

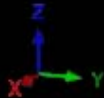
fsm 2007  
Houston  
Texas



**RIEGL**  
LASER MEASUREMENT SYSTEMS



- 2 Operators
- *RIEGL* 3D Laser Scanner
- NIKON D200 & CANON G6
- Google Earth for Registration
- RiSCAN PRO & Phidias



Scan Position 1



Scan Position 2



Scan Position 3



Scan Position 4



Scan Position 5



Scan Position 6

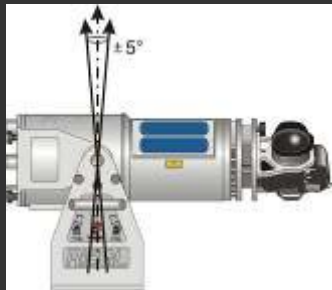




Scan Position 7



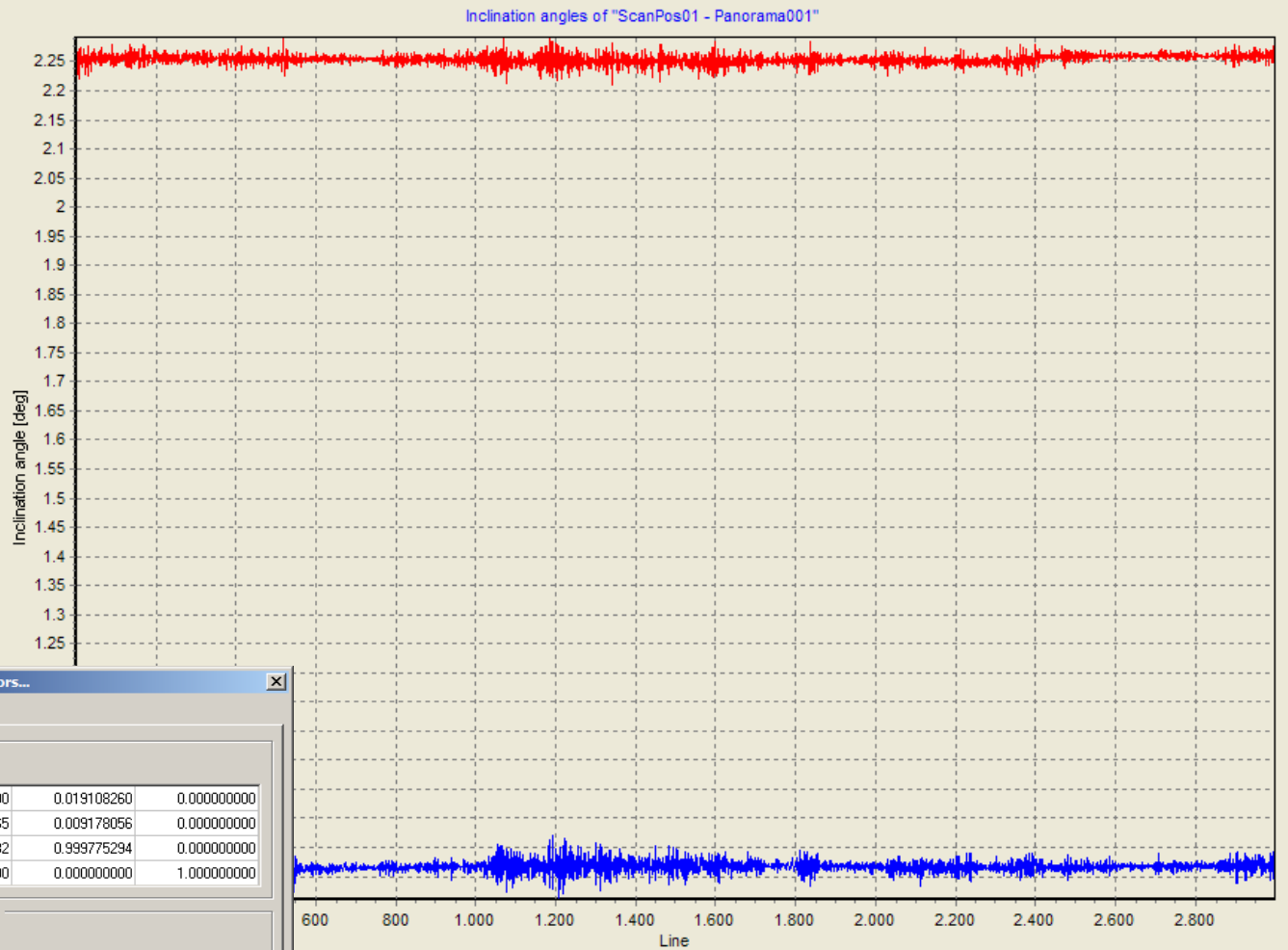
Scan Position 9



Scanner orientation  
 stand up  
 Total line count: 3000

Rotation around Y axis  
 Visible  
 Min: 0.810  
 Max: 0.920  
 Delta: 0.110  
 Mean: 0.866  
 StdDev: 0.011

Rotation around X axis  
 Visible  
 Min: 2.211  
 Max: 2.292  
 Delta: 0.081  
 Mean: 2.254  
 StdDev: 0.009



Calculate SOP via inclination sensors...

Calculation

MATRIX

SOP:

0.999817421	0.000000000	0.019108260	0.000000000
-0.000175409	0.999957865	0.009178056	0.000000000
-0.019107455	-0.009179732	0.999775294	0.000000000
0.000000000	0.000000000	0.000000000	1.000000000

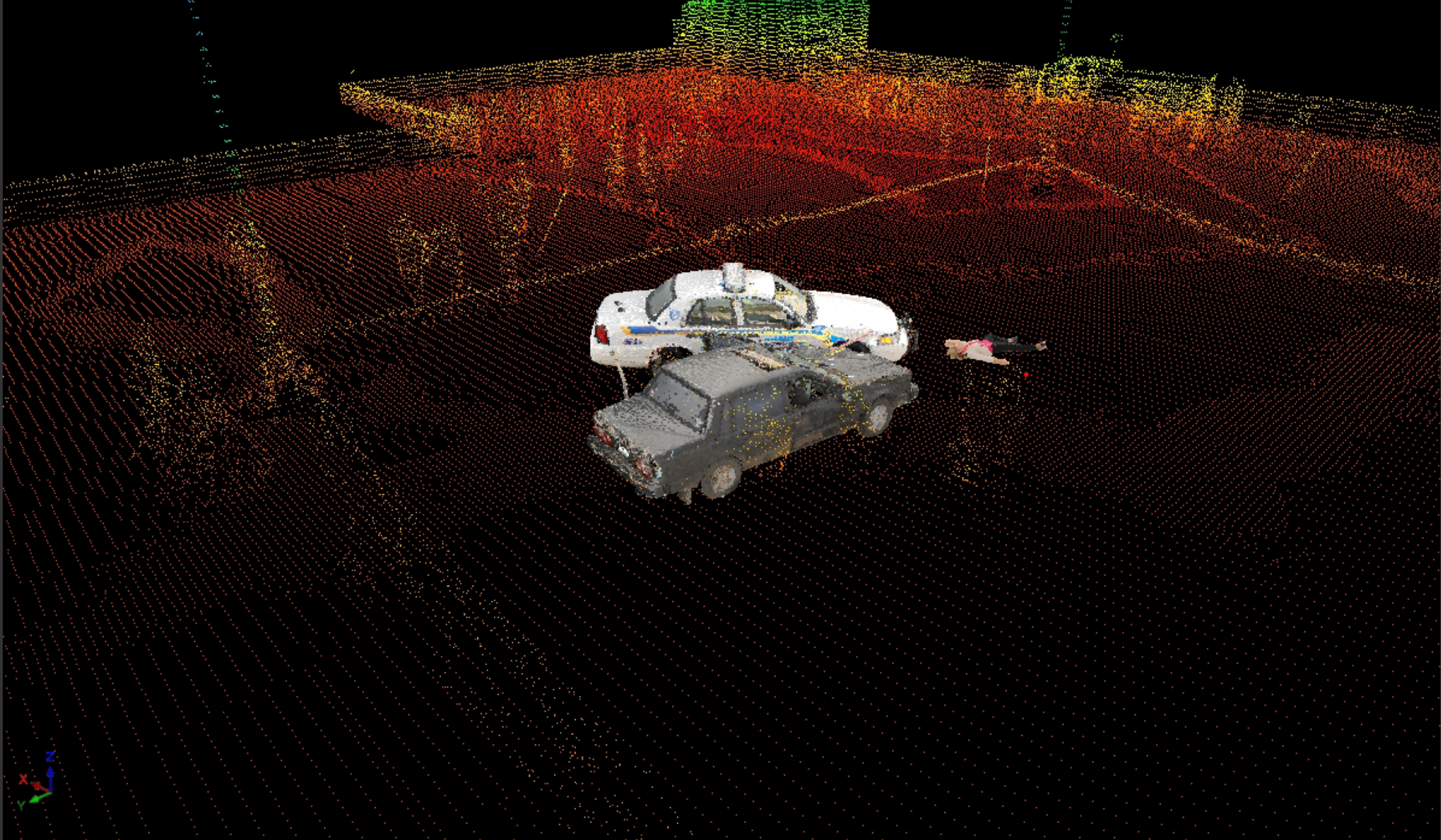
CALCULATION SETTINGS

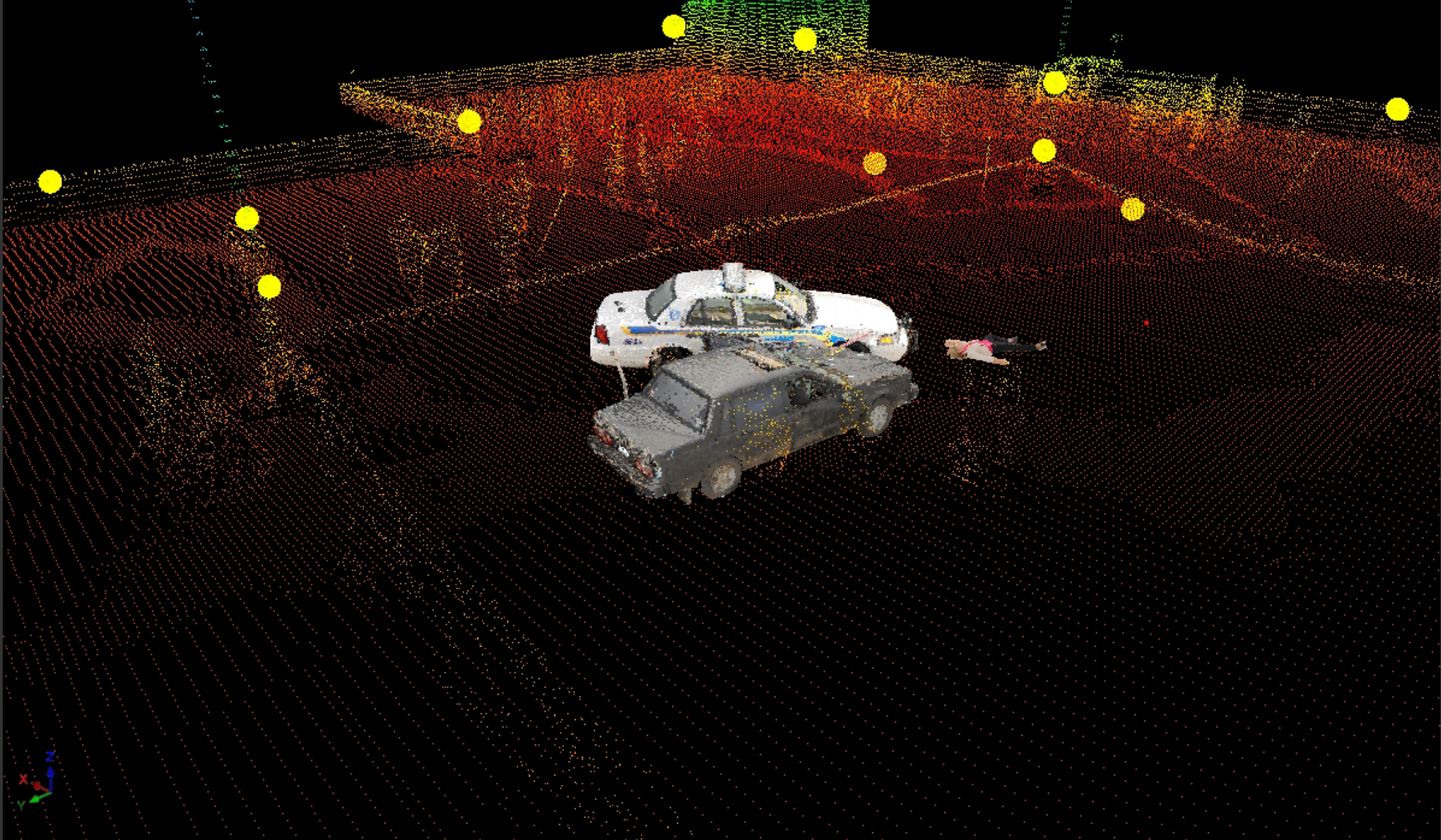
Scans:

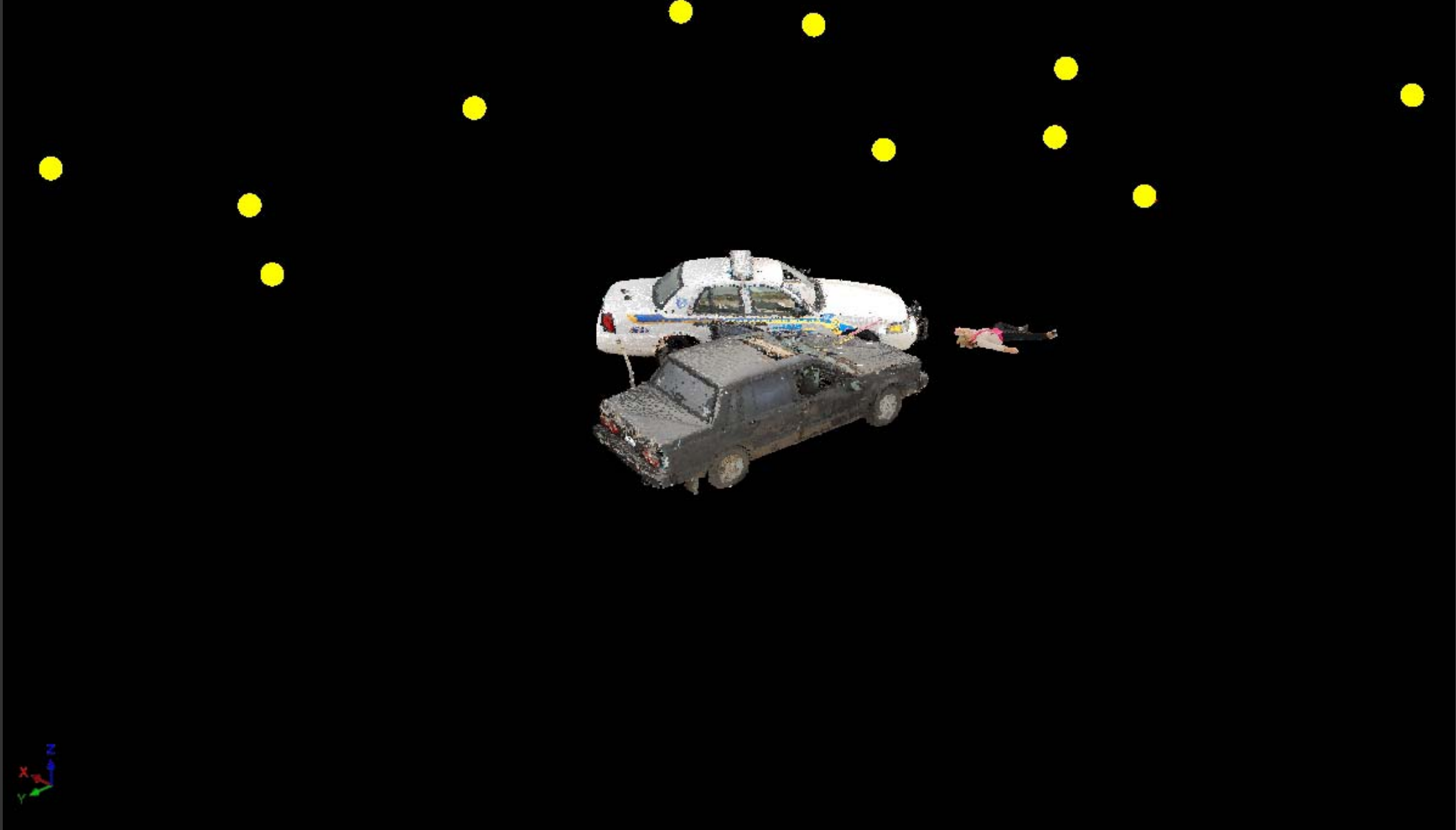
BeamWidening\_ScanPos01 - Panorama001

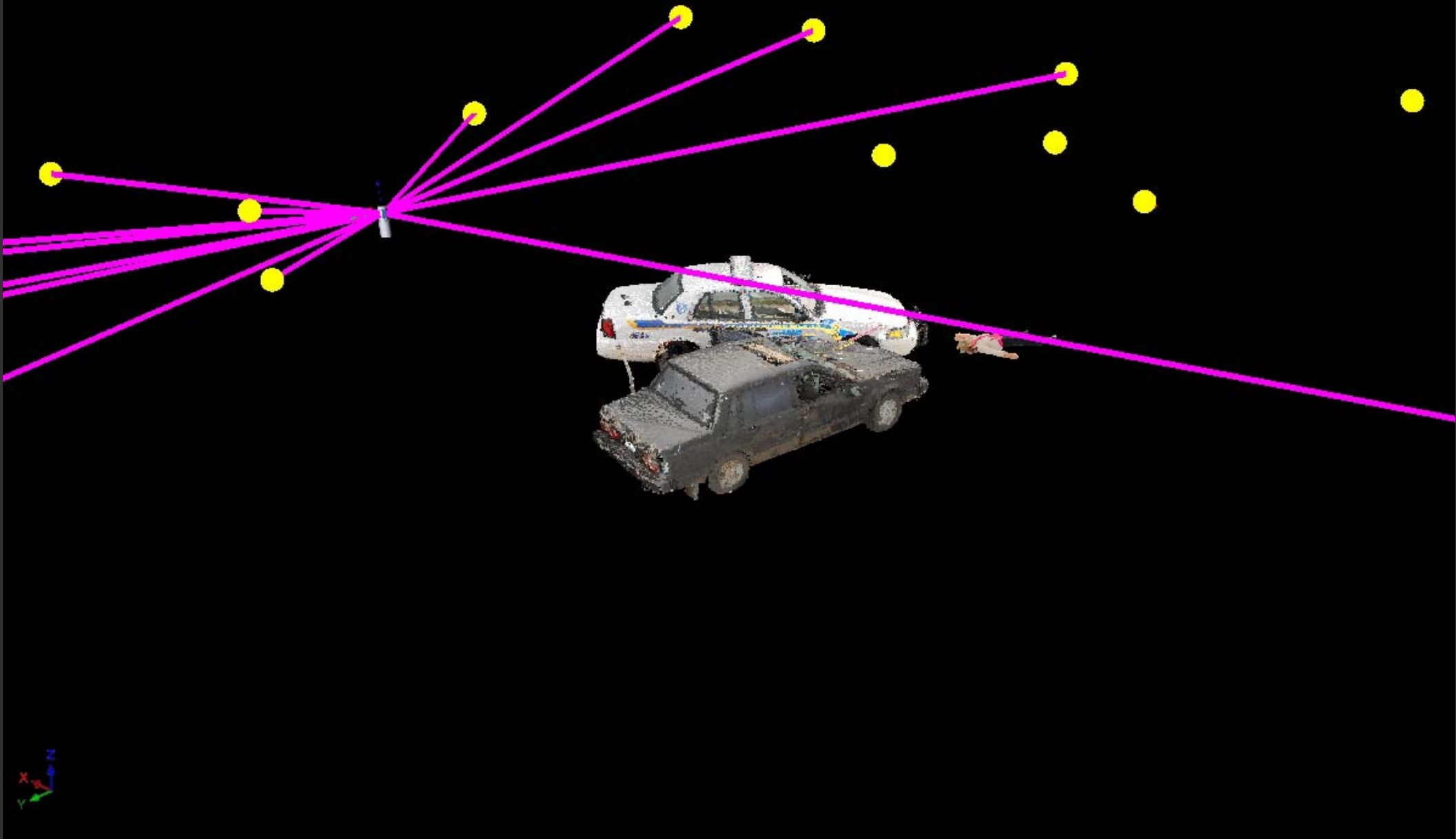
Calculate

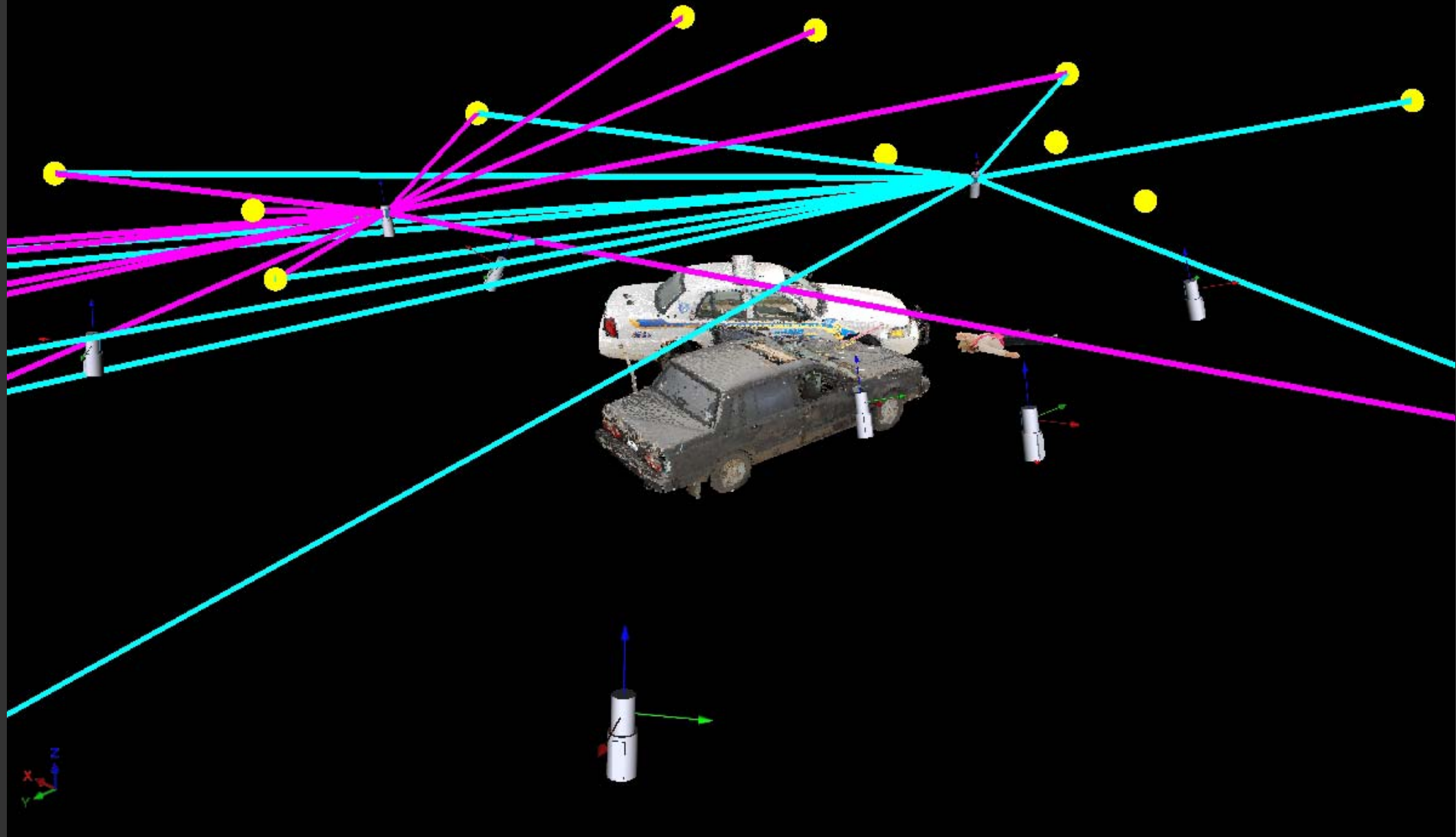
OK Cancel Help



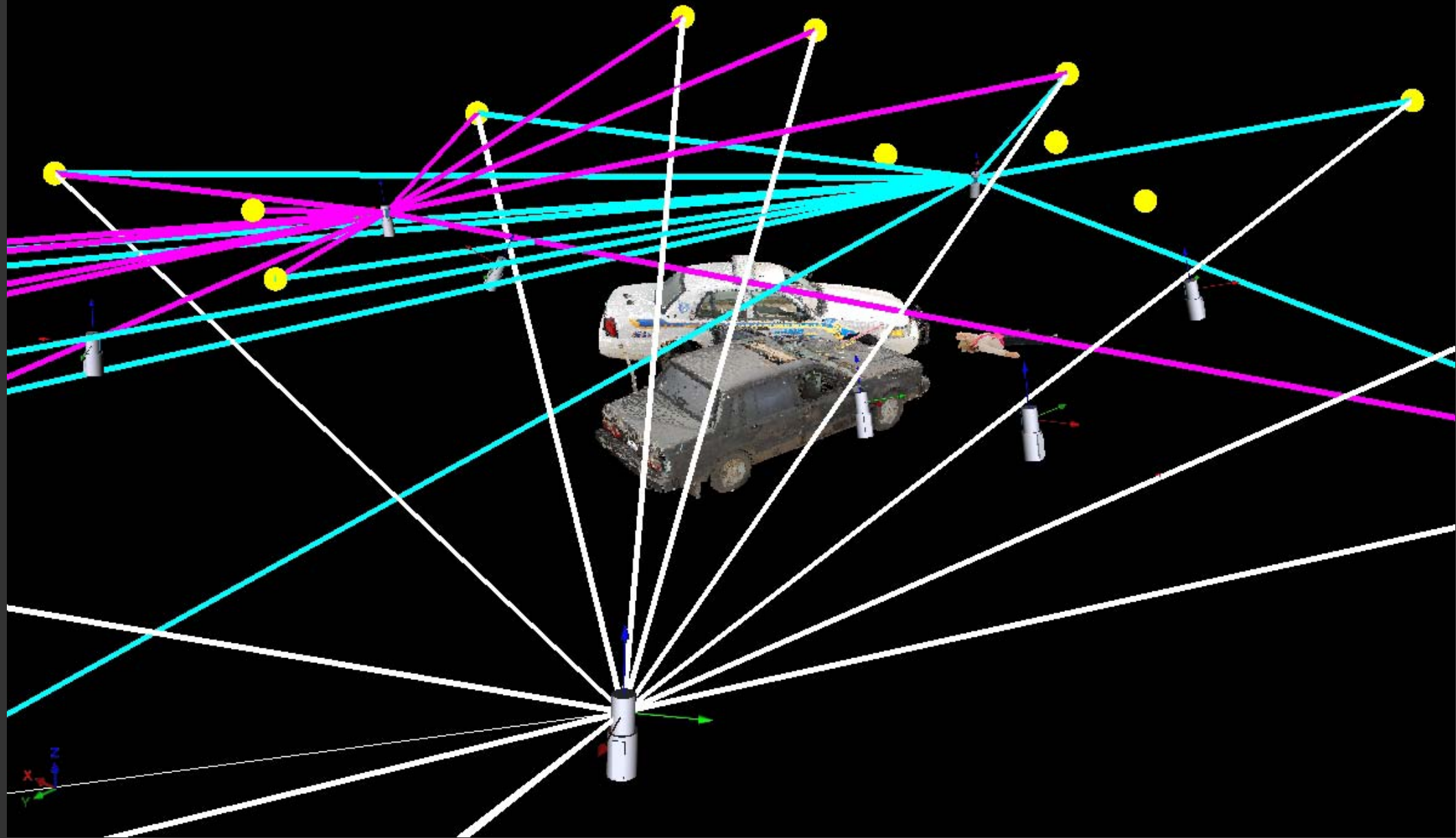












Project: 2007\_03\_Houston

Error (StdDev) [m]: 0.0036m

Number of pointpairs used for calculation:

Tiepoints: 274

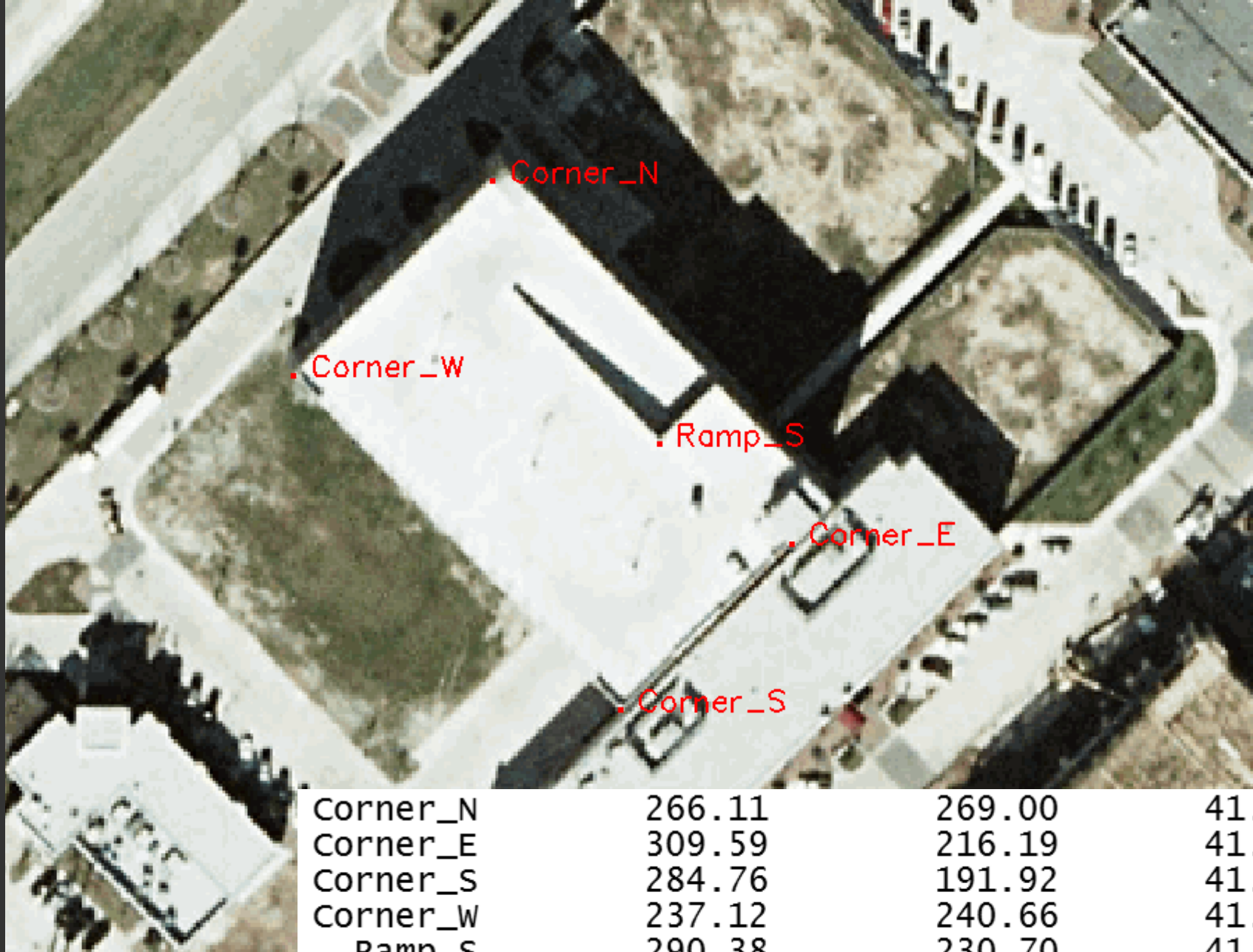
Name	delta X	delta Y	delta Z	delta Roll	delta Pitch	delta Yaw	#	Remarks
ScanPos01	0.000	0.000	0.000	0.000	0.000	0.000	204	Locked
ScanPos02	0.000	0.000	0.001	0.003	0.004	0.002	162	
ScanPos03	0.000	0.000	0.000	0.001	0.002	0.002	201	
ScanPos04	0.001	-0.001	0.001	-0.002	0.001	0.003	180	
ScanPos05	0.000	-0.001	0.002	0.001	-0.004	0.002	189	
ScanPos06	0.000	0.000	0.001	0.001	0.000	0.001	165	
ScanPos07 Z420	-0.001	-0.001	0.000	0.000	0.000	0.002	165	
ScanPos08 Z420	-0.001	-0.001	0.001	-0.004	-0.002	0.003	96	
ScanPos09	0.001	-0.001	0.000	0.002	0.000	0.002	165	
ScanPos10	0.002	0.002	0.006	-0.002	-0.004	0.003	69	
ScanPos11	-0.001	-0.004	0.020	0.012	-0.007	-0.003	48	

## Registration Accuracy

- Time for Data Acquisition: 4h
- Time for Visualization (RiSCAN PRO): 8h
- Time for Postprocessing (Phidias): 10h

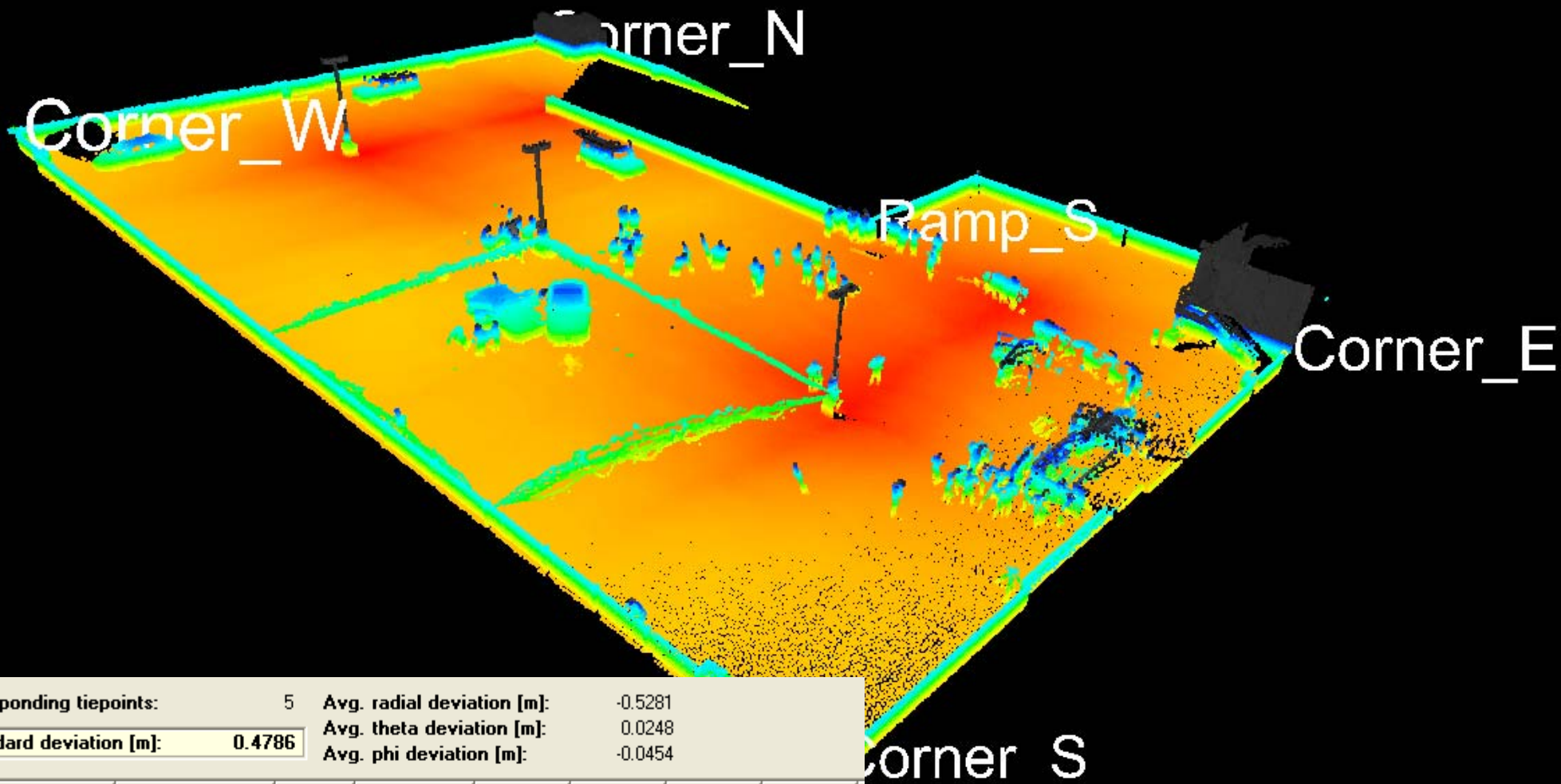
Registration Accuracy





Corner_N	266.11	269.00	41.77
Corner_E	309.59	216.19	41.77
Corner_S	284.76	191.92	41.77
Corner_W	237.12	240.66	41.77
Ramp_S	290.38	230.70	41.77

Registration by Google Earth

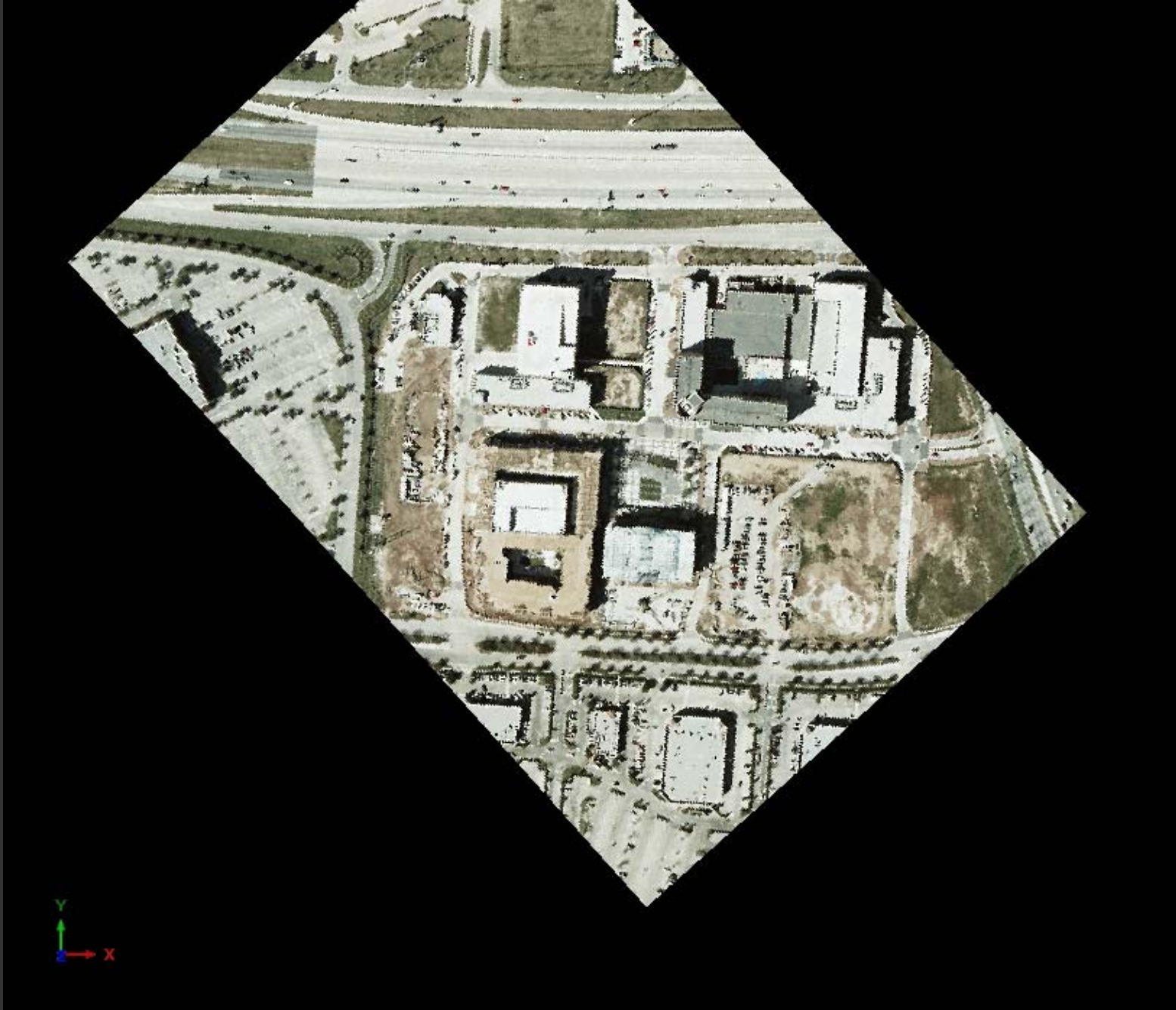


Corresponding tiepoints: 5 Avg. radial deviation [m]: -0.5281  
 Standard deviation [m]: 0.4786 Avg. theta deviation [m]: 0.0248  
 Avg. phi deviation [m]: -0.0454

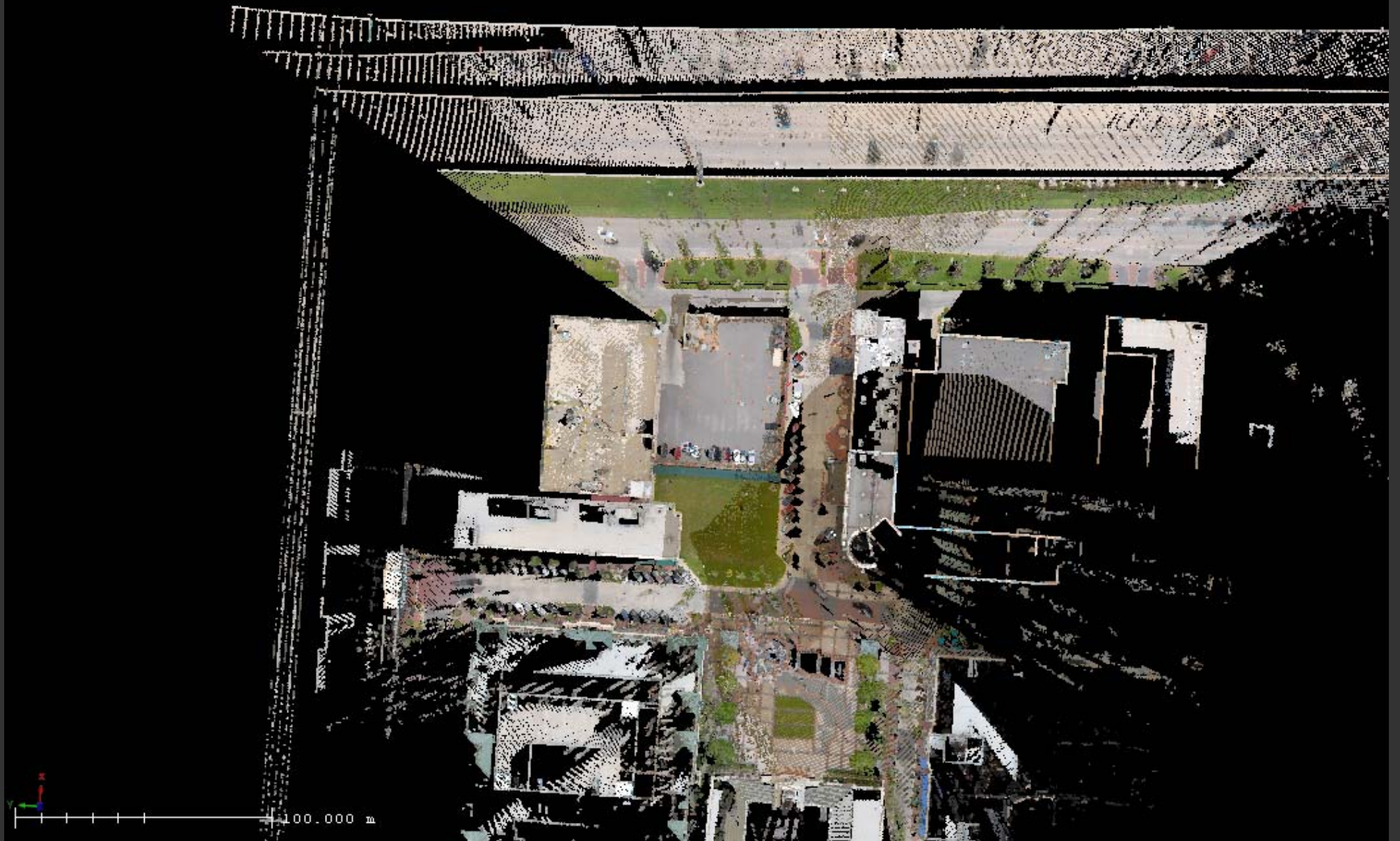
Name	Link	Ref...	RefType	Size	X	Y	Z
<input checked="" type="checkbox"/> Ramp_S	Ramp_S	0		0.00	12.748	-9.008	-0.992
<input checked="" type="checkbox"/> Corner_W	Corner_W	0		0.00	-14.621	37.068	-0.897
<input checked="" type="checkbox"/> Corner_S	Corner_S	0		0.00	-19.199	-29.799	-0.899
<input checked="" type="checkbox"/> Corner_N	Corner_N	0		0.00	24.720	34.569	-1.028
<input checked="" type="checkbox"/> Corner_E	Corner_E	0		0.00	14.831	-32.175	-0.995



Registration by Google Earth

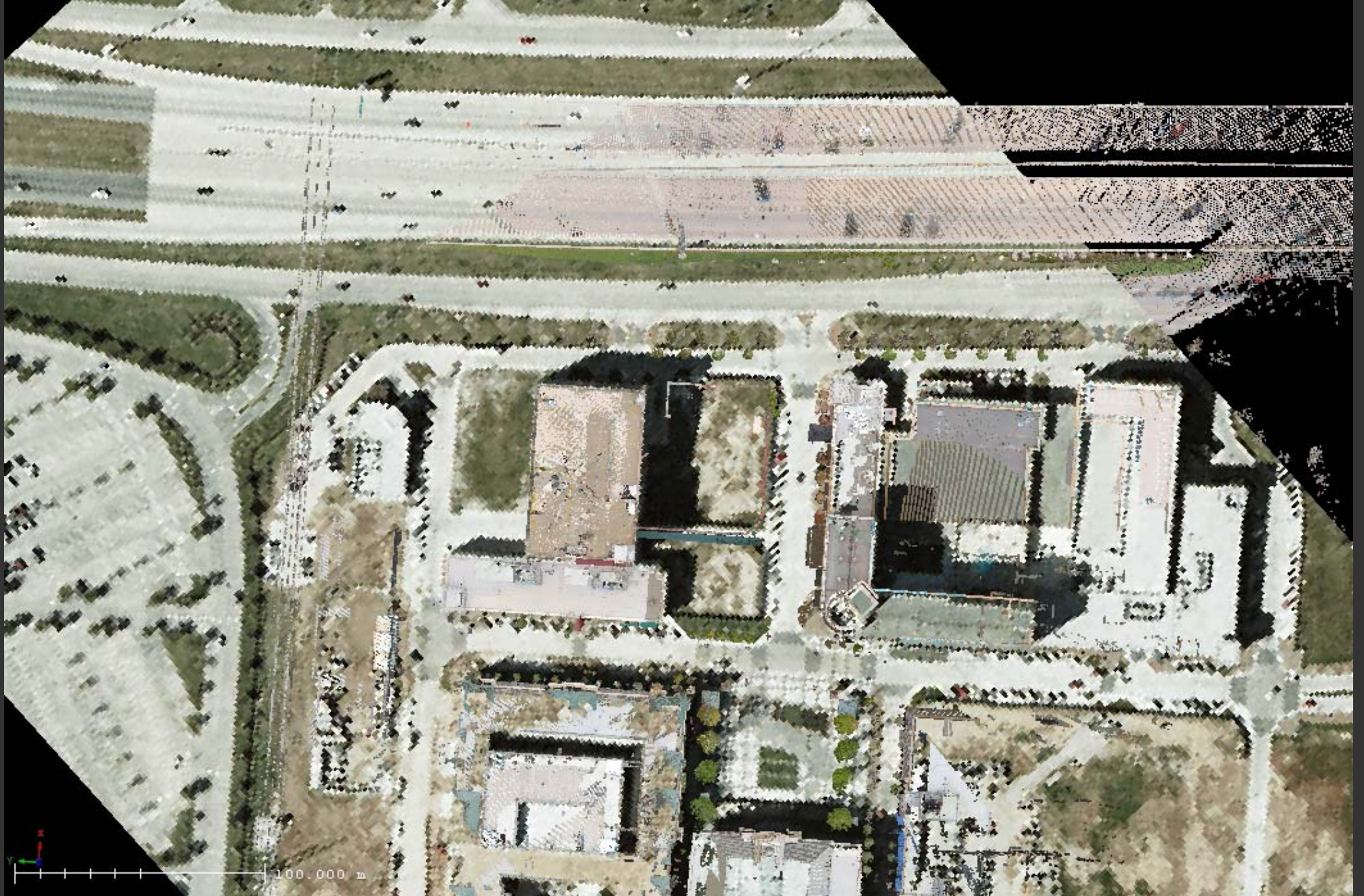


Google with 3D Point Cloud



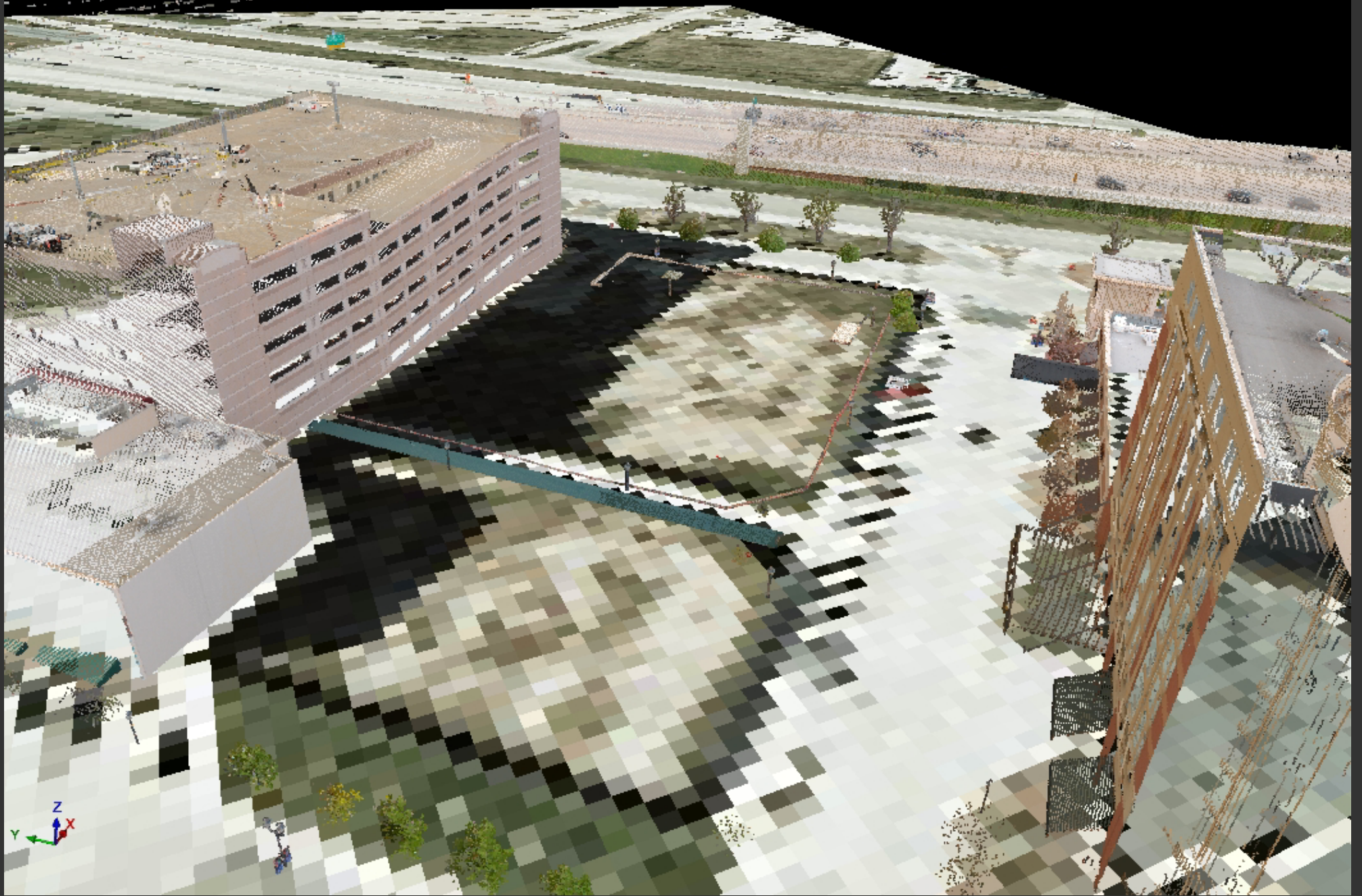
Google with 3D Point Cloud





Google with 3D Point Cloud





Google with 3D Point Cloud

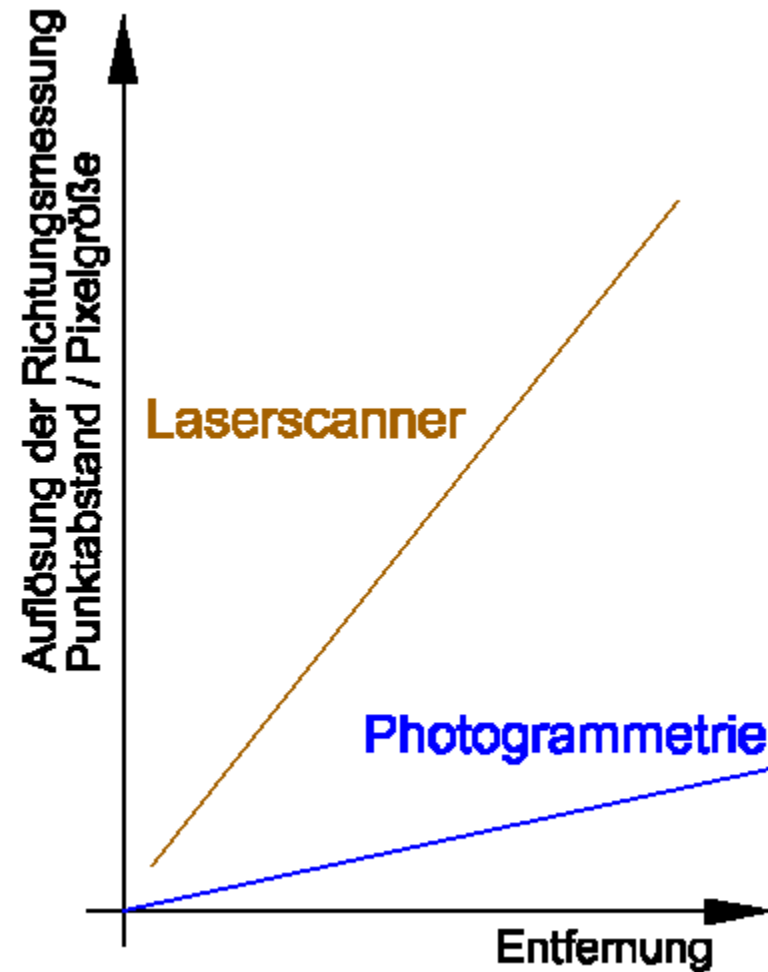
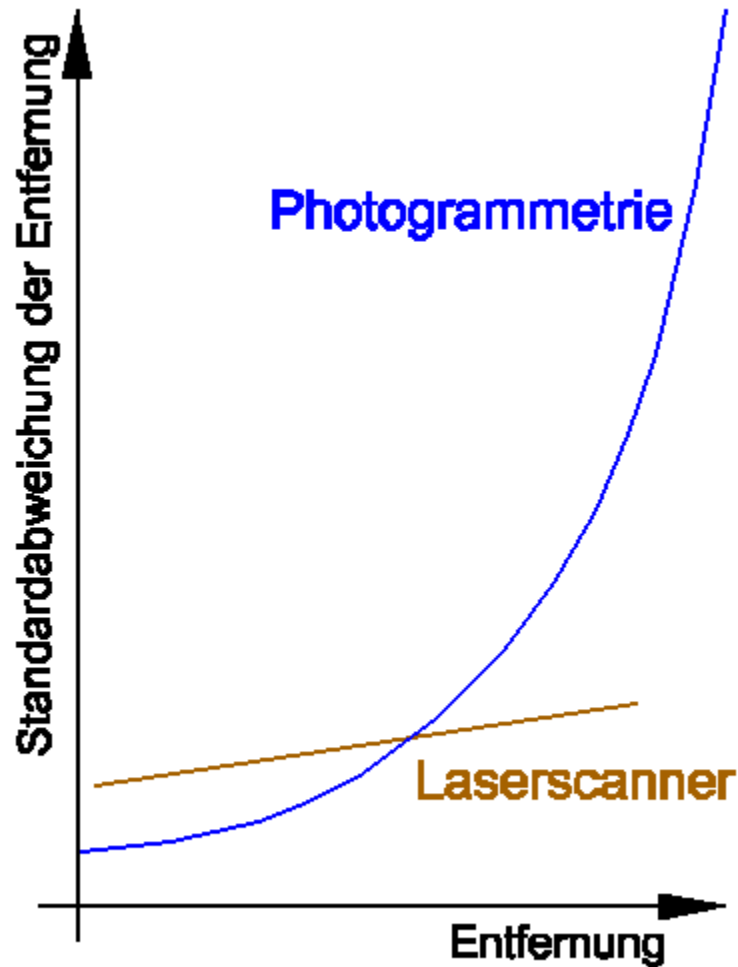








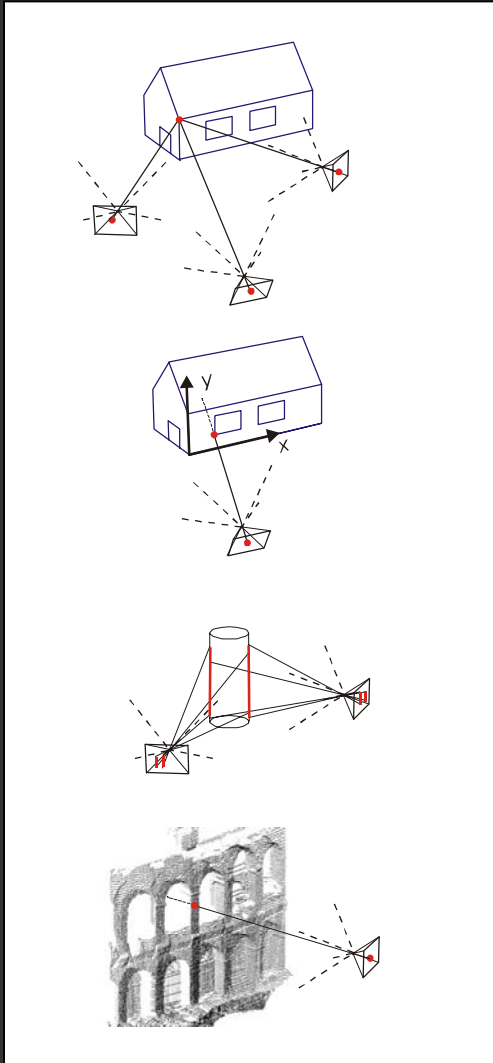
# Google with 3D Point Cloud



3D Monoplotting – Accuracy

3D Laser Scanning & Photogrammetry



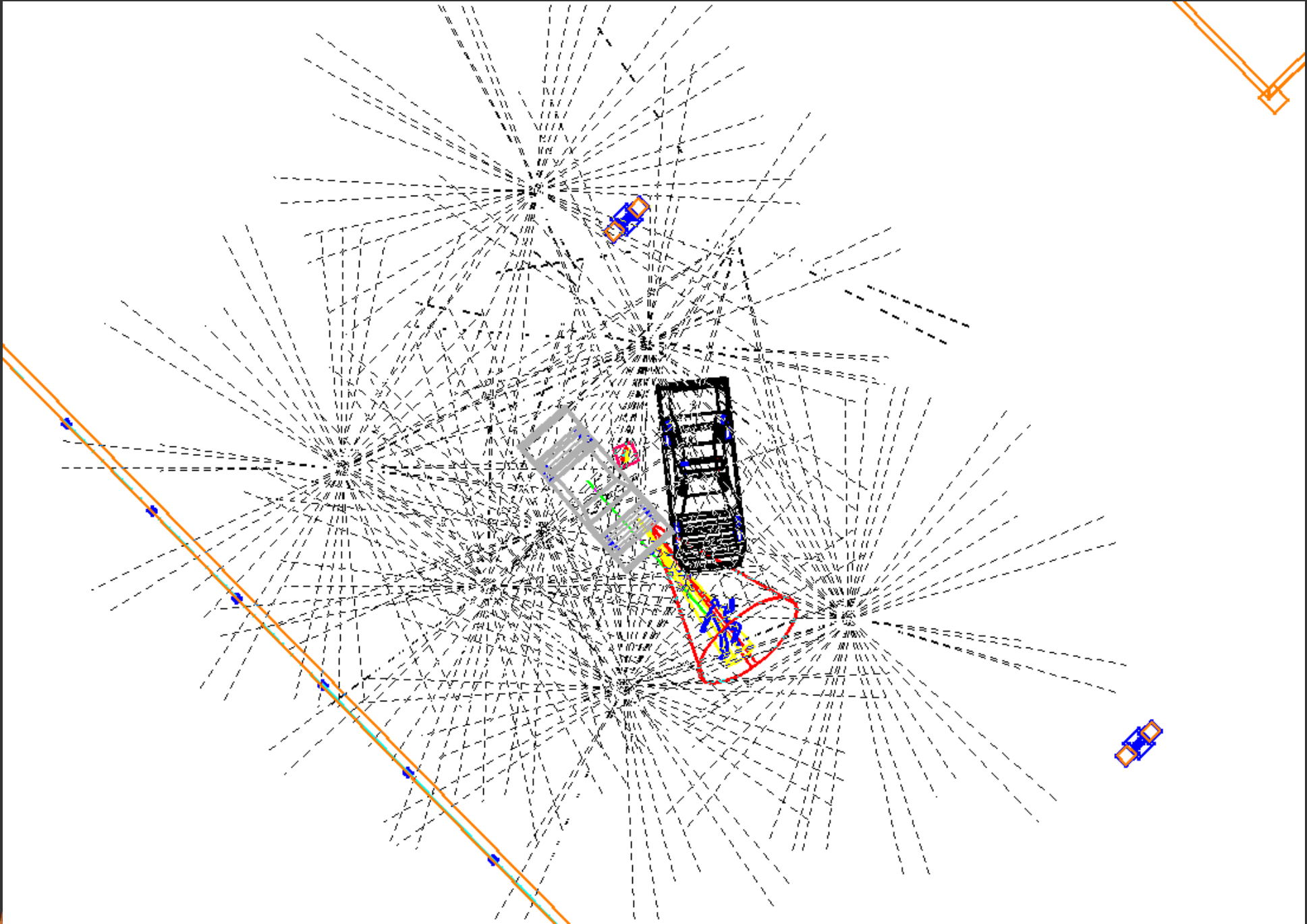


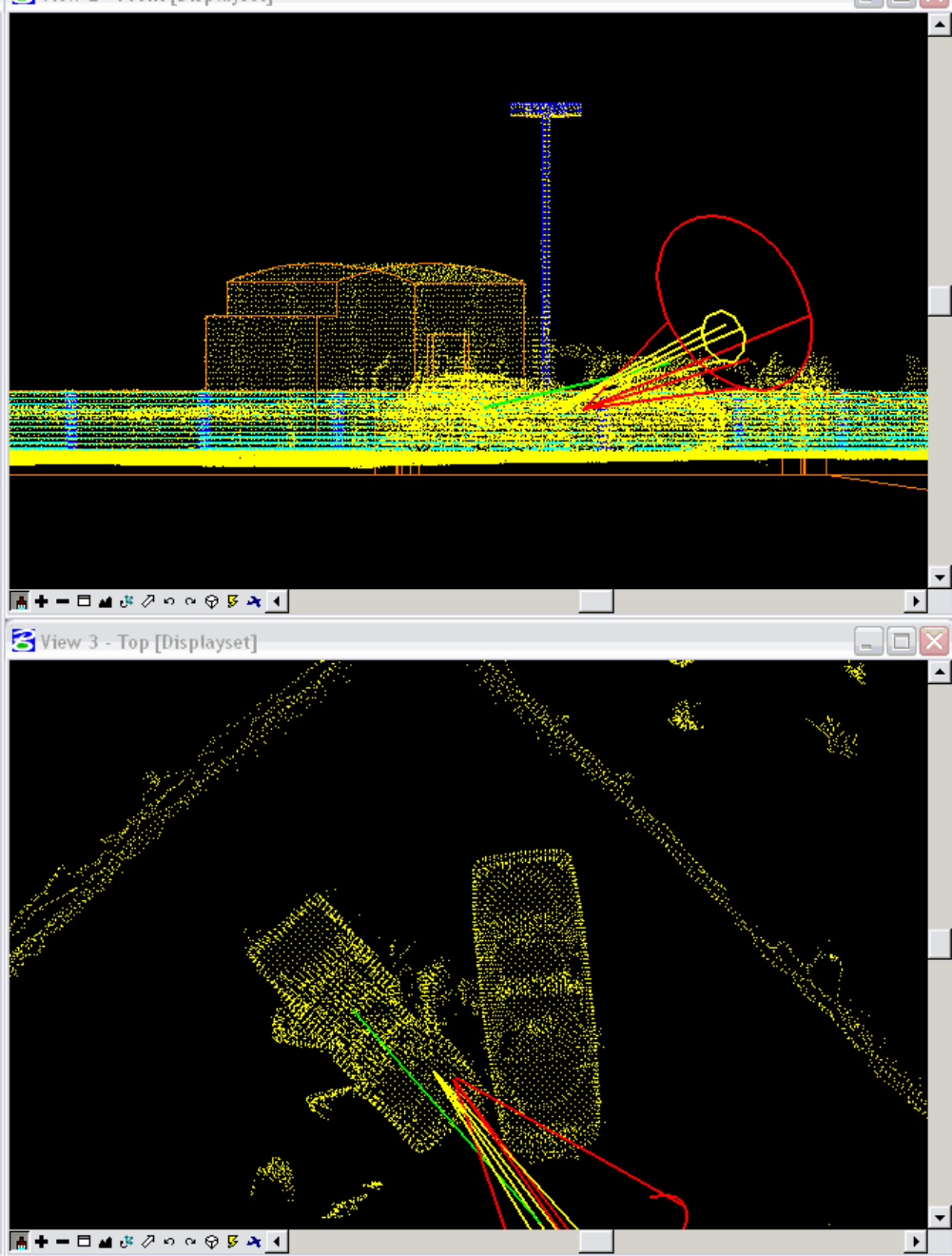
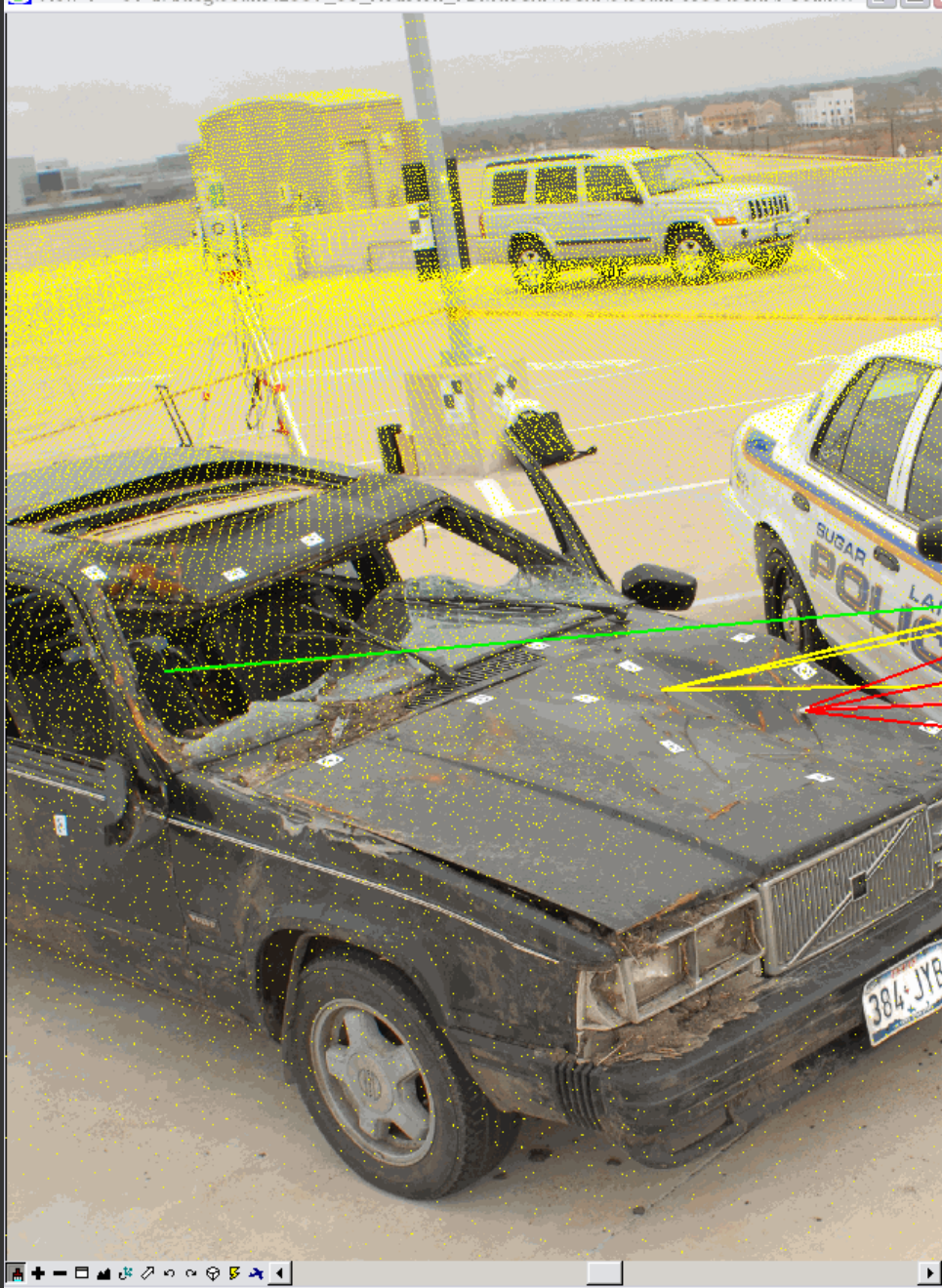
Multi Image Measurement

Measurement in Plane

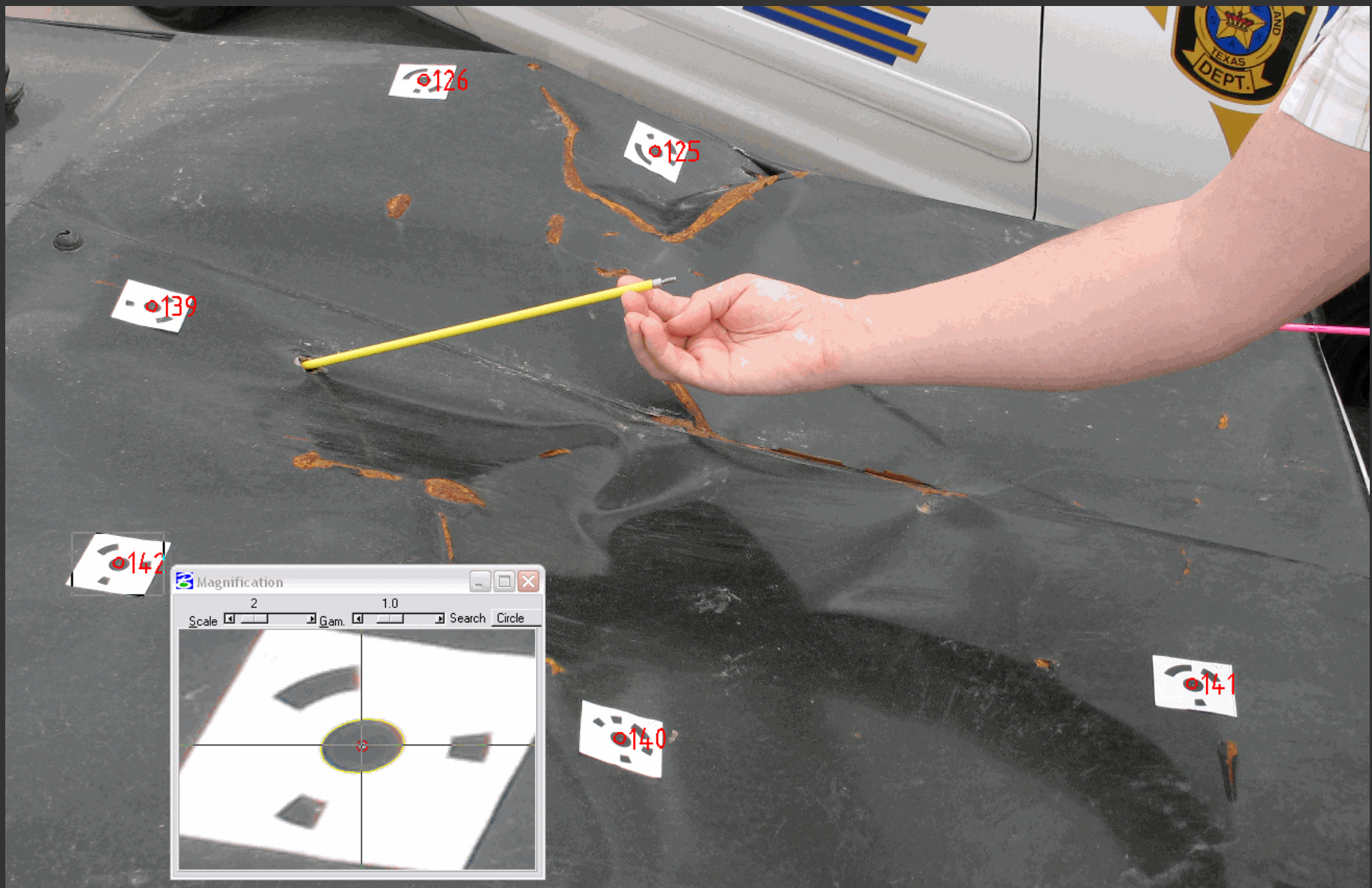
Cylinder and Edge Measurement

3D Intersection with Pointcloud



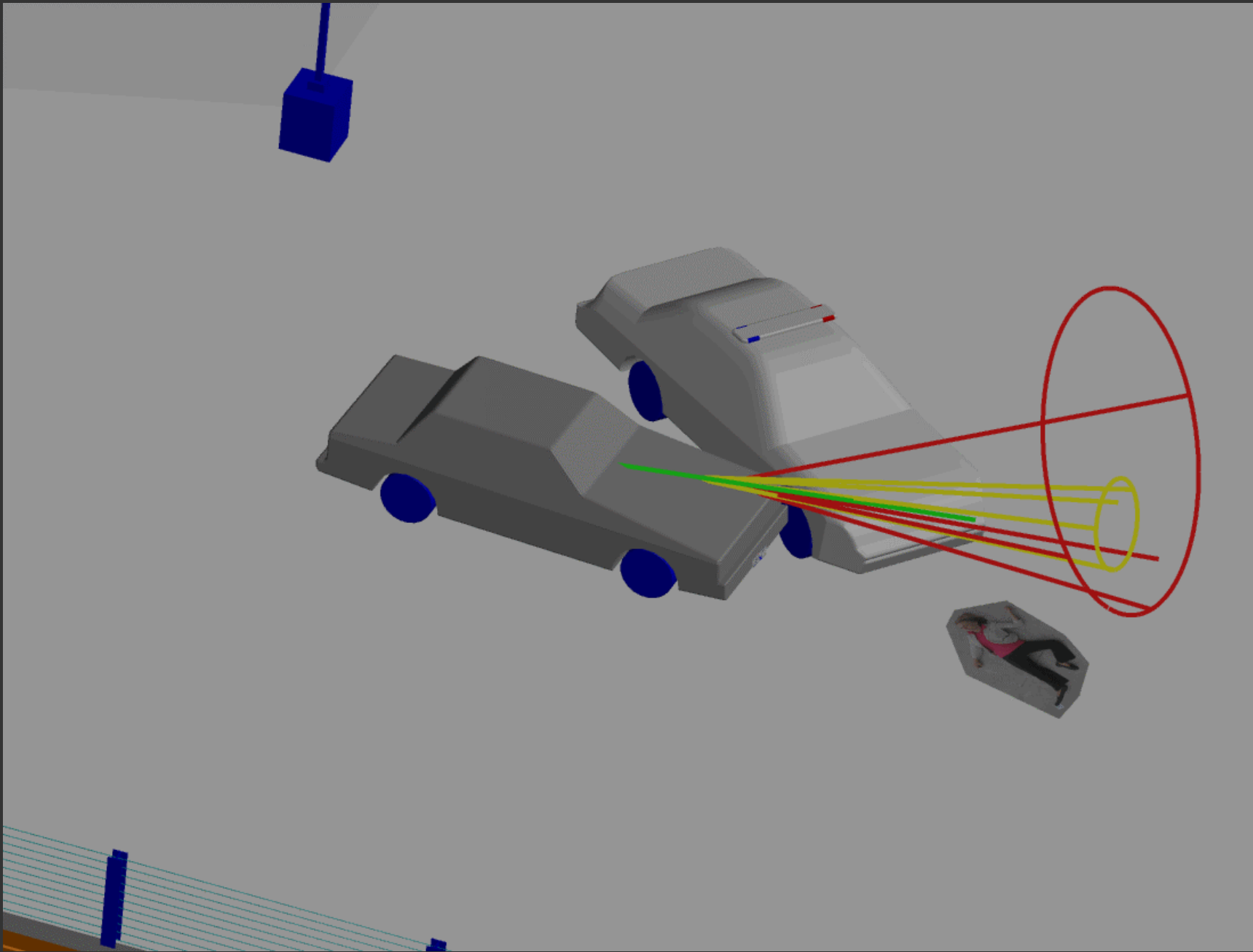


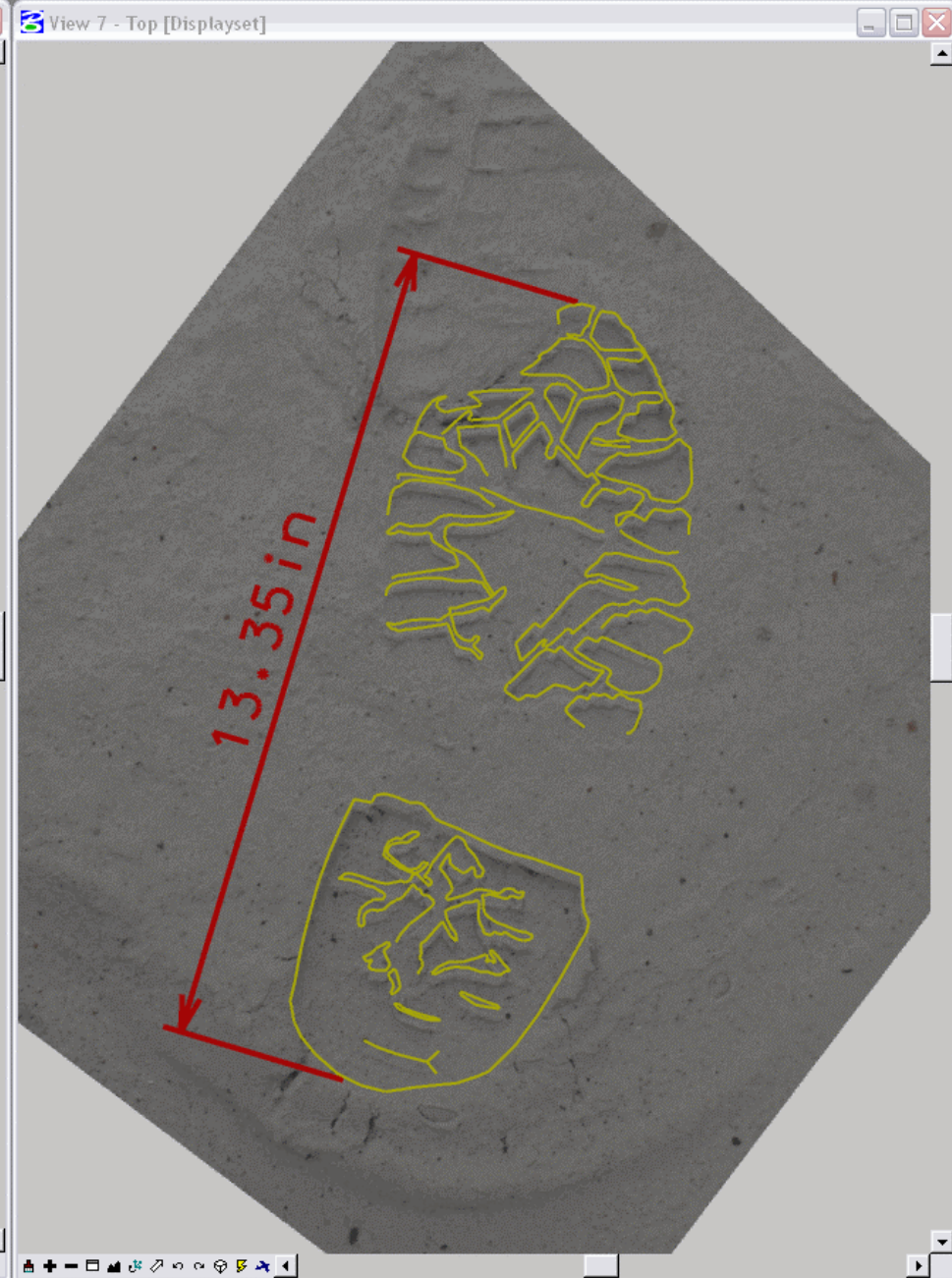
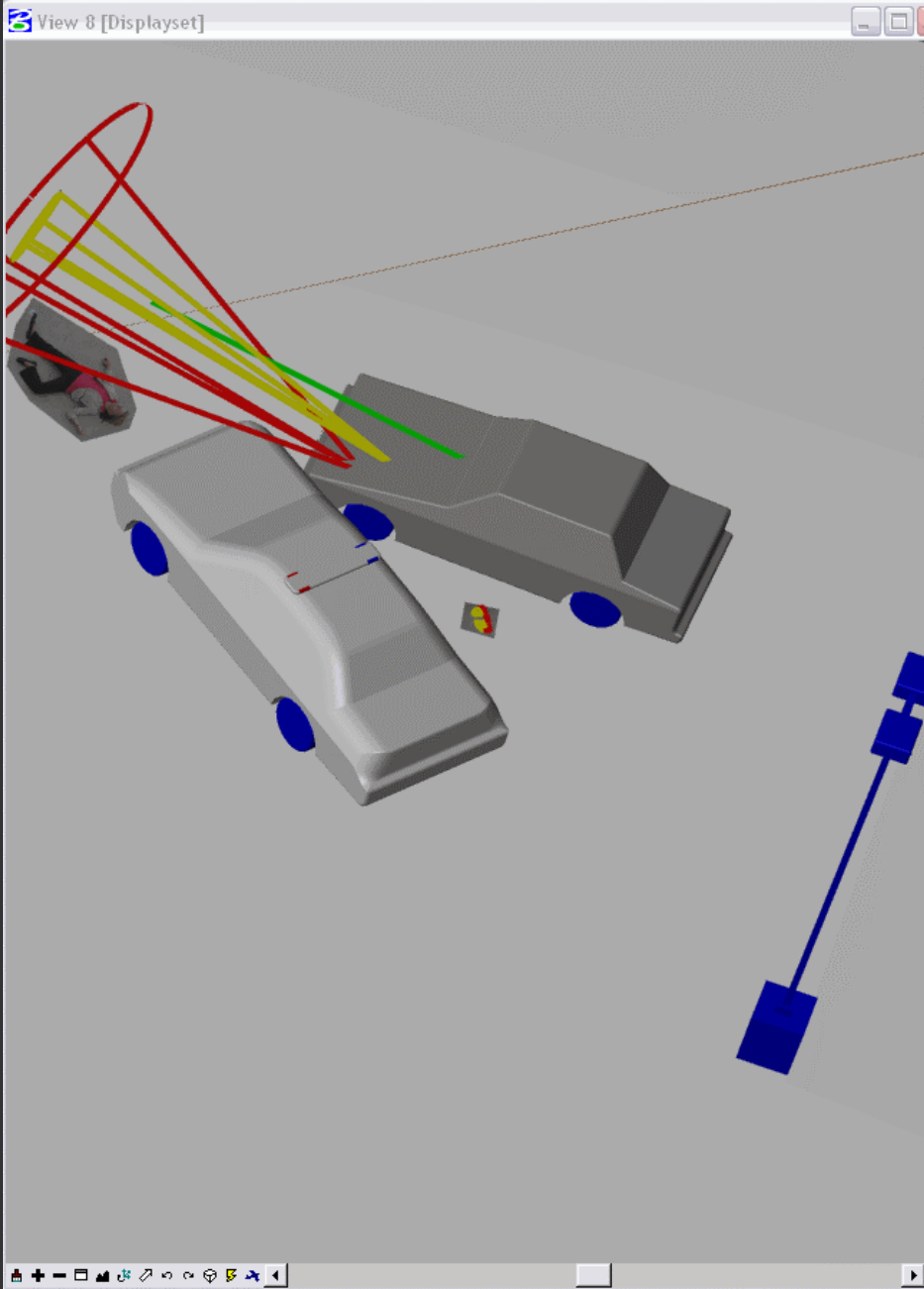
# PHIDIAS 3D Monoplotting





# PHIDIAS 3D Model











Thank you  
for your attention!



**RIEGL**  
LASER MEASUREMENT SYSTEMS