

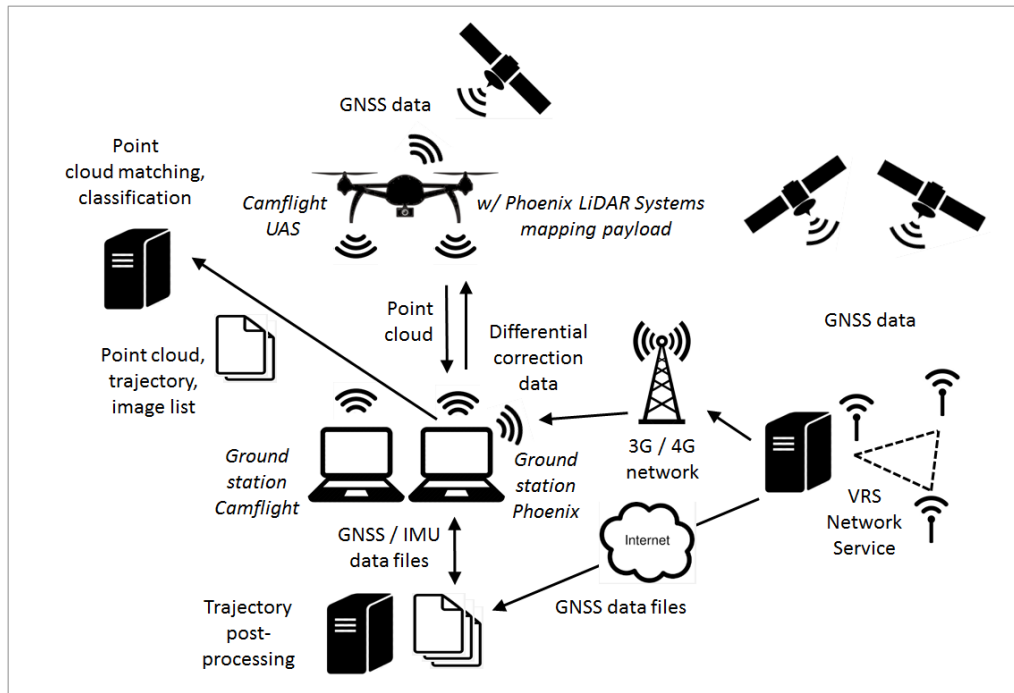
Abstract

The objective of the flight mission was to evaluate the accuracy of point clouds from Phoenix LiDAR Systems scanner in a realistic survey mission scenario and testing the performance of Terrasolid software for data calibration. The results indicates that Phoenix LiDAR Systems' scanners can be used for survey grade projects even without support of ground control points.

Survey mission and sensors

Date:	29 June 2016
Location:	Kyrkslätt, Sjökulla, Finland
Platform:	Camflight FX8 UAS
Mapping payload:	Phoenix LiDAR Systems AL3-32 with Sony Alpha A6000 camera
Flying height:	40m

System configuration



Trajectory processing

- raw trajectory, 200 Hz, processed with Phoenix LiDAR Systems SpatialFuser software
- post-processed with Novatel's Inertial Explorer software

Laser data processing

- LiDAR point processing into point cloud (LAS) with Phoenix LiDAR Systems' software
- Flight line matching with Terrasolid TerraMatch
- Automatic classification with Terrasolid TerraScan. Partial manual editing for buildings.
- Point classes : Ground, Low vegetation, High vegetation, Buildings
- Point colouring with Terrasolid TerraPhoto

Georeferencing

- Control points: Finnish Geodetic Institute test field
 - XY-accuracy < 1 cm
 - Z accuracy < 1.5 cm
- Point cloud match with known points

Number	Easting	Northing	Known Z	Laser Z	Dz
1	355007.194	6681305.610	65.159	65.168	+0.009
2	355042.113	6681331.238	68.236	68.279	+0.043
3	355054.820	6681319.338	68.628	68.667	+0.039
4	355071.565	6681286.798	66.806	66.844	+0.038
15	354970.664	6681080.558	71.597	71.558	-0.039
43	355124.750	6681082.099	67.006	67.006	-0.000
44	355132.507	6681054.538	67.092	67.034	-0.058
45	355075.257	6681018.545	66.014	66.045	+0.031
47	355038.927	6681041.354	67.626	67.601	-0.025
Average dz		+0.004			
Minimum dz		-0.058			
Maximum dz		+0.043			
Average magnitude		0.031			
Root mean square		0.035			
Std deviation		0.037			

- Note : the value Dz tells the true difference between the point cloud and known points. The point cloud orientation is determined with post processed trajectory only, i.e. the point cloud has not been adjusted to known points.

Laser points

- 16 files (white tiles)
- 2.2 GB In LAZ 1.2 format
- 3.4 GB in LAS 1.2 format
- 226 356 712 points
- Coordinate system
 - ETRS-TM35FIN, EPSG:3067

Ortho mosaics

- 4 files (orange tiles)
- 189 MB In jpg/jwg format
- Coordinate system
 - ETRS-TM35FIN, EPSG:3067

