

SECURING THE RF SPECTRUM BY USING FULL POTENTIAL OF SPACE AND GROUND BASED SPECTRUM MONITORING

STEPHAN ROEMER, BD SATCOM & NAVIGATION, OHB GROUP

ATHENS, 3.9.2025



ABOUT OHB SE

GROUP STRUCTURE







MT Aerospace AG

70 %

Rocket Factory Augsburg AG

Aerotech Peissenberg GmbH & Co. KG

Aerotech

Space s.r.o.

OHB Digital Connect GmbH

DIGITAL

Bremen, Mainz & Gelsdorf, Germany 100%

OHB Digital Services GmbH Bremen,

Germany 74.9%

GEOSYSTEMS GmbH Oberpfaffenhofen, Germany 100%

MT Aerospace Guyane S.A.S. Kourou. French Guiana 70%

Blue Horizon Sarl Betzdorf, Luxembourg 100%

OHB Teledata GmbH Bremen &

Oberpfaffenhofen, Germany 100%

OHB Information Technology Services GmbH Bremen & Oberpfaffenhofen, Germany 100%

> OHB Chile SpA Viña del Mar. Chile 100%

OHB Orbital Access GmbH Bremen, Germany 100%

= consolidated

OHB – MORE THAN JUST SATELLITES



SERVICES AND ACTIVITIES IN RF SPECTRUM MONITORING DOMAIN

OHB Group is strongly involved in the field of Radio Frequency Interference and counter measures.

On Satcom domain we need to secure our Satcom Satellites (armed Forces, IRIS2,..). Beside hardening ours systems against it, we are also involved in activities for constant monitoring the RF satcom spectrum to identify disturbers but also to be preparing collaborative spectrum use. -> See also presentation of Frank Zeppenfeldt (ESA) later today.

On Navigation domain OHB group has not only build all flying Galileo G1G satellites and is currently building the LEO-PNT pathfinder B satellites, but OHB group is also heavily involved into monitoring the RF spectrum in the field of navigation frequencies.

There we combine our own jamming & spoofing knowledge with ground based sensor data for QoSS and are currently developing the technology, payloads and mission for high accuracy RFI detection (as e.g. requested by EUSPA in Spring 2025).

Some examples of our work will be shown in the following slides:

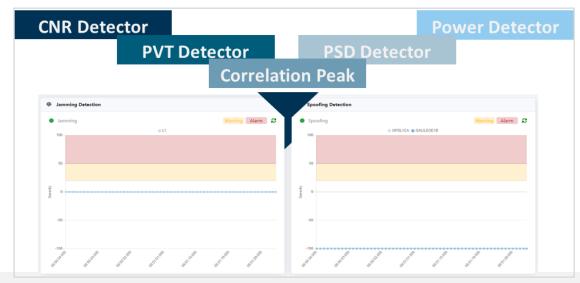
GNSS SITUATIONAL AWARENESS

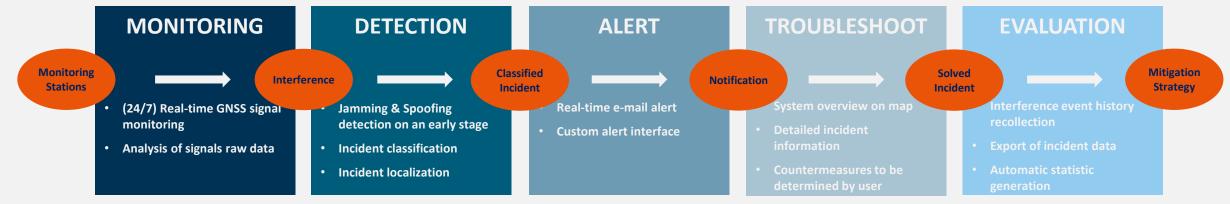




GIDAS – GNSS QUALITY ASSURANCE VIA GROUND BASED SENSORS

- Multiple detection techniques
- 2. Weighted combination of multiple techniques to improve robustness
- 3. Simple to read and interpret decision metrics for jamming and spoofing





GNSS SITUATIONAL AWARENESS

GROUND BASED ACTIVITIES



GIDAS – GNSS QUALITY ASSURANCE VIA GROUND BASED SENSORS

GIDAS STATIONARY

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





ROMANIA: Integration of GNSS quality control systems by OHB at the 17 Romanian Airports in 2024/25 to counter jamming/spoofing











GIDAS – GNSS QUALITY ASSURANCE

PORTABLE

"The portable, standalone GIDAS, everything within a suitcase."

- MONITORING CENTER & SENSOR integrated into a single, standalone portable suitcase
- Only external requirement: power supply connection
 - Addressed market segments: Law enforcement and governmental bodies, frequency regulation authorities, toll collection enforcement, airports, safety critical infrastructure





GIDAS – GNSS QUALITY ASSURANCE

MOBILE

"The flexible, moving data collection unit of GIDAS installations."

- **MONITORING CENTER & SENSOR integrated in a single** unit for automobiles
 - Addressed market segments: Law enforcement and governmental bodies, frequency regulation authorities, toll collection





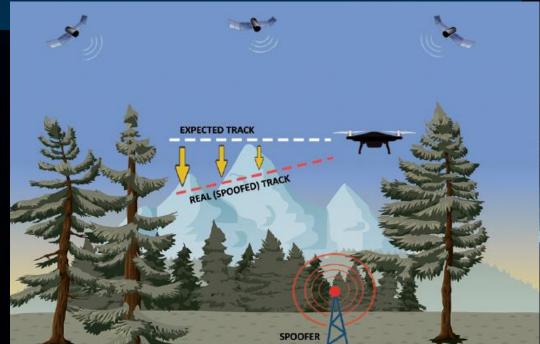
JAMMING AND SPOOFING

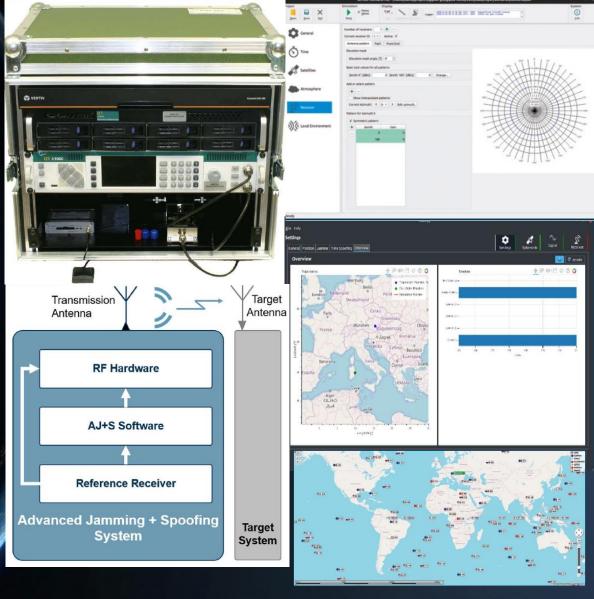
TESTING AND PROTECTING LOCAL INFRASTRUCTURE

- For testing your jamming/spoofing monitoring and protection services you need to know everything about jamming and spoofing
- Therefore, we had developed our own AJ&S system for testing and military use cases
- Simulating/executing sophisticated jamming and spoofing attacks
- Including high end Signal generator for all GNSS –Lband signalas (e.g. GPS L1, L2,L5, Glonass, Galileo, Beidou, SBAS..)

Integrated reference receiver for performing synchronized spoofing

attacks

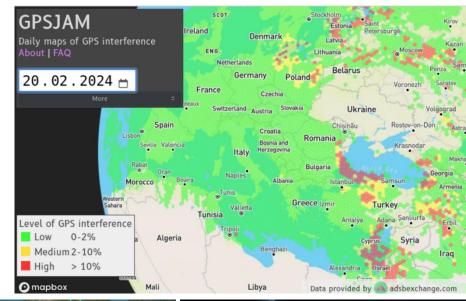


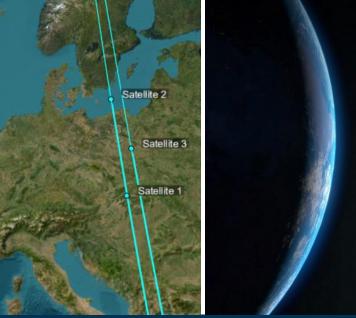


SAFIR-PNT – GNSS JAMMING/SPOOFING DETECTION FROM SPACE



- Different projects in this domain are ongoing at OHB System (e.g. MOGSI-LISA payload for DLR, NAVGUARD for European Defense Fund) that look at civilian / military aspects of GNSS signal interference monitoring from LEO
- While the topic was pretty academic 3 years ago, it has gained dramatically in importance since the Russian/Ukraine war.
- There is great interest in (i.p. Eastern) Europe now regarding this topic, as GNSS signal interference has many impacts in that region.
- Hence, OHB are currently looking at a multilateral military-funded project of Belgium, Poland, Austria, and Germany (and potentially others), for Situational Awareness for Interference-free, Resilient PNT
- Some pre-developments already running in ESA content





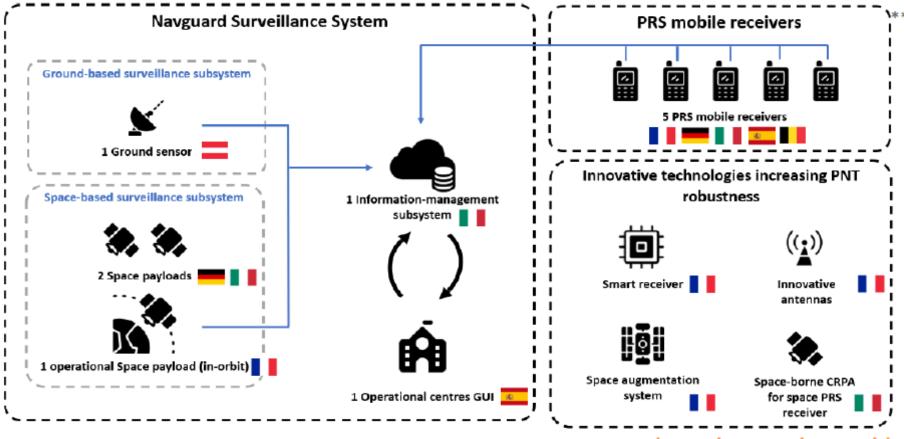
NAVGUARD; MOGSI (SPACEBORNE MONITORING OF GNSS SIGNAL) & INTERFERENCE) /LISA (LEO INTERFERENCE SITUATIONAL AWARENESS)



NAVGUARD aims at developing a common infrastructure for EU NAVWAR capability, relying on space-based & ground-based surveillance & complementing current European efforts to strengthen the future Galileo PRS service resilience for military applications and the development of the user segment used by the forces of the EU Member States. *

EXPECTED IMPACTS: stimulate innovative anti-spoofing and anti-jamming technologies **

→ Monitoring threats to PRS signal integrity



→ Towards a robust and trustable PRS based PNT

^{*} source: EC call for proposal for "Space and ground-based NAVWAR surveillance"

^{**} source: Galileo For EU Defence – GEODE & Navguard presentation @ Munich Satellite Navigation Summit 2023, Session 5. SECURE NAVIGATION, 14th March 2023

OHB – GENERAL POSITION TO SPECTRUM MONITORING



SERVICES AND ACTIVITIES IN RF SPECTRUM MONITORING DOMAIN

The RF spectrum is a limited and extremely valuable, but also extremely vulnerable resource.

The digitalization of our daily life and business makes it essential for the European Citizen, the European governments as well as the European Industry (e.g. Industry 4.0, 6G/D2D, Autonomous Driving/Flying, ..) to:

- Hardening our systems against disturbers
- monitor the RF spectrum in Areas of Interest with 24/7 coverage and
- to act against threads by intentional and unintentional disturbers as soon as possible (starting by creating the legal framework and the roll out of the necessary technology to identify, classify, fingerprint and geolocate the disturbers)

Or in other words:

Without a reliable and secure access to the today GNSS, future PNT as well as 5G/6G and D2D services, the security of our modern world is in great danger to miss the challenges we currently face (e.g. EU goals in the policy windows of "clean transition and decarbonization; digital transition; health, biotech, agriculture and bioeconomy; defence and space", see EU Resilience and Security, Defence Industry, and Space (RSDS) documents)

gpsjam.org



THANK YOU!

Stephan Roemer
OHB SE
Manfred-Fuchs-Platz 2-4
28359 Bremen
Germany

Phone: +49-421-2020-7559

Email: stephan.roemer@ohb.de

Web: www.ohb.de

Bernhard Czar
OHB AUSTRIA
Kärntner Str. 7b/1,
8020 Graz
AUSTRIA

Phone: +43 316 890971-0

Email: bernhard.czar@ohb-austria.at Web: https://www.ohb-austria.at/

COMPANIPRESENTATION NO BUSISE!//PUBBLIC 13