simactive

CORRELATOR3D™ LiDAR WORKFLOW

QUICKSTART GUIDE

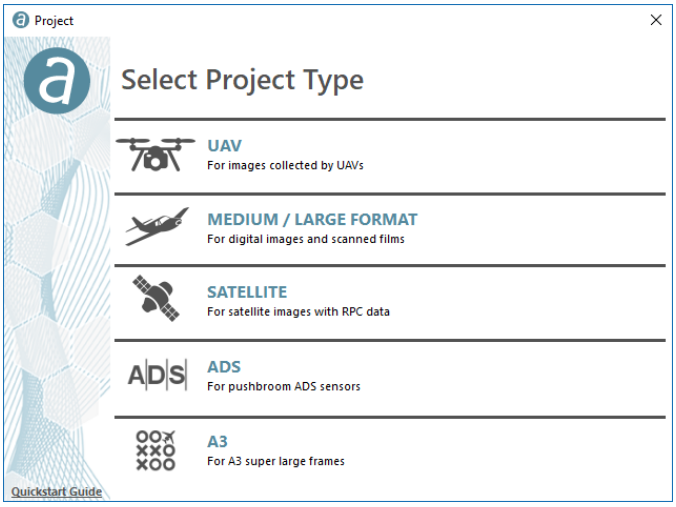
OVERVIEW

LiDAR sensors mounted on aircraft or drones are widely being used for mapping. They are often perceived as a competing technology to standard cameras used for photogrammetry, but it is quite the opposite in fact as they complement each other by capturing data of different nature. While LiDAR captures elevation data at a high resolution, cameras capture the physical world in the scene in a visual sense. Merged together, they actually lead to great advantages in displaying information about the terrain. Thus, integrating these two sources of information means LiDAR data can be used as a Digital Elevation Model (DEM) and/or control from which imagery can be orthorectified and mosaiced. In turn these mosaics can be used to colorize the LiDAR point cloud.

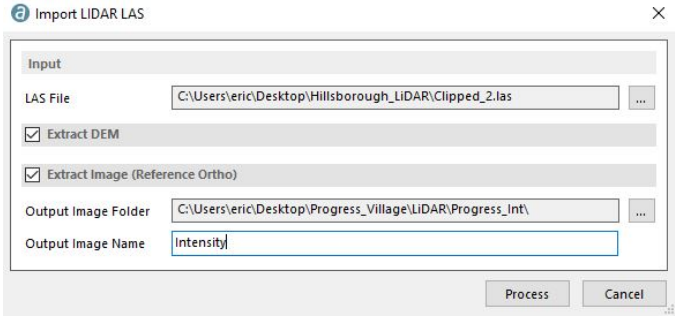
This guide will describe both processes in Correlator3D™ for first-time users covering the workflow from input imagery to final products. A more detailed description of the software can be found in the user manual.

IMPORTING LIDAR IN CORRELATOR3D

All workflows in Correlator3D™ begin by creating a project and importing imagery, orientation parameters, projection, sensor parameters along with control if available.



Before moving on to aerial triangulation, users must import the specific LAS file by selecting "Import" and then "LiDAR LAS File" from the "File" menu. Then, the following options should be checked: "Extract DEM" and "Extract Image (Reference Ortho)". The output image folder and name must also be specified.

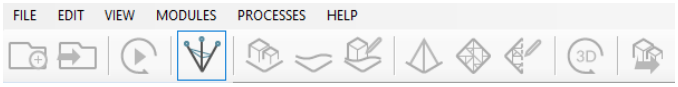


Once processed, the DEM and intensity image from the LAS file will be loaded into the project.

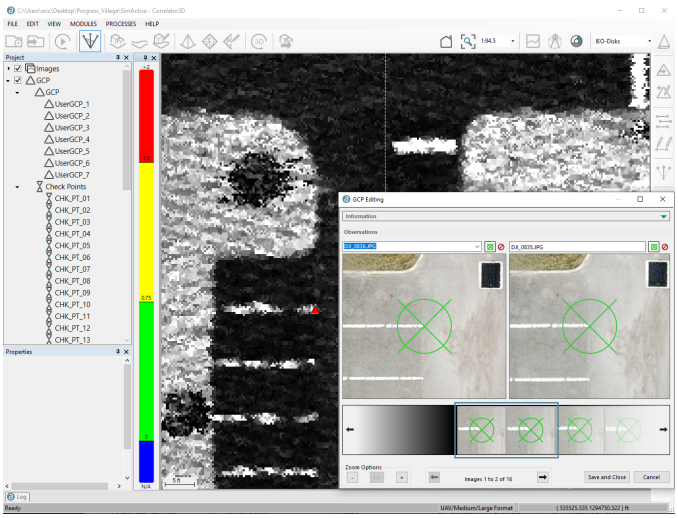
USING THE LIDAR INTENSITY IMAGE AND DEM FOR CONTROL

Assuming the point density of the LiDAR data being used is sufficient, GCPs can be selected from the intensity image and the DEM. The intensity image provides the X and Y coordinates while the DEM provides elevation (Z coordinate). The process of tagging GCPs from these is seamless in Correlator3D™ and can be summarized as follows.

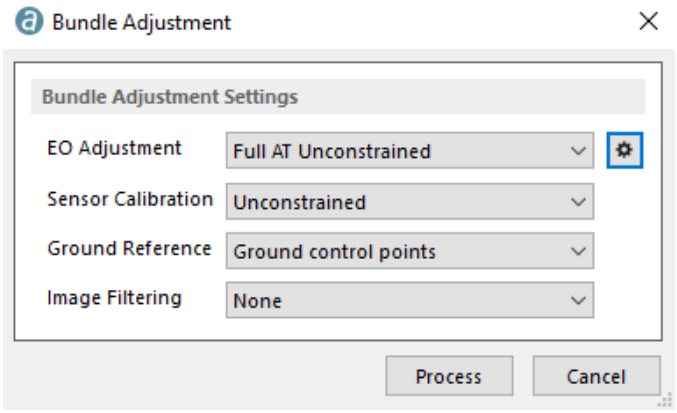
First, users need to enter the aerial triangulation mode by selecting the corresponding button in the main toolbar.



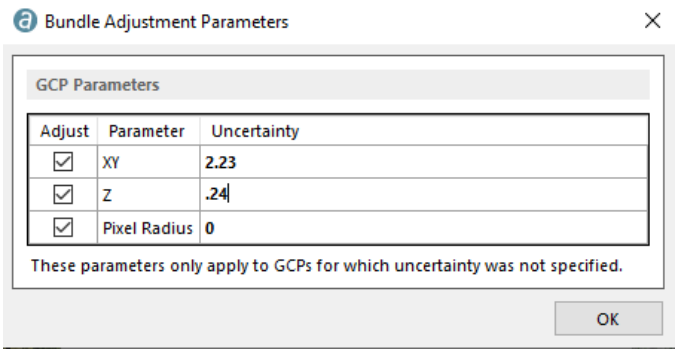
Once in the AT mode, GCPs should be added using the GCP Creation tool from the AT toolbar. The cursor can be moved over the intensity image at a level of zoom where users can identify and precisely select a suitable GCP. This will bring up the corresponding aerial images. The same location on each corresponding image as was chosen on the intensity image should be then selected. Correlator3D™ will capture the corresponding elevation value from the DEM automatically.



Users should repeat these steps for each GCP to be added, then select Bundle Adjustment from the AT toolbar. This will invoke the bundle adjustment dialog.



Users should specify the appropriate parameters and make sure the ground reference is set to ground control points. The EO adjustment parameters can be further specified by clicking on the settings button.



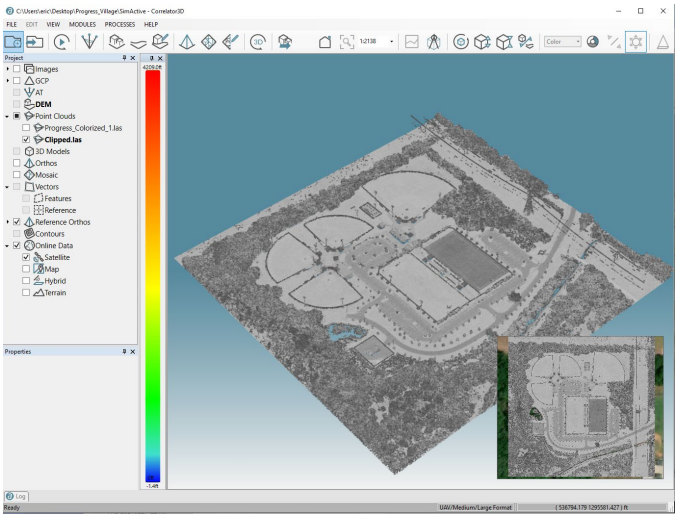
The uncertainty values apply to the GCP added in the previous step. For example, if metadata on the accuracy of the LiDAR used to generate the DEM are available, these can be used. When everything is set as desired, a bundle adjustment must be run. A quality report will appear for review once the adjustment is complete. If acceptable, orthos and mosaics can be generated by following the main toolbar through those steps.

Note: There is no need to generate a DSM, as the DEM from the original LAS import should be used.

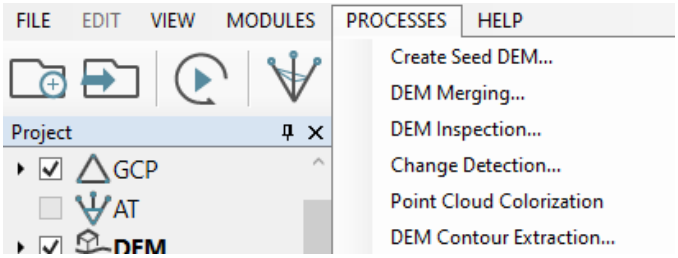
COLORIZING THE POINT CLOUD

Now that the LiDAR data and aerial imagery are co-registered in the same reference frame, point cloud colorization can begin.

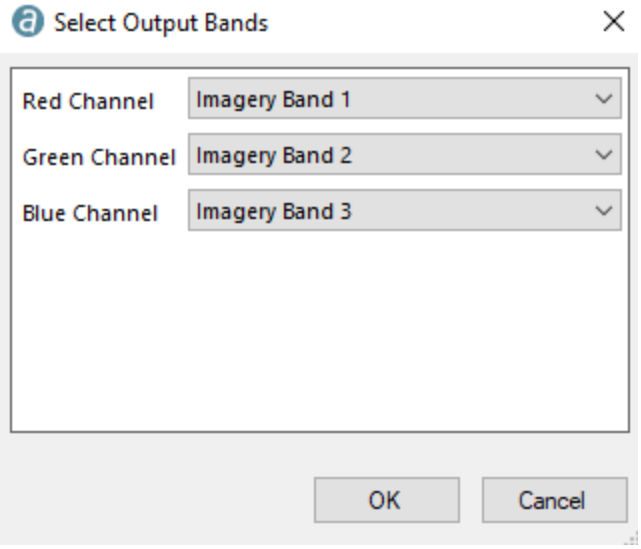
From the project tree under "Point Clouds", the original LAS file should be added using the corresponding contextual button. The point cloud will be displayed.



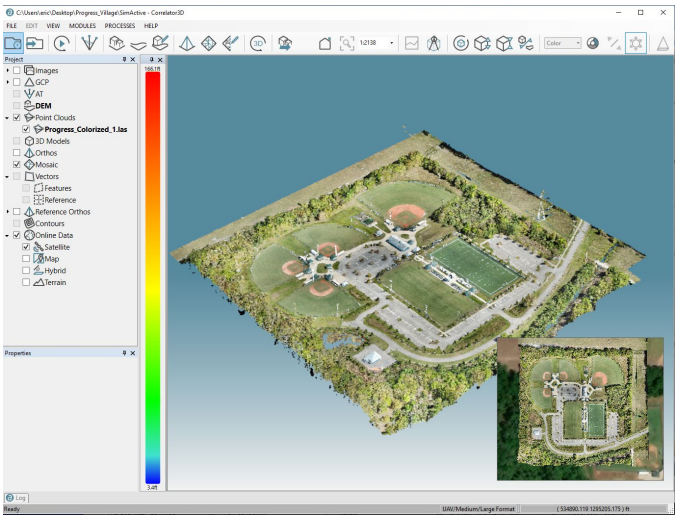
"Point Cloud Colorization" should then be selected from "Processes" menu.

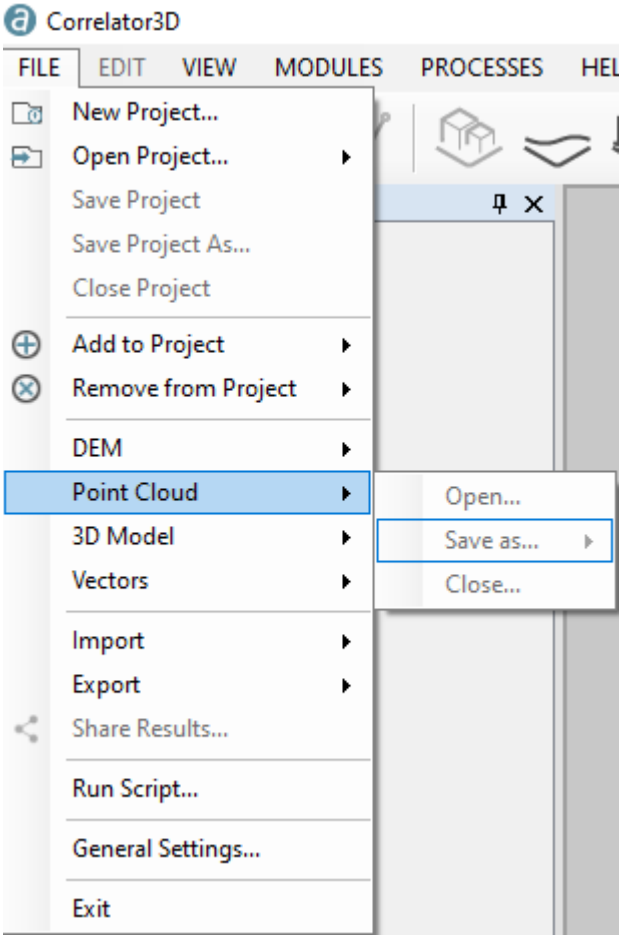


Output Bands should be specified (default values are usually correct) and the point cloud colorization started.



The resulting colorized point cloud will appear in the main window. It can then be used in other applications.



EXPORTING THE POINT CLOUD

To export the resulting point cloud, from the main menu select "File", "Point Cloud" and "Save As".