Appendix A - Description of test areas at Andøya

RED = Official Test Area **1**

Green = Official Test Area **2**

Blue = Official Test Area **3**

Survey points

Notice: Geodetic reference frame is EUREF89.

Differences between EUREF89 and WGS84 (from Appendix H):

North: $N_{WGS84\ epoch2025.7} = N_{EUREF89UTM33epoch1989.0} + \Delta N$ where $\Delta N = 0.652m$

East: $E_{WGS84\ epoch2025.7} = E_{EUREF89UTM33epoch1989.0} + \Delta E$ where $\Delta E = 0.472m$

Latitude: $\varphi_{WGS84\ epoch2025.7} = \varphi_{EUREF89UTM33epoch1989.0} + \Delta Lat$ where ΔLat =0.000005777°

Longitude: $\lambda_{WGS84\ epoch2025.7} = \lambda_{EUREF89UTM33epoch1989.0} + \Delta Long$ where $\Delta Long$= 0.000012236

Seven significant decimal digits for latitude and longitude will ensure cm-precision.

Note that coordinates in Table 1 are from 2024! Pending update after measurements in 2025!

Table 1: Coordinates from Jammertest 2024

Point ID	Latitude	Longitude	Ellipsoidal height	Physical height	Northing UTM33	Easting UTM33	Mark
SAMF	69.27560042	15.96812897	42.73	6.88	7685395.45	538232.98	Foot antenna at roof
MECONING	69.28000843	16.00593213	370.23	334.44	7685910.97	539717.71	rig
RX_1	69.28031078	16.01065010	352.50	316.72	7685947.75	539903.42	Green antenna
RX_2	69.27876623	16.01691109	358.16	322.39	7685779.63	540153.46	White antenna
SENDER	69.28007238	16.00643461	381.98	346.19	7685918.43	539737.43	rig
REFANTENNA	69.27538406	15.96826115	41.01	5.16	7685371.41	538238.59	Grey ant. yellow tripod
E-BLEIK-RF	69.27560844	15.96881180	42.64	6.79	7685396.77	538259.93	Ericsson Right Front
E-BLEIK-LF	69.27560014	15.96882632	42.60	6.75	7685395.85	538260.52	Ericsson Left Front
E-BLEIK-LB	69.27560509	15.96884918	42.60	6.75	7685396.42	538261.42	Ericsson Left Back
E-BLEIK-RB	69.27561842	15.96885426	42.65	6.80	7685397.91	538261.59	Ericsson Right Back
11	69.27548568	15.96814545	40.85	5.00	7685382.66	538233.84	Antenna rig
12	69.27549051	15.96816671	40.84	4.99	7685383.22	538234.67	Antenna rig
13	69.27549534	15.96818795	40.85	5.00	7685383.77	538235.50	Antenna rig
14	69.27550022	15.96820929	40.86	5.01	7685384.32	538236.33	Antenna rig
21	69.27549321	15.96813174	40.86	5.01	7685383.49	538233.28	Antenna rig
22	69.27549803	15.96815312	40.87	5.02	7685384.05	538234.12	Antenna rig
23	69.27550290	15.96817433	40.88	5.03	7685384.60	538234.95	Antenna rig
24	69.27550779	15.96819577	40.89	5.04	7685385.16	538235.79	Antenna rig
31	69.27550083	15.96811797	40.89	5.04	7685384.34	538232.73	Antenna rig
32	69.27550562	15.96813928	40.89	5.04	7685384.88	538233.56	Antenna rig
33	69.27551050	15.96816054	40.91	5.06	7685385.44	538234.39	Antenna rig

34	69.27551533	15.96818190	40.92	5.07	7685385.99	538235.22	Antenna rig
41	69.27550813	15.96810477	40.92	5.07	7685385.14	538232.19	Antenna rig
42	69.27551297	15.96812596	40.93	5.08	7685385.69	538233.02	Antenna rig
43	69.27551782	15.96814729	40.94	5.09	7685386.25	538233.85	Antenna rig
44	69.27552264	15.96816853	40.96	5.11	7685386.80	538234.68	Antenna rig
1	69.27553403	15.96883049	39.86	4.01	7685388.48	538260.80	Asphalt nail
2	69.27523091	15.96674688	40.48	4.63	7685353.39	538179.06	Asphalt nail
LOK2-ORIG	69.22249871	15.93303984	66.92	31.04	7679453.28	536937.52	Tree stick, Height ref: terrain
A50	69.22293289	15.93335322	65.69	29.80	7679501.88	536949.19	Tree stick, Height ref: top
A100	69.22336709	15.93366659	65.76	29.87	7679550.48	536960.86	Tree stick, Height ref: top
A150	69.22380127	15.93398000	65.64	29.75	7679599.08	536972.52	Tree stick, Height ref: top
B50	69.22218526	15.93394222	65.80	29.91	7679418.87	536973.77	Tree stick, Height ref: top
B100	69.22187181	15.93484460	66.76	30.88	7679384.47	537010.03	Tree stick, Height ref: top
B150	69.22155835	15.93574693	67.95	32.07	7679350.07	537046.28	Tree stick, Height ref: top
C50	69.22237796	15.93182408	64.44	28.55	7679439.08	536889.60	Tree stick, Height ref: top
C100	69.22225721	15.93060834	63.97	28.08	7679424.89	536841.68	Tree stick, Height ref: top
C150	69.22213644	15.92939261	63.64	27.75	7679410.69	536793.75	Tree stick, Height ref: top

Preliminary coordinates for new markers at Test Area 2 in 2025:

Point ID	North	East
D50	7679467.472	536985.442
D100	7679481.667	537033.364
D150	7679495.863	537081.286
E50	7679404.678	536925.852
E100	7679356.078	536914.185
E150	7679307.479	536902.517
F0	7679474.946	536931.772
F50	7679502.191	536889.846
F95	7679526.711	536852.113
F200	7679583.924	536764.070

Description of Test Area 1

Overview of survey points

More detailed view of surveyed points.

Description of Test Area 2

Test Area 2 is the parking lot at the end of a dirt road. (Position N 69.2225°, Ø 15.9335°)
Most of the testing will be conducted at the parking lot, or the surrounding area.
The setup is based around known positions, distances and controlled RF power levels for the tests.

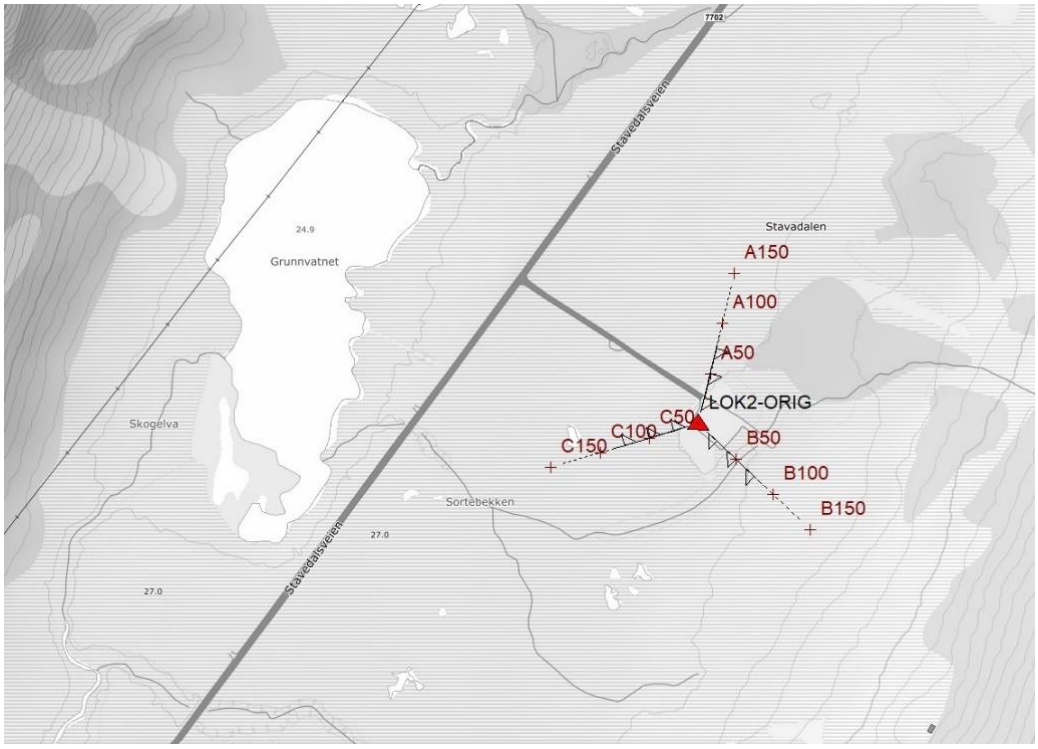


Figure 1 Test Area 2, directions for where we place the jammers, or generate signals from. (Established in 2024).

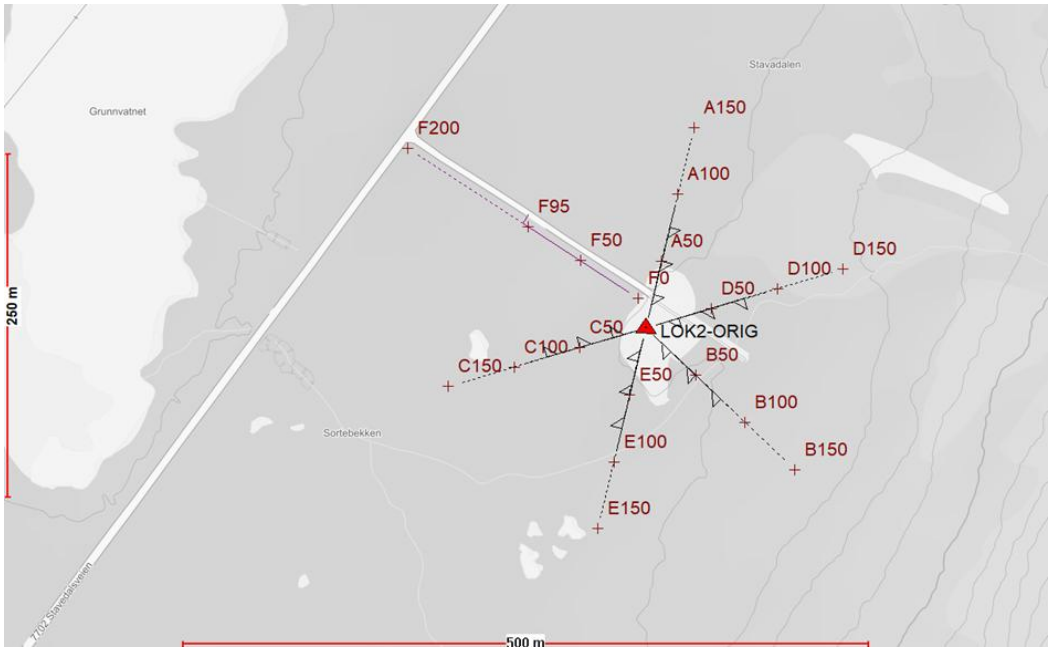


Figure 2: Test Area 2, directions for where we place the jammers and several new directions that will work as visual markers from the air as "drone waypoints". (Established in 2025).

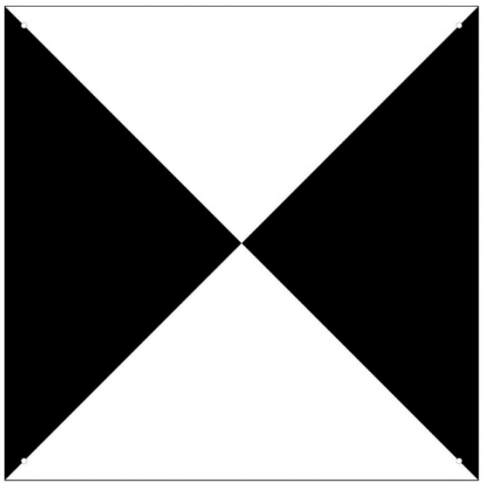
The test setup at location 2

A, B and C axis are positions used for placement of jammers, or spoofing equipment, as shown in figure 1. A, B and C axis is separated 120 degrees apart will be marked with “wood sticks” (trelekter).

D and E axis are continuations of C and A axis. They will be marked wit drone waypoints visual from the air. The F axis is approximately 5m perpendicular to the edge of the road coming into Test Area 2. The purpose of the F - markers is to make drone landing platforms available for attendees.

D, E and F- axis will have this black and white drone markers, which should be visible at 100 meters above ground level.

Example: drone marker/ visual waypoint. (Dimensions 50 cm x 50 cm)



Fiducial marks added to drone markers for Test Area 2.
Axis marked with color and distance marked with squares.

Red	=	D - direction
Blue	=	E - direction
Green	=	F - direction
1 square	=	50 meters
2 squares	=	100 meters
3 squares	=	150 meters
4 squares	=	200 meters

Example: D – direction @ 150 meters.

Description of motorcade route(s) on Andøya, Test Area 3

The start is as Stave community house (69.212187 North ,15.858559 East), the small jammers can be used the intersection between county road 7702 and communal road “Oklveien” (69.14409 North, 15.75847 East). The figure below shows the stretch that can be used for the motorcade (Red line).

The road is quite narrow 5.1 meters with a speed limit of 80 km/h. The traffic volume is low with about 1000 vehicles per day. For some tests where reduced speed is need there will be a NPRA vehicle in front and at the back of motorcade. Communication to the vehicles will be via FM radio.

Calibration Control Marks (New at Jammertest 2025)

In a straight, open road section, two control marks will be painted in center of the outer (dotted) white line at the right-hand side. The marks will be positioned so that vehicles can align with them as follows:

- The **front right wheel** is placed directly on the painted mark.
- The **rear right wheel** is aligned with the center of the white line.

This arrangement provides a precise and repeatable reference for the forward right wheel position relative to the vehicle's facing direction.

The coordinates of the control marks will be averaged from several time independent RTK-measurements and distributed in *Appendix A* Table 1. These marks are intended for calibrating on-board GNSS and inertial navigation equipment against a known reference point.

Example: