

LIDAR post-processing overview

This report describes post-processing procedures which may have been applied to your LIDAR dataset prior to delivery.

Noise reduction

During the quality check of your LIDAR dataset some points are reclassified if they are considered to be erroneous. This includes high points that may be due to atmospheric conditions (haze) and isolated points appearing below the ground surface caused by system noise. In your delivery these points will have classification number 7 whilst all other points will have a classification of 1, following the ASPRS standards on LIDAR classification. We do not remove noisy points in case, for your studies, they are points of interest. However, a program included with your delivery can be used to create new point cloud files which only contain points of certain classifications.

Example ASCII point cloud: Note the 2 points which have classification 7 due to suspected erroneous elevation probably due to haze.

```
126960.000003 419804.05 218522.156 151.47 101 1 1 17
126960.000012 419804.066 218521.638 151.521 121 1 1 17
126960.000021 419804.085 218521.112 151.504 90 1 1 17
126960.000029 419804.102 218520.595 151.537 72 1 1 17
126960.000038 419804.123 218520.039 151.457 120 1 1 17
126960.000047 419804.139 218519.518 350.001 107 7 1 18
126960.000056 419804.156 218518.995 151.534 108 1 1 18
126960.000065 419804.177 218518.453 151.445 113 1 1 18
126960.000073 419804.196 218517.922 355.546 110 7 1 18
126960.000082 419804.214 218517.403 151.421 112 1 1 18
```

Digital Elevation Models

In most cases we will generate a DEM during the processing of your LIDAR dataset which can be used to aid the processing of Eagle/Hawk hyperspectral data. If this is the case it will be included with your delivery with a description of the DEM in the readme file (including pixel resolution, datum information and a description of the header format).

In some cases making a DEM from multiple point clouds can result in a “saw tothing” effect where the elevation from points of one flight line are different to that from another flight line (see Figures 2 to 4). If there is a consistent offset between the point cloud datasets, and if ground control points or ground truth are available, then the ground control can be used to “tie” the datasets together. Alternatively, for DEMs of lower vertical accuracy, a low pass filter can be used to reduce the

variation.

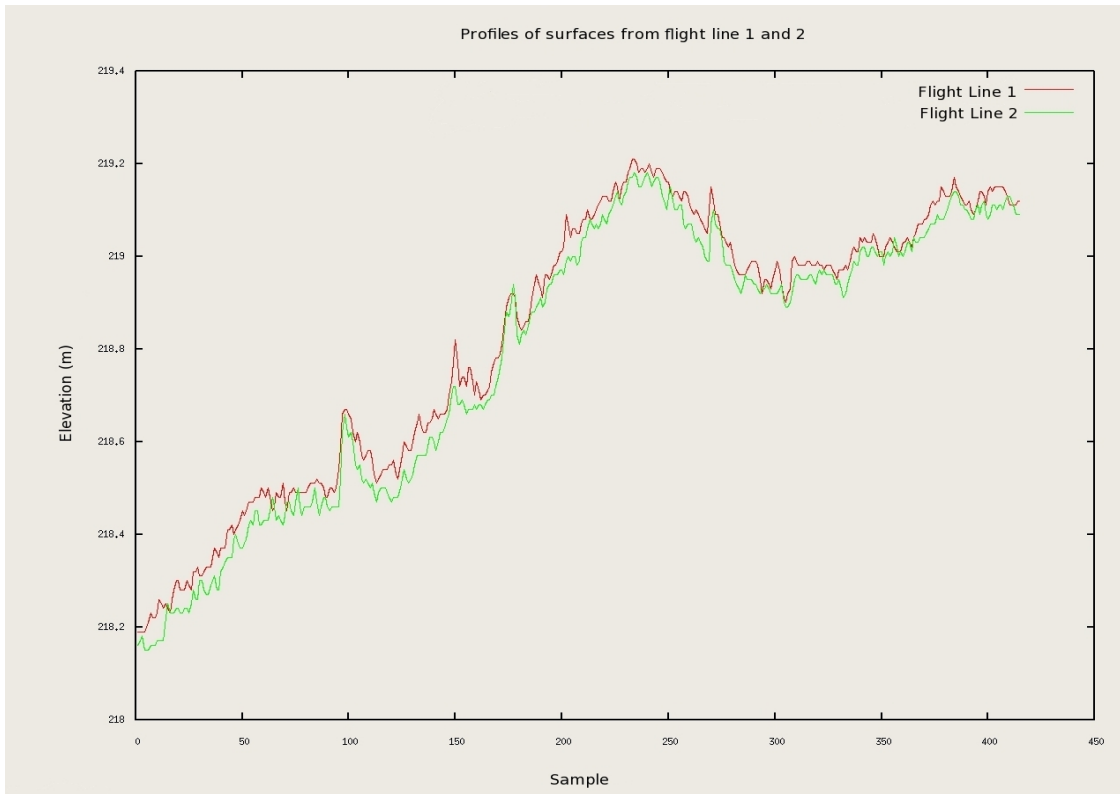


Figure 1: Profiles of two surfaces created by LIDAR data from two flight lines. Surface from flight line 2 is approximately 5cms lower than the surface from flight line 1 data.

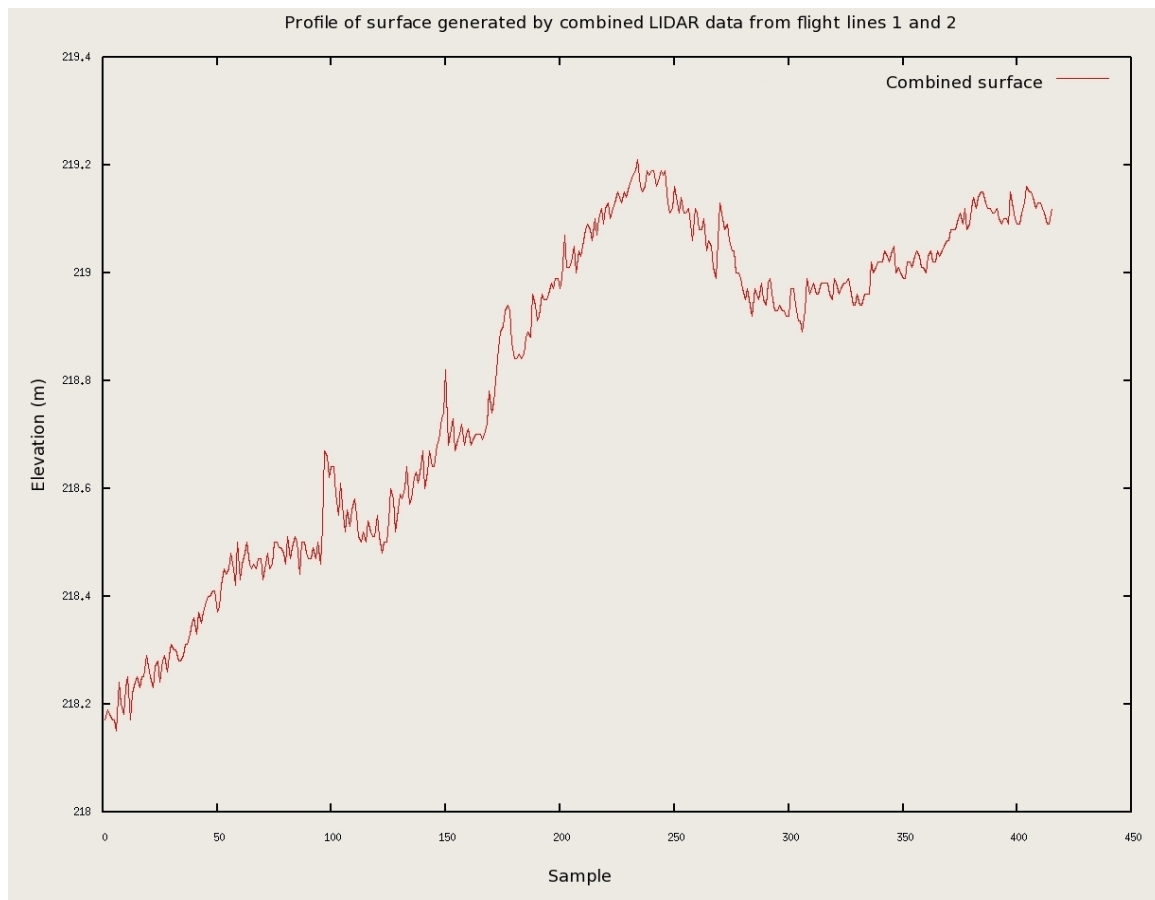


Figure 2: Profile of the surface generated by combining LIDAR data from flight lines 1 and 2. Note how it is noisier than either of the surfaces 1 and 2 as it is influenced by them both.

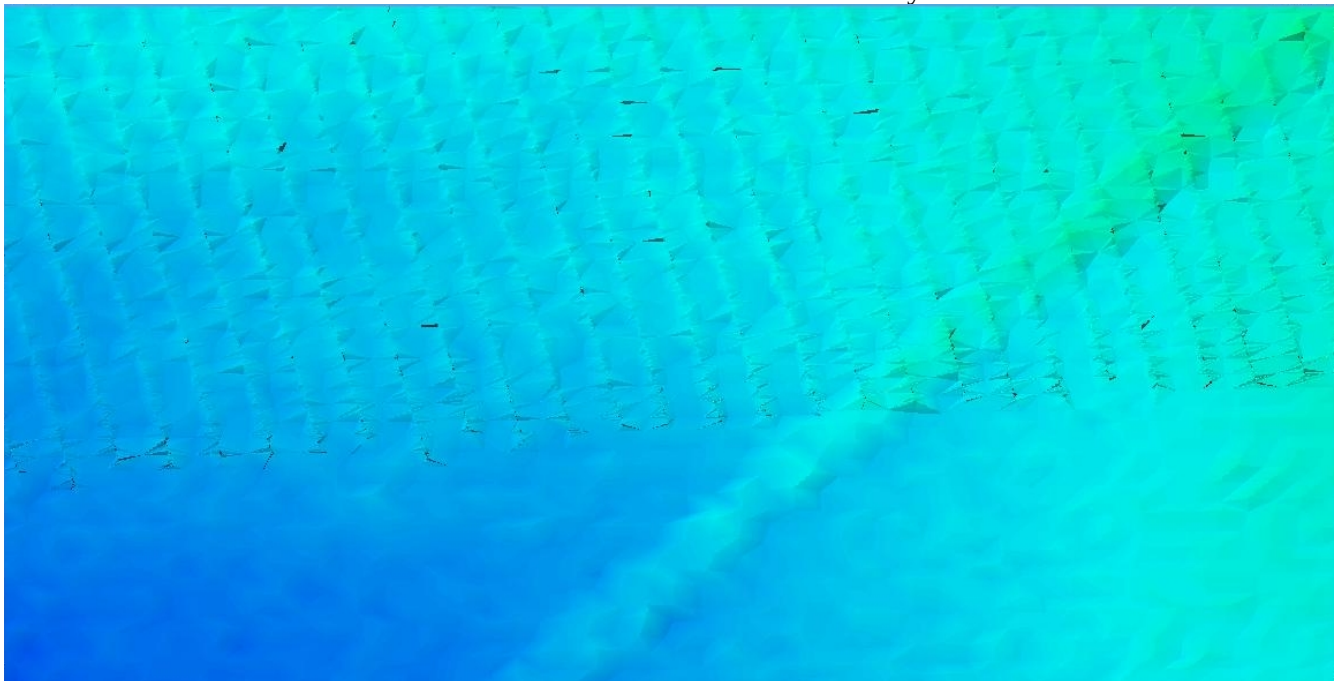


Figure 3: Zoomed section of the combined surface. The area where the flight lines overlap can clearly be seen by the "saw tooth" effect.