**Okefenokee Swamp LiDAR Project – Processing report**

**Metadata:**

* [Identification\_Information](file:///C:\Metadata\metadata.htm#1)
* [Spatial\_Data\_Organization\_Information](file:///C:\Metadata\metadata.htm#2)
* [Spatial\_Reference\_Information](file:///C:\Metadata\metadata.htm#3)
* [Entity\_and\_Attribute\_Information](file:///C:\Metadata\metadata.htm#4)
* [Distribution\_Information](file:///C:\Metadata\metadata.htm#5)
* [Metadata\_Reference\_Information](file:///C:\Metadata\metadata.htm#6)

*Identification\_Information:*

*Citation:*

*Citation\_Information:*

*Originator:* S-Nelson & Associates, Inc

*Publication\_Date:* 04/15/2011

*Title:* Okefenokee Swamp LiDAR Project

*Geospatial\_Data\_Presentation\_Form:* vector digital data

*Online\_Linkage:* www.lidar.cr.usgs.gov

*Description:* 2m LiDAR dataset covering Charlton & Ware Counties, Georgia

*Abstract:*

LiDAR dataset was a part of the ARRA USGS grant announcement 10HQPA0014 “The National Map: Imagery and Elevation Maps”. The LiDAR data was acquired during the months of March 2010 – April 2010 (Leaf-off conditions) with a reflight in June 2010. The naming convention for the LiDAR DEM is delivered a alpha –numeric sequence, consisting of 1,500m x 1,500m size tiles and starting in the upper left hand corner of the project. Where Charton and Ware county borders other states and counties, the entire project area is buffered by 400 meters. Adjacent flight lines overlap by an average of 30 percent. The LiDAR was acquired using a Reigl LMS-Q680i full waveform system. The classified point cloud using the following classes: Ground, Water, Low Vegetation, Medium Vegetation, High Vegetation, & Noise. The coordinate system used is UTM zone 17N and the vertical datum is NAV88. The LiDAR DEM was provided in LAS and raster formats. Breaklines where collected using 0.5 meter 4-band imagery with the LiDAR point cloud.

LiDAR was acquired on the entire coast of Georgia and 50 miles inland, this project is an extension of the coastal LiDAR dataset. The average post spacing is 1.2 meters. The flying altitude is 4,500-feet AMT, with a target flying speed of 100 knots.

*Purpose:*

LiDAR was acquired on the entire coast of Georgia and 50 miles inland as a part of the Coastal Regional Commission, this project is an extension of the coastal LiDAR dataset. Data from this project forms the foundation of a seamless coastal map and wetland map of the State of Georgia and was developed to primarily support multi-use applications, including the US Geological Survey, homeland security, emergency management, flood mapping, economic development, and the business of government.

The University of West Georgia (UWG) Department of Geosciences is attributed with the proposal of this project. The total area of 1,618 mi2 was covered in the acquisition this project. The project area is a part of the Georgia's Lower Coastal Plain that contains the Okefenokee Swamp, the largest contiguous swamp in North America. The topography of the area is generally low, flat, and swampy. This project will cover the Ware and Charlton Counties. The focus of this project will be given to the Okefenokee National Wildlife Refuge area. Building LiDAR database on those counties will allow us to monitor and manage important physical environmental resources very closely. This project was selected by the University of West Georgia as a complimentary data set for analysis of the 2007 Georgia Wildfires. This dataset will be used in conjunction with the imagery acquired at the time of flight to detect and calculate carbon emissions generated from the wildfire.

UWG has contracted with 3 companies to perform the data acquisition, survey control, and data processing. The aerial acquisition was done by is Aerial Cartographics of America Inc, the survey control was established by Land Air Surveying, and the LIDAR processing portions have been completed by S. Nelson and Associates, Inc. UWG Geoscience department produced a 2m raster DEM from the classified point cloud.

*Lineage:* Airborne LiDAR data acquired using Cessna Grand Caravan, Reigl LMS-Q680i. The data was tiled using Virtual Geomatics VG4D production manager and filtered using proprietary algorithms. Manuel editing was then preformed to remove vegetation from the ground class.

*Process\_Step:*

S. Nelson and Associates used Virtual Geomatics VG4D Production Manager to process the calibrated 1.2 .las files creating a seamless LiDAR overlay with a 30% overlap between flight strips covering all of Charlton and Ware Counties, Georgia. Performing a quality check of the unclassified data set included assessing the vertical accuracy using ground control targets geometrically distributed over entire 1684 sq mile project ensured accuracy better than 7 cm. A alpha-numeric column and row tiling patter was then applied using the upper left hand corner of the project. The unclassified LiDAR flight strips where then populated into 1500X1500 meter tiles. Conservative ground and vegetation filers where then applied to the entire dataset, using the discrete returns (1-5) to establish noise, ground, low, medium, and high vegetation classes. Tiles were then filtered using macros developed for specific land cover types (Urban, Agricultural, Swamp\Wetland, and Forrest) and subsequently manually edited to remove low and medium vegetation from the ground class. In some cases, the filters would remove too much ground on elevated road ways and additional steps were taken to add data back to the ground class. Additionally, SNA paid for a high altitude flight (18,000’ agl) ortho photography for breakline collection. Students from UWG were used to digitize the water features using a combination of the ortho photography and the latest NAIP data set from 2010. Due to the heavy flooding at the time of acquisition, we needed a set of images for visual comparison. Breaklines were created with ArcMap using the orthophotography with NAIP imagery and ERDAS Imagine for difficult wetland areas. Breaklines were made for ponds and lakes greater than two acres and rivers wider than 100 feet. Hydro features were identified and polygons created using the ortho photography provided by ACA. Accuracy was determined by overlaying the polygons over the LAS tiles ground only layer. Polygons within 2 m of a shoreline were determined adequate based on VG4D's ability to associate vertices with LAS points within this distance. 2D polygons were then draped to the LiDAR bare earth model using a 2 m search distance and z values obtained from the ground class.

*Process\_Contact*

*Contact\_Person:* Jon A. Indridason

*Contact\_Information:* jindridason@s-nelson.com

*Contact\_Organization\_Primary:* S. Nelson & Associates, Inc.

*Contact\_Organization:*  www.s-nelson.com

*Contact\_Person:* Jon A. Indridason

*Contact\_Address:* 110 Evans Mill Drive Ste 204

*Address\_Type:* Business

*City:* Dallas

*State\_or\_Province:* Georgia

*Postal\_Code:* 30157

*Contact\_Voice\_Telephone:* 770-505-8566

*Spatial\_Data\_Organization\_Information:*

*Direct\_Spatial\_Reference\_Method:* Vector

*Point\_and\_Vector\_Object\_Information:* LAS 1.2

*SDTS\_Terms\_Description:*

*SDTS\_Point\_and\_Vector\_Object\_Type:* G-polygon

*Point\_and\_Vector\_Object\_Count:* 13 Billion discrete LIDAR returns

*Spatial\_Reference\_Information:*

*Horizontal\_Coordinate\_System\_Definition:* UTM 17N

*Geodetic\_Model:* GEIOD99

*Horizontal\_Datum\_Name:* North American Datum of 1983

*Ellipsoid\_Name:* Geodetic Reference System 80

*Semi-major\_Axis:* 6378137.000000000000000000

*Denominator\_of\_Flattening\_Ratio:* 298.257222101000020000

*Entity\_and\_Attribute\_Information:*

*Detailed\_Description:* The tile.shp had the following attributes fields: Name, Path, FileName, Status, SubStatus, Reference, NoOfPoints, Return1, Return2, Return3, Return4, Return5, MinZ, MaxZ, MeanZ, MC\_Name

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*Entity\_Type\_Label:* Tiles\_

*Attribute:* Name

*Attribute\_Label:* Name

*Attribute\_Definition:* Tiles definition

*Attribute\_Definition\_Source:* ESRI

*Attribute\_Domain\_Values:*

*Unrepresentable\_Domain:*

*Attribute:*

*Attribute\_Label:* Shape

*Attribute\_Definition:* Feature geometry.

*Attribute\_Definition\_Source:* ESRI

*Attribute\_Domain\_Values:*

*Unrepresentable\_Domain:* Coordinates defining the features.

*Attribute:*

*Attribute\_Label:* ID

*Attribute:*

*Attribute\_Label:* SlopeInter

*Attribute:*

*Attribute\_Label:* StartSlope

*Attribute:*

*Attribute\_Label:* StopSlope

*Attribute:*

*Attribute\_Label:* Area

*Distribution\_Information:*

*Resource\_Description:* Downloadable Data

*Standard\_Order\_Process:* USGS Click website

*Digital\_Form:*

*Digital\_Transfer\_Information:*

*Transfer\_Size:* 0.016

*Metadata\_Reference\_Information:*

*Metadata\_Date:* 20110415

*Metadata\_Contact:* Jon A. Indridason

*Contact\_Information:* jindridason@s-nelson.com

*Contact\_Organization\_Primary:* S. Nelson & Associates, Inc.

*Contact\_Organization:*  www.s-nelson.com

*Contact\_Person:* Jon A. Indridason

*Contact\_Address:* 110 Evans Mill Drive Ste 204

*Address\_Type:* Business

*City:* Dallas

*State\_or\_Province:* Georgia

*Postal\_Code:* 30157

*Contact\_Voice\_Telephone:* 770-505-8566

*Metadata\_Standard\_Name:* FGDC Content Standards for Digital Geospatial Metadata

*Metadata\_Standard\_Version:* FGDC-STD-001-1998

*Metadata\_Time\_Convention:* local time

*Metadata\_Extensions:*

*Online\_Linkage:* [<http://www.esri.com/metadata/esriprof80.html>](http://www.esri.com/metadata/esriprof80.html)

*Profile\_Name:* ESRI Metadata Profile

*Citation\_Information:*

*Originator:* Jacob D. Hall

*Publication\_Date:* 2011/04/30

*Publication\_Time:* 12:00pm EST

*Time\_Period\_Information*

*Multiple\_Dates/Times:* LiDAR Processing – 2010/09/01-2011/04/25

*Multiple\_Dates/Times:* Breakline/Hydroflattening 2011/01/21-2011/04/05

*Multiple\_Dates/Times:* QC\QC – 2011/04/01-2011/04/25

*Contact\_Information:*

*Contact\_Person\_Primary:* Jon A. Indridason

*Contact\_Organization\_Primary:* S. Nelson &, Associates, Inc

*Contact\_Position:* Project Manager

*Contact\_Address:* 110 Evans Mill Drive ste 204, Dallas GA, 30157

*Contact\_Voice\_Telephone:* 770-505-8566

*Contact\_TDD/TTY\_Telephone:*

*Contact\_Facsimile\_Telephone:* 770-505-8566

*Contact\_Electronic\_Mail\_Address:* jindridason@s-nelson.com

*Hours\_of\_Service:* 8am-5pm EST Monday-Friday