



**AALBORG UNIVERSITY**  
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## **ROOF LOCATION POINTS NOVI 9 – SELMA LAGERLØFTS VEJ 312**

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AALBORG UNIVERSITET

# ROOF LOCATION POINTS

## NOVI 9 – SELMA LAGERLØFTS VEJ 312

Johannes Hejselbæk



Oktober - 2018

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## INTRODUCTION

### Objective

The objective of this work is to establish some reference points on the roof of NOVI 9 for use in relation to measurements and other activities needing absolute knowledge of position, elevation and/or orientation.

### Method

To ensure the highest possible accuracy and precision of the determination of the location of the chosen reference points the surveyor school at AAU have been consulted. Further, their high-grade equipment has been used for the conducted measurements. This was made possible through the assistance of Anders Otte from the Plan Department.

26 reference points have been determined using a surveyor-grade GPS system as described in the following. The distribution of the 26 points is shown in the reference sketch. All the points have been painted with red colour on a white background on non-movable objects on the roof.

## EQUIPMENT

The used GPS is a Leica GPS1200 utilizing RTK corrections resulting in an accuracy in the order of centimetres. The measured coordinates are relative to the Universal Transverse Mercator (UTM) zone 32 with European Terrestrial Reference System 1989 (ETRS89) and Danish Vertical Reference 1990 (DVR90).



# REFERENCE SKETCH





## DATA

=====  
=====

Leica GPS1200 - Output data 21-09-2017

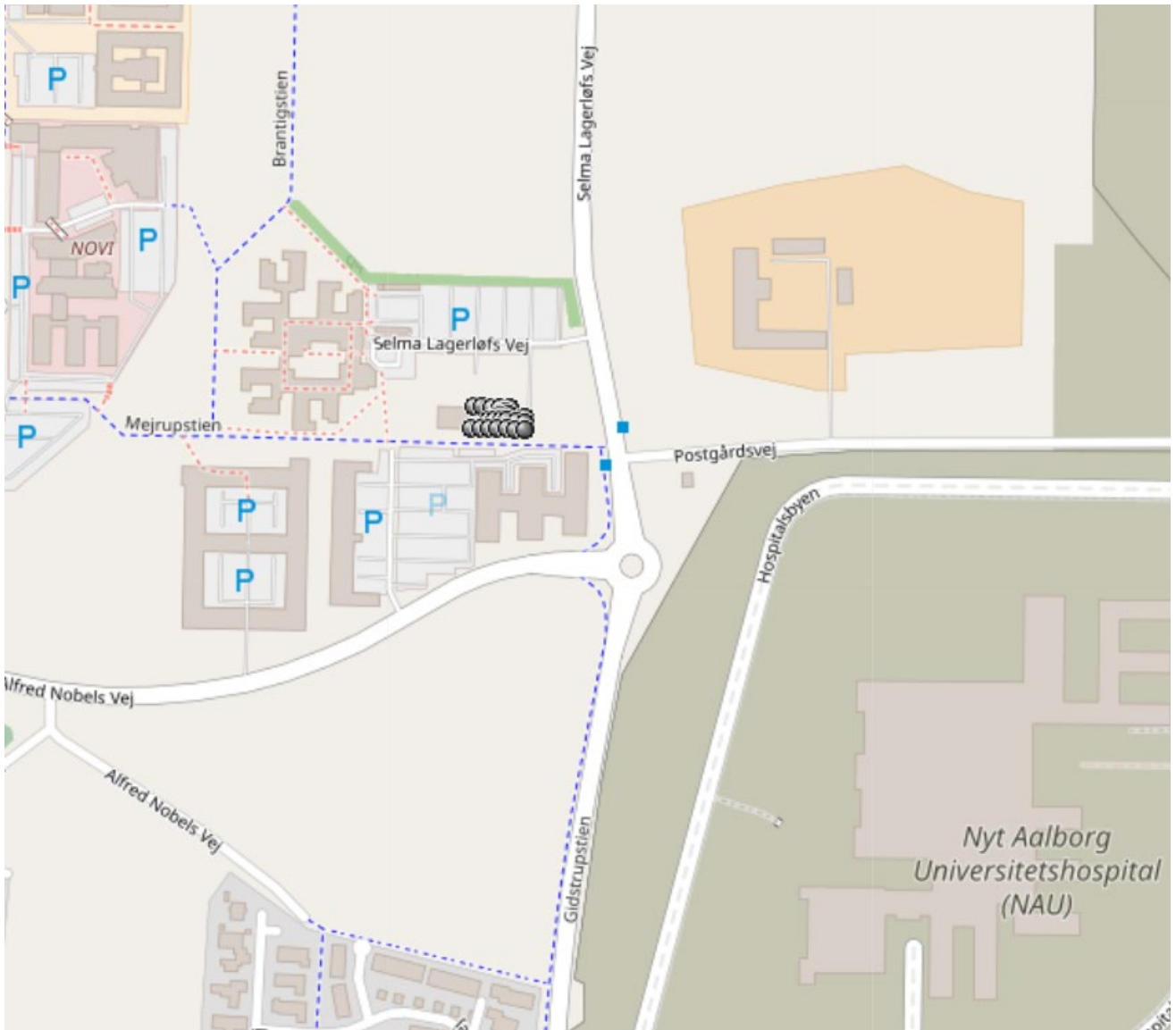
=====  
=====

| NAME: | EASTING: | NORTHING: | ZONE: | ELEVATION: |
|-------|----------|-----------|-------|------------|
|-------|----------|-----------|-------|------------|

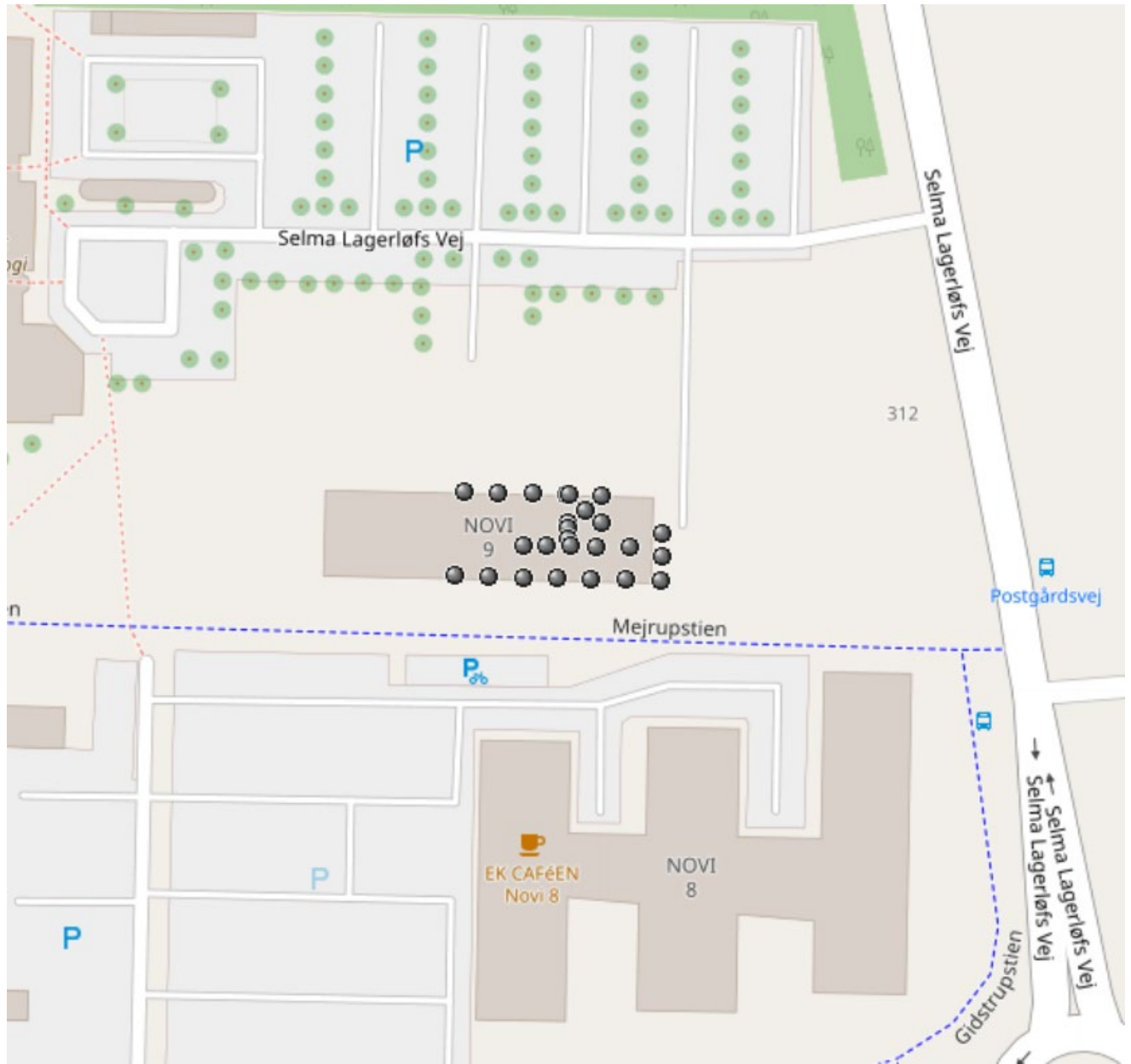
=====  
=====

|    |              |               |     |         |
|----|--------------|---------------|-----|---------|
| 01 | 560 339,141E | 6319 141,328N | 32V | 40.35 m |
| 02 | 560 339,103E | 6319 137,315N | 32V | 40.36 m |
| 03 | 560 339,047E | 6319 133,037N | 32V | 40.35 m |
| 04 | 560 332,831E | 6319 133,085N | 32V | 40.36 m |
| 05 | 560 326,754E | 6319 133,119N | 32V | 40.36 m |
| 06 | 560 320,735E | 6319 133,167N | 32V | 40.35 m |
| 07 | 560 314,720E | 6319 133,224N | 32V | 40.34 m |
| 08 | 560 308,694E | 6319 133,275N | 32V | 40.34 m |
| 09 | 560 302,635E | 6319 133,316N | 32V | 40.34 m |
| 10 | 560 304,126E | 6319 148,110N | 32V | 40.34 m |
| 11 | 560 310,169E | 6319 148,071N | 32V | 40.34 m |
| 12 | 560 316,177E | 6319 148,042N | 32V | 40.34 m |
| 13 | 560 322,184E | 6319 147,981N | 32V | 40.34 m |
| 14 | 560 322,573E | 6319 142,029N | 32V | 39.17 m |
| 15 | 560 322,570E | 6319 140,137N | 32V | 39.17 m |
| 16 | 560 314,656E | 6319 138,891N | 32V | 39.18 m |
| 17 | 560 318,723E | 6319 138,851N | 32V | 39.19 m |
| 18 | 560 322,996E | 6319 138,833N | 32V | 39.19 m |
| 19 | 560 327,528E | 6319 138,807N | 32V | 39.20 m |
| 20 | 560 333,430E | 6319 138,763N | 32V | 39.17 m |
| 21 | 560 328,348E | 6319 142,997N | 32V | 42.80 m |
| 22 | 560 322,605E | 6319 143,052N | 32V | 42.79 m |
| 23 | 560 322,655E | 6319 147,801N | 32V | 42.80 m |
| 24 | 560 328,381E | 6319 147,726N | 32V | 42.80 m |
| 25 | 560 325,451E | 6319 145,336N | 32V | 42.89 m |
| 26 | 560 325,596E | 6319 145,087N | 32V | 42.72 m |

## MAPS



[OpenStreetMap.org]



[OpenStreetMap.org]





# AERIAL PHOTOS







# RAW DATA

Format Manager 6.0 - 2014-03-06/PCE/KJ  
 ksys: 9 hsys: 3

Leica GPS1200  
 Koordinater i UTM zone 32 (ETRS89) og DVR 90

| Punkt         | E          | N           | H      | Sig E | Sig N | Sig H | PDOP  | HDOP  | VDOP  | Objektkode | Objekt    | Liniekode           | yyyy-mm-dd hh:mm:ss |
|---------------|------------|-------------|--------|-------|-------|-------|-------|-------|-------|------------|-----------|---------------------|---------------------|
| RTCM-Ref 1437 | 560324.695 | 6319139.379 | 39.285 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 99999.000  | 99999.000 | 2017-09-04 08:22:44 |                     |
| 0001          | 560339.141 | 6319141.328 | 40.355 | 0.008 | 0.009 | 0.021 | 1.4   | 0.7   | 1.2   |            |           | 2017-09-04 10:44:52 |                     |
| 0002          | 560339.103 | 6319137.315 | 40.359 | 0.008 | 0.009 | 0.021 | 1.4   | 0.7   | 1.2   |            |           | 2017-09-04 10:45:23 |                     |
| 0003          | 560339.047 | 6319133.037 | 40.347 | 0.008 | 0.009 | 0.020 | 1.4   | 0.7   | 1.2   |            |           | 2017-09-04 10:46:05 |                     |
| 0004          | 560332.831 | 6319133.085 | 40.362 | 0.008 | 0.009 | 0.021 | 1.4   | 0.7   | 1.2   |            |           | 2017-09-04 10:46:39 |                     |
| 0005          | 560326.754 | 6319133.119 | 40.357 | 0.007 | 0.008 | 0.019 | 1.4   | 0.7   | 1.2   |            |           | 2017-09-04 10:47:21 |                     |
| RTCM-Ref 1705 | 560322.000 | 6319133.528 | 36.491 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 99999.000  | 99999.000 | 2017-09-04 10:48:45 |                     |
| 0006          | 560320.735 | 6319133.167 | 40.345 | 0.007 | 0.008 | 0.017 | 1.6   | 0.8   | 1.4   |            |           | 2017-09-04 10:48:59 |                     |
| 0007          | 560314.720 | 6319133.225 | 40.338 | 0.007 | 0.007 | 0.017 | 1.6   | 0.8   | 1.4   |            |           | 2017-09-04 10:49:29 |                     |
| 0008          | 560308.694 | 6319133.275 | 40.341 | 0.006 | 0.007 | 0.015 | 1.6   | 0.8   | 1.4   |            |           | 2017-09-04 10:50:02 |                     |
| 0009          | 560302.635 | 6319133.316 | 40.337 | 0.005 | 0.006 | 0.014 | 1.6   | 0.8   | 1.4   |            |           | 2017-09-04 10:50:39 |                     |
| 0010          | 560304.126 | 6319148.110 | 40.337 | 0.005 | 0.005 | 0.013 | 1.6   | 0.8   | 1.4   |            |           | 2017-09-04 10:51:22 |                     |
| 0011          | 560310.169 | 6319148.071 | 40.337 | 0.005 | 0.005 | 0.013 | 1.6   | 0.8   | 1.4   |            |           | 2017-09-04 10:51:52 |                     |
| 0012          | 560316.177 | 6319148.042 | 40.339 | 0.005 | 0.006 | 0.013 | 1.6   | 0.8   | 1.4   |            |           | 2017-09-04 10:52:20 |                     |
| 0013          | 560322.184 | 6319147.981 | 40.339 | 0.006 | 0.006 | 0.015 | 1.6   | 0.8   | 1.4   |            |           | 2017-09-04 10:52:44 |                     |
| RTCM-Ref 1714 | 560322.600 | 6319141.842 | 37.119 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 99999.000  | 99999.000 | 2017-09-04 10:54:20 |                     |
| 0014          | 560322.573 | 6319142.029 | 39.171 | 0.008 | 0.011 | 0.024 | 1.8   | 0.9   | 1.6   |            |           | 2017-09-04 10:54:35 |                     |
| 0015          | 560322.570 | 6319140.137 | 39.165 | 0.005 | 0.006 | 0.016 | 1.7   | 0.9   | 1.5   |            |           | 2017-09-04 10:55:06 |                     |
| 0016          | 560314.656 | 6319138.891 | 39.180 | 0.005 | 0.005 | 0.013 | 1.5   | 0.7   | 1.3   |            |           | 2017-09-04 10:55:47 |                     |
| 0017          | 560318.723 | 6319138.852 | 39.186 | 0.005 | 0.006 | 0.014 | 1.6   | 0.8   | 1.4   |            |           | 2017-09-04 10:56:12 |                     |
| RTCM-Ref 1720 | 560322.991 | 6319138.802 | 39.220 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 99999.000  | 99999.000 | 2017-09-04 10:56:59 |                     |
| 0018          | 560322.996 | 6319138.833 | 39.186 | 0.005 | 0.006 | 0.015 | 1.6   | 0.8   | 1.4   |            |           | 2017-09-04 10:57:12 |                     |
| 0019          | 560327.528 | 6319138.807 | 39.197 | 0.006 | 0.007 | 0.018 | 1.5   | 0.8   | 1.3   |            |           | 2017-09-04 10:57:33 |                     |
| 0020          | 560333.430 | 6319138.763 | 39.170 | 0.005 | 0.006 | 0.016 | 1.7   | 0.8   | 1.5   |            |           | 2017-09-04 10:58:01 |                     |
| 0021          | 560328.348 | 6319142.997 | 42.797 | 0.005 | 0.007 | 0.016 | 1.5   | 0.7   | 1.3   |            |           | 2017-09-04 10:59:43 |                     |
| 0022          | 560322.605 | 6319143.052 | 42.794 | 0.005 | 0.007 | 0.015 | 1.5   | 0.7   | 1.3   |            |           | 2017-09-04 11:00:08 |                     |
| 0023          | 560322.655 | 6319147.801 | 42.796 | 0.005 | 0.006 | 0.014 | 1.5   | 0.7   | 1.3   |            |           | 2017-09-04 11:00:33 |                     |
| 0024          | 560328.381 | 6319147.726 | 42.799 | 0.005 | 0.006 | 0.013 | 1.5   | 0.7   | 1.3   |            |           | 2017-09-04 11:01:02 |                     |
| RTCM-Ref 1731 | 560325.297 | 6319147.131 | 42.116 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 99999.000  | 99999.000 | 2017-09-04 11:01:54 |                     |
| RTCM-Ref 1738 | 560325.645 | 6319149.381 | 44.301 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 99999.000  | 99999.000 | 2017-09-04 11:04:14 |                     |
| 0025          | 560325.451 | 6319145.337 | 41.196 | 0.008 | 0.016 | 0.026 | 3.3   | 1.8   | 2.8   |            |           | 2017-09-04 11:10:36 |                     |
| RTCM-Ref 1763 | 560327.109 | 6319143.394 | 39.544 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 99999.000  | 99999.000 | 2017-09-04 11:20:14 |                     |
| 0026          | 560324.051 | 6319145.963 | 42.888 | 0.424 | 0.566 | 1.096 | 1.5   | 0.7   | 1.3   |            |           | 2017-09-04 11:26:39 |                     |
| RTCM-Ref 1776 | 560326.855 | 6319145.510 | 38.595 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 99999.000  | 99999.000 | 2017-09-04 11:28:19 |                     |
| 0027          | 560325.596 | 6319145.087 | 42.716 | 0.008 | 0.010 | 0.019 | 1.8   | 1.0   | 1.5   |            |           | 2017-09-04 11:28:37 |                     |