Geospatial Modeling & Visualization
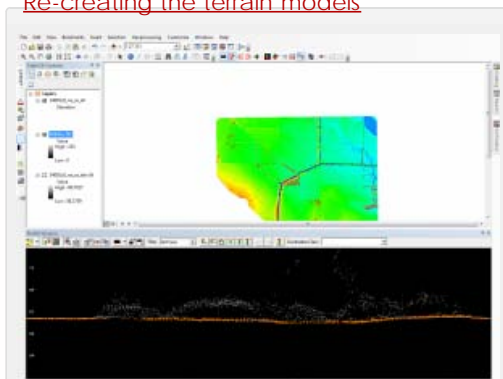
*A Method Store for Advanced Survey and Modeling Technologies*

ALS processing: Manual Re-classification

In most ALS projects, in the first instance, the data is automatically classified. No automatic classification is perfect, and the careful visual assessment and the manual re-classification of some returns are important steps in the creation of a high quality hydro-enforced terrain model, and the development of other derivatives of ALS point clouds. The Bayou Meto terrain model elevered at CAST was processed using TIFFS, a software program which implements a morphological filter. Other good low cost or open source software for automatic classification includes LASTools and MCC-Lidar.

Initial Automatic Classification
Generate Dual-surface Hillshade
Hydro-flow enforcement
Derive Profiles
Editing classifications
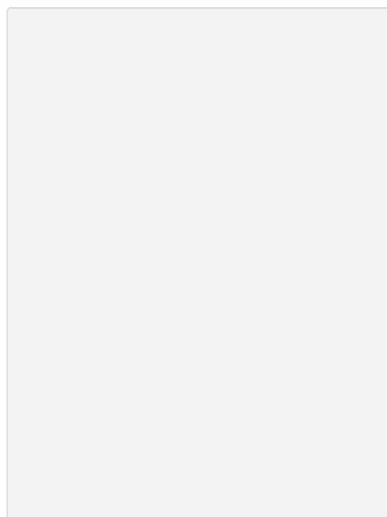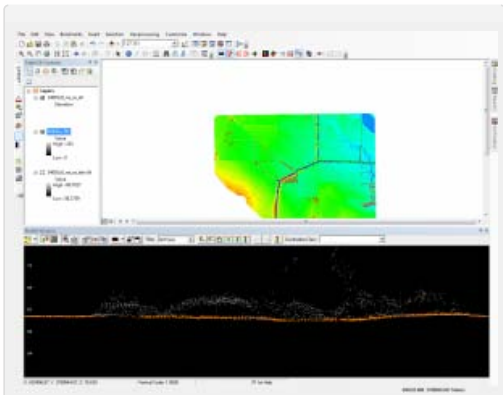Typical problem areas
Re-creating the terrain models

Automatically classified Point Cloud seen in profile. Terrain points (class 2) are orange, and off-terrain points are grey.
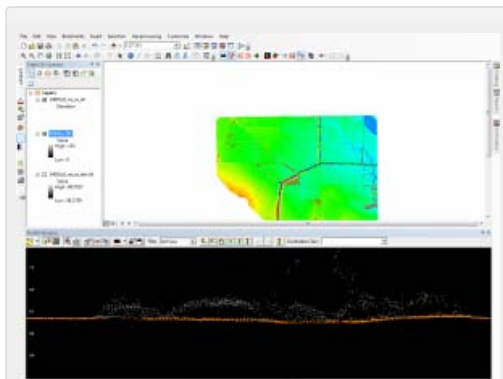

Automatically classified Point Cloud seen in profile. Terrain points (class 2) are orange, and off-terrain points are grey.

To facilitate visually identifying incorrectly classified returns, it's useful to interpolate the automatically classified ground points into a DTM, and to create basic hillshades. Many classification errors will be readily apparent in the hillshaded models. The DTMs for the Bayou Meto project were created using LP360 for ArcGIS.
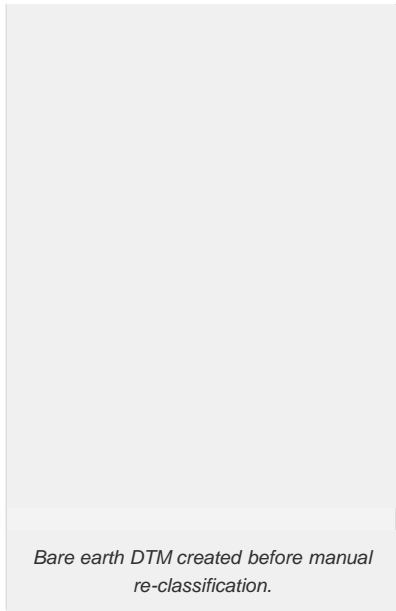
Viewing the point cloud simultaneously with the hillshaded terrain model, you can navigate quickly to 'problem areas' to re-classify any incorrect points in the ALS point cloud.

Automatically classified Point Cloud seen in profile. Terrain points (class 2) are orange, and off-terrain points are grey.

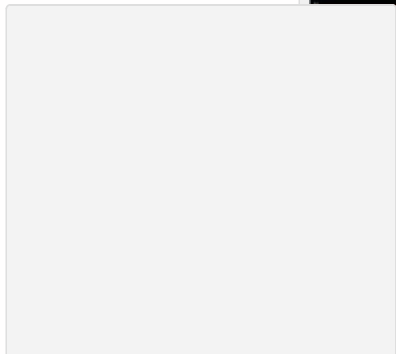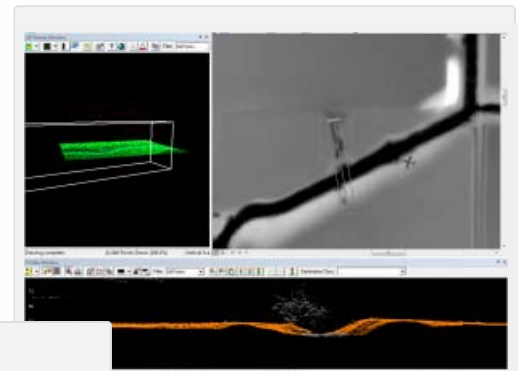*Bare earth DTM created before manual re-classification.*

...viewers allow simultaneous viewing as a 3d ...t cloud, in profile, and at a shaded DTM.

Draw a profile across an area of the terrain model where potential mis-classifications have been identified. Depending on how regular the terrain surface is, set
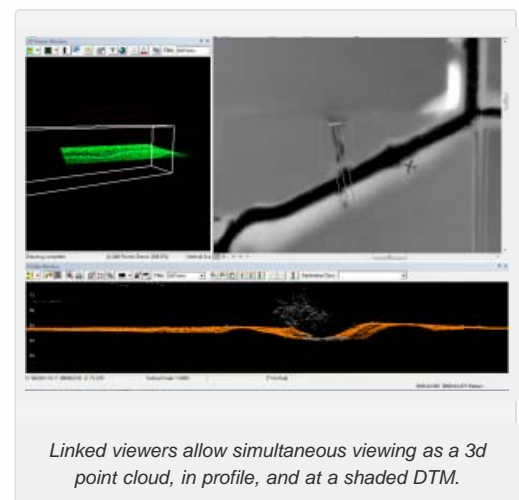
Bare earth DTM created before manual re-classification.

the depth of the profile. Areas where the elevation of the terrain varies greatlygenerally require narrower profiles to clearly visualize the separation between the ground surface and low vegetation.
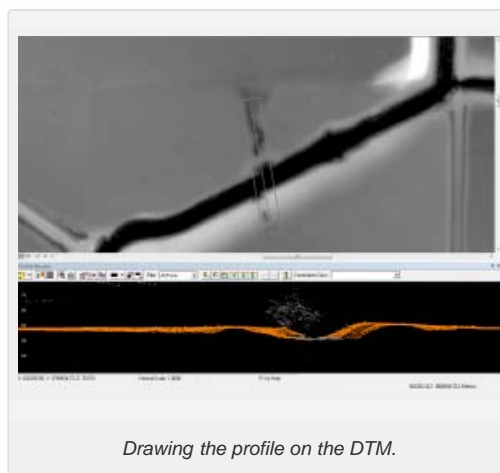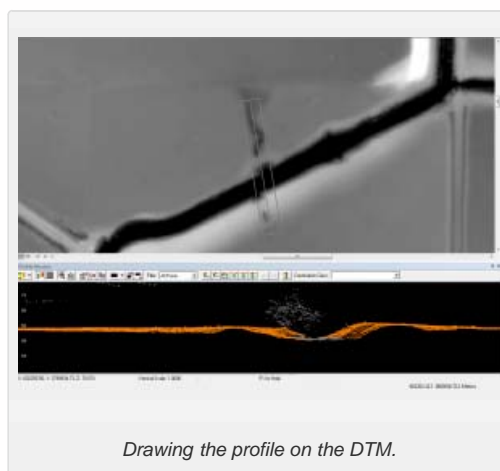

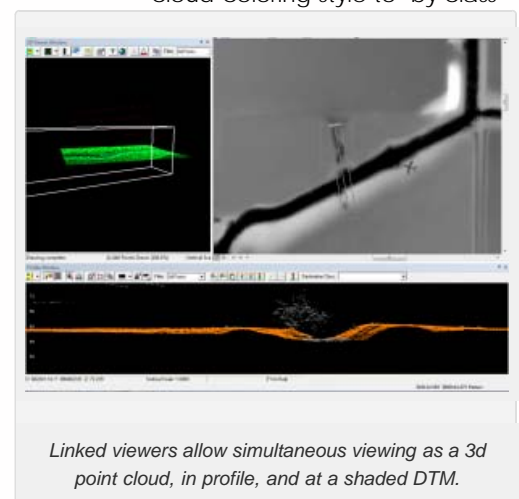
Drawing the profile on the DTM.

Linked viewers allow simultaneous viewing as a 3d point cloud, in profile, and at a shaded DTM.

When editing the classification of the points it's best to set the point cloud coloring style to 'by class'

rather than by elevation or by return, as it's then easier to see which points should be re-classified. In LP360 you can change the classification of points by selecting them in the profile view using a 'brush' or 'lasso' tool and then typing the number of the class they should be and hitting enter.

Drawing the profile on the DTM.

*Linked viewers allow simultaneous viewing as a 3d point cloud, in profile, and at a shaded DTM.*

Work across the dataset systematically, until all problem areas have been improved. Note that areas with dense, low vegetation, large numbers of small buildings, and mixed steep slopes and vegetation are the most likely to contain mis-classified returns, and will require more effort. In the Bayou Meto dataset, the edges of streams proved typical problem areas, combining sloping terrain and low, dense
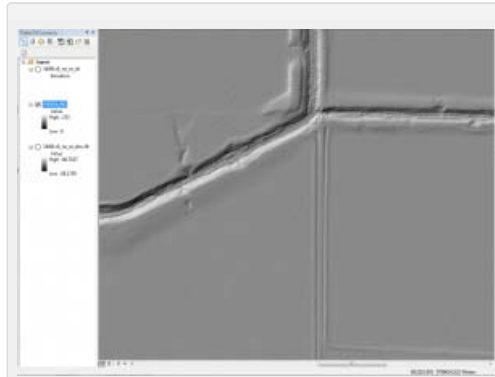
vegetation.
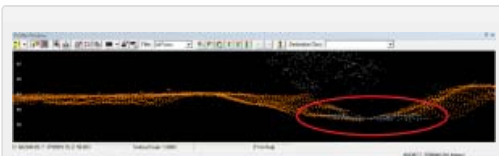
Typical problem area circled in red, located under vegetation at the base of the slope.
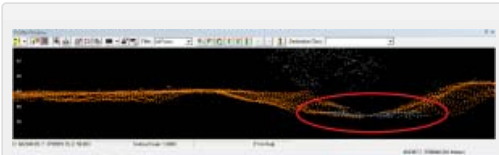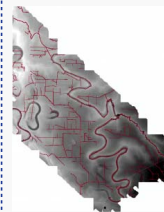

Typical problem area circled in red, located under vegetation at the base of the slope.

After re-classifying the ALS returns, it is necessary to re-create the terrain models and any other derivatives. These new models are the basis for further processing and analysis.

Hillshades and other derivatives are created from the cleaned point clouds.

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Bayou Meto Lidar