Tools, Tips and Workflows

Importance of QA/QC for LIDAR Datasets

BSAU | AWG

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LIDAR datasets are large and require extensive quality control and quality assurance procedures to ensure desired accuracies and product results. Statistics play an important role in evaluating LIDAR data in an efficient manner during such this QA/QC process. Statistics can be calculated for the LIDAR project dataset as a whole, for each file in the dataset or even on specified areas within the project.

The Statistics that can be gathered are dependent upon the user, however in the case of QA/QC some of the most commonly gathered information is: point count, point density, area and points per classification. Information can also be gathered based on a specific classification field, a return combination, elevation range, intensity range or flags set within the LIDAR data.

LP360 provides a Point Cloud Task (PCT) specifically for determining LIDAR statistics, known as the "Point Cloud Statistics Extractor":

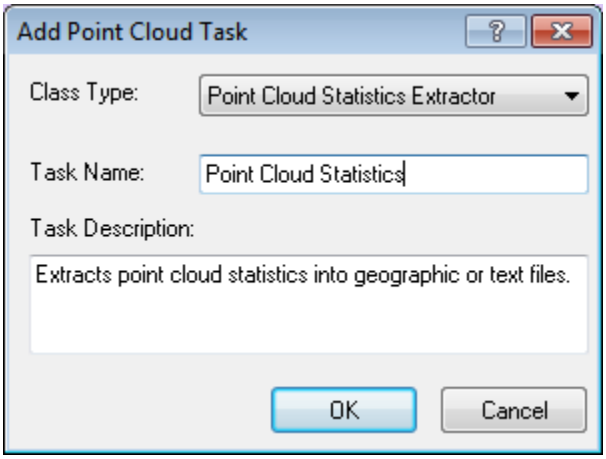

Figure 1 - Add a New Task

Using the Point Cloud Statistics Extractor, information can be extracted from the loaded LIDAR dataset. Engaging the "Extract by Files" option users may gather the header data from each LAS file in the dataset. Doing so provides a means to evaluate the compliance and completeness of each LAS file received.

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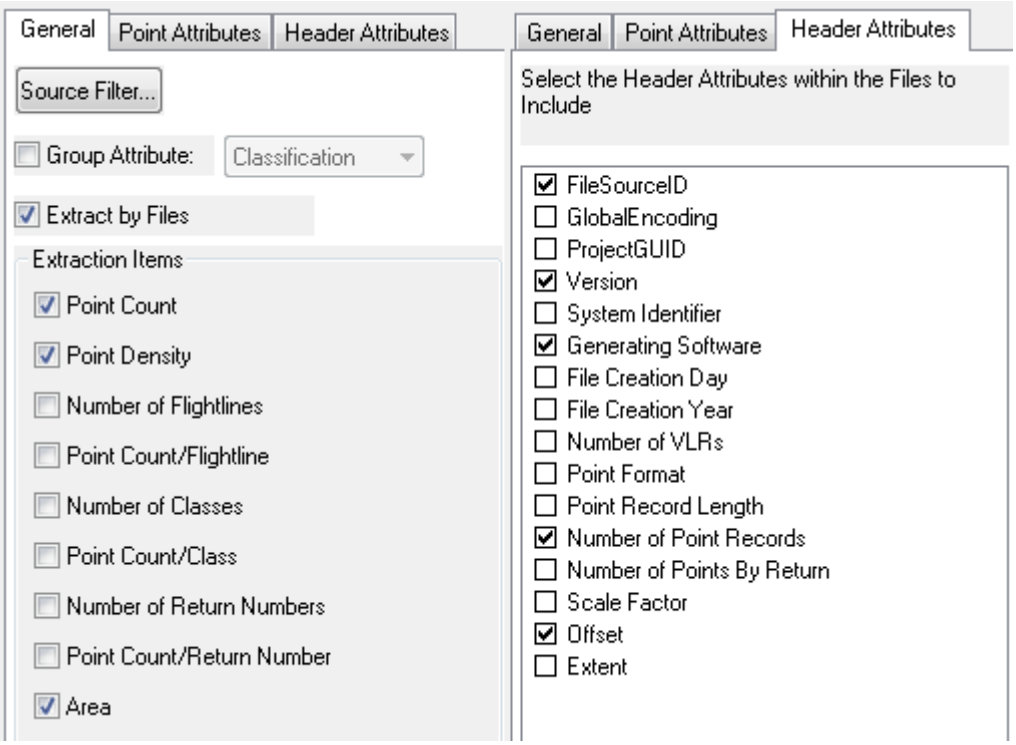

Figure 2 - General and Header Attributes

Coupling the “Extract by Files” option with the options to determine information directly about the LIDAR points found in each file (Figure 2) can provide insight into the data that has been received. These attributes include, but are not limited to: Elevation; Intensity; Classification; and Scan Angle. Point attributes can be summarized to provide the minimum, average, maximum and standard deviation values for each attribute (Figure 3).

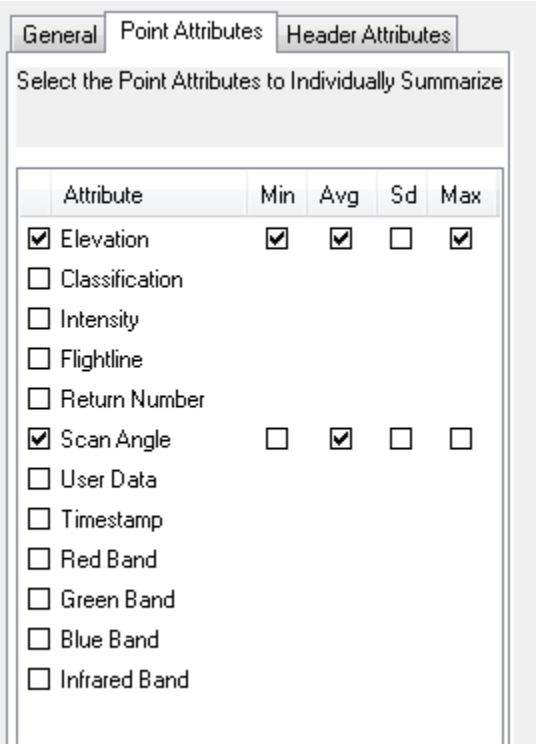

Figure 3 - Point Attributes

Multiple ways to execute the PCT provide flexibility to the user in determining the desired summary information. For example, executing the task on the entire project can provide overall statistics. Whereas, executing the task on several small areas throughout the project using the envelope or stamp options of the Point Cloud Task Toolbar (Figure 4) provides a means for sampling results that can be focused on specific areas to avoid influence from overlap or water bodies on statistics such as point density.

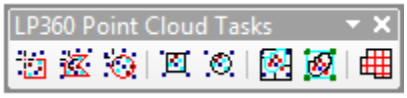

Figure 4- PCT Toolbar

The resultant information from running the Point Cloud Statistics Extractor is stored in the attribute table (figure 5) of the shapefile. Reporting capabilities within ArcMap can then be leveraged to evaluate the information stored in the attribute table by compiling summary results (Figure 6) or by flagging erroneous or questionable data values.

	FID	Shape	ID	FName	SRS	Version	GenSoft	CrDay	CrYear	XMin	YMin	ZMin	XMax	YMax	ZMax	PntCnt	PntCntAsDb	SumArea	PntDen	ELAV	ELMN	ELMX
	0	Polygon	1	WS_001.las	NAD83 / Kentucky North (ftUS), NAVD88 - Geoid03 (F	1.2	GeoCue GeoCoder	227	2012	1540000.01	190608.7	923.56	1541185.22	191999.99	1039.78	82228	82228	1648970.8209	0.0499	954.39	923.56	1039.78
	1	Polygon	2	WS_002.las	NAD83 / Kentucky North (ftUS), NAVD88 - Geoid03 (F	1.2	GeoCue GeoCoder	227	2012	1538000	190625.13	864.56	1539999.98	191999.99	1036.41	247646	247646	2749692.5028	0.0901	925.9958	864.56	1036.41
	2	Polygon	3	WS_003.las	NAD83 / Kentucky North (ftUS), NAVD88 - Geoid03 (F	1.2	GeoCue GeoCoder	227	2012	1536000	190683.63	853.97	1537999.99	191999.99	988.89	263093	263093	2632706.8364	0.0999	898.0523	853.97	988.89
	3	Polygon	4	WS_004.las	NAD83 / Kentucky North (ftUS), NAVD88 - Geoid03 (F	1.2	GeoCue GeoCoder	227	2012	1534000	190743.36	849.23	1535999.99	191999.99	956.37	208130	208130	2513247.4337	0.0828	876.5192	849.23	956.37
	4	Polygon	5	WS_005.las	NAD83 / Kentucky North (ftUS), NAVD88 - Geoid03 (F	1.2	GeoCue GeoCoder	227	2012	1532000	190802.13	858.05	1533999.98	191999.99	989.69	214086	214086	2395696.0428	0.0894	910.2367	858.05	989.69
	5	Polygon	6	WS_006.las	NAD83 / Kentucky North (ftUS), NAVD88 - Geoid03 (F	1.2	GeoCue GeoCoder	227	2012	1530000	190861.08	913.45	1531999.99	191999.99	1020.99	198826	198826	2277808.6109	0.0873	944.5195	913.45	1020.99
	6	Polygon	7	WS_007.las	NAD83 / Kentucky North (ftUS), NAVD88 - Geoid03 (F	1.2	GeoCue GeoCoder	227	2012	1528000	190920.45	914.89	1529999.99	191999.99	1020.94	167722	167722	2159069.2046	0.0777	942.3456	914.89	1020.94
	7	Polygon	8	WS_008.las	NAD83 / Kentucky North (ftUS), NAVD88 - Geoid03 (F	1.2	GeoCue GeoCoder	227	2012	1526000.01	190979.99	862.24	1527999.98	191999.99	987.24	164600	164600	2039969.4	0.0807	904.7233	862.24	987.24

Figure 5 - Statistics per Tile

	FID	Shape	ID	PntCnt	PntCntAsDb	SumArea	PntDen	ELAV	ELMN	ELMX
▶	0	Polygon	1	2377529	23775294	378703528.05	0.0628	922.4725	823.98	1747.55

Figure 6 - Statistics for Project

Hence, the “Point Cloud Statistics Extractor” tool within LP360 provides an efficient QA/QC evaluation tool at the macro level for project data. Completeness of information and compliance to delivery formats for some of the requested information can then be performed before time is spent at the detailed level looking at the fit of the LIDAR data point cloud and individual point classifications.