



**INTERNATIONAL
CIVIL AVIATION
ORGANIZATION**



Minimum Navigation Operational Network (NAV MON)

Muna Alnadaf/ Technica Officer CNS
Air Navigation Bureau/ ICAO HQ

CNS SG/15 Meeting
Doha- Qatar
11-15 May 2026



GANP- NAV MON

- The introduction of new element in the GANP “Navigation Minimal Operating Networks” (NAVS B0/4)
- NAVS B0/4 has been classified as priority 1 in the revised MID Region Air Navigation Strategy (MID Doc 002).
- NAV MON, according to the GANP, aims to rationalize the conventional Navigational aids network through the increased deployment of the satellite based navigation system.
- To assist States with implementation, MIDANIRG/18 agreed on the need to develop a template for NA MON plan in line with ICAO SARPs and Regional requirements.

MIDANPIRG DECISION 18/42: NAV MON PLAN AD-HOC ACTION GROUP

That, the NAV. MON Plan Ad-hoc Action Group be:

a) established to develop a template for NAV MON Plan to be presented to the CNS SG/11 for further review and enhancement;

b) Composed of:

Mr. Saleh Al-Harthy (Oman, CNS SG Chairman)

Mr. Ahmed Abdelwahab (Egypt)

Ms. Amena Dodin (Jordan)

Mr. Khaled Eltanany (Oman)

Mr. Khaled Al-Harby (Saudi Arabia)

Mr. Jacob Avis (UAE)

Mr. Jehad Al-Faqir (IATA)

ICAO MID Office

MIDANPIRG/20- NAV MON

- The progress made by the NAV MON AG was noted by the MIDANPIRG/20
- Four (4) States (Egypt, Jordan, Oman and UAE) have volunteered to populate their data in the proposed plan template and provide feedback to the CNS SG/13 meeting.
- The meeting tasked the ATM, CNS and PBN Sub-groups to review and improve the Draft NAV MON plan template to be presented for MIDANPIRG/21 for further review and endorsement.

MIDANPIRG DECISION 20/46: NAV MON Plan Template

That, in order to develop the NAV MON Plan template, the ATM SG, CNS SG and PBN SG be tasked to review and update, as deem necessary, the NAV MON Plan Template to be presented to MIDANPIRG/21 for further review and endorsement.

MIDANPIRG/21- NAV MON

- PBN SG submitted their input to the template to be finalized during CNS SG/13

MIDANPIRG CONCLUSION 21/26: NAV MON Plan Template

That, the CNS SG in coordination with ATM SG and PBN SG review and update, as deem necessary, the NAV MON Plan Template to be presented to MIDANPIRG/22 for endorsement.

MIDANPIRG DECISION 22/20: MID NAV-MON ACTION GROUP

That,

- a) NAV-MON Action Group be established to develop a proposal for a Regional Navigational Minimum Operational Network supporting the ANS operations;
- b) the terms of reference of the NAV-MON Action Group be developed during the first meeting of the Action Group; and
- c) States support the NAV-MON Action Group through the assignment of CNS and ANS Subject matter experts and sharing states' experience and provision of required data for developing the MID NAV-MON Network



AN-COCONF/14

14th Air Navigation Conference

26 August to 6 September 2024 | Montréal, Canada

Recommendation 2.2/2 – Addressing GNSS Interference & Contingency Planning

State Responsibilities

- Implement **effective GNSS RFI mitigation measures** based on ICAO and industry guidance
- Maintain **sufficient network of conventional navigation aids** for operational safety
- Develop **regional GNSS reporting procedure** through planning and implementation regional groups (PIRGs)
- Collaborate with industry to make aircraft systems more **resilient to RFI events**
- Review aircraft **minimum equipage lists** to ensure compatibility with implemented minimum operational networks

Resilient Navigation Operational Network (NAV RON)

- ✓ The RON concept evolves from the navigation minimal operational network (NAV MON) to ensure operational safety and continuity during GNSS RFI
- ✓ Optimize deployment of terrestrial navigation aids based on traffic density, operational requirements, and aircraft capabilities
- ✓ Better utilize combinations of available conventional terrestrial navigation aids to support GNSS reversion during disruptions:
 - 1) as redundant aids to support PBN navigation specifications and enable cross-check with GNSS
 - 2) as contingency support to facilitate pilot positional awareness and/or
 - 3) as already well established, as infrastructure for conventional Instrument Flight Procedures (IFP).



NSP.010.01		Resilient Navigation Operational Network (High Priority)			
ID	Document Affected	Description of Amendment proposal or Action	Status	Delivery Date	Remarks
10808	Actions	Improve aeronautical charts to optimise navigation infrastructure utilization by incorporating (or restoring) chart annotations that enable VOR/DME crosschecks or facilitate ILS intercept	On schedule	Q4 2027	Initiated (PANS-AIM, IFPP)
10809	Actions	Identify how to maintain route spacing within mix of conventional and PBN procedures to support operations during GNSS reversion	On schedule	Q4 2027	Needs OPS Experts – not started yet
10810	Actions	Define digital data that enable aircraft and aircrew to understand what level of infrastructure is provided which supports a given PBN procedure and avoid specifying GNSS only as appropriate	On schedule	Q4 2027	Initiated (PANS-AIM, IFPP)
10812	Actions	Clarify criteria related to DME facility selection and tuning for PBN to ensure that available infrastructure gets used for continued operation in case of GNSS reversion.	On schedule	Q4 2027	Liaison with RTCA SC227 / EUROCAE WG85, SESAR MIAR Project
10813	Actions	Develop methods for network pulse load assessment to optimize facility planning, to ensure satisfactory service of a given density of a DME network for a given set or density of traffic	On schedule	Q4 2027	First WP's
10807	Actions	Provide guidance as appropriate to maintain safe and efficient operations in case of GNSS degradations	On schedule	Q4 2030	Needs OPS Input – some experience but format not so clear yet
10811	Actions	To develop the RON CONOPS and the inter-relation between the two concepts, MON and RON	On schedule	Q4 2030	First WP (JWG15)
10814	Actions	Identify relevant document to be updated and develop subsequential amendments.	On schedule	Q4 2030	Not started yet – linked especially to ID 10807



ICAO 42nd Assembly Resolution

Resolution A42-8, Appendix C
(Updated Resolution A41-8)

ICAO Policy on GNSS Resilience

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Included operative clause on NAV RON “.... . *Encourages States to ensure that **sufficient resilient** terrestrial CNS capabilities remain available*”



Action by the meeting:

The meeting is invited to discuss means to assist States with the implementation of NAV MON, in order to maintain safe navigation and enable aircraft to safely proceed to and land at an airport during disruptions caused by RFI, taking into consideration the previous efforts undertaken to develop the NAV MON template.

Thank You

