


Jammertest 2023 Information

 Norwegian Communications Authority


Statens vegvesen
Norwegian Public Roads
Administration

FFI Norwegian Defence
Research Establishment

Justervesenet 
Norwegian Metrology Service

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- Bird view technical program





Tomas Levin
Senior principal engineer,
Norwegian Public Roads
Administration



Nicolai Gerrard
Senior engineer,
Norwegian Communications Authority



Anders Rødningsby
Principal scientist
Norwegian Defence
Research Establishment



Harald Hauglin
Chief engineer,
Norwegian Metrology Service



What is Jammertest?



Becoming more robust!

Systems that use GNSS are becoming part of everyday operation for national road authorities. They provide simple, cheap and always available solutions for time synchronization and ability for actors in the transport sector to find their location and relate to data from national road databanks.

But how vulnerable are solutions based on GNSS?

How can authorities contribute to making society more robust?

Jammetest 2021 – 2022 and most likely 24,25,26... are all part of this effort!



Public - private cooperation

Authorities, industry and academia are all part of the solution, but have different roles.

Identify problems, talk about the problems, challenge great minds and enable them to work on the problems.

Only the police and the military are allowed to conduct jamming in open air in Norway – hence authorities have teamed up to enable industry to test.

Jammetest 2023 will build on the same template as Jammetest 2022 and 2021.



Whom will you meet?

Four branches of government that are responsible for the jammetest:

- **The Norwegian Communications Authority (Nkom)**
- **Norwegian Defence Research Establishment (FFI)**
- **Norwegian Public Roads Administration (SVV)**
- **Norwegian Metrology Service (JV)**

And we are backed by the Norwegian Space Agency

In total it looks like we will be around 100-ish persons taking part in testing, we believe that this one of the largest open GNSS jamming test conducted in the world 😊

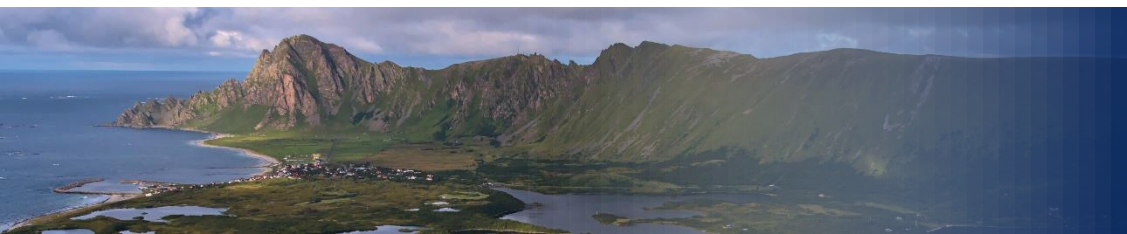


What do want to achieve?

Bring together experts in the field and problem owners to look at GNSS vulnerability in order to get even better more robust solutions on the market.

We believe in doing this by working together and sharing with each other as much as we are comfortable with sharing.

Have an informal atmosphere with mutual respect and understanding. You can take pictures, but show common courtesy and ask if you want to take pictures of others and their “equipment”.



Health, safety and environment (HSE)

Testing under real world conditions on open public roads can be dangerous!

In order to make Jammertest 2023 as safe as possible a few simple requirements are laid down:

- **High visibility clothing**
- **Zero tolerance for driving under the influence of alcohol and drugs**
- **Existing speed limits are in force during test**
- **Listen and conform to the organizer's requests**
- **The road between the cemetery and the tunnel is a NO STOP area. You are not allowed to stop your vehicle there for any reason.**

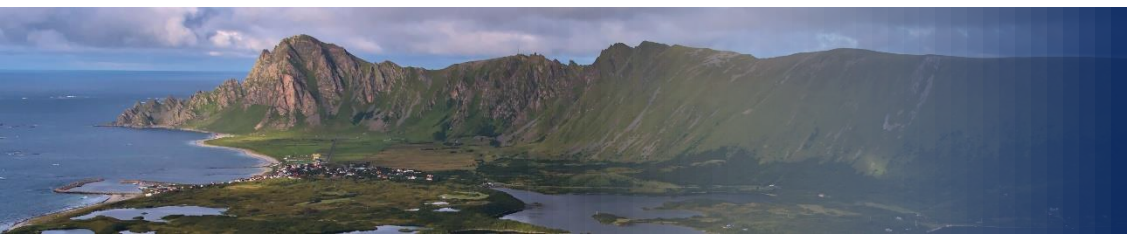
If you have any questions, they may be directed to "Statens vegvesen" (Norwegian public roads administration) employees. They are wearing orange high-viz clothing.



Jammertest 2023

September 18th – 22nd

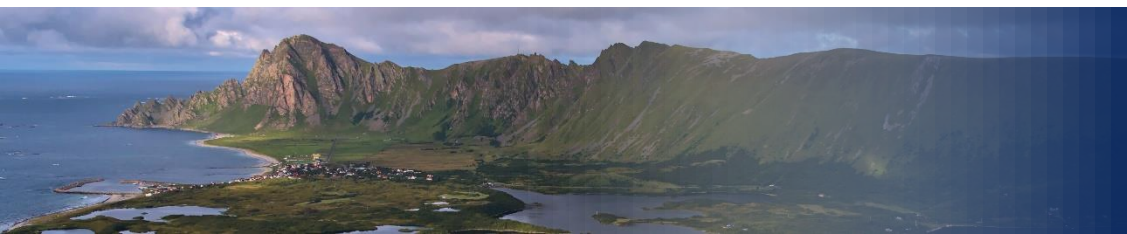
Where?
Andøya!



Jammertest 2022

a quick recap

Session	Main activity
Monday <i>after lunch</i>	General static tests of high-effect jammer and of low-effect/personal jammers
Tuesday <i>before lunch</i>	Jamming: Step-up tests and tests of different signal types and frequency bands
Tuesday <i>after lunch</i>	Jamming: Continue with step-up tests and tests of different signal types and frequency bands – Tests with jamming over longer time periods.
Wednesday <i>before lunch</i>	Jamming: Driving tests on roads with static high- and low-effect jammers
Wednesday <i>after lunch</i>	Jamming: Driving tests on roads with dynamic jammers
Thursday <i>before lunch</i>	Spoofing: Fundamental spoofing attacks
Thursday <i>after lunch</i>	Spoofing: Trial of more advanced spoofing attacks
Friday <i>before lunch</i>	New ideas tests Demonstrations tests



Jammertest 2022

Test locations

Recap

Overview with indications of

- total test area (red)
- village of Bleik and surrounding area (green)
- Grunnvatn (yellow)



Jammertest 2023

Test locations

(Yellow: Andenes)

Test locations

Red: Area 1

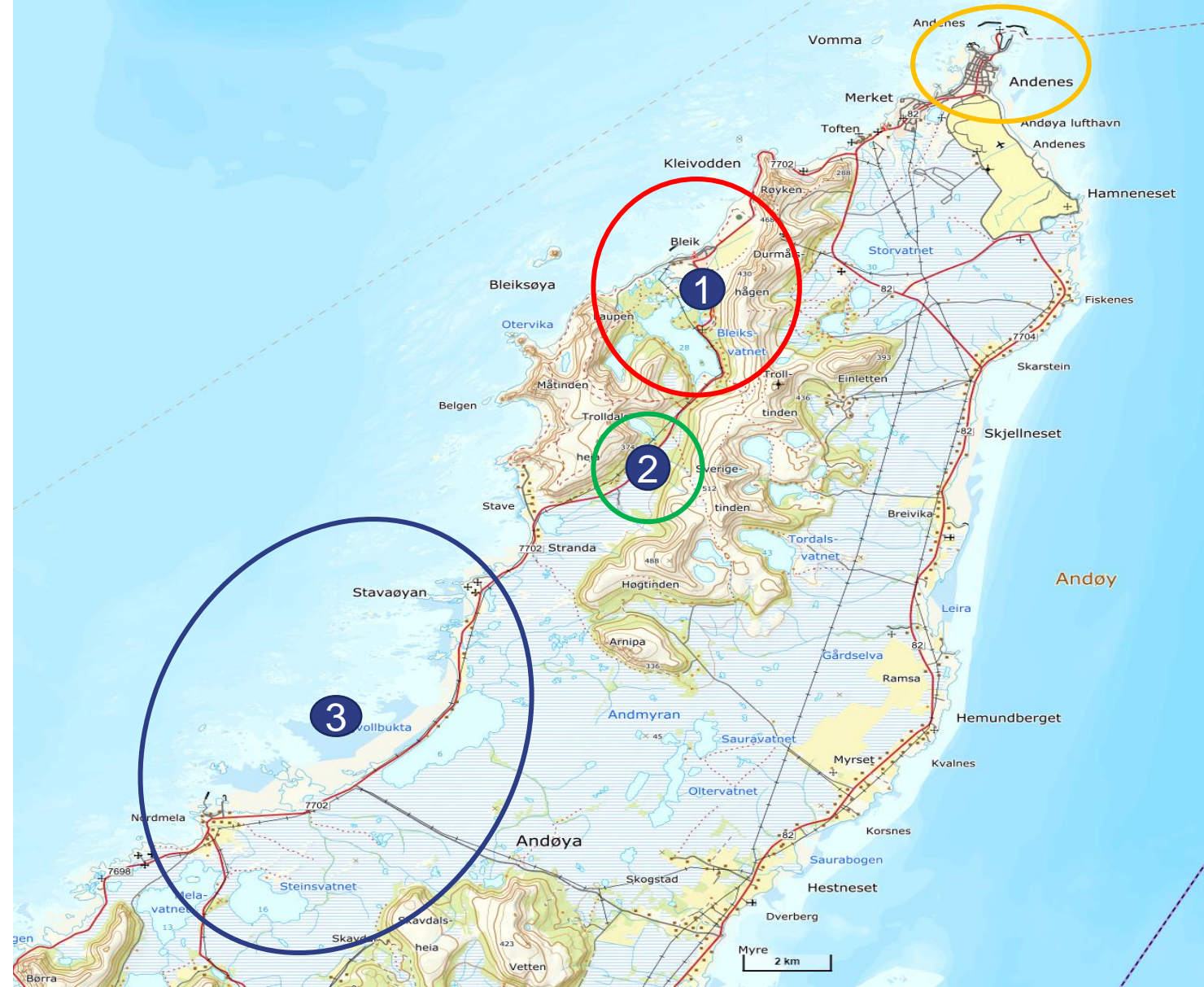
Bleik

Green: Area 2

Grunnvatnet

Blue: Area 3

Stave-Nordmela



Jammertest 2023

Test locations

(Yellow: Andenes)

Test locations

Red: Area 1

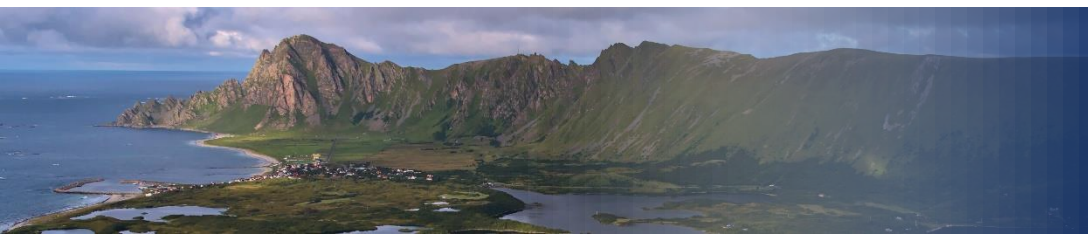
Bleik

Green: Area 2

Grunnvatnet

Blue: Area 3

Stave-Nordmela



Jammertest 2023

Test locations

Three locations, where we can work in parallel:

- 1: Main, high effect jammer and sophisticated spoofing attacks
- 2: Small, low effect jammers, «sand box»
- 3: Small, low effect jammers in and on cars, straight piece of road with limited traffic to test driving scenarios

Participants are free to move between and use the different locations



Jammertest 2023 Session setup

Day	Location 1 (Bleik)	Location 2 (Grunnvatn)	Location 3 (Stave-Nordmela)
Monday (18.09.23) (from lunch)	High effect stationary jamming	Book time slots on hourly basis Low effect jammers	Low effect stationary jamming
Tuesday (19.09.23)	High effect stationary jamming Multi-jammer scenarios	Book time slots on hourly basis Low effect jammers	Motorcade (with low effect jammers) Based on industry input
Wednesday (20.09.23)	Stationary meaconing Stationary spoofing Mainly position, navigation	Book time slots on hourly basis Low effect jammers	Motorcade (with low effect jammers) Based on industry input
Thursday (21.09.23)	Stationary meaconing Stationary spoofing Mainly timing	Book time slots on hourly basis Low effect jammers/Multi-jammer scenarios	Mobile meaconing (SDR) Mobile spoofing (SDR) Mainly position, navigation
Friday (22.09.23) (until lunch)	Rest, demonstrations	Rest	Rest

Example of test setup

4 Stationary power ramp jamming with CW & PRN 15

Preconditions and setup:

- 4.1.1 Test: X mW to 20W, 2 dB increments CW: L1
- 4.1.2 Test: X mW to 20W, 2 dB increments PRN: L1
- 4.1.3 Test: X mW to 20W, 2 dB increments CW: L1, G1
- 4.1.4 Test: X mW to 20W, 2 dB increments PRN: L1, G1
- 4.1.5 Test: X mW to 20W, 2 dB increments CW: L1, G1
- 4.1.6 Test: X mW to 20W, 2 dB increments PRN: L1, G1, L2
- 4.1.7 Test: X mW to 20W, 2 dB increments CW: L1, G1, L2, L5
- 4.1.8 Test: X mW to 20W, 2 dB increments PRN: L1, G1, L2, L5

Practical information

- Travel & accomodation
- Transport
- Logistics





JAMMERTEST 2023 – September 18th – 22nd





TEST VEHICLE

blox

FIN ETB-608



Confirm your
interest by May
1st

<https://forms.office.com/r/1EnrY5CyP6>



Contact points

Test leaders: Nicolai Gerrard, nge@nkom.no & Tomas Levin, tomas.levin@vegvesen.no

Technical questions about jamming: Anders Rødningsby, anders.rodningsby@ffi.no

Technical questions about spoofing: Harald Hauglin, hha@justervesenet.no

Practical information: Heidi Andreassen, heidi@testnor.com





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