

**NLS**  
FINNISH GEOSPATIAL  
RESEARCH INSTITUTE  
FGI

# Jammertest 2022 and 2023

Andøya, Norway

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# The Plan, Data, and devices

- What are you going to measure?
    - Plan test cases early
    - Make a dry run of the tests so you know everything will work
  - Devices
    - What devices you need?
    - If possible, don't make updates to the devices on the last minute
  - What will you do if something breaks while on the go?
    - Spare devices? (cables, splitters etc.)
  - Getting there?
    - Official documents
    - How are you going through customs and airport security?
- 

# Traveling

- How are you going to travel?
  - Ground?
  - Plane?
    - How to pack things?
    - Is the thing allowed on plane?
    - Airport security?
    - Or should you ship the stuff there after all?
- Where are you going to travel?
  - Outside of Finland?
    - SPAN IMU is export controlled, exportation likely requires a few months of paperwork...
  - Outside of EU?
    - ATA Carnet for customs

*Hint: Start planning early, preferably yesterday!*

# Jammertest: There and back again

Heading Association  
Associação emitente

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CHAÎNE DE GARANTIE INTERNATIONALE

FINLAND CHAMBER OF COMMERCE

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CUSTOMS CONVENTION ON THE A.T.A. CARNET FOR THE TEMPORARY ADMISSION OF GOODS  
CONVENTION COUVRANT LE CARNET A.T.A. POUR L'ADMISSION TEMPORAIRE DES MARCHANDISES  
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FI-02150 Espoo

B. REPRESENTED BY\*/Représenté par\*  
Any authorized representative

C. INTENDED USE OF GOODS/Situation prévue des marchandises  
Professional goods  
18.9.2022-24.9.2022

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H. CERTIFICATE BY CUSTOMS AT DEPARTURE /  
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a) Identification marks have been affixed as indicated in column 7 against the following item No(s) of the General List  
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b) GOODS EXAMINED/Vérifié les marchandises\*  
Yes/Oui : No/Non :

c) Registered under Reference No.\*  
Enregistré sous le numéro.\*

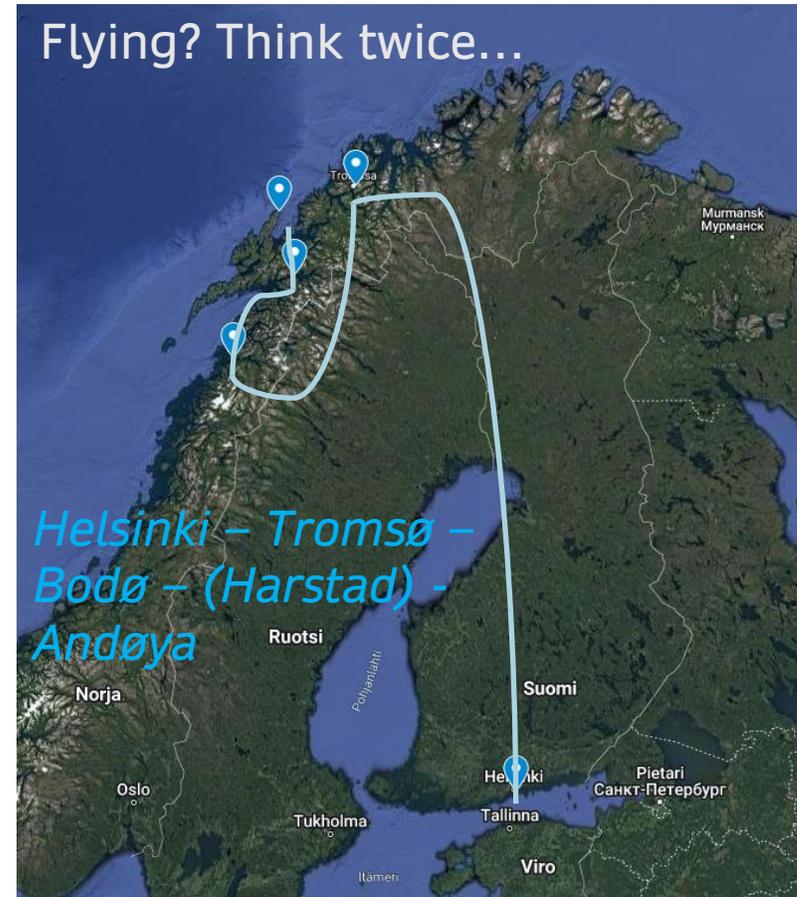
d) Customs Office - Place - Date (year/month/day) Signature and Stamp  
Bureau de douane - Lieu - Date (année/mois/jour) Signature et timbre

I. Signature of authorised official and Issuing Association stamp/ Signature du délégué et timbre de l'association émettrice  
HELSINKI REGION CHAMBER OF COMMERCE  
Matti HEDIKONEN  
Helsinki 2022.09.11.13  
Place and Date of Issue (year/month/day)  
Lieu et date d'émission (année/mois/jour)

J. Signature of Holder/Signature du titulaire

\*If applicable/ \*Si y a lieu

'Fun' with customs



# Test area

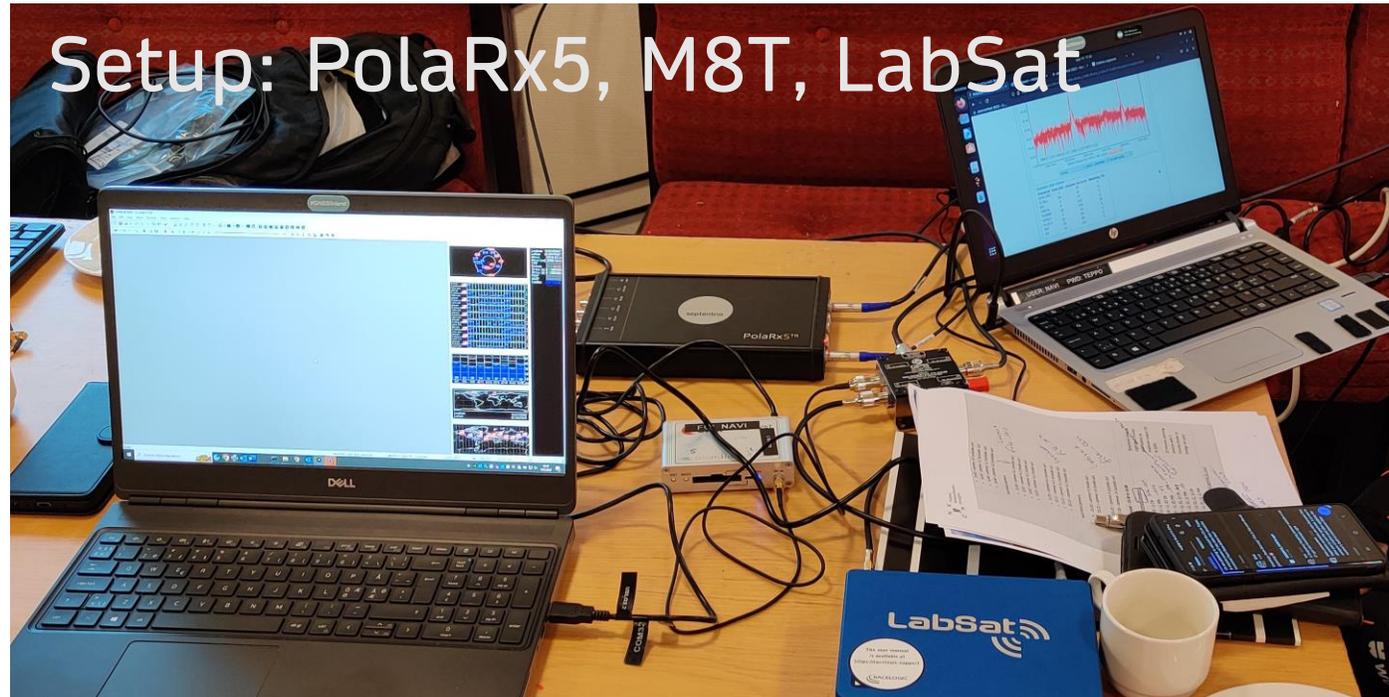
- All tests run by the FGI during Jammertest 2022 done within the town of Bleik
- We travelled light
  - Limitations on equipment



# DATA collection

Aim: Collect data for a research project funded by the Academy of Finland, Resilience and Security of Geospatial Data for Critical Infrastructures (REASON)

- Measurements that are compatible with the FinnRef network
- Measurements that can be replayed in laboratory conditions using other receivers
- Equipment should be as light as possible



Setup: PolaRx5, M8T, LabSat



Novatel antenna + tripod

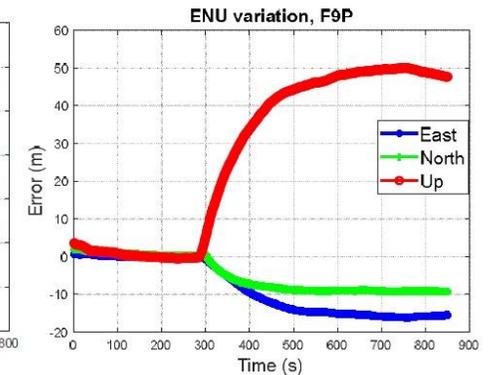
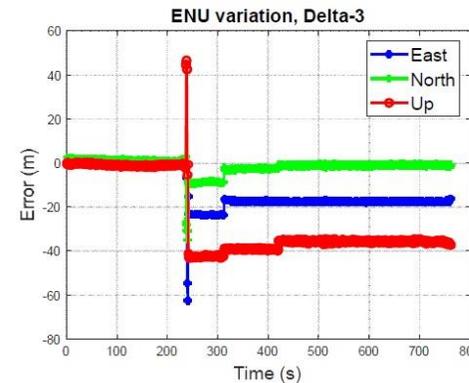
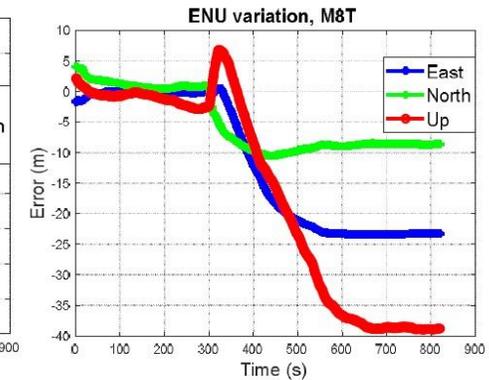
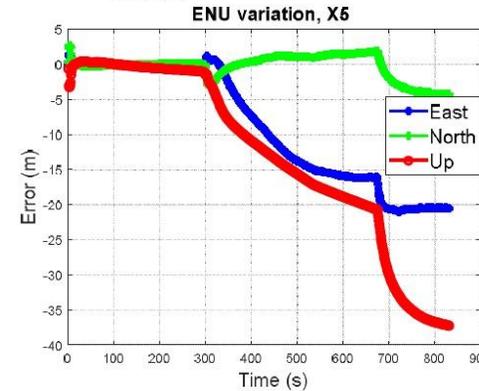
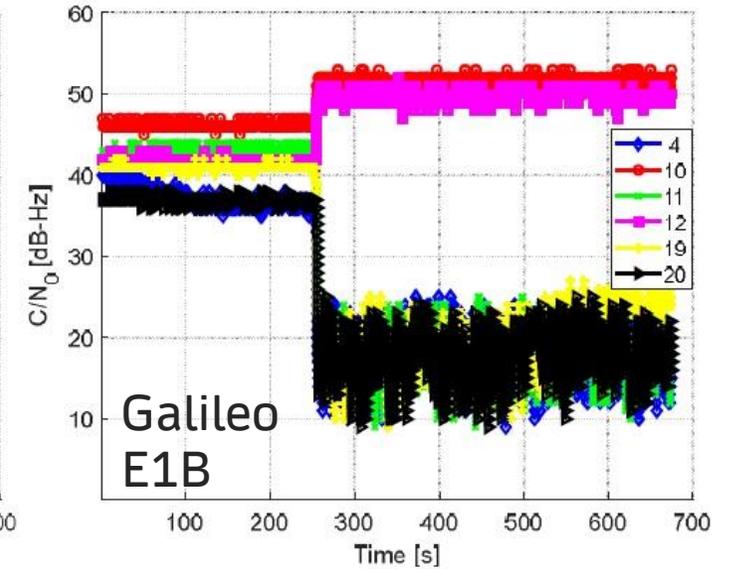
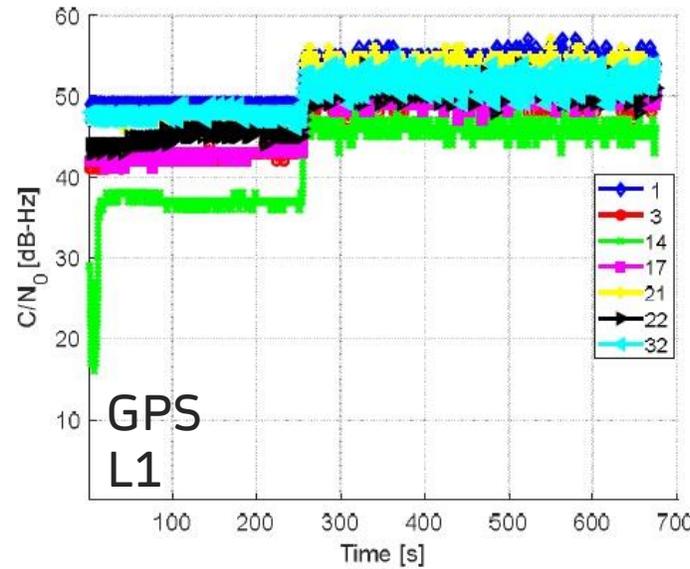
# Some results

## Spoofing:

- test the behaviour of various receivers under simulated and live conditions
- Difference in CN0 values and resolved ENU parameters

## Jamming

- Signal correlation-based method for jamming detection and classification
- Automated jamming detection system for FinnRef
- Create a machine learning based method that can use Septentrio 'burst' data products



# Jammertest 2023

- FGI is sending a team to Jammertest 2023
- Current plan for experiments still to be decided

Some ideas:

- No flying this time, we'll take the car
- Since we are driving, collect data on the trip (test HAS, OSNMA...)
- LabSat seems like a must
- Collect data with phones?

