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Agenda Item 5: ATM and CNS Systems Modernization

CHALLENGES AND OPPORTUNITIES IN MANAGING AIRSPACE EFFICIENCY AND RESILIENCE IN APAC REGION

(Presented by IATA)

SUMMARY

The paper presents the challenges and opportunities in managing airspace efficiency and resilience effectively, which is a key and strategic enabler for seamless, intelligent and sustainable airspace systems in APAC region.

In 2025-2026, to address the operational challenges at Europe-Asia interface affected by airspace disruptions and traffic shift, a comprehensive case study on airspace efficiency and the potential solutions was completed by IATA and industry stakeholders. The data-driven and performed-based approach was applied and validated, moreover, a robust and advanced industry framework is recommended for airspace efficiency and resilience management.

1. INTRODUCTION

1.1 Airspace disruptions, operational uncertainty and rising fuel costs have posed significant challenges to the airlines and industry. More airspace is becoming entangled in conflicts which the industry manages safely, but with sub-optimal or inefficient route systems.

1.2 At the beginning of 2026, forecasts indicated airlines would make record profit¹. With geopolitical conflicts, surging fuel prices, indirect economic impacts are expected to affect airlines even after the recovery to normal operations in the Middle East. At the same time, there is increasing pressure to achieve industry objectives and environmental long-term goals. Meanwhile airspace disruptions and GNSS interference are impacting airline operational decisions at strategic and tactical levels.

1.3 In response, IATA continues to support enhanced airspace management through improved coordination mechanisms, strengthened civil-military cooperation, and ongoing contributions to ICAO contingency frameworks. At the same time, the rapid growth of commercial Unmanned Aircraft (UA) introduces additional challenges for airspace management, requiring a coordinated approach to ensure that their integration does not negatively impact airspace efficiency and resilience.

¹ <https://www.iata.org/en/publications/economics/reports/global-outlook-for-air-transport-december-2025/>

1.4 Data shows that even a very modest 5% efficiency improvement of the airspace could save airlines \$12.5 billion annually and cut millions of tons of carbon², while current and emerging technologies provide opportunities to support the achievement of such gains. Some of the technical solutions are already in the cockpit of modern avionics, and the aircraft are ready for more efficient and less polluting operations, but the airspace systems cannot take advantage of the precision and flexibility of modern performance.

1.5 The existing operational improvements were greatly recognized for their immediate potential to increase efficiency and reduce emissions; however, the current approach and measures taken are reactive, fragmented and program based. The industry will need a more structured framework to manage the airspace efficiency, enabled by flexible and data-driven solutions, harmonized international standards, and smarter regulations under multilateralism and innovative thinking.

2. DISCUSSION

Current Status of Airspace Efficiency and Resilience

2.1 Often a disruption in one airspace has a spill-over effect on traffic across other FIRs and regions. The current military conflict in the Middle East is impacting flights from and to the region, not just within the region. When a disruption occurs in an airspace, inefficiencies across traffic flows are amplified. Therefore, a holistic approach towards implementing airspace optimization initiatives can help address airspace disruptions. Operational improvements such as air traffic flow management, flexible use of airspace and civil-military cooperation, can support more efficient airline operations across axes where there was a shift in traffic flow due to airspace disruption. IATA has been working with ICAO, ANSPs, and other stakeholders to progress the implementation of operational improvements. In some regions there is slow progress due to various challenges, namely availability of funds to support investment in associated infrastructure and lack of political will to introduce change.

2.2 States are required to develop contingency plans under ICAO Annex 11. However, these plans are often not maintained up to date, nor do they include relevant contingency scenarios. At the tactical level, IATA continues working with ICAO, regulators, airlines and stakeholders to ensure effective response to airspace disruptions using Contingency Coordination Teams (CCTs).

2.3 Additionally, exchange of information, amongst States, for known and anticipated disruptions, can help ANSPs and airlines better prepare and agree on contingency scenarios. Strengthening civil-military coordination to ensure effective and timely communication with airspace users, without compromising national security, would enable operators to conduct more robust risk assessments to make better informed operational decisions. IATA has been working with ICAO at global and regional levels to strengthen civil-military cooperation.

2.4 Recent activities include the continued activation of CCTs in key regions such as the Middle East to enhance situational awareness for airlines, ongoing contributions to ICAO's global airspace contingency framework, and the use of data analytics tools to quantify the impact of airspace disruptions.

2.5 Furthermore, the increasing use of drones for state/military missions poses a risk to airports and aircraft when such Unmanned Aircraft Systems (UAS) are operated near or within the airspace of an airport. While designating the airspace around airports as "no-fly zones" for unauthorized UA is helpful for commercial and recreational use, but from recent events in the Middle East, this has proved insufficient when there is a military conflict.

² <https://www.iata.org/en/pressroom/2026-speeches/willie-walsh-speech-iata-82nd-agm-report-state-global-air-transport-industry/>

2.6 In 2022, IATA led a task force consisting of a number of organizations and civil aviation authorities and developed Guidance Material ([Response to Unauthorized UA in the Vicinity of Aerodrome Guidance Material](#)). Yet there seems to be a delay in the implementation of effective risk assessment procedures for unauthorized UA. Since certain counter-UAS technologies can interfere with critical on-board manned aircraft systems, a coordinated, multi-tiered approach is required. This should include risk assessment processes, clear operational procedures for escalating responses, and close collaboration between airport operators, ANSPs, regulators, and law enforcement.

2.7 In parallel to these challenges, the rapid growth of commercial UA, including large-scale drone operations and advanced air mobility concepts, is expected to significantly increase airspace demand. This evolution introduces new challenges related to airspace integration, traffic management, safety, and interoperability with manned aviation.

2.8 ICAO and the industry are progressing UTM guidance to support the scalable integration of UAS. While this provides a useful foundation, further work is required to address the impact on airspace efficiency, capacity, and airline operations. The integration of commercial UA must be considered in the context of overall airspace resilience, ensuring that new operations do not introduce additional challenges or operational disruptions.

Recommended Industry Framework for Airspace Efficiency Management

2.9 In response to the operational challenges along the Europe-Asia air corridor and at the interface of APAC and EUR/NAT Regions, which is significantly impacted by airspace disruptions and traffic shift due to long-term and continuous geopolitical conflicts, IATA has collaborated with industry stakeholders to complete a case study on the potential solutions utilizing a data-driven and performance-based approach, and delivered a White Paper in Q1 2026: [Data-driven Airspace Efficiency Study](#).

2.10 According to the White Paper and industry feedback, airspace efficiency is a core enabler of operational excellence, cost discipline and environmental sustainability. As aviation navigates evolving pressures on service quality, cost management and decarbonization responsibilities, the ability to manage airspace efficiency as a strategic asset has never been more essential. The most effective programs make leadership commitment visible, governance clear and performance continuously monitored while empowering personnel to innovate in their daily work.

2.11 As the APAC region and the whole aviation ecosystem are evolving towards the concept of smarter and greener operations, one of the strategic enablers is a more robust and mature framework for airspace efficiency management to be developed and established by the stakeholders. For instance, an Airspace Efficiency Management System (AEMS) could be developed and fostered, which adopts the structured and organization-wide framework inspired by the Safety Management System (SMS), moving airspace efficiency from the reactive, fragmented and program-based efforts to a proactive discipline grounded in governance, data-driven approach, and continuous improvement.



Figure 1. Recommended Industry Framework for Airspace Efficiency Management

2.12 Industry guidance materials will need to be developed to provide fundamental AEMS framework, recommended methodologies and tools, as well as implementation guidelines to address specific and key scenarios (e.g. airspace/airport disruptions, drones and new entrants in congested airspaces, space vehicle activities, large weather events or route changes, etc.). This approach is intentionally practical and scalable so that the CAAs and ANSPs in the region with different sizes of airspace and airports, infrastructure compositions, and operational profiles, etc. can adapt it to their own context. By applying the principles, States can turn their airspace systems into a controlled, optimized and continuously improving asset, delivering immediate and long-term efficiency, sustainability and resilience.

2.13 To facilitate adoption and implementation, data platforms and digital tools also need to be developed to support robust airspace efficiency framework, e.g. data/AI-driven technologies for airspace efficiency gap analysis, performance monitoring and benchmarking tools with recommended KPIs, digitalized intelligent platform with greater level of collaboration between airspace efficiency and operators' fuel/emission programs, etc.

2.14 It is recognized that the establishment of airspace efficiency management framework will serve as a blueprint for building a disciplined, organization-wide system and a strategic enabler of smart and green transformation for APAC region in the long run.

Key Takeaways and Recommendations

2.15 Short-term: Immediate mitigating actions including strengthened civil-military, cross-region and cross-border cooperation are required in response to the challenges in airspace contingency and efficiency, especially during the era of uncertainty with increasing conflict risks and emerging impact from new entrants to the civil aviation and current airspace systems.

2.16 Medium-term: Industry guidelines along with data-driven and performance-based technical solutions need to be developed to support the airspace planning and operational optimization initiatives, also to enhance the interoperability of UAS among civil and State systems.

2.17 Long-term: The recommended industry framework and modernized digital tools for effectively managing airspace efficiency and resilience will need to be developed and equipped to enable safer, smarter, greener and multi-layered operations with integration of various airspace users.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) note the information contained in this paper;
- b) discuss the challenges and opportunities for the region and encourage APAC States to consider endorsing the recommended framework and sharing practices in airspace efficiency and resilience management; and
- c) discuss any relevant matters as appropriate.

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