



Region 1: Test results for Quincy, MA

Summary

In FEMA-Region 1 the Quincy area is split up in multiple parts. This test encompasses total about 45 square miles. A LiDAR data acquisition was ordered for a 2' equivalent contour accuracy, which equals the highest specification level. The area was flown and post-processed by Photo Science. CompassData performed the quality control of the collected and processed LiDAR data with a fundamental vertical accuracy (FVA) and a consolidated vertical accuracy (CVA) assessment, respectively. The planning, data collection, data processing, and data testing were successfully accomplished by the STARR members.

Index

- Final Test Results
- FVA Test
- CVA Test
- Distribution of Testing Points
- FVA Test Details
- CVA Test Details

Final Test Results

The vertical accuracy requirements based on flood risk and terrain slope are met with 13.6 cm and 14.3 cm for both FVA and CVA testing. The mandatory requirements for the highest specification for vertical accuracy, 95% confidence level are for FVA < 24.5 cm and CVA < 36.3 cm.

FVA Test

Tested 13.6 cm fundamental vertical accuracy at 95% confidence level in open terrain using $RMSE_z \times 1.9600$. The Root Mean Square Error for the elevation differences between GPS control points and LiDAR points is 7.0 cm calculated with 20 FVA points.

CVA Test

Tested 14.3 cm consolidated vertical accuracy at 95th percentile in: open terrain, forest terrain, and urban terrain. The Root Mean Square Error for the elevation differences between GPS control points and LiDAR points is 7.6 cm calculated with 20 supplemental vertical accuracy points (SVA).



Distribution of Testing Points

Region 1, Quincy, MA



Legend:

-  FVA points in open terrain on hard surface
-  FVA points in open terrain used as well in CVA test
-  SVA points in open terrain
-  SVA points in urban terrain
-  SVA points in forest terrain

According to the area to be tested the 20 FVA points are evenly distributed. Additional 20 SVA points are distributed in respect to the available major land classes.



FVA Test Details

UTM Zone 19 North, NAD83, NAVD88

MSL = NAVD88/Geoid09

All units in meters

FVA	Date	Easting	Northing	MSL(m)	MSL(o)	Δ Z
QUI301	10/16/2010	337952.519	4700553.367	2.527	2.53	0.00
QUI302	10/16/2010	338044.661	4700042.956	3.503	3.26	0.24
QUI303	10/16/2010	333782.262	4699871.796	3.684	3.65	0.03
QUI304	10/16/2010	335117.700	4698767.163	3.859	3.82	0.04
QUI305	10/16/2010	336026.737	4697706.271	1.449	1.49	-0.04
QUI306	10/16/2010	335168.795	4695331.519	3.681	3.66	0.02
QUI307	10/16/2010	329891.003	4694621.573	2.218	2.24	-0.02
QUI308	10/16/2010	334333.846	4694230.510	2.943	2.92	0.02
QUI309	10/16/2010	337944.999	4692694.558	3.715	3.70	0.01
QUI310	10/16/2010	330953.199	4690462.959	2.540	2.59	-0.05
QUI311	10/16/2010	334210.081	4689324.585	8.551	8.63	-0.08
QUI312	10/16/2010	331233.703	4688273.395	2.349	2.37	-0.02
QUI313	10/16/2010	332019.994	4687020.782	6.336	6.29	0.05
QUI314	10/16/2010	329903.226	4682716.864	14.556	14.55	0.01
QUI315	10/16/2010	334144.604	4684827.337	12.438	12.46	-0.02
QUI316	10/21/2010	332960.508	4685011.997	2.895	2.91	-0.02
QUI317	10/16/2010	334261.206	4681925.206	1.701	1.71	-0.01
QUI318	10/16/2010	335224.959	4680208.183	9.969	9.90	0.07
QUI319	10/16/2010	337108.419	4678766.805	6.273	6.19	0.08
QUI320	10/16/2010	339029.740	4681929.002	2.268	2.18	0.09

Z Mean	0.046	RMSE:	0.070
Z Min:	-0.079	* 1.9600	0.136
Z Max:	0.243		

Note:

All 20 of the FVA points (open terrain) passed. 100% of the points are within the 24.5 cm confidence level. The FVA test is passed.



CVA Test Details

CVA	Date	Northing (GPS)	Easting (GPS)	MSL (GPS)	MSL (LiDAR)	ΔZ
QUI301	10/16/2010	4700553.367	337952.519	2.527	2.53	0.00
QUI306	10/16/2010	4695331.519	335168.795	3.681	3.66	0.02
QUI310	10/16/2010	4690462.959	330953.199	2.54	2.60	-0.06
QUI316	10/16/2010	4685011.997	332960.508	2.895	2.91	-0.02
QUI318	10/16/2010	4680208.183	335224.959	9.969	9.89	0.08
QUI701	10/16/2010	4681022.644	338515.684	4.341	4.35	-0.01
QUI702	10/16/2010	4680643.478	335693.723	3.656	3.69	-0.03
QUI703	10/16/2010	4682613.346	329968.930	13.432	13.36	0.07
QUI704	10/16/2010	4686312.869	331237.468	8.135	8.08	0.05
QUI705	10/16/2010	4696598.940	335384.071	32.168	32.03	0.14
QUI801	10/16/2010	4689186.482	332998.957	5.418	5.38	0.04
QUI802	10/16/2010	4687031.718	331728.854	3.379	3.44	-0.06
QUI803	10/16/2010	4684146.921	331779.140	3.701	3.73	-0.03
QUI804	10/16/2010	4682264.119	332974.547	8.789	8.83	-0.04
QUI805	10/16/2010	4681500.306	334271.317	4.19	4.18	0.01
QUI806	10/21/2010	4679776.416	338150.730	3.008	3.00	0.01
QUI807	10/16/2010	4700366.445	338306.459	2.222	1.98	0.24
QUI808	10/16/2010	4698457.320	334988.721	5.557	5.56	0.00
QUI809	10/16/2010	4693988.540	332633.137	19.509	19.48	0.03
QUI810	10/16/2010	4694279.082	336845.995	3.723	3.63	0.09

Z Mean	0.05	RMSE:	0.076
Z Min:	-0.06	* 1.9600	0.149
Z Max:	0.24	95 Percentile	0.143

Land Class Types: O = Open, F = Forest, U = Urban

UTM Zone 19 North, NAD83, NAVD88

MSL = NAVD88/Geoid09

All units in meters

Note:

All 20 of the SVA points (open, forest, and urban terrain) passed. 100% of the points are within the 36.3 cm confidence level. The CVA test is passed.