LP360 | sUAS

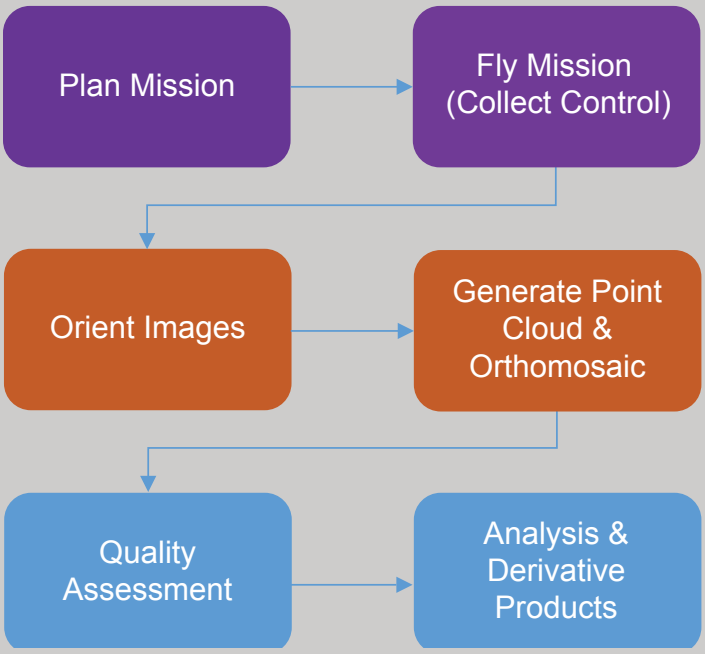
LP360 for sUAS is an advanced point cloud exploitation product that runs either as an extension of ArcGIS Desktop or as a 64 bit stand-alone Windows application. Used for years as a premier application for visualizing and extracting information from LIDAR point clouds, we have recently added significant new features to support point clouds derived from overlapping images ("multi-ray photogrammetry"). The most prevalent source of this image-based point cloud data will be from small unmanned aerial systems (sUAS).

An sUAS provides a cost effective approach for collecting image and derived point cloud elevation data over project areas where manned aerial flights would be cost prohibitive. Examples include:

- Localized, high resolution inspection
- Volumetric analysis for stockpiles and open pit mines/quarries
- Cut and Fill (earthworks) analysis for construction projects
- Detailed site mapping
- Small area mapping for site planning

Planning and flying the mission is performed with either proprietary software provided by the sUAS manufacturer or with an open source package such as Mission Planner and APM Pilot. The process of orienting images and generating a point cloud/orthomosaic is performed with a commercial point cloud generator such as Pix4D Mapper or Agisoft's PhotoScan Pro (both of which are sold and supported by AirGon LLC). Quality Assessment, Analysis and Derivative Product generation are performed with LP360 for sUAS.

Initial quality assessment is performed with tools provided by the point cloud generation software to ensure that full data coverage has been achieved and that the image orientation process can converge to a solution. Following this initial processing step, the data (both the derived point cloud and the orthomosaic) are imported into LP360 for sUAS.



The typical sUAS workflow

Visualization:

LP360 for sUAS includes an extensive collection of visualization modes and tools. Comprehensive visualization is a core element of the exploitation environment both for inspection and for quality assurance. Points can be displayed by intensity, color value, elevation and classification. Modes such as Classification can be modulated by intensity, a feature essential to interactive classification. Rendering modes include points, a surface model triangulated irregular network (TIN), wireframe and combinations of points on surfaces. Surface “sun” shading is also supported. Contours are dynamically generated and displayed. Viewing windows include plan (map) view, profile (cross section) and 3D.

There is even a free LP360 Viewer available that you can deliver to your customers, allowing them to experience the rich value of point cloud/ortho data.

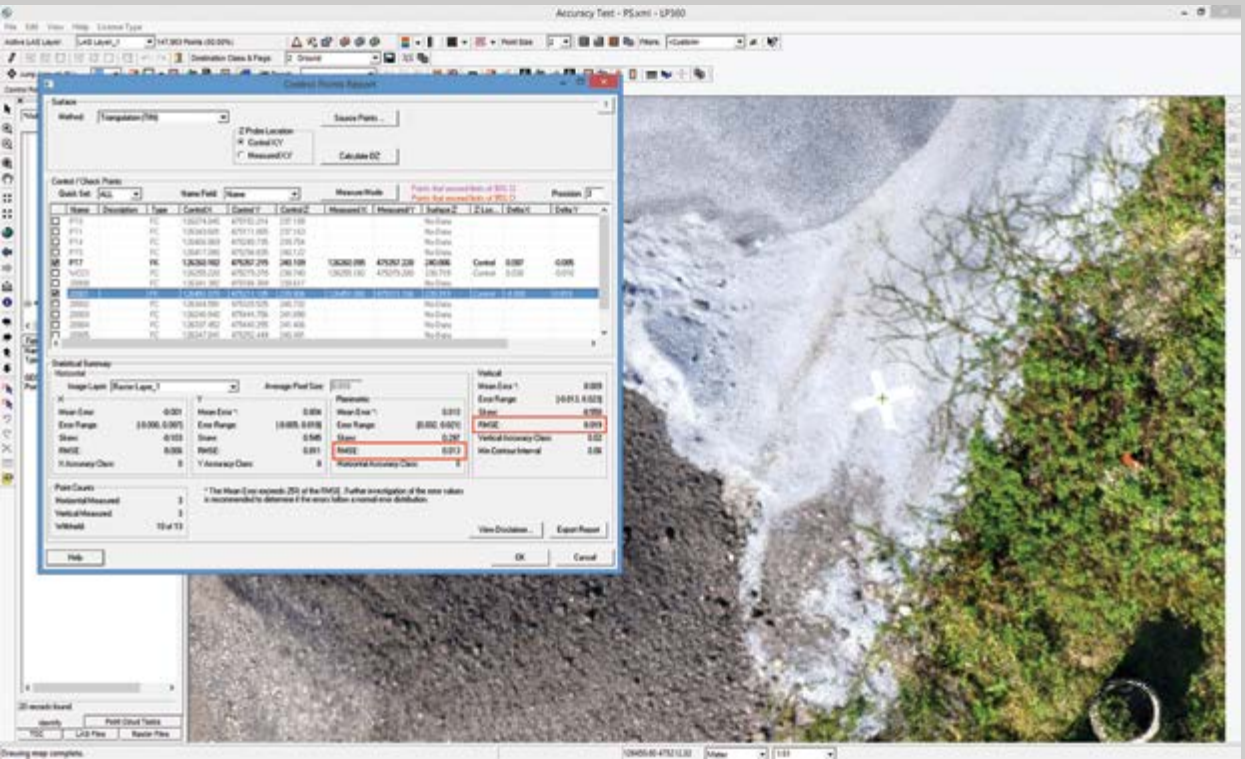
Quantitative Quality Assessment:

LP360 for sUAS includes tools for testing both the horizontal and vertical accuracy of point clouds and orthomosaics. Complete visualization and reporting, in accordance with the 2014 ASPRS Accuracy Specification, are provided. Without a 3D visualization environment, vertical errors are very difficult to assess. A report generator is included, allowing you to deliver an accuracy report as part of the customer deliverables.

Independent accuracy assessment showing 1.3 cm and 1.9 cm of horizontal and vertical RMSE, respectively

Classification:

LP360 for sUAS includes interactive tools for “classifying” data in both the Map View and Profile Views. Classification sets an attribute tag on points that designates their feature class (e.g. ground, vegetation, building, overhead structure and so forth). Classification of data is an important data preparation step prior to volumetric analysis and ground digital elevation model (DEM) generation. For example, conveyor systems overhanging stockpiles are classified prior to volumetric analysis to allow them to be excluded from the volume computations. In addition to interactive tools, LP360 for sUAS includes utility “Point Cloud Tasks” for classifying height above ground, moving one class to another class and generating classification statistics. For workflows where ground surfaces are routinely extracted, you can upgrade to LP360 Advanced to take advantage of its automatic ground extraction tools.

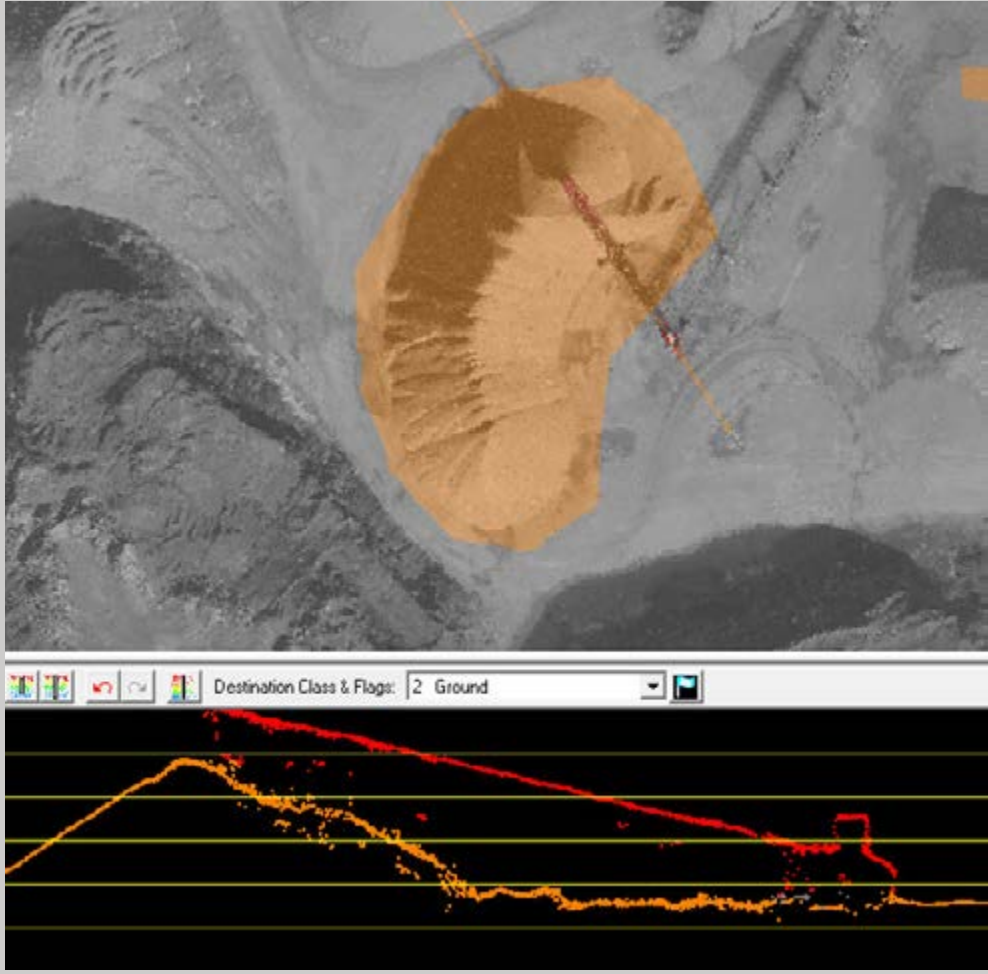


Volumetric Analysis:

LP360 for sUAS includes a complete tool set for volumetric analysis. These tools allow you to define the “toe” of a volume calculation with a variety of methods from interactive sketching to predefined definition files. Volumes can be computed using defined bases or between point clouds (for use in time change analysis). The reports include tabular data as well as the ability to generate output point clouds that represent the volume area (for example, a point cloud of a stock pile).

Cross Sections and Contours:

Cross sections can be extracted from point clouds using a variety of “alignment” definitions. The cross sections can be of a user specified length or clipped to enclosing polygons. LP360 for sUAS includes advanced contouring tools that allow for both interactive visualization (dynamic contouring) and generating file-based contours for customer delivery.



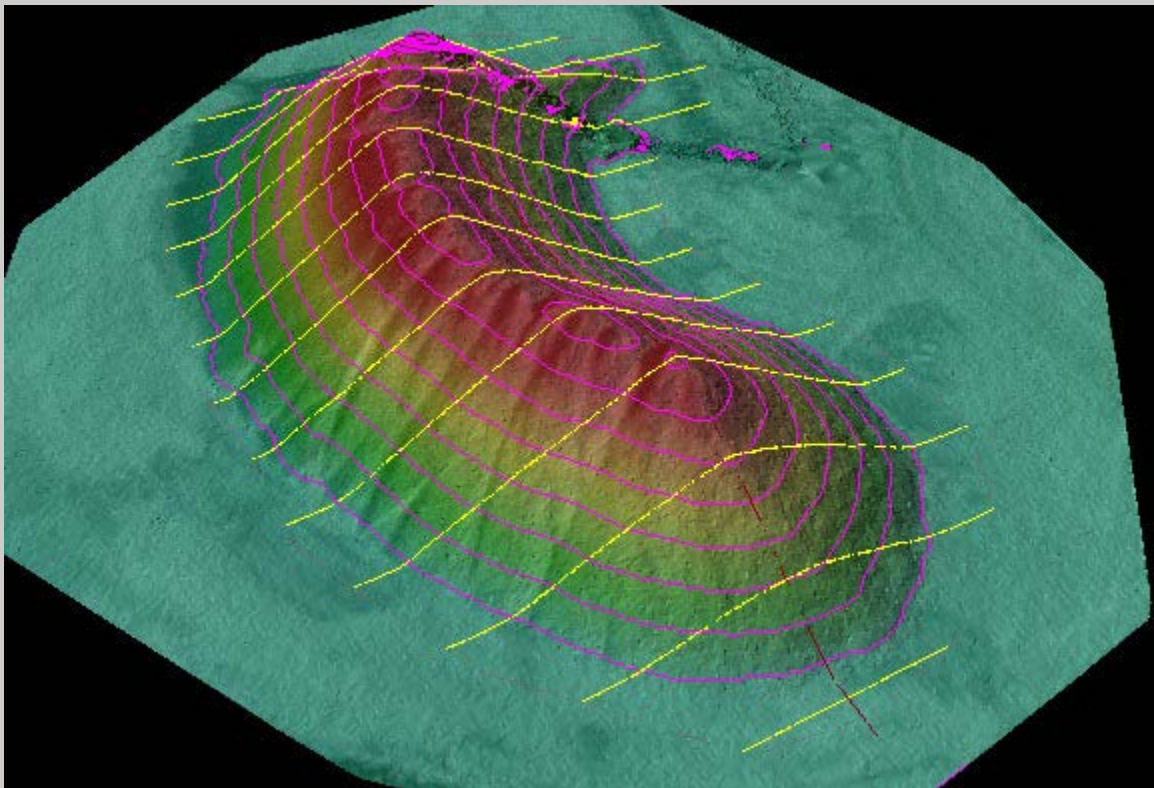
Classification for volumetrics (Ground in orange, Overhead in Red)

Derivative Product Generation:

LP360 includes an extensive set of tools for creating derivative products. The digital elevation model (DEM) tools allow you to set the grid spacing and interpolation methods. Project-wide contours can be exported at user specified intervals and labeling. Contour smoothing can be applied for cartographic applications. Additional products include slope, aspect, hill shade and intensity rasters.

Dual mode deployment:

LP360 for sUAS is delivered as two packages; one is a standalone 64 bit executable for high performance data visualization and processing. The second is an extension for ArcGIS Desktop, enabling seamless integration of point cloud data into ArcGIS. Both deployments are included with your LP360 for sUAS license.



Volumetric extraction with cross-sections and contours

LP360 for sUAS is the most comprehensive solution available for analyzing and extracting value from point clouds generated by products such as Pix4D Mapper and PhotoScan Pro (both sold and supported by AirGon LLC). Based on years of experience with photogrammetry and LIDAR tool development, LP360 for sUAS gives you the confidence that you are delivering products of the highest integrity to your customers.

AirGon LLC
9668 Madison Blvd., Suite 202
Madsion, AL 35758
USA

1-256-461-8289
1-256-461-8249 (fax)

www.AirGon.com

AirGon
GeoCue Group

LP360 | sUAS

AirGon LLC is a wholly owned subsidiary of GeoCue Group, Inc. LP360 for sUAS is a product of QCoherent Software LLC, a wholly owned subsidiary of GeoCue Group, Inc.