



Twelfth Meeting of the MIDANPIRG Communication, Navigation and  
Surveillance Sub-Group (CNS SG/12)  
(Amman, Jordan, 2-4 May 2023)



# Navigation Minimal Operating Networks (NAV. MON)

# ASBU Elements

## NAVs Threads

NAVS-B0/1	Ground Based Augmentation Systems (GBAS)	Technology	  
NAVS-B0/2	Satellite Based Augmentation Systems (SBAS)	Technology	  
NAVS-B0/3	Aircraft Based Augmentation Systems (ABAS)	Technology	  
NAVS-B0/4	Navigation Minimal Operating Networks (Nav. MON)	Technology	  
NAVS-B1/1	Extended GBAS	Technology	  
NAVS-B2/1	Dual Frequency Multi Constellation (DF MC) GBAS	Technology	  
NAVS-B2/2	Dual Frequency Multi Constellation (DF MC) SBAS	Technology	  
NAVS-B2/3	Dual Frequency Multi Constellation (DF MC) ABAS	<sup>2</sup> Technology	  

- During MIDANPIRG the element “Navigation Minimal Operating Networks” (NAVS B0/4) has been classified as priority 1 in the revised MID Region Air Navigation Strategy ( ICAO MID Doc 002).

NAVS		Priority	Applicability	Performance Indicator
NAVS B0/1	Ground Based Augmentation Systems (GBAS )	Priority 2		
NAVS B0/2	Satellite Based Augmentation Systems (SBAS)	Priority 2		
NAVS B0/3	Aircraft Based Augmentation Systems (ABAS)	Priority 1	All States	Indicator: % of states requiring aircraft equipage with the ABAS to enable PBN operations
NAVS B0/4		Priority 1	All States	Indicator: % of states developed the plan of rationalized conventional navaids network to ensure the necessary levels of resilience for navigation  Supporting metric : Number of states that have developed a plan of rationalized conventional NAVAIDS network to ensure the necessary levels of resilience for navigation

**The average Regional implementation level of ASBU NAV B0/4 Element is 47%**

**Main Purpose** 

- To adjust conventional nav aids networks through the increased deployment of satellite based navigation systems and procedures to ensure the necessary levels of resilience for navigation.
- To provide a minimum level of capabilities to accommodate State aircraft operations where there is a mismatch in terms of aircraft equipage.
- To make a more efficient use of the frequency spectrum

**New Capabilities**  Provision of a navigation backup.**Description** 

This element allows the rationalization of the ground based conventional infrastructure through the definition of minimal networks of ground nav aids. Consultations and agreements from airspace users and aircraft operators are required to define this element.

The MON should be revisited with the introduction of new navigation capabilities.

**Maturity Level**  Ready for implementation

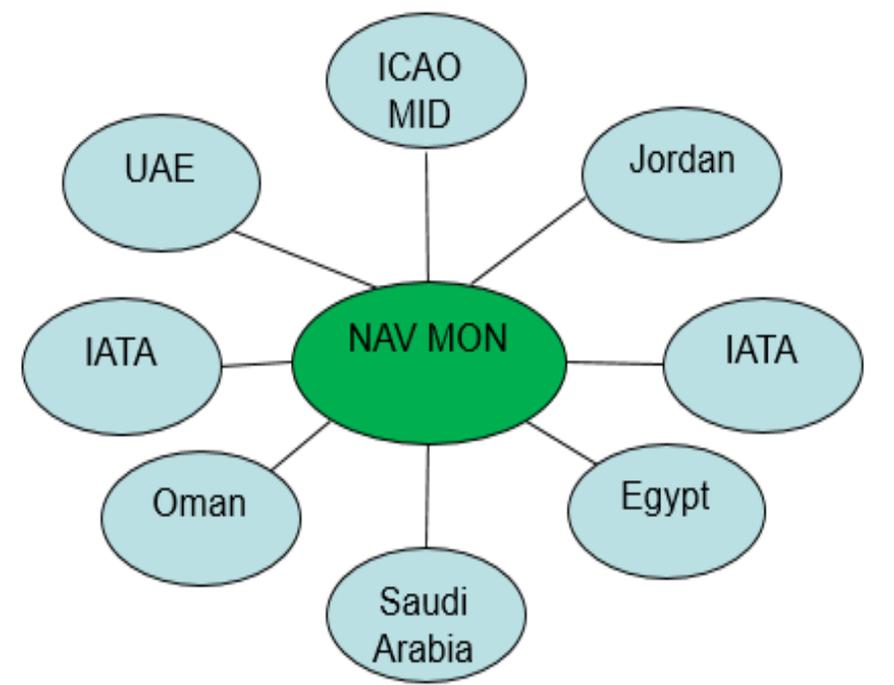
Consultations and agreements from airspace users and aircraft operators are required to define this element  
And to mitigate the withdrawal of existing ground networks.

# NAV MON Action Group

- MIDANPIRG/18 (*Virtual Meetings, 15 - 22 February 2021*)

Decision 18/42, agreed to establish NAV MON ad-hoc action group to develop a template for Navigation Minimal Operating Networks (Nav. MON) plan in line with ICAO SARPs and Regional requirements.

NAV MOD AG established to develop the template to rationalize the conventional Navigational aids network through the increased deployment of the satellite based navigation system, composed of :



# NAV MON Template Layout

Para1 : Introduction

Para 2 : Performance-based navigation impact on NAVAID infrastructure planning

Para 3.1 Ground based Navigation

Para 3.2 Space based Navigation

Para 3.3 Navigation Minimal Operating Networks

## Para 3.1 Ground based Navigation :

list of NAV facilities

Type of NAV facility	Location	ID	Phase of flight (enroute, terminal, approach)	Range (NM)	Purpose of operation		Remark
					Normal operation	Contingency operation	
DVOR	QAIA	QAA	E,T,A	200	OJAI	RNAV5	
DME	QAIA	QAA	E,T,A	200	OJAI	RNAV5	Use in conjunction with DVOR
ILS							

## Para 3.2 Space based Navigation:

List of space-based operations ( all navigation specifications used in-state )

Operation Type / PBN Application	Phase of flight	NAV Facility(ies)			
		Normal operation	Augmentation	Contingency operation	Facility ID
<b>RNAV 5</b>	Enroute	GNSS	ABAS	DVOR/DME	QAA

### Para 3.3 Navigation Minimal Operating Networks:

List of the minimal navigation facilities required to ensure the necessary levels of resilience CNS infrastructure in a state.

Type of NAV facility	Location	ID	Range	Decommissioning Plan	
				Date	Replacing facility type
QAA DVOR\DME	QAIA	QAA	200		

## **Action by the Meeting:**

- The meeting invited States to develop their Navigation Minimal Operating Networks (Nav. MON) plan in line with ICAO SARPs and Regional requirements through the increased deployment of the satellite-based navigation system to ensure the necessary levels of resilience for navigation and maintain the safety of aircraft operations;
- Removal of conventional ground infrastructure should be planned carefully to ensure that safety is not compromised, such as by performance of safety assessment, and consultation with users through regional air navigation planning.
- Strategy For Rationalization Of Conventional Radio Navigation Aids And Evolution Toward Supporting Performance-based Navigation is at attachment H, Annex 10, Vol 1



# THANK YOU