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MODERNISING FLIGHT RULES FOR THE FUTURE OF AVIATION: AN EVOLUTIONARY IMPERATIVE

(Presented by the Civil Air Navigation Services Organisation)

EXECUTIVE SUMMARY

This paper highlights the growing need to evolve current flight rules and airspace structures to ensure the safe, inclusive, and scalable integration of increasingly diverse and automated aviation operations. It draws on the findings of a recent multi-stakeholder Think Paper, "Seamless Airspace: Are Today's Flight Rules Ready for the Future of Aviation?", developed with contributions from air navigation service providers, research organisations, and industry stakeholders representing both emerging and traditional airspace users.

The paper calls on ICAO and its Member States to accelerate global dialogue and collaborative research towards future-ready frameworks.

Strategic Goals:	This working paper relates to *Every Flight is Safe and Secure, Aviation Delivers Seamless, Accessible, and Reliable Mobility for All* and *The Economic Development of Air Transport Assures the Delivery of Economic Prosperity and Societal Well-Being for All.*
Financial implications:	To be determined based on proposed initiatives, including research, demonstration projects, and infrastructure modernisation.
References:	Doc 9750, *Global Air Navigation Plan (GANP)* CATS Think Paper: "Seamless Airspace: Are Today's Flight Rules Ready for the Future of Aviation?"[1]

[1] https://canso.org/publication/cats-global-council-think-paper-seamless-airspace-are-todays-flight-rules-ready-for-the-future-of-aviation/

1. INTRODUCTION

1.1 As aviation undergoes an era-defining transformation—driven by automation, digitalisation, and the emergence of new entrants such as highly automated aircraft systems (HAAS), eVTOLs, and persistent high-altitude platforms—the foundational question is no longer if existing frameworks must evolve, but how and how fast.

1.2 Over the past year, a global group of aviation experts from across industry, regulatory, and research domains conducted an in-depth review of the adequacy of current flight rules in addressing these transformations. Their findings, consolidated in a think paper titled "Seamless Airspace: Are Today's Flight Rules Ready for the Future of Aviation?", offer important insights into the regulatory and operational evolution needed to support future airspace structures.

1.3 The work supports ICAO's *Global Air Navigation Plan* (Doc 9750, GANP) and long-term vision by advancing interoperability, integration of new entrants, and safe automation enablement.

2. WHY THIS TOPIC IS URGENT

2.1 Today's flight rules—primarily visual flight rules (VFR) and instrument flight rules (IFR)—were developed for a world of human pilots, predictable environments, and legacy aircraft performance. However, the aviation landscape is evolving rapidly. Conceptual advances and early trials are underway to integrate uncrewed and automated aircraft systems into the airspace system. While large-scale implementation remains in development, these trends underscore the need to modernise regulatory frameworks to ensure they remain future-ready and resilient. Key drivers include:

a) Ongoing efforts to accelerate the integration of uncrewed and highly automated systems, supported by operational trials and research on safety risk modelling, separation assurance, and performance-based operations;

b) increasing diversity in mission types, automation levels, aircraft performance, and operational durations, including novel applications in urban corridors and higher airspace;

c) emergence of new airspace users in previously underutilised or unregulated domains, which challenges existing models of responsibility, access, and oversight; and

d) rising reliance on digital infrastructure and automation, with foundational work underway to develop secure, certifiable, and interoperable systems that support more flexible and scalable operations.

2.2 These developments pose significant challenges for today's flight rules and airspace structures, which may not be sufficiently adaptable to accommodate increasing operational complexity and automation. A proactive and collaborative approach is required to examine how existing frameworks can evolve—ensuring continued safety, accountability, interoperability, and equitable access, while minimising regulatory fragmentation and supporting innovation.

3. PROPOSED STRATEGIC DIRECTIONS

3.1 The airspace of tomorrow must be built on trust, transparency, accountability, and shared responsibility—not just technology. A future-ready digital airspace framework must serve all stakeholders, be resilient by design, and ensure global interoperability. By aligning regulatory foresight with innovation, the aviation community can ensure that the benefits of digital transformation and operational evolution are inclusive, scalable and secure.

3.2 This vision is not about replacing the past—it is about evolving with purpose. It recognises that future progress depends on thoughtfully adapting our systems, roles, and responsibilities to meet the demands of increasingly digital and diverse operations.

3.3 To guide this evolution, the Think Paper outlines six strategic directions to support the transition to a digitally coordinated, inclusive, and performance-based airspace framework:

a) Advance research on future flight rules and system architectures: Promote targeted research to assess operational concepts, enabling technologies, and system architectures that can support next-generation flight rules, including digital coordination, automation-enabled separation, and hybrid airspace models.

b) Launch coordinated demonstration projects: Support real-world demonstrations to validate automation-assisted deconfliction, self-separation, and interoperable operations across diverse performance and automation levels. International coordination is essential to ensure consistency and scalability.

c) Develop a global transition roadmap: Collaborate on the development of a globally supported roadmap to guide the transition from current frameworks to a digitally enabled airspace system. This should prioritise foundational projects such as automated separation trials, digital flight rules prototyping, and mixed-equipage integration models.

d) Strengthen global regulatory alignment: Enhance cooperation through ICAO and regional frameworks to advance harmonised standards that reflect the realities of automation, new actors, and emerging responsibilities in airspace management.

e) Invest in digital infrastructure and cyber resilience: Prioritise the development of future-ready CNS capabilities and digital systems that are secure by design. As connectivity increases, cybersecurity and digital trust must be treated as critical infrastructure for safe and scalable operations.

f) Build an inclusive and scalable ecosystem: Ensure that both high- and low-equipped aircraft can safely and fairly access shared airspace. Design systems that support full traffic conspicuity, equitable access, and practical transition pathways that balance innovation with legacy operations.

4. CONCLUSION

4.1 Flight rules and airspace structures form the regulatory backbone of aviation. If they are not modernised, the vision of globally integrated, automation-enabled airspace will remain out of reach. ICAO and its Member States are encouraged to take forward the findings of this think paper as a basis for collaborative research, policy innovation, and regulatory roadmap development.

4.2 The transformation of airspace management is underway. The question is not whether it must evolve—but whether we are prepared to guide that evolution collectively, safely, and inclusively.

5. ATTACHMENT:

5.1 Think paper – Think Paper – "Seamless Airspace: Are Today's Flight Rules Ready for the Future of Aviation?"

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