

Phase I Completion Report

Project U15007

LiDAR Acquisition

IL Counties of Bond, Clinton & Washington

Surdex Corporation Project # 2401007
July 2015

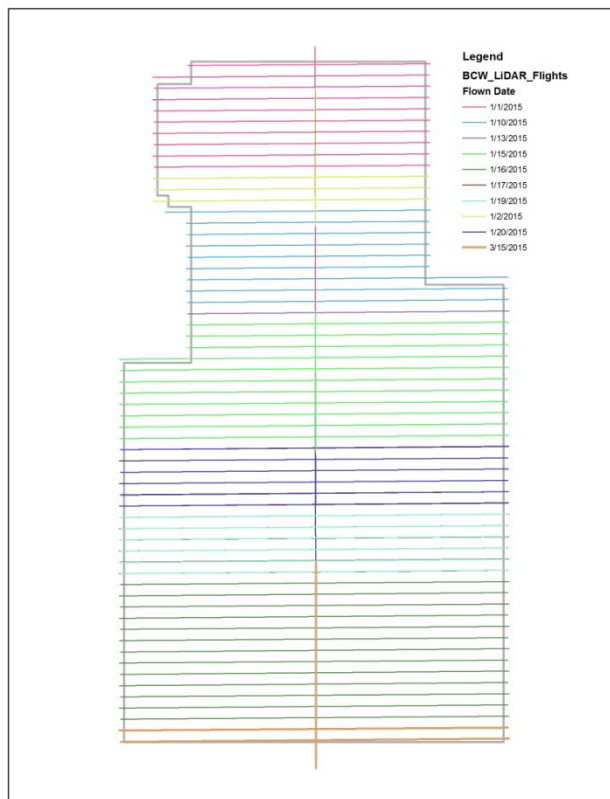


LIDAR Acquisition:

The Illinois project areas of Bond, Clinton & Washington Counties were fully covered by 5,000' tiles in a State Plane IL West 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 9,100' AMSL
Airspeed	150 knots
Full swath width	2021 meters
Scan Rate	53.4 Hz
Sidelap	30.00%
Field of View	40 degrees
Nominal Post Spacing	0.89 meters
Max Pulse Repetition Rate	198 KHz
Returns per pulse	4 + intensity

LiDAR data was flown in 10 lifts by Surdex Corporation between January 1 to January 20, 2015 and one reflight lift on March 15th. Surdex utilized their twin engine Cessna 335 with a Leica ALS70-HP multi-pulse instrument and based their operations at three airports: Greenville (GRE), Centralia (ENL), Pinckneyville (PJY) and Midamerica (BLV) 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.

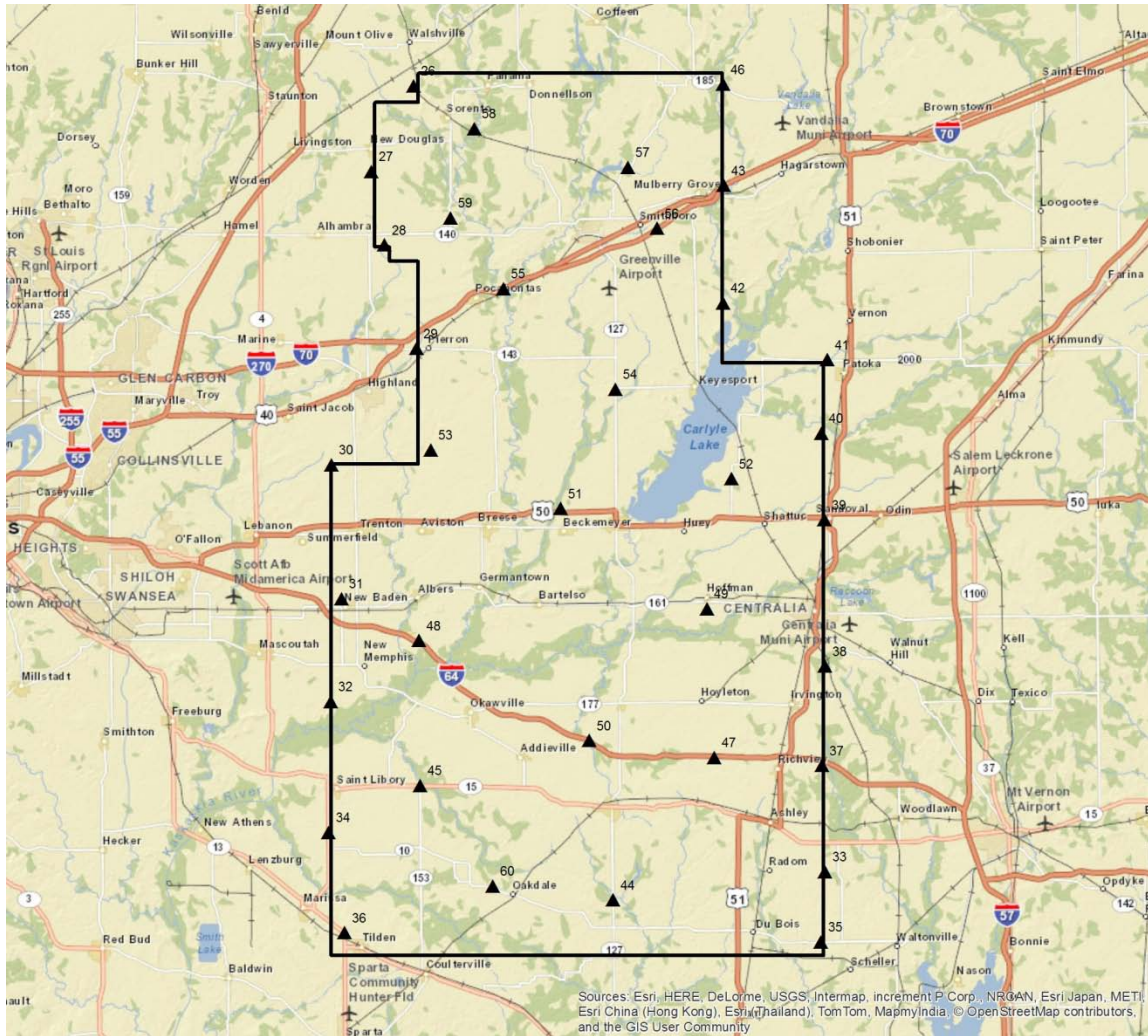
Surdex performed quality checks against all missions to ensure sufficient point coverage of all collected flight lines, review of intensity data and verification that all collected GPS-IMU data was within expected data quality ranges. Surdex was delayed starting the Phase II data processing due to inaccurate sensor calibration settings. Once these settings were updated by the manufacturer the post processing of the swath data was completed.

Ground Survey

Surdex collected 35 survey ground control points across the three 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.

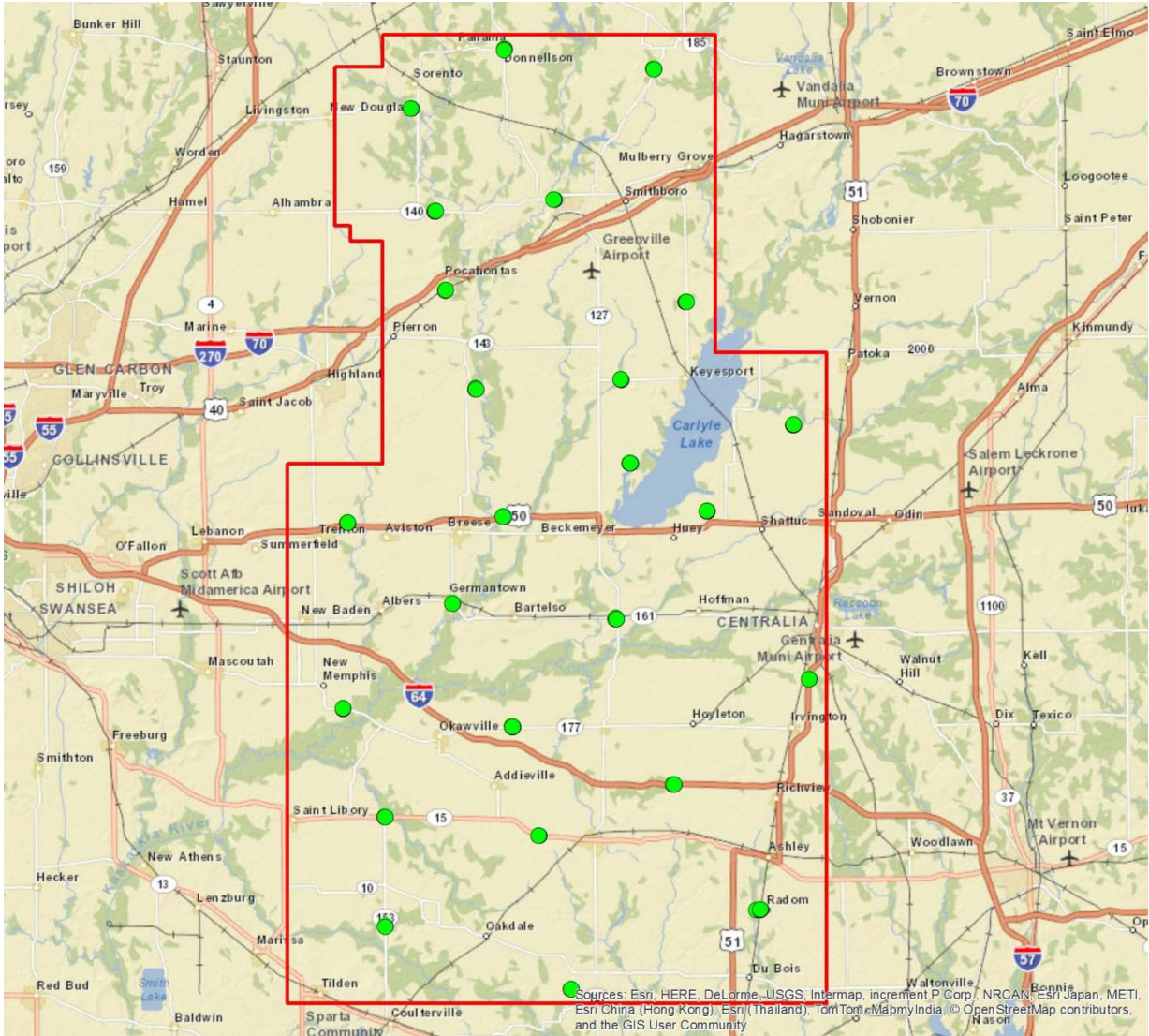
Here is an overview of the survey control collected for the project.



Quality Control Points

Surdex has also completed field collection of 124 QC points in State Plane IL West zone. This data will provide an independent evaluation of the processed LiDAR against all five ground cover classes – 26 Hard Surfaces (HS), 24 Short grass (SG), 26 Tall grass (TG), 24 Brush (B) and 24 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.



Sample of QC point cluster in Clinton County.



Sample ground photos of QC points by groundcover:

SHORT GRASS



TALL GRASS



HARD SURFACE

Date & Time: Wed Dec 17 08:28:31 CST 2014
Position: 038°46'46.3"N / 089°36'46.2"W
Altitude: 482ft
Azimuth: -094° -1671mils
Elevation Angle: +20.3°
Horizon Angle: -03.1°
Zoom: 1X
0291



BRUSH

Date & Time: Fri Dec 19 08:29:12 CST 2014
Position: 038°48'12.0"N / 089°32'28.6"W
Altitude: 496ft
Azimuth: -061° -1084mils
Elevation Angle: +20.9°
Horizon Angle: -03.1°
Zoom: 1X
1004b



FORESTED

Date & Time: Fri Dec 19 08:30:57 CST 2014
Position: 038°49'12.6"N / 089°32'25.6"W
Altitude: 485ft
Azimuth: +026° +0462mils
Elevation Angle: +18.5°
Horizon Angle: -04.4°
Zoom: 1X
1005t

