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| Norfolk, VA LiDAR Delivery ReportProduced for U.S. Geological SurveyUSGS Contract: G10PC00013Task Order: G13PD00279 |
| Report Date: January 29, 2014 |
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**Norfolk, VA LiDAR Pilot Deliverables Overview Checklist**

[x]  **Project Report**

 [x]  Collection report detailing mission planning , flight logs, acquisition, and calibration

[x]  Processing report

 [x]  QA/QC Reports

[x]  **Survey Data**

 [x]  Surveyed quality checkpoint report, photos, and coordinate listing

 [x]  Checkpoints as a shapefile

[x]  **Metadata**

 [x]  FGDC Compliant metadata for:

 [x]  Deliverables (LAS, DEM, 1st Return DSM, Last Return DSM, Breaklines, Intensity Imagery,

 Lifts, 3D Buildings, 2D Buildings, Forest Polygons, Tree Points, and Project)

[x]  **Raw Point Cloud Data**

 [x]  LAS Version 1.2

 [x]  Georeferenced

 [x]  Contains GPS Times

 [x]  Contains Intensity Values

 [x]  Full swaths

 [x]  1 file per swath, 1 swath per file

[x]  **UTM Classified Point Cloud Data**

 [x]  LAS Version 1.2

 [x]  Correct Georeference Information

 [x]  Contains GPS Times

 [x]  Contains Intensity Values

 [x]  Tile to 1,500 meters x 1,500 meters Tile Grid

 [x]  Classified with Class 1 – Unclassified, Class 2 – Bare-Earth Ground, Class 7 – Noise, Class 9 – Water,

 Class 10 – Ignored Ground, Class 11 – Withheld.

[x]  **UTM Bare Earth Surface (Raster DEM)**

[x]  Cell size of 1 meter

[x]  ERDAS .img File format

 [x]  Georeference info included (xml files)

 [x]  Tiled with no overlap

 [x]  Reviewed for edgematching and artifacts

 [x]  Free of void areas

 [x]  Hydrographic features have been flattened according to SOW

[x]  **UTM First Return Surface (Raster DSM)**

[x]  Cell size of 1 meters

[x]  ERDAS .img File format

 [x]  Georeference info included (xml files)

 [x]  Tiled with no overlap

 [x]  Free of void areas

 [x]  Generated from first return LiDAR points

[x]  **UTM Last Return Surface (Raster DSM)**

[x]  Cell size of 1 meter

[x]  ERDAS .img File format

 [x]  Georeference info included (xml files)

 [x]  Tiled with no overlap

 [x]  Free of void areas

 [x]  Generated from last return LiDAR points

[x]  **UTM Extents**

[x]  Tile grid in shapefile format derived from the LiDAR deliverables

[x]  Tile grid named according to USNG conventions in shapefile format

 [x]  Project area boundary delivered as shapefile

[x]  **UTM Breakline Data**

 [x]  Breakline data in GDB

 [x]  Breakline data as Shapefiles

[x]  **UTM Vegetation Data**

 [x]  Vegetation data in GDB

 [x]  Vegetation data as Shapefiles

[x]  **UTM Building Data**

 [x]  Building data in GDB

 [x]  Building data as Shapefiles

[x]  **UTM Intensity Imagery**

[x]  Intensity imagery in GeoTIFF format and 0.3 m pixel size

**Project Report**

A comprehensive project report has been delivered in PDF format. This report includes the LiDAR acquisition and processing information along with detailed information on the production and quality control process used for the development of all deliverables.

**Survey Data**

All survey control data, reports and photos are included in this delivery. Accuracy assessment points are delivered in ESRI shapefile format.

**Metadata**

Project level metadata for each of the deliverables (Swaths or Lifts, fully classified LiDAR, breaklines, bare-earth DEMs, first return DSMs, intensity imagery, project, and contours) has been delivered in XML format. Metadata has been reviewed through the USGS metaparser tool to ensure that it is FGDC compliant.

# Raw Point Cloud Data

Raw Point Cloud Data has been included as part of this delivery. The Raw Point Cloud Data is delivered in LAS v1.2 with all required header information including: Georeference information, GPS times, and Intensity Values. The data is delivered as full swaths with one file per swath.

# UTM Classified Point Cloud

Classified point cloud data has been delivered tiled to 1,500 meter x 1,500 meter tiles that are named tilename.las. The final delivery consists of 1,457 LiDAR tiles that meet the project specified requirement.

# UTM Bare Earth Surface (Raster DEM)

A total of 1,457 1,500 meter x 1, 500 meter tiled bare earth raster DEMs in ERDAS IMG format have been delivered for this project. All tiles have a cell size of 1 meter and have been reviewed to ensure that they meet the project required specifications.

# UTM First Return Surface (Raster DSM)

A total of 1,457 1,500 meter x 1, 500 meter tiled raster DSMs generated from the first return LiDAR points have been delivered in ERDAS IMG format for this project. All tiles have a cell size of 1 meter and have been reviewed to ensure that they meet the project required specifications.

# UTM Last Return Surface (Raster DSM)

A total of 1,457 1,500 meter x 1, 500 meter tiled raster DSMs generated from the last return LiDAR points have been delivered in ERDAS IMG format for this project. All tiles have a cell size of 1 meter and have been reviewed to ensure that they meet the project required specifications.

# UTM Extents

Three ESRI shapefiles are included with this delivery. One shapefile is the boundary of the project area. The second shapefile is the tile grid, created and named according to US National Grid format. The third shapefile is derived from the extents of the actual LAS deliverable to ensure that all delivered LiDAR have been accounted for. The extents have been verified against the project boundary to ensure that there is full coverage for the project.

# UTM Breakline Data

Breaklines have been delivered in an ESRI file geodatabase and as shapefiles. Breaklines were derived to meet the project specifications as outlined in the SOW.

# UTM Building Data

Buildings have been delivered in an ESRI file geodatabase and as shapefiles. 2D and 3D Building products were derived to meet the project specifications as outlined in the SOW.

# UTM Vegetation Data

Vegetation products have been delivered in an ESRI file geodatabase and as shapefiles. Tree points and forest polygons were derived to meet the project specifications as outlined in the SOW.

# UTM Intensity Imagery

Intensity imagery is delivered tiled to 1, 500 meter x 1, 500 meter tiles that are named according to the project tile grid. The imagery is in GeoTIFF format with 0.3 meter pixel size. The intensity imagery is created from the full point cloud LiDAR data. The final delivery consists of 1,457 GeoTIFF tiles.

# Other Comments

Data for the Norfolk, VA LiDAR Project is delivered in UTM coordinates on one (1) Hard Drive (Lacie Minimus S/N:14571211191154QHB). A second delivery will be made at a later date containing all deliverables projected to State Plane coordinates.