

Report for Multi-Station Adjustment

Report date: 2022-07-04

Generated by: RichardWalters

Scope: standard report

Host application: RiSCAN PRO 2.12.1

MSA module: 2.7.2-1858+352f3401

Report module: 1.5.0

Platform: Windows-10-10.0.19041-SP0

Hostname: DESKTOP-QPP05B7

1 Project Summary

Project name: **RAF Greatworth**

Global Coordinate Reference System (GLCS): WGS84 / Geocentric (EPSG::4978)

Report GLCS: WGS84 / Geographic (EPSG::4979)

Project origin:

Latitude [deg]: N52° 5' 12.289135"

Longitude [deg]: W1° 11' 38.986467"

Altitude [m]: -0.0000

Project Coordinate System (PRCS): levelled Cartesian east, north, up system

GNSS Coordinate Reference Systems:

CRS#1 ... WGS84 / Geographic (EPSG::4979)

Report Coordinate System:

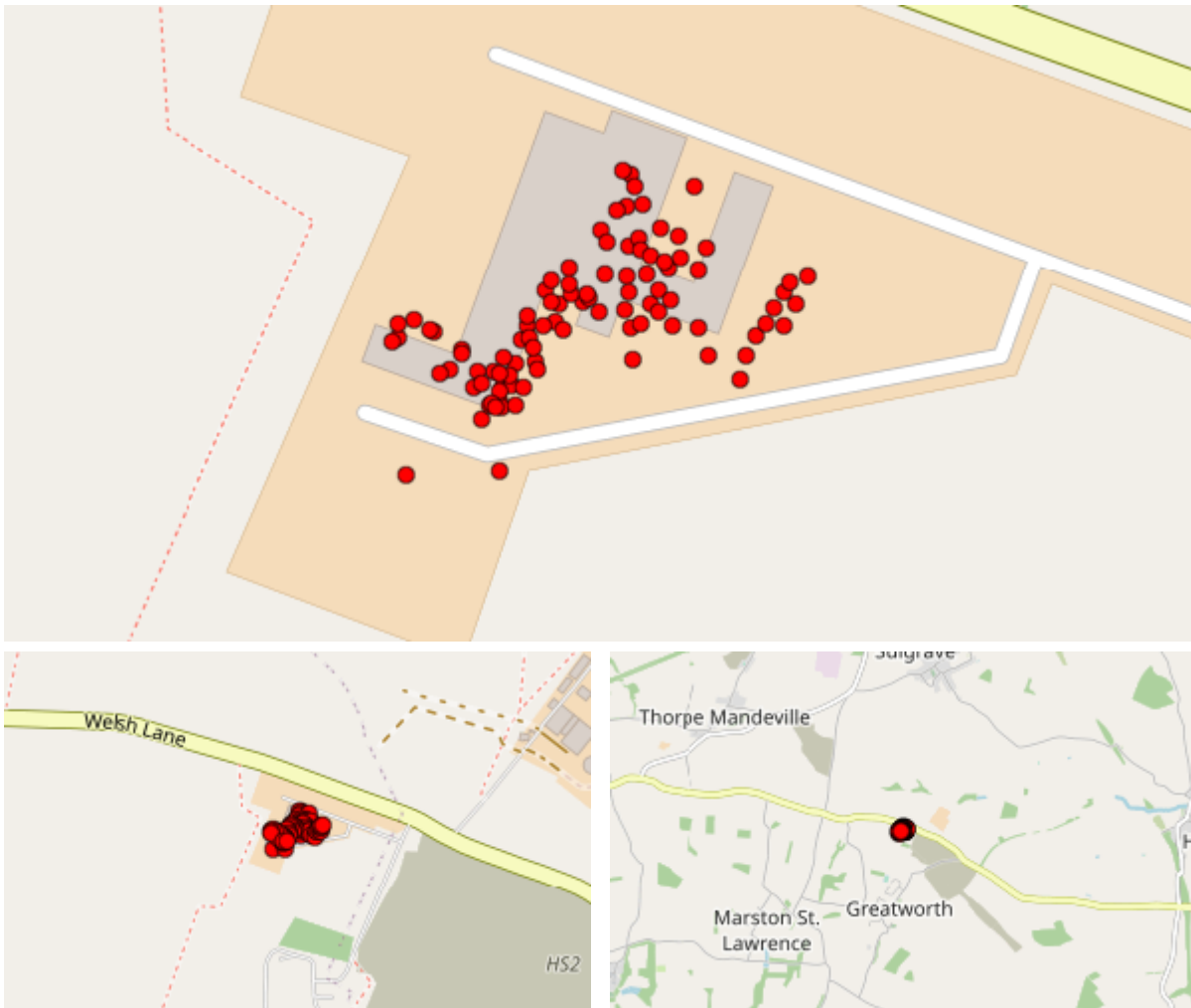
PRCS

number of scan positions: 97

instruments used:

instrument type: VZ-400

serial number: S9997385



Map Data © OpenStreetMap contributors

2 Data available in Project

Control point (CtrlP) – Point of known coordinates and accuracy. Control Points are used in multi-station adjustment / scan data adjustment to register pointclouds to a known control survey.

Check point (ChkP) – Check points are a freely selectable subset of the Control points to verify the success of the adjustment process. Check points are not used for pointcloud registration, but serve as an independent set of control.

2.1 Scandata

Name	Date	Time	Horiz. FoV [deg]	Resolution [mdeg]	Point Count	Image Count	Refl. Scans
ScanPos001	2022-06-16	08:12:48	360.00	40.0	9,961,813	7	0
ScanPos002	2022-06-16	08:18:37	360.00	40.0	9,531,372	7	0
ScanPos003	2022-06-16	08:25:08	360.00	40.0	15,792,416	7	0
ScanPos003b	2022-06-16	08:30:31	360.00	60.0	8,819,033	7	0
ScanPos004	2022-06-16	08:34:35	360.00	60.0	8,703,859	7	0

Name	Date	Time	Horiz. FoV [deg]	Resolution [mdeg]	Point Count	Image Count	Refl. Scans
ScanPos005	2022-06-16	08:42:26	360.00	60.0	8,986,581	7	0
ScanPos006	2022-06-16	08:45:42	360.00	60.0	8,078,250	7	0
ScanPos007	2022-06-16	08:48:35	360.00	60.0	8,562,041	7	0
ScanPos008	2022-06-16	08:53:12	360.00	60.0	9,780,375	7	0
ScanPos009	2022-06-16	08:56:38	360.00	60.0	9,847,017	7	0
ScanPos010	2022-06-16	08:59:28	360.00	60.0	9,894,633	7	0
ScanPos011	2022-06-16	09:04:39	360.00	60.0	9,884,836	7	0
ScanPos012	2022-06-16	09:07:53	360.00	60.0	9,829,045	7	0
ScanPos013	2022-06-16	09:10:34	360.00	60.0	9,725,389	7	0
ScanPos014	2022-06-16	09:13:58	360.00	60.0	9,816,966	7	0
ScanPos015	2022-06-16	09:18:34	360.00	60.0	9,806,398	7	0
ScanPos016	2022-06-16	09:21:45	360.00	60.0	9,937,257	7	0
ScanPos017	2022-06-16	09:24:35	360.00	60.0	9,823,468	7	0
ScanPos018	2022-06-16	09:27:38	360.00	60.0	9,743,401	7	0
ScanPos019	2022-06-16	09:30:21	360.00	60.0	9,795,574	7	0
ScanPos020	2022-06-16	09:33:11	360.00	60.0	9,849,966	7	0
ScanPos021	2022-06-16	09:36:04	360.00	60.0	9,943,040	7	0
ScanPos022	2022-06-16	09:38:57	360.00	60.0	8,186,272	7	0
ScanPos023	2022-06-16	09:42:24	360.00	60.0	6,629,302	7	0
ScanPos024	2022-06-16	09:45:48	360.00	60.0	9,530,658	7	0
ScanPos025	2022-06-16	09:48:52	360.00	60.0	9,685,824	7	0
ScanPos026	2022-06-16	09:51:48	360.00	60.0	9,809,683	7	0
ScanPos027	2022-06-16	09:54:52	360.00	60.0	9,879,586	7	0
ScanPos028	2022-06-16	09:57:53	360.00	60.0	9,464,599	7	0
ScanPos029	2022-06-16	10:03:40	360.00	60.0	8,601,679	10	0
ScanPos030	2022-06-16	10:06:50	360.00	60.0	9,195,245	7	0
ScanPos031	2022-06-16	10:10:11	360.00	60.0	9,943,717	7	0
ScanPos032	2022-06-16	10:13:32	360.00	60.0	9,916,334	7	0
ScanPos033	2022-06-16	10:16:21	360.00	60.0	9,920,946	7	0
ScanPos034	2022-06-16	10:20:15	360.00	60.0	9,833,965	7	0
ScanPos035	2022-06-16	10:23:28	360.00	60.0	9,833,310	7	0
ScanPos036	2022-06-16	10:26:12	360.00	60.0	9,864,979	7	0
ScanPos037	2022-06-16	10:29:03	360.00	60.0	9,847,991	7	0
ScanPos038	2022-06-16	10:33:04	360.00	60.0	9,461,684	7	0
ScanPos039	2022-06-16	10:36:09	360.00	60.0	9,730,031	7	0
ScanPos040	2022-06-16	10:41:12	360.00	60.0	8,103,282	7	0
ScanPos041	2022-06-16	10:44:25	360.00	60.0	7,211,887	7	0
ScanPos042	2022-06-16	10:47:40	360.00	60.0	9,770,371	7	0
ScanPos043	2022-06-16	10:52:53	360.00	60.0	8,099,984	7	0
ScanPos044	2022-06-16	10:58:28	360.00	60.0	8,070,238	7	0

Name	Date	Time	Horiz. FoV [deg]	Resolution [mdeg]	Point Count	Image Count	Refl. Scans
ScanPos045	2022-06-16	11:02:22	360.00	60.0	9,098,857	7	0
ScanPos046	2022-06-16	11:05:34	360.00	60.0	9,230,418	7	0
ScanPos047	2022-06-16	11:08:21	360.00	60.0	9,436,955	7	0
ScanPos048	2022-06-16	11:11:09	360.00	60.0	9,520,072	7	0
ScanPos049	2022-06-16	11:13:56	360.00	60.0	8,421,030	7	0
ScanPos050	2022-06-16	11:16:40	360.00	60.0	7,018,455	7	0
ScanPos051	2022-06-16	11:19:54	360.00	60.0	9,230,280	7	0
ScanPos052	2022-06-16	11:23:11	360.00	60.0	9,936,519	7	0
ScanPos053	2022-06-16	11:26:07	360.00	60.0	9,692,337	7	0
ScanPos054	2022-06-16	11:28:53	360.00	60.0	9,472,813	7	0
ScanPos055	2022-06-16	11:33:02	360.00	60.0	9,640,780	7	0
ScanPos056	2022-06-16	11:35:49	360.00	60.0	9,047,196	7	0
ScanPos057	2022-06-16	11:39:03	360.00	60.0	9,693,766	7	0
ScanPos058	2022-06-16	11:41:58	360.00	60.0	9,329,791	7	0
ScanPos059	2022-06-16	11:44:59	360.00	60.0	7,348,268	7	0
ScanPos060	2022-06-16	11:47:57	360.00	60.0	9,885,674	7	0
ScanPos061	2022-06-16	11:50:43	360.00	60.0	9,954,990	7	0
ScanPos062	2022-06-16	13:23:01	360.00	60.0	9,266,704	7	0
ScanPos063	2022-06-16	13:25:56	360.00	60.0	9,560,631	7	0
ScanPos064	2022-06-16	13:28:52	360.00	60.0	9,352,970	7	0
ScanPos065	2022-06-16	13:31:59	360.00	60.0	7,115,777	7	0
ScanPos066	2022-06-16	13:34:41	360.00	60.0	9,742,951	7	0
ScanPos067	2022-06-16	13:37:29	360.00	60.0	9,807,503	7	0
ScanPos068	2022-06-16	13:40:26	360.00	60.0	9,529,517	7	0
ScanPos069	2022-06-16	13:43:16	360.00	60.0	7,815,761	7	0
ScanPos070	2022-06-16	13:46:23	360.00	60.0	6,149,921	7	0
ScanPos071	2022-06-16	13:49:30	360.00	60.0	9,673,065	7	0
ScanPos072	2022-06-16	13:54:51	360.00	60.0	8,974,627	7	0
ScanPos073	2022-06-16	13:58:06	360.00	60.0	7,940,598	7	0
ScanPos074	2022-06-16	14:01:08	360.00	60.0	9,534,994	7	0
ScanPos075	2022-06-16	14:04:09	360.00	60.0	9,775,209	7	0
ScanPos076	2022-06-16	14:07:03	360.00	60.0	8,838,883	7	0
ScanPos077	2022-06-16	14:10:02	360.00	60.0	9,824,325	7	0
ScanPos078	2022-06-16	14:12:43	360.00	60.0	8,494,219	7	0
ScanPos079	2022-06-16	14:15:42	360.00	60.0	8,309,462	7	0
ScanPos080	2022-06-16	14:18:34	360.00	60.0	9,647,341	7	0
ScanPos081	2022-06-16	14:21:25	360.00	60.0	9,234,921	7	0
ScanPos082	2022-06-16	14:26:17	360.00	60.0	8,837,598	7	0
ScanPos083	2022-06-16	14:29:12	360.00	60.0	7,789,672	7	0
ScanPos084	2022-06-16	14:32:01	360.00	60.0	7,131,317	7	0

Name	Date	Time	Horiz. FoV [deg]	Resolution [mdeg]	Point Count	Image Count	Refl. Scans
ScanPos085	2022-06-16	14:34:41	360.00	60.0	6,751,418	7	0
ScanPos086	2022-06-16	14:37:35	360.00	60.0	9,642,150	7	0
ScanPos087	2022-06-16	14:40:19	360.00	60.0	5,854,493	7	0
ScanPos088	2022-06-16	14:43:17	360.00	60.0	6,154,693	7	0
ScanPos089	2022-06-16	14:46:18	360.00	60.0	7,846,981	7	0
ScanPos090	2022-06-16	14:49:08	360.00	60.0	9,677,767	7	0
ScanPos091	2022-06-16	14:52:21	360.00	60.0	9,638,228	7	0
ScanPos092	2022-06-16	14:55:19	360.00	60.0	9,531,528	7	0
ScanPos093	2022-06-16	14:58:16	360.00	60.0	9,619,381	7	0
ScanPos094	2022-06-16	15:01:05	360.00	60.0	9,675,109	7	0
ScanPos095	2022-06-16	15:04:31	360.00	60.0	7,191,864	7	0
ScanPos096	2022-06-16	15:07:36	360.00	60.0	6,434,852	7	0
Total					883,028,928		

2.2 GNSS Measurements

The VZ-400 acquired the following GNSS measurements at the following scan positions:

Name	CRS	Latitude [deg]	Longitude [deg]	Altitude [m]	Horiz. Acc. [m]	Vert. Acc. [m]	Satel-lites
ScanPos001	CRS#1	N52° 5' 12.289135"	W1° 11' 38.986467"	223.6662	1.912	1.949	4262065
ScanPos002	CRS#1	N52° 5' 12.399044"	W1° 11' 38.130253"	223.2880	1.752	1.799	4262065
ScanPos003	CRS#1	N52° 5' 12.631979"	W1° 11' 38.437384"	220.5011	2.779	2.830	4262065
ScanPos003b	CRS#1	N52° 5' 12.718680"	W1° 11' 38.267160"	227.5025	2.416	2.116	4262065
ScanPos004	CRS#1	N52° 5' 12.638035"	W1° 11' 38.218865"	223.6118	13.104	5.472	4262065
ScanPos005	CRS#1	N52° 5' 12.993042"	W1° 11' 38.300155"	225.5920	14.666	5.222	4262065
ScanPos006	CRS#1	N52° 5' 12.914631"	W1° 11' 38.206846"	230.2456	14.903	5.328	4262065
ScanPos007	CRS#1	N52° 5' 12.978383"	W1° 11' 38.032491"	222.4359	12.711	7.200	4262065
ScanPos008	CRS#1	N52° 5' 13.056222"	W1° 11' 38.181757"	221.6167	7.434	6.741	4262065
ScanPos009	CRS#1	N52° 5' 12.968931"	W1° 11' 38.534377"	223.5227	12.216	4.400	4262065
ScanPos010	CRS#1	N52° 5' 12.682454"	W1° 11' 39.175200"	229.1365	18.078	4.995	4262065
ScanPos011	CRS#1	N52° 5' 12.672644"	W1° 11' 38.644292"	234.7228	19.520	5.341	4262065
ScanPos012	CRS#1	N52° 5' 13.047508"	W1° 11' 38.865655"	233.4199	9.994	5.284	4262065
ScanPos013	CRS#1	N52° 5' 13.221203"	W1° 11' 38.809657"	230.4039	11.561	5.586	4262065
ScanPos014	CRS#1	N52° 5' 13.236055"	W1° 11' 38.941098"	226.1861	9.399	8.200	4262065
ScanPos015	CRS#1	N52° 5' 13.231015"	W1° 11' 39.077409"	223.2579	10.238	8.559	4262065
ScanPos016	CRS#1	N52° 5' 13.071882"	W1° 11' 39.295588"	226.8879	10.659	5.122	4262065
ScanPos017	CRS#1	N52° 5' 12.986442"	W1° 11' 39.097823"	224.4791	10.729	4.889	4262065
ScanPos018	CRS#1	N52° 5' 13.132329"	W1° 11' 37.921574"	220.4287	10.511	6.804	4262065
ScanPos019	CRS#1	N52° 5' 13.442086"	W1° 11' 38.124558"	221.3729	14.542	6.067	4262065
ScanPos020	CRS#1	N52° 5' 13.199603"	W1° 11' 38.039437"	221.4005	12.456	4.994	4262065
ScanPos021	CRS#1	N52° 5' 13.735820"	W1° 11' 38.261774"	223.7486	12.165	5.637	4262065

Name	CRS	Latitude [deg]	Longitude [deg]	Altitude [m]	Horiz. Acc. [m]	Vert. Acc. [m]	Satel-lites
ScanPos022	CRS#1	N52° 5' 13.362180"	W1° 11' 37.881891"	223.6206	17.100	4.865	4262065
ScanPos023	CRS#1	N52° 5' 13.671194"	W1° 11' 37.733745"	224.8350	18.307	5.196	4262065
ScanPos024	CRS#1	N52° 5' 13.752508"	W1° 11' 37.799294"	231.4215	10.477	6.898	4262065
ScanPos025	CRS#1	N52° 5' 13.567880"	W1° 11' 37.616325"	228.5274	21.088	7.974	4262065
ScanPos026	CRS#1	N52° 5' 13.752923"	W1° 11' 37.976378"	229.5051	18.261	6.087	4262065
ScanPos027	CRS#1	N52° 5' 14.235757"	W1° 11' 37.208091"	222.6693	10.424	5.749	4262065
ScanPos028	CRS#1	N52° 5' 14.474174"	W1° 11' 37.585463"	224.9120	12.372	7.187	4262065
ScanPos029	CRS#1	N52° 5' 14.348742"	W1° 11' 37.767200"	230.1193	3.776	3.883	4262065
ScanPos030	CRS#1	N52° 5' 14.219265"	W1° 11' 37.488845"	223.4874	4.510	4.222	4262065
ScanPos031	CRS#1	N52° 5' 14.258017"	W1° 11' 37.286206"	228.3769	3.526	4.225	4262065
ScanPos032	CRS#1	N52° 5' 14.039620"	W1° 11' 37.654659"	226.8648	4.231	3.551	4262065
ScanPos033	CRS#1	N52° 5' 14.016617"	W1° 11' 37.404495"	230.1208	3.542	3.970	4262065
ScanPos034	CRS#1	N52° 5' 13.636735"	W1° 11' 37.459525"	234.7021	16.162	9.631	4262065
ScanPos035	CRS#1	N52° 5' 13.882109"	W1° 11' 36.872971"	227.0604	13.606	4.988	4262065
ScanPos036	CRS#1	N52° 5' 14.309944"	W1° 11' 36.646486"	240.9953	9.456	5.019	4262065
ScanPos037	CRS#1	N52° 5' 14.143683"	W1° 11' 36.738969"	242.4181	10.343	6.012	4262065
ScanPos038	CRS#1	N52° 5' 13.673213"	W1° 11' 37.183478"	240.5342	11.003	4.340	4262065
ScanPos039	CRS#1	N52° 5' 14.020709"	W1° 11' 36.992104"	244.7069	10.366	4.925	4262065
ScanPos040	CRS#1	N52° 5' 14.155814"	W1° 11' 36.702860"	253.0785	9.987	5.413	4262065
ScanPos041	CRS#1	N52° 5' 14.180408"	W1° 11' 36.666172"	240.7399	10.254	5.693	4262065
ScanPos042	CRS#1	N52° 5' 14.025430"	W1° 11' 36.772622"	240.1222	6.954	6.673	4262065
ScanPos043	CRS#1	N52° 5' 13.926435"	W1° 11' 37.072874"	221.5300	10.538	6.523	4262065
ScanPos044	CRS#1	N52° 5' 13.481022"	W1° 11' 36.741019"	129.7696	26.708	26.932	4262065
ScanPos045	CRS#1	N52° 5' 14.452578"	W1° 11' 36.393614"	224.9742	14.257	15.150	4262065
ScanPos046	CRS#1	N52° 5' 14.949136"	W1° 11' 37.632224"	128.2887	73.892	19.101	4262065
ScanPos047	CRS#1	N52° 5' 13.740997"	W1° 11' 37.228320"	222.1709	14.652	13.032	4262065
ScanPos048	CRS#1	N52° 5' 13.463658"	W1° 11' 37.509905"	223.5759	19.160	7.870	4262065
ScanPos049	CRS#1	N52° 5' 13.341190"	W1° 11' 37.301766"	228.5644	12.227	4.976	4262065
ScanPos050	CRS#1	N52° 5' 13.540145"	W1° 11' 37.418192"	225.4888	11.448	7.783	4262065
ScanPos051	CRS#1	N52° 5' 13.513422"	W1° 11' 37.095895"	221.3821	17.247	10.823	4262065
ScanPos052	CRS#1	N52° 5' 13.294085"	W1° 11' 37.132265"	231.4970	10.415	5.315	4262065
ScanPos053	CRS#1	N52° 5' 13.577453"	W1° 11' 37.113926"	210.1394	26.536	15.863	4262065
ScanPos054	CRS#1	N52° 5' 13.976298"	W1° 11' 36.924069"	198.1338	21.794	10.815	4262065
ScanPos055	CRS#1	N52° 5' 14.074357"	W1° 11' 37.086545"	198.1846	24.240	11.320	4262065
ScanPos056	CRS#1	N52° 5' 13.508571"	W1° 11' 36.748066"	222.3557	18.274	11.019	4262065
ScanPos057	CRS#1	N52° 5' 14.221158"	W1° 11' 35.833763"	144.7568	28.252	15.900	4262065
ScanPos058	CRS#1	N52° 5' 13.694511"	W1° 11' 37.097377"	215.0511	15.724	5.631	4262065
ScanPos059	CRS#1	N52° 5' 13.406598"	W1° 11' 36.591923"	226.2243	15.528	8.264	4262065
ScanPos060	CRS#1	N52° 5' 13.480038"	W1° 11' 36.372254"	223.9912	9.533	5.055	4262065
ScanPos061	CRS#1	N52° 5' 13.332963"	W1° 11' 36.400072"	222.6403	9.911	6.132	4262065
ScanPos063	CRS#1	N52° 5' 13.447106"	W1° 11' 37.287910"	196.8647	19.449	8.104	4262065

Name	CRS	Latitude [deg]	Longitude [deg]	Altitude [m]	Horiz. Acc. [m]	Vert. Acc. [m]	Satel-lites
ScanPos064	CRS#1	N52° 5' 13.633431"	W1° 11' 36.549881"	219.2221	20.557	13.722	4262065
ScanPos065	CRS#1	N52° 5' 13.682981"	W1° 11' 37.420882"	186.5290	24.149	14.051	4262065
ScanPos066	CRS#1	N52° 5' 13.988068"	W1° 11' 36.055145"	231.8279	9.518	5.423	4262065
ScanPos067	CRS#1	N52° 5' 13.607556"	W1° 11' 35.776730"	217.7323	6.675	4.485	4262065
ScanPos068	CRS#1	N52° 5' 13.723905"	W1° 11' 35.513119"	219.4954	14.207	4.295	4262065
ScanPos069	CRS#1	N52° 5' 13.784950"	W1° 11' 36.044461"	218.5558	18.437	10.053	4262065
ScanPos070	CRS#1	N52° 5' 13.788769"	W1° 11' 36.263755"	205.1663	19.267	14.163	4262065
ScanPos071	CRS#1	N52° 5' 14.048661"	W1° 11' 35.732778"	229.1363	12.685	8.044	4262065
ScanPos072	CRS#1	N52° 5' 13.479790"	W1° 11' 39.570500"	157.8869	16.611	11.690	4262065
ScanPos073	CRS#1	N52° 5' 13.695118"	W1° 11' 38.117792"	205.2077	14.657	12.026	4262065
ScanPos074	CRS#1	N52° 5' 13.546832"	W1° 11' 37.881245"	222.4277	7.426	5.893	4262065
ScanPos075	CRS#1	N52° 5' 13.674918"	W1° 11' 37.986157"	227.4958	6.102	2.928	4262065
ScanPos076	CRS#1	N52° 5' 13.398526"	W1° 11' 37.977360"	227.0553	10.057	5.465	4262065
ScanPos077	CRS#1	N52° 5' 13.222694"	W1° 11' 38.080528"	226.6035	6.842	3.108	4262065
ScanPos078	CRS#1	N52° 5' 13.228772"	W1° 11' 37.806055"	227.8374	5.572	4.876	4262065
ScanPos079	CRS#1	N52° 5' 13.131655"	W1° 11' 38.085711"	226.5909	5.673	3.716	4262065
ScanPos080	CRS#1	N52° 5' 13.261182"	W1° 11' 38.200348"	231.8676	3.389	2.902	4262065
ScanPos081	CRS#1	N52° 5' 13.226357"	W1° 11' 37.991391"	225.7879	3.311	4.183	4262065
ScanPos082	CRS#1	N52° 5' 13.101425"	W1° 11' 38.022042"	228.9603	6.207	3.906	4262065
ScanPos083	CRS#1	N52° 5' 13.057417"	W1° 11' 38.214420"	232.6308	10.518	2.965	4262065
ScanPos084	CRS#1	N52° 5' 12.960549"	W1° 11' 38.534885"	233.2041	10.557	5.763	4262065
ScanPos085	CRS#1	N52° 5' 12.977709"	W1° 11' 38.449311"	233.0113	7.052	3.835	4262065
ScanPos086	CRS#1	N52° 5' 12.938294"	W1° 11' 38.395638"	227.7722	9.422	3.711	4262065
ScanPos087	CRS#1	N52° 5' 12.787832"	W1° 11' 38.244485"	228.0995	7.103	3.339	4262065
ScanPos088	CRS#1	N52° 5' 12.811657"	W1° 11' 38.306926"	228.0714	10.109	3.934	4262065
ScanPos089	CRS#1	N52° 5' 12.824109"	W1° 11' 38.562074"	225.3143	11.159	6.198	4262065
ScanPos090	CRS#1	N52° 5' 12.873162"	W1° 11' 38.880295"	226.5052	5.443	3.847	4262065
ScanPos091	CRS#1	N52° 5' 13.035111"	W1° 11' 38.530357"	230.4595	4.262	5.225	4262065
ScanPos092	CRS#1	N52° 5' 13.109968"	W1° 11' 38.985692"	224.2419	4.047	4.836	4262065
ScanPos093	CRS#1	N52° 5' 13.118345"	W1° 11' 39.315651"	221.0555	4.395	5.122	4262065
ScanPos094	CRS#1	N52° 5' 12.948822"	W1° 11' 39.423992"	230.4437	4.050	4.347	4262065
ScanPos095	CRS#1	N52° 5' 12.781203"	W1° 11' 38.300738"	226.8478	3.705	5.595	4262065
ScanPos096	CRS#1	N52° 5' 12.795706"	W1° 11' 38.167828"	227.1146	4.269	5.346	4262065

CRS#1 ... WGS84 / Geographic (EPSG::4979)

2.3 Orientation Measurements

The VZ-400 acquired no orientation measurements.

2.4 Control Points defined in a coordinate reference system

No Control Points in a coordinate reference system used.

2.5 Check Points defined in a coordinate reference system

No Check Points in a coordinate reference system used.

2.6 Control Points defined in a locally levelled coordinate system

No Control Points in a locally leveled coordinate system used.

2.7 Check Points defined in a locally levelled coordinate system

No Check Points in a locally leveled coordinate system defined.

3 Data used for Multi-station-Adjustment

3.1 Data per Scan Position

	Number of Plane Patches	Plane Patches of Phase 3		
Name	Phase 3	NS	WE	Horiz.
ScanPos001	1,783	904	211	668
ScanPos002	1,883	850	375	658
ScanPos003	2,261	958	327	976
ScanPos003b	2,292	619	609	1,064
ScanPos004	2,383	622	818	943
ScanPos005	2,969	667	953	1,349
ScanPos006	2,705	616	963	1,126
ScanPos007	1,086	413	291	382
ScanPos008	3,199	684	1,094	1,421
ScanPos009	4,036	978	1,063	1,995
ScanPos010	3,552	1,122	779	1,651
ScanPos011	3,627	1,087	923	1,617
ScanPos012	3,505	1,075	935	1,495
ScanPos013	3,214	1,008	809	1,397
ScanPos014	3,550	1,260	774	1,516
ScanPos015	3,487	1,307	635	1,545
ScanPos016	3,215	1,042	718	1,455
ScanPos017	2,356	175	647	1,534
ScanPos018	3,825	774	1,285	1,766
ScanPos019	4,052	912	1,201	1,939
ScanPos020	3,700	717	1,189	1,794
ScanPos021	3,836	810	1,138	1,888
ScanPos022	3,701	602	974	2,125
ScanPos023	913	254	29	630
ScanPos024	4,160	1,165	1,175	1,820
ScanPos025	3,465	1,047	962	1,456

	Number of Plane Patches	Plane Patches of Phase 3		
Name	Phase 3	NS	WE	Horiz.
ScanPos026	4,004	991	1,234	1,779
ScanPos027	3,194	786	1,071	1,337
ScanPos028	1,943	601	503	839
ScanPos029	2,052	438	559	1,055
ScanPos030	3,403	986	1,101	1,316
ScanPos031	2,475	728	615	1,132
ScanPos032	3,585	925	1,167	1,493
ScanPos033	3,245	927	1,156	1,162
ScanPos034	4,583	947	1,182	2,454
ScanPos035	4,924	1,210	951	2,763
ScanPos036	4,720	1,102	1,178	2,440
ScanPos037	3,717	890	999	1,828
ScanPos038	4,698	1,289	1,211	2,198
ScanPos039	1,994	435	467	1,092
ScanPos040	2,195	603	445	1,147
ScanPos041	1,201	379	426	396
ScanPos042	2,881	686	396	1,799
ScanPos043	3,133	916	756	1,461
ScanPos044	2,643	1,158	721	764
ScanPos045	2,614	408	890	1,316
ScanPos046	2,349	717	603	1,029
ScanPos047	3,632	975	1,224	1,433
ScanPos048	2,286	549	819	918
ScanPos049	2,664	574	899	1,191
ScanPos050	3,287	755	878	1,654
ScanPos051	3,586	932	1,023	1,631
ScanPos052	2,713	828	882	1,003
ScanPos053	2,154	840	489	825
ScanPos054	2,533	862	564	1,107
ScanPos055	3,080	1,249	877	954
ScanPos056	4,079	1,250	978	1,851
ScanPos057	3,565	1,129	1,291	1,145
ScanPos058	2,369	650	739	980
ScanPos059	1,880	510	372	998
ScanPos060	3,402	905	936	1,561
ScanPos061	2,815	928	640	1,247
ScanPos062	3,744	1,129	925	1,690
ScanPos063	1,328	549	64	715
ScanPos064	2,613	564	842	1,207

	Number of Plane Patches	Plane Patches of Phase 3		
Name	Phase 3	NS	WE	Horiz.
ScanPos065	3,787	1,066	1,188	1,533
ScanPos066	1,909	351	758	800
ScanPos067	2,598	699	615	1,284
ScanPos068	3,449	961	1,185	1,303
ScanPos069	2,544	903	711	930
ScanPos070	2,117	563	742	812
ScanPos071	2,470	430	1,102	938
ScanPos072	2,099	946	548	605
ScanPos073	2,173	914	543	716
ScanPos074	3,033	761	1,003	1,269
ScanPos075	2,761	917	805	1,039
ScanPos076	2,732	687	961	1,084
ScanPos077	2,638	593	928	1,117
ScanPos078	2,343	683	731	929
ScanPos079	2,940	651	1,061	1,228
ScanPos080	2,338	714	787	837
ScanPos081	3,091	442	1,310	1,339
ScanPos082	2,463	575	812	1,076
ScanPos083	2,316	423	805	1,088
ScanPos084	2,926	598	1,073	1,255
ScanPos085	1,516	532	408	576
ScanPos086	3,381	979	1,118	1,284
ScanPos087	2,047	594	673	780
ScanPos088	1,908	505	843	560
ScanPos089	2,294	651	595	1,048
ScanPos090	4,062	1,410	776	1,876
ScanPos091	1,113	518	4	591
ScanPos092	1,418	342	303	773
ScanPos093	2,323	731	537	1,055
ScanPos094	1,524	596	196	732
ScanPos095	2,836	1,006	930	900
ScanPos096	1,934	963	417	554

NS ... North-South, WE ... West-East, Horiz. ... Horizontal

3.2 Control Points used for Multi-Station Adjustment

No Control Points used.

3.3 Tie Points used for Multi-Station Adjustment

No Tie Points used.

4 Results of MSA

4.1 General Information

User Settings:

use CRS control points: False
use SOCS tie points: False
use LLCS control points: False
GNSS measurement usage: yes
GNSS outliers: remove GNNS outliers
GNSS trust level: low
gap closure distance: 0.250 m
adjustment effort: standard
adjustment matches: planes to planes
reporting level: standard

Observations Used:

project plane patches: 35,913
scan position plane patches: 275,121
GNSS measurements: 96
orientation measurements: 97
control points in CRS: 0
control points in LLCS: 0
tie points in PRCS: 0
LLCS: 0
project northing from: GNSS

Adjustment Info:

start time: 2022-07-04T16:11:44
run time: 00:09:24
parameters estimated: 108,324

4.2 Final Poses of Scan Positions

The following positions and orientations have been estimated for the scan positions:

In the PRCS coordinate system:

Name	X [m]	Y [m]	Z [m]	Acc. X [m]	Acc. Y [m]	Acc. Z [m]
ScanPos001	-1.247	1.444	224.462	0.000	0.000	0.000
ScanPos002	16.388	2.161	224.396	0.001	0.000	0.000
ScanPos003	12.869	12.045	224.317	0.000	0.000	0.000
ScanPos003b	14.434	14.320	224.563	0.000	0.000	0.000
ScanPos004	16.317	15.262	224.569	0.000	0.000	0.000
ScanPos005	17.021	18.158	224.592	0.000	0.000	0.000

Name	X [m]	Y [m]	Z [m]	Acc. X [m]	Acc. Y [m]	Acc. Z [m]
ScanPos006	18.452	18.203	224.624	0.000	0.000	0.000
ScanPos007	20.750	17.781	224.594	0.001	0.000	0.000
ScanPos008	19.310	21.987	224.597	0.000	0.000	0.000
ScanPos009	16.770	23.324	224.636	0.000	0.000	0.000
ScanPos010	15.075	20.694	224.588	0.000	0.000	0.000
ScanPos011	11.597	17.787	224.622	0.000	0.000	0.000
ScanPos012	6.839	20.929	224.600	0.000	0.000	0.000
ScanPos013	9.229	24.671	224.632	0.000	0.000	0.000
ScanPos014	4.056	27.962	224.607	0.000	0.000	0.000
ScanPos015	0.578	30.360	224.631	0.000	0.000	0.000
ScanPos016	-2.672	26.877	224.584	0.001	0.001	0.000
ScanPos017	20.225	26.713	224.629	0.001	0.002	0.000
ScanPos018	22.872	22.697	224.614	0.000	0.000	0.000
ScanPos019	21.513	29.211	224.630	0.000	0.001	0.000
ScanPos020	26.663	29.809	224.607	0.000	0.000	0.000
ScanPos021	24.781	35.793	224.629	0.000	0.000	0.000
ScanPos022	27.264	33.099	224.617	0.000	0.000	0.000
ScanPos023	31.540	33.338	224.614	0.002	0.002	0.000
ScanPos024	28.926	39.660	224.586	0.000	0.000	0.000
ScanPos025	35.685	38.733	224.601	0.000	0.000	0.000
ScanPos026	34.967	46.647	224.560	0.000	0.000	0.000
ScanPos027	39.603	51.242	224.567	0.000	0.000	0.000
ScanPos028	40.315	56.900	224.554	0.001	0.000	0.000
ScanPos029	38.894	57.888	226.765	0.000	0.000	0.000
ScanPos030	41.319	54.873	227.846	0.000	0.000	0.000
ScanPos031	42.621	51.331	227.862	0.000	0.000	0.000
ScanPos032	37.757	50.252	227.845	0.000	0.000	0.000
ScanPos033	35.972	44.666	227.843	0.000	0.000	0.000
ScanPos034	40.162	43.807	224.535	0.000	0.000	0.000
ScanPos035	47.331	39.713	224.577	0.000	0.000	0.000
ScanPos036	49.477	45.708	224.542	0.000	0.000	0.000
ScanPos037	52.328	54.879	224.585	0.000	0.000	0.000
ScanPos038	45.844	47.022	228.052	0.000	0.000	0.000
ScanPos039	42.122	45.253	228.059	0.000	0.000	0.000
ScanPos040	42.209	43.205	228.054	0.000	0.000	0.000
ScanPos041	44.210	41.889	228.052	0.000	0.000	0.000
ScanPos042	46.584	41.010	228.044	0.001	0.001	0.000
ScanPos043	49.568	41.623	228.061	0.000	0.000	0.000
ScanPos044	52.799	39.271	226.549	0.000	0.000	0.000
ScanPos045	54.332	43.502	224.554	0.000	0.000	0.000
ScanPos046	39.720	38.446	224.577	0.000	0.001	0.000

Name	X [m]	Y [m]	Z [m]	Acc. X [m]	Acc. Y [m]	Acc. Z [m]
ScanPos047	39.965	35.414	224.572	0.000	0.000	0.000
ScanPos048	39.361	32.194	224.603	0.000	0.000	0.000
ScanPos049	34.770	31.680	224.576	0.000	0.000	0.000
ScanPos050	32.905	34.324	224.624	0.000	0.000	0.000
ScanPos051	40.565	28.590	224.561	0.000	0.000	0.000
ScanPos052	40.934	22.827	224.586	0.000	0.000	0.000
ScanPos053	42.377	29.645	224.567	0.000	0.000	0.000
ScanPos054	43.988	33.074	224.598	0.000	0.000	0.000
ScanPos055	45.795	35.865	224.548	0.000	0.000	0.000
ScanPos056	43.309	38.521	224.581	0.000	0.000	0.000
ScanPos057	47.772	33.848	224.561	0.000	0.000	0.000
ScanPos058	45.728	31.864	224.587	0.000	0.000	0.000
ScanPos059	48.351	28.969	224.559	0.001	0.000	0.000
ScanPos060	53.015	28.579	224.604	0.000	0.000	0.000
ScanPos061	54.766	23.650	224.568	0.001	0.000	0.000
ScanPos062	61.852	23.736	224.553	0.000	0.000	0.000
ScanPos063	60.568	19.383	224.600	0.001	0.001	0.000
ScanPos064	63.545	27.150	224.568	0.000	0.001	0.000
ScanPos065	65.554	29.563	224.549	0.000	0.000	0.000
ScanPos066	67.133	32.501	224.575	0.000	0.001	0.000
ScanPos067	68.621	29.163	224.569	0.000	0.000	0.000
ScanPos068	71.025	33.133	224.594	0.000	0.000	0.000
ScanPos069	68.736	35.334	224.592	0.000	0.000	0.000
ScanPos070	70.005	37.098	224.584	0.000	0.000	0.000
ScanPos071	73.241	38.154	224.605	0.000	0.000	0.000
ScanPos072	29.518	35.119	225.645	0.000	0.000	0.000
ScanPos073	32.348	34.925	226.893	0.000	0.000	0.000
ScanPos074	28.921	36.705	227.480	0.000	0.000	0.000
ScanPos075	25.660	37.665	227.487	0.000	0.000	0.000
ScanPos076	25.703	33.369	227.482	0.000	0.000	0.000
ScanPos077	24.171	29.052	227.452	0.000	0.000	0.000
ScanPos078	27.909	28.550	227.468	0.000	0.001	0.000
ScanPos079	21.599	26.775	227.461	0.000	0.000	0.000
ScanPos080	21.504	30.933	227.483	0.000	0.000	0.000
ScanPos081	22.342	25.155	227.463	0.000	0.000	0.000
ScanPos082	23.014	21.118	227.490	0.000	0.001	0.000
ScanPos083	18.004	20.020	227.479	0.000	0.000	0.000
ScanPos084	16.179	20.172	227.480	0.000	0.001	0.000
ScanPos085	12.199	20.832	227.471	0.000	0.000	0.000
ScanPos086	16.093	16.996	227.476	0.000	0.000	0.000
ScanPos087	16.520	14.060	227.471	0.000	0.000	0.000

Name	X [m]	Y [m]	Z [m]	Acc. X [m]	Acc. Y [m]	Acc. Z [m]
ScanPos088	14.742	14.918	227.479	0.000	0.000	0.000
ScanPos089	12.761	18.561	227.466	0.001	0.000	0.000
ScanPos090	5.200	20.262	227.445	0.000	0.000	0.000
ScanPos091	9.276	24.163	227.446	0.001	0.001	0.000
ScanPos092	3.204	28.375	227.456	0.001	0.001	0.000
ScanPos093	-2.389	29.561	227.441	0.000	0.000	0.000
ScanPos094	-3.688	26.113	227.458	0.001	0.001	0.000
ScanPos095	15.611	14.165	227.465	0.000	0.000	0.000
ScanPos096	19.062	14.550	226.009	0.000	0.000	0.001

Name	Roll [deg]	Pitch [deg]	Yaw [deg]	Acc. Roll [deg]	Acc. Pitch [deg]	Acc. Yaw [deg]
ScanPos001	-1.617	-0.608	-95.949	0.000	0.000	0.000
ScanPos002	-0.096	0.341	14.506	0.002	0.001	0.001
ScanPos003	0.253	-4.770	86.864	0.001	0.001	0.001
ScanPos003b	0.260	0.555	77.068	0.002	0.002	0.002
ScanPos004	-2.149	-1.420	40.061	0.002	0.002	0.002
ScanPos005	2.409	2.649	107.202	0.002	0.002	0.002
ScanPos006	2.948	2.808	-152.434	0.003	0.003	0.003
ScanPos007	2.577	2.955	-168.430	0.004	0.004	0.004
ScanPos008	2.092	2.408	138.762	0.001	0.002	0.002
ScanPos009	1.150	1.208	-169.735	0.001	0.001	0.002
ScanPos010	0.754	3.946	-153.159	0.002	0.001	0.002
ScanPos011	0.711	-1.279	147.155	0.002	0.001	0.002
ScanPos012	-2.295	0.082	-169.955	0.002	0.002	0.002
ScanPos013	-2.950	-0.945	148.348	0.002	0.001	0.002
ScanPos014	-0.541	0.780	-101.311	0.002	0.002	0.002
ScanPos015	0.679	-0.148	132.223	0.002	0.002	0.002
ScanPos016	-0.430	0.810	-106.661	0.002	0.002	0.003
ScanPos017	-2.068	-0.496	172.430	0.003	0.004	0.009
ScanPos018	-1.527	0.442	-44.845	0.002	0.002	0.002
ScanPos019	-0.843	1.940	31.399	0.001	0.001	0.002
ScanPos020	1.067	2.295	161.433	0.001	0.002	0.002
ScanPos021	-0.139	-0.122	120.405	0.001	0.001	0.001
ScanPos022	-1.747	-0.315	88.342	0.001	0.001	0.002
ScanPos023	-0.784	0.496	94.017	0.006	0.006	0.009
ScanPos024	3.747	-0.302	177.422	0.001	0.001	0.001
ScanPos025	0.156	-1.392	144.321	0.001	0.001	0.002
ScanPos026	-0.643	0.302	96.976	0.001	0.001	0.002
ScanPos027	-0.405	1.381	87.521	0.002	0.001	0.002
ScanPos028	-0.216	0.465	146.286	0.002	0.002	0.002
ScanPos029	1.028	-0.259	177.244	0.002	0.002	0.002
ScanPos030	-0.822	-1.661	25.390	0.001	0.001	0.002

Name	Roll [deg]	Pitch [deg]	Yaw [deg]	Acc. Roll [deg]	Acc. Pitch [deg]	Acc. Yaw [deg]
ScanPos031	-0.579	-1.340	-13.676	0.003	0.003	0.003
ScanPos032	2.200	-1.197	-17.214	0.001	0.001	0.002
ScanPos033	1.651	-1.250	-22.105	0.001	0.001	0.002
ScanPos034	-1.535	2.471	-105.863	0.001	0.002	0.002
ScanPos035	-1.271	0.218	64.431	0.001	0.002	0.003
ScanPos036	-1.532	3.823	115.388	0.001	0.001	0.002
ScanPos037	1.043	2.601	137.159	0.001	0.001	0.002
ScanPos038	-1.044	3.222	-48.885	0.001	0.001	0.001
ScanPos039	0.144	-0.698	-49.511	0.003	0.004	0.004
ScanPos040	-0.402	2.265	51.467	0.002	0.002	0.002
ScanPos041	3.007	0.162	41.793	0.002	0.003	0.002
ScanPos042	1.333	-2.075	63.665	0.002	0.002	0.003
ScanPos043	-2.762	-1.141	61.460	0.002	0.002	0.001
ScanPos044	1.746	-0.099	95.480	0.003	0.003	0.003
ScanPos045	0.018	0.353	-159.131	0.002	0.001	0.002
ScanPos046	0.378	2.147	-110.717	0.002	0.002	0.002
ScanPos047	0.520	1.021	41.616	0.002	0.003	0.003
ScanPos048	-2.260	-0.806	112.664	0.002	0.002	0.001
ScanPos049	-1.124	1.596	95.144	0.002	0.002	0.002
ScanPos050	-1.054	1.142	-151.472	0.002	0.003	0.003
ScanPos051	-0.276	0.193	45.437	0.001	0.002	0.002
ScanPos052	-0.056	-1.266	-111.221	0.002	0.002	0.002
ScanPos053	-0.120	1.490	137.968	0.002	0.002	0.002
ScanPos054	0.196	-2.191	175.352	0.002	0.002	0.002
ScanPos055	-0.038	-1.754	86.631	0.002	0.002	0.002
ScanPos056	0.290	0.725	176.427	0.001	0.002	0.002
ScanPos057	0.397	2.797	29.670	0.003	0.004	0.004
ScanPos058	-0.729	0.125	-42.838	0.002	0.001	0.002
ScanPos059	1.194	-2.313	-5.793	0.002	0.002	0.002
ScanPos060	-0.118	-0.527	44.892	0.001	0.002	0.002
ScanPos061	-0.226	0.628	44.268	0.002	0.002	0.003
ScanPos062	0.602	0.906	105.202	0.001	0.001	0.002
ScanPos063	-0.470	1.648	-57.712	0.005	0.005	0.008
ScanPos064	-1.182	2.807	-175.060	0.002	0.002	0.002
ScanPos065	-0.209	0.323	81.767	0.003	0.002	0.003
ScanPos066	0.176	0.063	155.646	0.001	0.002	0.001
ScanPos067	-0.024	1.463	120.568	0.002	0.003	0.005
ScanPos068	0.498	0.595	-163.731	0.001	0.001	0.001
ScanPos069	-0.313	2.591	141.260	0.003	0.003	0.003
ScanPos070	-0.435	1.735	163.020	0.004	0.003	0.003
ScanPos071	-1.131	1.113	134.715	0.002	0.002	0.002

Name	Roll [deg]	Pitch [deg]	Yaw [deg]	Acc. Roll [deg]	Acc. Pitch [deg]	Acc. Yaw [deg]
ScanPos072	1.396	-0.632	67.781	0.003	0.004	0.003
ScanPos073	0.421	1.310	-141.614	0.003	0.003	0.003
ScanPos074	0.974	1.222	89.802	0.002	0.001	0.001
ScanPos075	-0.146	0.686	134.030	0.001	0.002	0.002
ScanPos076	1.307	0.494	-31.192	0.002	0.002	0.002
ScanPos077	1.533	2.757	-0.560	0.001	0.001	0.001
ScanPos078	-0.662	0.943	109.834	0.005	0.004	0.004
ScanPos079	1.423	2.560	-107.120	0.002	0.001	0.001
ScanPos080	1.751	0.333	132.684	0.003	0.004	0.003
ScanPos081	0.368	2.469	0.443	0.002	0.002	0.002
ScanPos082	-1.603	1.094	-116.017	0.002	0.002	0.002
ScanPos083	-1.579	-1.058	-99.929	0.001	0.001	0.002
ScanPos084	1.917	0.515	-123.016	0.003	0.003	0.004
ScanPos085	-0.547	0.246	173.899	0.003	0.003	0.002
ScanPos086	-0.735	1.620	-98.641	0.001	0.001	0.001
ScanPos087	0.354	-2.714	102.666	0.004	0.004	0.003
ScanPos088	0.933	0.438	-70.687	0.004	0.004	0.003
ScanPos089	0.388	1.371	-119.903	0.002	0.002	0.001
ScanPos090	0.262	0.962	101.507	0.001	0.001	0.002
ScanPos091	-0.350	1.813	-158.564	0.003	0.002	0.003
ScanPos092	1.307	1.620	-174.443	0.003	0.003	0.004
ScanPos093	-1.635	-0.027	-158.173	0.001	0.002	0.002
ScanPos094	-0.138	0.976	77.223	0.005	0.003	0.004
ScanPos095	0.521	0.911	95.412	0.004	0.003	0.003
ScanPos096	-0.652	1.464	143.259	0.005	0.004	0.003

4.3 Changes in Scan Positions

The following table reflects the change of scan positions with respect to position and orientation in comparison to positions and orientations wrt to prior to multi-station adjustment.

In the PRCS coordinate system:

Name	Changes wrt to prior to multi-station adjustment					
	X [m]	Y [m]	Z [m]	Roll [deg]	Pitch [deg]	Yaw [deg]
ScanPos001	-0.0000	0.0000	-0.0000	0.0000	0.0000	0.0000
ScanPos002	0.0005	-0.0001	-0.0001	-0.0002	0.0000	0.0009
ScanPos003	0.0000	-0.0003	-0.0004	0.0003	0.0015	0.0002
ScanPos003b	0.0002	-0.0002	-0.0004	0.0008	0.0004	0.0007
ScanPos004	-0.0000	-0.0005	-0.0006	-0.0038	0.0041	0.0007
ScanPos005	0.0000	-0.0005	-0.0009	0.0019	-0.0005	0.0014
ScanPos006	-0.0003	-0.0002	-0.0010	0.0011	-0.0004	-0.0067
ScanPos007	-0.0001	-0.0012	0.0001	0.0127	0.0055	-0.0138
ScanPos008	0.0002	-0.0005	-0.0006	0.0027	-0.0009	-0.0036

	Changes wrt to prior to multi-station adjustment					
Name	X [m]	Y [m]	Z [m]	Roll [deg]	Pitch [deg]	Yaw [deg]
ScanPos009	0.0002	-0.0004	-0.0009	0.0046	-0.0020	-0.0047
ScanPos010	-0.0001	-0.0003	-0.0007	-0.0007	-0.0054	-0.0043
ScanPos011	-0.0008	0.0000	-0.0005	0.0037	-0.0022	-0.0079
ScanPos012	-0.0003	0.0005	-0.0004	0.0002	-0.0019	-0.0025
ScanPos013	0.0003	0.0002	-0.0005	0.0027	-0.0016	-0.0098
ScanPos014	0.0006	0.0010	-0.0004	-0.0018	-0.0019	-0.0069
ScanPos015	0.0009	0.0013	0.0001	-0.0037	-0.0027	-0.0042
ScanPos016	0.0008	0.0018	-0.0005	0.0014	0.0009	-0.0087
ScanPos017	0.0119	0.0073	-0.0004	0.0022	-0.0033	-0.1206
ScanPos018	0.0001	-0.0008	-0.0008	-0.0086	0.0013	-0.0024
ScanPos019	0.0005	-0.0007	-0.0017	-0.0038	0.0031	-0.0074
ScanPos020	0.0004	-0.0011	-0.0019	0.0060	-0.0041	-0.0028
ScanPos021	0.0011	-0.0011	-0.0020	0.0030	0.0030	-0.0045
ScanPos022	0.0009	-0.0015	-0.0018	-0.0003	0.0061	-0.0040
ScanPos023	0.0048	-0.0055	-0.0018	0.0012	-0.0005	-0.0408
ScanPos024	0.0015	-0.0015	-0.0024	0.0032	-0.0021	-0.0035
ScanPos025	0.0010	-0.0018	-0.0027	0.0038	-0.0007	-0.0051
ScanPos026	0.0019	-0.0021	-0.0033	0.0018	0.0043	-0.0035
ScanPos027	0.0024	-0.0025	-0.0036	0.0008	0.0041	-0.0072
ScanPos028	0.0021	-0.0027	-0.0039	0.0032	0.0057	0.0047
ScanPos029	0.0020	-0.0025	-0.0036	0.0026	0.0011	0.0014
ScanPos030	0.0021	-0.0022	-0.0032	0.0006	0.0009	-0.0022
ScanPos031	0.0018	-0.0022	-0.0032	-0.0013	-0.0037	-0.0016
ScanPos032	0.0023	-0.0020	-0.0030	-0.0030	-0.0047	-0.0045
ScanPos033	0.0016	-0.0021	-0.0028	-0.0022	-0.0006	-0.0049
ScanPos034	0.0014	-0.0025	-0.0031	0.0004	-0.0009	-0.0021
ScanPos035	0.0015	-0.0029	-0.0030	-0.0022	0.0013	-0.0034
ScanPos036	0.0012	-0.0028	-0.0034	0.0029	0.0015	0.0006
ScanPos037	0.0015	-0.0030	-0.0039	0.0040	0.0005	-0.0055
ScanPos038	0.0010	-0.0020	-0.0033	-0.0013	-0.0001	-0.0047
ScanPos039	0.0010	-0.0013	-0.0034	-0.0029	-0.0104	-0.0065
ScanPos040	0.0008	-0.0019	-0.0034	-0.0002	0.0002	-0.0005
ScanPos041	0.0009	-0.0020	-0.0034	-0.0015	-0.0035	0.0057
ScanPos042	0.0003	-0.0025	-0.0032	0.0038	0.0018	-0.0045
ScanPos043	0.0006	-0.0022	-0.0030	-0.0049	-0.0007	-0.0062
ScanPos044	0.0005	-0.0024	-0.0033	0.0055	-0.0000	0.0001
ScanPos045	0.0011	-0.0027	-0.0033	0.0023	-0.0012	0.0005
ScanPos046	0.0010	-0.0028	-0.0027	0.0014	-0.0056	-0.0052
ScanPos047	0.0010	-0.0024	-0.0026	-0.0018	0.0048	-0.0004
ScanPos048	0.0009	-0.0023	-0.0024	-0.0002	0.0049	-0.0073

	Changes wrt to prior to multi-station adjustment					
Name	X [m]	Y [m]	Z [m]	Roll [deg]	Pitch [deg]	Yaw [deg]
ScanPos049	0.0011	-0.0020	-0.0024	-0.0019	0.0014	-0.0053
ScanPos050	0.0014	-0.0020	-0.0025	0.0023	0.0005	-0.0077
ScanPos051	0.0006	-0.0025	-0.0021	-0.0032	-0.0003	-0.0052
ScanPos052	-0.0002	-0.0027	-0.0019	0.0108	-0.0001	-0.0086
ScanPos053	0.0008	-0.0026	-0.0025	0.0007	0.0075	-0.0046
ScanPos054	0.0008	-0.0028	-0.0024	0.0017	0.0004	-0.0052
ScanPos055	0.0011	-0.0027	-0.0030	-0.0013	0.0024	-0.0037
ScanPos056	0.0012	-0.0025	-0.0031	0.0029	0.0030	-0.0041
ScanPos057	0.0009	-0.0023	-0.0030	0.0076	-0.0171	0.0005
ScanPos058	0.0011	-0.0030	-0.0034	0.0049	-0.0038	0.0121
ScanPos059	0.0016	-0.0027	-0.0027	-0.0046	-0.0014	0.0188
ScanPos060	0.0016	-0.0008	-0.0025	-0.0036	-0.0021	0.0124
ScanPos061	0.0029	-0.0005	-0.0026	-0.0062	-0.0033	0.0143
ScanPos062	0.0031	0.0017	-0.0019	-0.0045	0.0016	0.0175
ScanPos063	0.0031	0.0016	-0.0016	-0.0066	0.0022	0.0021
ScanPos064	0.0017	0.0025	-0.0014	-0.0036	-0.0026	0.0238
ScanPos065	0.0012	0.0033	-0.0017	0.0058	-0.0017	0.0269
ScanPos066	-0.0003	0.0041	-0.0016	-0.0007	-0.0039	0.0320
ScanPos067	0.0013	0.0048	-0.0018	-0.0000	0.0076	0.0237
ScanPos068	-0.0010	0.0063	-0.0022	0.0010	-0.0095	0.0345
ScanPos069	-0.0021	0.0042	-0.0019	0.0119	0.0033	0.0419
ScanPos070	-0.0033	0.0056	-0.0022	0.0085	0.0021	0.0298
ScanPos071	-0.0038	0.0075	-0.0020	0.0059	-0.0125	0.0301
ScanPos072	0.0016	-0.0017	-0.0026	-0.0087	0.0092	-0.0040
ScanPos073	0.0019	-0.0014	-0.0027	0.0042	-0.0009	-0.0055
ScanPos074	0.0018	-0.0015	-0.0028	-0.0030	0.0039	-0.0041
ScanPos075	0.0019	-0.0012	-0.0029	-0.0006	0.0011	-0.0051
ScanPos076	0.0016	-0.0012	-0.0030	-0.0028	0.0007	-0.0074
ScanPos077	0.0009	-0.0013	-0.0026	-0.0006	0.0033	-0.0048
ScanPos078	0.0005	-0.0015	-0.0029	0.0083	-0.0080	-0.0046
ScanPos079	0.0006	-0.0009	-0.0022	-0.0050	-0.0021	-0.0080
ScanPos080	0.0017	-0.0011	-0.0020	-0.0122	0.0103	-0.0157
ScanPos081	0.0005	-0.0007	-0.0024	0.0000	0.0038	-0.0064
ScanPos082	0.0000	-0.0006	-0.0025	-0.0103	-0.0058	-0.0120
ScanPos083	-0.0001	0.0002	-0.0019	-0.0035	-0.0007	-0.0120
ScanPos084	0.0002	0.0007	-0.0017	-0.0032	-0.0046	-0.0089
ScanPos085	0.0000	0.0012	-0.0010	-0.0019	-0.0131	-0.0060
ScanPos086	-0.0002	0.0004	-0.0017	-0.0073	0.0003	-0.0058
ScanPos087	-0.0002	0.0005	-0.0017	0.0084	-0.0010	0.0010
ScanPos088	0.0000	0.0002	-0.0018	-0.0093	-0.0083	0.0005

	Changes wrt to prior to multi-station adjustment					
Name	X [m]	Y [m]	Z [m]	Roll [deg]	Pitch [deg]	Yaw [deg]
ScanPos089	0.0002	0.0007	-0.0012	-0.0061	-0.0046	-0.0076
ScanPos090	0.0004	0.0014	-0.0003	0.0057	-0.0006	-0.0064
ScanPos091	0.0015	0.0006	-0.0006	-0.0014	-0.0020	-0.0090
ScanPos092	0.0013	0.0014	-0.0003	0.0017	-0.0055	-0.0066
ScanPos093	0.0018	0.0026	0.0003	-0.0008	-0.0068	-0.0091
ScanPos094	0.0019	0.0026	0.0005	0.0049	0.0053	-0.0037
ScanPos095	-0.0004	0.0004	-0.0016	0.0061	-0.0011	-0.0061
ScanPos096	-0.0007	-0.0000	-0.0022	0.0022	-0.0074	-0.0105

4.4 Residuals

For an assessment of the quality of the multi-station adjustment the following residual deviations (in short residuals) can be observed.

4.4.1 GNSS Measurements

Note: The listed deviations include the estimated shifts of the base station error. For the calculation these shifts are considered.

	Deviations in PRCS			a priori Accuracies	
Name	Res. X [m]	Res. Y [m]	Res. Z [m]	Horiz. [m]	Vert. [m]
ScanPos001	-1.2473	1.4443	0.7957	1.912	1.949
ScanPos002	0.0850	-1.2362	1.1081	1.752	1.799
ScanPos003	2.4140	1.4484	3.8155	2.779	2.830
ScanPos003b	0.7381	1.0426	-2.9393	2.416	2.116
ScanPos004	1.7010	4.4774	0.9570	13.104	5.472
ScanPos005	3.9529	-3.5988	-0.9996	14.666	5.222
ScanPos006	3.6068	-1.1306	-5.6213	14.903	5.328
ScanPos007	2.5859	-3.5231	2.1585	12.711	7.200
ScanPos008	3.9873	-1.7230	2.9804	7.434	6.741
ScanPos009	8.1618	2.3118	1.1132	12.216	4.400
ScanPos010	18.6689	8.5370	-4.5482	18.078	4.995
ScanPos011	5.0815	5.9326	-10.1012	19.520	5.341
ScanPos012	4.5388	-2.5118	-8.8195	9.994	5.284
ScanPos013	5.8626	-4.1386	-5.7719	11.561	5.586
ScanPos014	3.1919	-1.3062	-1.5793	9.399	8.200
ScanPos015	2.3101	1.2469	1.3728	10.238	8.559
ScanPos016	3.2139	2.6834	-2.3043	10.659	5.122
ScanPos017	22.3450	5.1595	0.1502	10.729	4.889
ScanPos018	2.5956	-3.3657	4.1851	10.511	6.804
ScanPos019	5.1018	-6.4259	3.2575	14.542	6.067
ScanPos020	8.6310	1.6669	3.2068	12.456	4.994

Name	Deviations in PRCS			a priori Accuracies	
	Res. X [m]	Res. Y [m]	Res. Z [m]	Horiz. [m]	Vert. [m]
ScanPos021	10.9826	-8.9229	0.8806	12.165	5.637
ScanPos022	6.2317	-0.0675	0.9968	17.100	4.865
ScanPos023	7.6870	-9.3805	-0.2211	18.307	5.196
ScanPos024	6.3210	-5.5715	-6.8357	10.477	6.898
ScanPos025	9.5964	-0.7920	-3.9265	21.088	7.974
ScanPos026	15.7340	1.4022	-4.9450	18.261	6.087
ScanPos027	5.7418	-8.9261	1.8977	10.424	5.749
ScanPos028	13.6386	-10.6377	-0.3577	12.372	7.187
ScanPos029	15.6778	-5.7730	-3.3534	3.776	3.883
ScanPos030	12.8033	-4.7853	4.3585	4.510	4.222
ScanPos031	10.2470	-9.5252	-0.5149	3.526	4.225
ScanPos032	12.3981	-3.8538	0.9806	4.231	3.551
ScanPos033	5.8499	-8.7296	-2.2771	3.542	3.970
ScanPos034	11.0879	2.1539	-10.1671	16.162	9.631
ScanPos035	7.0881	-9.5246	-2.4835	13.606	4.988
ScanPos036	4.9218	-16.7539	-16.4529	9.456	5.019
ScanPos037	9.5338	-2.4442	-17.8328	10.343	6.012
ScanPos038	11.5137	4.2415	-12.4824	11.003	4.340
ScanPos039	4.1472	-8.2691	-16.6478	10.366	4.925
ScanPos040	-1.2730	-14.4929	-25.0242	9.987	5.413
ScanPos041	0.0294	-16.5686	-12.6879	10.254	5.693
ScanPos042	4.4304	-12.6580	-12.0780	6.954	6.673
ScanPos043	13.1313	-8.9845	6.5315	10.538	6.523
ScanPos044	10.0441	2.4310	96.7797	26.708	26.932
ScanPos045	4.9625	-23.3687	-0.4198	14.257	15.150
ScanPos046	13.9345	-43.7714	96.2887	73.892	19.101
ScanPos047	6.4882	-9.4618	2.4014	14.652	13.032
ScanPos048	11.2460	-4.1092	1.0270	19.160	7.870
ScanPos049	2.6919	-0.8387	-3.9878	12.227	4.976
ScanPos050	3.0435	-4.3433	-0.8645	11.448	7.783
ScanPos051	4.5671	-9.2514	3.1792	17.247	10.823
ScanPos052	5.6287	-8.2350	-6.9103	10.415	5.315
ScanPos053	6.7224	-10.1756	14.4276	26.536	15.863
ScanPos054	4.7184	-19.0746	26.4643	21.794	10.815
ScanPos055	9.6193	-19.3147	26.3635	24.240	11.320
ScanPos056	0.6877	0.8291	2.2258	18.274	11.019
ScanPos057	-12.2571	-25.8692	79.8048	28.252	15.900
ScanPos058	9.7580	-11.5755	9.5362	15.724	5.631
ScanPos059	2.7570	-5.5707	-1.6646	15.528	8.264
ScanPos060	3.2381	-8.2315	0.6135	9.533	5.055

Name	Deviations in PRCS			a priori Accuracies	
	Res. X [m]	Res. Y [m]	Res. Z [m]	Horiz. [m]	Vert. [m]
ScanPos061	5.5193	-8.6145	1.9279	9.911	6.132
ScanPos063	28.2265	-16.4092	27.7355	19.449	8.104
ScanPos064	17.1505	-14.4013	5.3466	20.557	13.722
ScanPos065	35.7437	-13.5192	38.0207	24.149	14.051
ScanPos066	11.3187	-20.0117	-7.2524	9.518	5.423
ScanPos067	7.5048	-11.5885	6.8373	6.675	4.485
ScanPos068	4.8901	-11.2146	5.0991	14.207	4.295
ScanPos069	12.7175	-10.9005	6.0367	18.437	10.053
ScanPos070	18.1624	-9.2549	19.4182	19.267	14.163
ScanPos071	11.2884	-16.2323	-4.5303	12.685	8.044
ScanPos072	40.6381	-1.6826	67.7584	16.611	11.690
ScanPos073	15.8080	-8.5327	21.6850	14.657	12.026
ScanPos074	7.8768	-2.1692	5.0520	7.426	5.893
ScanPos075	6.6128	-5.1681	-0.0083	6.102	2.928
ScanPos076	6.4886	-0.9211	0.4264	10.057	5.465
ScanPos077	6.9214	0.1964	0.8489	6.842	3.108
ScanPos078	5.4332	-0.4931	-0.3690	5.572	4.876
ScanPos079	4.4475	0.7335	0.8699	5.673	3.716
ScanPos080	6.5357	0.8875	-4.3842	3.389	2.902
ScanPos081	3.3953	-3.8133	1.6750	3.311	4.183
ScanPos082	4.6508	-3.9897	-1.4702	6.207	3.906
ScanPos083	3.3036	-3.7266	-5.1514	10.518	2.965
ScanPos084	7.5801	-0.5804	-5.7236	10.557	5.763
ScanPos085	1.9715	-0.4514	-5.5401	7.052	3.835
ScanPos086	4.8432	-3.0689	-0.2957	9.422	3.711
ScanPos087	2.3921	-1.3541	-0.6284	7.103	3.339
ScanPos088	1.8030	-1.2322	-0.5925	10.109	3.934
ScanPos089	4.6798	2.0258	2.1518	11.159	6.198
ScanPos090	3.1785	2.2107	0.9397	5.443	3.847
ScanPos091	0.5909	1.1053	-3.0137	4.262	5.225
ScanPos092	3.1892	3.0035	3.2142	4.047	4.836
ScanPos093	3.8794	3.9313	6.3858	4.395	5.122
ScanPos094	4.6432	5.7228	-2.9858	4.050	4.347
ScanPos095	2.5544	-1.0446	0.6175	3.705	5.595
ScanPos096	3.4745	-1.1078	-1.1060	4.269	5.346

* ... Observation classified as outlier that has not been used for adjustment

Statistics	mean	median	std. dev.	std(mad)	min	max	count
Res. X [m]	7.3157	5.4762	7.0978	4.0066	-12.2571	40.6381	96
Res. Y [m]	-5.2445	-3.6627	7.9457	7.4254	-43.7714	8.5370	96

Statistics	mean	median	std. dev.	std(mad)	min	max	count
Res. Z [m]	3.8962	0.5199	19.3679	5.1631	-25.0242	96.7797	96
Res. X [1]	0.725	0.554	0.711	0.440	-0.652	4.152	96
Res. Y [1]	-0.423	-0.340	0.702	0.653	-2.702	1.413	96
Res. Z [1]	0.065	0.094	1.609	0.874	-4.623	5.796	96
Res. X with outlier [m]	7.3157	5.4762	7.0978	4.0066	-12.2571	40.6381	96
Res. Y with outlier [m]	-5.2445	-3.6627	7.9457	7.4254	-43.7714	8.5370	96
Res. Z with outlier [m]	3.8962	0.5199	19.3679	5.1631	-25.0242	96.7797	96
Res. X with outlier [1]	0.725	0.554	0.711	0.440	-0.652	4.152	96
Res. Y with outlier [1]	-0.423	-0.340	0.702	0.653	-2.702	1.413	96
Res. Z with outlier [1]	0.065	0.094	1.609	0.874	-4.623	5.796	96

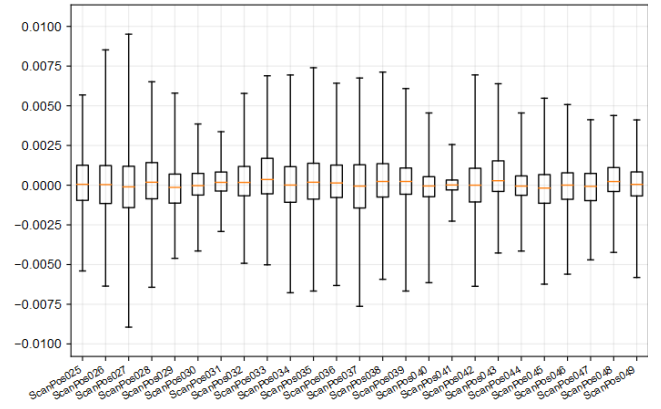
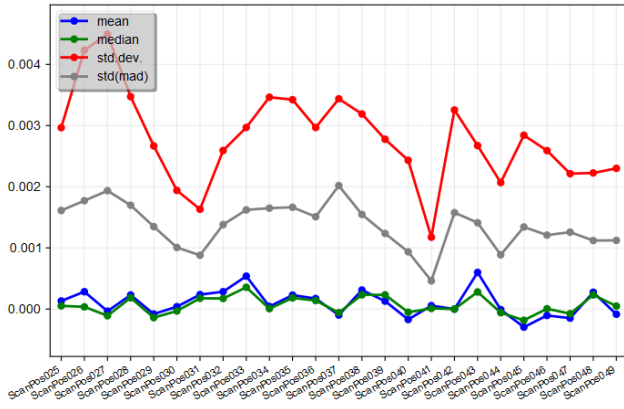
4.4.2 Plane Patches

The subsequent figures show the residuals in distance and angle of all plane patches per scan position, expressed as mean, median, standard deviation and median absolute deviation (std(mad)). Additionally, the figures depict the number of plane patches available for every scan position.

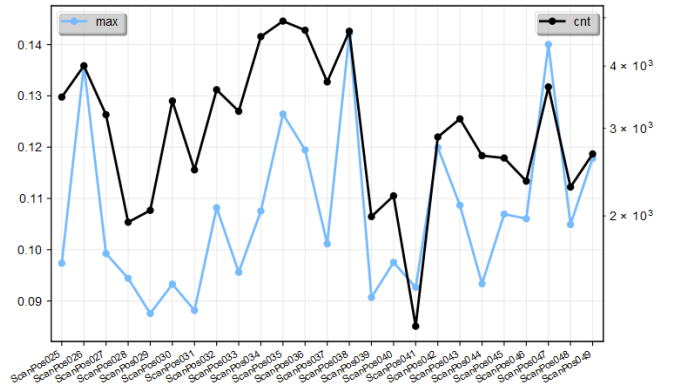
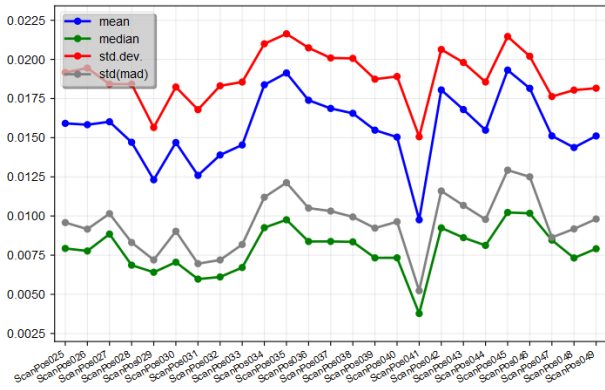
For the residuals in distance of the plane patches the boxplot shows the median as orange line. The box is defined by the quantil 25% and 75%. This translates to 50 percent of the total amount of points lie in the range shown by the box. The whiskers are at the quantil 2.5% and 97.5%, containing 95% of all points.



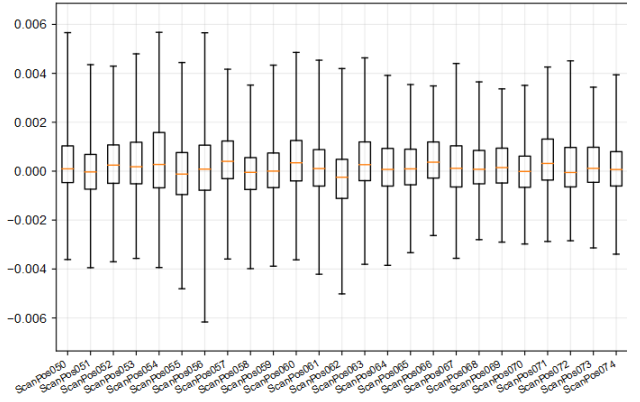
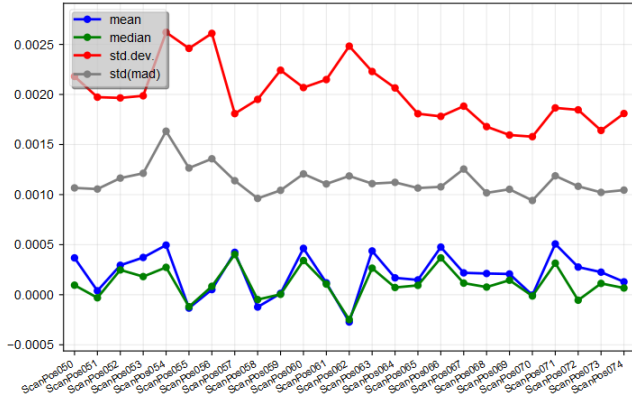
residuals in distance [m]



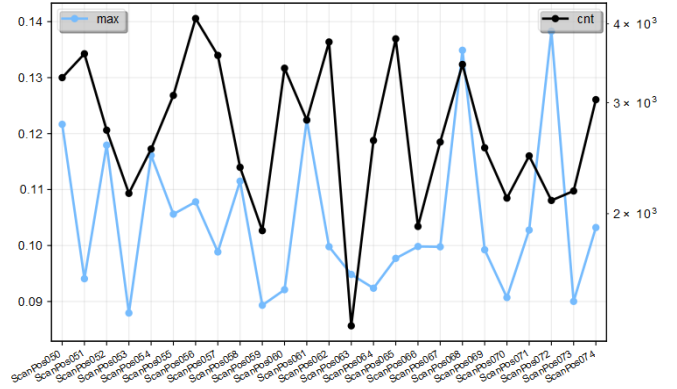
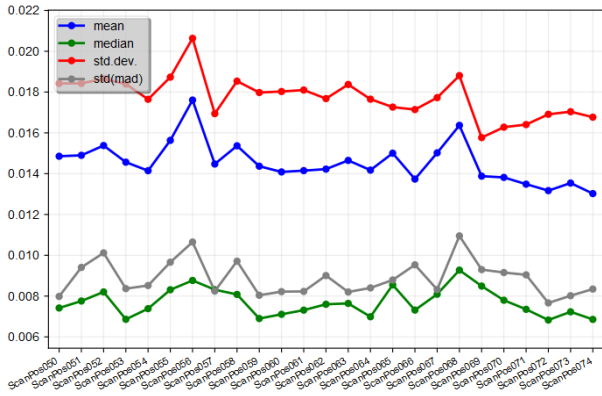
residuals in angle [deg]



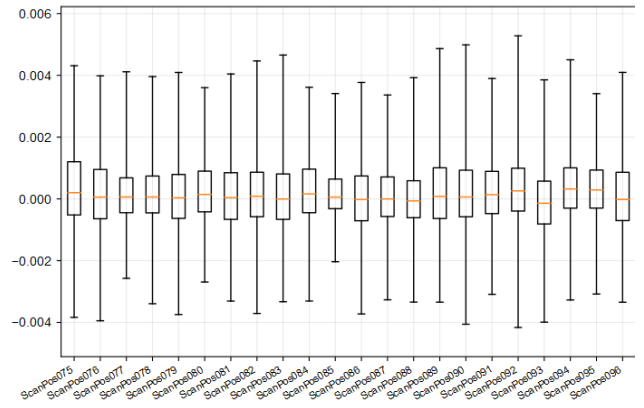
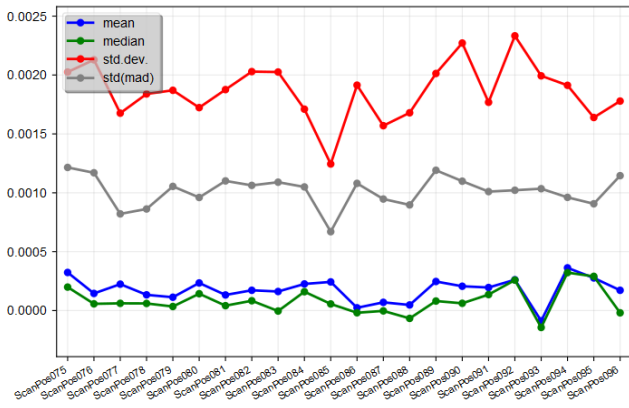
residuals in distance [m]



residuals in angle [deg]



residuals in distance [m]



residuals in angle [deg]

