



Region 1: Test results for Blackstone, MA

Summary

In FEMA-Region 1 the Blackstone area is split up in multiple parts. This test encompasses 5 parts in total about 85 square miles. (Other Blackstone parts are processed and tested with the adjoining Narragansett and Charles areas.) 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.

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Final Test Results

The vertical accuracy requirements based on flood risk and terrain slope are met with 16.7 cm and 30.4 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

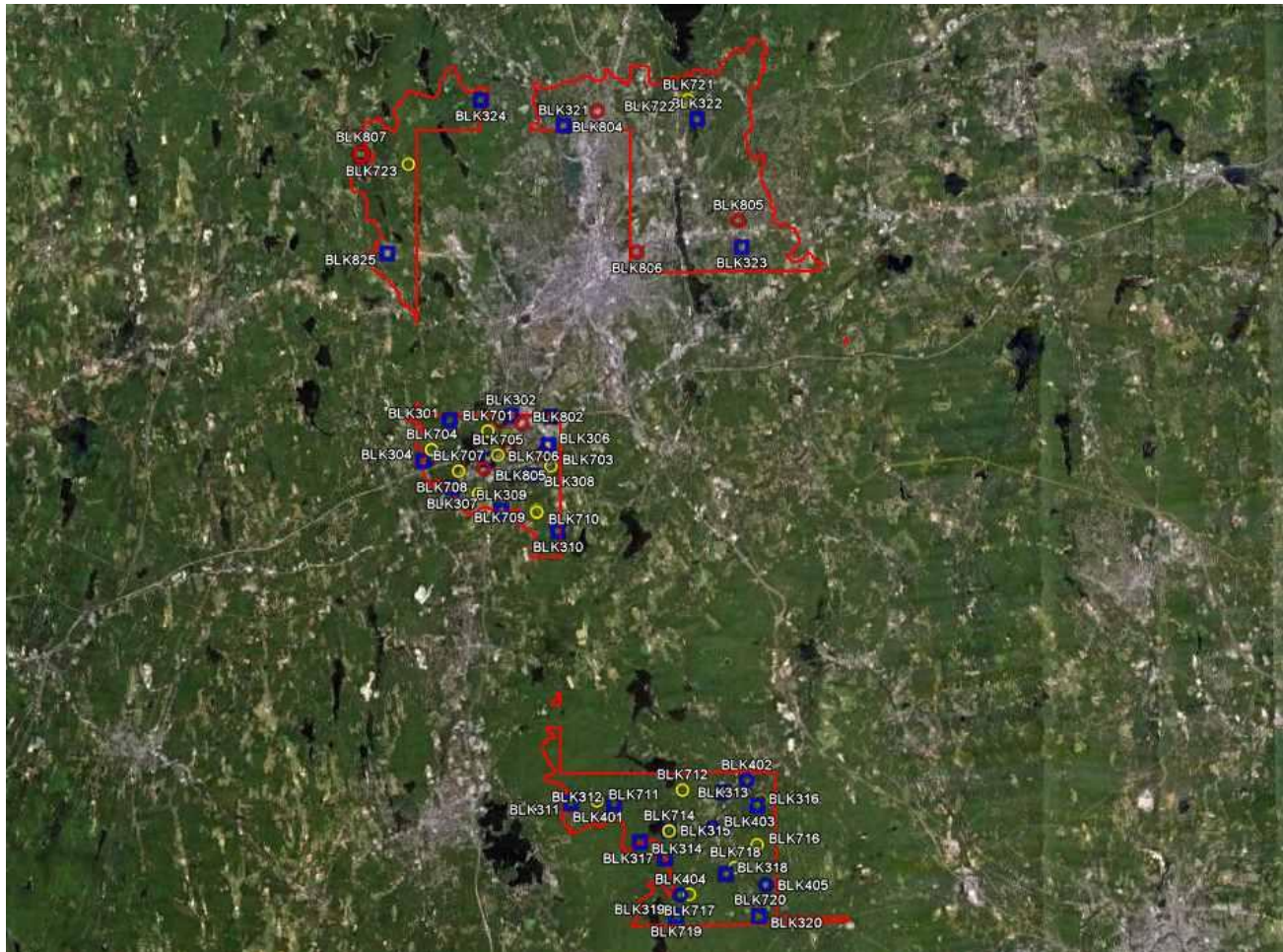
Tested 16.7 cm fundamental vertical accuracy at 95% confidence level in open terrain using $RMSE_{(Z)} \times 1.9600$. The Root Mean Square Error for the elevation differences between GPS control points and LiDAR points is 8.5 cm calculated with 25 FVA points.

CVA Test

Tested 30.4 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 15.1 cm calculated with 35 supplemental vertical accuracy points (SVA).








Distribution of Testing Points



Region 1, Blackstone, 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 25 FVA points are evenly distributed. Additional 35 SVA points are distributed in respect to the available major land classes.



FVA Test Details

FVA-Points	Date	Northing (GPS)	Easting (GPS)	MSL (GPS)	MSL (LiDAR)	ΔZ
BLK301	10/19/2010	4676325.404	262633.315	216.065	215.92	0.14
BLK302	10/19/2010	4676429.711	265265.384	176.918	176.91	0.01
BLK303	10/19/2010	4676330.778	266949.246	175.503	175.52	-0.02
BLK304	10/19/2010	4674610.586	261440.257	221.339	221.28	0.06
BLK305	10/19/2010	4674581.889	264218.053	191.433	191.48	-0.05
BLK306	10/19/2010	4675125.291	266802.673	164.545	164.51	0.04
BLK307	10/19/2010	4673426.518	262653.193	193.648	193.62	0.03
BLK308	10/19/2010	4673866.202	266108.635	169.225	169.13	0.09
BLK309	10/19/2010	4672383.417	264723.953	183.974	183.93	0.04
BLK310	10/19/2010	4671432.607	267120.915	207.141	207.13	0.01
BLK311	10/19/2010	4659893.263	267303.829	251.692	251.71	-0.02
BLK312	10/19/2010	4659812.155	269138.779	213.646	213.65	0.00
BLK313	10/19/2010	4660121.479	273794.509	152.581	152.66	-0.08
BLK314	10/19/2010	4658148.997	270195.201	206.313	206.39	-0.08
BLK315	10/19/2010	4658586.174	271425.306	210.857	210.90	-0.04
BLK316	10/19/2010	4659520.912	275229.324	169.317	169.41	-0.09
BLK317	10/19/2010	4657423.611	271242.829	193.949	194.09	-0.14
BLK318	10/19/2010	4656671.08	273800.320	160.319	160.40	-0.08
BLK319	10/19/2010	4654988.602	271634.816	223.352	223.50	-0.15
BLK320	10/19/2010	4654850.045	275157.630	136.846	136.99	-0.14
BLK321	11/21/2010	4688795.695	267898.982	214.183	214.02	0.16
BLK322	11/21/2010	4689729.573	273273.903	142.443	142.34	0.10
BLK323	11/21/2010	4683330.662	275385.617	167.748	167.78	-0.03
BLK324	11/21/2010	4683530.678	260183.752	326.264	326.26	0.00
BLK325	11/21/2010	4690002.242	264377.276	267.113	267.17	-0.06

ΔZ Mean	0.07		
ΔZ Min	-0.15	RMSE:	0.085
ΔZ Max	0.16	* 1.96	0.167

UTM Zone 19 North, NAD83, NAVD88

MSL = NAVD88/Geoid09

All units in meters

Note:

All 25 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

SVA-Points	Typ	Date	Northing (GPS)	Easting (GPS)	MSL (GPS)	MSL (LiDAR)	Δ Z
BLK401	O	11/18/2010	4659936.674	268454.961	237.654	237.67	0.02
BLK402	O	11/18/2010	4660585.896	274832.793	156.109	156.10	-0.01
BLK403	O	11/18/2010	4658632.905	273299.845	176.752	176.79	0.04
BLK404	O	11/18/2010	4655861.719	271837.606	228.827	228.82	-0.01
BLK405	O	11/18/2010	4656143.669	275499.147	143.111	143.14	0.03
BLK701	F	12/5/2010	4675791.862	264249.616	182.963	182.98	0.02
BLK702	F	12/5/2010	4675578.769	265078.619	170.043	170.06	0.02
BLK703	F	12/5/2010	4674212.220	266904.815	158.432	158.44	0.01
BLK704	F	12/5/2010	4675076.628	261825.420	225.523	225.58	0.06
BLK705	F	12/5/2010	4674748.227	264648.160	179.003	179.04	0.04
BLK706	F	12/5/2010	4673988.761	266149.237	172.501	172.56	0.06
BLK707	F	12/5/2010	4674123.354	262951.991	193.974	194.05	0.08
BLK708	F	12/5/2010	4673138.827	263783.434	236.081	236.21	0.13
BLK709	F	12/5/2010	4672322.972	266225.415	183.705	183.74	0.03
BLK710	F	12/5/2010	4672255.701	266244.404	187.822	187.96	0.14
BLK711	F	12/5/2010	4659942.238	268427.943	237.038	237.29	0.25
BLK712	F	4/1/2011	4660283.362	272073.356	201.033	201.34	0.31
BLK713	F	4/1/2011	4659719.347	275395.389	162.902	163.14	0.24
BLK714	F	12/5/2010	4658562.800	271449.271	210.476	210.64	0.16
BLK715	F	12/5/2010	4658572.905	273281.203	186.561	186.77	0.21
BLK716	F	12/5/2010	4657857.088	275174.713	178.937	179.18	0.24
BLK717	F	12/5/2010	4655864.858	272222.828	212.640	212.81	0.17
BLK718	F	12/5/2010	4656921.563	274209.750	156.280	156.60	0.32
BLK719	F	4/1/2011	4655006.133	271615.572	222.887	223.19	0.30
BLK720	F	12/5/2010	4654872.821	275194.497	136.580	136.79	0.21
BLK721	F	11/21/2010	4689724.370	273304.835	141.600	141.71	0.11
BLK722	F	11/21/2010	4689752.231	273264.212	143.208	143.15	-0.06
BLK723	F	11/21/2010	4687298.947	261213.830	424.195	424.01	-0.19
BLK801	U	12/5/2010	4676221.578	264767.784	173.664	173.59	-0.07
BLK802	U	12/5/2010	4676084.534	265698.839	157.073	157.02	-0.05
BLK803	U	12/5/2010	4674987.104	265132.366	164.262	164.23	-0.03
BLK804	U	12/5/2010	4674764.197	266566.244	159.454	159.36	-0.09
BLK805	U	12/5/2010	4674190.856	264031.679	191.576	191.55	-0.03
BLK806	U	11/21/2010	4683245.411	270886.452	149.684	149.49	-0.19
BLK807	U	11/21/2010	4687774.686	259206.339	349.767	349.87	0.10

Z Mean	0.12	RMSE:	0.152
Z Min:	-0.19	* 1.9600	0.297
Z Max:	0.32	95 Percentile	0.304

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



UTM Zone 19 North, NAD83, NAVD88

MSL = NAVD88/Geoid09

All units in meters

Note:

All 35 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.