*International Civil Aviation Organization* SAM/IG/27-WP/5.1
South American Regional Office 13/05/2022
**Twenty-Seventh Workshop/Meeting of the ICAO SAM Implementation Grouop (SAM/IG/27) – Regional Project RLA/06/901**
(Virtual, May 31st to June 3th 2022)

**Agenda Item 5: Other business**

# SAM REGION RVSM AIRSPACE MONITORING THE IMPACT OF THE IMPLANTATION ON THE REDUCTION OF COORDINATION ERRORS

(Prepared by Secretariat)

**SUMMARY**

This working paper presents the results of monitoring the RVSM airspace of the SAM region, specifically about large height deviations (LHDs), mainly those caused by errors in the coordination between air traffic services.

This working paper includes relevant information on the impact of implementation on the reduction of LHDs.

**References:**

- ICAO Doc 9574
- ICAO Doc 9937
- GTE Reports

## 1. Background

1.1 As part of the responsibilities of the Member States, Annex 11, 3.3.5.1 establishes that "In all airspaces in which a reduced vertical separation minimum is applied 300 m (1 000 ft) between FL 290 and FL 410 inclusive, a program should be established, at the regional level, to monitor the height-keeping performance of aircraft operating at those levels, to ensure that continued application of this vertical separation minimum meets safety objectives.

1.2 Following up on the aforementioned, in the CAR/SAM regions, the monitoring of the RVSM space includes 34 included FIRs. This activity is carried out in close coordination with the regional monitoring agency CARSAMMA and the participating States, and the organization's focal points.

1.3 Regarding the South American Region, the monitoring process is carried out in the 27 FIRs. It is essential to highlight that the SAM region contributes approximately the 70% of the volume of the CAR/SAM operations; therefore, the South American region will usually have a higher number of LHDs compared to the CAR region

TABLE I

| YEAR | LHDs CAR/SAM | LHDs SAM | % SAM |
|---|---|---|---|
| 2018 | 858 | 731 | 85.20% |
| 2019 | 993 | 797 | 80.26% |
| 2020 | 363 | 311 | 85.67% |
| 2021 | 592 | 459 | 77.53% |

2. **Analysis**

2.1 As part of the monitoring mechanism, the focal points of the FIRs collect the large height deviations (LHD) during the twelve months of the year, and following the focal point's terms of reference, the LHDs are reported to CARSAMMA for the data analysis and presentation to the GTE.

2.2 Regarding the total amount of the LHD in the last four years, a reduction of approximately 42% is identified between the values of the years 2019 and 2021. It is important to consider that although there is not yet a 100% recovery of air transport, a reduction in the number of events can still be identified on the data extrapolation.

2.3 The data has made possible the trend identification of the number of events by FIR. The Table II of this Working Paper shows the LHD trend during the last four years. It is important to mention that some FIRs have significantly reduced the number of events; however, some have maintained or increased the trend.

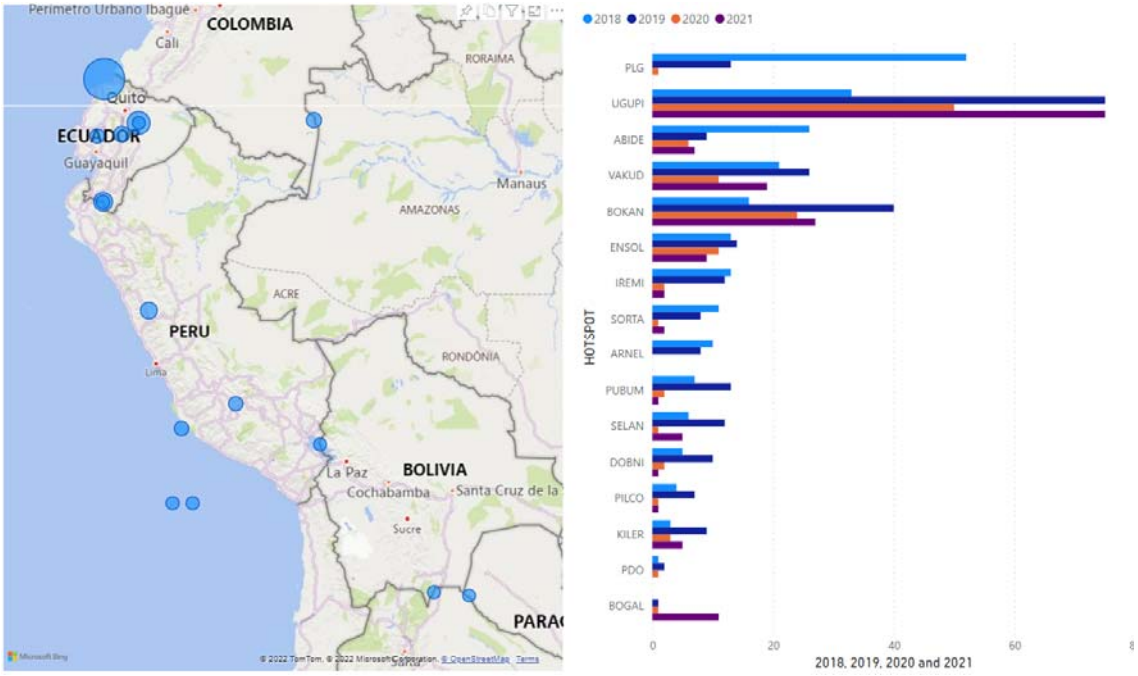
TABLE II

| FIR | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|
| CORD-SACF | 23 | 12 | 1 | 12 |
| EZEI - SAEF | 20 | 38 | 2 | 3 |
| MEND - SAMF | 0 | 6 | 0 | 1 |
| RESIS - SARR | 4 | 9 | 7 | 4 |
| COMOD - SAVF | 0 | 0 | 0 | 0 |
| LA PAZ - SLLF | 51 | 79 | 15 | 9 |
| ATLAN - SBAO | 3 | 1 | 2 | 0 |
| AMAZ - SBAZ | 21 | 28 | 15 | 19 |
| BRAS - SBBS | 28 | 3 | 2 | 3 |
| CURIT - SBCW | 13 | 6 | 1 | 3 |
| RECIF - SBRE | 3 | 2 | 1 | 0 |
| PUNT RNAS - SCCZ | 1 | 0 | 0 | 0 |
| SANTIA - SCEZ | 0 | 0 | 0 | 0 |
| ANTOF - SCFZ | 14 | 13 | 4 | 5 |
| PASCUA - SCIZ | 0 | 0 | 0 | 0 |
| PUERT MONT - SCTZ | 0 | 0 | 0 | 0 |
| BARRAN - SKEC | 57 | 69 | 17 | 59 |
| BOGOT - SKED | 172 | 242 | 132 | 220 |
| GUAYA - SEFG | 48 | 103 | 38 | 32 |

| | | | | |
|---|---|---|---|---|
| GEORG - SYGC | 6 | 4 | 3 | 1 |
| CAYE - SOOO | 0 | 0 | 0 | 0 |
| PANAM - MPZL | 115 | 59 | 14 | 17 |
| ASUNC - SGFA | 13 | 13 | 4 | 2 |
| LIMA - SPIM | 57 | 72 | 32 | 48 |
| PARAM - SMPM | 11 | 2 | 2 | 2 |
| MONTE - SUEO | 7 | 7 | 1 | 5 |
| MAIQU - SVZM | 64 | 29 | 19 | 13 |

2.4 The "hot spots" or areas with the highest number of events are mainly located on the FIR borders. Several points have had an important number of events during the last four years, and the work of the GTE will be concentrated on those points. The coordination with the rest of the SAM region working groups is essential, mainly for coordinating mitigation actions. Graph I shows a list of the most important "hot spots" in the SAM region.

GRAPH 1




2.5 LHD data analysis has made it possible to identify that approximately 97% of the LHDs are the product of coordination errors between air traffic services; Likewise, it has made it possible to determine that some of the root causes related to these LHDs are directly related to implementation, including lack or inadequate implementation of surveillance or communication.

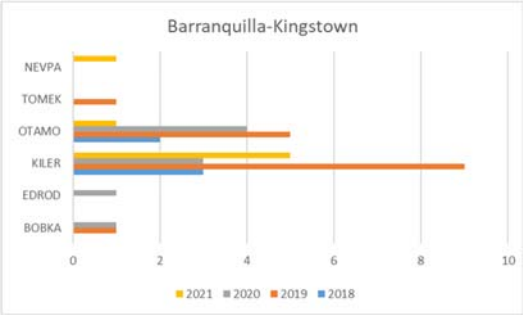
2.6 For example, a case was reported n the AIDC implementation between Barranquilla and Panama, where the LHDs increased during 2021; Although a more profound analysis is necessary, it has been identified that errors in the system messages contributed to the increase in events during 2021.

| HOTSPOT | 2021 | 2020 | 2019 | 2018 |
|---|---|---|---|---|
| ABIDE | 7 | 6 | 9 | 26 |
| ARNEL | 0 | 0 | 8 | 10 |
| BOGAL | 11 | 1 | 1 | 0 |
| BOKAN | 27 | 24 | 40 | 16 |
| DOBNI | 1 | 2 | 10 | 5 |
| ENSOL | 9 | 11 | 14 | 13 |
| IREMI | 2 | 2 | 12 | 13 |
| KILER | 5 | 3 | 9 | 3 |
| PDO | 0 | 1 | 2 | 1 |
| PILCO | 1 | 1 | 7 | 4 |
| PLG | 0 | 1 | 13 | 52 |
| PUBUM | 1 | 2 | 13 | 7 |
| SELAN | 5 | 1 | 12 | 6 |
| SORTA | 2 | 1 | 8 | 11 |
| UGUPI | 75 | 50 | 75 | 33 |
| VAKUD | 19 | 11 | 26 | 21 |
| **Total** | **165** | **117** | **259** | **221** |

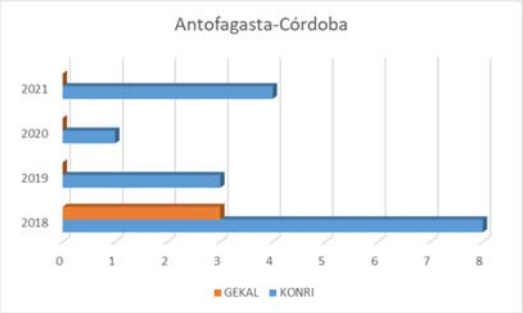
2.7 The data has made it possible to demonstrate that the improvements in communications and surveillance directly impact the reduction of coordination errors between air traffic services. The data has allowed quantifying the impact of implementation on coordination errors.

2.8 Some examples of communications and surveillance improvements that have had an impact on the reduction of coordination errors are the following:

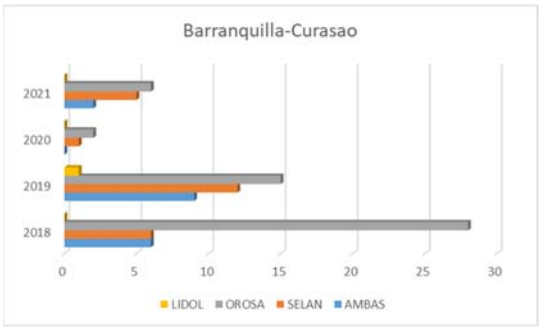
a) Improvement of the Barranquilla-Kingstown oral communications circuit contributed to the reduction of coordination errors by approximately 60% (comparing 2019 and 2021)




b) Implementation of the estimated coordination message between Córdoba and Antofagasta.



c) Improvement in surveillance coverage (ADS B Curacao) between Barranquilla and Curacao reduced coordination errors by approximately 67% (comparing 2019 and 2021).




2.9 The improvements in communication and surveillance, including the implementation of the AIDC, the improvement in surveillance coverage, the improvement in the scope of communications, and the improvements in the oral circuits, among other implementations, have a direct impact on the reduction of events LHD, mainly those produced by coordination errors between air traffic services.

2.10 Considering the above, and to improve the analysis of LHD data, mainly due to coordination errors, it is essential to know the status of communications and surveillance; these data would allow a better picture of the region to eventually establish a risk-based implementation map.

## 3. Suggested actions

3.1 The meeting is invited to:

a) To analyze the information in this working paper;

b) To continue to support the improvements in communications and surveillance, including the exchange of radar data and the implementation of the AIDC; and

c) To support the SAM office with the data on the scope of communications and surveillance to develop a map to relate communication and surveillance events with the communication and surveillance limitations in air traffic services.

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