

Safety Information Bulletin

Operations – ATM/ANS

SIB No.: 2022-02R1

Issued: 17 February 2023

Subject: Global Navigation Satellite System Outage Leading to Navigation / Surveillance Degradation

Revision:

This SIB revises EASA SIB 2022-02 dated 17 March 2022.

Ref. Publications:

None.

Applicability:

National Aviation Authorities (NAAs), Air Navigation Service Providers (ANSPs) and air operators.

Description:

Since February 2022, there has been an increase in jamming and or possible spoofing of Global Navigation Satellite Systems (GNSS). This issue particularly affects the geographical areas surrounding conflict zones but is also present in the eastern Mediterranean, Baltic Sea and Arctic area.

EASA has analysed data from the Network of Analysts and open sources, and has concluded that GNSS jamming and/or spoofing has intensified in recent months. The main affected flight information regions (FIR) are:

- The Black Sea area:
 - FIR Istanbul LTBB, FIR Ankara LTAA
 - Eastern part of FIR Bucuresti LRBB, FIR Sofia LBSR
 - FIR Tbilisi UGGG, FIR Yerevan UDDD, FIR Baku UBBA
- The southeastern Mediterranean area, Middle East:
 - FIR Nicosia LCCC, FIR Beirut OLBB, FIR Damascus OSTT, FIR Telaviv LLLL, FIR Amman OJAC, northeastern part of FIR Cairo HECC
 - Northern part of FIR Baghdad ORBB, northwestern part of FIR Tehran OIIX
 - Northern part of FIR Tripoli HLLL
- The Baltic Sea area (FIRs surrounding FIR Kaliningrad UMKK):
 - Western part of FIR Vilnius EYVL, northeastern part of FIR Warszawa EPWW, southwestern part of FIR Riga EVRR
- Arctic area:
 - Northern part of FIR Helsinki EFIN, northern part of FIR Polaris ENOR

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The effects of GNSS jamming and/or possible spoofing were observed by crews in various phases of flight, in some cases leading to re-routing or diversions, due to the inability to perform a safe landing. Under the present conditions, it is not possible to predict GNSS interference or its effects. The magnitude of the issues generated by these interferences would depend upon the extent of the area concerned, on the duration, and on the phase of flight of the affected aircraft.

The following list provides examples of issues that a degradation of GNSS signal could generate:

- Inability to use GNSS for waypoint navigation;
- Loss of area navigation (RNAV) approach capability;
- Inability to conduct or maintain Required Navigation Performance (RNP) operations, including RNP and RNP Authorization Required (RNP AR) approaches;
- Triggering of ground proximity warning system's terrain warnings, possibly with "PULL UP" commands;
- Inconsistent aircraft position on the navigation display;
- Loss of Automatic Dependent Surveillance-Broadcast (ADS-B), wind shear, terrain and surface functionalities;
- Failure or degradation of ATM/ANS/CNS and aircraft systems which use GNSS as a time reference;
- Potential airspace infringements and/or route deviations.

This SIB is revised to update the affected areas and include the newest information.

At this time, the safety concern described in this SIB is not considered to be an unsafe condition that would warrant Safety Directive (SD) action under Commission Regulation (EU) [965/2012](#), Annex II, ARO.GEN.135(c), nor under Commission Regulation (EU) [2017/373](#), Annex II, point ATM/ANS.AR.A.030.

Recommendation(s):

To address the identified issues EASA recommends the implementation of the following mitigating measures. These measures are to be considered for the aforementioned flight information regions, and should be extended to any other area where GNSS jamming and/or possible spoofing is identified.

NAAAs should:

- Ensure that contingency procedures are established in coordination with ANSPs and airspace users, and that essential conventional navigation infrastructure, particularly Instrument Landing Systems, are retained and fully operational;
- Implement appropriate and proactive mitigating measures as a matter of high priority, including the issuance of NOTAMs, e.g. describing affected areas and related limitations (as appropriate and determined at State level).

NAAAs and ANSPs should:

- Establish a process to collect information on GNSS degradations, in coordination with the relevant National Communications Authorities, and promptly notify the related outcomes to air operators and to other airspace users;

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- Confirm ANSPs' readiness to provide reliable surveillance coverage that is resilient to GNSS interference, such as ground NAV aids for conventional non-satellite based navigation (Distance Measuring Equipment (DME), Very High Frequency omnidirectional range (VOR));
- Ensure that ANSPs' contingency plans include alternative procedures to be followed in case of large-scale GNSS jamming and/or possible spoofing events.

Air operators, including helicopter operators, should:

- Ensure that flight crews promptly report by means of a special air-report (AIREP) to air traffic control any observed interruption, degradation or anomalous performance of GNSS equipment or related avionics;
- Assess operational risks and limitations linked to the loss of on-board GNSS capability, including any on-board systems requiring inputs from a reliable GNSS signal;
- Ensure that operational limitations introduced by the dispatch of aircraft with inoperative radio navigation systems in accordance with the Minimum Equipment List, are considered before operating an aircraft in the affected areas;
- Ensure that flight crews and relevant flight operation personnel:
 - are aware of possible GNSS jamming and/or possible spoofing;
 - verify the aircraft position by means of conventional navigation aids when flights are operated in proximity to the affected areas;
 - check that the navigation aids critical to the operation for the intended route and approach are available; and
 - remain prepared to revert to a conventional arrival procedure where appropriate and inform air traffic controllers in such a case;
- Ensure, in the flight planning and execution phase, the availability of alternative conventional arrival and approach procedures (i.e. an aerodrome in the affected area with only GNSS approach procedure should not be considered as destination or alternate).

All parties concerned are reminded on their obligations to report any event impacting safety according to Regulation (EU) No. [376/2014](#).

Contact(s):

For further information contact the EASA Safety Information Section, Certification Directorate, E-mail: ADs@easa.europa.eu.

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