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**Thirtieth Meeting of the Regional Airspace Safety Monitoring
Advisory Group (RASMAG/30)**

Bangkok, Thailand, 14 – 17 July 2025

Agenda Item 5: Airspace Safety Monitoring Activities/Requirements in the Asia/Pacific Region

**ASE CASE STUDIES HIGHLIGHTING THE IMPORTANCE OF COMPLIANCE WITH
THE LTHM REQUIREMENT**

(Presented by MAAR)

SUMMARY

This paper highlights the importance of complying with the Long-Term Height Monitoring (LTHM) requirement. Aircraft approved for Reduced Vertical Separation Minima (RVSM) operations are required to undergo Height-Keeping Performance Monitoring (HKPM) every 2 years or 1,000 flight hours, whichever is longer, to confirm that their height-keeping performance remains within acceptable safety limits. As Altimetry System Errors (ASE) are not visible during normal operations, aircraft may continue to operate with significant errors without being detected. Case studies presented in RMACG/12 (WP/221) by the EUR RMA, as well as additional findings from the FAA's Large ASE Report (LASER) presented by NAARMO in RMACG/7 (IP/38) demonstrate that non-compliant or modified aircraft can generate large ASE values—often identified only by chance through monitoring systems. These examples underscore that, without regular HKPM, unsafe conditions in RVSM airspace may go unnoticed. This paper aims to reinforce awareness of the LTHM requirement and encourage States and aircraft operators to maintain full compliance in order to ensure continued safety and integrity of RVSM operations.

1. INTRODUCTION

1.1 The annual APAC Consolidated LTHM Compliance Status paper provides the meeting with an essential overview of regional adherence to height-keeping monitoring requirements. This paper is intended to complement that data by emphasizing the underlying safety rationale that drives the need for the highest achievable level of compliance.

1.2 ASE is the difference between the altitude displayed to the pilot and ATC, and the actual pressure altitude at which the aircraft is flying. A large ASE value effectively negates the established 1,000 ft vertical separation minimum in RVSM airspace, creating a direct risk of mid-air collision.

1.3 The LTHM requirement ensures that aircraft undergo periodic HKPM, which serves as the primary mechanism for detecting and addressing large ASE. This paper presents case studies from the EUR RMA, as presented in RMACG/12, and a LASER case from the FAA presented by NAARMO in RMACG/7, which illustrate how undetected ASE can persist in operational fleets and reaffirm the essential role of HKPM in maintaining vertical safety in RVSM operations.

2. DISCUSSION

2.1 The following cases, drawn from investigations conducted by the EUR RMA and FAA, provide clear and compelling evidence of why continuous HKPM is essential for maintaining safety in RVSM airspace. All case descriptions have been anonymized to protect operator and aircraft confidentiality.

Case 1: ASE +500 ft due to Unassessed Airframe Modification (EUR RMA)

A business jet transiting European airspace was incidentally captured by a Height Monitoring Unit (HMU). The recorded ASE was +500 feet—well beyond the RVSM tolerance limit of ± 245 ft. Investigation revealed that the aircraft had undergone a structural modification involving the installation of an external fuselage component, without undergoing the necessary RVSM performance revalidation. This case highlights the risks associated with structural modifications that are not properly assessed for their impact on height-keeping performance.

Case 2: ASE -900 ft due to Incorrect Static Source Configuration (EUR RMA)

A monitored aircraft was found to have an ASE of -900 feet. Further investigation indicated that the static source selector had been inadvertently left in the alternate position—likely following pre-flight maintenance—requiring a manual correction that was not applied. This situation raised important questions regarding maintenance procedures, flight crew awareness, and the need for clear guidance when operating on standby systems.

Case 3: Significant ASE Resulting from Non-Standard Configuration (EUR RMA)

Another aircraft was found to be operating in a non-standard configuration that significantly altered its static source error characteristics. No compensatory correction had been applied, and the aircrew were unaware of the performance impact. This case underscores the importance of proper training and operational guidance to ensure crews understand how configuration changes may affect altimetry system performance.

Case 4: Repeated ASE > 200 ft Identified Through AGHME Monitoring (FAA)

An aircraft monitored by multiple AGHME systems was found to have consistently large ASE values, including -338 ft, -206 ft, and -218 ft, recorded across multiple regions. Although the aircraft passed ground-based calibration checks, in-flight monitoring revealed errors that were not otherwise detectable. Contributing factors included wear of components (e.g., pitot-static probes), structural deformation, and surface modifications near static ports. Environmental conditions such as aerodynamic loading, temperature, and moisture were also identified as influencing ASE. This case highlights that aircraft appearing to be in compliance may still develop performance degradation over time—detectable only through regular HKPM.

2.2 These cases demonstrate that ASE-related risks are both real and recurring, and may remain undetected in the absence of regular HKPM. While the aircraft involved were formally approved for RVSM operations, their actual performance fell outside acceptable limits due to factors that were not being actively monitored. This reinforces the critical importance of conducting HKPM in line with the LTHM requirement, as it provides a highly reliable and objective means to verify continued compliance and support safe operations within RVSM airspace. Notably, the majority of the case studies presented involve issues related to unassessed structural modifications, non-standard configurations, or

gradual deterioration of altimetry systems over time—further demonstrating the necessity of full compliance with the LTHM requirement.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) note the information presented in this paper; and
- b) encourage States and aircraft operators to take appropriate actions to improve compliance with the LTHM requirement

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