RAPPORT FOR LASERSKANNING

Geovekstprosjekt

LACHOA33 Romeriksåsene DTM20

terratec

INNHOLDSFORTEGNELSE

Rapport utarbeidet,

Lysaker, 11.09.2013

Olav Gaute Ytterdal,
Prosjektingeniør

1. GENERELLE OPPLYSNINGER I PROSJEKTET

1.1 Oppdragsgiver

Navn: Kartverket Oslo
Besøksadresse: Storgata 33A, 7.etasje, 0184 Oslo
Postadresse: Kartverket Oslo, 3507 Hønefoss
Prosjektleder: Morten Hoff

1.2 Oppdraget

Navn:	LACHAO33
Kommune, -nr:	Nittedal(0233), Gjerdrum(0234), Ullensaker(0235), Nannestad(0238) og Hurdal(0239)
Fylke:	Akershus

1.3 Oppdragstaker

Navn:	TerraTec AS
Besøksadresse:	Lysaker Torg 12.
Postadresse:	Pb. 513, 1327 LYSAKER
Prosjektleder:	Berit Morstad
Prosjektreferanse:	40331_Romeriksåsene

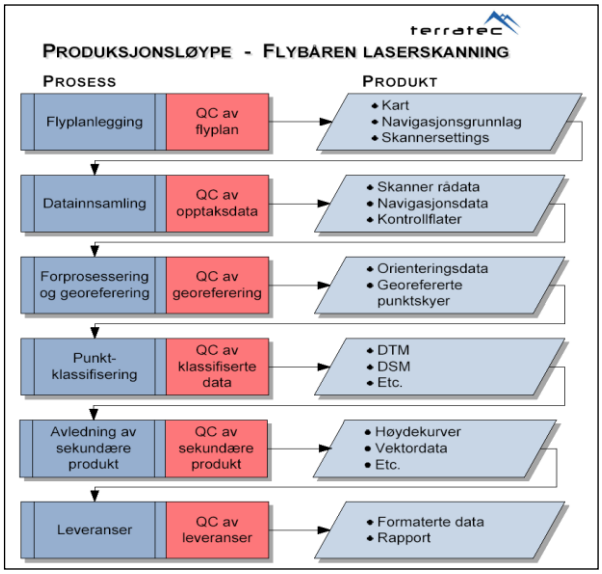
1.4 Oppdragets innhold

Oppdraget innebærer laserskanning av område med minimum punktetthet 0.7 pkt/m2. Det utføres preprosessering og sensor-/stripekorreksjoner for endelig georeferering av punktskyen. Absolutt høydenøyaktighet forbedres ved måling mot kontrollflater. For generering av terrengmodell utføres automatisk og manuell klassifisering av datasettet.

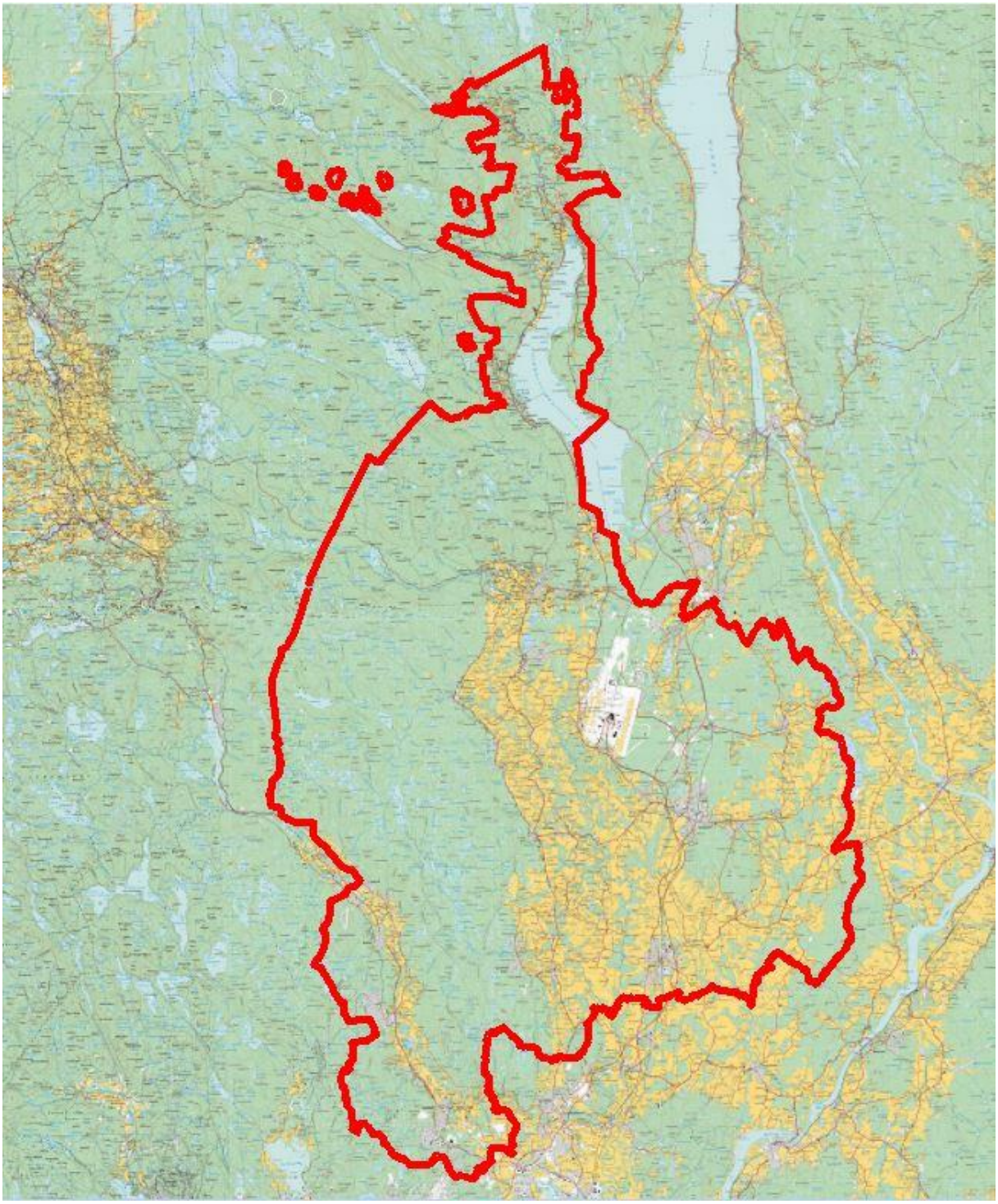
1.5 Kvalitetssikring

Kvalitetssikringsopplegget er utført i.h.h.t. TerraTecs kvalitetsstyrings-system. Opplegget for denne type produksjon er vist skjematisk i figuren til høyre. I dette prosjektet er det spesielt lagt vekt på:

- Kalibrering av sensorsystem
- Tverrstriper og flystriper i forskjellige retninger
- Utjevning mellom overlappende striper
- Justering mot kontrollflater



1.6 Kartutsnitt



2. DATAINNSAMLING

2.1 Utførelse

TerraTec AS har gjennomført laserskanningen i følgende operasjoner:

Område	Operatør	Dato
Romeriksåsene	Jaanus Juhani	07.06.2013
Romeriksåsene	Tarvo Hiiemaa	10.06.2013
Romeriksåsene	Dariusz Zakrzewski	06.07.2013

2.2 Måleutstyr

Kalibreringsparametre for systemet er beregnet ved flyging over vårt standard kalibreringsområde i Hamar. Disse parametrene er beregnet i TerraMatch og implementert i ALS Post Processor for prosessering av rådata.

Spesifikasjoner laserskanning Nord Trøndelag:

Laserskanner, snr: ##)	ALS70, snr. 204
IMU:	MicroIRS
GNSS-mottakere:	NovAtel OEM4 og Topcon Legacy E
Plattform:	FW
Høyde over laveste terreng (m)	3124m
Flyhastighet:	150kt
Laserpuls	104600 Hz
Åpningsvinkel (grad)	±16 grader

2.3 Grunnlag/datum

Horisontalt:	Euref89 UTM sone 32
Vertikalt:	NN2000

2.4 Kvalitet på kontrollpunkt

Følgende kontrollflatemålinger er utført:

Utført av:	TerraTec AS
Antall flater:	20
Målemetode:	CPOS
Utstyr:	Leica 1200 GPS-mottakere

2.5 Avvik kontrollpunkt

Avviket mellom kontrollflater og laserdata er relativt små og godt innenfor kravet - jfr. kap 3.4.

2.6 Transformasjoner

GPS-beregning i TerraPOS er utført i WGS84. Transformasjon er utført for levering i de ulike datum prosjektet skal leveres i.

Transformasjon WGS84 – EU89 UTM32

Høydetransformasjon Ellipsoidisk – NN1954 - NN2000

Høydetranformasjonenen fra ellipsoidiske til ortometriske høyder er utført med geoidemodell generert i WSK Trans, Href2007b og HREF2013a utgitt av Statens kartverk.

2.7 Vanskeligheter i datainnsamlingen

Det er ikke rapportert om noen vanskeligheter i forbindelse med datainnsamlingen.

3. PROSESSERING/DATABEARBEIDING

3.1 Beregnings- og editeringsarbeid

Program/versjon	Produsent	Funksjon
Leica Mission Pro	Leica Geosystems	Flyplanlegging
TerraPOS	TerraTec	GNSS-prosessering
IPAS Pro	Leica Geosystems	GNSS/INS-integrasjon
ALS Post - Processing ALSPP	Leica Geosystems	Beregning av "rå" punktskyer
WSKTrans	Statens kartverk	Geoide
Leica Geo Offce	Leica Geosystems	Landmålingsberegninger
TerraScan	Terrasolid	Prosessering, visning, editering og klassifisering av laser punktdata
TerraMatch	Terrasolid	Sensor- og stripekorreksjoner
TerraModeler	Terrasolid	Visualisering av terrengoverflate
MicroStation	Bentley	CAD-plattform for Terrasolid-program

3.2 GNSS/INS-beregninger

Blending av GPS og IMU-data er utført med kalman-filter i Leicas programvare IPAS-PRO v 15. Det er for øyeblikket ingen god utskriftmulighet for dokumentasjon av beregningen. Alle resultatene av beregningene har høy kvalitet og er innenfor spesifikasjonene til sensorene.

3.3 Kalibrering og stripejustering

Utover årlig kalibrering av sensoren er det gjennomført en egen prosjektkalibrering for å redusere eventuelle gjenværende feil i sensororienteringen. Arbeidet er utført med TerraMatch.

3.3.1 Prosjektkalibrering

Det er foretatt en prosjektkalibrering for hver enkelt flysesjon. Her er korreksjoner for Heading, Roll og Pitch estimert og deretter påført. Det har ikke blitt estimert unormale

verdier under denne prosessen. Deretter inngår alle flystriper i endelig stripeutjevning, hvor det blir løst for delta Z og delta R:

```
Tie lines:
H:\04_Laser_Projects_2013\40331_Romeriksåsene\Lidardata\reports
\40331_TIL_HPRS.til
Trajectories:
H:\04_Laser_Projects_2013\40331_Romeriksåsene\trajectories\
Solution for individual strips
Combined solution for all scanners

Starting average misma 0.02195
Final average mismatch 0.01756

Execution time: 12.0 sec
Number of iterations: 11

Flightline     Z shift R shift
1               +0.050 +0.0077
2               -0.064 -0.0061
3               +0.020 +0.0060
4               +0.021 -0.0029
5               +0.010 +0.0023
6               -0.061 -0.0015
7               -0.017 -0.0061
8               +0.083 +0.0014
9               -0.050 -0.0326
100             -0.024 -0.0002
101             -0.015 -0.0048
102             -0.008 -0.0026
103             -0.017 -0.0006
104             -0.008 +0.0019
105             +0.001 -0.0010
106             -0.003 -0.0000
107             +0.048 -0.0006
200             -0.023 -0.0014
201             -0.011 +0.0017
```

202	-0.017	-0.0052
203	-0.021	+0.0039
204	+0.088	-0.0065
205	+0.060	-0.0034
206	-0.045	+0.0006
207	-0.088	+0.0028
208	+0.004	-0.0036
210	+0.006	-0.0033
211	+0.013	-0.0013
212	+0.019	-0.0029
213	+0.036	+0.0023
214	-0.006	+0.0001
215	+0.037	+0.0004
216	+0.031	-0.0024
217	+0.044	-0.0014
219	+0.010	+0.0008
220	+0.008	-0.0012
221	+0.016	-0.0006
222	-0.032	+0.0001
223	-0.039	+0.0010
224	-0.074	-0.0003
225	+0.006	-0.0038
226	+0.019	+0.0027
227	-0.020	-0.0025
229	-0.006	-0.0027
230	-0.015	+0.0053
231	-0.048	+0.0027
232	+0.005	+0.0026
233	+0.029	+0.0045
234	+0.103	+0.0010
235	-0.013	+0.0027
236	+0.016	+0.0010
237	-0.004	+0.0003
238	-0.014	-0.0026
239	-0.013	+0.0031
240	-0.016	-0.0023
241	-0.028	+0.0057
242	-0.000	-0.0013
243	-0.026	-0.0015

Number of usable observations

Flightline	Z	Roll
1	226	225
2	687	684
3	1312	1287
4	4713	4678
5	7130	7059
6	7488	7463
7	3690	3683
8	4737	4734
9	630	630
100	842	839
101	18704	18627
102	14188	14098
103	24912	24801
104	12840	12756
105	10917	10874
106	7518	7490
107	7290	7269
200	7100	7067
201	4981	4931
202	5830	5800
203	3190	3190
204	1999	1998
205	2070	2062
206	2951	2891
207	1617	1592
208	1756	1755
210	253	253
211	17756	17588
212	14322	14152
213	11380	11247
214	13293	13092
215	9897	9868
216	7333	7292
217	980	977
219	3727	3718
220	6215	6210
221	8041	8003

222	7706	7674
223	6455	6281
224	458	458
225	371	371
226	1338	1338
227	359	359
229	1800	1756
230	2339	2292
231	2619	2587
232	3723	3695
233	2793	2772
234	1448	1440
235	202	200
236	84	84
237	885	878
238	136	134
239	485	480
240	920	918
241	1194	1182
242	348	344
243	14382	14156

3.4 Resultat fra kjentflater

Det er gjort beregninger på høydeavvik mellom laserdataene og de landmålte kontrollflatene. Resultater er listet i vedlegg A.

4. LEVERANSER

4.1 Innhold i leveransene

Filformat laserdata	Beskrivelse
#.sos:	terrengpunkter på sosi-sverm. Sosi-versjon 4.0
#.las:	terreng (klasse 2) og ikke terrengpunkter (klasse 1) på lasformat
#.tif:	Geotiff grid overflate og terreng.

De nevnte laserdata er levert sammen med rapport for laserskanning, tetthets- og dekningsoversikter.

4.2 Oppdeling og navning av filer

Las- og sosifiler er inndelt i.h.h.t. kartbladinndeling 1:2000 (1600x1200m).

SOS-filer er i tillegg navnet etter følgende system:

Uklassifisert:	<kartbladindeks>_CL1.sos
Bakkepunkter:	<kartbladindeks>_CL2.sos
Støypunkter	<kartbladindeks>_CL7.sos
Punkter på bru:	<kartbladindeks>_CL10.sos

Oversiktsfiler er navnet etter følgende system:

Dekningsoversikt:	LACHNT31_Prosjektavgrensning.sos
Flystripe:	LACHNT31_Flystripe.sos
Tetthetsanalyse:	LACHNT31_Tetthetsanalyse.sos
Punkttetthetskart:	LACHNT31_Punkttetthet-førsteretur.tif
	LACHNT31_Punkttetthet-terreng.tif

Dataene er lagret i følgende katalogstruktur:

- Prosjektnavn

- Rapport
- Las-data
- SOSI-Punktsky
- Dekningsoversikt og flystriper
- Tetthetsanalyse og kart
- Overflatemodell GeoTiff
- Terrengmodell GeoTiff

5.0 Vedlegg A

Kontrollflate 1:

H:\04_Laser_Projects_2013\40331_Romeriksåsene\diverse\Controlpoints\NN2000_CP\CP_1739.xyz

Number	Easting	Northing	Known Z	Laser Z	Dz
1	609450.530	6652468.800	138.420	138.400	-0.020
2	609451.600	6652469.510	138.460	138.520	+0.060
3	609452.590	6652470.160	138.460	138.520	+0.060
4	609453.780	6652470.890	138.450	138.510	+0.060
5	609451.100	6652467.860	138.430	138.440	+0.010
6	609452.190	6652468.550	138.480	138.480	+0.000
7	609453.460	6652469.150	138.500	138.540	+0.040
8	609454.530	6652469.750	138.480	138.550	+0.070
9	609451.770	6652466.710	138.460	138.450	-0.010
10	609452.850	6652467.310	138.510	138.510	+0.000
11	609454.120	6652468.030	138.520	138.560	+0.040
12	609455.250	6652468.670	138.520	138.510	-0.010
13	609452.320	6652465.690	138.480	138.470	-0.010
14	609453.410	6652466.400	138.540	138.530	-0.010
15	609454.900	6652467.030	138.560	138.560	+0.000
16	609455.960	6652467.580	138.550	138.530	-0.020
17	609452.980	6652464.700	138.500	138.460	-0.040
18	609454.200	6652465.400	138.570	138.550	-0.020
19	609455.310	6652466.090	138.580	138.560	-0.020
20	609456.450	6652466.780	138.570	138.550	-0.020
21	609453.740	6652463.830	138.520	138.480	-0.040
22	609454.710	6652464.330	138.580	138.580	+0.000
23	609455.920	6652464.930	138.600	138.640	+0.040
24	609457.070	6652465.620	138.610	138.610	+0.000

Average dz	+0.007
Minimum dz	-0.040
Maximum dz	+0.070
Average magnitude	0.025
Root mean square	0.033
Std deviation	0.033

Kontrollflate 2:

H:\04_Laser_Projects_2013\40331_Romeriksåsene\diverse\Controlpoints\NN2000_CP\CP_1621.xyz

Number	Easting	Northing	Known Z	Laser Z	Dz
1	604293.650	6656444.880	201.190	201.070	-0.120
2	604292.640	6656444.190	201.230	201.100	-0.130
3	604291.670	6656443.440	201.190	201.110	-0.080
4	604290.750	6656442.710	201.140	201.040	-0.100
5	604289.670	6656441.990	201.140	201.030	-0.110
6	604293.020	6656445.980	201.210	201.090	-0.120
7	604292.030	6656445.250	201.250	201.130	-0.120
8	604291.090	6656444.660	201.240	201.140	-0.100
9	604290.120	6656443.770	201.180	201.050	-0.130
10	604288.950	6656443.070	201.170	201.130	-0.040
11	604292.310	6656446.990	201.230	201.130	-0.100
12	604291.360	6656446.500	201.300	201.150	-0.150
13	604290.450	6656445.680	201.270	201.150	-0.120
14	604289.150	6656444.840	201.200	201.090	-0.110
15	604288.230	6656444.110	201.190	201.110	-0.080
16	604291.560	6656448.040	201.280	201.180	-0.100
17	604290.380	6656447.410	201.300	201.210	-0.090
18	604289.590	6656446.720	201.290	201.220	-0.070
19	604288.410	6656445.760	201.210	201.120	-0.090
20	604287.510	6656445.060	201.210	201.110	-0.100
21	604290.770	6656449.090	201.310	201.210	-0.100
22	604289.640	6656448.260	201.340	201.230	-0.110
23	604288.810	6656447.570	201.310	201.230	-0.080
24	604287.680	6656446.650	201.240	201.120	-0.120
25	604286.800	6656446.020	201.210	201.140	-0.070

Average dz	-0.102
Minimum dz	-0.150
Maximum dz	-0.040
Average magnitude	0.102
Root mean square	0.104
Std deviation	0.024

Kontrollfalte 3

H:\04_Laser_Projects_2013\40331_Romeriksåsene\diverse\Controlpoints\NN2000_CP\CP_1560.xyz

Number	Easting	Northing	Known Z	Laser Z	Dz
1	614396.320	6657995.700	183.360	183.280	-0.080
2	614395.840	6657996.560	183.350	183.380	+0.030
3	614395.350	6657997.460	183.350	183.330	-0.020
4	614394.850	6657998.470	183.340	183.340	+0.000
5	614394.290	6657999.490	183.300	183.300	+0.000
6	614397.640	6657996.440	183.320	183.310	-0.010
7	614397.280	6657997.220	183.370	183.350	-0.020
8	614396.820	6657998.200	183.350	183.350	+0.000
9	614396.320	6657999.200	183.320	183.340	+0.020
10	614395.390	6658000.170	183.270	183.310	+0.040
11	614398.840	6657997.140	183.300	183.290	-0.010
12	614398.430	6657997.890	183.320	183.320	+0.000
13	614397.960	6657998.770	183.320	183.290	-0.030
14	614397.380	6657999.690	183.300	183.270	-0.030
15	614396.810	6658000.740	183.270	183.230	-0.040
16	614399.970	6657997.770	183.300	183.300	+0.000
17	614399.660	6657998.430	183.300	183.310	+0.010
18	614399.180	6657999.420	183.290	183.290	+0.000
19	614398.710	6658000.290	183.260	183.260	+0.000
20	614398.170	6658001.240	183.230	183.250	+0.020
21	614400.980	6657998.390	183.280	183.270	-0.010
22	614400.790	6657999.130	183.300	183.290	-0.010
23	614400.290	6657999.840	183.280	183.270	-0.010
24	614399.760	6658000.670	183.240	183.230	-0.010
25	614399.200	6658001.720	183.210	183.170	-0.040

Average dz	-0.008
Minimum dz	-0.080
Maximum dz	+0.040
Average magnitude	0.018
Root mean square	0.025
Std deviation	0.025

Kontrollflate 4

H:\04_Laser_Projects_2013\40331_Romeriksåsene\diverse\Controlpoints\NN2000_CP\CP_1379.xyz

Number	Easting	Northing	Known Z	Laser Z	Dz
1	622776.950	6663607.960	169.160	169.260	+0.100
2	622777.360	6663606.830	169.130	169.260	+0.130
3	622777.700	6663605.770	169.080	169.230	+0.150
4	622778.060	6663604.590	169.040	169.190	+0.150
5	622778.460	6663603.470	169.000	169.150	+0.150
6	622775.950	6663607.900	169.170	169.280	+0.110
7	622776.380	6663606.710	169.130	169.250	+0.120
8	622776.710	6663605.470	169.090	169.230	+0.140
9	622777.040	6663604.220	169.050	169.190	+0.140
10	622777.380	6663602.990	169.010	169.130	+0.120
11	622775.110	6663607.880	169.170	169.300	+0.130
12	622775.290	6663606.660	169.130	169.240	+0.110
13	622775.590	6663605.370	169.090	169.220	+0.130
14	622775.820	6663603.800	169.040	169.170	+0.130
15	622776.240	6663602.620	169.000	169.100	+0.100
16	622773.860	6663607.610	169.160	169.280	+0.120
17	622774.070	6663606.400	169.110	169.240	+0.130
18	622774.240	6663605.190	169.080	169.170	+0.090
19	622774.730	6663603.530	169.030	169.150	+0.120
20	622775.110	6663602.360	169.010	169.080	+0.070
21	622772.650	6663607.330	169.140	169.230	+0.090
22	622772.870	6663606.130	169.110	169.210	+0.100
23	622773.190	6663604.930	169.060	169.190	+0.130
24	622773.660	6663603.410	169.010	169.140	+0.130
25	622773.950	6663602.070	168.960	169.100	+0.140

Average dz	+0.121
Minimum dz	+0.070
Maximum dz	+0.150
Average magnitude	0.121
Root mean square	0.123
Std deviation	0.021

Kontrollflate 5

H:\04_Laser_Projects_2013\40331_Romeriksåsene\diverse\Controlpoints\NN2000_CP\CP_1229.xyz

Number	Easting	Northing	Known Z	Laser Z	Dz
1	627963.740	6667306.910	163.910	163.900	-0.010
2	627963.420	6667308.050	163.950	163.890	-0.060
3	627963.250	6667309.120	163.960	163.940	-0.020
4	627963.050	6667310.060	163.990	164.010	+0.020
5	627962.910	6667311.010	164.010	164.020	+0.010
6	627964.850	6667307.250	163.920	163.910	-0.010
7	627964.690	6667308.290	163.950	163.920	-0.030
8	627964.340	6667309.420	163.980	164.000	+0.020
9	627964.190	6667310.370	164.000	164.040	+0.040
10	627964.010	6667311.280	164.010	163.980	-0.030
11	627966.140	6667307.660	163.930	163.910	-0.020
12	627965.810	6667308.660	163.960	164.000	+0.040
13	627965.870	6667309.540	163.980	164.030	+0.050
14	627965.810	6667310.590	164.000	163.990	-0.010
15	627965.600	6667311.580	164.020	163.990	-0.030
16	627967.280	6667308.140	163.940	163.900	-0.040
17	627967.070	6667309.050	163.960	163.970	+0.010
18	627966.980	6667309.820	163.980	164.020	+0.040
19	627966.930	6667310.860	164.010	163.990	-0.020
20	627966.740	6667311.840	164.020	164.020	+0.000
21	627968.450	6667308.500	163.950	163.940	-0.010
22	627968.350	6667309.300	163.960	163.960	+0.000
23	627968.140	6667309.980	163.980	163.990	+0.010
24	627967.850	6667310.890	164.000	163.990	-0.010
25	627967.720	6667311.900	164.020	164.020	+0.000

Average dz	-0.002
Minimum dz	-0.060
Maximum dz	+0.050
Average magnitude	0.022
Root mean square	0.027
Std deviation	0.027

Kontrollflate 6

H:\04_Laser_Projects_2013\40331_Romeriksåsene\diverse\Controlpoints\NN2000_CP\CP_0788.xyz

Number	Easting	Northing	Known Z	Laser Z	Dz
1	624192.880	6678327.610	215.040	215.040	+0.000
2	624193.790	6678327.750	215.030	215.080	+0.050
3	624194.740	6678327.900	215.000	215.100	+0.100
4	624195.910	6678328.090	215.040	215.110	+0.070
5	624192.920	6678326.650	215.050	215.120	+0.070
6	624194.000	6678326.720	215.040	215.170	+0.130
7	624195.020	6678326.940	215.080	215.130	+0.050
8	624196.250	6678327.000	215.090	215.180	+0.090
9	624192.970	6678325.860	215.080	215.160	+0.080
10	624194.050	6678325.850	215.090	215.170	+0.080
11	624195.440	6678325.720	215.130	215.140	+0.010
12	624196.410	6678325.810	215.180	215.180	+0.000
13	624193.020	6678324.960	215.110	215.210	+0.100
14	624194.100	6678325.170	215.100	215.240	+0.140
15	624195.440	6678325.030	215.160	215.240	+0.080
16	624196.420	6678325.080	215.220	215.270	+0.050
17	624193.090	6678324.170	215.100	215.200	+0.100
18	624194.260	6678324.140	215.210	215.240	+0.030
19	624195.320	6678324.190	215.190	215.260	+0.070
20	624196.450	6678324.370	215.250	215.270	+0.020
21	624193.160	6678323.100	215.140	215.180	+0.040
22	624194.320	6678323.280	215.230	215.250	+0.020
23	624195.380	6678323.430	215.280	215.260	-0.020
24	624196.510	6678323.700	215.310	215.330	+0.020
25	624193.080	6678324.970	215.110	215.210	+0.100

Average dz	+0.059
Minimum dz	-0.020
Maximum dz	+0.140
Average magnitude	0.061
Root mean square	0.072
Std deviation	0.042

Kontrollflate 7

H:\04_Laser_Projects_2013\40331_Romeriksåsene\diverse\Controlpoints\NN2000_CP\CP_0483.xyz

Number	Easting	Northing	Known Z	Laser Z	Dz
1	614442.130	6688006.340	191.740	191.790	+0.050
2	614441.870	6688007.500	191.780	191.810	+0.030
3	614441.680	6688008.460	191.840	191.850	+0.010
4	614441.480	6688009.570	191.830	191.870	+0.040
5	614441.160	6688010.760	191.770	191.800	+0.030
6	614441.250	6688005.990	191.820	191.850	+0.030
7	614440.810	6688007.310	191.850	191.830	-0.020
8	614440.490	6688008.340	191.860	191.870	+0.010
9	614440.240	6688009.440	191.840	191.890	+0.050
10	614440.010	6688010.640	191.870	191.870	+0.000
11	614440.150	6688005.470	191.870	191.870	+0.000
12	614439.830	6688006.810	191.900	191.890	-0.010
13	614439.430	6688008.000	191.910	191.930	+0.020
14	614439.190	6688009.380	191.870	191.920	+0.050
15	614439.110	6688010.490	191.890	191.900	+0.010
16	614439.330	6688005.120	191.830	191.860	+0.030
17	614438.930	6688006.620	191.910	191.970	+0.060
18	614438.420	6688007.730	191.930	191.940	+0.010
19	614438.290	6688009.090	191.910	191.950	+0.040
20	614438.100	6688010.310	191.880	191.900	+0.020
21	614438.460	6688004.740	191.830	191.840	+0.010
22	614437.900	6688006.280	191.910	191.980	+0.070
23	614437.580	6688007.440	191.930	191.970	+0.040
24	614437.300	6688008.860	191.930	191.970	+0.040
25	614437.110	6688010.110	191.920	191.970	+0.050

Average dz	+0.027
Minimum dz	-0.020
Maximum dz	+0.070
Average magnitude	0.029
Root mean square	0.035
Std deviation	0.023

Kontrollflate 8

H:\04_Laser_Projects_2013\40331_Romeriksåsene\diverse\Controlpoints\NN2000_CP\CP_0070.xyz

Number	Easting	Northing	Known Z	Laser Z	Dz

1	607892.870	6707288.920	325.770	325.720	-0.050
2	607891.370	6707288.470	325.790	325.750	-0.040
3	607889.960	6707288.020	325.810	325.790	-0.020
4	607888.450	6707287.600	325.840	325.850	+0.010
5	607887.080	6707287.200	325.860	325.820	-0.040
6	607892.580	6707290.160	325.820	325.790	-0.030
7	607891.070	6707289.590	325.800	325.840	+0.040
8	607889.610	6707289.140	325.820	325.850	+0.030
9	607888.080	6707288.570	325.860	325.900	+0.040
10	607886.520	6707288.370	325.890	325.900	+0.010
11	607892.220	6707291.250	325.830	325.810	-0.020
12	607890.660	6707290.830	325.830	325.830	+0.000
13	607889.290	6707290.400	325.880	325.870	-0.010
14	607887.370	6707289.870	325.890	325.880	-0.010
15	607886.150	6707289.580	325.900	325.880	-0.020
16	607891.820	6707292.480	325.790	325.750	-0.040
17	607890.210	6707291.810	325.800	325.790	-0.010
18	607888.950	6707291.560	325.820	325.780	-0.040
19	607887.090	6707290.970	325.840	325.840	+0.000
20	607886.010	6707290.700	325.870	325.840	-0.030
21	607891.520	6707293.210	325.750	325.720	-0.030
22	607889.940	6707292.620	325.780	325.730	-0.050
23	607888.730	6707292.230	325.790	325.780	-0.010
24	607886.950	6707291.840	325.810	325.770	-0.040
25	607885.700	6707291.510	325.810	325.800	-0.010
26	607886.000	6707290.710	325.840	325.840	+0.000

Average dz	-0.014
Minimum dz	-0.050
Maximum dz	+0.040
Average magnitude	0.024
Root mean square	0.029
Std deviation	0.026

Kontrollflate 9

H:\04_Laser_Projects_2013\40331_Romeriksåsene\diverse\Controlpoints\NN2000_CP\CP_0177.xyz

Number	Easting	Northing	Known Z	Laser Z	Dz
1	616015.310	6703407.300	419.440	419.480	+0.040

2	616016.290	6703407.540	419.420	419.460	+0.040
3	616017.520	6703407.750	419.420	419.470	+0.050
4	616018.560	6703407.910	419.400	419.400	+0.000
5	616020.170	6703408.140	419.420	419.450	+0.030
6	616015.430	6703406.050	419.490	419.480	-0.010
7	616016.580	6703406.230	419.430	419.490	+0.060
8	616017.800	6703406.140	419.480	419.510	+0.030
9	616018.800	6703406.390	419.420	419.410	-0.010
10	616020.440	6703406.870	419.440	419.440	+0.000
11	616015.700	6703404.850	419.500	419.510	+0.010
12	616017.000	6703405.130	419.510	419.490	-0.020
13	616017.960	6703405.140	419.510	419.510	+0.000
14	616019.100	6703405.360	419.480	419.500	+0.020
15	616020.610	6703405.760	419.460	419.480	+0.020
16	616015.870	6703403.760	419.510	419.500	-0.010
17	616017.140	6703403.960	419.510	419.580	+0.070
18	616018.370	6703403.980	419.530	419.560	+0.030
19	616019.490	6703404.370	419.520	419.540	+0.020
20	616020.900	6703404.550	419.510	419.490	-0.020
21	616016.030	6703402.540	419.550	419.540	-0.010
22	616017.450	6703402.750	419.540	419.620	+0.080
23	616018.770	6703402.870	419.540	419.550	+0.010
24	616019.850	6703403.090	419.550	419.600	+0.050
25	616021.250	6703403.380	419.560	419.520	-0.040

Average dz	+0.018
Minimum dz	-0.040
Maximum dz	+0.080
Average magnitude	0.027
Root mean square	0.035
Std deviation	0.030

Kontrollflate 10

H:\04_Laser_Projects_2013\40331_Romeriksåsene\diverse\Controlpoints\NN2000_CP\CP_0159.xyz

Number	Easting	Northing	Known Z	Laser Z	Dz
1	598977.680	6703939.680	504.030	504.010	-0.020
2	598978.020	6703940.760	504.090	504.110	+0.020
3	598978.310	6703941.650	504.200	504.170	-0.030

4	598979.040	6703943.230	504.350	504.370	+0.020
5	598979.450	6703944.450	504.500	504.480	-0.020
6	598979.480	6703945.770	504.590	504.580	-0.010
7	598978.440	6703939.430	504.060	504.030	-0.030
8	598979.080	6703940.790	504.190	504.130	-0.060
9	598979.220	6703941.750	504.340	504.250	-0.090
10	598979.730	6703943.120	504.420	504.420	+0.000
11	598980.130	6703944.300	504.520	504.530	+0.010
12	598980.110	6703945.660	504.630	504.610	-0.020
13	598979.100	6703939.210	504.050	504.030	-0.020
14	598979.730	6703940.620	504.200	504.170	-0.030
15	598980.060	6703941.850	504.300	504.320	+0.020
16	598980.380	6703942.990	504.420	504.400	-0.020
17	598980.720	6703944.290	504.580	504.570	-0.010
18	598980.700	6703945.550	504.620	504.570	-0.050
19	598980.000	6703939.100	504.030	504.030	+0.000
20	598980.390	6703940.310	504.140	504.160	+0.020
21	598980.770	6703941.650	504.260	504.280	+0.020
22	598981.090	6703942.890	504.390	504.390	+0.000
23	598981.290	6703944.200	504.500	504.510	+0.010
24	598981.410	6703945.340	504.580	504.540	-0.040

Average dz	-0.014
Minimum dz	-0.090
Maximum dz	+0.020
Average magnitude	0.024
Root mean square	0.031
Std deviation	0.028

Kontrollflate 11

H:\04_Laser_Projects_2013\40331_Romeriksåsene\diverse\Controlpoints\NN2000_CP\CP_0190.xyz

Number	Easting	Northing	Known Z	Laser Z	Dz
1	603261.560	6702423.460	421.430	421.420	-0.010
2	603260.950	6702424.390	421.480	421.490	+0.010
3	603260.450	6702425.350	421.560	421.520	-0.040
4	603259.960	6702426.360	421.620	421.640	+0.020
5	603259.540	6702427.110	421.660	421.670	+0.010
6	603259.080	6702427.930	421.720	421.710	-0.010

7	603262.560	6702423.940	421.500	421.520	+0.020
8	603261.960	6702424.870	421.550	421.550	+0.000
9	603261.420	6702426.010	421.620	421.630	+0.010
10	603261.000	6702426.880	421.670	421.700	+0.030
11	603260.670	6702427.660	421.730	421.740	+0.010
12	603260.210	6702428.650	421.830	421.810	-0.020
13	603263.680	6702424.390	421.550	421.550	+0.000
14	603263.230	6702425.420	421.600	421.620	+0.020
15	603262.730	6702426.520	421.680	421.650	-0.030
16	603262.200	6702427.410	421.710	421.730	+0.020
17	603261.930	6702428.320	421.800	421.800	+0.000
18	603261.580	6702429.340	421.880	421.830	-0.050
19	603264.610	6702424.750	421.500	421.510	+0.010
20	603264.070	6702425.950	421.580	421.580	+0.000
21	603263.530	6702427.020	421.650	421.650	+0.000
22	603263.110	6702427.870	421.700	421.710	+0.010
23	603262.780	6702428.750	421.760	421.760	+0.000
24	603262.400	6702429.670	421.810	421.820	+0.010

Average dz	+0.001
Minimum dz	-0.050
Maximum dz	+0.030
Average magnitude	0.014
Root mean square	0.019
Std deviation	0.020

Kontrollflate 12

H:\04_Laser_Projects_2013\40331_Romeriksåsene\diverse\Controlpoints\NN2000_CP\CP_0062.xyz

Number	Easting	Northing	Known Z	Laser Z	Dz
1	614056.980	6708582.150	457.120	457.100	-0.020
2	614056.710	6708583.280	457.150	457.140	-0.010
3	614056.440	6708584.450	457.190	457.210	+0.020
4	614056.120	6708585.610	457.230	457.240	+0.010
5	614055.890	6708586.580	457.260	457.250	-0.010
6	614055.610	6708587.760	457.300	457.340	+0.040
7	614057.870	6708582.350	457.210	457.150	-0.060
8	614057.700	6708583.560	457.260	457.240	-0.020
9	614057.500	6708584.860	457.330	457.260	-0.070

10	614057.220	6708585.940	457.360	457.300	-0.060
11	614057.010	6708587.010	457.390	457.350	-0.040
12	614056.660	6708588.030	457.420	457.390	-0.030
13	614058.620	6708582.580	457.240	457.280	+0.040
14	614058.500	6708583.790	457.270	457.260	-0.010
15	614058.190	6708584.990	457.330	457.320	-0.010
16	614057.930	6708586.230	457.380	457.380	+0.000
17	614057.620	6708587.080	457.400	457.390	-0.010
18	614057.340	6708588.210	457.450	457.440	-0.010
19	614059.590	6708582.830	457.240	457.230	-0.010
20	614059.360	6708583.890	457.280	457.230	-0.050
21	614059.190	6708585.100	457.310	457.330	+0.020
22	614058.970	6708586.310	457.350	457.350	+0.000
23	614058.760	6708587.400	457.410	457.440	+0.030
24	614058.590	6708588.330	457.450	457.480	+0.030

Average dz	-0.010
Minimum dz	-0.070
Maximum dz	+0.040
Average magnitude	0.025
Root mean square	0.032
Std deviation	0.031

Kontrollflate 13

H:\04_Laser_Projects_2013\40331_Romeriksåsene\diverse\Controlpoints\NN2000_CP\CP_0245.xyz

Number	Easting	Northing	Known Z	Laser Z	Dz
1	608246.070	6700309.930	374.570	374.550	-0.020
2	608245.720	6700310.840	374.620	374.570	-0.050
3	608245.380	6700311.760	374.670	374.620	-0.050
4	608245.010	6700312.720	374.730	374.670	-0.060
5	608244.770	6700313.690	374.780	374.730	-0.050
6	608244.420	6700314.570	374.830	374.720	-0.110
7	608247.140	6700310.370	374.580	374.570	-0.010
8	608246.870	6700311.190	374.620	374.610	-0.010
9	608246.320	6700312.160	374.680	374.670	-0.010
10	608245.950	6700313.090	374.730	374.710	-0.020
11	608245.500	6700314.030	374.790	374.750	-0.040
12	608245.080	6700314.940	374.850	374.780	-0.070

13	608247.950	6700310.690	374.550	374.550	+0.000
14	608247.600	6700311.520	374.600	374.580	-0.020
15	608247.110	6700312.590	374.670	374.670	+0.000
16	608246.750	6700313.540	374.750	374.690	-0.060
17	608246.360	6700314.360	374.800	374.760	-0.040
18	608245.920	6700315.330	374.860	374.790	-0.070
19	608248.810	6700311.040	374.520	374.490	-0.030
20	608248.460	6700311.980	374.570	374.530	-0.040
21	608248.090	6700312.920	374.640	374.600	-0.040
22	608247.690	6700313.820	374.700	374.660	-0.040
23	608247.400	6700314.680	374.750	374.670	-0.080
24	608246.930	6700315.770	374.820	374.760	-0.060

Average dz	-0.041
Minimum dz	-0.110
Maximum dz	+0.000
Average magnitude	0.041
Root mean square	0.049
Std deviation	0.027

Kontrollflate 14

H:\04_Laser_Projects_2013\40331_Romeriksåsene\diverse\Controlpoints\NN2000_CP\CP_0335.xyz

Number	Easting	Northing	Known Z	Laser Z	Dz
1	611662.270	6695380.230	200.540	200.460	-0.080
2	611663.000	6695381.670	200.570	200.440	-0.130
3	611663.620	6695382.900	200.570	200.460	-0.110
4	611664.010	6695383.610	200.560	200.460	-0.100
5	611664.660	6695384.700	200.580	200.530	-0.050
6	611663.420	6695379.550	200.560	200.450	-0.110
7	611664.030	6695380.870	200.590	200.500	-0.090
8	611664.580	6695381.790	200.550	200.520	-0.030
9	611665.190	6695382.810	200.550	200.530	-0.020
10	611665.740	6695384.160	200.570	200.540	-0.030
11	611664.480	6695379.060	200.530	200.420	-0.110
12	611665.160	6695380.420	200.530	200.470	-0.060
13	611665.700	6695381.470	200.540	200.510	-0.030
14	611666.190	6695382.370	200.540	200.490	-0.050
15	611666.770	6695383.510	200.550	200.460	-0.090

16	611665.770	6695378.570	200.470	200.380	-0.090
17	611666.320	6695379.830	200.490	200.380	-0.110
18	611666.750	6695381.000	200.490	200.400	-0.090
19	611667.040	6695381.930	200.500	200.450	-0.050
20	611667.740	6695382.950	200.490	200.460	-0.030
21	611666.880	6695377.960	200.390	200.320	-0.070
22	611667.570	6695379.170	200.370	200.330	-0.040
23	611668.120	6695380.180	200.370	200.310	-0.060
24	611668.640	6695381.090	200.380	200.280	-0.100
25	611669.220	6695382.160	200.380	200.290	-0.090

Average dz	-0.073
Minimum dz	-0.130
Maximum dz	-0.020
Average magnitude	0.073
Root mean square	0.079
Std deviation	0.032

Kontrollflate 15

H:\04_Laser_Projects_2013\40331_Romeriksåsene\diverse\Controlpoints\NN2000_CP\CP_0591.xyz

Number	Easting	Northing	Known Z	Laser Z	Dz
1	600565.780	6683650.600	341.150	341.130	-0.020
2	600564.510	6683651.480	341.130	341.090	-0.040
3	600563.520	6683652.370	341.110	341.080	-0.030
4	600562.830	6683652.930	341.090	341.040	-0.050
5	600561.410	6683654.120	341.000	341.040	+0.040
6	600566.680	6683651.630	341.160	341.100	-0.060
7	600565.450	6683652.490	341.130	341.110	-0.020
8	600564.310	6683653.280	341.120	341.090	-0.030
9	600563.440	6683653.950	341.080	341.070	-0.010
10	600562.230	6683655.210	341.000	341.020	+0.020
11	600567.530	6683652.680	341.170	341.120	-0.050
12	600566.340	6683653.550	341.140	341.150	+0.010
13	600565.350	6683654.340	341.120	341.080	-0.040
14	600564.250	6683655.070	341.060	341.060	+0.000
15	600563.140	6683656.190	341.000	341.010	+0.010
16	600568.340	6683653.750	341.160	341.140	-0.020
17	600567.180	6683654.820	341.140	341.160	+0.020

18	600565.980	6683655.570	341.110	341.090	-0.020
19	600565.140	6683656.200	341.080	341.080	+0.000
20	600563.960	6683657.090	341.020	340.990	-0.030
21	600568.990	6683654.870	341.180	341.160	-0.020
22	600567.840	6683655.720	341.150	341.110	-0.040
23	600566.750	6683656.530	341.110	341.070	-0.040
24	600565.870	6683657.140	341.080	341.070	-0.010
25	600564.880	6683657.890	341.050	341.100	+0.050

Average dz	-0.015
Minimum dz	-0.060
Maximum dz	+0.050
Average magnitude	0.027
Root mean square	0.032
Std deviation	0.028

Kontrollflate 16

H:\04_Laser_Projects_2013\40331_Romeriksåsene\diverse\Controlpoints\NN2000_CP\CP_1161.xyz

Number	Easting	Northing	Known Z	Laser Z	Dz
1	599312.420	6668998.750	196.080	196.030	-0.050
2	599313.580	6668998.660	196.050	196.020	-0.030
3	599314.610	6668998.330	196.050	196.080	+0.030
4	599315.790	6668997.930	196.080	196.070	-0.010
5	599316.610	6668997.590	196.060	196.090	+0.030
6	599312.160	6668997.650	195.990	196.040	+0.050
7	599313.060	6668997.320	196.000	196.020	+0.020
8	599314.260	6668997.110	196.010	195.990	-0.020
9	599315.420	6668996.750	196.020	196.050	+0.030
10	599316.310	6668996.420	196.080	196.070	-0.010
11	599311.840	6668996.630	196.010	195.970	-0.040
12	599312.690	6668996.300	196.000	195.970	-0.030
13	599313.920	6668996.020	196.020	195.990	-0.030
14	599315.150	6668995.700	195.970	196.010	+0.040
15	599315.920	6668995.360	196.040	195.990	-0.050
16	599311.500	6668995.510	195.950	195.960	+0.010
17	599312.480	6668995.220	195.980	195.950	-0.030
18	599313.600	6668994.840	195.990	195.990	+0.000
19	599314.580	6668994.460	195.940	195.910	-0.030

20	599315.510	6668994.220	195.780	195.900	+0.120
21	599311.020	6668994.360	195.930	195.880	-0.050
22	599312.280	6668994.000	195.940	195.960	+0.020
23	599313.260	6668993.730	195.940	195.900	-0.040
24	599314.170	6668993.400	195.950	195.900	-0.050
25	599315.160	6668993.180	195.930	195.910	-0.020
26	599314.620	6668998.340	196.010	196.080	+0.070
27	599311.840	6668996.620	195.990	195.960	-0.030
28	599315.520	6668994.280	196.040	195.900	-0.140

Average dz	-0.009
Minimum dz	-0.140
Maximum dz	+0.120
Average magnitude	0.039
Root mean square	0.049
Std deviation	0.049

Kontrollflate 17

H:\04_Laser_Projects_2013\40331_Romeriksåsene\diverse\Controlpoints\NN2000_CP\CP_0929.xyz

Number	Easting	Northing	Known Z	Laser Z	Dz
1	609959.770	6674451.490	183.150	183.240	+0.090
2	609960.340	6674450.410	183.250	183.270	+0.020
3	609960.780	6674449.400	183.360	183.360	+0.000
4	609961.160	6674448.420	183.350	183.390	+0.040
5	609961.450	6674447.550	183.310	183.320	+0.010
6	609958.720	6674451.090	183.140	183.200	+0.060
7	609959.160	6674450.010	183.220	183.290	+0.070
8	609959.630	6674448.890	183.310	183.340	+0.030
9	609960.040	6674447.890	183.310	183.350	+0.040
10	609960.220	6674447.110	183.280	183.290	+0.010
11	609957.730	6674450.770	183.120	183.260	+0.140
12	609958.250	6674449.730	183.200	183.310	+0.110
13	609958.300	6674448.740	183.270	183.290	+0.020
14	609958.630	6674447.780	183.280	183.330	+0.050
15	609959.130	6674446.770	183.250	183.260	+0.010
16	609956.550	6674450.350	183.090	183.190	+0.100
17	609956.870	6674449.410	183.170	183.230	+0.060
18	609957.260	6674448.310	183.270	183.260	-0.010

19	609957.580	6674447.530	183.270	183.300	+0.030
20	609957.920	6674446.400	183.240	183.280	+0.040
21	609955.370	6674449.970	183.080	183.130	+0.050
22	609955.680	6674448.980	183.180	183.190	+0.010
23	609956.060	6674447.890	183.240	183.300	+0.060
24	609956.340	6674447.030	183.240	183.270	+0.030
25	609956.650	6674446.040	183.220	183.260	+0.040

Average dz	+0.044
Minimum dz	-0.010
Maximum dz	+0.140
Average magnitude	0.045
Root mean square	0.057
Std deviation	0.036

Kontrollflate 18

H:\04_Laser_Projects_2013\40331_Romeriksåsene\diverse\Controlpoints\NN2000_CP\CP_1400.xyz

Number	Easting	Northing	Known Z	Laser Z	Dz
1	604995.880	6662935.850	142.540	142.470	-0.070
2	604996.010	6662937.190	142.510	142.480	-0.030
3	604995.940	6662938.700	142.480	142.460	-0.020
4	604996.080	6662940.170	142.450	142.400	-0.050
5	604996.350	6662941.990	142.430	142.390	-0.040
6	604997.190	6662935.630	142.620	142.600	-0.020
7	604997.210	6662937.040	142.570	142.560	-0.010
8	604997.220	6662938.710	142.540	142.530	-0.010
9	604997.350	6662940.100	142.510	142.480	-0.030
10	604997.640	6662941.920	142.490	142.450	-0.040
11	604998.330	6662935.560	142.670	142.640	-0.030
12	604998.620	6662937.250	142.640	142.600	-0.040
13	604998.680	6662938.640	142.610	142.590	-0.020
14	604998.760	6662939.910	142.590	142.560	-0.030
15	604998.870	6662941.730	142.570	142.500	-0.070
16	604999.450	6662935.660	142.700	142.650	-0.050
17	604999.610	6662937.080	142.640	142.620	-0.020
18	604999.820	6662938.480	142.630	142.630	+0.000
19	604999.930	6662939.840	142.600	142.570	-0.030
20	604999.890	6662941.580	142.580	142.520	-0.060

21	605000.620	6662935.600	142.720	142.700	-0.020
22	605000.690	6662936.870	142.690	142.630	-0.060
23	605000.900	6662938.330	142.650	142.650	+0.000
24	605001.010	6662939.710	142.630	142.600	-0.030
25	605001.190	6662941.360	142.590	142.550	-0.040

Average dz	-0.033
Minimum dz	-0.070
Maximum dz	+0.000
Average magnitude	0.033
Root mean square	0.038
Std deviation	0.019

Kontrollflate 19

H:\04_Laser_Projects_2013\40331_Romeriksåsene\diverse\Controlpoints\NN2000_CP\CP_1178.xyz

Number	Easting	Northing	Known Z	Laser Z	Dz
1	616686.670	6668221.910	164.130	164.150	+0.020
2	616685.940	6668222.570	164.100	164.130	+0.030
3	616685.230	6668223.330	164.090	164.120	+0.030
4	616684.540	6668224.020	164.090	164.010	-0.080
5	616687.560	6668222.780	164.150	164.230	+0.080
6	616686.980	6668223.370	164.130	164.150	+0.020
7	616685.810	6668223.960	164.110	164.090	-0.020
8	616685.320	6668224.740	164.110	164.130	+0.020
9	616688.400	6668223.600	164.170	164.260	+0.090
10	616687.680	6668224.220	164.150	164.140	-0.010
11	616686.910	6668224.690	164.140	164.130	-0.010
12	616686.060	6668225.450	164.100	164.060	-0.040
13	616689.150	6668224.190	164.170	164.250	+0.080
14	616688.400	6668224.900	164.150	164.180	+0.030
15	616687.540	6668225.520	164.130	164.140	+0.010
16	616686.870	6668226.290	164.120	164.080	-0.040
17	616690.260	6668225.200	164.170	164.180	+0.010
18	616689.270	6668225.990	164.150	164.220	+0.070
19	616688.460	6668226.550	164.140	164.230	+0.090
20	616687.810	6668227.160	164.120	164.130	+0.010
21	616690.840	6668225.700	164.190	164.180	-0.010
22	616689.770	6668226.500	164.170	164.210	+0.040

23	616688.980	6668227.220	164.140	164.190	+0.050
24	616688.430	6668227.790	164.120	164.100	-0.020

Average dz	+0.019
Minimum dz	-0.080
Maximum dz	+0.090
Average magnitude	0.038
Root mean square	0.047
Std deviation	0.044

Kontrollflate 20

H:\04_Laser_Projects_2013\40331_Romeriksåsene\diverse\Controlpoints\NN2000_CP\CP_0669.xyz

Number	*Easting*	*Northing*	*Known Z*	*Laser Z*	*Dz*
1	*614211.420*	*6681517.140*	*194.450*	*194.380*	*-0.070*
2	*614210.830*	*6681516.100*	*194.480*	*194.390*	*-0.090*
3	*614210.210*	*6681515.010*	*194.530*	*194.420*	*-0.110*
4	*614209.540*	*6681513.890*	*194.520*	*194.460*	*-0.060*
5	*614208.920*	*6681512.740*	*194.500*	*194.480*	*-0.020*
6	*614207.430*	*6681513.450*	*194.580*	*194.510*	*-0.070*
7	*614208.190*	*6681514.580*	*194.520*	*194.450*	*-0.070*
8	*614209.010*	*6681515.720*	*194.520*	*194.490*	*-0.030*
9	*614209.760*	*6681516.690*	*194.600*	*194.480*	*-0.120*
10	*614210.310*	*6681517.860*	*194.510*	*194.510*	*+0.000*
11	*614209.130*	*6681518.540*	*194.530*	*194.480*	*-0.050*
12	*614208.500*	*6681517.380*	*194.550*	*194.550*	*+0.000*
13	*614207.780*	*6681516.330*	*194.590*	*194.580*	*-0.010*
14	*614206.970*	*6681515.240*	*194.600*	*194.590*	*-0.010*
15	*614206.220*	*6681514.250*	*194.600*	*194.550*	*-0.050*
16	*614205.150*	*6681514.800*	*194.590*	*194.540*	*-0.050*
17	*614205.730*	*6681515.800*	*194.560*	*194.550*	*-0.010*
18	*614206.630*	*6681516.770*	*194.560*	*194.540*	*-0.020*
19	*614207.430*	*6681518.200*	*194.520*	*194.500*	*-0.020*
20	*614208.070*	*6681519.160*	*194.500*	*194.460*	*-0.040*
21	*614207.070*	*6681519.780*	*194.450*	*194.370*	*-0.080*
22	*614206.350*	*6681518.740*	*194.480*	*194.480*	*+0.000*
23	*614205.380*	*6681517.320*	*194.510*	*194.430*	*-0.080*
24	*614204.820*	*6681516.350*	*194.530*	*194.480*	*-0.050*
25	*614204.230*	*6681515.390*	*194.530*	*194.490*	*-0.040*
26	*614207.420*	*6681518.180*	*194.550*	*194.500*	*-0.050*

Average dz *-0.046*
Minimum dz *-0.120*
Maximum dz *+0.000*
Average magnitude *0.046*
Root mean square *0.057*
Std deviation *0.034*