

Phase I Completion Report

Project U15039

LiDAR Acquisition

IL Counties of Jefferson & Marion

Surdex Corporation Project # 2401207
June 2015

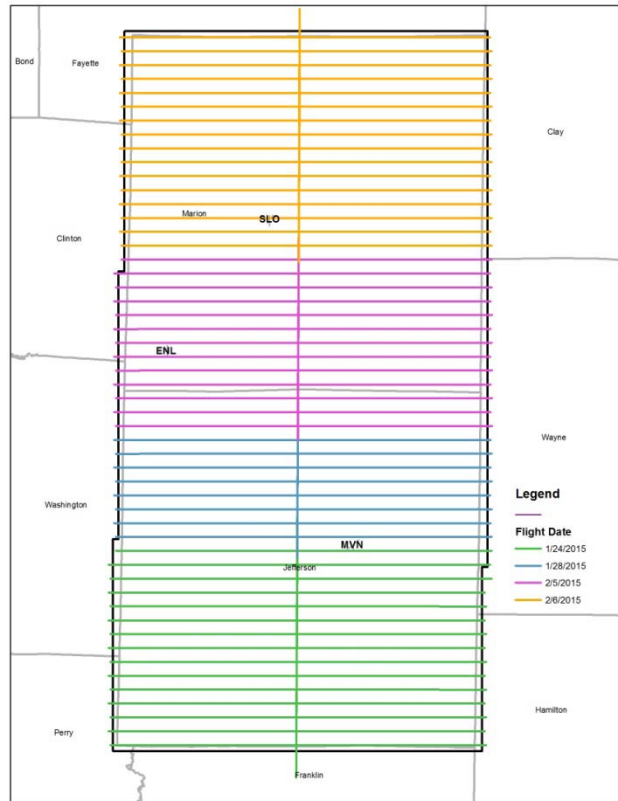


LIDAR Acquisition:

The Illinois project areas of Jefferson & Marion Counties were fully covered by 2,000' tiles in a State Plane IL East layout provided by the University of Illinois. Full tiles covering these counties areas were buffered for flight planning purposes. The following parameters were used in preparing the flight plan.

Flight altitude	Approximately 8,828' AMSL
Airspeed	150 knots
Full swath width	1,959 meters
Scan Rate	30.6 Hz
Sidelap	30.00%
Field of View	40 degrees
Nominal Post Spacing	0.86 meters
Max Pulse Repetition Rate	205 KHz
Returns per pulse	4 + intensity

LiDAR data was flown in 4 lifts by Surdex Corporation between January 24 to February 6, 2015. Surdex utilized their twin engine Cessna 335 with a Leica ALS70-HP multi-pulse instrument and based their operations at three airports: Salem (SLO), Centralia (ENL) and Mt Vernon (MVN) Airports were used in order to keep the baseline distance to a maximum of 25 miles. The graphic below shows areas covered by each flight date. Perpendicular (north-south) lines indicate cross flights flown.



The flight crew was guided by a GPS controlled flight management system, which displayed the flight plan; including altitude, heading, cross track deviation and PDOP. During the flight mission, the system operator monitored flight management data and laser information, to ensure a successful mission.

Before and after each LiDAR mission, Surdex Corporation collected a perpendicular cross flight over lines collected during that lift. This process ensures the ability to compare point data collected in multiple directions for any indication of problems with the data.

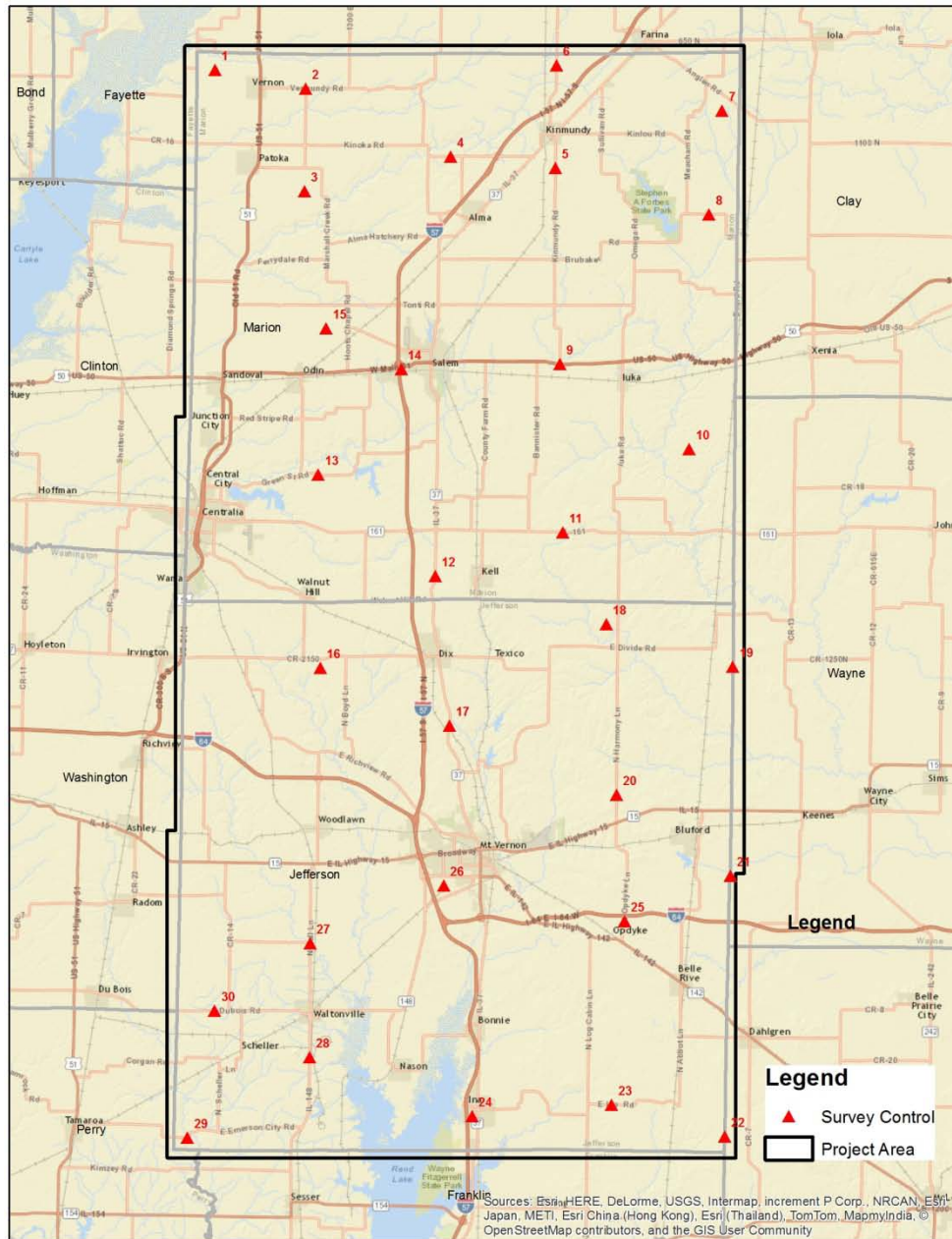
Surdex performed quality checks against all missions to ensure sufficient point coverage of all collected flight lines, review of intensity data and verification that all collected GPS-IMU data was within expected data quality ranges. All other initial processing yielded no issues and allows Surdex to progress into Phase II for full processing and delivery.

Ground Survey

Surdex collected 30 survey ground control points across both counties. This data will be used to vertically adjust the LiDAR data, if necessary, once all bare earth classification macros have been successfully run-early in Phase II of this project.

Surdex has found the most success with ground control adjustment when evaluated exclusively against bare earth data. Although all points would receive the adjustment, performing the assessment at this stage ensures that low lying vegetation is not used to assess the vertical accuracy of the LiDAR data when determining how much of a vertical adjustment should be applied.

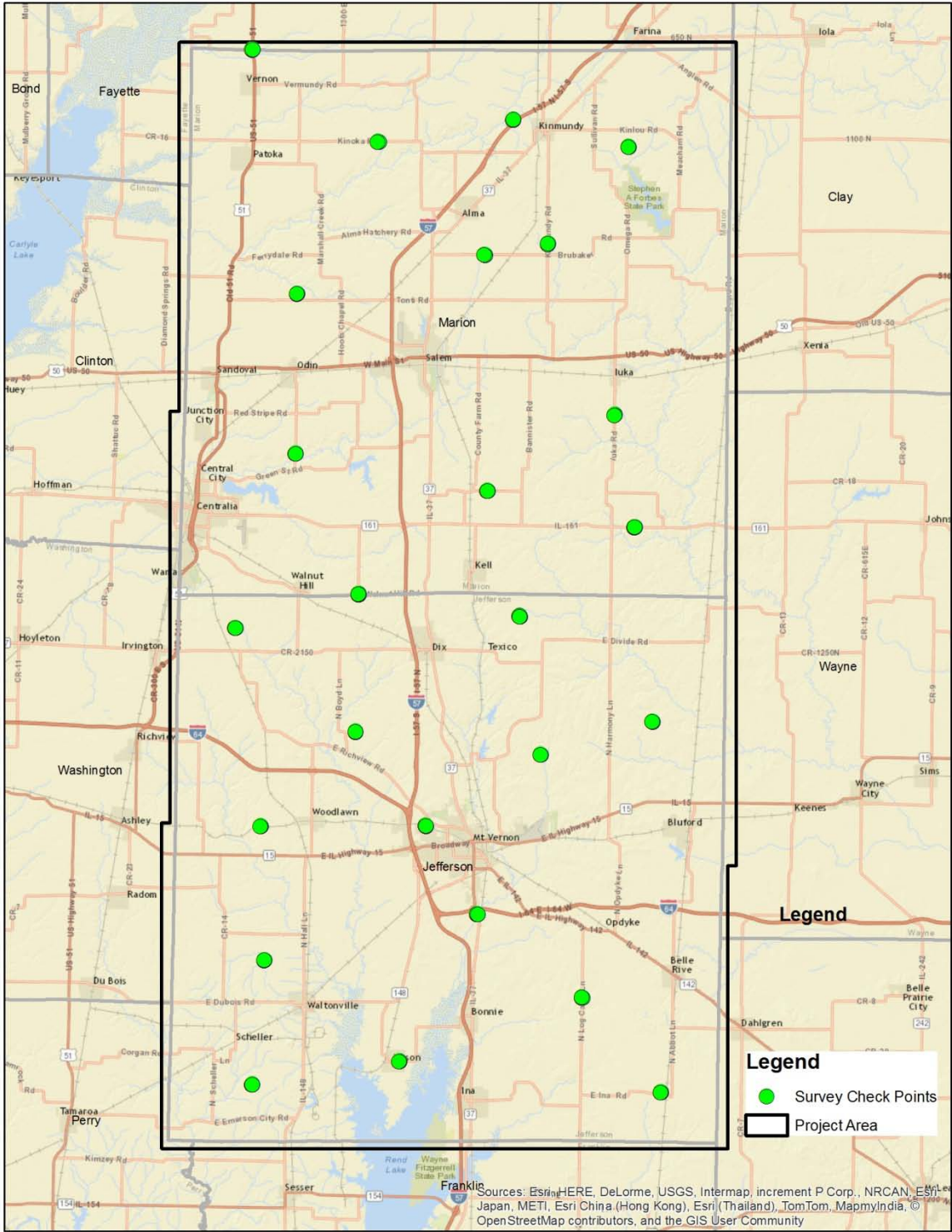
Here is an overview of the survey control collected for the project.



Quality Control Points

Surdex has also completed field collection of 150 QC points – 30 clusters of 5 points in State Plane IL East zone. This data will provide an independent evaluation of the processed LiDAR against all five ground cover classes - Hard Surfaces (HS), Short grass (SG), Tall grass (TG), Brush (B) and Forested (F). This process included collection of ground photos where possible, samples of ground photos in the various classes are included below. This data will be used in Phase II for final completion of all project deliverables.

Overview of the point “clusters” – each cluster has 5 points for each of the ground cover classes.



Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, Mapnyndia, OpenStreetMap contributors, and the GIS User Community

Sample of QC point cluster in Jefferson County.



Sample ground photos of QC points by groundcover:

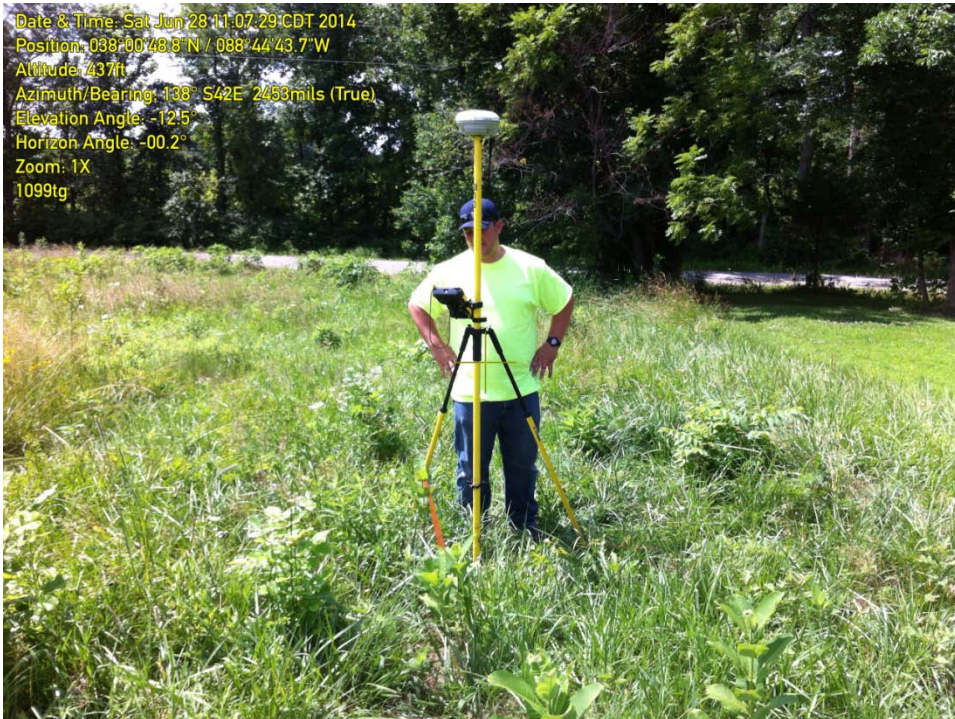
SHORT GRASS

Date & Time: Sat Jun 28 11:05:41 CDT 2014
Position: 038°03'45.3"N / 088°51'22.7"W
Altitude: 455ft
Azimuth/Bearing: 101° S79E 1796mils (True)
Elevation Angle: -08.8°
Horizon Angle: -00.6°
Zoom: 1X
1098sg



TALL GRASS

Date & Time: Sat Jun 28 11:07:29 CDT 2014
Position: 038°00'48.8"N / 088°44'43.7"W
Altitude: 437ft
Azimuth/Bearing: 138° S42E 2463mils (True)
Elevation Angle: -12.5°
Horizon Angle: -00.2°
Zoom: 1X
1099tg



HARD SURFACE



BRUSH



FORESTED

Date & Time: Sat Jun 28 12:01:34 CDT 2014
Position: 038°00'49.3"N / 088°44'36.1"W
Altitude: 408ft
Azimuth Bearing: 128° S52E 2276mts (True)
Elevation Angle: -10.5°
Horizon Angle: -01.2°
Zoom: 1X
1000ft

