



**Fourteenth Plenary Meeting of the Regional Aviation Safety Group – Pan America
(RASG-PA/14)**

Lima, Peru 1st August to 20 November 2024

Agenda Item 7: Aspects of Coordination between RASG-PA and GREPECAS

SAFETY RISK FACTOR IN CAR/SAR RVSM

(Presented by GTE rapporteur/Secretariat)

EXECUTIVE SUMMARY

Aggregated data analysis on Large Height Deviations (LHD) is essential to identifying trends and factors affecting the risk level in the RVSM airspace in the CAR/SAM regions.

Identifying these trends and factors allows experts from FIRs and air operators to implement mitigating measures, improving operational safety and reducing risk in RVSM airspace.

This Working Paper presents two of the factors that most impact the risk level in the analysis of RVSM airspace:

- Aircraft without communication
- Aircraft without RVSM approval

Action:	Suggested actions are included in Section 5
<i>Strategic Objectives:</i>	<ul style="list-style-type: none"> • Safety • Air Navigation Capacity and Efficiency
<i>References:</i>	<ul style="list-style-type: none"> • Preliminary Report of (GTE/24) • Working Paper WP11 GTE24 presented by Colombia • Information Paper IP02 Vertical Collision Risk Assessment of the CAR/SAM regions in 2023 by CARSAMMA

1. Introduction

1.1 The joint aggregated LHD analysis is critical to enhancing safety in RVSM airspace, as it identifies trends and factors that could increase the risk of vertical collision (CRM).

1.2 The aggregated LHD data analysis could help FIRs and operators make informed decisions to mitigate risks, especially in areas with dense traffic or limited communication. Implementing corrective measures reduces the likelihood of incidents, maintains operational safety standards, and contributes to achieving the Target Level of Safety (TLS) in RVSM airspace within the CAR/SAM regions.

2. Scope

2.1 This working paper aims to present updated information on the analysis of the 2023 LHD reports and the identification of various factors that affected the risk level. The goal is to prevent the recurrence of similar failures. It also seeks the experts from the FIRs and air operators to take the appropriate mitigating measures.

3 Discussion

3.1 Analysing the quantitative factors that have negatively impacted the risk level in the calculation of the Collision Risk Model (CRM) in FIRs where the risk level exceeds the Target Level of Safety (TLS), we have identified the following:

- a. Aircraft without contact with ATS services
- b. Non-RVSM-approved aircraft that overflew the FIR
- c. Limited Surveillance coverage of the FIRs

Aircraft without contact with ATS services

3.2 The 2023 LHD event analysis has identified, aircraft crossing the receiving FIR's reporting point without establishing the necessary communication as a contributing factor. The delay in communication between aircraft and the receiving FIR's air traffic services can generate LHD events, the risk assessment of which varies considerably depending on whether the FIR has surveillance coverage or not. The lack of communication by crews in airspace without radar coverage significantly impacts the safety risk (see Appendix 1 for examples of late communications).

Aircraft without RVSM approval

3.3 Operating aircraft in RVSM airspace without the necessary approval information significantly impacts the vertical collision risk assessment (CRM, Collision Risk Model), one of the main factors contributing to some CAR/SAM FIRs being above the desired safety level (TLS).

3.4 The FIRs identified above the target safety level (TLS) in 2023, and which suffered the risk of aircraft operating without RVSM approval were:

- Port Au Prince: 22 aircraft operated in RVSM airspace without approval.
- La Paz: 19 aircraft operated in RVSM airspace without approval.
- Guayaquil: 11 aircraft operated in RVSM airspace without approval.
- Curacao: 2 aircraft operated in RVSM airspace without approval.
- Panama: 7 aircraft operated in RVSM airspace without approval.

3.5 Air traffic service providers authorize aircraft overflights in RVSM airspace based on the information provided by operators in item 10 of the flight plan or on information provided by the crews via the frequency through a flight plan update related to the RVSM status. However, on some occasions, the aircraft that update their flight plan by communication frequency are not registered as RVSM approved in the RVSM capabilities database managed by CARSAMMA.

3.6 Aircraft not listed in the CARSAMMA RVSM capabilities database or other Monitoring Agencies (RMA) overfly various RVSM airspaces during their route, creating an operational safety risk. However, this risk is only identified when a coordination error between the involved FIRs causes an LHD event or through the "prolonged audit" carried out by CARSAMMA.

3.7 The "Prolonged Audit" is an activity conducted by CARSAMMA and other monitoring agencies based on flight plans or other information (e.g., ADS data) to identify aircraft operating in RVSM airspace without being registered in the RVSM capabilities databases.

3.8 During 2023 and 2024, CARSAMMA identified several aircraft without RVSM information in its database and requested official information from the States of registration. However, some States in the CAR/SAM regions have not responded to CARSAMMA's communications, hindering the update of this database. (See **Appendix B**).

4. Conclusions

4.1 We can conclude that when flight crews fail to contact the Flight Information Region (FIR) they are about to enter, they are disregarding the procedure established in Document 4444 - Procedures for Air Navigation Services. According to section 4.11.1.1 "On routes defined by designated significant points, the aircraft shall transmit position reports upon passing the vertical, or as soon as possible after flying over each designated compulsory reporting point, except as provided in 4.11.1.3 and 4.11.3. The relevant ATS unit may request additional reports at other points."

4.2 It is important to consider Annex 2 – Rules of the Air, section 3.3.4, Changes to a Flight Plan: "All changes to a flight plan submitted for an IFR flight, or a VFR flight operated as a controlled flight, shall be reported as soon as possible to the appropriate air traffic services unit."

4.3 These concepts are essential for the operation of aircraft in any controlled airspace, especially in RVSM.

5. Suggested actions

5.1 The Meeting is invited to:

- a. Urge States to note the factors identified in the data analysis that affect operational safety in the CAR/SAM RVSM airspace, especially regarding aircraft without communication entering the FIR or without RVSM capabilities information, which impacts the safety risk;
- b. Urge States to improve communication with CARSAMMA, facilitating the exchange of RVSM capability data for aircraft registered in CAR/SAM States; and
- c. propose other measures to improve safety in the RVSM airspace of the CAR/SAM FIRs.

Appendix A

SAMPLE OF AIRCRAFT THAT ENTERED THE FIR WITHOUT COMMUNICATION INCREASING THE RISK VALUE IN 2023

EVENT 409: AVA137 in route SKRG-SEFG crosses the boundary point BOKAN at 20:53 UTC without coordination, generating an LHD E2 event. The crew calls the adjacent FIR when requesting descent 15 minutes later. At that time, the SEFG FIR identifies the aircraft, although it has surveillance, due the volume of traffic, the ATS did not identify the aircraft before the first call. According to CARSAMMA's analysis, the event lasted 900 seconds with a risk value of 46.

Report #: 409	POSITION: TEMOX	AVIANCA	TEMOX	MODE C, S o ADS: SI	HT LHD: 0
DATE: 20/06/2023	HOUR: 21:00	FLIGHT ID: AVA137	REGISTRATION: N951AV	CLRD FL:	DURATION: 900
ROUTE: UP778 - SKRG (Rio Negro) / SEFG (Guayaquil)			ACFT TYPE: A320	EVENT FL: 370	CODE: E2
REPORTING UNIT: GUAYAQUIL	FIR ERROR: BOGOTA	DMC /VMC: DMC		XFL SAME: 0	XFL OPS: 0
OTHER ACFT:	STATUS P' ACFT: *ND	DISTANCE (NM):	POSITION P' ACFT:	FL P' ACFT:	
CAUSE: OMISSION DE ESTIMA		STATUS RVSM: APPROVED	GTE TIME: 900	GTE CODE: E2	
EL AVA137, A LAS 21:00 NOTIFICA SOBRE LA POSICION TEMOX EN ESPACIO AEREO ECUATORIANO, LA CUAL ESTA UBICADA A 108 NM AL SUR DE LA POSICION BOKAN, LA QUE CRUZO A LAS 20:53, A FL 370, NO SE DISPONIA DE LA COORDINACION NI VIA ORAL NI AIDC. SE INFORMA AL RESPECTO A BOGOTA CONTROL.					
PROBABILIDAD: 1	DURACION: 3	GRAVEDAD: 3	RADAR / ADS: 5	WEATHER: 5	OTRO TRAFICO: 0
VALOR DEL RIESGO: 46		ACCION MITIGADORA: REQUIERE MONITOREO Y GESTION			
OBSERVACIONES: VALIDADO POR CARSAMMA CON LA AYUDA DE LOS POC DE LAS FIR INVOLUCRADAS - 6 CAR X SAM - 01/08/23					

EVENT 476: N8X in route KTEB-SBFI crosses the ABIDE point at 19:47 without coordination, generating an LHD E2 event. However, it contacted the adjacent FIR at 20:09, 22 minutes after crossing the FIR boundary. At the ABIDE point, Amazonico FIR's radar coverage is limited. Considering the type of aircraft and its average speed, it traveled approximately 160 NM in Amazonico FIR. This event lasted 1,320 seconds and generated a risk value of 51.

Report #: 476	POSITION: BRACO	SEA HUNT BOAT MANUFACTURING INC.	BRACO	MODE C, S o ADS: NO	HT LHD: 0
DATE: 30/07/2023	HOUR: 20:09	FLIGHT ID: N8X	REGISTRATION: N8X	CLRD FL:	DURATION: N/A
ROUTE: UP793 - KTEB (Tembeoro) / SBFI (Est do Inacra) - (BRACO UP793) DGM ULS16 DUBGI UL655			ACFT TYPE: F4U	EVENT FL: 410	CODE: E2
REPORTING UNIT: AMAZONICA	FIR ERROR: BOGOTA	DMC /VMC:		XFL SAME: 0	XFL OPS: 0
OTHER ACFT:	STATUS P' ACFT: *ND	DISTANCE (NM):	POSITION P' ACFT:	FL P' ACFT:	
CAUSE: ERROR EN EL CICLO COORDINACIONES ATC		STATUS RVSM: APPROVED ?	GTE TIME: 1320	GTE CODE: E2	
EL ACC BOGOTA NO COORDINO EL TRANSITO. EL TRANSITO REALIZO EL PRIMERO CONTACTO A LAS 20:09 UTC, INFORMANDO QUE MANTENIA EL FL410 Y QUE HABIA PASADO LA POSICION BRACO A LAS 19:47 UTC. *** CARSAMMA: LLAMA A LAS 20:09 E INFORMA QUE PASO TCP A LAS 19:47. SON 22 MINUTOS DE ANTELACION O 1320 SEGUNDOS. ***					
PROBABILIDAD: 3	DURACION: 3	GRAVEDAD: 3	RADAR / ADS: 10	WEATHER: 5	OTRO TRAFICO: 0
VALOR DEL RIESGO: 51		ACCION MITIGADORA: REQUIERE MONITOREO Y GESTION			
OBSERVACIONES: VALIDADO POR CARSAMMA CON LA AYUDA DE LOS POC DE LAS FIR INVOLUCRADAS - 7 CAR X SAM - 01/08/23					

Appendix B

AIRCRAFT WITH NO RVSM APPROVALⁱ INFORMATION THAT OVERFLEW CAR/SAM RVSM AIRSPACE IN 2023

DATE	ROUTE	ESTADO DE REGISTRO	STATUS RVSM 1ST ACFT	RMA
1/3/2023	MPTO/SVMI	VENEZUELA	NO APPROVED	CARSAMMA
1/7/2023	MUHA/MDSD	LITHUANIA	NO APPROVED	EUR RMA
2/4/2023	SKBO/LEMD	SPAIN	NO APPROVED	EUR RMA
2/6/2023	SKBO/MMMX	MEXICO	NO APPROVED	NAARMO
2/10/2024	MROC/KMIA	USA	NO APPROVED	NAARMO
2/10/2023	SCEL/KMIA	USA	NO APPROVED	NAARMO
2/12/2023	MMMX/SAEZ	USA	NO APPROVED	NAARMO
3/2/2023	GVAC/EGYP	UNITED KINGDOM	NO APPROVED	EUR RMA
3/2/2023	GVAC/EGYP	UNITED KINGDOM	NO APPROVED	EUR RMA
3/2/2023	SCEL// LFPG	FRANCE	NO APPROVED	EUR RMA
3/5/2023	MGGT/MDJB	USA	NO APPROVED	NAARMO
3/15/2023	SPJC/LFPG	FRANCE	NO APPROVED	EUR RMA
3/24/2024	MMMX/SCEL	USA	NO APPROVED	NAARMO
4/5/2023	MMMX/SPJC	USA	NO APPROVED	NAARMO
4/8/2023	SBKP/SKBO	USA	NO APPROVED	NAARMO
4/27/2023	LEMD/SKBO	SPAIN	NO APPROVED	EUR RMA
4/27/2023	KBRO/MPTO	USA	NO APPROVED	NAARMO
5/6/2023	SPJC/MPTO	MEXICO	NO APPROVED	NAARMO
5/7/2023	MMMX/SAEZ	USA	NO APPROVED	NAARMO
5/8/2023	LPPT/SKBO	COLOMBIA	NO APPROVED	#N/A
5/15/2023	SAEZ/MMMX	USA	NO APPROVED	NAARMO
5/26/2023	MPTO/SAME	PANAMA	NO APPROVED	CARSAMMA
5/27/2023	SLVR/LEMD	SPAIN	NO APPROVED	EUR RMA
6/11/2023	SEQM/KMIA	USA	NO APPROVED	NAARMO
6/11/2023	MPTO/TO(Tapachula)	MEXICO	NO APPROVED	NAARMO
6/12/2023	SKBO/MMUN	MEXICO	NO APPROVED	NAARMO
7/30/2023	LEMD/SCEL	SPAIN	NO APPROVED	EUR RMA
7/30/2023	KTEB/SBFI	USA	NO APPROVED	NAARMO
8/5/2023	MMMX/SCEL	USA	NO APPROVED	NAARMO
8/6/2023	TNCC/SKRG	NETHERLANDS	NO APPROVED	CARSAMMA
8/11/2023	KIAH/TTPP	USA	NO APPROVED	NAARMO
8/13/2023	SAEZ/KMIA	USA	NO APPROVED	NAARMO
9/3/2023	MNMG/MTTP	SOUTH AFRICA	NO APPROVED	EUR RMA
9/19/2023	KMIA/SAEZ	USA	NO APPROVED	NAARMO
9/26/2023	MBPV /MNMG	SOUTH AFRICA	NO APPROVED	ARMA
9/26/2023	TJSJ/SBSG	UNITED KINGDOM	NO APPROVED	NATCMA
9/26/2023	LFPG /SKBO	FRANCE	NO APPROVED	EUR RMA
10/2/2023	MNMG /MTTP	MEXICO	NO APPROVED	NAARMO
10/11/2023	SACO/MPTO	PANAMA	NO APPROVED	CARSAMMA
10/24/2023	SVMI/SKBO	GERMANY	NO APPROVED	NAARMO
10/25/2023	SKCG /MROC	USA	NO APPROVED	NAARMO
10/30/2023	KMIA/SBKP	CGVIJ	NO APPROVED	NAARMO
10/31/2024	SKBO/EGLL	USA	NO APPROVED	NAARMO

ⁱ The RASGPA Secretariat may provide further information upon request on aircraft that overflew CAR/SAM FIRs.