Schweizerische Eidgenossenschaft
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Office fédéral de l'aviation civile OFAC
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Federal Office of Civil Aviation FOCA

SASOC 2024

# GPS Interference

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03. Mai 2024

# Topics

- GPS Jamming
- GPS Spoofing
- Map of current GPS Interferences
- EASA SIB / CARI
- Countermeasures

# GPS Jamming

Jamming → GPS position is lost

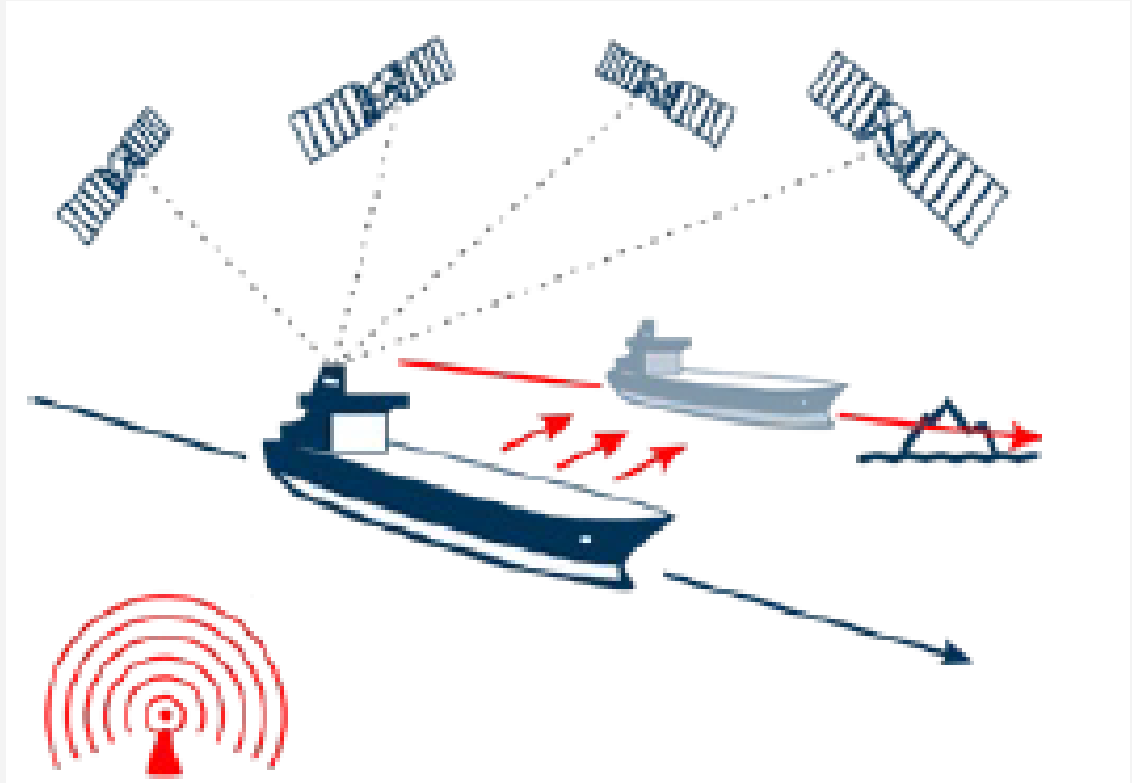
The intentional attempt to interrupt the GNSS service by broadcasting higher -powered signals. With the discontinuation of GNSS positioning, the onboard system must fall back to alternative navigation systems. Especially during challenging conditions, this can raise the likelihood of accidents.

Credit: OHB Digital Solutions

# GPS Spoofing

Spoofing: → GPS position is wrong.

The intentional attempt to force a GNSS receiver to  a false position/course can be challenging to detect Spoofed GNSS receivers output false position and timing information, exposing the change of collisions with the ground or other objects.



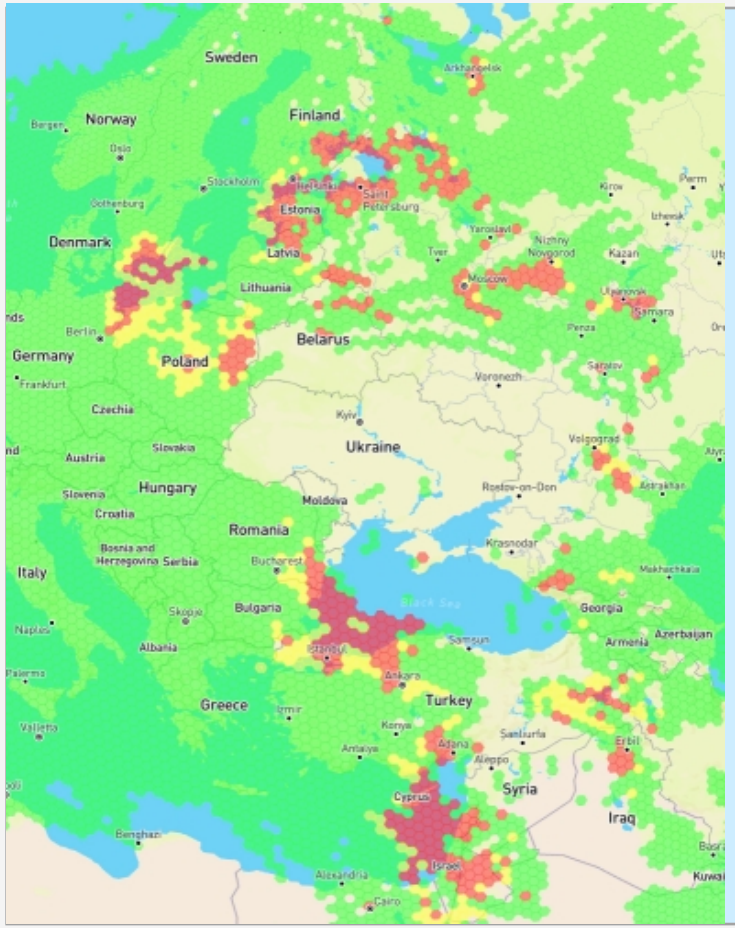
Credit: OHB Digital Solutions

# GPS Spoofing

- Jamming and spoofing in aviation can happen unintentionally:
  - Truck's with jammers on motorways close to airports
  - GPS Test equipment/ Repeaters used by Maintenance on airports
- Intentional Spoofing is complicated and normally done by states/military


Picture source: © *Send Solutions*

# Map of current GPS Interferences




Link:

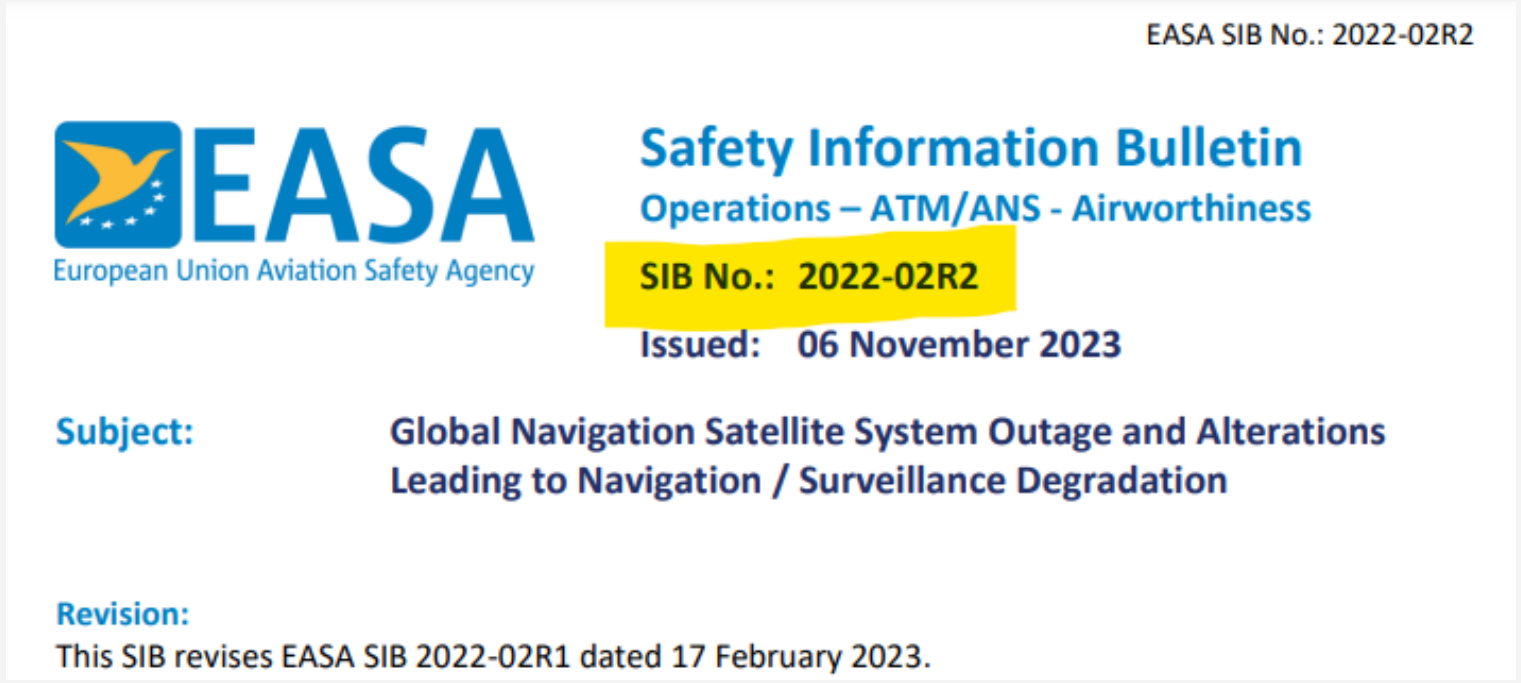
GPSJAM GPS/GNSS Interference Map

Link: GPS jamming & interference map | Flightradar24

# EASA SIB 2022-02R2

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

EASA Safety Publications Tool (europa.eu)



EASA SIB No.: 2022-02R2

EASA
European Union Aviation Safety Agency

**Safety Information Bulletin**

**Operations – ATM/ANS - Airworthiness**

**SIB No.: 2022-02R2**

**Issued: 06 November 2023**

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

**Revision:**

This SIB revises EASA SIB 2022-02R1 dated 17 February 2023.

# EASA CARI on System Resilience to GNSS Events

EASA
European Union Aviation Safety Agency

**CONTINUING AIRWORTHINESS REVIEW ITEM**

| | | | |
|---|---|---|---|
| **APPLICABILITY:** | CS 25, CS 29 | CARI: | 20-02 |
| | | ISSUE: | 01 |
| | | DATE: | 16 FEB 2024 |
| | | STATUS: | Open |
| | | NEXT ACTION: | TC Holder(s) and OEMs |
| SUBJECT: | Design Review of Aircraft Systems and Architecture in Relation to GNSS Jamming and/or Spoofing Events | | |
| REQUIREMENTS: | CS 25.1309, CS 29.1309, 21.A.3A | | |
| ADVISORY MATERIAL: | CS ACNS, EUROCAE ED-259A, AMC 25.1309, AMC 29.1309 | | |
| PRIMARY PANEL: | 6 | | |

The Type Certificate Holder (TCH) and OEMs is requested to:

1. Identify all systems that rely on GNSS signals to perform their intended function and provide overview of the system architecture,
2. Identify all related aircraft systems failure modes and effects, in isolation and at aircraft level, when subject to GNSS jamming and spoofing events. A description of the information presented to the flight crew, information transmitted to ATC, information recorded in flight data recorder and maintenance computer as a result of GNSS jamming and spoofing events should also be provided.
3. Evaluate the severity of those effects using AMC to 2X.1309 guidance (MINOR, MAJOR, HAZ, CAT). The severity assessment should not combine additional independent failures.

# Countermeasures

GPS Jamming ⇨ Alternate Navigation Solution DME/DME, IRS

GPS Spoofing ⇨ Detection (e.g.GIDAS) ⇨ Alternate Navigation Solution DME/DME, unbiased IRS

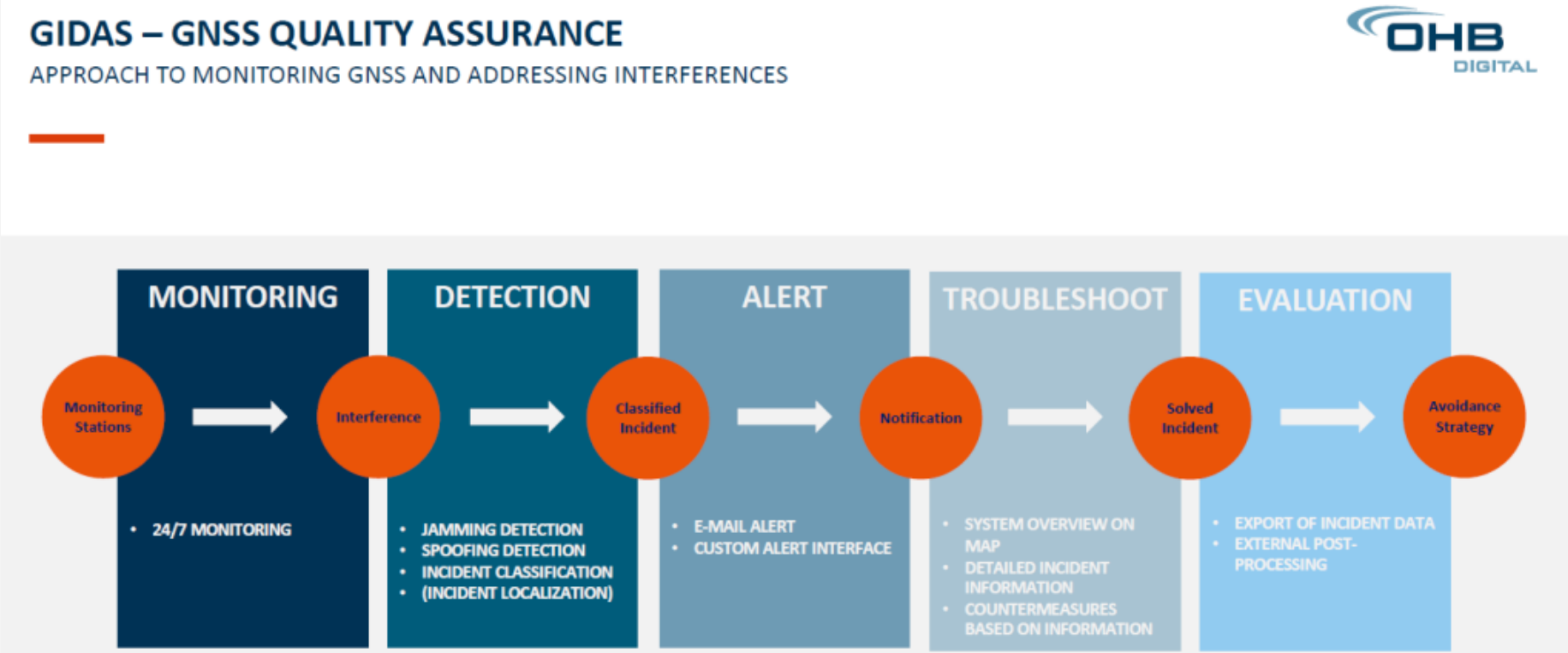
Short therm ⇨ Ground Based Spoofing Detectors on Approach, (like WS warnings)
⇨ Airbased Dectors like Airtext+ (from Send Solutions)

Midtherm ⇨ Use more then just one System, (Galileo)

Longtherm ⇨ Make GPS more robust with build in spoofing detectors.
⇨ Use different alternates like E-Loran, MagNav (Only in middle Latitudes)

# Countermeasures

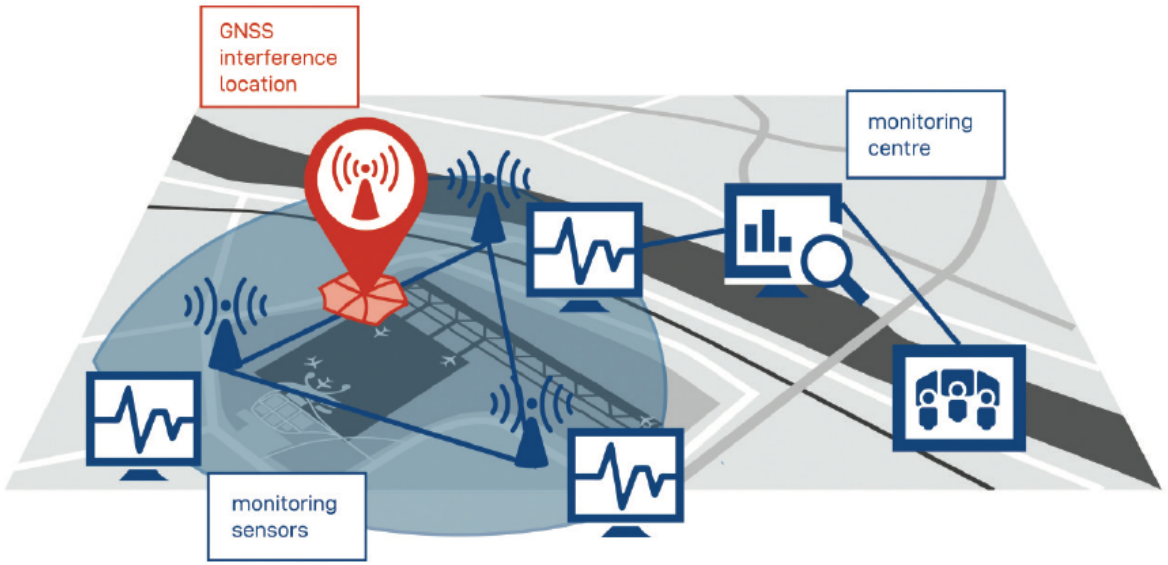
To detect spoofing, various detectors must be combined.
The Company OHB Digital Services offers already today a GNSS Quality Assurance System:



# Countermeasures

## GIDAS – GNSS QUALITY ASSURANCE

STATIONARY





Monitoring Center:

**"The central brain and data hub of GIDAS installations."**

Monitoring Sensor:

**"The fixed mounted data collection units of GIDAS installations."**

# Links:

GPS-Spoofing - Gefälschte GPS-Signale werden beim Fliegen zunehmend zum Problem - News – SRF

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