

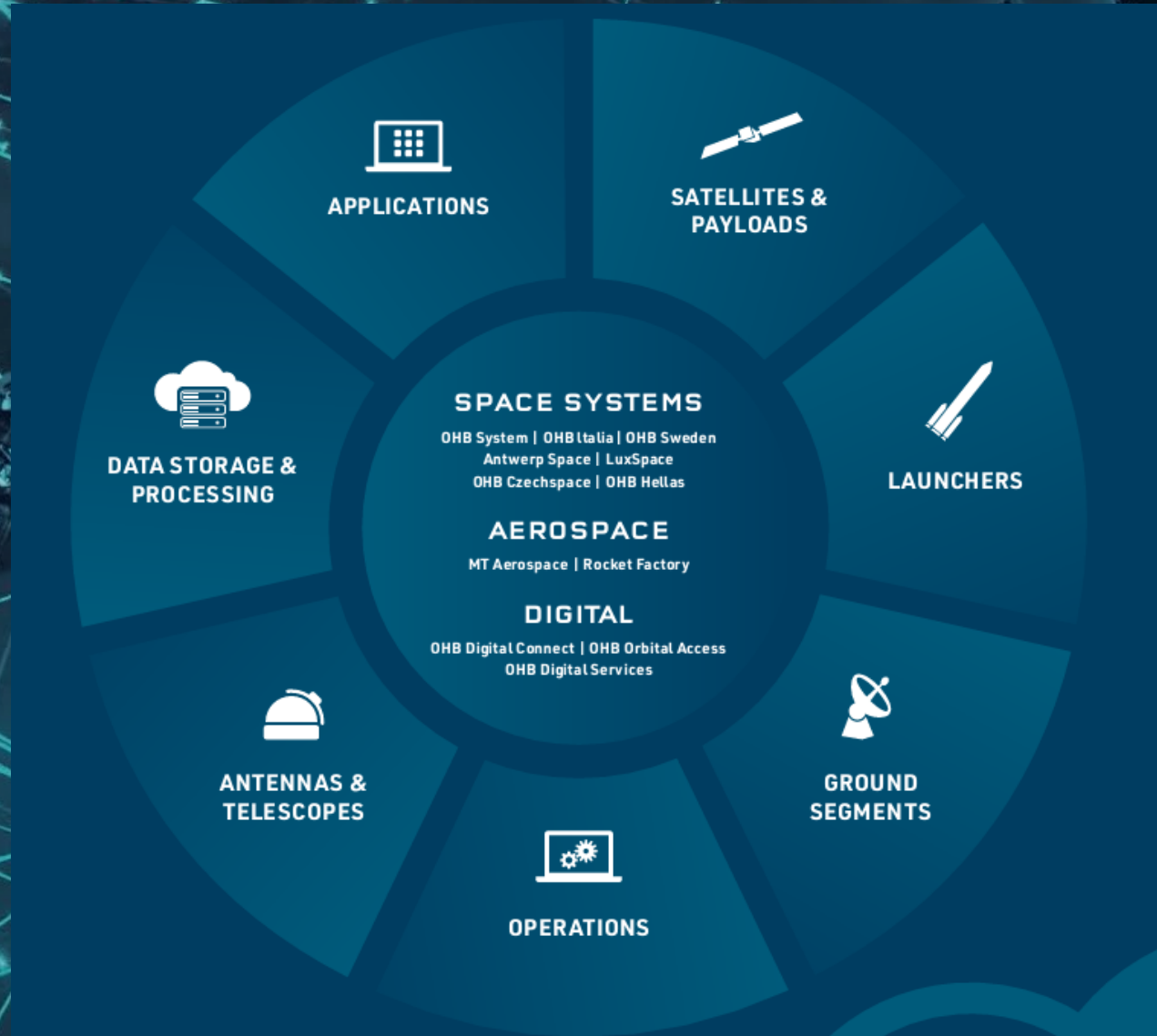
A short, thick orange horizontal line.

# GNSS INTERFERENCE

# THE THREAT OF JAMMING AND SPOOFING

BERNHARD CZAR  
MANAGING DIRECTOR OHB AUSTRIA  
29<sup>TH</sup> JAN 2025  
VIENNA

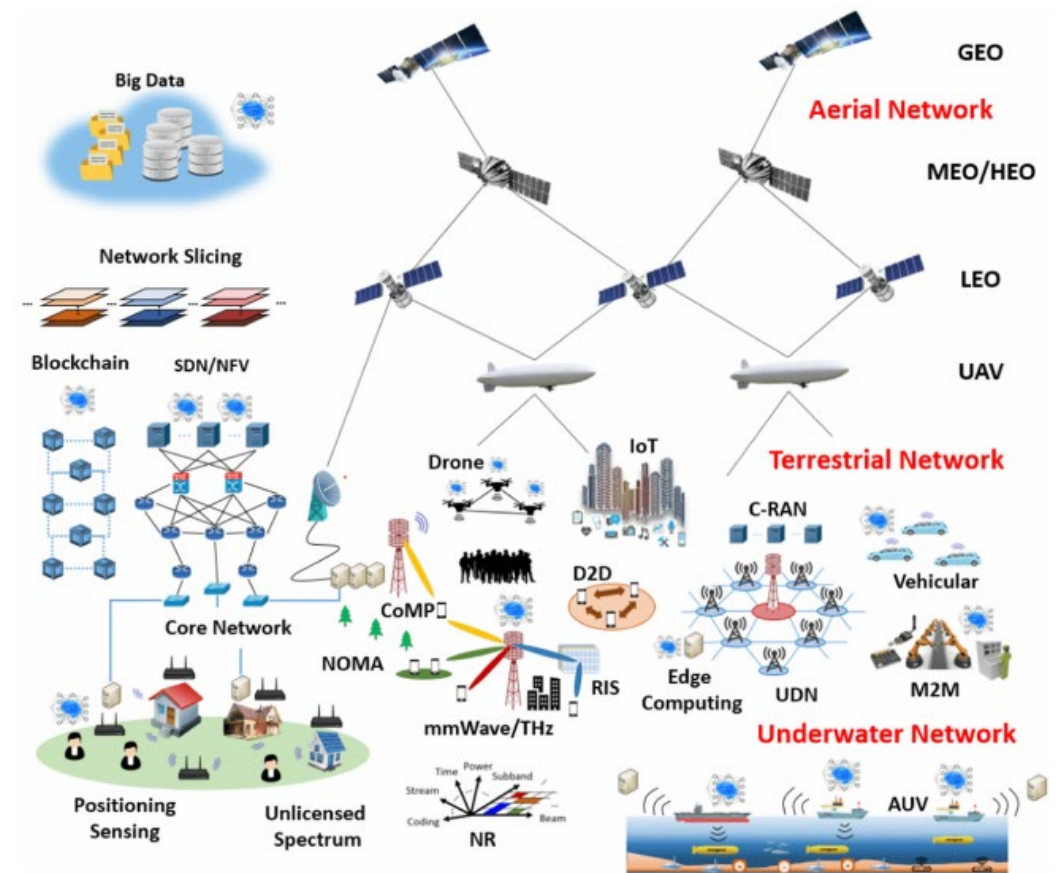
# OHB GROUP: END-TO-END (SPACE) SOLUTIONS





# HOW THE PUBLIC SECTOR AND THE INDUSTRY IS RELYING ON SPACE SYSTEMS

- Our ecosystem is heavily depending on radio frequency (RF) signals for communication and navigation
- This dependency will strongly increase within the following decade, and is essential for the success of the society as well as the industry
- Some examples of systems critical for ecosystems based on RF signals
  - IoT/m2M networks (e.g. for forestry or agriculture)
  - 5G Terrestrial and non-terrestrial networks
  - 6G Collaborative Spectrum Use for real 3D Communication networks
  - Timing Signals (via GNSS or LEO PNT) for
    - coordination of financial transfers and time critical applications,
    - coordination of mobile networks (including 5G/6G)
    - Energy grid regulation and synchronisation
  - Navigation Systems via GNSS and LEO PNT
    - Autonomous driving
    - Container movers in harbors
    - Flight Connections

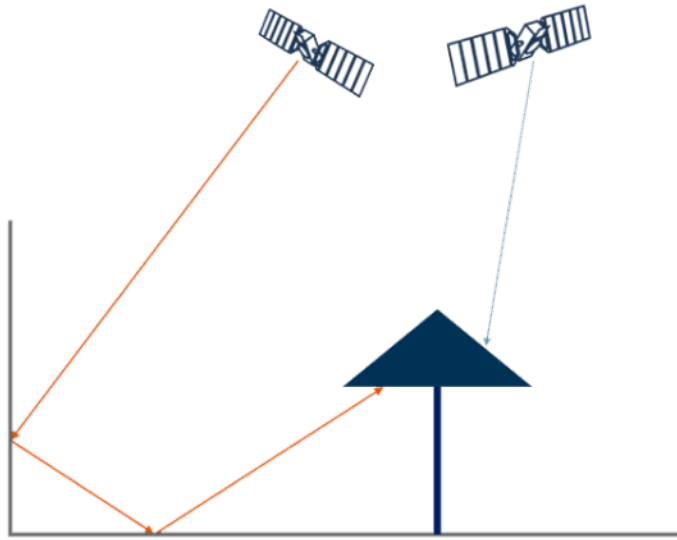


# GNSS QUALITY ASSURANCE

## WHAT IS GNSS INTERFERENCE?

### Out of band interference and unintentional interference

This type of interference can be caused by services using neighboring frequency bands or environmental influences (e.g., GNSS multipath). It usually occurs in the vicinity of other infrastructure using radio frequency links.



Multipath

### Jamming

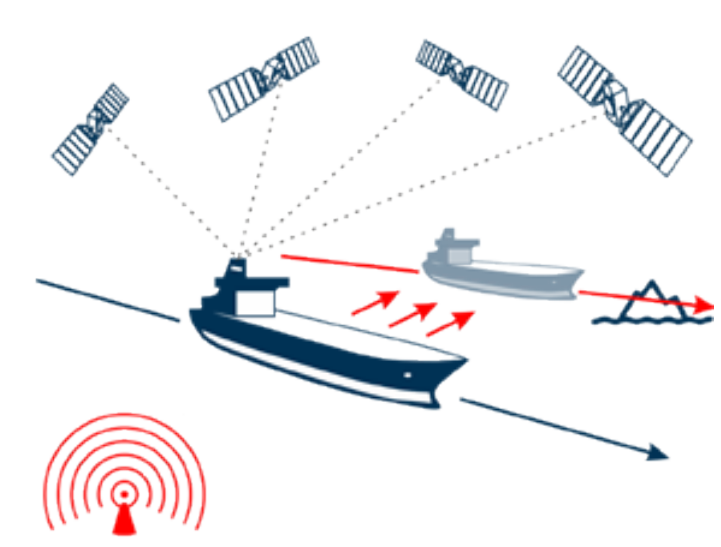
The intentional attempt to interrupt the GNSS service by broadcasting higher-powered signals. With the discontinuation of GNSS positioning, the onboard system must fall back to alternative navigation systems. Especially during challenging conditions, this can raise the likelihood of accidents.



Jammed plane

### Spoofing

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 chance of collisions with the ground or other objects.



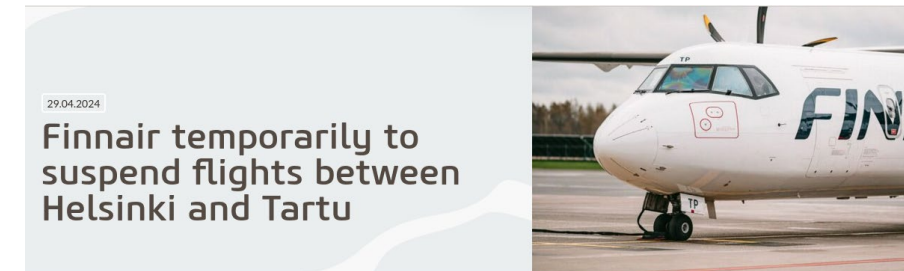
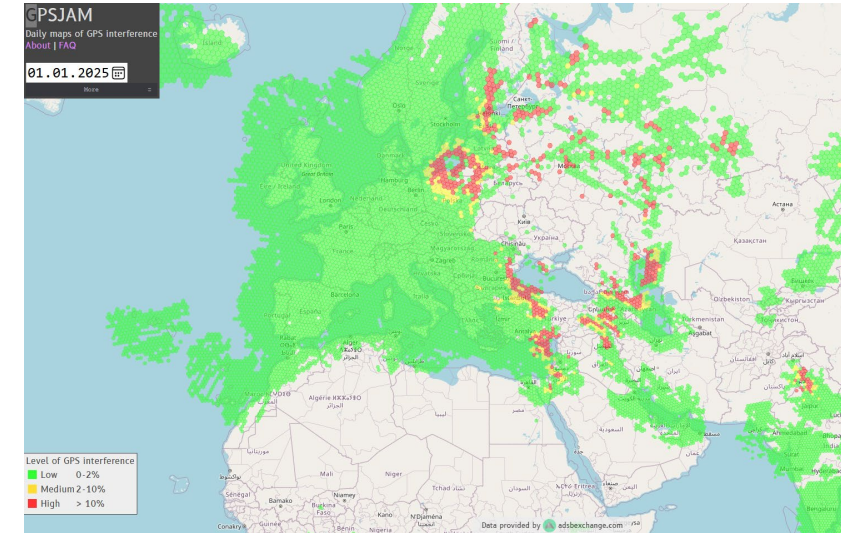
Spoofed vessel

# IMPORTANCE OF SPECTRUM SECURING



## OHB JAMMING-AND SPOOFING DETECTION AND COUNTERMEASURES

- Current measurements shows the high numbers of disturbers on GNSS signals already
- But the tendency shows that the number of attacks, the duration as well as the “quality” or persistence of attacks (spoofing and jamming) is drastically increasing over time
- OHB Group, especially via OHB Digital Solutions is providing now solutions to the institutional players to protect the users of such systems in critical applications
- Example: Air traffic management, landing procedures
  - While bigger airports have ILS systems, smaller are using GNSS landing procedures
  - Protecting smaller airports especially in eastern Europe (incl. Scandinavia) which are using GNSS based landing systems



Finnair announced that it will suspend flights between Helsinki and Tartu from the GPS signal. The airline itself will light tickets for that period via SMS

### Russian GPS jamming threatens air disaster, warn Baltic ministers

Interference with navigation signals blamed on Moscow has forced two Finnish flights to turn around mid-journey



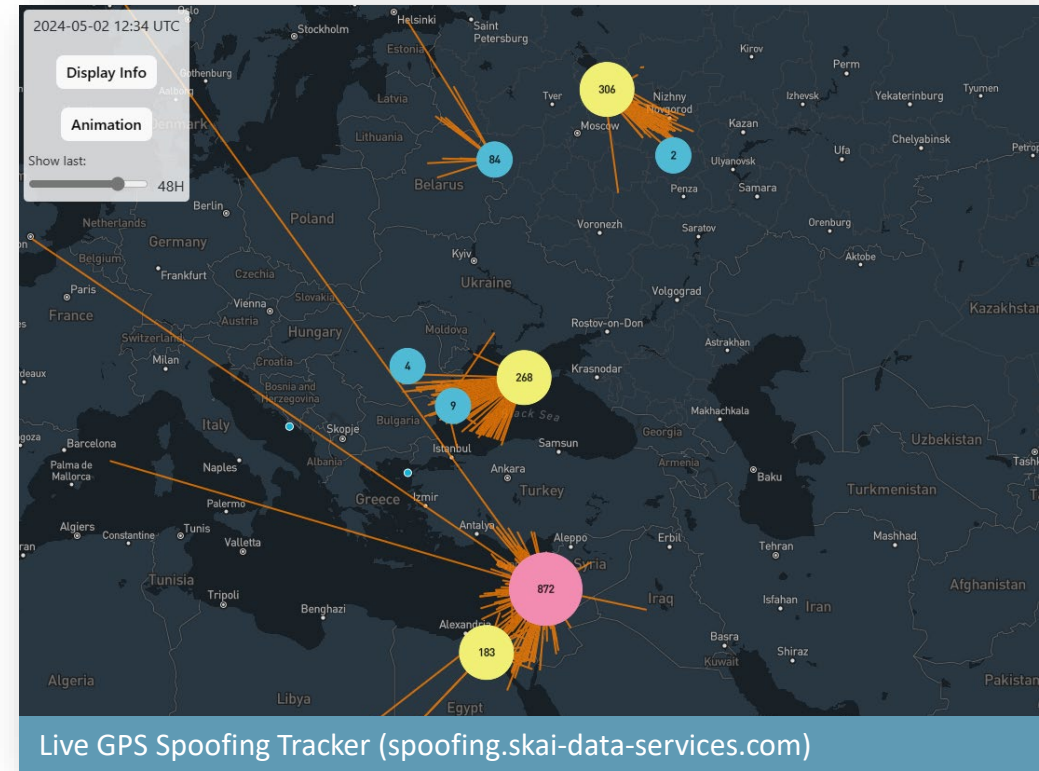
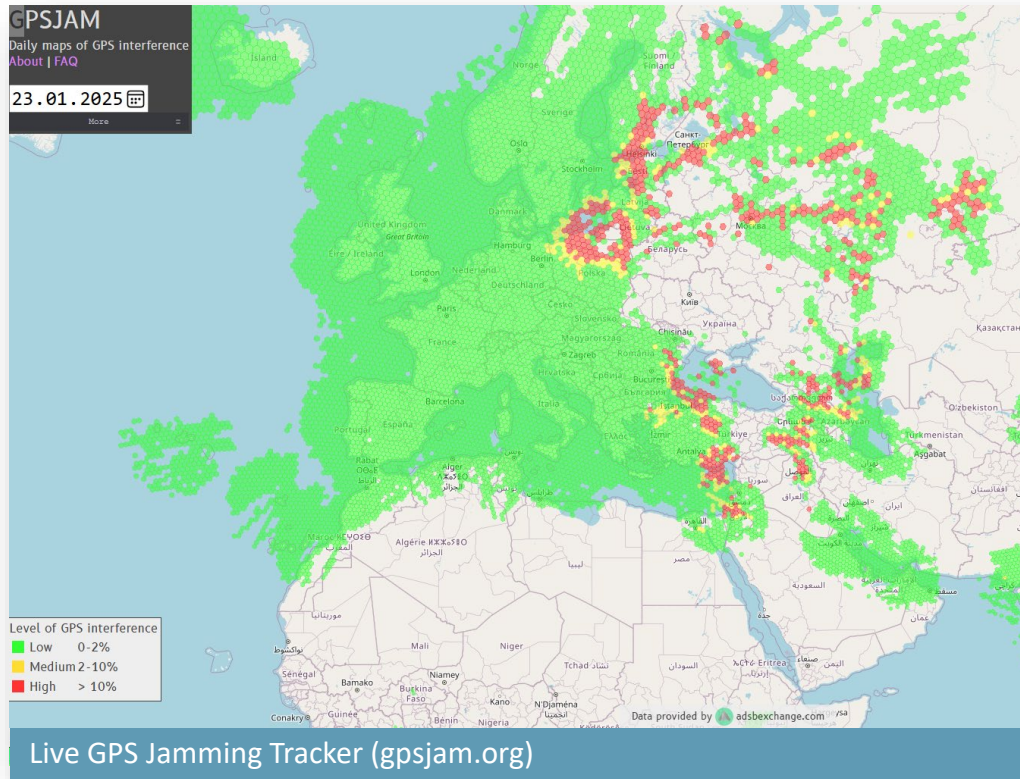
John FRANKLIN • 17 March 2022  
in community [Air Operations](#)

EASA has published a [Safety Information Bulletin](#) warning of the increased probability of problems with Global Navigation Satellite Systems (GNSS) in the current context of the Russian invasion of Ukraine.



# AWARENESS

## GNSS JAMMING AND SPOOFING STEADILY INCREASING



- The region around the Baltic Sea — Finland, Estonia, Latvia, Lithuania, Poland — and around the Black Sea — Rumania, Bulgaria, Turkey, Greece — has faced persistent attacks against GPS systems

# IMPORTANCE OF GNSS SPECTRUM MONITORING

## THE FAR-REACHING CONSEQUENCES OF GNSS JAMMING AND SPOOFING

### Technology

## Unprecedented GPS jamming attack affects 1600 aircraft over Europe

A 63-hour-long marathon of GPS jamming attacks disrupted global satellite navigation systems for hundreds of aircraft flying through the Baltic region – and Russia is thought to be responsible

By Jeremy Hsu

29 March 2024

BY MATT BURGESS SECURITY APR 30, 2024 1:16 PM

## The Dangerous Rise of GPS Attacks

Thousands of planes and ships are facing GPS jamming and spoofing. Experts warn these attacks could potentially impact critical infrastructure, communication networks, and more.

## GPS jammers are being used to avoid tolls in Germany, BALM spokesperson confirms

You can read this article in 2 minutes

Some hauliers are gaining a major competitive advantage because they are using illegal hacks to avoid German truck toll payments, according to a report in German tabloid Bild. The cheating is done by using devices that allow trucks to pass through toll booths without paying.

## Chinese companies fuelling theft of luxury cars with cheap GPS-jammers

Thieves block signals from vehicles' tracking devices, making them harder to recover

Matt Oliver, INDUSTRY EDITOR  
28 April 2024 • 7:44pm

Kronen Zeitung UNABHÄNGIG  
Fr., 24.01.2025 0°C Wien  
Krone+ Österreich Wien Politik Ausland Sport Adabei  
Blaulich Bundesländer Gericht Crime Recht beraten

### GPS-PROBLEME

## Airbus von Wien nach Brunn umgeleitet

Österreich | 31.12.2024 09:59

## NASA report: Passenger aircraft nearly crashes due GPS disruption

July 8, 2019 - By Dana Goward

Est. reading time: 1 minute



### 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

## James Bond-Themed Superyacht Called '007' Sinks Within Yards of Greek Beach

"In trying not to be sunk, he sailed closer to shore," a boat owner who watched the event unfold said of the captain's actions

- GNSS disruptions and consequences making headlines worldwide
- Incidents spanning maritime, aviation, energy, road tolling, communication networks, and more
- Integrity of essential infrastructure jeopardized
- High economical losses
- Human safety compromised

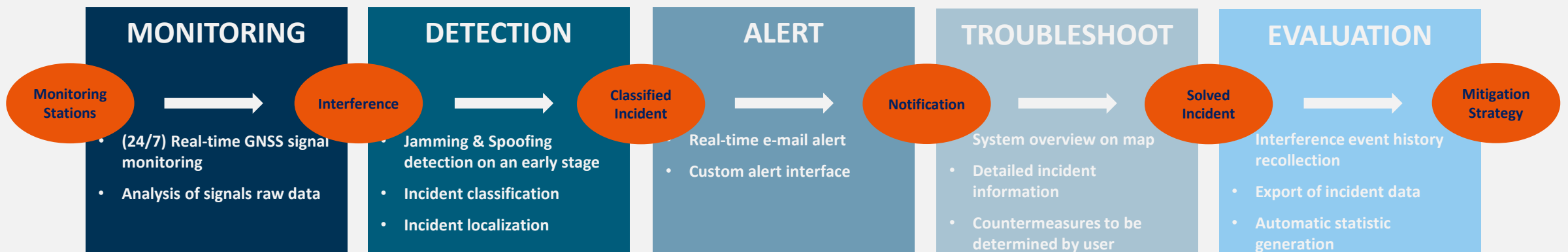
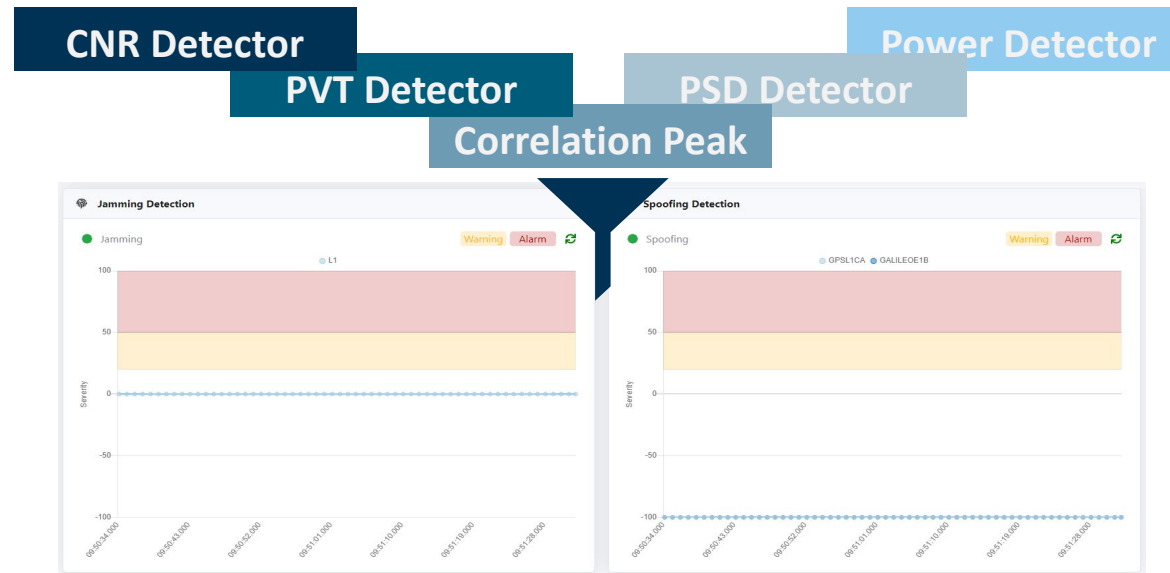
# GIDAS – GNSS QUALITY ASSURANCE VIA GROUND BASED SENSORS

GNSS SPECTRUM MONITORING, INTERFERENCE DETECTION AND ANALYSIS SYSTEM

**1** Multiple detection techniques  
(no extensive list)

**2** Weighted combination of  
multiple techniques to  
improve robustness

**3** Simple to read and interpret  
decision metrics for  
jamming and spoofing





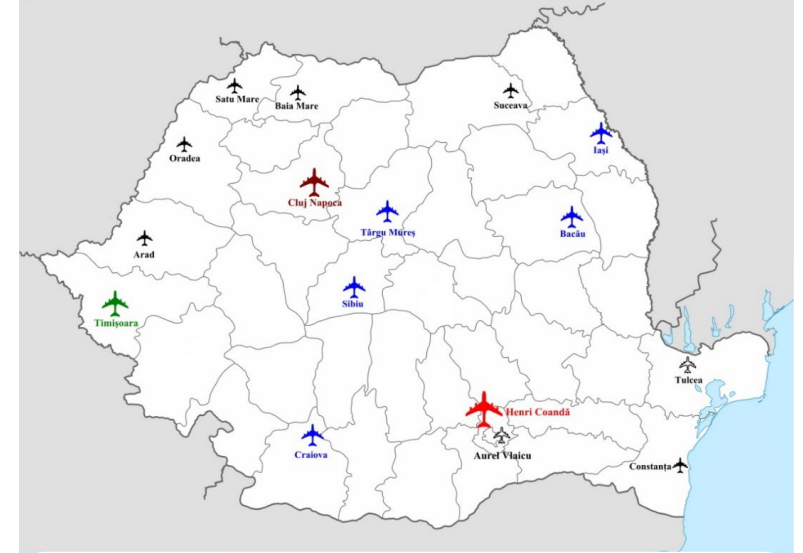
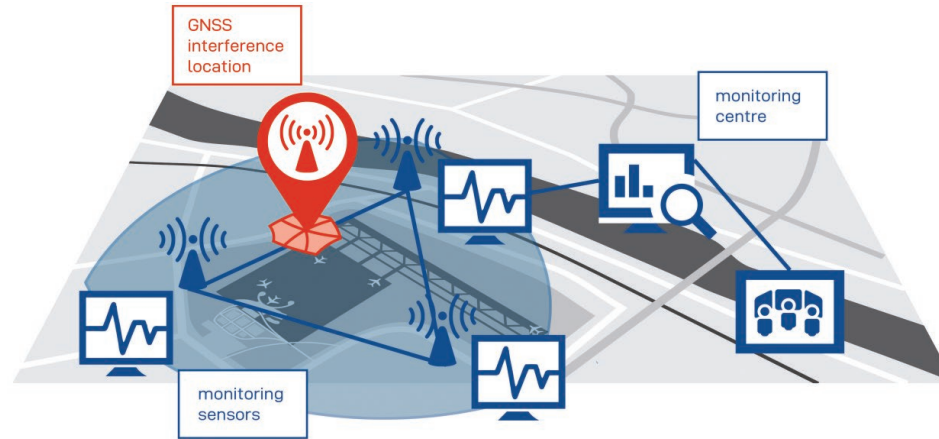
# GIDAS

VERSATILE SOLUTION FOR MULTIPLE APPLICATIONS



## GIDAS Stationary

- Ports
- Airports
- Toll Collection
- Power Grids
- Etc.



**ROMATSA: Integration of GNSS quality control systems at the 17 Romanian Airports in 2024/25**



Graz Airport



Port of Tallinn



Brno Airport



Frankfurt Airport



Toll Collection

# SHORT TERM – GIDAS

VERSATILE SOLUTION FOR MULTIPLE APPLICATIONS



## GIDAS Portable

- The portable, standalone GIDAS designed to be deployed at any place at any time
  - Law Enforcement (stolen cars)
  - Frequency regulation authorities
  - Toll Collection
  - Airports
  - Etc.



## GIDAS Embedded

- GIDAS Directly integrated into customer's products
  - Time Servers
  - Drones
  - Navigation systems
  - Auto-pilots
  - Etc.



**GNSS Jamming or Spoofing**

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# THANK YOU!

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