



**INTERNATIONAL CIVIL AVIATION ORGANIZATION
WESTERN AND CENTRAL AFRICAN OFFICE**

**Sixth Meeting of the APIRG Communications, Navigation
and Surveillance Sub-group (CNS/SG/6)**

Dakar, Senegal, 18–22 May 2015

Agenda Item 4: Review of the status of implementation of CNS/SG Work Programme and related Task forces/Working Groups as assigned by APIRG

Outcome of the Fourth Meeting of the Performance Based Navigation/Global Navigation Satellite System Task Force (PBN/GNSS TF/4)

(Presented by the Secretariat)

Summary

This paper discusses the strategy for the introduction of GNSS in the AFI Region as adopted by the APIRG, in view of recent developments at global and regional level.

Action by the meeting is at **paragraph 3**.

References

- Doc 9750 (Global Air Navigation Plan)
- APIRG/16 -19 Reports

This Working Paper is related to Strategic Objectives: **A**

1. Introduction

The Fourth Meeting of the Performance Based Navigation/Global Navigation Satellite System Task Force (PBN/GNSS TF/4) was held at the ICAO Western and Central African Regional Office (WACAF), Dakar, Senegal from 3 to 6 December 2013.

2. Discussion

2.1 The meeting was provided with the outcome of the ICAO 12th Air Navigation Conference held in Montreal, Canada from 19 to 30 November 2012 related to GNSS.

The meeting was briefed on the evolution of the core constellation in particular the current deployment by United States of a modern global positioning system (**GPS**) satellites with L1C/A and L5 signals and improved military encrypted signals that will enable civil and authorized State aircraft with modernized equipment to remove ionosphere induced errors and take advantage of increased performance and robustness.

2.2 The meeting was updated on the evolution of the Russian **GLObal Navigation Satellite System (GLONASS)** operating with a stable constellation of twenty-four GLONASS-M satellites, with additional back-up satellites and on the ongoing work to develop a new generation of GLONASS-K satellites.



2.3 The meeting also noted the progress made by the European Union in the development of **Galielo** planned to be fully deployed in 2020 and the development of the China **BeiDou**, GNSS constellation system planned to be fully operational on 2020.

2.4 The meeting considered **Recommendation 6/5 (ICAO work programme to support global navigation satellite system evolution)** of ICAO 12th AN Conference requesting ICAO to undertake a work programme to address interoperability of existing and future global navigation satellite system constellations and augmentation systems, identify operational benefits to enable air navigation service providers and aircraft operators to quantify these benefits for their specific operational environment and continue the development of Standards and Recommended Practices and guidance material for existing and future global navigation satellite system elements and encouraging the development of industry standards for avionics.

2.5 The meeting noted **Recommendation 6/6 (Use of multiple constellations)** of the Conference calling upon States to take advantage of the improved robustness and availability enabled by multiple global navigation satellite system constellations and associated augmentation systems and encouraging them to publish information specifying the GNSS elements they approve for use in their airspace and to adopt a performance-based approach with regard to the use GNSS.

2.6 The meeting was provided with the outcome of the 12th Air navigation conference related to the Ionospheric Effects on GNSS Aviation Operations. Emphasis was made on Recommendation 6/9 (**Ionosphere and space weather information for future global navigation satellite system implementation**) of the Conference requesting ICAO to coordinate regional and global activities on ionosphere characterization for global navigation satellite system implementation and States to consider a collaborative approach to resolve ionospheric issues including ionospheric characterization for cost-effective, harmonized and regionally suitable GNSS implementation and formulated conclusion 4/04 that reads as follows:.

CONCLUSION 4/04: REVIEW OF THE AFI GNSS STRATEGY IN LINE WITH THE RECOMMENDATIONS OF ICAO 12th AN-CONFERENCE

That:

When reviewing and implementing the AFI GNSS strategy and Plan AFI States consider the advantage of the improved robustness and availability enabled by multiple GNSS constellations and associated augmentation systems and develop the appropriated relevant regulation for cost effective use of core and augmented GNSS.

The meeting was briefed on APIRG meetings relevant conclusions and decision since APIRG/16 meeting. Focus was made on the last APIRG/19 Conclusion 19/28 (**Assessment of GNSS vulnerabilities**) and Conclusion 19/29 (**Impact Analysis of the implementation of GNSS/SBAS in the AFI Region**)

2.7 The meeting was informed on the main components of the AFI Air Navigation System Implementation Action Plan consisting in the implementation of ICAO Aviation Systems Blocks Upgrades (ASBU) applicable block 0 Modules.

It was agreed that the timelines of the AFI GNSS strategy and Plan should be aligned with those related to the implementation of GNSS contained in the action Plan and the following conclusion was formulated:.

CONCLUSION 4/05: Alignment of the timelines of the AFI GNSS Strategy with those related to the implementation of GNSS elements under ASBU Block 0 Module B0-APTA

That:



The timelines of the AFI GNSS Strategy be aligned with those related to the implementation of GNSS elements under ASBU Block 0 Module B0-APTA as contained in the Regional Air Navigation System Implementation Action Plan line with the Global Air Navigation Plan Technology Roadmap for air navigation systems.

2.8 The Task Force consider the composition of the participants and noted the low pace of attendance of engineers to its sessions.

2.9 The meeting noted also that the current organization of the Task Force sessions does not give enough opportunity for technical consistent consideration and discussion on GNSS technology although important topics such as GNSS vulnerabilities risen up by the ICAO 12th Air Navigation Conference need to be addressed.

It was proposed that the future meetings of the Task Force be organized with two specialized sessions on PBN and GNSS with a plenary session.

3 Actions by the meeting

The meeting is invited to:

- a) Take note of the Information given above;
- b) Identify the best mechanisms to address GNSS technical issues in the APIRG new structure and framework
- c) Accordingly identify the remaining tasks related to GNSS planning and implementation in the work programme of the future AAPIRG Sub Groups.