



*International Civil Aviation Organization*

**Middle East Air Navigation Planning and  
Implementation Regional Group (MIDANPIRG)**

**Fourteenth Meeting**

*(Jeddah, Saudi Arabia, 15-19 December 2013)*

**Agenda Item 4: Performance Framework for Regional Air Navigation Planning and  
Implementation  
4.6 CNS/ATM**

**GNSS IMPLEMENTATION IN THE MID REGION**

*(Presented by the Secretariat)*

**SUMMARY**

This paper presents the GNSS Strategy and other related issues in the MID Region.

Action by the meeting is at paragraph 3.

**REFERENCES**

- CNS/ATM/IC SG/7 Report
- MIDANPIRG/13 Report
- PBN/GNSS TF/5 Report

**1. INTRODUCTION**

1.1 The The Fifth Meeting of the Performance Based Navigation/Global Navigation Satellite System Task Force (PBN/GNSS TF/5) was held at the ICAO MID Regional Office in Cairo, Egypt, 15 – 17 April 2013. The meeting was attended by a total of thirty five (35) participants from eight (8) States and one (1) International Organization.

1.2 The seventh meeting of the MIDANPIRG CNS/ATM/IC SG was held at the ICAO MID Regional Office in Cairo, Egypt, 07 October – 09 October 2013.

**2. DISCUSSION**

2.1 The meeting may wish to recognize that frequency interference-free operation of Global Navigation Satellite System (GNSS) is essential, and that the frequency band 1559 - 1610MHz, is used for elements of GNSS.

2.2 The meeting may recall that the International Telecommunication Union (ITU) process, allows under footnotes No. 5.362B and 5.362C the operation of fixed service in some States on a secondary basis until 1 January 2015. The continued use by the fixed service constitutes a severe constraint on the safe and effective use of GNSS in some areas of the world, as distances of up to 400km between the stations of the fixed service and the aircraft is required to ensure safe operation of

GNSS. In this respect, it was highlighted that ten (10) States at the global level have removed their names from footnotes 5.362B and 5.362C during WRC-12. This was a significant step forward towards achieving better worldwide protection of GNSS.

2.3 The meeting may also recall that MIDANPIRG/13 urged the following MID States (Iraq, Jordan, Qatar, Sudan, Syria and Yemen) to delete their names from the footnotes 5.362B and/or 5.362C and agreed to the Conclusion 13/44: Protection of GNSS Signal. In this respect, ICAO MID Regional Office issued State Letter AN 6/28-12/216 dated 18 July 2012, and the following States replied (Jordan, Kuwait, Oman, and Qatar).

2.4 The CNS/ATM/IC SG/7 meeting reiterated the importance of protection of the GNSS Signal and urged Iraq, Jordan, Qatar, Sudan Syria and Yemen to have their names removed from footnotes 5.362B and/or 5.362C in coordination with their States spectrum regulatory authorities, according to the ITU procedures.

2.5 The PBN/GNSS TF/5 and CNS/ATM/IC SG/7 meetings recalled that the 12th Air Navigation Conference (AN-Conf/12) noted the status of implementation for different Global Navigation Satellite System (GNSS) constellations and augmentations systems, mainly the modernization of Global Positioning System (GPS), Global Navigation Satellite System (GLONASS), Galileo GNSS constellation, BeiDou system, EGNOS, and GAGAN. The AN-Conf/12 discussed the introduction of multi-constellation, multi-frequency GNSS that will entail number of new technical and regulatory challenges beyond those already associated with current GNSS implementation.

2.6 It was highlighted that ACAC are persuading the SBAS Implementation in the Regions of ACAC and ASECNA (SIRAJ) project which is based on EGNOS extension. Furthermore, Egypt has adopted an initiative to establish a Regional Aeronautical Mobile Satellite (Route) System to provide Aeronautical Safety Communication, Navigation and Surveillance/Air Traffic Management Services over Africa and Middle East Regions; the initiative is called "NAVISAT".

2.7 The CNS/ATM/IC SG/7 meeting was also apprised of other ICAO Regions activities related to PBN in order to harmonize the implementation between regions and share experiences. It was noted that all regions are conducting Regional Seminars and Workshop related to PBN and GNSS. In this regard, the meeting encouraged States to conduct Workshop/Seminars at National level.

2.8 As follow-up to MIDANPIRG/13 Conclusion 13/46 – *GNSS Survey*, the PBN/GNSS TF/5 meeting noted that several States replied to the survey. The results of the survey indicated that:

- many States are planning for Ground Based Augmentation System (GBAS) installation;
- the following States (Egypt, Iran, Jordan, and Syria) did not complete the decommissioning of NDBs.

2.9 The meeting encouraged these States to properly plan for the decommissioning of NDBs and updated the GNSS implementation Strategy to indicate decommissioning of NDB by 2014.

2.10 The meeting was apprised of the following AN-Conf/12 Recommendations related to GNSS:

- *Recommendation 6/7–Assistance to States in Mitigating Global Navigation Satellite System Vulnerabilities*
- *Recommendation 6/8 –Planning for Mitigation of Global Navigation Satellite System Vulnerabilities*

- *Recommendation 6/9 – Ionosphere and Space Weather Information for Future Global Navigation Satellite System Implementation*
- *Recommendation 6/10 – Rationalization of Terrestrial Navigation Aids*

2.11 Based on the above the CNS/ATM/IC SG/7 meeting reviewed and updated the MID Region GNSS Implementation Strategy as at **Appendix A** to this working paper and agreed to the following Draft Conclusion:

<b>Why</b>	Harmonized GNSS Implementation
<b>What</b>	Updated MID GNSS Strategy
<b>Who</b>	MIDANPIRG/14
<b>When</b>	19 December 2013

***DRAFT CONCLUSION 7/4: MID REGION GNSS IMPLEMENTATION STRATEGY***

*That, the MID Region GNSS implementation Strategy be updated as at **Appendix 5A** to the Report on Agenda Item 4.6.*

**3. ACTION BY THE MEETING**

3.1 The meeting is invited to:

- a) urge concerned States to delete their names from the footnotes 5.362B and/or 5.362C;
- b) urge States to provide enough protection to GNSS signal frequency band;
- c) encourage MID States to share their experience in GNSS implementation and conduct workshop seminars at national level; and
- d) endorse Draft Conclusion in para 2.8.

-----

## APPENDIX A

### MID REGION GNSS IMPLEMENTATION STRATEGY

The following is the MID Region GNSS Implementation Strategy:

Considering:

- a) Safety is the highest priority;
- b) Global Air Navigation Plan 4<sup>th</sup> edition defines GNSS as the core technology that has led to the development of Performance Based Navigation (PBN);
- c) GNSS is the basis for future improvements in navigation services;
- d) Standards and Recommended Practices (SARPs), PANS, and guidance material for GNSS implementation are available;
- e) human, environmental, availability of avionics, capabilities and the level of user equipment and economic factors will affect the GNSS implementation;
- f) developments of GNSS systems including new satellite constellations, augmentation systems and improvement in system performance;
- g) airworthiness and operational approvals allowing the current GNSS applied for en-route and non-precision approach phases of flight without the need for augmentation services external to the aircraft;
- h) the effects of ionosphere on GNSS and availability of mitigation techniques;
- i) the implementation of GNSS in the operations as foreseen in the MID Region PBN implementation strategy and plan;
- j) the monitoring of the GNSS signal according to Annex 10, Doc 9849 and other related ICAO documents;
- k) the AN-Conf/12 recommendations 6/5, 6/6, 6/7, 6/8 and 6/9; and
- l) the working document for the Aviation System Block Upgrade.

The general strategy for the implementation of GNSS in the MID Region is detailed below:

- 1) Introduction of GNSS navigation capability should be consistent with the Global Air Navigation Plan;
- 2) implementation of GNSS and augmentations systems should be in full compliance with ICAO Standards and Recommended Practices and PANS;
- 3) assessment of the extent to which the GNSS system accessible in the Region can meet the navigational requirements of ATM service providers and aircraft operators in the Region;
- 4) implementation of RNAV and RNP operations for en-route and terminal areas-according as follows:
  - implementation of approach procedures with vertical guidance (APV) (Baro VNAV and/or augmented GNSS), including LNAV-only minima, for all instrument runway ends, either as the primary approach or as a back-up for precision approaches by
  - implementation of straight-in LNAV-only procedures, as an exception to above, for

instrument-runways at aerodromes where there is no local altimeter setting available and where there are no-aircraft suitably equipped for APV operations;

- 5) States, in their planning and introduction of GNSS services, take full advantage of future benefits accrued from using independent core satellite constellations, other GNSS elements and their combinations, and avoid limitations on the use of specific system elements;
- 6) facilitate the use of GNSS; as enabler for PBN for en-route, terminal, approach and departure navigation;
- 7) States should coordinate to ensure that harmonized separation standards and procedures are developed and introduced concurrently in adjacent flight information regions along major traffic flows to allow for a seamless transition to GNSS based navigation;
- 8) States should to the extent possible work co-operatively on a multinational basis to implement GNSS in order to facilitate seamless and inter-operable systems;
- 9) States should undertake education, training and R&D programs to provide necessary knowledge in PBN, GNSS, augmentation systems and operational application;
- 11) States, in their planning for implementation of GNSS services, provide effective spectrum management and protection of GNSS frequencies to reduce the possibility of unintentional interference;
- 12) during transition to GNSS, sufficient ground infrastructure for current navigation systems must remain available. Before existing ground infrastructure is considered for removal, users should be given reasonable transition time to allow them to equip accordingly;
- 13) States should approach removal of existing ground infrastructure with caution to ensure that safety is not compromised, such as by performance of safety assessment, consultation with users through regional air navigation planning;
- 14) States should plan for complete decommissioning of NDBs by 2014;
- 15) implement GNSS with augmentation as required for APV where operationally required in accordance with the MID Regional and National PBN Implementation plans;
- 16) States continue their efforts to implement GNSS applications for en-route, APV and TMA operations. Attention should be accorded to meeting all GNSS implementation requirements, including establishment of GNSS legislation, regulatory framework, and approval procedure; and
- 17) introduce rationalizing terrestrial navigation aids, retaining a minimum network of terrestrial aids necessary to maintain safety of aircraft operations; in accordance with AN-Conf/12 recommendation 6/10.