



ICAO

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INFORMATION PAPER

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**Fourth Meeting of Rapporteurs of the North American, Central American, and Caribbean
(NACC/WG/RAP/04)
Online, 6-7 May 2026**

Agenda Item 2: Follow-up to Conclusions, Decisions, previous agreements and the Work Programme of the NACC/WG, CAR/SAM Planning and Implementation Regional Group (GREPECAS) and regional initiatives related to air navigation

AIR NAVIGATION INITIATIVES UNDER MCAAP PROJECT

(Presented by Secretariat)

EXECUTIVE SUMMARY

This Information Paper presents key elements of air navigation modernization in the NAM/CAR Regions, including ADS-B, CPDLC, ADS-C, AIDC, GNSS resilience, and SBAS. It highlights operational benefits, implementation challenges, and the need for regional coordination. The paper emphasizes the importance of performance-based planning aligned with ICAO GANP. It also outlines strategic actions to support States in decision-making and implementation. Regional cooperation remains essential to ensure safe, efficient, and resilient air navigation systems.

Strategic Objectives:

- Safety
- Air Navigation Capacity and Efficiency
- Environmental Protection

References:

- Tenth Meeting of the North American, Central American and Caribbean Working Group (NACC/WG/10) Tulum, Mexico, September 8-12, 2025

1. Introduction

1.1 The modernization of air navigation systems is a critical priority for the NAM/CAR Regions to enhance safety, efficiency, capacity, and environmental sustainability. The evolution towards advanced CNS technologies, including ADS-B, CPDLC, ADS-C, and AIDC, represents a fundamental shift from conventional systems to performance-based and satellite-supported operations.

1.2 increasing dependency on Global Navigation Satellite Systems (GNSS) introduces new vulnerabilities, particularly related to interference, requiring the development of resilience mechanisms such as Monitoring Operational Networks (MON).

1.3 Additionally, Satellite-Based Augmentation Systems (SBAS) are emerging as a strategic enabler to enhance GNSS performance, supporting advanced navigation capabilities and improving operational safety.

1.4 This paper provides an overview of these technologies, their operational impact, and the strategic considerations for their implementation at the regional level.

2. Discussion

2.1 *Air Navigation Modernization Technologies*

2.1.1 The implementation of advanced CNS technologies is transforming air traffic management:

- ADS-B (Automatic Dependent Surveillance–Broadcast): Enables real-time aircraft position reporting with high accuracy, improving surveillance and situational awareness.
- CPDLC (Controller-Pilot Data Link Communications) and ADS-C: Provide digital communication capabilities, reducing reliance on voice and improving efficiency and safety.
- AIDC (ATS Interfacility Data Communication): Facilitates automated coordination between air traffic control units, reducing workload and minimizing errors.

2.1.2 These technologies contribute to:

- Enhanced safety through improved situational awareness
- Increased airspace capacity
- Reduced controller workload
- Optimized flight trajectories and fuel efficiency

2.2 *GNSS Interference and Need for Resilience*

2.2.1 The increasing reliance on GNSS-based operations introduces risks associated with:

- Intentional interference (jamming and spoofing)
- Unintentional interference from electronic systems
- Atmospheric disturbances

2.2.2 These risks can result in:

- Degradation of surveillance services
- Navigation disruptions
- Increased operational safety risks

2.2.3 To mitigate these challenges, the development of a Minimum Operational Network (MON) is essential to ensure continuity of navigation services during GNSS outages.

2.3 ***Frequency Management and Regional Coordination***

2.3.1 Effective spectrum management is critical to ensure reliable CNS operations.

2.3.2 The regional initiative for frequency validation aims to:

- Harmonize aeronautical frequency data
- Reduce interference risks
- Strengthen preparation for international processes such as WRC-27
- Establish a reliable regional frequency database

2.3.4 This initiative reinforces the importance of coordinated regional action and data quality assurance.

2.4 ***SBAS as a Strategic Enabler***

2.4.1 Satellite-Based Augmentation Systems (SBAS) enhance GNSS performance by providing:

- Accuracy improvements
- Integrity monitoring
- Reliability for safety-critical operations

2.4.2 Operational benefits include:

- Support for approach procedures with vertical guidance (LPV)
- Reduced dependence on ground-based navigation aids (e.g., ILS)
- Improved access to remote aerodromes
- Enhanced safety and operational efficiency

2.4.3 However, SBAS implementation presents challenges:

- Infrastructure and investment requirements
- Need for regional governance frameworks
- Multi-State coordination and financing models

2.4.4 SBAS should therefore be considered as a strategic, long-term regional initiative supporting performance-based navigation and resilience.

2.5 ***National Air Navigation Planning and Strategic Alignment***

2.5.1 The successful implementation of these technologies requires integration into National Air Navigation Plans (NANPs), ensuring:

- Alignment with ICAO Global Air Navigation Plan (GANP)
- Interoperability across regions
- Performance-based planning with measurable KPIs
- Strong stakeholder coordination

2.5.2 A structured roadmap, supported by regional cooperation and ICAO guidance, is essential for effective implementation.

3. **Conclusion**

3.1 Advanced CNS technologies and GNSS-based systems are key enablers for the modernization of air navigation in the NAM/CAR Regions. While these technologies provide significant benefits in safety, efficiency, and capacity, they also introduce new challenges related to system resilience, coordination, and investment.

3.2 The integration of SBAS, GNSS monitoring, and digital communication systems must be approached through a coordinated regional strategy aligned with ICAO provisions and GANP. Strengthening regional collaboration, enhancing planning mechanisms, and ensuring performance-based implementation will be critical to achieving sustainable and resilient air navigation systems.

4. **Suggested Actions**

4.1 The Meeting is invited to note the information presented under this information paper.