



**Agenda Item 3: Report on activities and deliverables of the Interop WG and Subgroups
c) GREPECAS project for the management of aeronautical frequencies**

GNSS SYSTEM INTERFERENCE AND ITS SOLUTION IN THE STATE OF CHILE

(Prepared by Chile)

SUMMARY

This information paper presents a report on "GNSS interference and measures taken to resolve it."

References

- Reports from aircraft in flight indicating that since 25 May 2024, they have been affected by GPS signal loss.

1. Background

1.1 In June 2024, the General Directorate of Civil Aviation - Chile (DGAC) received reports of GPS signal loss and ADS-B failures in sectors north of Arturo Merino Benítez Airport (SCEL) during the approach phase.

1.2 According to the pilots, the signal loss always occurred in the same area and has been verified on different aircraft. This information paper describes the procedure followed to detect the source of the interference and the steps taken to resolve it.

2. Analysis

2.1 The reports received indicated a loss of GNSS signal affecting frequency L1, 1575.43 MHz, in the final stage of an arrival procedure (STAR) and initial stage of an approach procedure (both GNSS-based) to Arturo Merino Benítez Airport in Santiago, Chile, flying from north to south at approximately 6,000 feet.

2.2 The pilots' reports detail the following:

- During the arrival in Santiago on STAR EROLO 8A, near PULKI and up to ISILO, double GPS Primary failure, reflected on both MCDU and ND.
- ADS-B RPTG 1 and ADS-B RPTG 2 failed intermittently, which was recovered a few miles before intercepting the localizer for runway 17L.
- At ISILO, we recovered GPS 2 and landed without a GPS 1 signal, leaving a note in the maintenance log. It should be noted that due to the degradation priority to DME/DME, the ACCUR was always HIGH, so the event did not affect navigation; likewise, we were under radar vectors.

2.3 The available technical literature was consulted, in particular the Airbus bulletin "Safety first #29 September 2019, GNSS Interference." Main known sources of RFI:

- Personal devices (Personal Privacy Devices)
- Protection of sensitive sites
- GPS repeaters, etc.

2.4 The events occurred on May 24 and 25, 2024, then concentrated from June 6 to 23, 2024, and affected A320 aircraft.

2.5 The geographical coordinates provided allowed the interference to be located in an area in the town of Colina, 13 NM NNE of Santiago airport, where there is a correctional facility, therefore the hypothesis of a possible source of interference was considered.

2.6 A ground survey of the area of the possible source of the interference was carried out on June 19, 2024, by a team consisting of:

- A geodesic engineer, Aerodrome Inspector
- An aeronautical telecommunications specialist
- An air traffic controller

2.7 Equipped with:

- A portable GPS receiver with a high-sensitivity quad-helix antenna, which allows verification of the number of satellites available to the GNSS receiver (GPS, Galileo, and GLONASS), their intensity and trigonometry, and the position of the measurement.
- Aeronautical Mobile Service frequency receiver to verify reports from aircraft in flight in the area under survey.
- GPS receiver linked to software and an external antenna, which allowed the entire survey track to be recorded.

3. **Method**

3.1 The survey was carried out using a GNSS reception instrument, specifically a cartographic-type navigator, verifying the number of GNSS signals available and their intensity.

3.2 Contact was maintained with the Santiago Area Control Centre to receive notifications of interference from aircraft in flight.

3.3 The GNSS signals, number of satellites available, intensity, and trigonometry were continuously verified throughout the journey.

3.4 The signals were verified in the vicinity of the correctional facility.

4. **Results**

4.1 A reduction in GNSS signals was observed in the vicinity of the correctional facility; this decrease was significant in the surrounding area, and a complete loss of signals was confirmed at the main entrance.

4.2 During the afternoon of the same day, June 19, 2024, an aerial inspection was carried out with a Flight Inspection aircraft from DGAC, verifying the results of the ground survey.

5. **Conclusion**

The source of interference was geolocated within the correctional facility grounds.

6. **Measures**

6.1 The General Directorate of Civil Aviation sent a report to the Undersecretary of Telecommunications, the government agency responsible for the administration and control of the radio spectrum, reporting the interference. This agency communicated the interference to the correctional facility.

6.2 On July 26, 2024, the operating company responsible for the report informed that during the month of July no reports of GNSS signal loss were received in the Colina sector, for which they expressed their gratitude for the swiftness with which the situation was handled and the response to the problem this caused to the A320 fleet.

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