International Civil Aviation Organization
Asia and Pacific Office

Twenty-second Meeting of the Asia Pacific Regional Aviation Safety Team (APRAST/22)

(Bangkok, Thailand, 30 September to 04 October 2024)

Agenda Item 5: Presentations – State / Industry / ICAO

ESTABLISHMENT OF A RASG-APAC SAFETY ADVISORY

(Presented by SEI WG)

SUMMARY

The SEI WG requests the APRAST adopt a new communication mechanism to complement existing SEI safety tools and allow for timely dissemination of critical safety information and/or highlight specific mitigations found in existing SEI guidance.

1. INTRODUCTION

1.1 Over the last decade, the 10-step safety enhancement initiative (SEI) development process documented in Chapter 2 of the RASG-APAC Procedural Handbook has played an integral part in helping to reduce aviation risk. The SEI WG has followed this deliberative process resulting in over 17 safety outputs, or tools, targeting the highest risk categories for States/Administrations and Industry to implement.

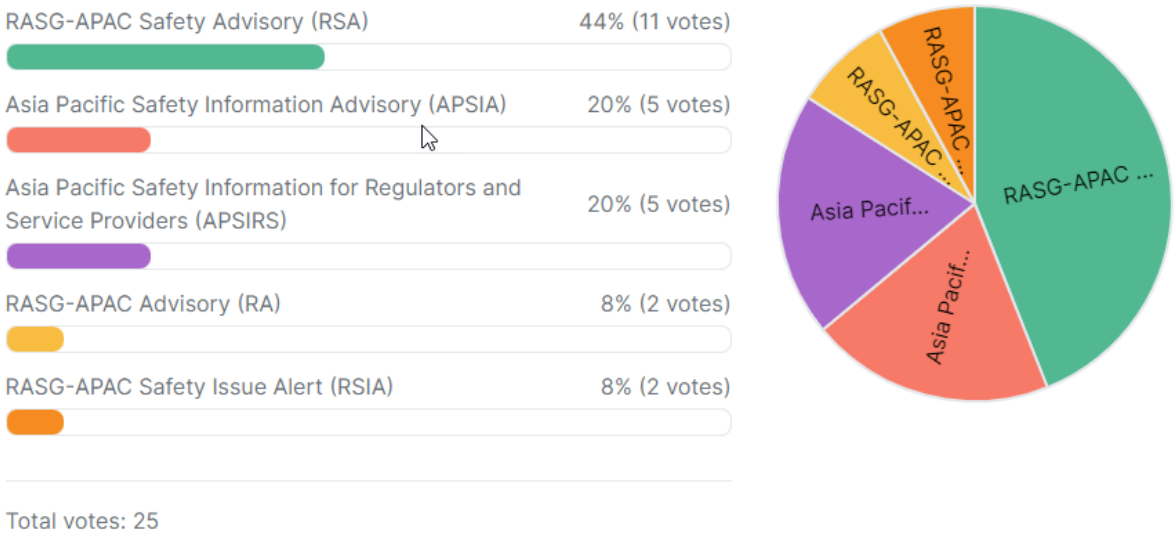
1.2 At APRAST/20, the SEI WG co-chairs set a vision to complement the SEI development process by brainstorming multiple communication mediums to share safety information for safety matters not requiring a full 10-step process. The goal of these new mediums is to have a mechanism that allows for timely dissemination of critical safety information and/or highlight specific mitigations found in existing guidance such as elements found in existing SEI safety outputs.

2. DISCUSSION

2.1 At APRAST/21, the U.S. CAST international representative to Pan America, provided a presentation on the Pan American Regional Aviation Safety Team (PA-RAST) best practices and challenges. One of the topics highlighted was the recent developments of the RASG-Pan America (RASG-PA) safety alerts and advisories. The PA-RAST published their first RASG-PA Safety Issue Alert (RSIA) in May 2024 highlighting the increased risk of Increased Risk of Controlled Flight into Terrain due to Incorrect Altimeter Settings on RNAV Approach at Non-ILS airports which is attached for reference.

2.2 Following APRAST/21, the SEI WG held several monthly meetings. At the July meeting, the members agreed on the concept of a safety advisory similar to RASG-PA's RSIA.

2.3 A poll was conducted to find consensus on a name of the safety advisory and a RASG-APAC Safety Advisory (RSA) was chosen as the best name. The results of the poll were presented at the August monthly meeting and shown below.



2.4 The SEI WG discussed multiple topics as a potential first use case which could benefit from such an RSA. Exemplary topics include weather/turbulence, alpha numeric call signs, Upset Prevention and Recovery Techniques. Also, Industry Organizations at past APRAST meetings have expressed a desire and the need to highlight the specific guidance on the appropriate use of Enhanced Ground Proximity Warning Systems found in Appendix 7 of LOC-1/CFIT-2 SEI, *Model Advisory Circular for Air Operators: Standard Operation Procedures for Flight Deck Crew Members*. However, a useful method to disseminate the highlighted areas were not available. Even the current safety information found in the published RSIA could be repurposed into a RSA, thus expanding our coordination efforts with other regional safety teams.

2.5 The SEI WG also agreed that it would be beneficial to establish a social media presence as a mechanism to share the RSAs with the global aviation community. According to the PA-RAST representative, the RASG-PA LinkedIn channel has over 1,000 subscribers and free engagement metrics are available from the website.

2.6 At the 13th meeting of the RASG-APAC in December 2023, the members decided to empower the APRAST and its Subgroups to adopt certain Decisions and Conclusions to simplify the processes and shorten development time for all APRAST work outputs. APRAST can adopt, inter alia, Decisions and Conclusions related to "all technical and operational aspects of APRAST work within its TORs including the development of regional guidance material for publication in ICAO APAC website" (ref. RASG-APAC Procedural Handbook – 3rd edition, Appendix B, section 4.0).

2.7 This empowerment allows the APRAST to develop and disseminate such guidance, but since it is intended for the RSA to be a RASG-APAC branded product, the SEI WG agrees it may be best to get the RASG-APAC's approval.

3. ACTION BY THE MEETING

3.1 The Meeting is invited to:

a) Approve the concept of a RASG-APAC Safety Advisory to help meet the need to disseminate safety information in a timely manner or highlight existing guidance;

b) Note the template used by RASG-PA to be adapted by the SEI WG; and

c) Discuss whether to table this at RASG-APAC/14 for approval considering the safety advisory is intended to be a RASG branded product.

— — — — — — — —

RASG-PA Safety Issue Alert (RSIA) #01

THREAT: POTENTIAL CONTROLLED FLIGHT INTO TERRAIN

Subject: Increased Risk of Controlled Flight into Terrain due to Incorrect Altimeter Settings on RNAV Approach at Non-ILS airports

Intended Audience: Air carrier operators, flight crews, air navigation service providers (ANSPs), air traffic controllers and States' Civil Aviation Authorities.

Background: Recent serious events[1] have highlighted the importance of ensuring the accuracy of barometric altimeter setting when executing approach procedures that rely on it for vertical navigation. Vertical navigation such as RNP APCH to LNAV/VNAV minima, RNP AR APCH or vertical navigation that use the continuous descent final approach (CDFA) technique rely on BARO-VNAV equipment onboard to compute the vertical profile.

Due to the reliance of barometric altimeter by the vertical profile of an RNAV approach, an error of 1 hectopascal (hPA) or 0.0295 inches of mercury (inHg) in the QNH translates to a deviation of 28ft in the displayed altitude. For instance, the flight crew in the event of the Paris-Charles de Gaulle (CDG) airport in France, had an incorrect altimeter information with an error of 10hPa (0.30 inHg) which resulted in the aircraft flying 280ft below of the intended altitude. However, the displayed altitude was correct thus providing a false altitude information to the flight crew. The diagram in Figure 1 shows the difference between intended and actual path when an incorrect QNH (or QFE) is used.

The risk of Controlled Flight into Terrain (CFIT) increases when inaccurate barometric altimeter values are used to fly RNAV approaches, specially, at airports with no Instrument Landing Systems (ILS). The aircraft's proximity to the published RNAV approach path will not trigger a *Too Low Terrain* alert by the Terrain Awareness Warning System (TAWS) because the flight path remains outside of the Terrain Clearance Floor (TCF) alert envelope (fig.1). Combined, these factors effectively eliminate an important safety barrier against CFIT.

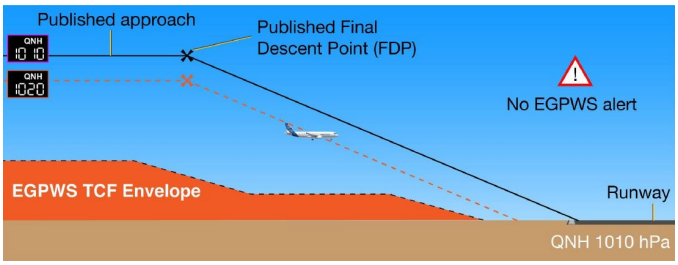


Figure 1: Example of the effects of an incorrect BARO altimeter setting[2]

An RNAV approach coupled with the ILS may help keep the aircraft off unsafe altitudes (as the ILS glide slope keeps the aircraft at a safe altitude); however, relying on the ILS alone does not necessarily mitigate the risk posed by an incorrect altimeter setting as it can still be a hazard even when executing an ILS approach. For example, executing an early go-around with an incorrect altimeter setting may result in the crew relying on the wrong altitude information still thus the potential of CFIT remains.

Although RASG-PA emphasized the use of TAWS to mitigate the risk of CFIT in the RASG-PA Safety Advisory (RSA) 07B[3], recent events have highlighted a limitation in the system not addressed in the RSA. *(See recommendations on the next page)*

[1] Preliminary report: 9H-EMU, Airbus 320. Paris-Charles de Gaulle airport - 23 May 2022. https://bea.aero/fileadmin/user_upload/BEA2022-0219_9H-EMU_preliminary_report_for_publication_EN_finalise.pdf

[2] Graphic courtesy of The Airbus Safety Magazine, November 2022- *Use the Correct BARO Setting for Approach*

[3] RSA: Regional Safety Advisory https://www.icao.int/RASGPA/Pages/RASGPA-SA.aspx

Recommendations: To mitigate the risk of using an incorrect barometric altimeter setting, RASG-PA recommends the following:

To Air Carrier Operators:

- Ensure that flight crews are made aware of the importance of receiving and inputting accurate barometric altimeter settings when flying RNAV approaches (approaches using baro-VNAV function) to prevent CFIT accidents. If there is doubt, flight crews must query air traffic control to ensure the correct barometric altimeter setting is received, especially when flying into airports without digital ATIS (D-ATIS). Flight crews should be aware of potential transcription errors on the ATIS due to language, poor handwriting, etc. Ensure both pilots are independently verifying the altimeter setting.
- Given that the number one contributing factor of incorrect altimeter setting is flight crews not changing the departure airport's altimeter setting to the arrival airport's altimeter setting, operators should ensure crews are aware of this error and develop procedures to help pilots verify they use the landing airport's altimeter setting.
- Develop procedures to support flight crews in checking the consistency of the QNH with previous settings and other available sources (e.g. ATIS).
- Leverage the FDM/FOQA program to identify the prevalence of incorrect altimeter setting events in order to mitigate the risk.
- Be aware of the potential confusion of flight crews when flying to airports that use barometric pressure units different to the units they use in their domestic airports i.e. hectopascal (hPa) vs inches of mercury (inHg). To address this confusion, ensure flight crews are extra vigilant of the barometric pressure units they use when flying into locations that use different units.

To ANSPs:

- Ensure that air traffic controllers are aware of the importance of issuing accurate barometric altimeter settings to flight crews flying RNAV approaches (such as approaches that use baro-VNAV function) to prevent CFIT accidents.
- If the airport does not have a D-ATIS, ensure accurate and clear barometric information is recorded on the ATIS. When in doubt, re-issue the altimeter information directly to the flight crews.
- Ensure correct barometric altimeter settings are correctly read-back by flight crews.
- If the capability exists, consider the use of the barometric pressure settings that Mode S enhanced surveillance (EHS) equipped aircraft downlink to enable timely identification of aircraft operating with incorrect barometric altimeter setting.
- If the barometric information is not easily available and requires air traffic controllers to use conversion tables, consider changing this method by providing controllers with a direct reading method that is not susceptible to human error.
- Ensure that air traffic controllers are aware of the existence of the potential confusion associated with different barometric unit use among international flight crews. If controllers suspect that one of the flights under their control might be using different units, they should verify that flight crews are using the correct barometric units. When these errors are identified, ANSPs should communicate them to the operators' safety department to avoid re-occurrence and ensure that all crews flying to their locations are aware of the units used by the state's ANSP.

Note: In the context of the factors explained in this RSIA, air traffic controllers may be the only safety barrier against CFIT.