

DPH-9.1 Report on Overlap Consistency (interswath)

The USGS Lidar Base Specification 2022 rev. A states: "Overlap consistency will be assessed at multiple locations within overlap in nonvegetated areas of only single returns and with slopes of less than 10 degrees. To the degree that the data allow, test areas should be located such that the full width of the overlap is represented. The overlap areas that will be tested are those between the following:

- adjacent, overlapping parallel swaths within a project,
- cross-tie swaths and a sample of intersecting project swaths in both flight directions; and
- adjacent, overlapping lifts.

Each overlap area will be evaluated using a signed difference raster with a cell size equal to the ANPS, rounded up to the next integer, then doubled ($\text{Cellsize} = \text{CEILING}(\text{ANPS}) \times 2$). The difference rasters will be statistically summarized to verify that RMSDz values do not exceed the limits set forth in table 2 for the QL of information that is being collected."

Table 2. Relative vertical accuracy for light detection and ranging swath data.

[QL, quality level; RMSD_z, root mean square difference in the z direction; m, meter; ≤, less than or equal to]

Quality level	Smooth surface repeatability, RMSD _z (m)	Swath overlap difference, RMSD _z (m)
QL0	≤0.03	≤0.04
QL1	≤0.06	≤0.08
QL2	≤0.06	≤0.08
QL3	≤0.12	≤0.16

The purpose of this section is to show two separate mosaicked versions of a thematically rendered map of swath separation for all of the data processed. Any 'Exclusion Shapefile' pathed out on the Input Tab of this tool was applied to the processing for this test to avoid skewing the results with known areas of no data.

For the first – known as a Measurable Flightline Separation Raster (FSR) - processing has been done to isolate measurements to clusters of single returns and is limited to areas of < 10 degree slope. The colors are gradated by the selected QL's swath overlap difference RMSDz limits. Only swath overlap areas are shown in the raster. The color is overlaid on a lidar intensity background to show land cover features. A frequency distribution chart of RMSDz raster values can be found on the page following the raster graphic.

For the second raster – known as a Swath Separation Image and found at the end of this test section – there are no limitations on slope angles and return types are user defined. The colors are gradated by the selected QL's swath overlap difference RMSDz limits. Only swath overlap areas are shown in the RGB raster. The color is overlaid on a lidar intensity background to show land cover features. Tiled GeoTIFFs of this mosaicked raster can be found in the output folder for this test.