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Agenda Item 24: Aviation Safety and Air Navigation Priority Initiatives

CROSS-REGIONAL AIRSPACE OPTIMIZATION TO ENHANCE SAFETY, CAPACITY, AND EFFICIENCY OVER THE HIGH SEAS

(Presented by Oman and the United Arab Emirates)

EXECUTIVE SUMMARY

This paper highlights the need for a global and comprehensive cross-regional airspace optimization strategy over the high seas to enhance safety, capacity, and efficiency. With growing air traffic demand, inconsistencies in separation standards, and operational constraints at flight information region (FIR) boundaries, there is an urgent need to harmonize airspace structures, enhance coordination, and implement modern air traffic management (ATM) solutions. This paper builds upon previous ICAO planning and implementation regional groups (PIRGs) conclusions, national development efforts, and inter-regional discussions, proposing a global action plan to address key challenges and improve operational efficiency in oceanic and cross-regional airspace.

Action: The Assembly is invited to:

a) recognize the urgency of cross-regional airspace optimization to enhance safety, efficiency, and capacity over high seas;
b) request ICAO PIRGs with the support of ICAO Regional Offices to initiate and coordinate cross-regional initiatives supporting ATM harmonization;
c) encourage States and air navigation services providers (ANSPs) to engage in cross-regional collaboration and active data sharing between FIRs to harmonize airspace structures and separation standards, enhance situational awareness, enable data-driven decision-making, and support effective air traffic flow management (ATFM) and optimized cross-regional traffic flow; and
d) support establishing joint cross-regional task forces supported by the Secretariat to expedite airspace enhancement projects taking into consideration modern airspace concepts such as free route airspace (FRA), direct routing operations (DRO), and establish the basis of Project 30/10 as means to improve airspace safety, efficiency and sustainability.

Strategic Goals:	This working paper relates to the Strategic Goals *Every Flight is Safe and Secure; and Aviation Delivers Seamless, Accessible and Reliable Mobility for all.*
Financial implications:	The activities referred to in this paper should be borne by the individual States and ICAO.

References:	Annex 11 — *Air Traffic Services* Doc 10184, *Assembly Resolutions in Force (as of 7 October 2022)* Doc 10209. *Report of the Fourteenth Air Navigation Conference (AN-Conf/14)* (blue cover) and Supplement No. 1 Doc 7030, *Regional Supplementary Procedures* Doc 9750, *Global Air Navigation Plan*, Seventh Edition Doc 9854, *Global Air Traffic Management Operational Concept* Assembly Resolution A41-10, Appendices G and H

1. INTRODUCTION

1.1 The airspace over the high seas and at the interface between regional flight information regions (FIRs) is a critical transit corridor for international flights, requiring harmonized separation minima, efficient routing structures and seamless air traffic flow management (ATFM).

1.2 While some regional optimization efforts have been undertaken, many airspace volumes remain constrained by capacity limitations, route inefficiencies, and inconsistent ATM procedures across FIR boundaries. These challenges impact operational efficiency, increase fuel consumption, and affect environmental sustainability.

1.3 This paper proposes an integrated strategy to modernize high seas airspace through aligned separation minima, improved air navigation services provider (ANSP) coordination, and cross-regional initiatives. In line with AN-Conf/14-WP/40 (UAE), AN-Conf/14 WP/82 (Oman) and complementing AN-Conf/14-WP/10 and WP/9, it supports establishing a framework for minimum service levels. Reflecting the goals of Project 30/10, it advocates uniform separation application and modern ATM solutions; such as ATFM, free route airspace (FRA), flexible use of airspace (FUA), while improving the civil-military cooperation.

2. DISCUSSION

2.1 Challenges in cross-regional airspace management is seen in the growing complexity of air traffic operations over the high seas and across regional FIRs presents challenges related to airspace structures, operational procedures, and coordination. Differences in separation minima, inconsistent ATM practices, and fragmented decision-making processes result in inefficiencies and increased controller workload.

2.2 Capacity of environmental considerations with rising air traffic demand within existing airspace structures face constraints that limit operational flexibility and efficiency. Inefficient routes design and procedural discrepancies contribute to increased fuel consumption and emissions. Addressing these constraints is essential for a sustainable airspace management, and therefore undermining ICAO’s long-term aspirational goal (LTAG) of net-zero carbon emissions by 2050.

2.3 Harmonization of airspace structures and procedures is essential to enhance operational efficiency, FIRs should align separation standards and optimize route structures to facilitate seamless major traffic flows. Expansion of FRA will provide greater flexibility for airspace users while ensuring capacity optimization and safety improvements

2.4 Advancing ATM capabilities and coordination to strengthen ATFM and collaborative decision-making (CDM) will improve traffic predictability, balance demand and capacity, and reduce operational delays. Enhanced digitalization and cross-border data sharing will further support situational awareness and improve cross-regional coordination, leading to a more resilient and efficient air navigation system. Optimizing the use of modern communications, navigation, and surveillance (CNS) capabilities between cross-border states over high seas airspace.

3. CONCLUSION

3.1 The environmental policy of ICAO, supported by member States, is based on the well-recognised basket of measures approach. The optimization of operations is considered as a fundamental pillar of those measures. The maximum benefit of those operations relates to major flows of traffic crossing national, regional and inter-regional airspaces. Enhancing those operations does not require major technology breakthroughs, neither major investments, but strong coordination and leadership by States and also by ICAO.

3.2 The modernization of high seas and cross-regional airspace is no longer optional it is a strategic necessity to accommodate future traffic growth, improve operational resilience, and support ICAO's environmental goals. Fragmented procedures, inconsistent separation standards, and legacy coordination models continue to undermine efficiency and sustainability in these globally critical corridors.

3.3 By aligning separation minima, expanding the application of FRA, and enhancing cross-border coordination through ATFM and digital data exchange, States and ANSPs can unlock significant gains in safety, capacity, and environmental performance. The Assembly is invited to support the development of an ICAO-led framework through PIRGs to guide harmonized implementation and facilitate regional collaboration that bridges current operational divides.

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