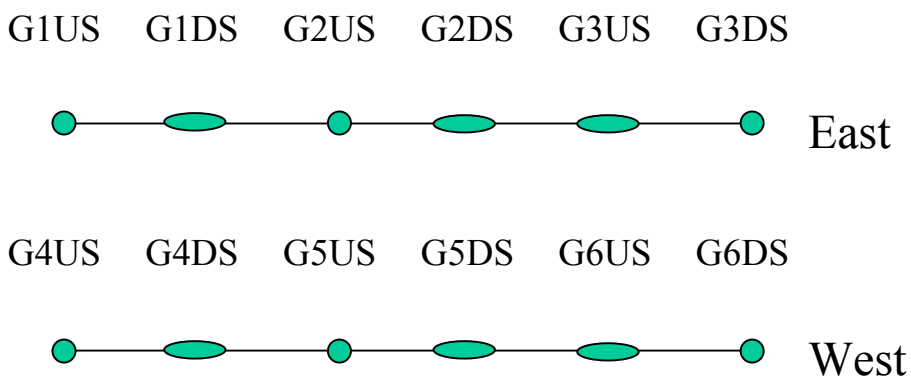
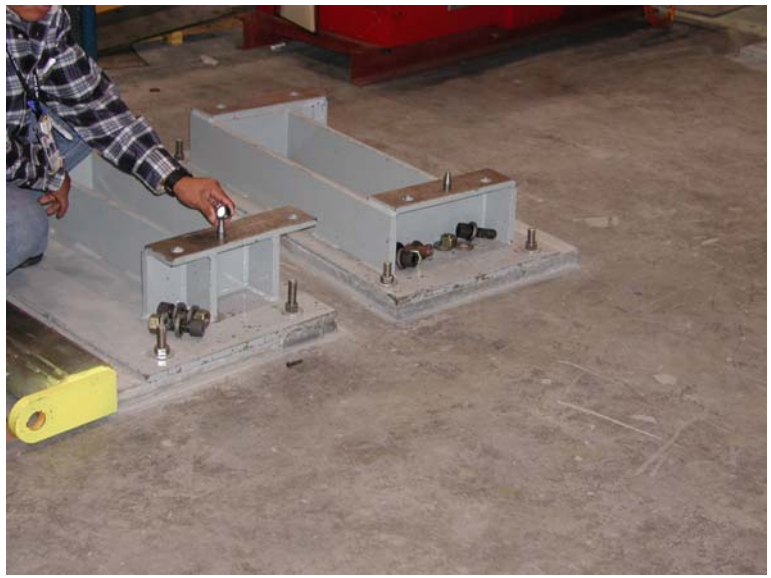
SPEAR Pins in Building 750
October 22-23, 2002

- Purpose: check the alignment-pin positions.
- Procedure:
  - Complete a survey of all the monuments as well as the pin hole locations. The holes are surveyed twice:
    - Directly using a centered reflector.
    - Indirectly through a fit of the inside.
  - Add a station shooting the reinstalled pins.

Previous Pin Results

Top of pin as of 06/17/2002		
	Z (mm)	X (mm)
G1US	-0.305	0.229
G1DS	0.838	1.143
G2US	-0.203	0.051
G2DS	0.533	0.203
G3US	-0.203	-0.203
G3DS	0.914	-0.584
G4US	-0.254	-0.076
G4DS	0.356	-0.178
G5US	-0.737	-0.381
G5DS	-0.203	-0.635
G6US	0.584	-0.254
G6DS	0.584	-0.178

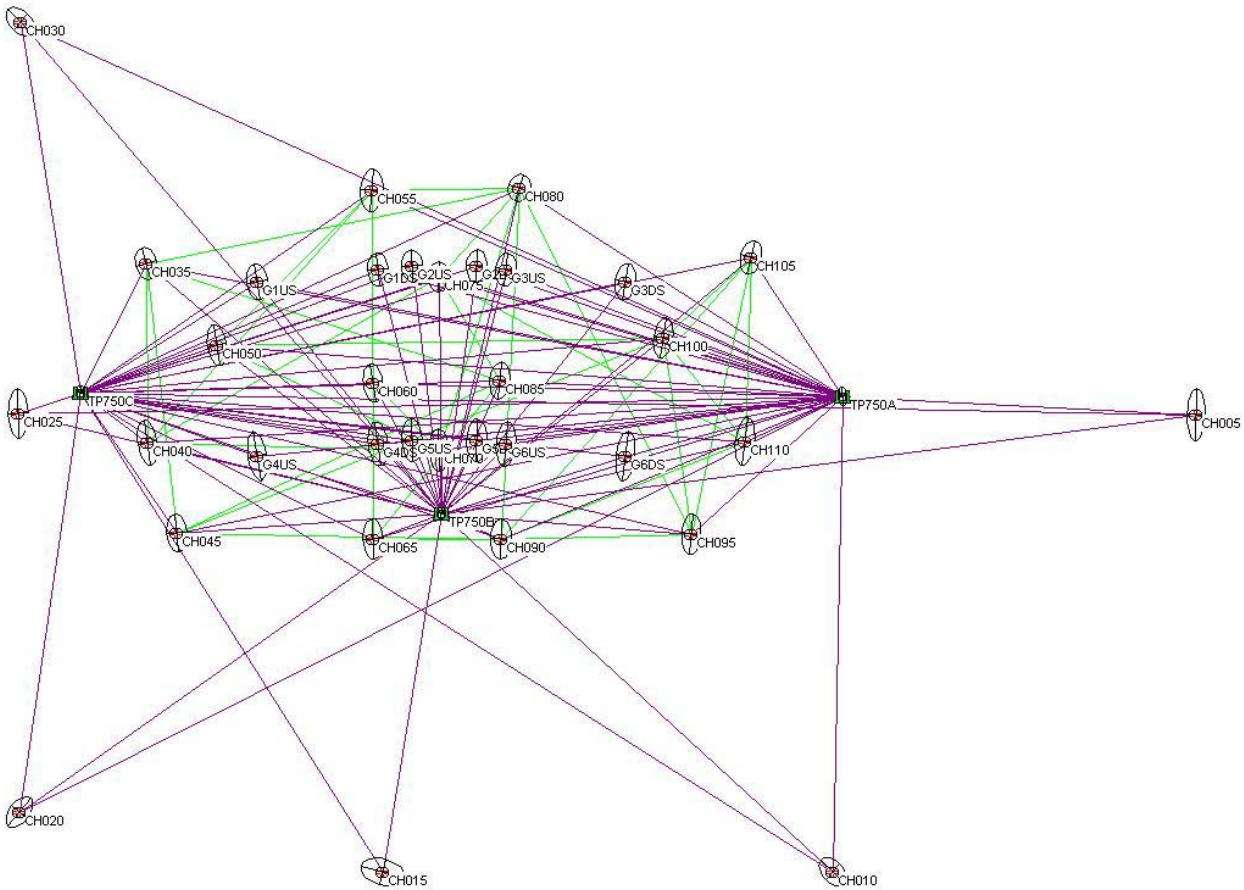




Network Description

- 22 monuments:
  - 16 floor
  - 6 high beams
- 12 pin hole locations:
  - as center of reflector sphere
  - as center of circle fit

Network Simulation

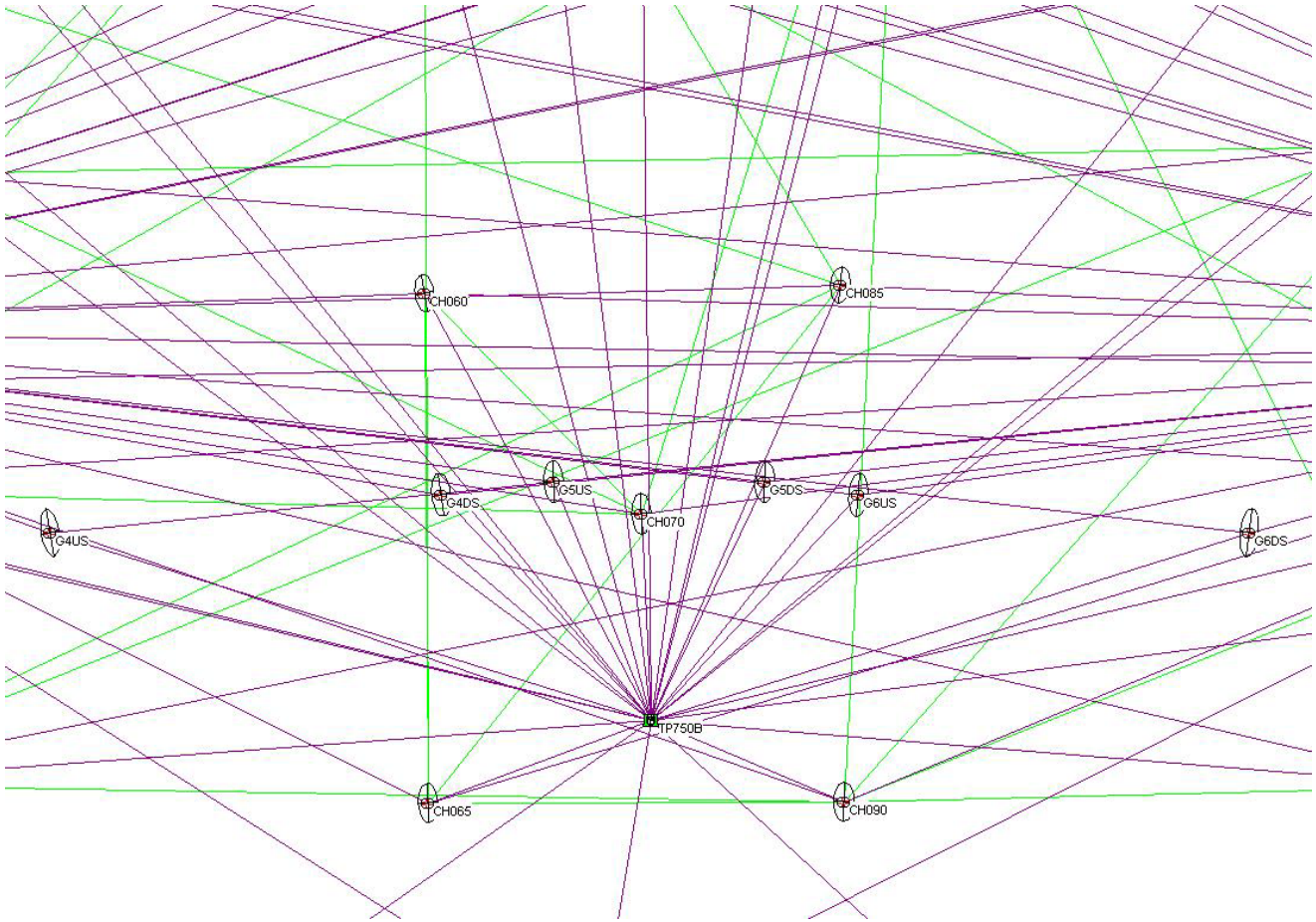


3 tracker stations (100 triplets):

distance 50 μm, horizontal angle 50 μm / D, vertical angle 50 μm / D .

33 height differences at 50 μm

Network Simulation Detail



Network Results

Free Datum based on Floor Monuments

Monument Changes			
	Z (mm)	X (mm)	Y (mm)
CH080	0.087	0.274	0.246
CH110	0.230	-0.022	0.108
CH095	0.204	-0.179	-0.082
CH035	-0.102	0.098	0.272
CH040	-0.390	-0.085	0.001
CH045	-0.166	-0.311	-0.110
CH050	-0.221	0.101	0.034
CH055	-0.023	0.116	0.212
CH060	-0.065	-0.021	-0.089
CH065	-0.080	-0.126	-0.144
CH070	0.002	-0.010	-0.129
CH075	0.013	0.102	-0.112
CH085	0.081	0.026	-0.187
CH090	0.010	-0.030	-0.148
CH100	0.085	-0.048	-0.008
CH105	0.335	0.112	0.137

Pin Hole Results

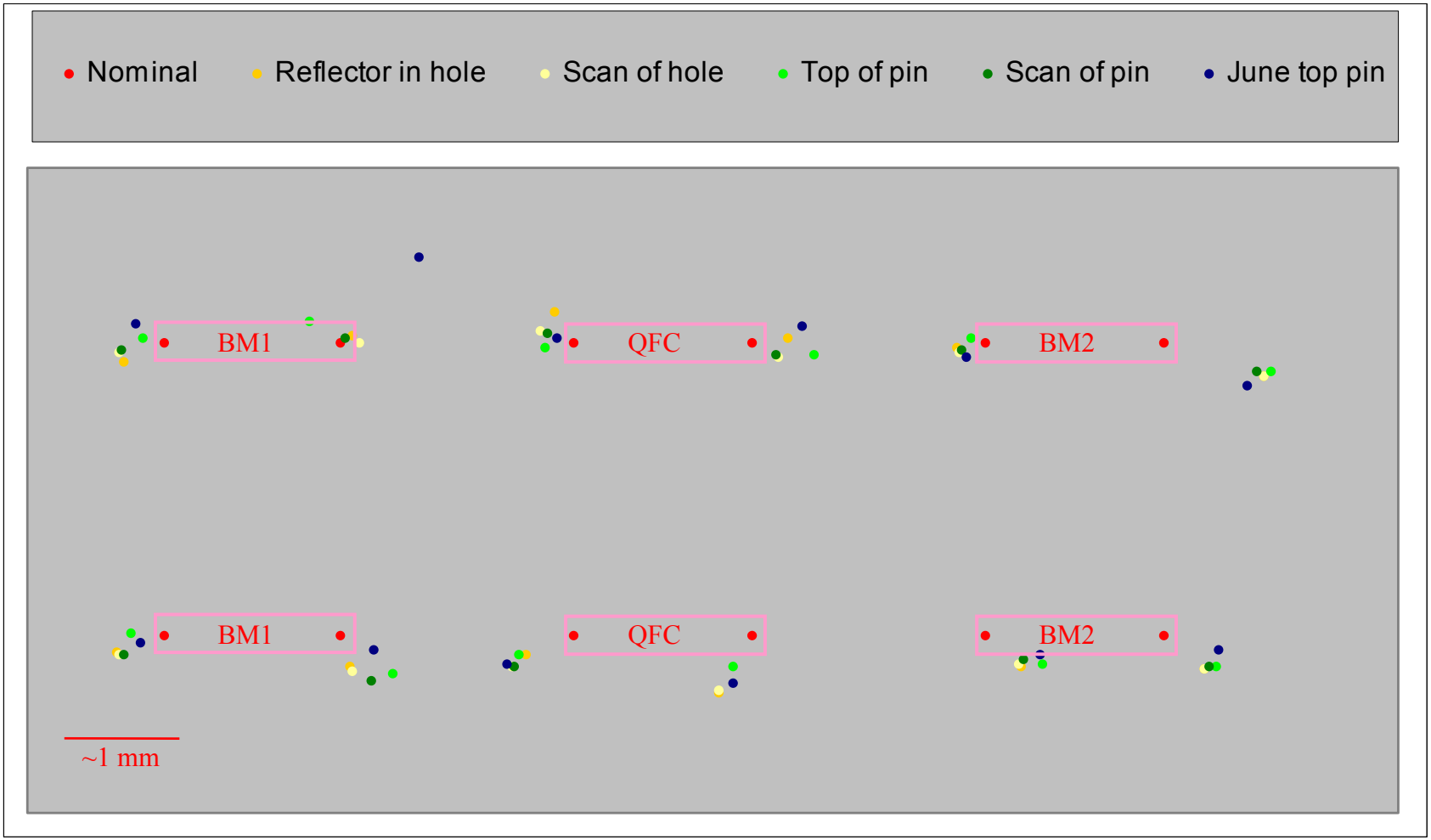
Reflector in hole			
	Z (mm)	X (mm)	Y (mm)
G1US	-0.442	-0.259	17.970
G1DS	0.126	0.087	18.125
G2US	-0.220	0.395	18.294
G2DS	0.395	0.038	18.237
G3US	-0.312	-0.061	18.181
G3DS	1.087	-0.452	18.284
G4US	-0.512	-0.227	18.184
G4DS	0.085	-0.399	18.208
G5US	-0.525	-0.247	18.172
G5DS	-0.369	-0.765	18.135
G6US	0.377	-0.393	17.961
G6DS	0.451	-0.449	17.989

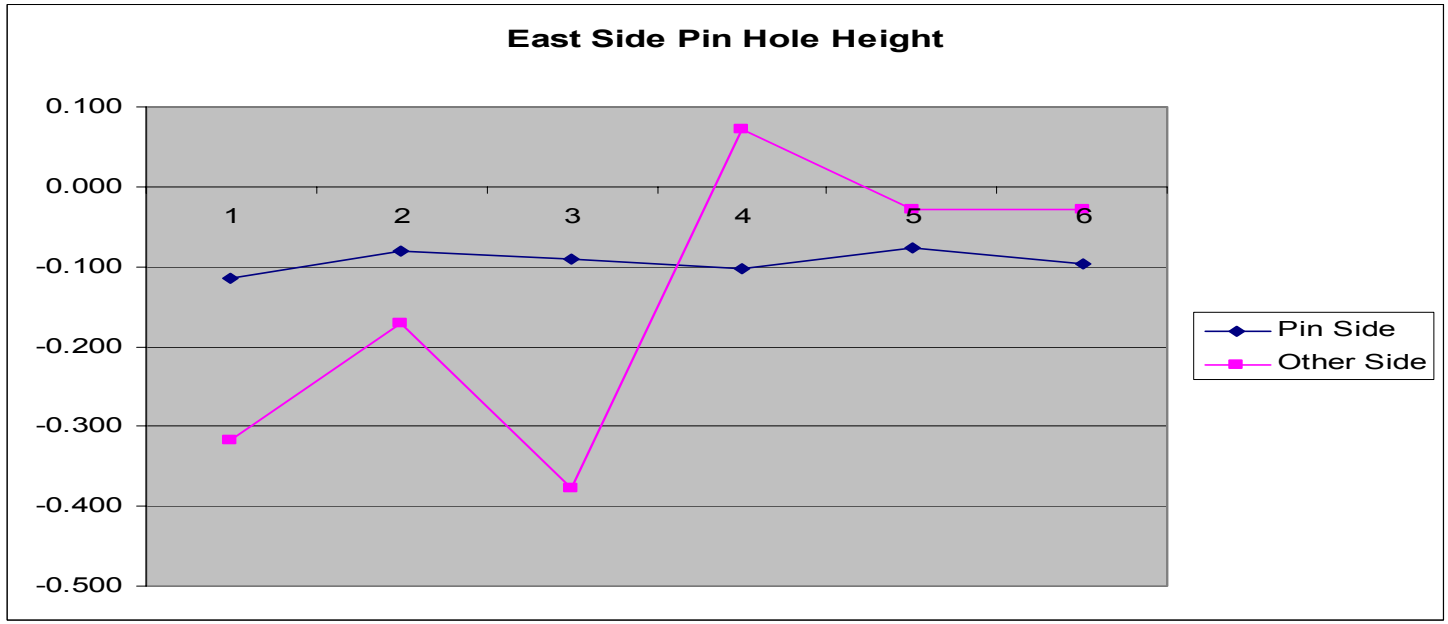
Circle scan			
	Z (mm)	X (mm)	Y (mm)
G1US	-0.481	-0.139	-0.367
G1DS	0.197	-0.008	-0.228
G2US	-0.380	0.146	-0.021
G2DS	0.267	-0.210	-0.113
G3US	-0.303	-0.123	-0.218
G3DS	1.094	-0.450	-0.111
G4US	-0.496	-0.247	-0.207
G4DS	0.110	-0.463	-0.181
G5US	-0.682	-0.391	-0.115
G5DS	-0.360	-0.712	-0.202
G6US	0.369	-0.375	-0.438
G6DS	0.453	-0.423	-0.291

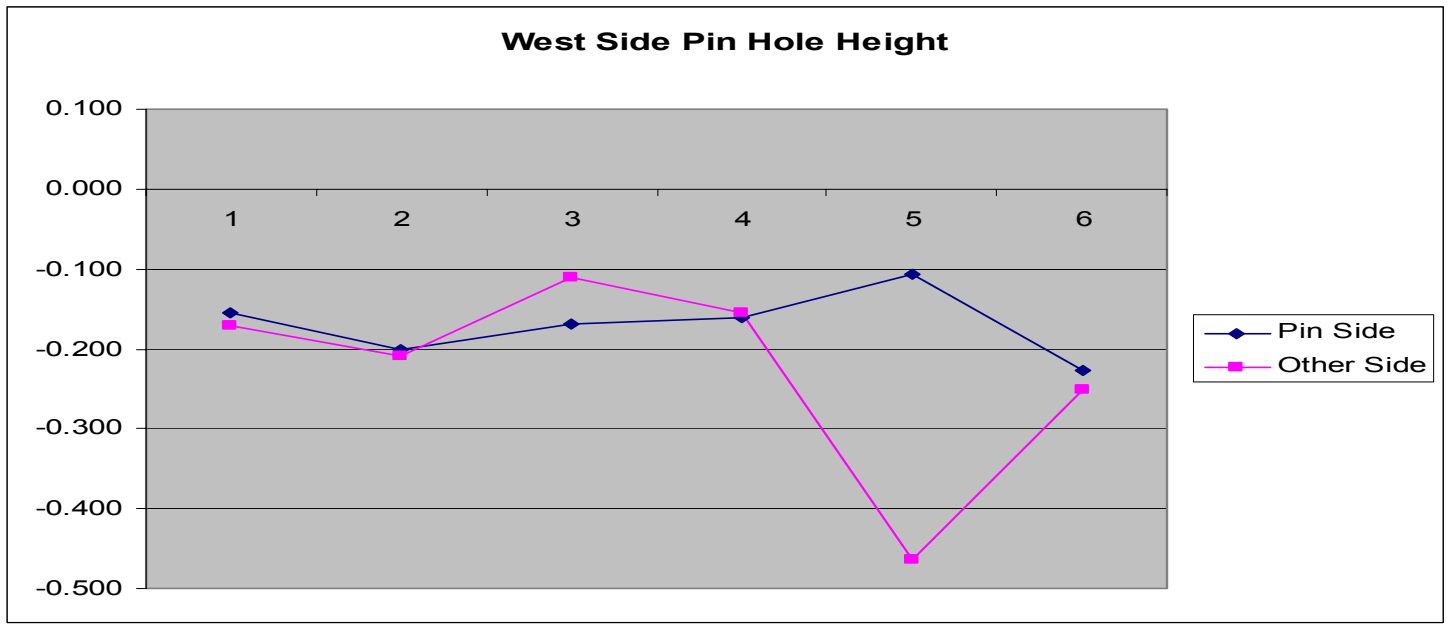
Pin Results

Top on pin			
	Z (mm)	X (mm)	Y (mm)
G1US	-0.211	0.052	59.767
G1DS	-0.359	0.282	59.995
G2US	-0.333	-0.079	59.989
G2DS	0.660	-0.173	59.926
G3US	-0.171	0.062	59.828
G3DS	1.167	-0.400	59.959
G4US	-0.353	0.044	59.936
G4DS	0.561	-0.498	59.931
G5US	-0.612	-0.259	59.925
G5DS	-0.210	-0.403	59.868
G6US	0.617	-0.386	59.690
G6DS	0.564	-0.419	59.649

Scan of pin			
	Z (mm)	X (mm)	Y (mm)
G1US	-0.455	-0.104	18.583
G1DS	0.046	0.061	18.797
G2US	-0.293	0.126	18.977
G2DS	0.259	-0.161	18.872
G3US	-0.277	-0.119	18.781
G3DS	1.004	-0.381	18.793
G4US	-0.441	-0.252	18.801
G4DS	0.317	-0.586	18.851
G5US	-0.652	-0.415	18.875
G5DS	24.576	38.690	-5.364
G6US	0.415	-0.312	18.605
G6DS	0.498	-0.399	18.564


Nominal
Reflector in hole
Scan of hole
Top of pin
Scan of pin
June top pin
BM1
QFC
BM2
BM1
QFC
BM2
~1 mm


East Side Pin Hole Height
0.100
0.000
-0.100
-0.200
-0.300
-0.400
-0.500
1
2
3
4
5
6
Pin Side
Other Side


West Side Pin Hole Height
0.100
0.000
-0.100
-0.200
-0.300
-0.400
-0.500
1
2
3
4
5
6
Pin Side
Other Side

Conclusion

- The good part:
  - Different methods agreed, except for one X position in the June survey.
  - Height of pin holes very consistent.
- The other:
  - Pin location up to 1 mm from nominal.