Automatically Classify LAS Point Clouds

The Lidar Classification process in TNTmips (Terrain / Lidar Classification) allows you to automatically reassign points in one or more LAS point clouds to different classes using criteria that you specify. If the input files have already been classified, you can choose which point classes to reclassify and which ones should retain their previous classification. The process includes separate classifiers to identify ground points and noise (anomalously high and low points). Each classification run applies a single classifier, and each type of classifier produces specific result classes. The ground classifiers apportion all processed points into either Ground or Unclassified result classes. The noise classifier only changes the class of points matching

point density, Coordinate Reference System (CRS), and coordinate ranges. Point spacing and point density are shown in the distance unit used in the CRS (meters or feet). Only files with the same CRS as the first selected file are accepted in the input list. Lidar classification can be run as an interactive process (using the Run icon button) or under Job Processing (using the Queue Jobs icon button in the toolbar).

When you process multiple input files, the same classifier parameters are applied to each file. Each classifier includes criteria that relate to the horizontal spacing of points; thus for best results the input files should have similar point spacing. A checkbox button below the classifier description lets you specify
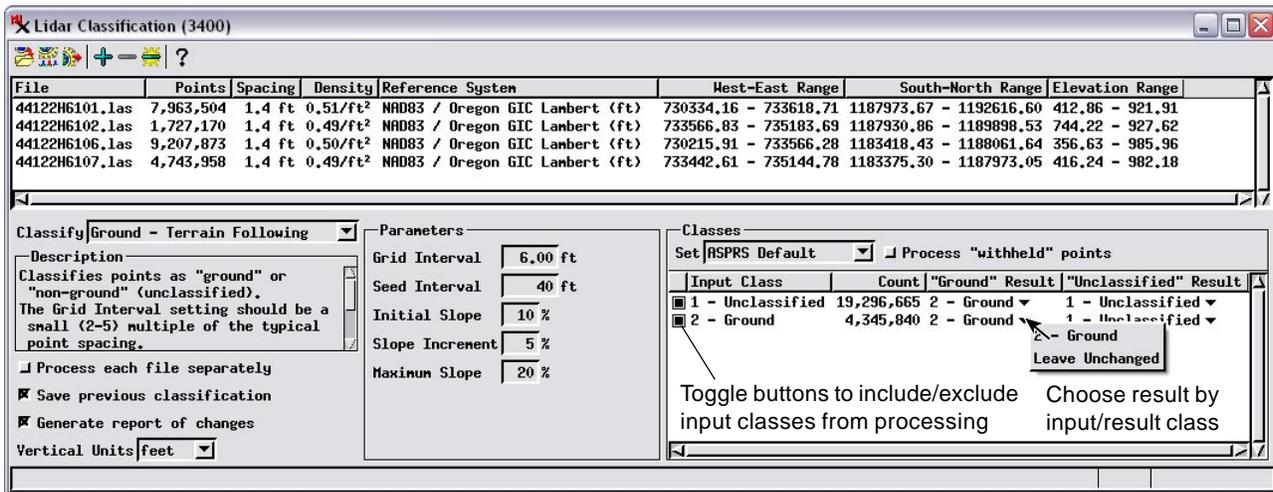
The Classes list in the Lidar Classification window allows you to choose which classes of points in the input files to process, and also lists the potential result classes produced by the selected classifier (such as Ground and Unclassified for the Ground classifier shown). For each combination of input class and result class, press the small arrow icon to open a menu to choose whether to accept the classifier result or leave the point class unchanged.

the specified noise criteria, assigning such points to either the low noise or high noise classes (see the Technical Guide entitled *LIDAR: Automatically Classify Noise in LAS Point Clouds*). Each LAS file is processed "in place", but you have the option to save the previous classification information with the file (see below).

Because the LAS files are processed in place, you can run classifications sequentially on the same set of input files. For example, if you are starting with unclassified point clouds, you could run the noise classification first, then a ground classification. You can also use the same classifier in multiple iterations with different parameters to refine the results. Classifiers are selected from the Classify menu, and a brief description of the selected classifier is shown below this menu. Parameter setting controls for the selected classifier are shown in the Parameters panel.

Lidar Classification Window

The LAS files you select for processing are listed in the upper part of the Lidar Classification window (illustrated above) with columns showing their point counts, nominal point spacing,

whether the input files are processed separately or are treated as one spatial unit. The latter option is appropriate when you load files that are contiguous tiles or flightlines from a single survey area, and allows edge points to be properly treated in neighborhood operations using points from adjacent files.

The Classes panel lists (in the column on the left) the existing point classes found in the input files along with the total point counts per class, and provides a toggle button for each class allowing you to choose which input classes to process. A column is also shown for each result class for the currently-selected classifier. For each combination of input class and result class you can choose whether to accept the classifier result or retain the previous class for those points, as shown in the illustration above. When a classification run is completed, the values in the Count column are updated to show the resulting point counts for each class.

Saving Previous Classifications

Each input LAS file is processed "in place", but you have the option to save the previous classification information via a

checkbox button below the classifier description. The old class information is stored separately for each input file. The automaticallly-generated name of a previous class file includes the name of the input LAS file followed by the date and time of processing and the file extension ".lasclass". (No previous class file is created if all points in the input file were never classified or unclassified). When a reclassified LAS file is viewed in the Display process, the points can be styled by class using the current class assignments or using any previous saved class assignments (see the TechGuide entitled *LIDAR: Comparing Automatic Classification Results*), allowing you to evaluate class changes on a point-by-point basis if desired.

Class Change Reports

You can choose to have the classification process create a tabular report of the classification changes by turning on the *Generate report of changes* checkbox. The report option requires saving the previous classification, so the latter option is turned on automatically if necessary. If you run classification as an interactive process, the results for all input files (whether processed separately or as a spatial group) are presented automatically in a separate window that appears when processing is complete (illustrated above right). The report table includes a row for each input class processed and a column for each result class produced; cells in the table record the number of points in each input class that were assigned to each output class. Separate columns list the number of points removed from each input class (reassigned to all other classes) as well as the total number of points processed from each input class. Rows at the bottom of the table list the number of points added to each result class and their point totals.

Changes to Classification since 2012-10-29 15:54:12 (3400)

Old \ New	1 - Unclassified	2 - Ground	Removed	Total
1 - Unclassified	14,268,575	5,028,090	5,028,090	19,296,665
2 - Ground	593,240	3,752,600	593,240	4,345,840
Added	593,240	5,028,090	5,621,330	
Total	14,861,815	8,780,690		23,642,505

A classification change report created for a ground classification of a set of 4 LAS files (shown in the illustration on the reverse) which as received included points in the Unclassified (19,296,665) and Ground (4,345,840) classes. The input classes processed (both classes in this example) are listed in the left-hand column of the report window. The remaining columns list, for each input class, the number of points assigned to each of the result classes (Unclassified and Ground in this example), the number of points removed from each input class, and the total number of input class points processed. In this example 593,240 input Ground points were reclassified as Unclassified. However, a much larger number of input Unclassified points (5,028,090) were reclassified as Ground. The reclassified LAS files include a total of 8,780,690 Ground points, almost double the number in the input files.

You can save the class change report as a table in an HTML file by pressing the Save As button. If you run classification under Job Processing, no report dialog appears, but the report is saved directly to HTML. If you have elected to run each input file separately under job processing, a separate change report file is saved in the input file directory for each input with a name derived automatically from the input file name. If you classify the input files as a unit, you are prompted for the name of a single HTML file to contain the change report.