



WORKING PAPER

**SEVENTH WORLDWIDE AIR TRANSPORT CONFERENCE
(ATCONF/7)**

Montréal, HQ, 16 to 20 November 2026

**Agenda Item 4: Emerging technologies, new business models and other associated aspects
4.1: Economic regulatory frameworks on emerging technologies**

**CONSIDERATIONS ON THE ECONOMIC REGULATORY
FRAMEWORK FOR DIGITAL AIR NAVIGATION SERVICES**

(Presented by Thailand)

EXECUTIVE SUMMARY

The rapid digital transformation of global air traffic management is driving a transition from traditional tactical communication to system-wide digital data exchange. Digital information applications enable real-time collaboration across borders, improving airspace capacity, trajectory optimization, and overall flight safety.

However, existing economic governance and cost-recovery mechanisms outlined in Doc 9082 (*ICAO's Policies on Charges for Airports and Air Navigation Services*) were designed around flight-centric operations. Traditional charges are calculated per flight based on distance flown and maximum take-off weight, segmented into specific operational phases (en-route, approach, aerodrome control). In contrast, digital information services operate on models that serve a broader ecosystem of stakeholders beyond traditional aircraft operators.

This working paper outlines potential considerations regarding the adequacy of existing economic policies for digital information service applications. It explores options for ensuring equitable cost recovery and protection against double-charging.

Action: The conference is invited to

- a) Recognize (i) the economic differences between legacy flight-centric charging principles and modern digital information infrastructure; and (ii) key considerations for digital service cost allocation that maintain non-discriminatory access while safeguarding against double-recovery; and
- b) Invite the International Civil Aviation Organization (ICAO) to consider whether Doc 9082 (*ICAO's Policies on Charges for Airports and Air Navigation Services*) and Doc 9161 (*Manual on Air Navigation Services Economics*) should be updated to address digital infrastructure and information service provisioning.

<i>Strategic Goal:</i>	This working paper relates to Strategic Goal: <i>The Economic Development of Air Transport Assures the Delivery of Economic Prosperity and Societal Well-Being for All.</i>
<i>Financial implications:</i>	Administrative resources associated with ICAO Secretariat and Panel activities, to be absorbed within the existing work program budget.

<i>References:</i>	<i>Doc 9082 - ICAO's Policies on Charges for Airports and Air Navigation Services</i> <i>Doc 9161 - Manual on Air Navigation Services Economics</i> <i>Doc 10199 - Information Management</i> <i>Doc 4444 - Air Traffic Management</i>
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1. INTRODUCTION

1.1 Air navigation services are experiencing a paradigm shift towards digital interoperability. Under the Global Air Navigation Plan (GANP), information exchange is transitioning from legacy point-to-point text messages to digital, system-to-system services. To enable these capabilities, modern operational frameworks increasingly rely on digital data models, digital interfaces, and collaborative platform architectures to facilitate seamless cross-border information exchange and management.

1.2 While technical specifications and operational rules are progressing globally, the corresponding economic frameworks remain understudied in detail. Traditional Air Navigation Service (ANS) cost-recovery mechanisms rely on per-flight charges based on physical movement through specific airspace volumes. Digital information services raise the question of whether updated economic approaches are needed to reflect the realities of digital data architecture and multi-user accessibility.

2. DISCUSSION

2.1 Limitations of the Existing Flight-Centric Model

2.1.1 Doc 9082 (*ICAO's Policies on Charges for Airports and Air Navigation Services*) establishes three foundational considerations for air navigation charges:

- services are provided to an identifiable, individual flight;
- services belong to distinct phases of operations (en-route, approach, or aerodrome control); and
- service costs vary or correlate with flight volume, distance flown, and aircraft weight.

2.1.2 Digital information services highlight several potential misalignments with these premises:

- Non-flight specific services: Information requests (e.g. meteorological information queries, aeronautical data synchronizations) could occur across multiple operational phases, across FIR boundaries, or take place without a direct correlation to an active flight path.
- Infrastructure mismatch: Digital data delivery structures operate independently of geographical flight paths, making it complex to allocate service provisions strictly by flight phases or distance.
- Expanding stakeholder ecosystem: Information consumers extend beyond commercial aircraft operators to include airport operators, unmanned aircraft system traffic management providers, third-party flight planning vendors, and data aggregators. Doc 9082 currently defines “users” primarily as aircraft operators.

2.2 Economic Considerations for Digital Information Services

2.2.1 To explore alignment with the principles of cost-relatedness, non-discrimination, transparency, and user consultation, modern calculation and cost-recovery approaches for digital air navigation services could consider several structural options.

2.2.2 Potential Cost Basis Principles

- *Incremental cost accounting*: Consideration could be given to whether Air Navigation Service Providers (ANSPs) should isolate incremental digital infrastructure costs (software, messaging interfaces, cyber authentication) from underlying data generation costs.
- *Protection against double-charging*: Because core data is already recovered through traditional en-route and terminal charges, consideration could be given to whether charges for digital access should be limited to the digital delivery interface layer to avoid charging twice for the same underlying information.

2.2.3 Tiered Charging Options

- *For primary airspace users*: States may wish to explore whether core digital service costs could be reflected within general air navigation cost pools, taking into account the potential operational benefits of ensuring unhindered access to safety-relevant data.
- *For commercial non-airline consumers*: States could consider whether entities that consume digital data feeds without contributing to air navigation charges might be billed using transparent, published service tier structures, or subscription fees based on bandwidth and connection availability.

3. CONCLUSION

3.1 Digital information exchange represents a major advancement in global air traffic management, offering substantial potential safety, efficiency, and environmental benefits. Considering a modernized, transparent economic regulatory framework could help ensure digital services are supported by fair cost-recovery mechanisms and encouraging equitable access across the global aviation ecosystem.

3.2 To support regulatory clarity, the conference is invited to consider proposing that ICAO evaluate updates to its economic policy instruments:

- a) Re-evaluating definitions in Doc 9082: Exploring whether the definitions of “facilities and services” and “users” in Doc 9082 should be expanded to accommodate digital infrastructure, information service providers, and non-airline consumers.
- b) Developing guidance in Doc 9161: Exploring whether specific guidance should be formulated to cover digital cost accounting, user categorization, and non-duplication rules.