. This can take several minutes to complete. Data scope: Summary

Msg date	Target address	Target identification	ECAT	Total messages	% compliance	Complies	Total compliance
2022-08-01	0AC138			425	100	Yes	425
2022-08-01	0AC138	NSE8807	2	499	100	Yes	499
2022-08-01	0AC138	NSE8815	2	456	100	Yes	456
2022-08-01	0AC138	NSE8808	2	404	100	Yes	404
2022-08-01	0AE093	GRA428A	1	16	100	Yes	16
2022-08-01	0AE056	POLI002	1	450	100	Yes	450
2022-08-01	0AE036	TIBGT	1	19	100	Yes	19
2022-08-01	0ACA66	ULS5391	3	9	100	Yes	9
2022-08-01	0C2057	JOS0214	3	2226	100	Yes	2226
2022-08-01	0BA014	HRREM	1	2133	100	Yes	2133

Showing 1 to 10 of 32,979 entries

Previous 1 2 3 4 5 ... 3298 Next

Flight compliance analysis



% of messages that comply exactly with the filters

Questionnaire for State/Territory

Objective: update data and information in the AGA area of the ICAO NACC Regional Office (available at: https://www.icao.int/NACC/Pages/ES/edocs-aga_ES.aspx) to support the work of the AGA Task Force of the NACC/WG, approved by the meeting carried out from 29 August to 1 September 2022.

Deadline: January 31, 2023

In case of any doubt you may call +52 (55) 52503211 or send an email to ftodesco@icao.int

* Required

* This form will record your name, please fill your name.

General data

1. State/Territory:

- ◯ Anguilla (UK)
- ◯ Antigua and Barbuda
- ◯ Aruba
- ◯ Bahamas
- ◯ Barbados
- ◯ Belize
- ◯ Bermuda (UK)

- ○ Bonaire
- ○ Cayman Islands (UK)
- ○ Costa Rica
- ○ Cuba
- ○ Curacao
- ○ Dominica
- ○ Dominican Republic
- ○ El Salvador
- ○ French Antilles
- ○ Grenada
- ○ Guatemala
- ○ Haiti
- ○ Honduras
- ○ Jamaica
- ○ México
- ○ Montserrat (UK)
- ○ Nicaragua
- ○ Puerto Rico
- ○ Saba
- ○ Saint Kitts and Nevis
- ○ Saint Lucia
- ○ Saint Vincent and the Grenadines
- ○ Sint Eustacius
- ○ Sint Maarten

- ◯ Trinidad and Tobago
- ◯ Turks and Caicos Islands (UK)
- ◯ Virgin Islands (UK)
- ◯ Virgin Islands (USA)

2. Name of the Civil Aviation Authority organization:

- ◯ Agencia Federal de Aviación Civil
- ◯ Agencia Hondureña de Aviación Civil
- ◯ Air Safety Support International (ASSI)
- ◯ Autoridad de Aviación Civil
- ◯ Belize Department of Civil Aviation
- ◯ Civil Aviation Authority - Bahamas (CAA-B)
- ◯ Civil Aviation Department of Ministry of Tourism and International Transport
- ◯ Curaçao Civil Aviation Authority
- ◯ Department of Civil Aviation & Shipping and Maritime (DCASM)
- ◯ Department of Civil Aviation Aruba
- ◯ Dirección General de Aeronáutica Civil
- ◯ Dirección General de Aviación Civil (DGAC)
- ◯ Directeur General de l'Aviation Civile
- ◯ Eastern Caribbean Civil Aviation Authority
- ◯ Federal Aviation Administration
- ◯ French Civil Aviation Authority (DGAC)
- ◯ Instituto de Aeronáutica Civil de Cuba
- ◯ Instituto Dominicano de Aviación Civil

- ◯ Instituto Nicaragüense de Aeronáutica Civil (INAC)
- ◯ Jamaica Civil Aviation Authority
- ◯ Netherlands Civil Aviation Authority
- ◯ Trinidad & Tobago Civil Aviation Authority
- ◯ Turks and Caicos Islands Civil Aviation Authority

Point of Contact

3. Name: *

4. Position or Official Title: *

5. Email address: *

6. Official telephone: *

7. Mobile (for emergency purposes):

Aerodrome Master Plan

8. Is there a national guidance for the elaboration of a master plan for the aerodrome operator? *

- ◯ Yes
- ◯ No

9. Does the State/Territory have an aerodrome strategic plan? *

- ◯ Yes
- ◯ No

10. Which are the doubts and difficulties on the matter?

Aerodrome Certification

11. Has the State/Territory promulgated regulations detailing the requirements for aerodrome certification? *

- ◯ Yes
- ◯ No

12. Has the State/Territory established a process for aerodrome certification? *

- ◯ Yes
- ◯ No

13. Does the State or Territory have procedures for the initial review and approval/acceptance of an aerodrome manual and its subsequent amendments? *

- ◯ Yes
- ◯ No

14. Is there a regulation defining the circumstances and justification for conducting aeronautical studies/risk assessments? *

- ◯ Yes
- ◯ No

15. Is there a guidance on the use and evaluation of aeronautical studies/risk assessments and their review to justify a waiver request? *

- ◯ Yes
- ◯ No

16. Which are the doubts and difficulties on the matter?

Runway Safety Team (RST)

17. Are there provisions, national procedures or guidance on Runway Safety Teams (RST)? *

- ◯ Yes
- ◯ No

18. Is there a focal point to coordinate implementation activities at national level? *

- ◯ Yes
- ◯ No

19. If there is a national focal point, please provide his/her name and his/her email address:

20. Which are the doubts and difficulties on the matter?

Airport Collaborative Decision Making (A-CDM)

21. Has the State/Territory identified the need to implement A-CDM at airports? *

- ◯ Yes
- ◯ No

22. In case you answered yes, what are the criteria defined to identify the need to implement A-CDM?

23. Which are the doubts and difficulties on the matter?

New Global Reporting Format (GRF) for Runway Surface Conditions

24. Which milestones of the GRF implementation process were carried out at the aerodrome level (multiple choice)? *

- [ ] GRF 1 - Revised ICAO provisions and guidance and guidance from other organizations.
- [ ] GRF 2 - Appointment of a focal point to coordinate implementation activities at the national level.
- [ ] GRF 4 - An Implementation Coordination Team has been established that includes staff from identified stakeholders.
- [ ] GRF 6 – Regulations, standards, procedures and guidance material have been identified to be developed/modified.
- [ ] GRF 10 - Regulations and standards have been developed and promulgated.
- [ ] GRF 11 - Procedures and guidance material have been developed.

25. Is the State/Territory personnel trained? *

- ◯ Yes
- ◯ No

26. Which are the doubts and difficulties on the matter?

Questionnaire for international aerodromes

Objective: update data and information in the AGA área of the ICAO NACC Regional Office (available at: https://www.icao.int/NACC/Pages/ES/edocs-aga_ES.aspx) to support the work of the AGA Task Force of the NACC/WG, approved by the meeting carried out from 29 August to 1 September 2022.

Deadline: **January 31, 2023**
In case of any doubt, you may call +52 (55) 52503211 or send an email to ftodesco@icao.int

* Required

General Data

1. Estado/Territorio: *

- ◯ Anguilla (UK)
- ◯ Antigua and Barbuda
- ◯ Aruba
- ◯ Bahamas
- ◯ Barbados
- ◯ Belize
- ◯ Bermuda (UK)
- ◯ Bonaire
- ◯ Cayman Islands (UK)

- ○ Costa Rica
- ○ Cuba
- ○ Curacao
- ○ Dominica
- ○ Dominican Republic
- ○ El Salvador
- ○ French Antilles
- ○ Grenada
- ○ Guatemala
- ○ Haiti
- ○ Honduras
- ○ Jamaica
- ○ México
- ○ Montserrat (UK)
- ○ Nicaragua
- ○ Puerto Rico
- ○ Saba
- ○ Saint Kitts and Nevis
- ○ Saint Lucia
- ○ Saint Vincent and the Grenadines
- ○ Sint Eustacius
- ○ Sint Maarten
- ○ Trinidad and Tobago
- ○ Turks and Caicos Islands (UK)

- ◯ Virgin Islands (UK)
- ◯ Virgin Islands (USA)

2. International Aerodrome: *

- ◯ MBGT - GRAND TURK/Grand Turk Intl
- ◯ MBPV - PROVIDENCIALES/ Providenciales Intl
- ◯ MBSC - SOUTH CAICOS/South Caicos Intl
- ◯ MDBH - BARAHONA/Apto. Internacional María Montes
- ◯ MDCY - SAMANA/El Catey Intl.
- ◯ MDJB - HIGUERO/Dr. Joaquín Balaguer Intl.
- ◯ MDLR - LA ROMANA/Casa de Campo Intl.
- ◯ MDPC - PUNTA CANA/Punta Cana Intl.
- ◯ MDPP - PUERTO PLATA/ Gregorio Luperón Intl.
- ◯ MDSD - SANTO DOMINGO/Jose Francisco Peña Gomez Intl.
- ◯ MDST - SANTIAGO/Cibao Intl.
- ◯ MGGT - GUATEMALA/La Aurora
- ◯ MGMM - SANTA HELENA/Mundo Maya Intl.
- ◯ MGPB - PUERTO BARRIOS/ Puerto Barrios
- ◯ MHLC - LA CEIBA/Goloson Intl
- ◯ MHLM - SAN PEDRO SULA/Ramón Villeda Morales
- ◯ MHPR - COMAYAGUA/Aeropuerto Intl. Palmerola
- ◯ MHRO - ROATÁN/Juan Manuel Gálvez Intl.
- ◯ MHTG - TEGUCIGALPA/Toncontín Intl
- ◯ MKBS - OCHO RIOS/Ian Fleming Intl.

- MKJP - KINGSTON/Norman Manley Intl
- MKJS - MONTEGO BAY/Sangster Intl
- MMAA - ACAPULCO/Gral. Juan N. Alvarez Intl. RS
- MMAN - MONTERREY/Del Norte Intl.
- MMAS - AGUASCALIENTES/Aeropuerto Jesús Terán
- MMBT - BAHÍAS DE HUATULCO/Bahías de Huatulco
- MMCB - CUERNAVACA/General Mariano Matamoros
- MMCE - CIUDAD DEL CARMEN/Ciudad del Carmen Intl
- MMCL - CULIACÁN/Culiacán
- MMCM - CHETUMAL/Chetumal Intl.
- MMCN - CIUDAD OBREGON/Ciudad Obregon
- MMCP - CAMPECHE/Ing. Alberto Acuña Ongay
- MMCS - CIUDAD JUÁREZ/Abraham González Intl.
- MMCT - CHICHEN-ITZA/Chichen Itza
- MMCU - CHIHUAHUA/General de División y Piloto Aviador Roberto Fierro Villalobos
- MMCV - CIUDAD VICTORIA/General Pedro José Méndez
- MMCZ - COZUMEL/Cozumel Intl.
- MMDO - DURANGO/Durango
- MMEP - TEPIC/Tepic Intl
- MMGL - GUADALAJARA/Miguel Hidalgo Costilla Intl.
- MMGM - GUAYMAS/Gral. José María Yáñez Intl.
- MMHO - HERMOSILLO/Aeropuerto Internacional General Ignacio Pesqueira García
- MMIO - SALTILLO/Plan de Guadalupe
- MMLM - LOS MOCHIS/Del Valle del Fuerte

- MMLO - LEON/Aeropuerto Internacional de Guanajuato
- MMLP - LA PAZ/Gral. Manuel Márquez de León Intl.
- MMLT - LORETO/Loreto Intl
- MMMA - MATAMOROS/Matamoros Intl
- MMMC - CIUDAD ACUÑA/Cuidad Acuña Intl.
- MMMD - MERIDA/Lic. Manuel Crescencio Rejón Intl.
- MMML - MEXICALI/Gral. Rodolfo Sánchez Taboada Intl.
- MMMM - MORELIA/Gral. Francisco J. Mujica Intl.
- MMMT - MINATITLAN/Minatitlan
- MMMV - MONCLOVA/Venustiano Carranza
- MMMX - MÉXICO/Aeropuerto Internacional Benito Juárez, Ciudad de México
- MMMY - MONTERREY/Gral. Mariano Escobedo Intl.
- MMMZ - MAZATLAN/Gral. Rafael Buelna Intl.
- MMNG - NOGALES/Nogales Intl.
- MMNL - NUEVO LAREDO/ Aeropuerto Internacional Quetzalcóatl
- MMOX - OAXACA/Xoxocotlan
- MMPB - PUEBLA/Hermanos Serdan
- MMPE - PUERTO PEÑASCO/Aeropuerto del Mar de Cortes
- MMPG - PIEDRAS NEGRAS/ Piedras Negras Intl.
- MMPN - URUAPAN/General Ignacio López Rayón
- MMPQ - PALENQUE/Palenque RS
- MMPR - PUERTO VALLARTA/ Lic. Gustavo Diaz Ordaz Intl.
- MMPS - PUERTO ESCONDIDO/Puerto Escondido
- MMQT - QUERETARO/Intercontinental de Querétaro
- MMRX - REYNOSA/Gral. Lucio Blanco Intl.

- ◯ MMSD - SAN JOSÉ DEL CABO/ Aeropuerto Internacional Los Cabos
- ◯ MMSF - SAN FELIPE/San Felipe Intl.
- ◯ MMSL - CABO SAN LUCAS/Cabo San Lucas
- ◯ MMSM - SANTA LUCIA/Aeropuerto Intl. Felipe Angeles
- ◯ MMSP - SAN LUIS POTOSI/Ponciano Arriaga
- ◯ MMTC - TORREÓN/Francisco Sarabia
- ◯ MMTG - TUXTLA GUTIERREZ/Angel Albino Corzo
- ◯ MMTJ - TIJUANA/Gral. Abelardo L. Rodríguez Intl.
- ◯ MMTM - TAMPICO/Gral. Francisco Javier Mina Intl.
- ◯ MMTO - TOLUCA/Jose María Morelos y Pavón
- ◯ MMTP - TAPACHULA/Tapachula Intl
- ◯ MMUN - CANCÚN/Cancún Intl.
- ◯ MMVA - VILLAHERMOSA/Capitán P.A. Carlos Rovirosa
- ◯ MMVR - VERACRUZ/Gral. Heriberto Jara Intl.
- ◯ MMZC - ZACATECAS/Aeropuerto General Leobardo C. Ruiz Intl.
- ◯ MMZH - IXTAPA-ZIHUATANEJO/ Ixtapa-Zihuatanejo Intl.
- ◯ MMZO - MANZANILLO/Playa de Oro Intl.
- ◯ MNMG - MANAGUA/Augusto César Sandino Intl
- ◯ MRLB - LIBERIA/Daniel Oduber Quirós
- ◯ MRLM - LIMÓN/Limón Intl
- ◯ MROC - ALAJUELA/Juan Santamaría Intl.
- ◯ MRPV - PAVAS/Tobías Bolaños Intl.
- ◯ MSLP - SAN SALVADOR/ Apto Intl Mons. Oscar Arnulfo Romero y Galdames
- ◯ MSSS - SAN SALVADOR/ Ilopango Intl

- MTCH - CAP HAITIEN/Cap Haitien Intl
- MTPP - PORT-AU-PRINCE/Port-au-¬Prince Intl
- MUCC - CAYO COCO/Jardines del Rey
- MUCF - CIENFUEGOS/Jaime González
- MUCL - CAYO LARGO DEL SUR/Vilo Acuña
- MUCM - CAMAGUEY/Ignacio Agramonte
- MUCU - SANTIAGO DE CUBA/ Antonio Maceo
- MUHA - HABANA/José Martí
- MUHG - HOLGUÍN/Frank País
- MUMZ - MANZANILLO/Sierra Maestra
- MUSC - SANTA CLARA/Abel Santamaría
- MUVR - VARADERO/Juan Gualberto Gómez
- MWCB - CAYMAN BRAC/Charles Kirkconnell Intl.
- MWCR - GEORGETOWN/Owen Roberts Intl
- MYGF - FREEPORT/ Grand Bahama International Airport
- MYNN - NASSAU/Lynden Pindling International Airport
- MZBZ - BELIZE/Philip S.W. Goldson Intl
- TNCA - ORANJESTAD/Reina Beatrix International Airport
- TNCB - KRALENDIJK/Flamingo, Bonaire I.
- TNCC - WILLEMSTAD/Hato, Curaçao I.
- TXFK - BERMUDA/L.F. Wade

3. Name of the organization responsible of the aerodrome operation and administration: *

Aerodrome Point of Contact

4. Name: *

5. Position or Official Title: *

6. Email address: *

7. Official telephone number: *

Operational Data

8. Select types of aerodrome operations (multiple option): *

- [ ] Option 1 – International General Aviation
- [ ] Option 2 – International Commercial Aviation - Passengers
- [ ] Option 3 – International Commercial Aviation – Air Cargo
- [ ] Option 4 – International Operations - Helicopters

9. Number of total passenger movement (boarding and landing plus connection) in 2021? *

10. Provide the number of aircraft movement in the average peak hour: *

Aerodrome Master Plan

11. Do you have a Master Plan approved/accepted by the Civil Aviation Authority? *

- ◯ Yes
- ◯ No

12. If you have an approved Master Plan, what is the estimated total passenger movement (boarding and landing) for the year 2026? *

13. Which are the doubts and difficulties on the matter?

Aerodrome Certification

14. Is the aerodrome certified? *

- ◯ Yes
- ◯ No

15. If it is not certified, which phases of the certification process have been completed (only one option)? *

- ◯ 01 - Dealing with the expression of interest by an intending applicant for the aerodrome certificate.
- ◯ 02 - Assessing the formal application, including evaluation of the aerodrome manual.
- ◯ 03 - Assessing the aerodrome facilities and equipment.
- ◯ 04 - Issuing or refusing an aerodrome certificate.
- ◯ 05 - Promulgating the certified status of an aerodrome and the required details in the AIP.

16. If it is not certified, in what year is the certification expected (only one option)? *

- ◯ 2023
- ◯ 2024
- ◯ 2025
- ◯ 2026
- ◯ Other

17. Which are the doubts and difficulties on the matter?

Runway Safety Team (RST)

18. Is there a RST established in the aerodrome? *

- ◯ Yes
- ◯ No

19. In case you answered yes, which is the name and contact (email address) of the point of contact in the aerodrome for the implementation of the local RST?

20. Is there an established process to identify the critical points and publish them in the AIP? *

- ◯ Yes
- ◯ No

21. Are the runway incursions cases recorded and analyzed? *

- ◯ Yes
- ◯ No

22. Provide the number of runway incursions in the last 5 years:

23. Which are the doubts and difficulties on the matter?

Airport Collaborative Decision Making (A-CDM)

24. Does the airport have an A-CDM? *

- ◯ Yes
- ◯ No

25. If you have an A-CDM, in which phase of the A-CDM is the aerodrome? (CARSAM ACDM Implementation Guide (icao.int))?

- ◯ Phase 1 – Initiation.
- ◯ Phase 2 – Implementation.
- ◯ Phase 3 – Tests and validation.
- ◯ Phase 4 – Operation and follow-up.

26. Which are the doubts and difficulties on the matter?

New Global Reporting Format (GRF) for Runway Surface Conditions

27. Are there national regulations and standards for the aerodrome to implement GRF? *

- ◯ Yes
- ◯ No

28. In case you answered yes, which milestones of the GRF implementation process were carried out at the aerodrome level (multiple option)?

- ☐ GRF 3 – Identifying the focal points in the aerodrome.
- ☐ GRF 7 – Developing a plan and a risk safety assessment.
- ☐ GRF 8 – Identifying the necessary means and resources for implementation (human, financial and material resources).
- ☐ GRF 9 - Consulting with the aerodrome runway security teams.
- ☐ GRF 12 – Providing the necessary means and resources for the execution (human, financial, and material resources).
- ☐ GRF13 - Conducting on the job training (OJT) on the implementation.
- ☐ GRF 14 - Carrying out tests/trials prior to effective implementation.
- ☐ GRF 15 – Reporting the runway Surface conditions with the new GRF methodology.

29. Is the aerodrome personnel trained? *

- ◯ Yes
- ◯ No

30. Which are the doubts and difficulties on the matter?

APPENDIX G

ICAO NACC REGIONAL OFFICE
NORTH AMERICA, CENTRAL AMERICA AND CARIBBEAN WORKING GROUP (NACC/WG)

Aeronautical meteorology Task Force (MET/TF) Programme

1. Background

As part of the technical assistance activities performed by the ICAO NACC Regional Office under the Systemic Assistance Programme (SAP) and to assist States to improve the effective implementation of the Standards and Recommended Practices (SARPs) contained in Annex 3 to the Chicago Convention, the NACC/WG is executing the present MET Programme in cooperation with States.

2. Objectives

1. Promote the implementation of MET Service for international air navigation as provided by Annex 3, included in the Electronic Regional Air Navigation Plan (eANPs) and under the Basic Building Blocks (BBBs) and Aviation System Block Upgrade (ASBU) Frameworks.
2. Ensure the continuous and coherent development of the MET component of the NAM and CAR/SAM e-ANPs and its harmonized implementation within adjacent regions.
3. Develop effective methods to determine the implementation status of the ASBU Block-0 and Block-1 elements and BBBs, to monitor the performance of the MET Services on a cyclical annual basis.
4. Enhance the State's capabilities for the safety oversight of Meteorological Service providers.
5. Identify and support the resolution of air navigation deficiencies in the aeronautical meteorological (MET) services.

3. Stakeholders

The MET Programme benefits from experts provided by States' Civil Aviation Authorities, meteorological authorities, services providers and bodies having experience in the provision of aeronautical meteorological services for international air navigation.

4. Work methods

The MET Programme will coordinate tasks to maximize efficiency and reduce costs via electronic means including emails, telephone and teleconference calls.

Subject Matter Experts (SMEs) will be convened for the development of short-term tasks based on the financing support to be required to the RLA/09/801 - Multi-Regional Civil Aviation Assistance Programme (MCAAP).

5. Work Plan

Reference	Description of the deliverable
Annex 3 Global Air Navigation Plan (GANP) e-ANP	Regional event on the foundational cores of Meteorological Service for International Air Navigation and its evolution.
Annex 3 ICAO Guidance Material	Regional event on provisions related to the implementation of Operational meteorological (OPMET) Data Exchange under ICAO Weather Information Exchange Model (IWXXM).
Annex 3 GANP e-ANP ICAO Guidance Material	Regional event on provisions related to meteorological authority, quality assurance, State safety oversight responsibilities and functions, and competency training and qualifications for aeronautical meteorological personnel.
Annex 3 e-ANP	Review of current CAR/SAM provisions on Significant meteorological information (SIGMET).
Annex 3 e-ANP ICAO Guidance Material	CAR Regional SIGMET test analysis and report.
Annex 3 ICAO Guidance Material	Dissemination and analysis of the MET- System wide information management (SWIM) Plan and the MET-SWIM Roadmap.
Annex 3 GANP e-ANP BBB/ASBU Frameworks	Event for the review of the national and regional MET systems and essential services.
GANP e-ANP	Review of the e-ANP Vol I and Vol II MET Tables and draft the corresponding Proposal for Amendment.
GANP ASBU Framework	Development of e-ANP Vol III MET component.
Annex 3 Anne 19 Universal Safety Oversight Audit Programme Continuous Monitoring Approach (USOAP CMA)	Technical assistance to enhance the State's capability for the safety oversight of aeronautical meteorology.

In cooperation with

ICAO canso AIRBUS

Air Traffic Management Cybersecurity Policy Template

DISCLAIMER

The information contained in this publication is subject to on-going review in the light of changing ICAO Standards and regulations and other important information provided by ICAO, CANSO and Airbus.

This publication has to objective to help CAR and Latin American States in the evaluation and start their work about cybersecurity.

Latin America and CAR Region has been implemented State of the art technology to support the evolution of their air navigation operations, in that sense is really important to support this evolution incorporating information to support States in the security cybersecurity implementation.

Cyber-attack does not stop, every year the percentage of incidents increase, include aviation sector.

This publication does not replace any other national or regional regulation.

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- **Yann Berger**, Product Security Expert, APSYS – Product Security, Airbus
- **Gaelle Hubert**, Governance specialist and security auditor, Airbus
- **Poulin Estelle**, Physical security specialist, Aviation Security specialist and ACC3 auditor, Airbus

Contents

Introduction

The first decade of the twenty-first century has seen an increase in terrorist activity against a range of targets using a variety of methods. These have ranged from the use of explosive devices in attacks against aircraft, trains, and buildings, to cyber-attacks against information and communications systems. At the same time, systems and equipment supporting air navigation services have evolved towards digitalization and connectivity making them vulnerable to Cyber–attacks. Information management systems supporting real-time decision-making are sensitive and deserve special protection attention.

Cyber-attacks are becoming a growing threat worldwide as a result of increased digitalization and the interconnectivity of systems. Civil Aviation is particularly sensitive to this emerging threat due to its widely interconnected systems. Any disruption of systems due to a cyber-attack can seriously affect the safety and security of flights and the reputation of civil aviation in the public eye. As such, ICAO addressed this emerging threat to civil aviation through resolution A40-10: “Addressing Cybersecurity in Civil Aviation” during the A40 Assembly- 40th Session in Montreal, from September 24 to October 4, 2019.

It is vital that the civil aviation sector integrates cybersecurity policies as part of their normal procedures, and integrates them in every part of their aviation system.

Within this context, Air Traffic Management (ATM), Communication, Navigation and Surveillances systems (CNS), Information Management (IM) and other important systems for aviation are exposed to many different types of potential risks, arising from:

- Actions that may be intentional and hostile,
- Accidental or negligent,
- Impact from natural disaster.

Aeronautical systems are vulnerable to Cyber-threats such as IT sabotage, data corruption and availability (notably ransomware), software corruption, communication disruption or interruption, satellite communication interference, Cyber-attacks including systems sabotage, data breaches, damage and destruction of hardware. Cyber-threats can also be part of a bigger plot to harm people such as kidnapping, hostage taking, physical injuries and death.

Civil Aviation Authorities and Air Navigation Services Providers in the Latin America and Caribbean Region are concerned about the increased threat of Cyber-attacks stemming from the implementation of state-of-the- art technology without the necessary protections and resilience procedures to ensure they continue to meet the agreed levels of safety. It is recommended, therefore, that States broaden their cybersecurity vision to encompass air navigation systems, taking into account satellite systems (e.g. ADS-B), information systems, air traffic management systems and others that may be vulnerable to Cyber-attacks. Digitalization and Internet connectivity mean that previously non-suspicious equipment is now vulnerable.

In order to protect their operation from internal and external threats, States should implement Cybersecurity mechanisms across the entire ATM system.

It is also recommended that cybersecurity be included in the security culture through the training of air transport personnel (Air Navigation Services Provider [ANSP], airlines and airports). The application of good basic practices introduced in training can reduce the probability of Cyber-attacks, which, although representing risk to security, can affect public confidence.

While new technologies may be better prepared to resist Cyber-attack, the legacy technologies that are still in use at airports, airlines and ANSPs may not be as prepared. As a result, ICAO considers Cybersecurity as an interrelated matter because of its functions and inter-connected technology. The reason for this is the perceived threat of a cyber-attack affecting aerodrome operations, airworthiness and air navigation systems and services.

Add here the comments

Air Traffic Management Cybersecurity Policy Template

1. How to use this document

This document does not replace any Standards and Recommended Practices (SARPS) , no PANS- ICAO or National Regulation. This document support the previous listed documents.

States, in accordance with their Aeronautical Technical/Operational Infrastructure, should:

- Identify critical infrastructures related to communications, navigation and surveillance of air traffic services and protect them accordingly.

- Protect automated systems supporting Air Traffic Services (ATS) units or aeronautical information systems, among others, to support the confidentiality, integrity and availability of the information as well as resilience of operations.

- Perform and maintain a risk analysis to evaluate cybersecurity threats and vulnerabilities, related to impacts on air traffic Services.

- Review and update the technical and operational specifications of their systems considering that new technologies implemented in air traffic services provide greater efficiency and simplify operations management, however, they may be vulnerable to cyber threats. This review would help to mitigate cyber risks and ensure resilience.

- Monitor and analyze the exchange of information and the connections to identify possible cyber-attacks and establish the adequate protection measures for air traffic systems.

- Collaborate and cooperate with industry in order to adapt technical requirements to the development pace of new technologies and to ensure that hardware and software supporting air traffic systems are updated and prepared against cyber threats. Also, all interested parties (i.e. States, ANSPs and industry) need to collaborate in the design of the Standard Operating Procedures (SOPs) to ensure an adequate protection of their operations.

- Provide training and qualification for the personnel that manage ANS technical and operational areas for a correct provision of services. Staff should be knowledgeable and have the skills to carry out recovery plans in the event of a cyber-incident.

2. Applicable Documents

- ICAO Annexes
- ICAO Document 8973 – Aviation Security Manual
- ICAO Document 9985 – ATM Security Manual
- ICAO Aviation Cyber Security Strategy
- ED 205 Process standard for Air Traffic Management / Air Navigation Services (ATM/ANS) ground systems security aspects of certification / declaration

3. Scope

This document covers the whole aviation functional structure and all aviation stakeholders such as Civil Aviation Authorities, Air Navigation Service Providers, Airports Operators and any other aviation organization that is part of the State Aviation System to ensure the implementation of cybersecurity procedures and practices in all services under the State oversight such as:

- Air Traffic Services Units (TWR, APP and ACC)
- Communication, Navigation and Surveillance data and infrastructure
- Digital information systems (aeronautical information, meteorological information and other supporting decision-making information).
- Systems for aviation interoperability
- Others according with State services and operations.

This document applies to the whole aviation system locations and premises hosting:

- Information required by ATM services.
- Information technology (IT) infrastructure that ATM services rely on.
- Operational technology (OT) and Interconnected Industrial and Automated Controlled Systems (IACS).
- Extended services and partnership, and related information system interconnections.
- All aviation personnel and external organizations having access to air navigation information, services and facilities.

4. Objectives

The overall objectives of this aviation system security Policy are:

- To contribute the resilience of the State Aviation System.
- To provide support to information integrity, availability and confidentiality.
- To protect hardware/software supporting the aviation system infrastructure to reduce risks to all aviation
  State's services.
- To support the implementation of cybersecurity procedures and processes to all air navigation-infrastructure and services.
- To support civil aviation cyber security and resilience.

5. Security Architecture Objective

In addition to the implementation of the best practices identified in the referenced documents, this document strongly recommends the identification, definition and implementation of security measures based on their criticality regarding safety and operability[1].

1 In information security the criticality is estimated with respect to CIA (confidentiality, integrity, availability) which could impact safety and operability.

6. ATM Security Documentation

Requirement ATMSP-001-01:

Based on this security policy, an information security management system should be defined, implemented and
maintained based on a risk management approach.

NB: ISO27001 and ISO27002 Standards provide approved processes and best practices for ISMS and other available documents in the national regulations, and organizations within the States.

7. Risk Management

Requirement ATMSP-002-01:

ATM security should be intelligence led, threat based and risk managed.

Requirement ATMSP-003-01:

Information security risk management should be considered as an integral part of the overall
system life cycle process.

Requirement ATMSP-004-01:

All ATM assets (data, systems, personnel…) should have defined responsibility.

Requirement ATMSP-005-01:

Defense in depth principles as defined in 5 – Security architecture objective, should be part of the information security management.

Requirement ATMSP-006-01:

ATM Security Risk based approach should implement technical security measures and operational security measures
(policies and processes) to reduce risk to an acceptable level regarding:

- ~~(Intentional) Successful~~ cyber-attack,
- Human error,
- Accident or incident,
- Impact from natural disaster.

Requirement ATMSP-007-01:

The organization in charge of physical or information ATM security should ensure efficient and coordinated treatment
of security risk. Improve this part

Requirement ATMSP-008-01:

ATM information security risks should be reviewed and monitored on a regular basis.

8. Security Governance and Organization

Requirement ATMSP-009-01:

States should designate the Appropriate Authority (AA) responsible for the overall ATM security.

Note: This requirement will depend on the national regulations and agreements.

Requirement ATMSP-010-01:

Designated ATM security responsible should define at a minimum:

- Roles and responsibilities for ATM security risk management;
- Processes for risk management;
- Processes for incident and crisis management.

Requirement ATMSP-011-01:

Skills and competencies of personnel appointed to ATM security roles and responsibilities should be kept up to date.

9. Human Resources

Requirement ATMSP-012-01:

Personnel should be part of ATM security during all employment phases:

- Before employment: through measures such as background checks in accordance with local regulations;
- During employment: by developing a Cybersecurity culture through regular training and raising awareness; and
- After employment: by ensuring the respect of the de-provisioning process and reminding staff of non-disclosure commitments.

Requirement ATMSP-013-01:

Security personnel should ensure that individuals with access to ATM facilities, controlled areas and ATM sensitive data do not constitute an unacceptable risk (as per Chapter 7 Risk Management).

10. Asset Management

Requirement ATMSP-014-01:

An inventory of ATM assets should be developed and kept up to date.

Requirement ATMSP-015-01:

ATM should classify its assets according to their criticality in order to implement appropriate means of protection.

Requirement ATMSP-016-01:

ATM data should be identify critical data ~~classified~~ adequately.

Note: Additional information: please refer to applicable national

regulation

Requirement ATMSP-017-01:

ATM data should be protected during storage, processing and exchange, in line with its criticality profile.

11. Access Control

Requirement ATMSP-018-01:

Access to any ATM assets should be granted on:

- The verification of absence of unacceptable risk (as per Chapter 7 Risk Management); and
- A need-to-know basis.

12. Physical and Environmental Security of CNS/ATM Components

Requirement ATMSP-019-01:

ATM physical security should safeguard IT, OT, IACS and CNS/ATM infrastructure, against unlawful interference and unauthorized access.

Requirement ATMSP-020-01:

ATM physical security should identify zones hosting CNS/ATM assets according to their criticality regarding safety and operability.

Requirement ATMSP-021-01:

ATM physical security measures should protect the CNS/ATM from unlawful or intentional interruption of services and operations.

Requirement ATMSP-022-01:

ATM physical security should protect incoming and outgoing flows from storage zones and data centres.

13. Operations Security

Requirement ATMSP-023-01:

ANSP cybersecurity department organization should ensure the coordination of cyber security operations, monitoring and continuous improvement of information processing.

Requirement ATMSP-024-01:

ATM cybersecurity operations should include IT, OT, IACS and CNS/ATMs infrastructure in the scope of cyber security operations.

Requirement ATMSP-025-01:

ATM cybersecurity operations should maintain the effectiveness of cyber security measures throughout their lifecycle.

Requirement ATMSP-026-01:

ATM cybersecurity should be operated from dedicated zones having dedicated physical and logical security perimeter.

Additional information: zones are to be defined in accordance with "zones and conducts" principles defined in IEC 62443.

Requirement ATMSP-027-01:

ANSP CD ATM cybersecurity should protect against the exploitation of technical vulnerabilities on IT, OT, IACS and CNS/ATM infrastructure.

Requirement ATMSP-028-01:

ATM cybersecurity should forbid the use of personal mobile for regular CNS/ATM activities.

Requirement ATMSP-029-01:

ATM cybersecurity should ensure that professional mobile devices do not constitute an unacceptable risk to security
(as per Chapter 7 Risk Management).

14. Communications Security

Requirement ATMSP-030-01:

ATM cybersecurity should maintain an up to date mapping of networks and their interconnections.

Requirement ATMSP-031-01:

ATM networks should be logically or physically segregated based on their criticality regarding safety and operability.

Requirement ATMSP-032-01:

ATM cybersecurity should ensure that wireless technologies and access to the Internet do not constitute an unacceptable risk to safety and security (as per Chapter 7 Risk Management).

15. System Acquisition, Development and Maintenance

Requirement ATMSP-033-01:

ATM cybersecurity should ensure that information security is an integral part of CNS/ATM systems throughout the entire lifecycle.

Additional information: This also includes the requirements for information systems which provide ATM services over public networks.

Requirement ATMSP-034-01:

ATM cybersecurity should ensure that CNS/ATM systems are designed based on the following principles (list not exhaustive):

- No single, nor common point of failure;
- Definition and implementation of security coding rules;
- Vulnerability management on COTS software and hardware;
- Implementation of industry standards and recommendations (NIST, OWASP, …).

16. Suppliers and Partners Relationships

Requirement ATMSP-035-01:

ATM cybersecurity should provide End-to-End security from supply chain to partners in the scope of CNS/ATM
cybersecurity management to cover all CNS/ATM systems.

Requirement ATMSP-036-01:

ATM cybersecurity should ensure relationships with external entities do not constitute an unacceptable risk (as per
Chapter 7 Risk Management).

17. Security Incident Management

Requirement ATMSP-037-01:

ATM cybersecurity should ensure a consistent and effective approach to the management of CNS/ATM

Cybersecurity incidents, including communication on security events and weaknesses.

Requirement ATMSP-038-01:

Safety and Business Continuity should be the main priorities of ATM Cybersecurity incident management.

18. Security Aspects of Business Continuity Management

Requirement ATMSP-039-01:

ATM Business continuity should be designed in accordance with Risk Management outcomes.

Requirement ATMSP-040-01:

ATM cybersecurity should establish a consistent, effective and common strategy to manage CNS/ATM security and safety through integration of all Stakeholders with common efforts, sharing information, to complete their operational objectives.

19. Protection of Personal Data

Requirement ATMSP-041-01:

ATM cybersecurity should ensure the privacy and protection of personally identifiable information in accordance with
applicable regulations.

20. Compliance

Requirement ATMSP-042-01:

CNS/ATM information systems should receive recognized security validation qualification before entry into service in compliance with ED 205 Process standard for Air Traffic Management / Air Navigation Services (ATM/ANS) ground systems security aspects of certification/declaration.

Additional information: recognised accreditation process is to be defined at the national level and made applicable for critical infrastructures)

Requirement ATMSP-043-01:

CNS/ATM information systems security validation should be on a regular basis.

Requirement ATMSP-044-01:

ATM cybersecurity should ensure that any deviation, detected through the validation process, does not constitute an unacceptable risk (as per Chapter 7 Risk Management).

Referenced Documents

Reference	Title	Issue	Date
ISO27001-2013	Information Security Management	2013	
ISO27002-2013	Information technology – Security techniques	2013	
NIST SP 800-53	Security and Privacy Controls for Federal Information	R4	2015
IEC-62443	Industrial Network and Systems Security		
Doc 9985	Air Traffic Management Security Manual	1	2013
	Aviation Cybersecurity Strategy – ICAO		Oct 2019
ED-205	Process standard for Air Traffic Management / Air Navigation Services (ATM/ANS) ground systems security aspects		Mar 2019
	Reference: Manual for National ATM Security Oversight	2.0	Oct 2013
	Strategy for Cybersecurity in Aviation (European	1.0	Sep 2019
CANSO	CANSO Cyber Security and Risk		Jun 2014
CANSO	Assessment Guide		Sep 2020
	CANSO Cyber Risk Assessment Guide		

Terms and Definition

Reference	Title
ASSET	An asset is anything the organization puts value in. The term asset encompasses, but is not limited to personnel, digital values, information technology resources, technological legacy, facilities, interconnected industrial and automated controlled systems or operational technology, products, programs, information security assessments and branding. Assets can be categorized as follows:
ATM	Air Traffic Management
ATM Security	ATM Cybersecurity organization, management and activities involved in the protection of ATM
CNS/ATM	Communications, navigation, and surveillance systems, employing digital technologies, including satellite systems together with various levels of automation, applied in support of a seamless global air traffic
IACS	Interconnected Industrial and Automated Controlled Systems [based on:
IT	Information Technology
IUEI	A circumstance or event with the potential to affect an aircraft due to human action resulting from unauthorized access, use, disclosure, denial, disruption, modification, or destruction
Operability	Operability is the ability to keep a piece of equipment, a system or a whole industrial installation in a safe and reliable functioning condition, according to pre-defined operational requirements.
OT	Operational Technology
Risk	Combination of the probability of an event and its consequence. [based on: ISO27000-2018 and NIST SP 800-53-r4] A measure of the extent to which an entity is threatened by a potential circumstance or event, and typically a function of: • the adverse impacts that would arise if the circumstance or event occurs; and • the likelihood of occurrence. Note: Information system-related security risks are those risks that arise from the loss of confidentiality, integrity, or availability of
Safety	ICAO Doc 9859: Safety is the state in which the possibility of harm to persons or property damage is reduced to, and maintained at or below, an acceptable level through a continuing process of hazard

Vulnerability	Weakness in an information system, system security procedures, internal controls, or implementation that could be exploited or triggered by a threat source. [CNSS Inst. 4009, Adapted] [Source: NIST SP800-53, Rev 2] A flaw or weakness in system security procedures, design