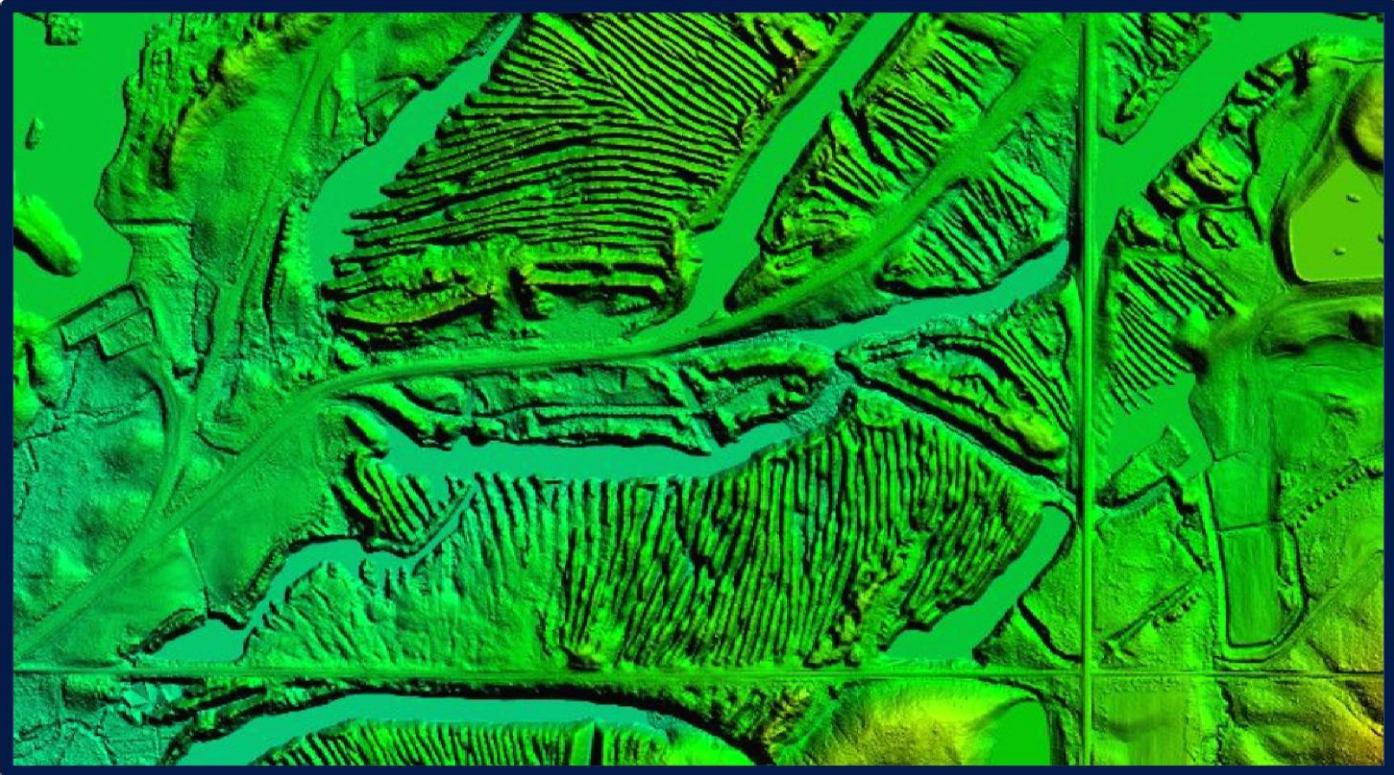




LIDAR ACCURACY REPORT

Project:	2015 ILHMP LiDAR Project
Report Area:	Ford-Iroquois-Livingston Counties, IL
Project No.:	U160013
Retainer Contract:	E0015873-R1
Date:	9-May-2016
Submitted by:	Wade Williams, C.P. Project Manager

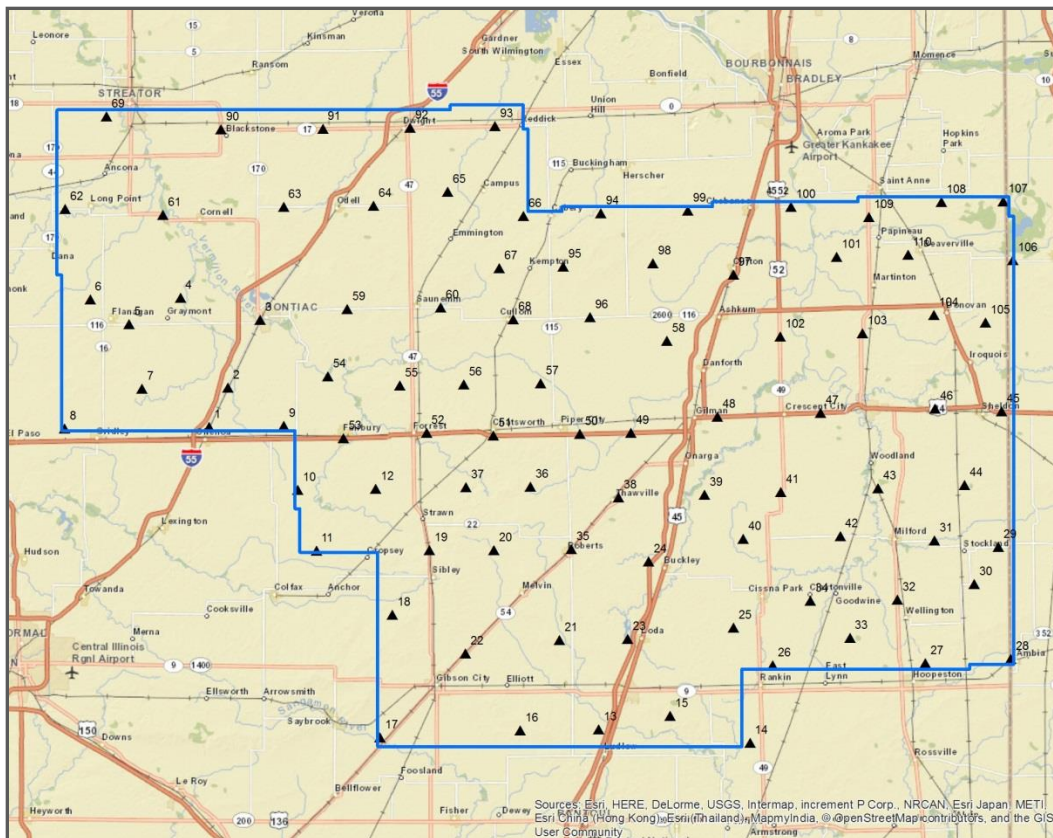


LiDAR Data Collection

The LiDAR elevation data for this project was collected April 27 to June 7, 2015 with a Leica ALS70HP Aerial LiDAR sensor system mounted in a twin engine Cessna 335. For efficiency purposes, this project design called for one combined flight plan for all three counties, with acquisition of LiDAR data with lines flown approximately 4,800' above mean sea level in a north-south alignment, with a perpendicular cross flight used for calibration purposes. The collection scenario called for the acquisition of a minimum contract point spacing of 0.67 meters on the ground.

Ford, Iroquois & Livingston Co. Swath LiDAR

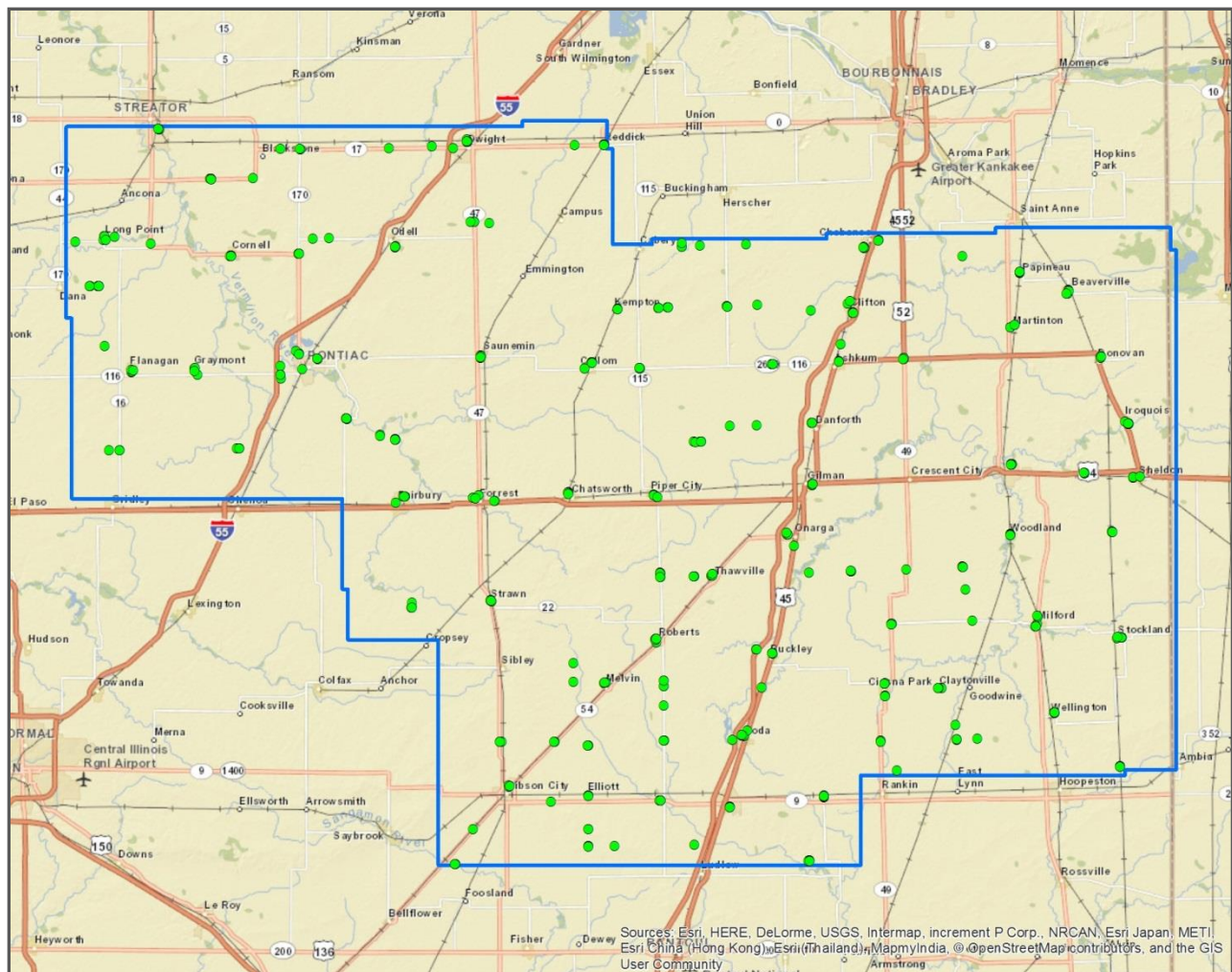
The field survey for this three county area consisted of 90 hard surface (bare-earth) control points used for calibrating the unclassified LiDAR swath data. The graphic below presents these control points over the counties. A complete copy of the results has been provided in the Accuracy folder, this chart shows the results.



Stat	Hard Surface (HS)
Count	90
RMSEz (NVA) feet	0.169
95% Confidence Level (NVA) feet	0.332

Ford, Iroquois & Livingston Co. LiDAR QC Check

An additional set of survey check points were collected over the combined Ford, Iroquois & Livingston flight plan for an independent QC of the LiDAR as validated against the swath LAS & DEM deliverable tiles. The points were collected over the following feature types: 95 hard surface points, 122 short grass points, 100 tall grass points, 100 tree & 99 brush points for a total of 516 QC check points in the three counties. The graphic below presents the distribution of QC check points over both counties.



These points consisted of various types of ground cover including hard surface, brush, short grass, tall grass and trees. Examples of actual points surveyed in Jefferson-Marion are included below.



Brush –Point 1009b



Trees –Point 1010t



Short Grass – Point 1006sg



Tall Grass – Point 1001tg



Hard Surface – Point 1002hs

The required LiDAR elevation data values were derived within ArcGIS off the classified LAS and 4' gsd raster grids. For each QC point location a LiDAR elevation value was derived and exported and the surface value subtracted from the survey elevation. These derived values were imported into Excel and comparisons were performed to generate statistics by ground cover type and for the overall dataset. Values reported are in US Feet due to the fact that all data was processed in IL Stateplane, NAD83, East Zone however metric equivalents are stated in some cases.

As indicated above the Swath LiDAR LAS hard surface Non-Vegetated Vertical Accuracy (NVA) meets project specifications RMSEz less than or equal to 10.0 cm (0.328 feet) & 19.6cm (0.643 feet) at the 95-percent confidence level. The calculated bare-earth RMSEz equals 5.5 cm (0.182 feet) and 10.9cm (0.358 feet) at the 95-percent confidence level.

In addition, the DEM grids Vegetated Vertical Accuracy (VVA) meet project specifications less than or equal to 29.4cm (0.965 feet) at the 95th percentile.

Swath LAS QC Accuracy Results

Stat	Hard Surface (HS)
Count	95
RMSEz (NVA) feet	0.182
95% Confidence Level (NVA) feet	0.358

Classified LAS QC Accuracy Results

The table below presents the results of the QC accuracy analysis for the three counties data set derived from the classified LAS tile data. All values are in US Feet.

Statistic	Overall	Hard Surface	Short Grass	Tall Grass	Trees	Brush
Count	516	95	122	100	100	99
RMSEz	0.421	0.173	0.246	0.482	0.404	0.648
95% CI	0.825	0.339	0.482	0.944	0.792	1.270
95th Percentile	0.965	0.327	0.416	1.050	0.956	1.259

DEM QC Accuracy Results

The table below presents the results of the QC accuracy analysis for the three counties data set derived from the DEM grids. All values are in US Feet.

Statistic	Overall	Hard Surface	Short Grass	Tall Grass	Trees	Brush
Count	516	95	122	100	100	99
RMSEz	0.411	0.171	0.231	0.462	0.401	0.640
95% CI	0.806	0.336	0.453	0.906	0.786	1.253
95th Percentile	0.957	0.321	0.415	0.981	0.935	1.264