International Civil Aviation Organization
CAR/SAM Regional Planning and Implementation Group (GREPECAS)

WORKING PAPER

GREPECAS/22 — WP/17
19/08/24

**Fourth GREPECAS–RASG-PA Joint Meeting and**
**Twenty-second Meeting of the CAR/SAM Regional Planning and Implementation Group (GREPECAS/22)**
Virtual Phase (Asynchronous, 16 September to 11 October 2024)
In-Person Phase (Lima, Peru, 20 to 22 November 2024)

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**Agenda Item 6. Initial Review of the Current GREPECAS Work Programme and Projects**

# REPORT OF THE 2023 CAR/SAM RVSM AIRSPACE MONITORING PROGRAM AND ACTIVITIES 2023-2024 OF THE GTE

(Presented by the Secretariat)


**EXECUTIVE SUMMARY**

This Working Paper provides a detailed overview of the activities carried out by the GREPECAS Scrutiny Working Group (GTE) during 2023 and the first semester of 2024. Throughout this period, the GTE has played a crucial role in the safety of RVSM airspace in the Caribbean and South American regions (CAR/SAM), ensuring it remains within established safety levels. In collaboration with CARSAMMA, the GTE has evolved significantly, becoming a key source of safety data essential for decision-making
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| **Action:** | Suggested Actions are included in Section 5 |
| *Strategic Objectives:* | • Safety<br>• Air Navigation Capacity and Efficiency |
| *References:* | • • Preliminary Report of the Twenty-Third Meeting of the Scrutiny Working Group (GTE/24) of the CAR/SAM Regional Planning and Implementation Group (GREPECAS) |

## 1. Introduction

1.1 Since the implementation of the Reduced Vertical Separation Minimum (RVSM) between Flight Levels 290 and 410 inclusive (RVSM airspace), the Scrutiny Working Group (GTE) of GREPECAS, together with the Monitoring Agency for the Caribbean and South American Regions (CARSAMMA), has played a vital role in continuously monitoring the performance of the air navigation system in RVSM airspace, in compliance with ICAO Doc. 9937 and 9574

## 2. Scope

2.1 This Working Paper provides a summary of the GTE's activities during the 2023-2024 period, including the results of the 2023 RVSM safety performance analysis for the CAR/SAM regions.

## 3. Discussion

3.1 The twenty-fourth GTE meeting (GTE 24) was held in Mexico City, Mexico, from August 5 to 9 of this year. Fifty (50) delegates representing 15 States/Territories and International Organizations of the CAR/SAM and NAM regions attended the meeting.

3.2 The LHD reports accumulated over 12 months, from January to December 2023, were used for the operational safety assessment. **The result of the CAR/SAM region's Collision Risk Model (CRM) assessment for 2023 was 2.371 x 10-9**, indicating the risk remained within the acceptable safety level of 5 x 10−9 fatal accidents per flight or loss of the standard vertical separation of 1,000 ft. (See Appendix A Fig. I).

**FIRs in 2023 with risk levels above the TLS**

3.3 In the 2023 assessment, it was identified that the Port-au-Prince (MTEG), La Paz (SLLF), Guayaquil (SEFG), Curacao (TNCF), Panama (MPZL), and Santo Domingo (MDCS) FIRs presented a risk level above the Target Level of Safety (TLS) (see Appendix A Fig II). Analyzing the CRM values over the past five years shows that certain FIRs have remained above the TLS. The Secretariat and the Rapporteur will organize meetings with the focal points of the involved States as part of the strategy implemented to reduce LHDs at the border. (See Appendix A Fig. II

3.4 GTE 24's WP07, presented by the Rapporteur, requested that CARSAMMA analyze the quantitative factors negatively impacting the CRM calculations of the FIRs listed above as being above the desired safety level (TLS), with the objective of establishing adequate measures to mitigate the risk. CARSAMMA identified the following factors in its study:

- Number of non-RVSM-approved aircraft flying over the FIR
- Timely and accurate coordination
- Incorrect information on the "0" Form designed to collect data for analyzing and assessing airspace safety in the CAR/SAM Regions.
- Duration of an aircraft at an unauthorized level (event duration)
- FIR surveillance coverage

**LHDs in the CAR/SAM FIRs**

3.5 Regarding large height deviations (LHDs) in 2023, 624 valid events were included in the CRM study. As in previous years, LHDs with Code "E" (error/failure/no coordination between ATC units) were the most frequent, with 561 events, followed by Code "L" (non-RVSM approved aircraft), with 94 events. The high number of Code "E" events requires analyzing the factors affecting FIR coordination; likewise, why non-RVSM-approved aircraft are using the airspace, increasing the risk level.

3.6 The process of individually analyzing and assessing LHDs determines the Risk Value (RV) associated with each LHD, using a risk matrix designed to evaluate if the risk level of each event falls within the acceptable limit established for the CAR/SAM Regions, which is 20 points. This analysis shows an average risk value of 21.4 for the CAR region, 22.2 for the SAM region, and an overall average of 22.5 for both regions CAR/SAM. During 2023, 40 events with values between 39 and 51 were identified, requiring analysis and mitigation by the States.

3.7 The FIRs that reported the more LHDs with their adjacent FIRs were Panama (71 events), Bogotá (53 events), and Santo Domingo (45 events). The three FIRs that caused the higher number of LHDs to their adjacent FIRs were Bogotá (114 events), Panama (58 events), and Amazonica (46 events).

**PBCS Assistance Seminar**

3.8 As part of the agreements from GTE 24, CARSAMMA, with the Secretariat will organize a seminar for the CAR/SAM States to train Contact Points on the actions necessary for reporting approvals of Performance-Based Communications and Surveillance (PBCS). The seminar will include information about filling out of the forms F0 (data collection form), F2 (approval registration form for operating in RVSM airspace with PBCS in the CAR/SAM regions), F3 (approval cancellation form for operating in RVSM airspace with PBCS in the CAR/SAM regions), F5 (RVSM flight plan data audit form), and F6 (ASE monitoring validation request form).

**Accredited Contact Points Manual for CARSAMMA**

3.9 The GTE 24 Meeting approved the update of the Manual of Accredited Contact Points to CARSAMMA. This project led by the Rapporteur and an ad-hoc group with representatives from Colombia, Cuba, Ecuador, the Dominican Republic, and Trinidad and Tobago.

3.10 The NE/11 of GTE 24, presented by Colombia, highlighted the need to update the methodology for analyzing and assessing E2 events. These events increase their risk value due to delayed communications from crews when entering a new FIR (GREPECAS WP 41 addresses this situation). Following this, the meeting deemed a more detailed analysis necessary and decided to create an ad-hoc group led by the Rapporteur and representatives from Colombia, Brazil, Chile, Jamaica, COCESNA, and CARSAMMA. Moreover, the Dominican Republic presented Working Paper 07 on the classification, analysis, and mitigation of human error to identify the different factors influencing LHDs in categories E1 and E2 to mitigate these events by addressing their root causes. The document detailed the most common operational errors leading to LHDs, proposing an analysis based on the operational context of each ATC unit.

3.11 CARSAMMA and NARMO presented the results of the “Prolonged Audits” identifying a significant number of aircraft operating in RVSM airspace without a registered in the RVSM capabilities database of the RMAs. It was noted during the presentation that some States in the CAR/SAM regions had not responded to CARSAMMA's communications on this matter. It is important to note that the operation of these aircraft negatively affects the evaluation of the Collision Risk Model (CRM) and is one of the main factors contributing to certain FIRs being above the Target Level of Safety (TLS) (See GREPECAS 41 WP). In response to this information, GTE 24 requested that the Secretariat send a letter to the States demanding an update of the database.

3.12 The Rapporteur, with support from CARSAMMA, will compile a list of specific LHD events in 2023 in which aircraft flew over RVSM airspace without approval. The aim is to work with the FIR Contact Points to maintain the desired level of safety (TLS).

3.13 GTE 24 acknowledged the good work of coordination and harmonization of procedures being carried out by CARSAMMA and NAARMO, which has led to an improvement in data exchange and in the performance analysis of the CAR Region's RVSM airspace as a whole. It is important to recognize the excellent work done by CARSAMMA, which has strengthened its team of experts and improved internal procedures to continue supporting the RVSM airspace monitoring process in the CAR/SAM regions over the past few years.

## 4. Conclusions and recommendations

4.1 The effectiveness of monitoring RVSM airspace depends on the quality and quantity of the data received by CARSAMMA. States must collaborate proactively to ensure that the data provided is accurate and complete, enabling proper risk assessment and timely corrective actions.

4.2 The analyses conducted show that certain events, particularly those related to lack of or erroneous coordination between FIRs and the operation in the RVSM airspace by non-approved aircraft, pose a significant safety risk. States and service providers must implement immediate actions to mitigate this risk and prevent future events.

4.3 The GTE's work in identifying and analyzing height deviations (LHDs) has improved the management of these events, particularly those related to coordination errors (codes E1 and E2). The suggested mitigation measures, along with the update of forms and procedures, will help reduce the frequency of these incidents and strengthen safety in the CAR/SAM regions.

4.4 Cooperation among States and active participation in data updating and validation are essential to maintaining a high level of safety in RVSM airspace. Implementing seminars and training, as proposed during the GTE 24 meeting, will facilitate a deeper understanding of the processes and contribute to the continuous improvement of the system.

4.5 The lack of response to CARSAMMA's communications from some States is a concern that must be addressed urgently. Updating the RVSM ACFT capability database and implementing GTE recommendations are necessary to ensure that all aircraft operating in RVSM airspace are authorized and that the vertical collision risk remains acceptable.

## 5. Suggested actions

5.1 The Meeting is invited to:

a) Take note of the information provided in this Working Paper;

b) Implement appropriate measures to reduce LHDs, including those related to ATS coordination errors;

c) Support the RVSM airspace monitoring process by providing the data and information requested by CARSAMMA; and

d) Suggest any additional actions deemed necessary.

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## APPENDIX A

**Fig. I** Figure I shows a table with the results of the CRM assessments for the period 2019-2023, indicating that operations in RVSM airspace have remained within the acceptable safety level of 5 x $10^{-9}$ fatal accidents per flight or loss of the standard vertical separation of 1,000 ft.

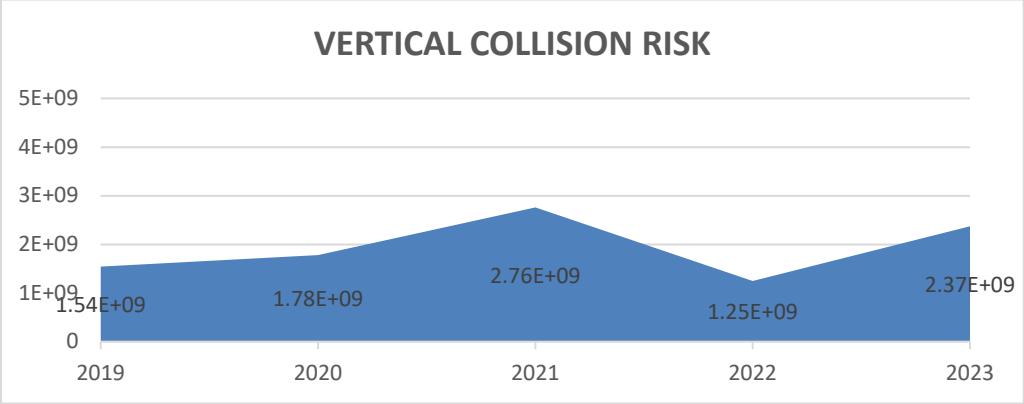


**Fig. II The Table shows the FIRs that during the last five years had a risk above the TLS of 5 x 10−9 fatal accidents per flight or loss of the standard vertical separation of 1,000 ft.**

| CRM | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| | La Paz | Cordoba | Mendoza | La Paz | Port Au Prince |
| | Bogotá | Brasilia | La Paz | Guayaquil | La Paz |
| FIR POR ENCIMA NIVEL DE | Guayaquil | Curitiva | Barranquilla | Asunción | Guayaquil |
| RIESGO ACEPTABLE DE | Asunción | Recife | Bogota | Port Au Prince | Curazao |
| SEGURIDAD OPERACIONAL | Montevideo | Santiago | Panama | Piarco | Panama |
| (5 x 10-9) | Maiquetia | Panama | Maiquetia | | Santo Domingo |
| | | Lima | | | |
| | | Habana | | | |

**Fig. III** Show the result of the CRM for each of the CAR/SAM FIRs

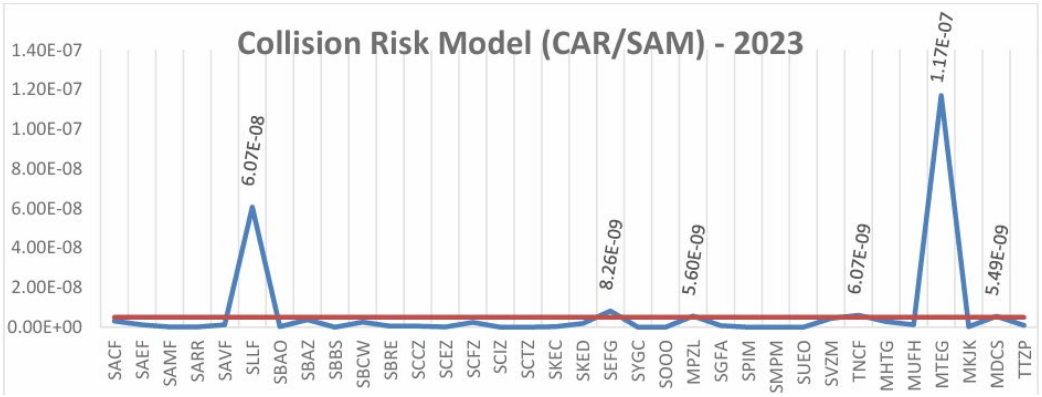

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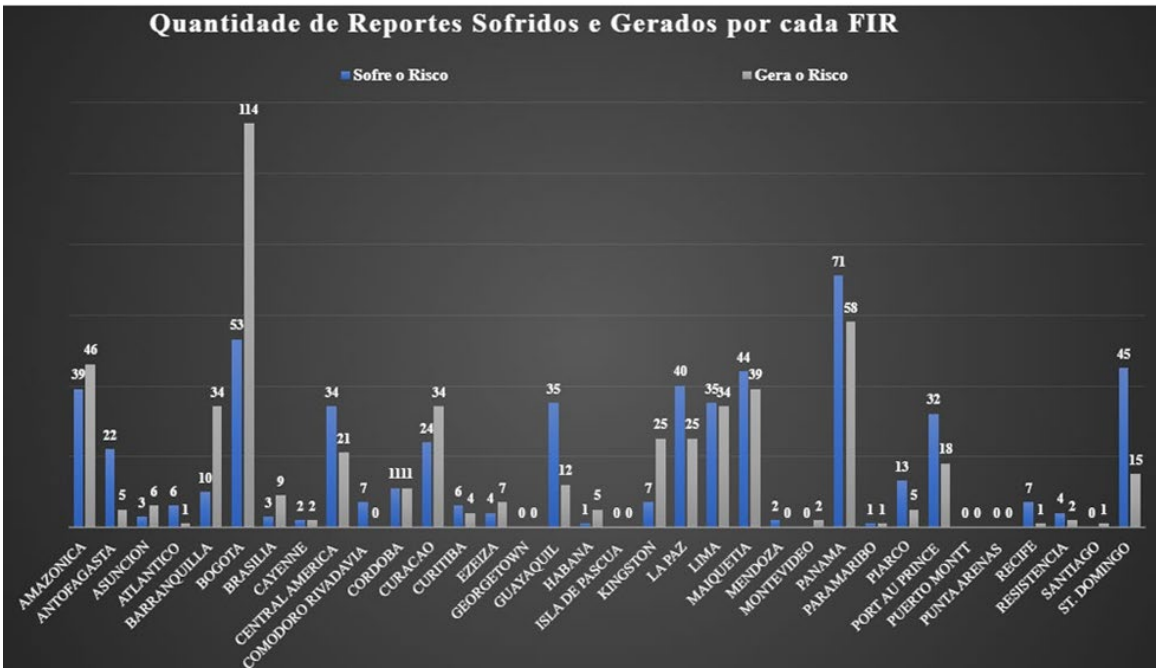
**Fig. IV** Shows the number of LHD reports reported, and caused by each CAR/SAM FIR

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