International Civil Aviation Organization

The Fourth Meeting of the South Asia, Indian Ocean and Southeast Asia ATM Coordination Group (SAIOSEACG/4)

Bangkok, Thailand, 18 – 21 March 2025

Agenda Item 5: ATS Route Development

ADDRESSING CAPACITY CONSTRAINTS ON ATS ROUTES L642 AND M771 DURING LARGE SCALE WEATHER DEVIATION (LSWD) EVENTS

(Presented by Singapore)

SUMMARY

This paper proposes a review of the longitudinal spacing between aircraft when Large-Scale Weather Deviations (LSWD) procedures are activated on ATS route L642 and M771 to minimise disruption to air traffic flow, while ensuring air navigation safety by making use of surveillance capabilities in the region.

1. INTRODUCTION

1.1 The Large-Scale Weather Deviation (LSWD) procedure for ATS routes over the South China Sea (SCS) was developed to ensure air navigation safety for deviations of multiple aircraft traversing across multiple Flight Information Regions (FIRs). Following the implementation of RNP10 routes in 2008, aircraft can be spaced 50NM apart and can deviate up to 10NM from the route centreline to avoid inclement weather. The LSWD procedures was last reviewed based on RNP10 navigation performance and have not been evaluated with the enhancement of communications, navigation, and surveillance (CNS) enhancements in the region.

1.2 This paper proposes the review of the procedures by optimising the longitudinal spacing between aircraft on ATS routes L642 and M771.

2. DISCUSSION

2.1 ATS routes L642 and M771 (Figure 1) are part of the parallel route structure over the SCS that serves major traffic flow in the region. These two routes are spaced at least 60NM apart and aircraft cruise based on the Flight Level Allocation Scheme (FLAS) utilising Flight Level (FL) FL310, FL320, FL350, FL360, FL390, and FL400. Recognising that the two ATS routes are amongst the busiest, Singapore and Viet Nam implemented 20NM longitudinal spacing between Ho Chi Minh and Singapore FIRs using surveillance separation in 2016. Subsequently, 20NM longitudinal separation operational trial commenced on 7 May 2024 between Ho Chi Minh, Hong Kong and Sanya FIRs.

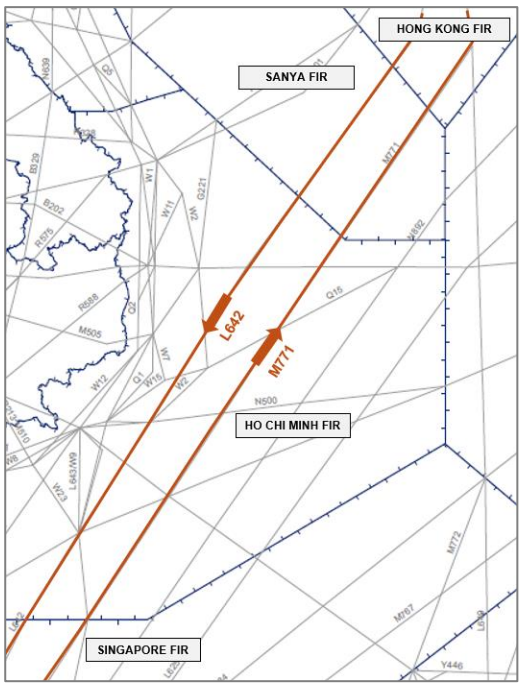

Figure 1: ATS Routes L642 and M771

Challenges

2.2 To facilitate aircraft deviating more than 10NM from the ATS route centreline to avoid inclement weather, the LSWD procedure reduces the number of available FLAS levels by 50% to mitigate traffic conflicts on the reciprocal tracks of the adjacent ATS routes, and are often imposed on pairs of ATS routes. For example, LSWD procedures on ATS routes L642 and M771 are typically activated concurrently, with L642 utilising FL320, FL360 and FL400, and M771 utilising FL310, FL350 and FL390. The respective ATS units may also increase the applicable longitudinal spacing between pairs of aircraft from 20NM to 50NM when the need arises, which reduces the capacity by 75% and more during LSWD.

2.3 The increase from 20NM to 50NM longitudinal spacing between pairs of aircraft operating on the same ATS route often leads to increased operational complexity, especially in the short-term. This inevitably requires ATC to make changes to both planned and cleared levels for some aircraft, which increases workload and the possibility of safety occurrences such as a Large Height Deviation (LHD).

2.4 While it is less impactful if LSWD procedures are activated with sufficient lead time for advanced planning by ATC and airlines operators, the dynamic and unpredictable weather phenomenon over the SCS often leads to the activation of the LSWD procedures in short notice. This would result in extensive ground delays, causing closely-scheduled flights to face significant disruptions as they are sequenced behind one another with only three available FLAS levels.

2.5 The LSWD procedures would often lead to assignment of sub-optimal flight levels, thus increasing fuel-burn for aircraft. Moreover, aircraft that have already departed may be subjected to additional airborne delay to cater for the increased longitudinal spacing (i.e., from 20NM to 50NM) imposed between aircraft at FIR boundaries. Pilots and aircraft operators who did not plan for the weather or airborne delay may be subjected to fuel-related concerns mid-flight.

Proposed review

2.6 Due to the extensive nature of weather deviations over the SCS, a more conservative longitudinal spacing is often adopted across ATS routes. The use of 50NM or 10 minutes longitudinal spacing applied during LSWD events had not been reviewed since the implementation of separation based on RNP10 navigation performance. There are opportunities to optimise the longitudinal spacing on ATS routes L642 and M771 given the significant CNS enhancements supporting surveillance services in SCS.

2.7 Instead of reverting to the default procedural separation at the FIR boundaries during the activation of LSWD, ATS units could consider applying a more optimal measure in a surveillance environment. Given that the most flights often follow a common trajectory around the weather, the longitudinal spacing between flights should also be consistent throughout their flight paths. Taking this into consideration, an additional 10NM buffer could initially be adopted when LSWD procedures are activated - i.e. 30NM spacing. If sustainable, ATS units can also consider removing all additional buffers entirely and retain the 20NM longitudinal spacing. This would greatly improve capacity, reduce ground and airborne delays especially during unplanned LSWD events.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information contained in this paper;

b) review the longitudinal spacing to be applied when activating LSWD procedures, and to share experiences at the next SCSTFRG;

c) discuss the following Draft Conclusion to continue applying surveillance separation during LSWD events and minimise additional separation buffers on ATS routes L642 and M771; and

d) discuss any relevant matters as appropriate.

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Draft Conclusion overleaf

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<table>
<tr><td colspan="3">Draft Conclusion SAIOSEACG/4-1 − SOUTH CHINA SEA LAREG SCALE WEATHER DEVIATION PROCEDURES</td></tr>
<tr><td colspan="2">What: States should continue to apply surveillance separation during Large-Scale Weather Deviation (LSWD) and minimise additional buffers for longitudinal spacing as far as practicable on ATS routes L642 and M771.</td><td>Expected impact:
☐ Political / Global
☐ Inter-regional
☐ Economic
☐ Environmental
☒ Ops/Technical</td></tr>
<tr><td>Why: In the case of activation of LSWD procedures, SCS States may default from 20NM surveillance separation to 50NM or more due to a lack of regionally agreed procedure. This may result in unnecessary capacity reductions and delays, creates potential issues for airlines in terms of fuel and flight management, and increased ATC workload.</td><td colspan="2">Follow-up: ☒Required from States</td></tr>
<tr><td>When: 21-Mar-25</td><td colspan="2">Status: Draft to be adopted by Subgroup</td></tr>
<tr><td colspan="3">Who: ☒Sub groups ☒APAC States ☐ICAO APAC RO ☐ICAO HQ ☐Other:</td></tr>
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