International Civil Aviation Organization

The Third Meeting of the South Asia, Indian Ocean and Southeast Asia ATM Coordination Group (SAIOSEACG/3)

Bangkok, Thailand, 16 – 19 April 2024

Agenda Item 3: Review of Current Operations and Problem Areas

IMPROVING FLIGHT DELAYS ON THE GROUND THROUGH REDUCTION OF LONGITUDINAL SEPARATION

(Presented by Singapore)

SUMMARY

This paper presents Singapore's progress on improving flight delays on the ground through the implementation of Air Traffic Management (ATM) initiatives by leveraging on technological advances to reduce longitudinal separation and encourages States to accelerate enhancing airspace capacity to support the continuous recovery of air travel.

1. INTRODUCTION

1.1 The continual increase in air traffic volume, post COVID, calls for Air Navigation Service Providers (ANSPs) and airline operators to work together to implement new ATM initiatives enhance efficiency. Conventionally, procedural time-based longitudinal separation would be applied between aircraft operating over remote and oceanic airspace. While such separation application would be easy to implement, it does not incorporate the benefits of modern technology which can be applied to reduce delays on the ground. Aircraft planning to operate on same ATS routes requesting for the same cruising flight level would have to depart with the required time intervals to ensure the longitudinal separation can be maintained on the ATS routes. Lengthy queue time on the ground could lead to additional fuel burnt and late arrival in destination aerodrome if not well managed. Although aircraft could opt to operate at a different cruising flight level to avoid being held up on the ground or plan on alternate routes, it would be less economical for the airlines and potentially increase fuel burn.

1.2 While there have been substantial developments in aviation that has enabled ANSPs to maximise route capacity, such as changing procedures from time-based separation to distance-based separation to reduce the minimum longitudinal separation required between Area Control Centres (ACCs), ground delays persist as the departure intervals based on conventional time-based separation remains unchanged.

2. DISCUSSION

<u>ATM initiatives that enabled reduced longitudinal separation and ground departure intervals</u>

2.1 With the broader application of Automatic Dependent Surveillance-Broadcast (ADS-B) to complement or replace radar, States have been actively implementing ADS-B data sharing projects to

improve surveillance coverage in the region. ADS-B has contributed to achieving substantial safety, capacity benefits and it is relatively cost-effective to adopt and integrate with other procedures such as datalink. In January 2016, Singapore and Viet Nam implemented 20NM longitudinal separation on ATS routes L642, M753, M771 and N892 through the use of ADS-B for flights operating at or above FL290. In September 2016, Singapore introduced procedures to reduce departure intervals on the ground from 10 to 5 minutes for ADS-B equipped aircraft operating out of Singapore planning to operate on same ATS route requesting for the same cruising flight level. This contributed to reduction of ground delays by 50%.

2.2 Another ATM initiative that enhances efficiency and safety is the application of en-route Performance Based Navigation (PBN) that allows suitably equipped aircraft to fly on a precise flight path with a high level of accuracy. In particular, the use of Required Navigation Performance (RNP) specification RNP 4 over remote/oceanic airspaces has allowed ANSPs to reduce the longitudinal and lateral separation to 30NM. In April 2022, Philippines and Singapore implemented 30NM longitudinal spacing based on RNP 4 navigation specification between Singapore ACC and Manila ACC on ATS routes N884 and M767. Relatedly, the reduction of departure interval from 10 minutes (using Mach Number Technique) to 5 minutes between a pair of RNP 4 compliant aircraft departing from Singapore has been effective since 1 December 2023.

Challenges in Adopting New Technology

2.3 While States and airlines can benefit greatly from a highly optimised airspace, there exist some inertia to implement new ATM initiatives and technology. Increased operating costs, user and ATC training and additional workload are some of the challenges that the industry face.

2.4 The designation of a navigation specifications for ATS routes would mean that flights without the required equipage may need to cruise at sub-optimal flight levels and increase fuel wastage. Conversely, airline operators would need to bear the cost of upgrading the aircraft equipage and provide the necessary training to meet the required route requirements.

2.5 States will also need to invest in infrastructure such as ADS-B ground-based stations, and in research on capabilities such as space-based air-ground communication. Without these infrastructure or improved systems, there would be limit for States to progressively enhance capacity and efficiency in remote airspace due to limited range or low connectivity of communications and surveillance capabilities.

Conclusion

2.6 In order to fully reap the advantages of evolving technology, States and the industry must come together and decide what is the optimal balance between costs and benefits. States should collaborate on new ATM initiatives to reduce separation on ATS routes and ultimately, to enable departure aerodromes to reduce the required departure intervals to eliminate unnecessary ground delay.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information contained in this paper;

b) consider reducing ground delay by leveraging on new and existing ATM initiatives; and

c) discuss any relevant matters as appropriate.

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