

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 (equations 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 $\Delta Lat = 0.000005777^\circ$

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.

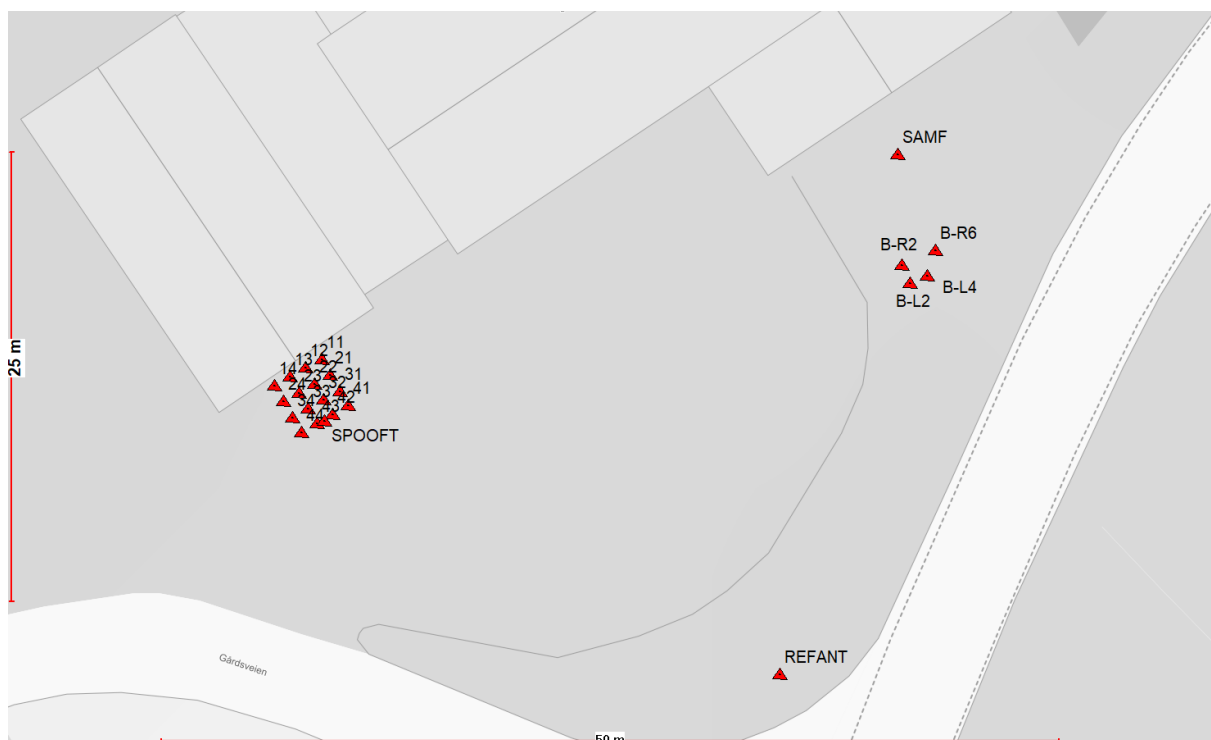
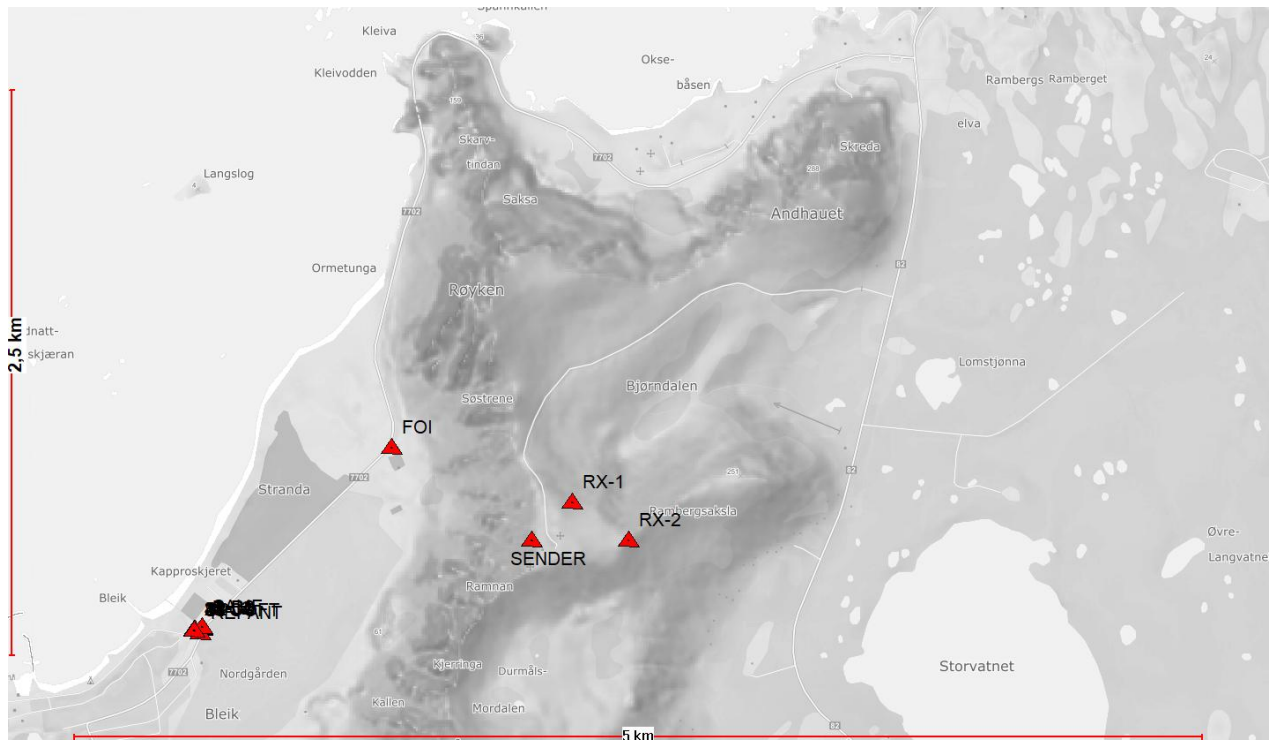
Table 1: Coordinates from Jammertest 2025 (Physical height = heights in The Norwegian NN2000 height system)

Point-ID	UTM33-North	UTM33-East	Physical height	Latitude	Longitude	Ellipsoidal height	Mark
FOI	7686191.493	539102.137	15.643	69.2826137	15.9904594	51.46	whip antenna
REFANT	7685369.617	538256.263	5.424	69.2753655	15.9687079	41.27	Reference
RX-1	7685948.751	539904.210	315.847	69.2803196	16.0106705	351.63	Antenna FFI
RX-2	7685779.526	540153.947	322.206	69.2787653	16.0169234	357.97	Antenna FFI
SAMF	7685398.515	538262.827	15.943	69.2756237	15.9688858	51.79	Lift antenna
SENDER	7685781.138	539725.355	361.265	69.2788432	16.0060716	397.05	FFI Jammer
SPOOFT	7685383.702	538230.922	5.246	69.2754954	15.9680720	41.10	Antenna rig
11	7685387.093	538230.784	5.134	69.2755258	15.9680698	40.98	Antenna rig
12	7685386.642	538229.871	5.057	69.2755219	15.9680466	40.91	Antenna rig
13	7685386.141	538229.009	5.049	69.2755175	15.9680246	40.90	Antenna rig
14	7685385.635	538228.140	5.036	69.2755131	15.9680024	40.89	Antenna rig
21	7685386.252	538231.246	5.062	69.2755182	15.9680814	40.91	Antenna rig
22	7685385.758	538230.377	5.068	69.2755139	15.9680592	40.92	Antenna rig
23	7685385.266	538229.503	5.054	69.2755097	15.9680367	40.90	Antenna rig
24	7685384.766	538228.630	4.980	69.2755053	15.9680145	40.89	Antenna rig
31	7685385.339	538231.770	5.209	69.2755100	15.9680942	41.06	Antenna rig
32	7685384.878	538230.890	5.039	69.2755060	15.9680717	40.89	Antenna rig
33	7685384.382	538230.015	5.057	69.2755016	15.9680495	40.91	Antenna rig
34	7685383.883	538229.164	5.052	69.2754973	15.9680275	40.90	Antenna rig
41	7685384.546	538232.232	5.064	69.2755028	15.9681055	40.91	Antenna rig
42	7685384.042	538231.360	5.050	69.2754984	15.9680833	40.90	Antenna rig
43	7685383.547	538230.499	5.048	69.2754941	15.9680613	40.90	Antenna rig
44	7685383.040	538229.633	5.044	69.2754897	15.9680391	40.89	Antenna rig
B-L2	7685391.362	538263.503	6.734	69.2755595	15.9688999	42.58	Ericsson Bleik
B-L4	7685391.773	538264.495	6.705	69.2755630	15.9689251	42.55	Ericsson Bleik
B-R2	7685392.352	538263.080	6.719	69.2755684	15.9688897	42.57	Ericsson Bleik
B-R6	7685393.160	538264.947	6.694	69.2755754	15.9689374	42.54	Ericsson Bleik
A50	7679501.865	536949.186	29.738	69.2229328	15.9333533	65.62	Tree stick top
A100	7679550.533	536960.850	29.818	69.2233676	15.9336665	65.70	Tree stick top
A150	7679599.058	536972.552	29.739	69.2238011	15.9339807	65.62	Tree stick top

B50	7679418.905	536973.788	30.131	69.2221856	15.9339426	66.02	Tree stick top
B100	7679384.449	537010.067	30.997	69.2218716	15.9348456	66.88	Tree stick top
B150	7679350.055	537046.308	32.009	69.2215582	15.9357476	67.89	Tree stick top
LOK2-ORIG	7679453.277	536937.520	31.037	69.2224987	15.9330398	66.92	Tree stick top
C50	7679439.113	536889.548	28.525	69.2223782	15.9318229	64.41	Tree stick top
C100	7679424.877	536841.664	28.187	69.2222571	15.9306079	64.08	Tree stick top
C150	7679410.700	536793.771	27.856	69.2221365	15.9293930	63.75	Tree stick top
D50	7679467.432	536985.437	30.981	69.2226191	15.9342555	66.87	Tree stick top
D100	7679481.647	537033.357	30.896	69.2227400	15.9354713	66.78	Tree stick top
D150	7679495.848	537081.292	34.431	69.2228608	15.9366873	70.31	Tree stick top
E50	7679404.753	536925.903	29.761	69.2220652	15.9327277	65.65	Tree stick top
E100	7679356.100	536914.217	28.025	69.2216305	15.9324140	63.91	Tree stick top
E150	7679307.500	536902.524	29.144	69.2211963	15.9320999	65.03	Tree stick top
F50	7679502.204	536889.820	28.597	69.2229439	15.9318539	64.49	Tree stick top
F100	7679529.409	536847.921	28.102	69.2231936	15.9308061	63.99	Tree stick top
F150	7679556.671	536805.978	27.602	69.2234437	15.9297573	63.50	Tree stick top
301	7670668.615	530198.748	8.408	69.1445606	15.7600883	44.52	Painted mark
302	7670680.369	530212.300	8.494	69.1446644	15.7604330	44.61	Painted mark
303	7677529.277	534164.531	8.165	69.2056106	15.8623208	44.16	Painted mark
304	7677547.576	534161.777	8.091	69.2057751	15.8622579	44.08	Painted mark
305	7678210.998	534007.445	6.021	69.2117434	15.8585974	42.02	Painted mark
306	7678203.811	534010.272	6.108	69.2116786	15.8586663	42.10	Painted mark
JAM-S3	7678284.284	533996.471	7.472	69.2124019	15.8583464	43.47	Jammer site 3

Description of Test Area 1

Overview of survey points



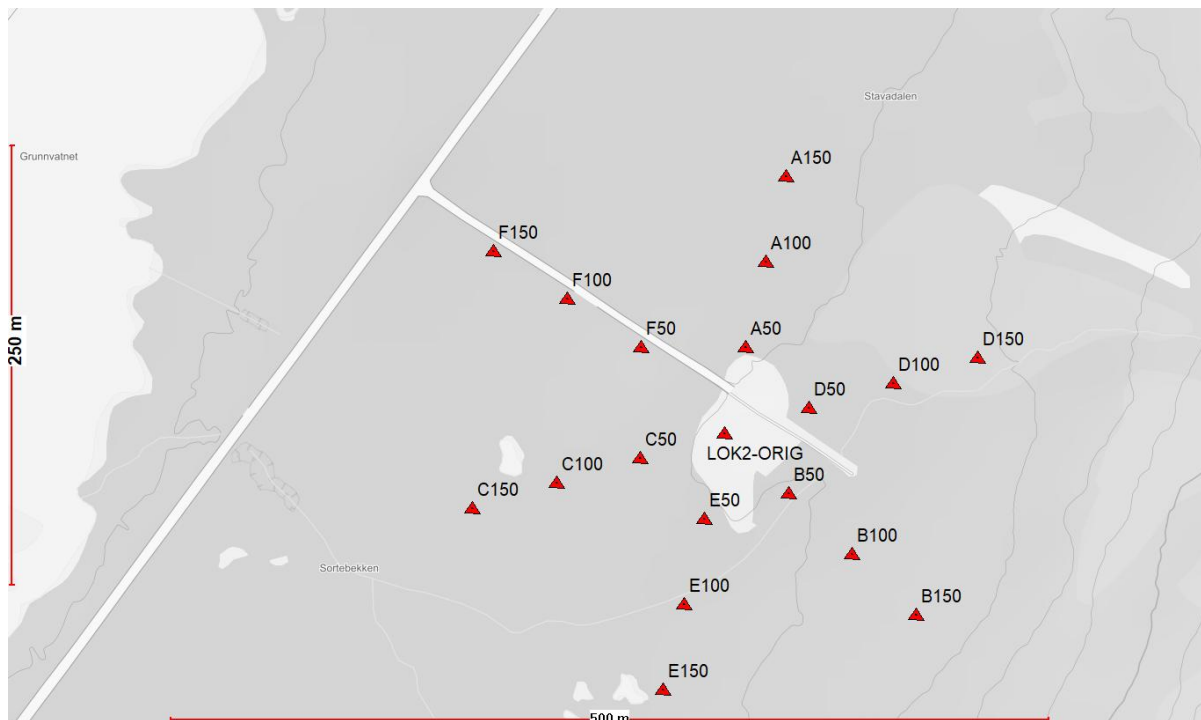
More detailed view of surveyed points outside Bleik samfunnshus.

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.



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

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 with drone waypoints visible 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 these black and white drone markers, which should be visible at 100 meters above ground level.

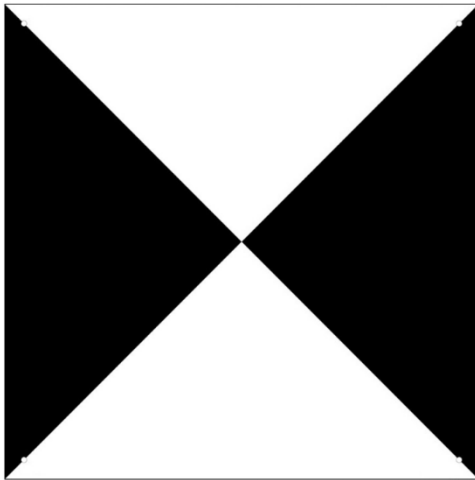
Distances from LOK2-ORIG to drone platform markers along the F-axis:

LOK2-ORIG – F50: 68.36m

LOK2-ORIG – F100: 117.62m

LOK2-ORIG – F150: 167.38m

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.

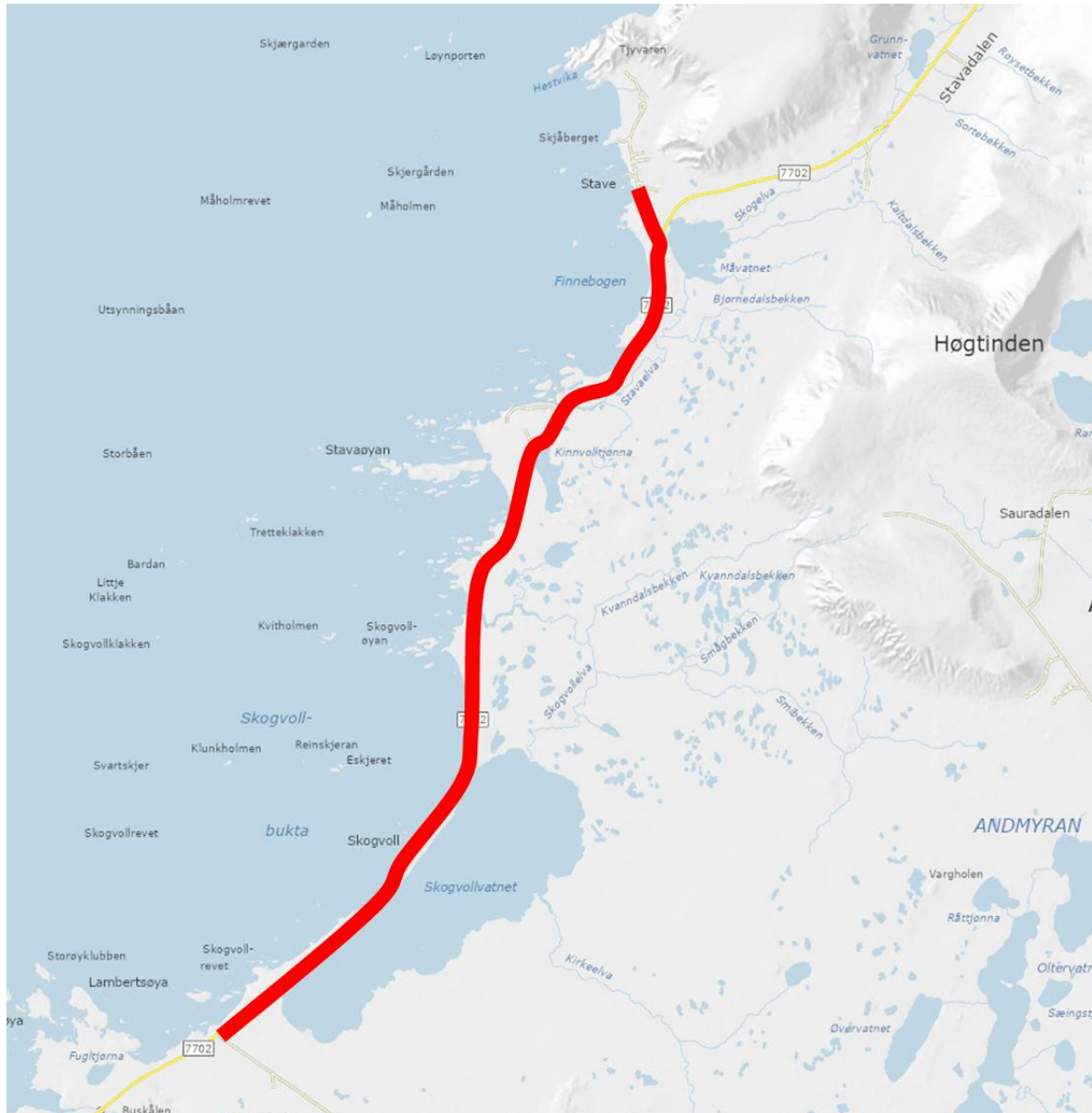
Red	=	D - direction
Blue	=	E - direction
Green	=	F - direction
1 square	=	50 meters
2 squares	=	100 meters
3 squares	=	150 meters
4 squares	=	200 meters

Example: D – direction @ 150 meters.



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

The start is at Stave community house (69.212187 North, 15.858559 East), the small jammers can be used at the intersection between county road 7702 and communal road "Okleveien" (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 needed there will be a NPRA vehicle in front and at the back of motorcade. Communication to the vehicles will be via FM radio.

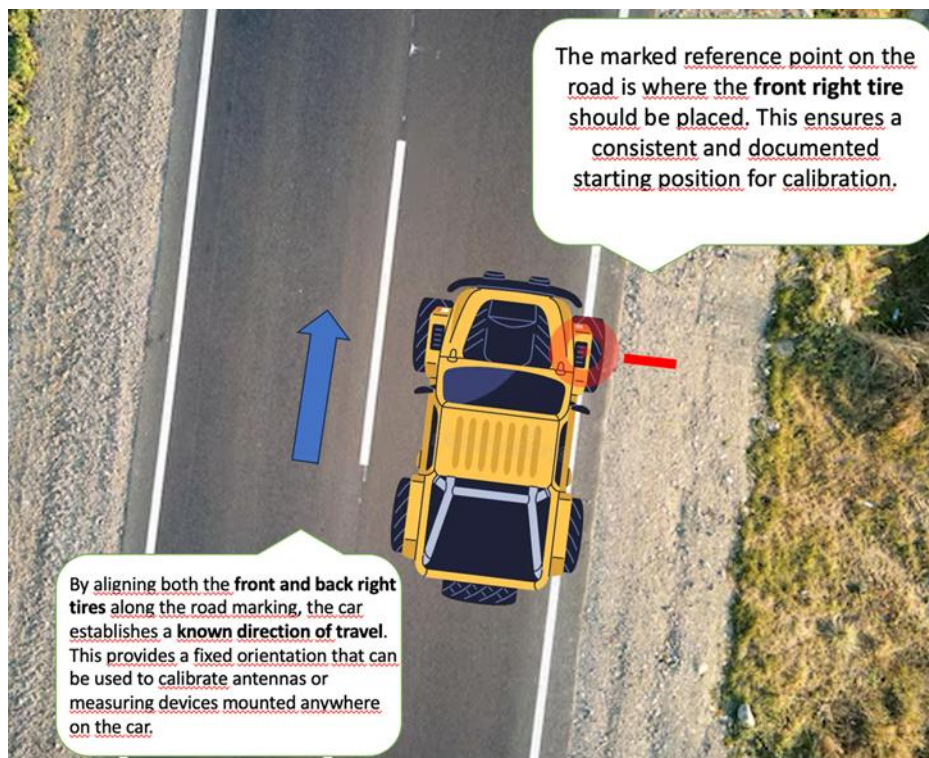
Calibration Control Marks (New at Jammertest 2025)

In a straight, open road section, three pairs of control marks (301-306) will be painted in center of the 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.

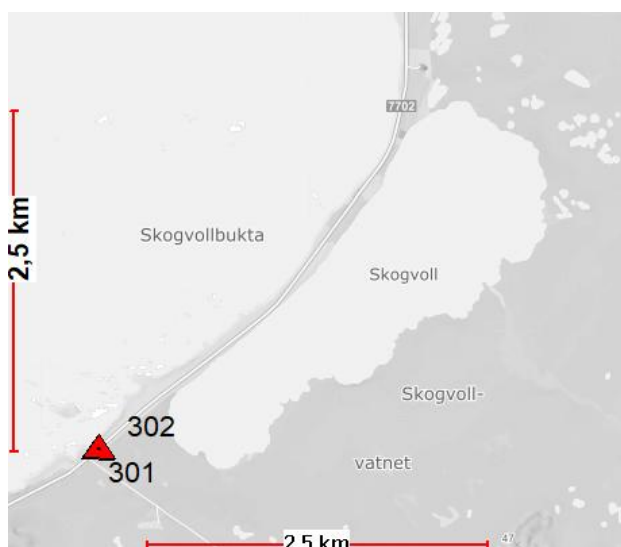
This arrangement provides a precise and repeatable reference for the forward right wheel position relative to the vehicle's facing direction.

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.





JAM-S3 is the Jammer-point at the car roof on Site 3



Example, one pair of calibration points

