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WORKING PAPER

ASSEMBLY — 42ND SESSION

TECHNICAL COMMISSION

Agenda Item 24: Aviation Safety and Air Navigation Priority Initiatives

IMPLEMENTATION OF A MINIMUM OPERATIONAL NETWORK (MON)

(Presented by Brazil)

EXECUTIVE SUMMARY

This working paper highlights the need for ICAO to develop global guidelines and harmonized criteria for the implementation of a minimum operational network (MON) to ensure safe and continuous air navigation. While presenting Brazil's comprehensive MON implementation plan as a reference, the paper emphasizes the lack of standardized criteria for defining strategic aerodromes, airspace volumes, and minimum ground infrastructure requirements, which may lead to fragmented and inefficient integrated responses.

Action: The Assembly is invited to:

a) prioritize the development of global guidelines and harmonized criteria for defining minimum operational networks (MON) under ICAO's work programme;
b) promote international coordination to ensure consistency in communications, navigation, and surveillance (CNS)/ air traffic management (ATM) resilience; and
c) encourage Planning and Implementation Regional Groups (PIRGs) to promote MON feasibility studies based on standardized criteria.

Strategic Goals:	This working paper relates to *Every Flight is Safe and Secure.*
Financial implications:	The ICAO activities referred to in this paper are expected to be undertaken within the resources available in the 2026-2028 Regular Budget.
References:	ICAO 41st Assembly Resolution A41-8 Doc 10209, *Report of the Fourteenth Air Navigation Conference* Doc 9750, *Global Air Navigation Plan* (GANP) PCA 100-5, Minimum Operational Network (MON) Implementation Plan, DECEA-Brazil

1. INTRODUCTION

1.1 ICAO has recognized the need for Member States to implement strategies leading to a more resilient navigation system, including ground-based contingency infrastructures.

1.2 In line with ICAO's ASBU NAVS-B0/4 and Resolution A41-8, Brazil has approved its National minimum operational networks (MON) Plan (PCA 100-5), designed to ensure operational continuity and resilience of the air traffic control system. While Brazil's plan provides a practical and replicable model, the absence of global guidelines on defining operational criteria and prioritizing infrastructure remains a critical gap, risking inconsistent regional or global responses.

2. DISCUSSION

2.1 The Fourteenth Air Navigation Conference (AN-Conf/14) reinforced that States maintain a sufficient network of conventional navigation aids to ensure safety and airspace capacity. Furthermore, it was directed that, through the mechanism of planning and implementation regional groups, they develop regional global navigation plan to increase operational awareness. However, criteria for what constitutes a MON remain undefined at the global level, leaving States to develop isolated solutions based on national interpretations.

2.2 In this context, Brazil has developed and approved the PCA 100-5, a comprehensive plan that establishes the structure, procedures and responsibilities for the implementation of a MON. The Plan aims to ensure the continuity and safety of air navigation operations, using ground-based navigation infrastructure and conventional procedures such as DME/DME, DME/DME/IRU, VOR/DME, ILS and SID OMNI.

2.3 Brazil has also invested in expanding the distance measuring equipment (DME) aid network, aiming to provide complementary/backup ground infrastructure for performance-based navigation (PBN) (relying on the use of aircraft inertial sensors).

2.4 The MON structure includes procedures for all phases of flight — departure, en-route, arrival, and approach — ensuring a robust contingency environment. The Plan also provides for radar vectoring and adjustment of aircraft separation when necessary, training of air traffic controllers and pilots, and the publication of NOTAM templates to inform stakeholders.

2.5 Taking this as an example, MON implementation should encompass:

a) strategic positioning of ground aids to cover critical traffic flows and major aerodromes;

b) development and publication of MON procedures;

c) revision of contingency plans by area control centres (ACC), approach control (APP), and the network management centres (CGNA);

d) training programmes and simulation exercises through air traffic control (ATC) simulation; and

e) continuous maintenance and periodic review of MON assets.

2.6 The Plan established operational criteria for defining aerodromes and airspace volumes of interest, prioritizing the implementation of navigation aids. These criteria include airport connectivity, neighbouring cities, the busiest airports, and other strategic aspects.

2.7 This MON implementation plan demonstrated that structured criteria—such as traffic flow prioritization, ranking of busiest aerodromes, and strategic positioning of DME/DME, VOR/DME, and ILS—can effectively guide investment and ensure readiness.

2.8 This experience underscores the urgency for ICAO to provide harmonized guidance to ensure consistency and interoperability among global MON initiatives. Without such guidance, there is a risk of fragmentation, inefficient allocation of resources, and uneven levels of operational resilience.

2.9 Furthermore, airlines require clear global criteria to adapt fleet capabilities for MON-based operations. It is important to emphasize the importance of airlines being prepared for this scenario of navigation based exclusively on ground aids, with aircraft equipped to operate with ILS, VOR/DME and DME/DME/IRU, ready to act as primary backup.

3. CONCLUSION

3.1 During the AN-Conf/14, one of the topics addressed and supported was the necessity of a MON. This network demands a globally coordinated approach to MON planning and implementation. Brazil's national experience shows that establishing clear operational criteria and phased implementation milestones is both feasible and effective; however, harmonized guidelines are necessary to ensure consistency, efficiency, and cross-border operational safety.

3.2 ICAO's leadership is crucial to avoid fragmented solutions and to strengthen global CNS/ATM resilience.

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