



FOURTEENTH AIR NAVIGATION CONFERENCE

Montréal, Canada, 26 August to 6 September 2024

Agenda Item 3: Air navigation system performance improvement

3.1: Proposals to improve the efficiency of air navigation services contributing to LTAG

ENHANCING SEGREGATED PARALLEL OPERATIONS TO PROMOTE ENVIRONMENTAL SUSTAINABILITY AND FUEL EFFICIENCY

(Presented by the United Arab Emirates)

EXECUTIVE SUMMARY

In response to the aviation industry's substantial contribution to greenhouse gas emissions, the International Civil Aviation Organization (ICAO) has set a long-term aspirational goal (LTAG) of achieving net-zero carbon emissions by 2050. As part of this effort, this working paper explores the enhancement of segregated parallel operations (SPO) to reduce environmental impact and fuel consumption.

SPO optimization is considered one of the areas for improvement in achieving greater sustainability in aviation.

Action: The Conference is invited to:

- a) encourage collaboration between Member States to develop necessary standards and regulations, offering the United Arab Emirates' experience as a resource; and
- b) invite ICAO and other Member States to consider adopting these procedures to improve segregated parallel operations (SPO).

1. INTRODUCTION

1.1 The civil aviation industry has a significant environmental footprint, contributing to greenhouse gas emissions, noise pollution, and other environmental impacts. In response, the ICAO has set a long-term aspirational goal (LTAG) of achieving net-zero carbon emissions by 2050.

1.2 One area where improvements can be made is in the optimization of segregated parallel operations (SPO), which can help reduce fuel burn and environmental impact, thereby enhancing the industry's sustainability.

2. DISCUSSION

2.1 Segregated parallel operations involve the use of parallel runways in such a way that one runway is designated for arrivals and the other for departures. This separation aims to enhance safety and efficiency by reducing the risk of conflicts between arriving and departing aircraft. As per *Manual on Simultaneous Operations on Parallel or Near-Parallel Instrument Runways* (Doc 9643) strict guidelines govern the implementation of SPO to ensure safe and efficient airspace utilization.

2.2 Doc 9643 mandates that nominal departure tracks diverge immediately after take-off by at least 30 degrees from the missed approach track of the adjacent approach. This divergence is intended to maintain safe separation between departing and arriving aircraft. However, implementing this divergence can be challenging due to factors such as surrounding obstacles or airspace restrictions.

2.3 Implementing the required 30-degree divergence for missed approach and departure procedures can have significant environmental and operational implications. For instance, large turns at low altitudes can increase fuel burn, noise pollution, and overall environmental impact. Even though missed approaches are infrequent, to fulfil the requirement, departure procedures must be designed to turn at a certain angle.

2.4 To address these challenges, the United Arab Emirates at Dubai International Airports has developed procedures that allow air traffic control (ATC) to optimize departures using omnidirectional departure procedures and enables ATC to direct aircraft executing a missed approach to turn at a defined distance from the runway, thereby maintaining a safe distance from departing aircraft. While standard missed approach procedures remain in place for pilots who cannot comply with the suggested turns.

2.5 The new developed procedures offered a more environmentally friendly alternative. Implemented in close collaboration with all United Arab Emirates stakeholders, these procedures ensure safety compliance and reduce environmental impact without jeopardising efficiency and airspace capacity.

2.6 The new procedures were initially approved for a trial period, during which five years of data were analysed. The trial demonstrated that all missed approach aircraft using these procedures remained within the proposed protection surfaces, validating the concept's effectiveness and safety.

2.7 Implementing these procedures required comprehensive training programs for ATC and pilot awareness through aeronautical information publication (AIP) publication to ensure smooth adoption and execution. Effective training is critical to familiarising personnel with the new procedures, enabling them to manage departures and missed approaches efficiently while adhering to enhanced safety and environmental standards. These training programs included simulations, practical exercises, and continuous professional development to keep ATC controllers updated on best practices and procedural adjustments.

2.8 The proposed method enables the design of departure procedures in a more environmentally friendly manner without reducing airport capacity. It reduces fuel burn and emissions, minimises noise pollution and contributes to the overall sustainability of the aviation industry.

3. **CONCLUSION**

3.1 The optimization of SPO through proposed procedures such as those developed at Dubai International Airports represents a significant step towards reducing the environmental footprint of airports with SPO. By addressing the challenges of implementing 30-degree divergence in missed approach and departure procedures, these new methods enhance fuel efficiency, reduce emissions, and maintain safety and operational efficiency. Continued collaboration among aviation authorities and stakeholders will be essential in further refining these procedures and promoting a more sustainable future for the aviation industry.

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