



ICAO

**Second Meeting of the Steering Group for the continued Improvement of Air traffic Services
over the South Atlantic (SAT/SG2)**

Dakar, Senegal, 9-12 December 2024

Agenda Item 5: SAT Members initiatives.

Safety Occurrence Reporting High-level Points

(Presented by IATA)

SUMMARY	
<p>The paper provides an overview of the influence of safety occurrences (large height deviations) on collision risk estimates, highlights the importance of a robust and just safety reporting culture, and details height monitoring requirements critical to assurance of continued safety application of the Reduced Vertical Separation Minimum (RVSM). Additionally, the paper provides IATA's observations regarding safety report archiving and its importance to progressing active safety management in the SAT.</p>	
<p>Action by the Meeting is in paragraph 3.</p>	
Reference	
<i>Strategic Objectives</i>	A Safety

1 INTRODUCTION

1.1 Vertical-plane system performance monitoring is necessary to ensure the continued safe use of the Reduced Vertical Separation Minimum (RVSM) and that established safety goals are met. System performance monitoring procedures must be established to ensure the following:

- a) the RVSM approval process remains effective (i.e., only approved aircraft are permitted to operate in RVSM airspace);
- b) the Target Level of Safety will be met; and
- c) the required level of aircraft height-keeping performance is maintained.

1.2 This monitoring activity includes conducting routine safety assessments, estimating the minimum risk of collision associated with operational errors and in-flight contingencies resulting from large height deviations (LHDs) (as prescribed in ICAO RVSM guidance material, a large height deviation is a vertical difference of 90 meters/300 feet or more from the flight level expected to be occupied by the flight), and evaluation of the stability of altimetry system error (ASE).

1.3 Regional Monitoring Agencies (RMAs), organizations responsible for performing system performance monitoring for a specific airspace or region, have been established world-wide. RMAs validate RVSM approval data, conduct aircraft height monitoring, and produce operational collision risk estimates. These important safety-specific activities, specified in ICAO standards and recommended practices (SARPS), rely exclusively on data provided by accredited member States. For safety assessment and system performance monitoring programs to be effective, it is essential that lines of communication are established between the RMA responsible for an airspace volume and the appropriate States, and that States ensure that all required safety data are submitted to RMAs.

1.4 The following sections provide an overview of:

- a) the necessity of reporting LHDs;

Note: While this paper focusses on assessing operations in the vertical plane, hence LHDs, it should be noted that the principles apply to large lateral deviations (LLDs) and large longitudinal errors (LLEs). These operational errors (LHDs, LLDs, and LLEs) are often referred to as safety occurrences.

- b) the influence of LHDs on collision risk estimates and the impact on safety when there is a lack of reporting;
- c) the importance of aircraft height monitoring and the risks associated with unmonitored aircraft; and
- d) the importance of promoting a positive safety reporting/data collection culture.

2. DISCUSSION

2.1 In accordance with ICAO SARP, a safety assessment is required for ongoing safety monitoring of existing separation standards. A safety assessment is a quantitative examination of whether the risk of midair collision associated with a separation minimum meets a safety goal, such as the Target Level of Safety.

2.2 The objective of the safety assessment is to determine overall risk, the risk of collision due to all causes, which is the sum of technical risk and operational risk. Technical risk results from the operation of aircraft height-keeping systems. On the other hand, operational risk arises from events such as pilot or controller operational errors, and in-flight contingencies. Reports of LHDs are the only source of data permitting determination of operational risk. If there is a deficiency in LHD reporting for an airspace under evaluation, it is possible that elevated risk or adverse performance trends would go undetected. The following sections highlight examples.

2.3 Experience has shown that LHDs have a significant influence on the outcome of collision risk estimates. The greatest exposure to risk is time spent at a flight level other than planned or assigned. For example, figure 1 illustrates two operational errors resulting in a risk-bearing large height deviation. In both examples, an aircraft is operating at a flight level other than expected and is potentially at risk of being in conflict with opposite direction traffic.

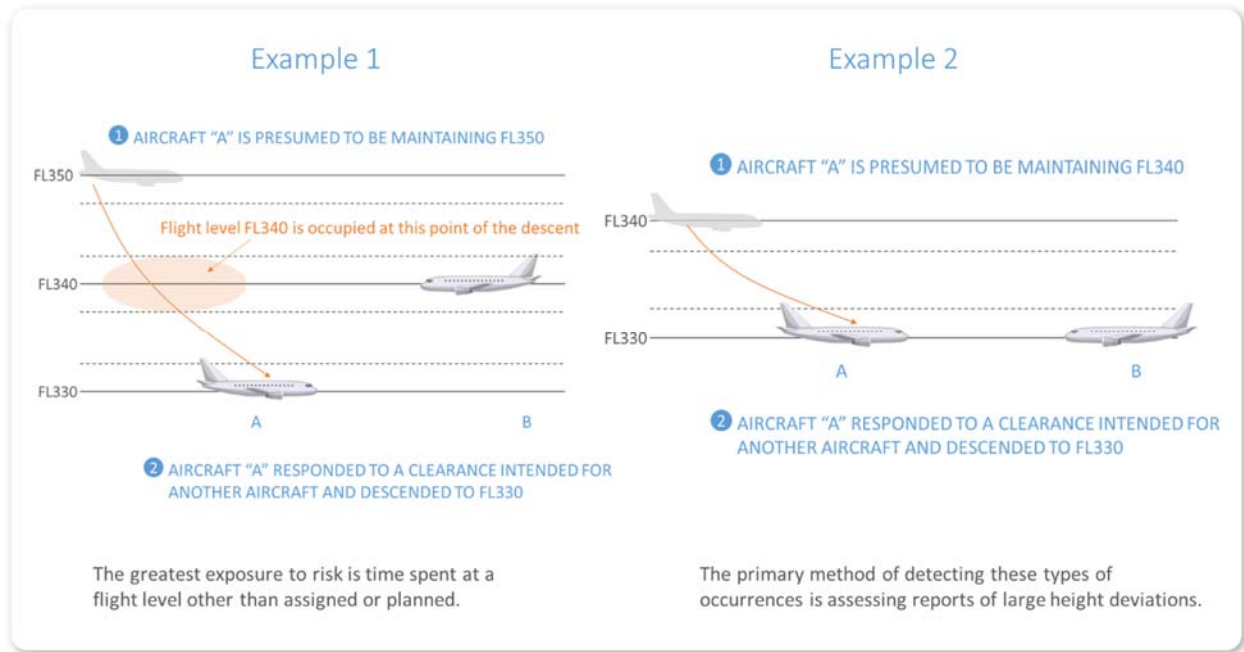


Figure 1. Examples of Risk-Bearing Large Height Deviations

2.4 Reports of LHDs are also necessary to perform trend analysis and detection of “hot spots,” or areas with a large concentration of LHDs. Assessing LHDs on a regular basis supports identification of systemic safety-degradation issues, identification of potential adverse performance trends, and enables mitigating risk at the earliest stage. An example of identification of hot spots is shown in figure 2, which depicts the location of operational errors uncovered in a portion of the Pacific airspace volume during 2023 using circles, with the areas of the circles proportional to the risk values associated with the errors.

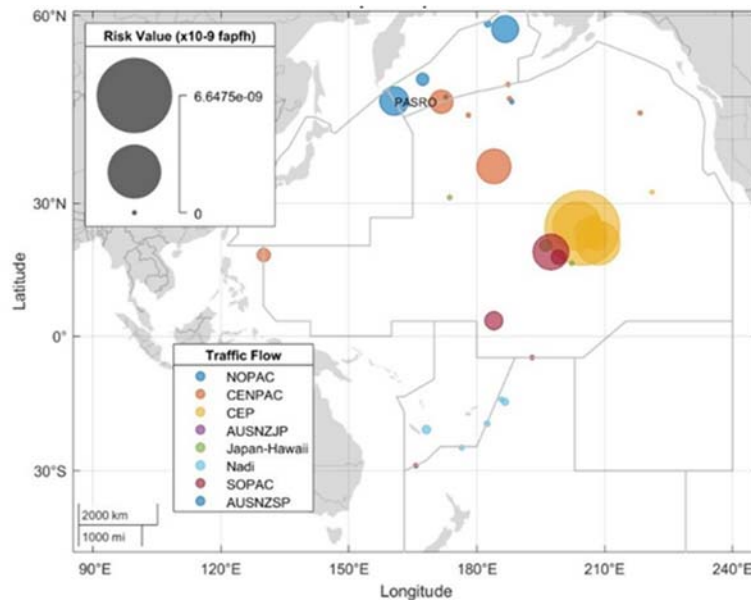


Figure 2. Example of identification of LHD hot spots

2.5 Therefore, it is essential that the necessary data are collected and that States, service providers, and applicable stakeholders understand types of events that qualify as safety-related occurrences and the importance of reporting them.

2.6 Identification and implementation of remedial actions is an outcome of assessing LHDs. To initiate remedial action for the purpose of reducing risk, it is necessary to have a clear understanding of the reasons driving the risk increase. Therefore, it is important that any safety assessments undertaken are of such detail that underlying causes of risk in the airspace are identified. As a result, a subject matter expert analysis of operational errors and large height deviations is an important activity to be included in the safety assessment process.

2.7 For example, following RVSM implementation, assessment of large height deviations revealed that there was a spike in operational errors related to instances where FL300 was being confused with FL330. It was speculated that the introduction of additional flight levels in the RVSM band was a contributing factor. Additional phraseology guidance was incorporated into procedural documentation to remediate this problem.

Height Monitoring

2.8 Height monitoring is conducted to confirm that the height-keeping performance of aircraft complies with requirements established to ensure safe use of the 1000-ft vertical standard. The objective of height monitoring is to assess an individual aircraft's Altimetry System Error (ASE). ASE is the difference between the pressure altitude indicated by an aircraft's altimeter and the actual pressure altitude being flown. ASE can have a significant impact on the safety of aircraft-pair separation. The actual pressure altitude being flown (not the pressure altitude displayed on the flight deck and reported by an aircraft's transponder) is not observable by the pilots, ATC, or TCAS. Height monitoring assesses aircraft performance using the GPS-derived geometric height being flown by an aircraft and an independent determination of the geometric height of the pressure altitude assigned by ATC and compares it to the pressure altitude flown.

2.9 To comply with ICAO standards (Annex 6), an aircraft's ASE must be less than 245 ft. The lower the ASE, the safer the flight. ASE performance can degrade over time, or simple aircraft modifications or maintenance issues can affect ASE performance.

2.10 If an aircraft is not height monitored, it is possible that an aircraft could be flying in RVSM airspace with a large (noncompliant) ASE value. Operating with an ASE value of this magnitude places the aircraft at risk of conflicting with an aircraft operating at adjacent flight levels. Figure 3 illustrates an aircraft with large ASE. In this case, aircraft "A," assigned to flight level 350, has an ASE value of -600ft which is undetectable by the flight crew, ATC or TCAS. Aircraft "A" is infringing on flight level 340 which is occupied by opposite direction traffic, aircraft "B".

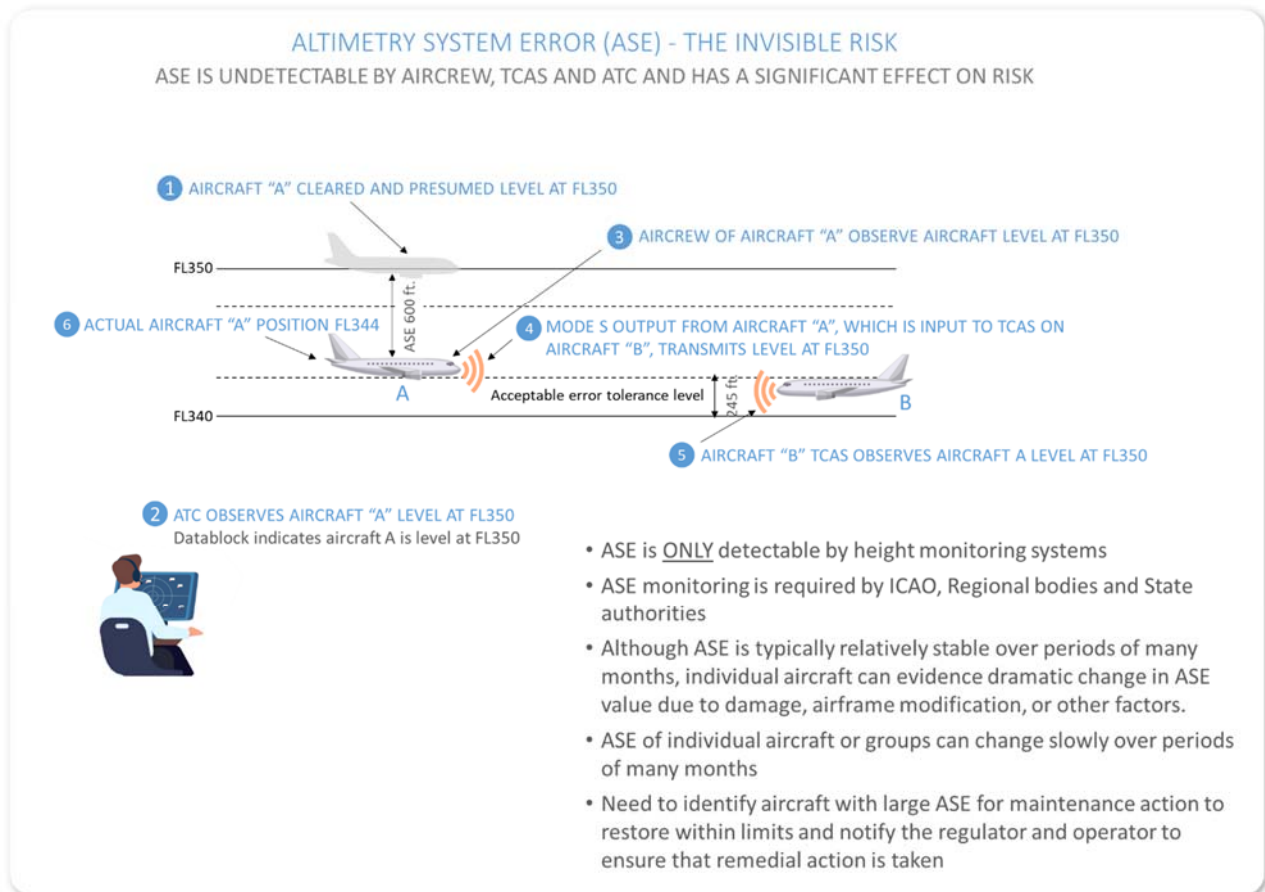


Figure 3. Example of a large ASE event

2.11 If the aircraft performs within the safety tolerance for ASE, the aircraft is considered eligible for RVSM operations.

2.12 Based on the forgoing, the following is proposed:

Why	To ensure safety assessment and system performance monitoring programs are effective and essential lines of communication are established between the RMAs responsible for an airspace volume and the appropriate States.
What	Invite States in coordination with RMAs assess the completeness and robustness of ASE reporting and related safety data submitted to RMAs. RMAs are invited to propose corrective measures to SAT SOG/05 that will ensure the required level of aircraft height-keeping performance data is effectively captured.
Who	RMAs responsible for airspace in the SAT area. SAT States
When	SAT SOG/05

Draft SAT SG/2 Conclusion xx – Assess regional processes and regional activities supporting aircraft height-monitoring in the SAT area

That the SAT SG,

- a) Recognize the impact of non-height monitored aircraft in RVSM designated airspace on the Target Level of Safety; and
- b) Invite SAT SOG/05 to review, adopt and implement proposed corrective measures as appropriate, that would harmonize and improve regional processes, reporting, data collection and coordination concerning aircraft height monitoring and ASE in the SAT.

Safety Occurrence Reporting and Data

2.13 Proper identification of qualifying safety occurrences and recording important parameters, such as time spent at an incorrect flight level, for each occurrence is necessary to quantify operational risk. As much information as possible should be collected and documented in a report to assist in the estimation of operational risk.

2.14 It is the responsibility of the State to establish a program for identifying safety occurrences and a mechanism for collecting and analyzing reports of such deviations. The operational risk assessment relies on States to provide these reports.

2.15 The primary sources for reports of safety occurrence events have been the ATS units providing air traffic control services in the airspace where the separation standards under evaluation are applied. Each ANSP should establish a means to detect and report these occurrences within the airspace for which it is responsible.

2.16 Other sources for reports of safety occurrences should also be explored. For example, aircraft operators should be encouraged to share pertinent summary information from internal safety oversight databases. Voluntary reporting safety databases should also be examined.

Promoting a Positive Safety Reporting Culture

2.17 There is a need to learn from operational errors (LHDs), as well as other incidents that occur in an airspace, so that appropriate action can be taken to prevent such events from occurring in the future. Assessing LHDs is a necessary and effective means of improving safety and adopting preventative actions. It is therefore important that an environment exists where reporting safety occurrences is encouraged, and the necessary processes are in place for collecting and disseminating reported occurrences to the appropriate safety groups for assessment.

2.18 To encourage safety occurrence reporting, organizations should develop guidance specifying the principles of a non-punitive, just culture which they will observe and ensure that safety just culture principles are adhered to at all levels of their organization.

2.19 CANSO: *Safety Culture Definition and Enhancement Process* explains:

The issue is not whether the organisation has a reporting system; it is whether, as a matter of practice, errors, near misses, hazards and risks are reported. A reporting culture depends, in turn, on how the organisation handles blame and punishment. If blame is the routine response to error, then reports will not be forthcoming. If, on the other hand, blame is reserved for truly egregious behaviour, involving recklessness or malice, reporting in general will not be discouraged. Rather than a blanket no-blame approach, what is required, Reason argues, is a just culture.

Robust Safety Reporting / Requirements in the SAT

- 2.20 General awareness of reporting requirements. Reporting awareness applies to States, ANSPS and operational/ATC personnel.
- 2.21 Established guidance material for the purpose of ensuring continuity of safety data reporting through personnel changes.
- 2.22 Potentially established processes and procedures for capturing and recording required safety data.
- 2.23 Some States and operators are not providing LHD reports.
- 2.24 Some types of LHDs are not being captured. For example, for a particular airspace, a significant number of coordination errors are reported but the number of pilot deviations or controller errors reported for the same airspace is zero.
- 2.25 A regional agreement and implementation of a data archiving system has not been finalized for the SAT area. Implementing an archiving system in the South Atlantic Group (SAT) offers significant benefits, including ensuring regulatory compliance, enhancing operational efficiency, and improving stakeholder transparency. The system simplifies access, supports regular updates, and provides standardization across documentation by serving as a centralized repository for preserving historical records, operational guidelines, and compliance materials. This reduces redundancy and inefficiencies while streamlining internal processes. Additionally, it guarantees that key documents are readily accessible to stakeholders, fostering improved collaboration and coherence across the SAT region.
- 2.26 The archiving system would support the SAT's commitment to safety and risk management by maintaining accurate records, ensuring consistent terminology, and aligning all materials with ICAO standards. Airlines, Air Navigation Service Providers (ANSPs), and regulators, in particular, benefit from enhanced accessibility to crucial documentation, allowing them to harmonize effectively on operational and compliance matters. The system reinforces SAT's pivotal role in advancing air traffic services over the South Atlantic by providing a reliable foundation for informed decision-making, facilitating efficient communication, and ensuring adherence to global aviation best practices.
- 2.27 The implementation of an archiving platform and robust reporting program allows for the identification of causal factors, development of corrective actions and mitigation of potential hazards before they lead to serious incidents. Timely and accurate reporting of safety events is crucial for maintaining situational awareness and ensuring the safety of all flights, enhancing overall safety and efficiency in the airspace. The SAT Annual Safety Report (ASR) Project Team as well as SAT SOG03 were briefed on the North Atlantic Events Reporting Application (NERA) database. The database supports collection of reportable events in the NAT HLA. With specified adjustments, the NERA database could be easily adapted to support collection of reportable events in the SAT, which could be later reviewed and scrutinized by the SAT SOG or its designated scrutiny group. Additionally, the data supports reporting of safety performance indicators, corrective actions and would highlight the scrutiny of related events in the SAT ASR.
- 2.28 IATA recommends that the SAT SG02 decide to support activities by the SAT SOG that would identify the necessary adjustments needed to adapt the NERA database to SAT safety event reporting / archiving requirements and to complete a trial application of an SAT events reporting database (SERD) by the end of CY2025.

2.29 Based on the forgoing, the following is proposed:

Why	To improve safety report accuracy and level of safety reporting in the SAT area.
What	In coordination with the SAT SOG, IATA, and IFALPA establish a safety report campaign in the SAT that would commence by the Q2 2025.
Who	SAT SOG Secretariat, IATA, IFALPA, SAT DMO
When	SAT SOG/05

Draft SAT SG/2 Conclusion xx – Improve safety reporting accuracy and level of safety reporting in the SAT area

That ,

- a) The SAT SOG to develop and establish a safety reporting campaign in the SAT that would improve the accuracy and level of safety reporting in the SAT area.
- b) In consideration of the resources required for development of the safety reporting and the desired timing for the campaign launch, the SAT SOG may approve its commencement via correspondence.

2.30 Based on the foregoing, as paragraph 2.28 refers, IATA urges the SAT SG to consider the availability of the NERA database. To date, no other oceanic safety reporting database automation is available in the SAT. Nevertheless, the need is immediate and substantial for RMAs, States, and regional safety experts to have access to safety reporting data to effectively identify and mitigate risks and perform scrutiny of reported events, as appropriate.

Why	Ensure the SAT has the appropriate safety reporting database identified to support safety report archiving and scrutinizing of regional events.
What	Invite SAT SOG to further review the NERA database and decide on the modifications necessary for adaptation for the SAT.
Who	SAT SOG05
When	By SAT SG3

Draft SAT SG/2 Conclusion xx – Establish a safety reporting event database for the SAT

That the SAT SOG

- a) further review the NERA database;
- b) Assess what modifications would be required to adapt the NERA database to the SAT;
- c) Report finding to SAT SG/03

2.31 The areas highlighted in the paper should be considered as components to support the progression of an active safety just culture in the SAT area and assists with the establishment of basic safety components required for oceanic airspace.

3 ACTION BY THE MEETING

3.1 The SAT Steering group invited to:

- a) note the information provided;
- b) recognize the relationship between RMA activities, (e.g., ASE, aircraft height monitoring), safety reporting and the TLS;
- c) recognize that a true safety assessment cannot be achieved without measures to effectively evaluate safety just culture in the SAT area;
- d) agree to the proposal to launch a safety reporting campaign in the SAT area; and
- e) Consider the draft conclusions provided in the WP section 2.12, 2.19 and 2.30.