

GACA Safety Bulletin

GACA SB24-002

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Global Navigation Satellite System Outage and Alterations Leading to Communication / Navigation / Surveillance Degradation

Applicability:

Flight Operations:	Airspace Users
Airspace:	Air Navigation Service Providers

This Document is available at: <https://gaca.gov.sa/web/en-gb/page/safety-bulletins>

General:

GACA Safety Bulletins (SB) are issued under the authority of the GACA Executive Vice President of Aviation Safety & Environmental Sustainability. GACA SBs contain important safety information and may include recommended actions. Besides the specific action recommended in a GACA-SB, an alternative action may be as effective in addressing the safety issue named in the GACA-SB. The contents of a GACA-SB document do not have the force and effect of law and are not meant to bind the public in any way. GACA SBs are intended only to provide clarity to the public regarding existing requirements under GACA regulations.

Subject:

Global Navigation Satellite System Outage and Alterations Leading to Communication / Navigation / Surveillance Degradation

Version: 1.0

References:

- [GACA Part-4 § 4.15, APPENDIX D](#)
- [GACAR Part-91 § 91.109](#)
- [EASA SIB No.: 2022-02R3](#)
- [FAA-SAFO 24002 Dated 25/01/2024](#)
- ICAO Doc 9849 Global Navigation Satellite System (GNSS) Manual, Chapter 7, §7.5 and §7.15.

Purpose:

This SB is intended to alert airspace users and Air Navigation Service (ANS) Providers to an increasing number of occurrences of GPS interference (jamming and spoofing) in the airspace of the ICAO Middle East Region and elsewhere, and provide recommended actions.

Background:

GPS/GNSS interference (loss of GNSS signals, jamming or spoofing) events pose a potential safety hazard to civil aviation.

Jamming is intentional radio frequency interference (RFI) with GNSS signals. This interference prevents receivers from locking onto satellites signals and has the main effect of rendering the GNSS system

ineffective or degraded for users in the jammed area.

Spoofing involves broadcasting counterfeit satellite signals to deceive GNSS receivers, causing them to compute incorrect position, navigation, and timing (PNT) data and can provide false guidance. This may lead pilots to unintentionally deviate from their intended flight paths and trajectories with consequent safety risks.

Interference particularly affects the geographical areas surrounding conflict zones, but it is also encountered in the south and eastern Mediterranean, Black Sea, Middle East, Baltic Sea, and Arctic area. It may affect the Jeddah FIR.

Globally, reports indicate a rise in interference incidents highlighting the need for increased awareness and the implementation of mitigation measures that should be consistent with the safety and security assessment principles described in ICAO Doc 9849 Global Navigation Satellite System (GNSS) Manual, Chapter 7, §7.5 and §7.15.

Recommended Actions:

Following is a list of recommended actions for airspace users and ANS providers:

Airspace Users should:

- a) Ensure that contingency procedures are developed, tested and training is provided to flight crews, based on information from aircraft and avionics OEMs (Original Equipment Manufacturers).
- b) Develop procedures requesting flight crews to promptly report any suspected GNSS interference incidents by submitting a GNSS Interference Report, using the attached template, to GACA and Saudi Air Navigation Service (SANS) using the email addresses: sd@gaca.gov.sa, and Atm@sans.com.sa; or through the GACA electronic reporting system in accordance with GACAR Part-4, Occurrence Reporting and Safety Information System;
- c) Notify respective aircraft and avionics original equipment manufacturers (OEMs) and the national authority of the State of Aircraft Design through normal safety channels when safety effects are encountered;
Note: Reports under b) and c) should provide detailed information such as location and time, and describe how the avionics behaved during the anomaly, to assist in tracking and investigating such events
- d) Ensure that backup and alternative navigation systems, such as Inertial Navigation Systems (INS), ground-based navigation aids, and aeronautical charts, are available;
- e) Be aware that integrated avionics may announce discrepancies between GNSS and IRS or DME-DME positions and place additional emphasis on flight crew closely monitoring aircraft equipment performance for any discrepancies or anomalies and being prepared to operate without GNSS.

ANS providers should:

- a) Ensure that technical and operational contingency procedures are developed and tested;
- b) Report interference incidents to GACA in accordance with GACAR Part-4 Occurrence Reporting and Safety Information System;
- c) Deploy and maintain adequate ground infrastructure (DME/DME) to support Performance-Based Navigation (PBN) procedures and enable airspace users to use multi-DME and multi-

- DME/inertial reference system (IRS) as complementary solutions to maintain PBN operations during GNSS interference;
- d) Maintain at least the minimum operational networks of navigation aids and radar infrastructure (including very high-frequency omnidirectional radio range (VOR), instrument landing system (ILS), and DME) to ensure the necessary levels of resilience for navigation;
 - e) Implement/maintain a GNSS-independent time source to synchronize relevant communications, navigation, and surveillance/air traffic management (CNS/ATM) infrastructure;
 - f) Use appropriate real-time monitoring and detection solutions for GNSS situational awareness while recognizing that only the aircraft operator is responsible for determining their ability to navigate;
 - g) Issue Notice to Airmen (NOTAM) regarding interference events in a timely manner and establish coordination arrangements with neighboring Flight Information Regions (FIRs) on how to best share their navigation infrastructures in the event of interference events and any resulting air traffic diversions;
 - h) Increase civil-military coordination to address interference risks associated with GNSS testing and conflict zones and ensure that navigation systems operate uninterrupted and reliably in diverse applications;
 - i) Closely coordinate with the Frequency Spectrum Authority regarding interference events to locate and determine the source and attempt to resolve it as appropriate. Any resolution may require coordination with other authorities.

Contact:

Questions or comments regarding this GACA-SB, or requests for further guidance on GNSS interference mitigations, should be directed to:

General Authority of Civil Aviation (GACA)	Sd@gaca.gov.sa
Saudi Air Navigation Services (SANS)	Atm@sans.com.sa

Attachment – GNSS Interference Reporting Form

1. Pilots should use this form to report any GPS interference.

The fields marked by () are mandatory and the information must be provided.*

Originator of this Report:	
Organization:	
Department:	
Street / No.:	
Zip-Code / Town:	
Name / Surname:	
Phone No.:	
E-Mail:	
Date and time of report:	
Description of Interference	
<input type="checkbox"/> GPS <input type="checkbox"/> GLONASS <input type="checkbox"/> Other constellation <input type="checkbox"/> EGNOS <input type="checkbox"/> WAAS <input type="checkbox"/> other SBAS <input type="checkbox"/> GBAS (VHF data-link for GBAS)	
Aircraft Type and Registration:	
Flight Number:	
*Airway/route flown:	
Coordinates of the first point of occurrence / Time (UTC):	UTC: Lat: Long:
Coordinates of the first point of occurrence / Time (UTC):	UTC: Lat: Long:
*Flight level or Altitude at which it was detected and phase of flight:	
Affected ground station: (if applicable)	Name/Indicator: [e.g. GBAS]
*Degradation of GNSS performance:	
<input type="checkbox"/> Large position errors (details): <input type="checkbox"/> Loss of integrity (RAIM warning/alert): <input type="checkbox"/> Complete outage (Both GPSs), <input type="checkbox"/> Loss of GPS1 or Loss of GPS2: <input type="checkbox"/> Loss of satellites in view/details: <input type="checkbox"/> Lateral indicated performance level changed from: ___ to ___ <input type="checkbox"/> Vertical indicated performance level changed from: ___ to ___ <input type="checkbox"/> Indicated Dilution of Precision changed from ___ to ___ <input type="checkbox"/> information on PRN of affected satellites (if applicable): <input type="checkbox"/> Low Signal-to-Noise (Density) ratio: <input type="checkbox"/> Others:	
*Problem duration:	<input type="checkbox"/> continuous for 20 minutes <input type="checkbox"/> intermittent
Remarks:	

End