Greater Wellington Regional Lidar Project Survey Summary

Project Scope: Acquisition and delivery of raw LiDAR point cloud data over the entire Wellington region extending to 100m offshore. Ground model of +/-0.1 to 0.15m in z (1 sigma) with a resolution of 1.3 points per square metre.

Data Acquisition: Airborne Laser Scanner (ALS) data was acquired from a fixed wing aircraft in 2013 using Aerial Surveys' Optech ALTM 3100EA LiDAR system. Acquisition was conducted in both daylight and night time hours. Weather conditions on each flight were recorded as good and suitable for LiDAR capture. No flight was carried out during periods of cloud, high wind or immediately after rain where water on the ground would have affected the returns of the sensor.

Survey Specification:

- Scanner: Optech ALTM 3100EA
- Flying height: 1000m AMGL
- Scan Angle: +/- 18.8 degrees
- Scan Frequency: 53Hz
- Pulse Rate 100kHz
- Swath Overlap: 50%
- Points Per Sqm: 1.73
- CT Resolution: 0.72
- DT Resolution: 0.80

Survey control: A new ground control survey to collect field test points for this program was carried out. The survey control plan consisted of well positioned check sites and a series of control tie runs running between check sites. This plan was prepared for the entire region. The ground control survey was carried out by the registered surveyors C&R Surveyors. A minimum of 80 points (averaging >100 points) were collected in areas of flat open ground with linear features. The accuracy of the check points was <0.025m. The ground control survey was completed by May 2013. In order to effectively utilise the control tie runs for post processing of LiDAR data the swaths were adjusted to fit the check site data by calculating the height differences between a TIN of the LiDAR ground points and the survey checkpoints.

Data processing: The positional data collected from each flight by the POS-AV510 GPS/IMU system was processed using the Applanix POSMMS application. This work was all undertaken in NZTM coordinates. The LiDAR range files and sbet files were loaded into the LMS processing application to create an unclassified point cloud for each of the flight lines. The individual flight lines of unclassified point data were then refined within the LMS application to compare and refine the fit of laser points between individual flight lines. The sorties were then checked and adjusted where required to match the control tie runs. Terramatch was used for this process as well as for matching adjoining sorties to ensure height differences between sorties were minimised. All product deliverables supplied by Aerial Surveys in terms of NZTM map projection and Wellington 1953 Vertical Datum. The data was converted from NZGD2000 ellipsoidal heights into the local height system using the LINZ NZGeiod09 and Wellington 1953 offset.

Classification: The point cloud data was classified by Landcare Research per the modified ASPRS classification scheme below, using an automated (Level 1) classification process:

1 - Unassigned
2 - Ground
4 – Vegetation
9 – Water

Re-processing: In 2016 the data was reprocessed by Landcare Research relative to the NZVD2016 vertical datum, the DEM was hydroflattened, and the DEM and DSM supplied as 1:1000 nominal scale (2500 720m high x 480m wide subtiles per full NZ Topo50 sheet).The deliverables to LINZ were a 1m gridded bare earth digital elevation model (DEM), a 1m gridded digital surface model (DSM), and the classified point cloud.

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