



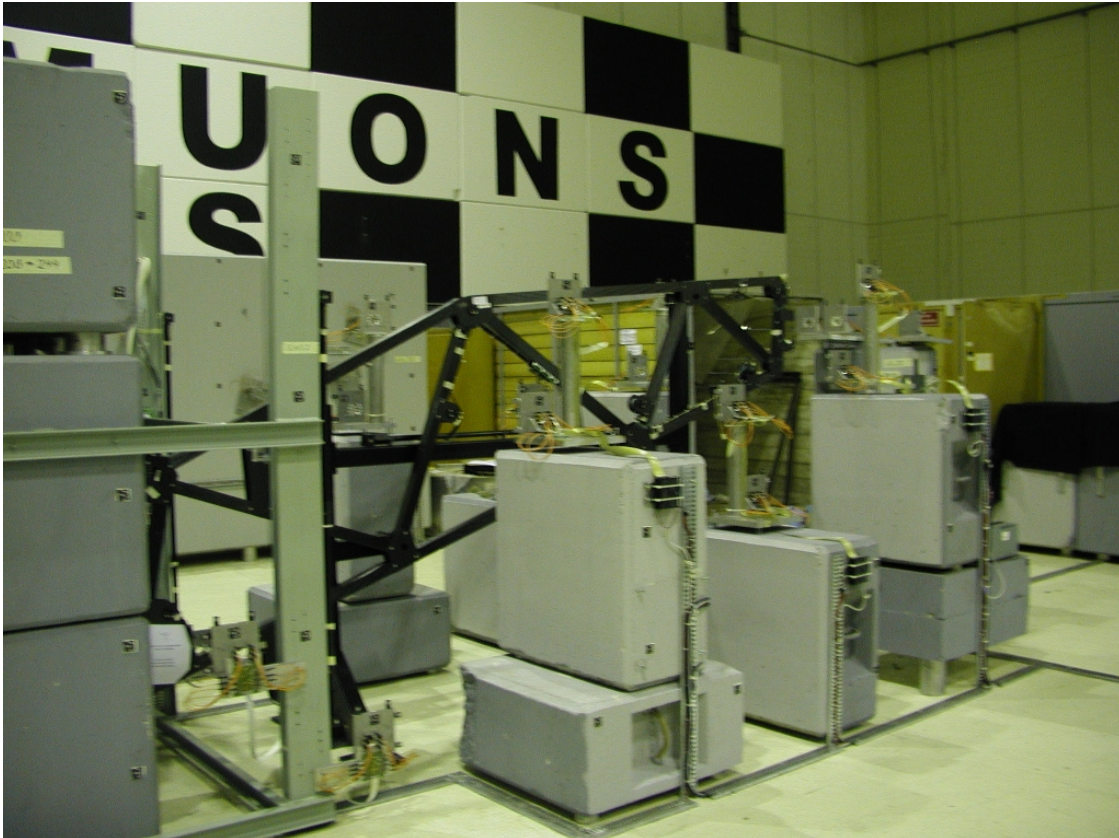
GENEVE SUISSE

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To :
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S. RAFTOPOULOS
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A. HERVE

Monday 15th October, 2007

**CMS - ISR: MAB Calibration Bench
PPPL DEMO PHOTO
EDMS: 874663**



Introduction:

This report presents the measurement of the MAB calibration bench, performed on October 9th, 2007 in the I4 Hall.

Configuration:

About 40 to 50 pictures were taken to measure all points on the camera plates in a well distributed configuration.

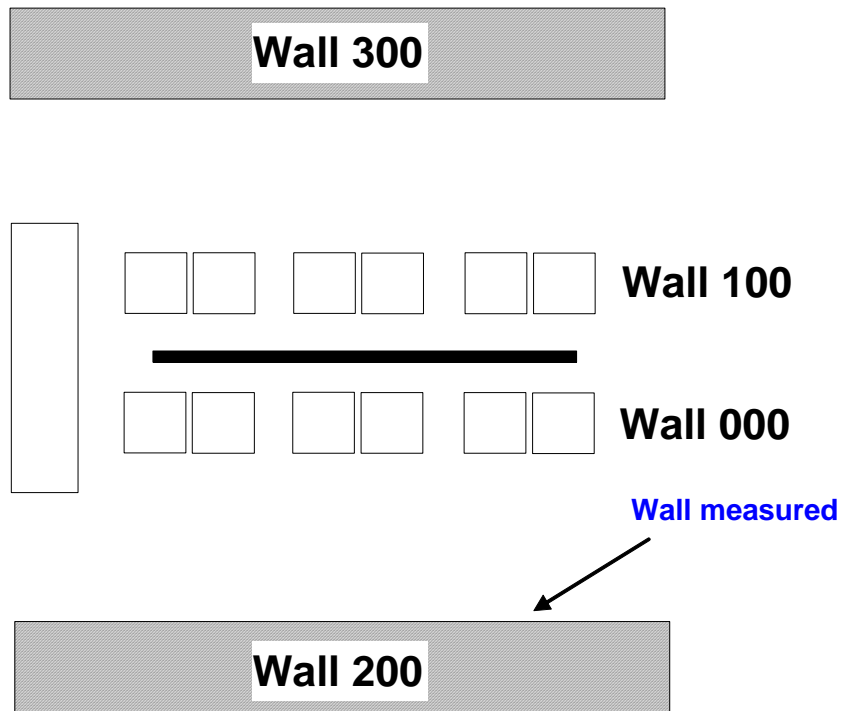


Figure 1: Configuration of LTD measurements in the MAB calibration bench area

Measurements:

All survey reference holes on the fixed plates on wall 200 have been measured. In each reference hole, a PG button target was inserted. The offset of the measured point to the reference surface is 15mm.

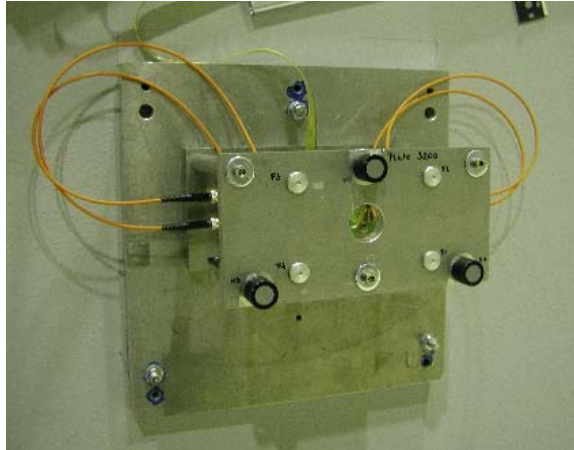


Figure 2: Photogrammetric survey targets on wall 000 / 100 (left) and wall 200 / 300 (right)

3.2 Point names:

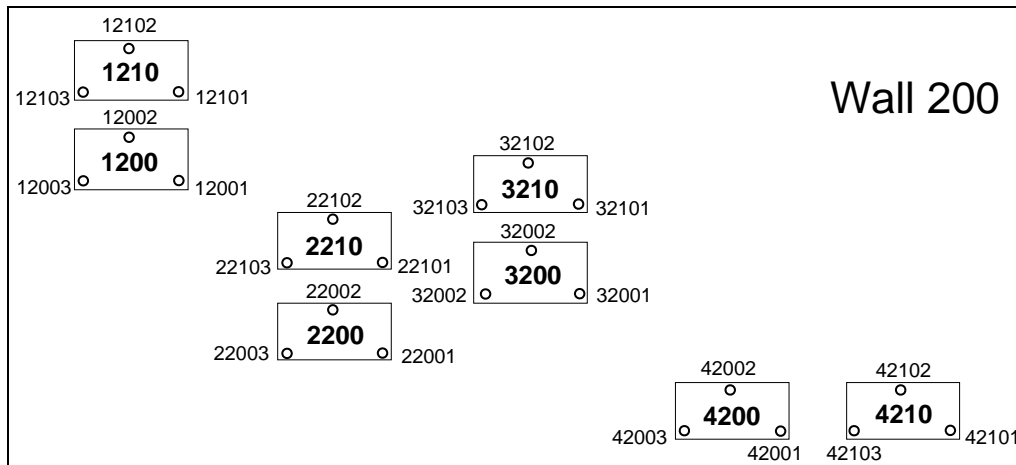


Figure 3: Point names for Wall 200 (outside view from wall 300)

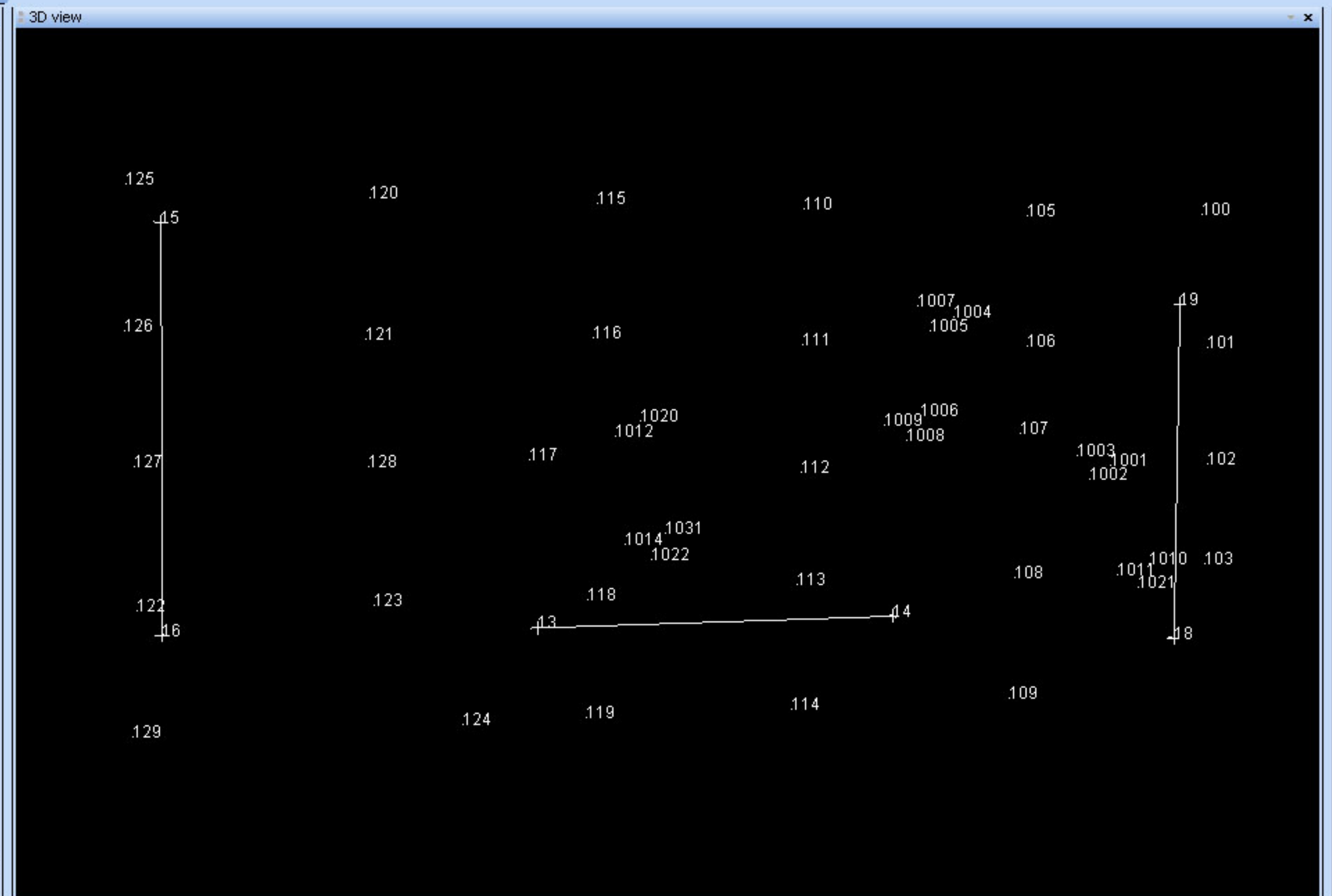
	Name	X (mm)	Y (mm)	Z (mm)	RMS X (mm)	RMS Y (mm)	RMS Z (mm)	DXYZ (mm)	DX (mm)	DY (mm)	DZ (mm)	Rays
CODED TARGETS	100	2655.72	-3779.51	-894.91	0.03	0.03	0.02	0.12	0.02	0.11	0.02	15
	101	2696.76	-3778.07	-329.71	0.02	0.03	0.02	0.11	0.05	0.06	0.08	21
	102	2711.91	-3777.15	167.15	0.02	0.03	0.02	0.15	0.00	0.11	0.11	19
	103	2706.34	-3776.53	592.51	0.02	0.04	0.02	0.09	-0.01	-0.01	0.09	15
	105	1836.01	-3773.78	-843.31	0.02	0.02	0.02	0.08	-0.05	0.07	-0.02	25
	106	1847.70	-3772.09	-309.18	0.01	0.02	0.01	0.07	-0.01	0.03	0.06	34
	107	1824.26	-3771.01	44.97	0.01	0.02	0.01	0.05	-0.02	-0.04	0.02	35
	108	1813.12	-3769.95	640.84	0.01	0.02	0.01	0.04	-0.01	0.03	0.00	31
	109	1794.52	-3769.44	1135.21	0.02	0.03	0.02	0.06	-0.04	0.00	-0.05	15
	110	878.44	-3762.67	-811.32	0.02	0.02	0.02	0.07	-0.06	0.00	-0.03	31
	111	878.76	-3763.90	-285.34	0.01	0.02	0.01	0.05	-0.03	-0.04	0.00	43
	112	880.68	-3765.37	213.96	0.01	0.02	0.01	0.05	-0.02	-0.04	-0.02	43
	113	873.95	-3766.42	651.57	0.01	0.02	0.01	0.07	0.03	-0.04	-0.05	38
	114	858.67	-3768.17	1144.71	0.01	0.02	0.01	0.12	0.00	-0.05	-0.10	25
	115	67.45	-3756.92	-783.61	0.02	0.02	0.02	0.04	-0.04	0.00	0.00	23
	116	58.78	-3758.28	-283.53	0.01	0.02	0.01	0.06	0.00	-0.05	-0.01	34
	117	-176.45	-3757.71	172.20	0.01	0.02	0.01	0.05	0.02	-0.04	-0.04	39
	118	48.40	-3760.78	695.08	0.01	0.02	0.01	0.05	0.03	-0.02	-0.04	34
	119	48.48	-3761.87	1142.82	0.02	0.02	0.01	0.10	0.06	-0.01	-0.08	25
	120	-746.30	-3755.79	-754.29	0.02	0.02	0.02	0.12	-0.11	-0.04	0.00	21
	121	-758.34	-3756.38	-252.95	0.02	0.02	0.01	0.05	-0.04	0.00	0.02	36
	122	-1508.81	-3751.74	704.34	0.02	0.03	0.01	0.06	-0.01	0.05	0.03	23
	123	-725.72	-3758.32	701.19	0.02	0.02	0.01	0.09	0.06	0.07	-0.03	36
	124	-404.27	-3761.65	1146.18	0.02	0.02	0.01	0.11	0.10	0.03	-0.04	26
	125	-1548.83	-3748.68	-751.35	0.03	0.04	0.02	0.17	-0.15	-0.08	0.04	12
	126	-1548.47	-3749.15	-252.95	0.03	0.03	0.02	0.14	-0.13	0.00	0.04	22
	127	-1517.93	-3750.15	207.05	0.02	0.02	0.01	0.10	-0.04	0.09	0.03	27
	128	-748.04	-3757.82	200.31	0.02	0.02	0.01	0.07	0.02	0.07	0.00	41
	129	-1522.87	-3752.77	1140.81	0.03	0.03	0.02	0.09	0.07	0.06	-0.02	19
BUTTON TARGETS	12001	1971.05	-3592.15	133.26	0.01	0.02	0.01	0.02	0.02	-0.01	0.01	32
	12002	2026.33	-3592.57	227.74	0.01	0.02	0.01	0.04	0.04	0.01	0.02	31
	12003	2121.15	-3593.20	172.03	0.02	0.02	0.01	0.07	0.02	0.00	0.07	28
	12101	2157.16	-3593.04	608.39	0.02	0.02	0.01	0.05	-0.02	-0.05	0.01	20
	12102	2253.34	-3593.38	661.89	0.02	0.02	0.01	0.05	-0.01	-0.04	0.03	19
	12103	2306.54	-3594.15	565.80	0.02	0.02	0.01	0.06	-0.02	0.00	0.06	21
	22001	1275.63	-3586.35	-432.15	0.01	0.02	0.01	0.04	-0.02	-0.02	-0.02	36
	22002	1330.91	-3587.28	-337.48	0.01	0.02	0.01	0.02	-0.01	-0.01	-0.01	36
	22003	1425.72	-3587.41	-393.47	0.01	0.02	0.01	0.03	-0.01	-0.02	-0.02	35
	22101	1148.55	-3587.14	26.72	0.01	0.02	0.01	0.05	0.02	-0.04	-0.03	37
	22102	1243.86	-3587.80	81.41	0.01	0.02	0.01	0.05	0.01	-0.04	-0.02	37
	22103	1298.17	-3587.84	-14.10	0.01	0.02	0.01	0.03	0.01	-0.02	-0.02	34
	32002	116.13	-3579.93	83.32	0.01	0.02	0.01	0.04	0.04	-0.01	-0.02	34
	32003	210.21	-3580.72	26.59	0.01	0.02	0.01	0.04	0.04	-0.01	-0.01	34
	32101	158.49	-3581.52	472.73	0.01	0.02	0.01	0.08	0.08	-0.02	-0.01	33
	32102	254.06	-3582.33	526.27	0.01	0.02	0.01	0.08	0.06	-0.03	-0.04	34
	32103	307.55	-3582.42	429.95	0.01	0.02	0.01	0.07	0.06	-0.02	-0.02	35

Results of the last measurement 4, comparison with the previous measurement 3.



Project overview

- MEAS2
- MEAS1
- MEAS3
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 - MatchingWall200
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- Matched Data
 - MEAS1 #1 -> MatchingWall200
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 - MEAS3 #1 -> MatchingWall200
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- Transformed Points
 - Transformation MEAS1 #1 -> MatchingW
- Deformation analysis
 - Deformation MEAS1 #1 -> MatchingW.all.
 - Deformation MEAS1 #1 -> MatchingWall2
 - Deformation MEAS1 #1 -> MatchingWall2
 - Deformation MEAS2 -> MatchingWall2...
 - Deformation MEAS2 -> MatchingWall200.
 - Deformation MEAS2 -> MatchingWall200.
 - Deformation MEAS3 #1 -> MatchingW.all.
 - Deformation MEAS4 -> MatchingWall2...

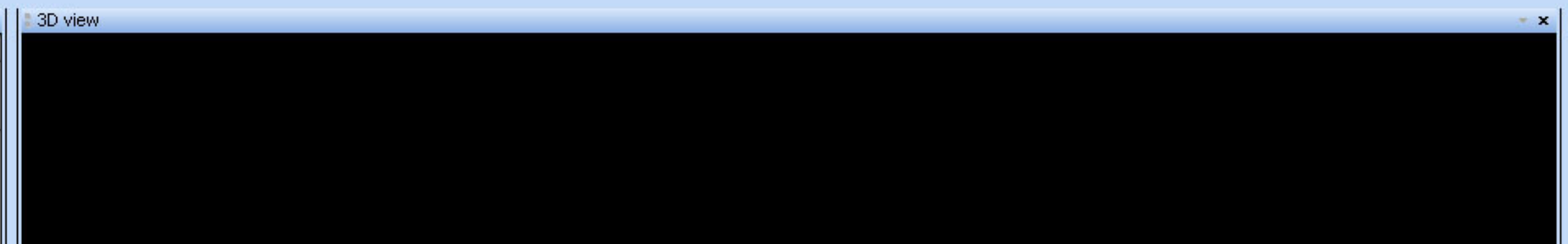


	Pnt. no.	Pnt. name	X [mm]	Y [mm]	Z [mm]	Sx [mm]	Sy [mm]	Sz [mm]	Rays	Active	Visible
1	95		-5057.6176	-5369.1301	-340.7483	1.7547	0.9114	0.4492	5	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	96		-4942.1740	-5290.0717	-703.9537	1.4584	0.7432	0.4391	6	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	2005		-2695.9283	-5548.2971	-58.6333	0.2537	0.5990	0.2328	6	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	2003		-3167.1447	-5416.7577	-570.6335	0.2349	0.4056	0.1924	5	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5	2043		3855.5227	-5718.2558	386.7665	0.1483	0.4582	0.1148	5	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	2023		3571.0559	-5574.3829	-708.2624	0.1161	0.4261	0.2165	7	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7	2002		-2974.5991	-5543.8449	-601.5210	0.2041	0.3754	0.1807	7	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8	2020		3748.1196	-5720.5176	-110.5354	0.1288	0.4153	0.1435	7	<input type="checkbox"/>	<input checked="" type="checkbox"/>
9	2024		3673.0697	-5570.9721	-357.2151	0.1199	0.4021	0.1688	7	<input type="checkbox"/>	<input checked="" type="checkbox"/>
10	2051		3811.1635	-5569.5193	-112.6675	0.1361	0.4028	0.1459	6	<input type="checkbox"/>	<input checked="" type="checkbox"/>



Project overview

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 - Deformation MEAS2 -> MatchingWall200 #1
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 - Deformation MEAS4 -> MatchingWall200

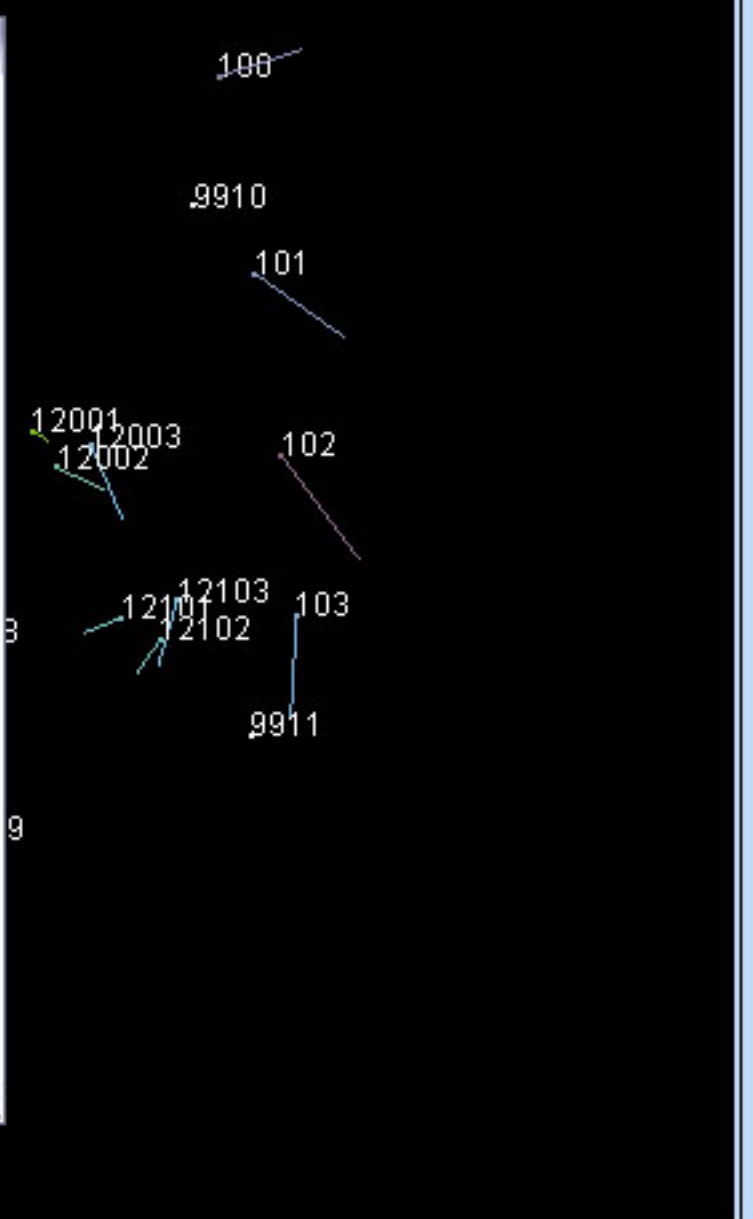


Results...

No.	Image
1	
2	
3	
4	
5	
6	

Information | **3D** | Measurement | Pre-orientation | Adjustment

OK



	Pnt. no.	Pnt. Name	X [mm]	Y [mm]	Z [mm]	Sx [mm]	Sy [mm]	Sz [mm]	Rxyz [mm]	Rx [mm]	Ry [mm]	Rz [mm]	Rays	Active	Visible
39	12103		2306.5426	-3594.1481	565.7971	0.0179	0.0213	0.0118	0.0617	-0.0216	-0.0043	0.0577	21	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
40	22001		1275.6273	-3586.3507	-432.1531	0.0122	0.0160	0.0114	0.0365	-0.0248	-0.0203	-0.0175	36	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
41	22002		1330.9050	-3587.2808	-337.4776	0.0118	0.0157	0.0106	0.0163	-0.0055	-0.0087	-0.0127	36	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
42	22003		1425.7190	-3587.4070	-393.4689	0.0125	0.0157	0.0110	0.0261	-0.0081	-0.0198	-0.0150	35	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
43	22101		1148.5511	-3587.1399	26.7186	0.0102	0.0162	0.0094	0.0499	0.0225	-0.0356	-0.0267	37	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
44	22102		1243.8636	-3587.8003	81.4078	0.0101	0.0160	0.0091	0.0476	0.0145	-0.0406	-0.0203	37	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
45	22103		1298.1655	-3587.8446	-14.1046	0.0109	0.0163	0.0095	0.0342	0.0128	-0.0248	-0.0198	34	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
46	32002		116.1292	-3579.9290	83.3156	0.0115	0.0178	0.0104	0.0410	0.0364	-0.0110	-0.0152	34	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
47	32003		210.2147	-3580.7150	26.5913	0.0114	0.0180	0.0107	0.0444	0.0414	-0.0123	-0.0104	34	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
48	32101		158.4945	-3581.5202	472.7339	0.0113	0.0175	0.0099	0.0772	0.0751	-0.0159	-0.0084	33	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Coordinates

0.0163 0.0242 0.0336 0.0414 0.0508 0.0586 0.0680 0.0774 0.0853 0.0947 0.1025 0.1119 0.1197 0.1291 0.1370 0.1464 0.1542 0.1636 0.1730



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 - Deformation MEAS2 -> MatchingWall200 #1
 - Deformation MEAS3 #1 -> MatchingWall200
 - Deformation MEAS4 -> MatchingWall200

3D view

Results...

Statistics of the adjustment								
Sigma 0:							0.00035	
Median: [mm]	0.0154	0.0186	0.0111					
RMS: [mm]	0.0178	0.0221	0.0127					
Results of the adjustment								
No.	X [mm]	Y [mm]	Z [mm]	Sx [mm]	Sy [mm]	Sz [mm]	Rays	Active
95	-5057.6176	-5369.1301	-340.7483	1.7547	0.9114	0.4492	5	<input type="checkbox"/>
96	-4942.1740	-5290.0717	-703.9537	1.4584	0.7432	0.4391	6	<input type="checkbox"/>
2005	-2695.9283	-5548.2971	-58.6333	0.2537	0.5990	0.2328	6	<input type="checkbox"/>
2003	-3167.1447	-5416.7577	-570.6335	0.2349	0.4056	0.1924	5	<input type="checkbox"/>
2043	3855.5227	-5718.2558	386.7665	0.1483	0.4582	0.1148	5	<input type="checkbox"/>
2023	3571.0559	-5574.3829	-708.2624	0.1161	0.4261	0.2165	7	<input type="checkbox"/>
2002	-2974.5991	-5543.8449	-601.5210	0.2041	0.3754	0.1807	7	<input type="checkbox"/>
2020	3748.1196	-5720.5176	-110.5354	0.1288	0.4153	0.1435	7	<input type="checkbox"/>
2024	3673.0697	-5570.9721	-357.2151	0.1199	0.4021	0.1688	7	<input type="checkbox"/>
2051	3811.1635	-5569.5193	-112.6675	0.1361	0.4028	0.1459	6	<input type="checkbox"/>
2029	3557.9177	-5423.1156	-282.9642	0.1101	0.3919	0.1658	6	<input type="checkbox"/>
2000	-2787.9471	-5981.5766	-516.3376	0.1604	0.2861	0.1066	10	<input type="checkbox"/>
2001	-2723.3933	-5720.4598	-46.6786	0.1525	0.2909	0.0927	9	<input type="checkbox"/>
2036	4231.1176	-6107.5438	-0.1721	0.1529	0.2886	0.0802	5	<input type="checkbox"/>

Information | 3D | Measurement | Pre-orientation | **Adjustment**

OK

	Pnt. no.	Pnt. Name	X [mm]	Y [mm]	Z [mm]	Sx [mm]	Sy [mm]	Sz [mm]	Rxyz [mm]	Rx [mm]	Ry [mm]	Rz [mm]	Rays	Active	Visible
39	12103		2306.5426	-3594.1481	565.7971	0.0179	0.0213	0.0118	0.0617	-0.0216	-0.0043	0.0577	21	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
40	22001		1275.6273	-3586.3507	-432.1531	0.0122	0.0160	0.0114	0.0365	-0.0248	-0.0203	-0.0175	36	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
41	22002		1330.9050	-3587.2808	-337.4776	0.0118	0.0157	0.0106	0.0163	-0.0055	-0.0087	-0.0127	36	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
42	22003		1425.7190	-3587.4070	-393.4689	0.0125	0.0157	0.0110	0.0261	-0.0081	-0.0198	-0.0150	35	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
43	22101		1148.5511	-3587.1399	26.7186	0.0102	0.0162	0.0094	0.0499	0.0225	-0.0356	-0.0267	37	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
44	22102		1243.8636	-3587.8003	81.4078	0.0101	0.0160	0.0091	0.0476	0.0145	-0.0406	-0.0203	37	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
45	22103		1298.1655	-3587.8446	-14.1046	0.0109	0.0163	0.0095	0.0342	0.0128	-0.0248	-0.0198	34	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
46	32002		116.1292	-3579.9290	83.3156	0.0115	0.0178	0.0104	0.0410	0.0364	-0.0110	-0.0152	34	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
47	32003		210.2147	-3580.7150	26.5913	0.0114	0.0180	0.0107	0.0444	0.0414	-0.0123	-0.0104	34	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
48	32101		158.4945	-3581.5202	472.7339	0.0113	0.0175	0.0099	0.0772	0.0751	-0.0159	-0.0084	33	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

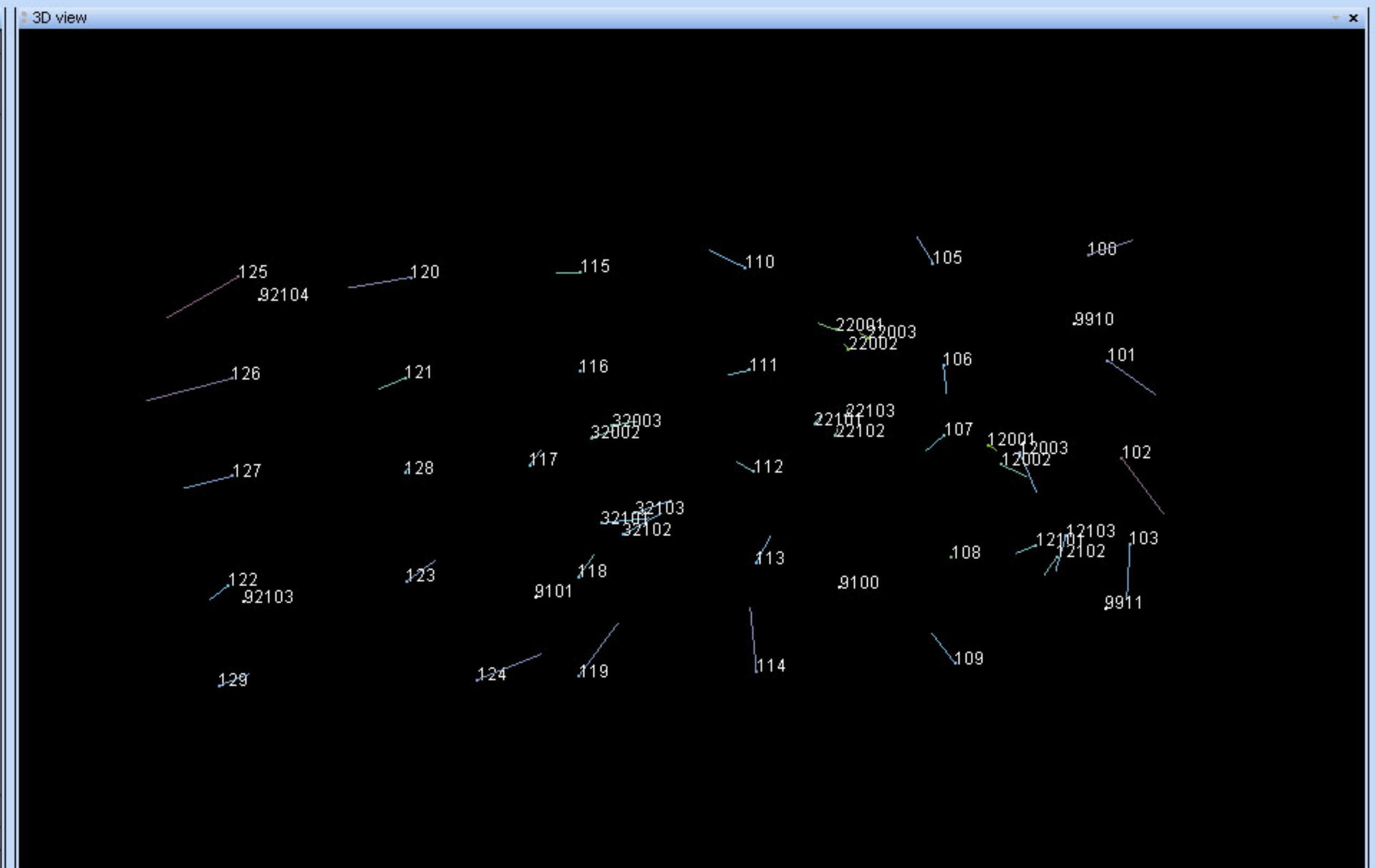
Coordinates

0.0163 0.0242 0.0336 0.0414 0.0508 0.0586 0.0680 0.0774 0.0853 0.0947 0.1025 0.1119 0.1197 0.1291 0.1370 0.1464 0.1542 0.1636 0.1730



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- Deformation analysis
 - Deformation MEAS1 #1 -> MatchingWall200
 - Deformation MEAS1 #1 -> MatchingWall200 ...
 - Deformation MEAS1 #1 -> MatchingWall200 ...
 - Deformation MEAS2 -> MatchingWall200
 - Deformation MEAS2 -> MatchingWall200 #1
 - Deformation MEAS2 -> MatchingWall200 #2
 - Deformation MEAS3 #1 -> MatchingWall200
 - Deformation MEAS4 -> MatchingWall200

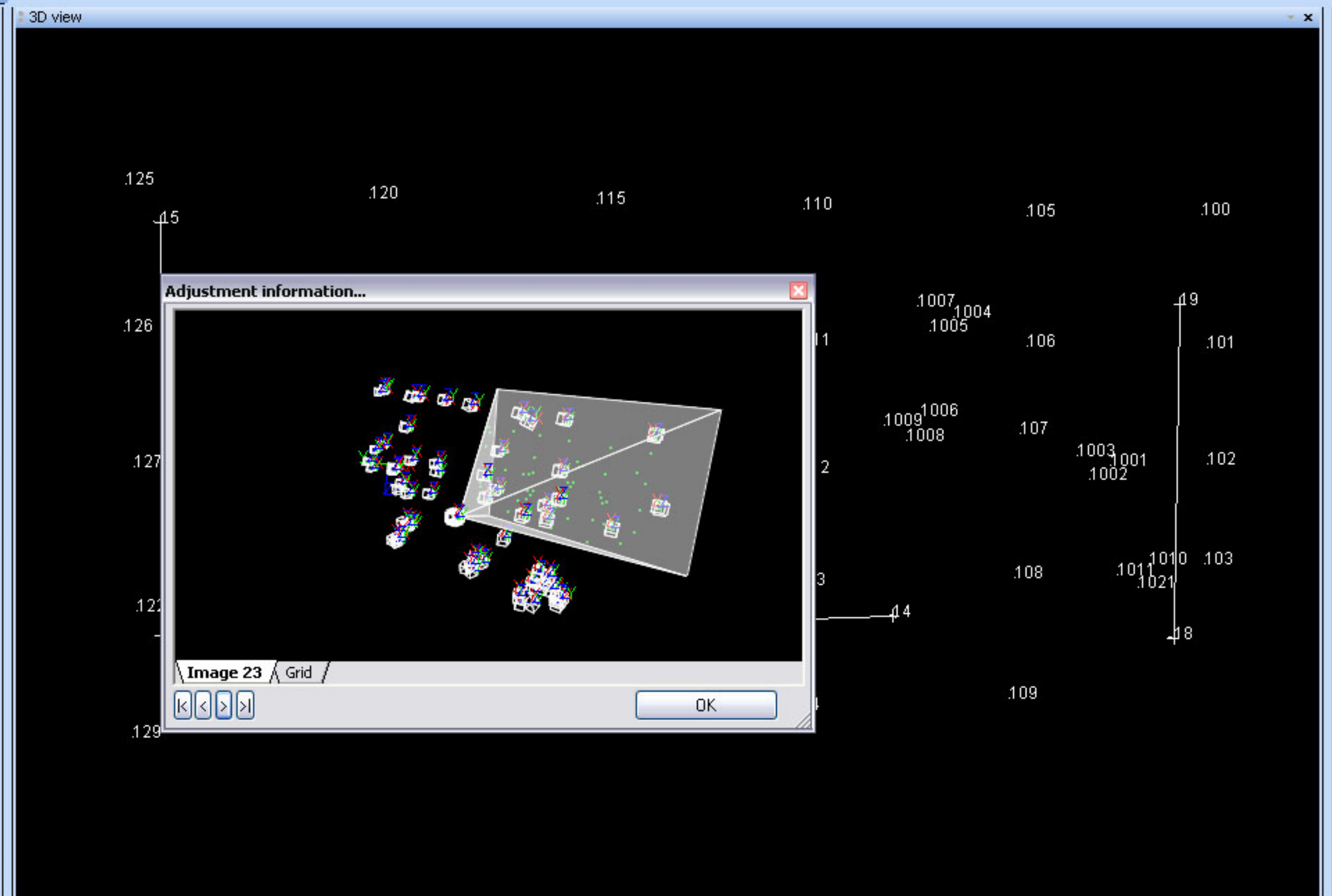


	Pnt. no.	Pnt. Name	X [mm]	Y [mm]	Z [mm]	Sx [mm]	Sy [mm]	Sz [mm]	Rxyz [mm]	Rx [mm]	Ry [mm]	Rz [mm]	Rays	Active	Visible
39	12103		2306.5426	-3594.1481	565.7971	0.0179	0.0213	0.0118	0.0617	-0.0216	-0.0043	0.0577	21	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
40	22001		1275.6273	-3586.3507	-432.1531	0.0122	0.0160	0.0114	0.0365	-0.0248	-0.0203	-0.0175	36	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
41	22002		1330.9050	-3587.2808	-337.4776	0.0118	0.0157	0.0106	0.0163	-0.0055	-0.0087	-0.0127	36	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
42	22003		1425.7190	-3587.4070	-393.4689	0.0125	0.0157	0.0110	0.0261	-0.0081	-0.0198	-0.0150	35	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
43	22101		1148.5511	-3587.1399	26.7186	0.0102	0.0162	0.0094	0.0499	0.0225	-0.0356	-0.0267	37	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
44	22102		1243.8636	-3587.8003	81.4078	0.0101	0.0160	0.0091	0.0476	0.0145	-0.0406	-0.0203	37	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
45	22103		1298.1655	-3587.8446	-14.1046	0.0109	0.0163	0.0095	0.0342	0.0128	-0.0248	-0.0198	34	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
46	32002		116.1292	-3579.9290	83.3156	0.0115	0.0178	0.0104	0.0410	0.0364	-0.0110	-0.0152	34	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
47	32003		210.2147	-3580.7150	26.5913	0.0114	0.0180	0.0107	0.0444	0.0414	-0.0123	-0.0104	34	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
48	32101		158.4945	-3581.5202	472.7339	0.0113	0.0175	0.0099	0.0772	0.0751	-0.0159	-0.0084	33	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>



Project overview

- MEAS2
- MEAS1
- MEAS3
- MEAS3 #1
- MEAS3 #1 #1
- MEAS4
- Reference data
 - MatchingWall200
 - TransformWall200
- Matched Data
 - MEAS1 #1 -> MatchingWall200
 - MEAS2 -> MatchingWall200
 - MEAS3 #1 -> MatchingWall200
 - MEAS4 -> MatchingWall200
- Transformed Points
 - Transformation MEAS1 #1 -> MatchingW
- Deformation analysis
 - Deformation MEAS1 #1 -> MatchingWall.
 - Deformation MEAS1 #1 -> MatchingWall2
 - Deformation MEAS1 #1 -> MatchingWall2
 - Deformation MEAS2 -> MatchingWall2...
 - Deformation MEAS2 -> MatchingWall200.
 - Deformation MEAS2 -> MatchingWall200.
 - Deformation MEAS3 #1 -> MatchingWall.
 - Deformation MEAS4 -> MatchingWall2...



	Pnt. no.	Pnt. name	X [mm]	Y [mm]	Z [mm]	Sx [mm]	Sy [mm]	Sz [mm]	Rays	Active	Visible
1	95		-5057.6176	-5369.1301	-340.7483	1.7547	0.9114	0.4492	5	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	96		-4942.1740	-5290.0717	-703.9537	1.4584	0.7432	0.4391	6	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	2005		-2695.9283	-5548.2971	-58.6333	0.2537	0.5990	0.2328	6	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	2003		-3167.1447	-5416.7577	-570.6335	0.2349	0.4056	0.1924	5	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5	2043		3855.5227	-5718.2558	386.7665	0.1483	0.4582	0.1148	5	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	2023		3571.0559	-5574.3829	-708.2624	0.1161	0.4261	0.2165	7	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7	2002		-2974.5991	-5543.8449	-601.5210	0.2041	0.3754	0.1807	7	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8	2020		3748.1196	-5720.5176	-110.5354	0.1288	0.4153	0.1435	7	<input type="checkbox"/>	<input checked="" type="checkbox"/>
9	2024		3673.0697	-5570.9721	-357.2151	0.1199	0.4021	0.1688	7	<input type="checkbox"/>	<input checked="" type="checkbox"/>
10	2051		3811.1635	-5569.5193	-112.6675	0.1361	0.4028	0.1459	6	<input type="checkbox"/>	<input checked="" type="checkbox"/>