Civil Aviation Authority

SAFETY NOTICE

Number: SN–2023/001

Version 2 Issued: 15 April 2024

Global Navigation Satellite System Outage Leading to Navigation/Surveillance Degradation

This Safety Notice contains recommendations regarding operational safety.

Recipients must ensure that this Notice is copied to all members of their staff who need to take appropriate action or who may have an interest in the information (including any 'in-house' or contracted maintenance organisations and relevant outside contractors).

Applicability:	
Aerodromes:	Not primarily affected
Air Traffic:	Not primarily affected
Airspace:	Not primarily affected
Airworthiness:	Not primarily affected
Flight Operations:	All Aircraft Operators
Licensed/Unlicensed Personnel:	Not primarily affected

1 Introduction

1.1 The issue of Global Navigation Satellite Systems (GNSS) jamming and/or spoofing has increased since 2022, particularly in geographical areas surrounding conflict zones but also in the south and eastern Mediterranean, Black Sea, Baltic Sea and Arctic areas.

1.2 This Safety Notice is issued to raise awareness, to advise Operators who may be impacted by the loss or degradation of GNSS signals, to update the affected areas and to include the newest information.

1.3 This Safety Notice replaces SN-2022/002 which is revoked.

2 Compliance/Action to be Taken

2.1 Air operators should:

a) Ensure that flight crews promptly report via air report to air traffic control any observed interruption, degradation or anomalous performance of GNSS equipment (jamming and/or spoofing) or related avionics;

b) Assess operational risks and limitations linked to the loss of on-board GNSS capability, including other on-board systems requiring inputs from reliable GNSS signal;

c) Ensure that operational limitations, introduced by the dispatch of aircraft with radio navigation system inoperative in accordance with Minimum Equipment List, are considered before operating an aircraft in the affected areas;

d) Ensure flight crews and relevant flight operation personnel:

i. are aware of possible GNSS jamming and/or spoofing;

ii. verify the aircraft position by means of conventional navigation aids when flights are operated in proximity of the affected areas;

iii. check that the navigation aids critical to the operation for the intended route and approach are available; and

iv. remain prepared to revert to a conventional arrival procedure where appropriate and inform air traffic controllers in such a case;

e) 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); and

f) Ensure that any flight crew observations of GNSS jamming and/or spoofing are reported using normal company safety reporting procedures.

2.2 All parties concerned are reminded of their obligations to report any event impacting safety according to UK Regulation (EU) No. 376/2014.

3 Further Information

3.1 The main affected flight information regions (FIR) where GNSS jamming and/or spoofing has intensified are:

• The Black Sea area:

- FIR Istanbul LTBB, FIR Ankara LTAA

- Eastern part of FIR Bucurest LRBB, FIR Sofia LBSR

- FIR Tbilisi UGGG, FIR Yerevan UDDD, FIR Baku UBBA

• The south and eastern Mediterranean area, Middle East:

- FIR Nicosia LCCC, FIR Beirut OLBB, FIR Damascus OSTT, FIR Telaviv LLLL, FIR Amman OJAC,

- North-eastern part of FIR Cairo HECC

- Northern part of FIR Baghdad ORBB, north-western 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, north-eastern part of FIR Warszawa EPWW, south-western part of FIR Riga EVRR

• Arctic area:

- Northern part of FIR Helsinki EFIN, northern part of FIR Polaris ENOR

3.2 The effects of GNSS jamming and/or spoofing were observed by flight crew in various phases of their flights, in certain cases leading to re-routing or diversion due to the inability to perform a safe landing procedure. Under the present conditions, it is not possible to predict GNSS outages and their effects. The magnitude of the issues generated by such outage would depend upon the extent of the area concerned, on the duration and on the phase of flight of the affected aircraft.

3.3 The following non-exhaustive list includes some potential issues that a degradation of GNSS signal could generate:

▪ Loss of ability 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 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;

▪ Inaccurate TCAS traffic information on navigational displays;

▪ Potential airspace infringements and/or route deviations due to GNSS degradation.

4 Queries

4.1 Any queries or requests for further guidance as a result of this Safety Notice should be addressed to the organisation’s Flight Operations Inspector.

5 Cancellation

5.1 This Safety Notice will remain in force until further notice.

Appendix 1 EASA SIB 2022-02R2 Global Navigation Satellite System Outage and Alterations Leading to Navigation / Surveillance Degradation