

**61ST CONFERENCE OF
DIRECTORS GENERAL OF CIVIL AVIATION
ASIA AND PACIFIC REGION**

*Kuala Lumpur, Malaysia
7 – 11 September 2026*

AGENDA ITEM 4: AIR NAVIGATION

**HUMAN PERFORMANCE AND SAFETY CONSIDERATIONS
FOR DIGITAL AIR TRAFFIC SERVICES FOR AERODROME
(DATS)**

Presented by International Federation of Air Traffic Controllers' Associations (IFATCA)

SUMMARY

Digital air traffic services for aerodrome (DATS) are increasingly being adopted by States as a means of enhancing operational flexibility, improving service provision, and supporting the sustainability of airport operations. While DATS offer significant opportunities, their successful implementation depends upon appropriate consideration of human performance, operational resilience, safety management, and regulatory oversight. This paper highlights key considerations for States and regulators to support the safe implementation of DATS.

HUMAN PERFORMANCE AND SAFETY CONSIDERATIONS FOR DIGITAL AIR TRAFFIC SERVICES FOR AERODROME (DATS)

1. INTRODUCTION

1.1 Air navigation service providers worldwide are exploring Digital Air Traffic Services for aerodrome (DATS) as a means of enhancing aerodrome service provision through the use of advanced surveillance, communication, and information technologies.

1.2 DATS may offer benefits including increased operational flexibility, improved access to information, support for contingency operations, and opportunities for more efficient provision of aerodrome air traffic services.

1.3 As implementation accelerates globally, States are increasingly required to establish regulatory frameworks capable of addressing the operational, technical, and human performance aspects associated with DATS.

2. DISCUSSION

DATS and Aviation Modernization

2.1 DATS represent a significant transformation in the provision of aerodrome control service, replacing direct out-of-the-window observation with indirect observation by means of a Visual Surveillance System (VSS), defined in the Procedures for Air Navigation Services — Air Traffic Management (PANS-ATM, Doc 4444) as “an electro-optical system providing an electronic visual presentation of traffic and any other information necessary to maintain situational awareness at an aerodrome and its vicinity”.

2.2 Doc 4444, 7.1.1.2.1 provides that visual observation shall be achieved through direct out-of-the-window observation, or through indirect observation utilizing a VSS which is specifically approved for the purpose by the appropriate ATS authority, and Section 7.12 sets out the requirements applicable to the use of a VSS in the provision of aerodrome control service.

2.3 While a VSS enables new operational concepts, the safe delivery of air traffic services remains dependent upon the performance of operational personnel and the effectiveness of supporting systems.

2.4 To assist with the implementation of DATS, the International Federation of Air Traffic Controllers Associations (IFATCA) has produced an Information Package on Digital Aerodrome Air Traffic Services (accessible at https://ifatca.org/wp-content/uploads/DATS_IP_v12.pdf).

Human Performance Considerations

2.5 DATS fundamentally alter how controllers perceive, interpret, and respond to operational information.

2.6 Human-machine interface design, visual presentation systems, workload management, situational awareness, equipment manipulation and controller competency therefore become critical safety considerations.

2.7 States should ensure that human performance assessments form an integral part of the approval, implementation, and oversight of DATS.

Safety Management and Operational Resilience

2.8 The implementation of DATS introduces new operational dependencies, including communications infrastructure, data transmission and display systems, surveillance technologies, and cyber resilience.

2.9 Safety risk assessments should therefore consider not only normal operations and routine technical maintenance, but also degraded modes of operation, contingency procedures, and recovery strategies following system failures.

2.10 Robust Safety Management Systems (SMS) and effective occurrence reporting mechanisms are essential to identifying emerging risks and supporting continuous improvement.

Positive Safety Culture and Change Management

2.11 The successful introduction of DATS requires active engagement with operational personnel throughout the design, implementation, and operational phases.

2.12 Positive safety culture encourages the reporting of operational concerns, human-machine interface issues, procedural limitations, and unforeseen operational consequences.

2.13 States should promote positive safety culture to ensure that operational experience gained during implementation can be effectively captured, openly discussed and used to improve safety performance.

Regulatory Oversight

2.14 Regulatory frameworks should evolve alongside technological developments to ensure that DATS achieve equivalent or improved levels of safety when compared with conventional tower operations.

2.15 Harmonized regional approaches may facilitate knowledge sharing, regulatory consistency, and the safe adoption of DATS throughout the APAC region.

2.16 This approach is reflected in IFATCA policy, which provides that a VSS may be used for visual observation in aerodrome control towers when authorised by the appropriate ATS authority, provided that at least the same level of safety as direct visual observation is guaranteed, contingency procedures are in place, and the installation does not introduce a complex hybrid working environment for the controller.

Conclusion

2.17 DATS offers significant opportunities for the modernization of aerodrome air traffic services; however, their successful implementation depends upon effective consideration of human performance, operational resilience, and safety management, consistent with PANS-ATM provisions. States are encouraged to consider IFATCA policy on the use of visual surveillance systems when implementing DATS.

2.18 Positive safety culture is essential to identifying emerging operational risks and supporting continuous improvement throughout the lifecycle of DATS.

2.19 States should ensure that regulatory oversight, safety management, and human performance considerations remain central to the implementation and operation of DATS environments.

3. ACTION BY THE CONFERENCE

3.1 The Conference is invited to:

- a) encourage States to refer IFATCA's Information Package on Digital Aerodrome Air Traffic Services when considering the implementation of DATS (https://ifatca.org/wp-content/uploads/DATS_IP_v12.pdf)
- b) recognize the importance of human performance and safety management considerations in the implementation of DATS;
- c) encourage States to incorporate human performance and operational resilience assessments into DATS regulatory and approval processes; and
- d) promote regional cooperation and information sharing to support the safe and harmonized implementation of DATS within the APAC region.

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