Project Description

Cooperative Agreement between the U.S. Geological Survey and the State of Kansas, Kansas Information Technology Office (KITO) for the acquisition of LIDAR data in Kansas.

**1. Background**

The United States Geological Survey (USGS) is responsible for coordinating geospatial data and partnership needs for the implementation of *The National Map* in Kansas. USGS Partnership funds to assist in acquiring Light Detection And Ranging (Lidar) data is a key component of this effort. This data will be of use to The National Map and the US Topo.

The data collected will be of value to the Consortium partners as well as other Federal, State, Regional, and Local agencies. This Consortium has contracted Aerometric and Sanborn through a State procurement process to acquire and process the lidar data through an open competitive process.

The USGS Partnerships Office, through this agreement, will provide funding to KITO for inclusion of USGS Partnership requirements and specifications in the FY 13 Kansas Lidar Consortium project of the SE Kansas block. This agreement will result in an overall decrease in project costs for USGS and its partners; significantly reduce program duplication; build on established relationships between USGS and its partners; and promote better coordination with other entities that have LIDAR data acquisition interests in the project area. The USGS Kansas Partnerships Office will be responsible for coordination of the project with KITO and the other Kansas Lidar Consortium partners.

**2. Scope**

This agreement covers funding for the acquisition of Lidar data for the SE Kansas Block. Specifications for the data being supplied to the USGS are included in Section 6 of this project description. Adjustments to expand the total project area may occur, but the cost in USGS partnership funds shall not exceed the dollar amount stated in the cooperative agreement. This data set will be distributed in the Public Domain.

The USGS will provide $135,335 to KITO for the SE Kansas Block. KITO will deliver all products to USGS including .las point clouds, bare earth and first return DEMs, hydro polygons, intensity images, and project reports.

The USGS will work closely with KITO to ensure that the LIDAR data acquired through this grant meets USGS technical requirements. USGS involvement will include participation in project planning, technical assistance, and distribution of the data to The National Map. The USGS will provide program resources to adequately inform its partners and other interested parties at the Federal, State, Regional, and Local levels about the project and the acquired LIDAR data.

**3. Responsibilities**

3.1 KITO will:

(a) Facilitate and manage the contract with the vendors. Provide all necessary personnel, equipment, and facilities to award, administer, and monitor the LIDAR acquisition program.

(b) Administer the agreements with all partnering agencies.

(c) Coordinate the overall project for the Consortium.

(d) Notify USGS on the progress of task activities and deliverables on a quarterly basis

3.3 USGS KS Partnerships Office will:

(a) Provide coordination with KITO and other consortium partners

during the course of the project

(b) Distribute final deliverables to The National Map and geo.data.gov

**4. Schedule**

The period of performance shall commence on date of award ending March 15, 2014.

**5. Points of Contact**

5.1 USGS:

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5.2 KITO:

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**6. Technical Specifications**

6.1 LIDAR will be meet U.S. Geological Survey National Geospatial Program Lidar Base Specification Version 1.0.

6.2 Project Area: 6,407 square miles covering 10 counties of Greenwood, Elk, Chautauqua, Woodson, Wilson, Montgomery, Anderson, Allen, Neosho, and Labette.

6.3 LIDAR Collection:

* Multiple Discrete Returns capable of at least 3 returns per pulse.
* Resolution = 1.4 meter GSD
* Vertical Accuracy of the LIDAR data will be assessed and reported in accordance with the guidelines developed by NDEP and adopted by ASPRS. The complete guidelines may be found in Section 1.5 of the Guidelines document. See: <http://www.ndep.gov/NDEP_Elevation_Guidelines_Ver1_10May2004.pdf>

Vertical accuracy requirements using the NDEP/ASPRS methodology are:

* Fundamental Vertical Accuracy (FVA) <= 24.5 cm ACCz at the 95% confidence (12.5 cm RMSEz)
* Consolidated Vertical Accuracy (CVA) <=36.3 cm, 95th percentile
* Supplemental Vertical Accuracy (SVA) <=36.3 cm 95th percentile

6.4 Flight Timeframe: December 1, 2012 through March 1, 2013 for leaf-off conditions. Ground will be snow free and without any flooding or inundation.

**7. Project Deliverables**

* 1. Raw Point Cloud
* All returns, all collected points, fully calibrated and adjusted to ground, by swath.
* Fully complaint LAS v 1.3; Point Record Format 1
* Georeference information in LAS header as:
* NAD 1983, UTM Zone 14N & 15N
* Horizontal unit: meters
* NAVD 88– Geoid09
* Vertical unit: meters
* Intensity values
* 1 file per swath, 1 swath per file, file size not to exceed 2 GB

7.2 Classified Point Cloud

* Fully complaint LAS v 1.3; Point Record Format 1
* Georeference information in LAS header as:
* NAD 1983, UTM Zone 14N & 15N
* Horizontal unit: meters
* NAVD 88 – Geoid09
* Vertical unit: meters
* Each record will include the following fields:
* X,Y,Z coordinates
* Flight line data
* Intensity value
* Return number, number of returns, scan direction, edge of flight line, scan angle
* Classification:

1 – unclassified

2 – ground

7 – low point and noise

9 – water

10 – ignored ground (breakline proximity)

11 – withheld points (extremely high or low noise; extreme edge of swath points)

17 – overlap, unclassified

18 – overlap, ground

1. – overlap, low point and noise

24– overlap, water

Note: Class 12 for overlap shall not be used.

* Classification Accuracy: Within any 1 km x 1 km area, no more than 2% of non-withheld points will possess a demonstrably erroneous classification value.
* GPS times recorded as Adjusted GPS Time (expressed in second of the week)
* Tiled to 5,000 m x 5,000 m; edge-matched seamlessly, and without overlap
* FGDC-Compliant Metadata for each tile

7.3 Bare-Earth Surface (Raster Digital Elevation Model (DEM))

* Horizontal DEM grid spacing of 1 meter
* ERDAS .IMG format
* Water Bodies (ponds and lakes), wide streams and rivers (double line) are to be hydro-flattened within the DEM to create level water surface below surrounding terrain. Hydro-flattening shall be applied to water bodies greater than 3/4 acres (3,000 square meters) and streams wider than 50 feet nominal width.
* Tiled 5,000 m x 5,000 m, without overlap
* Vertical accuracy of bare earth surface will be assessed and reported independently from the LIDAR point clod data. Vertical Accuracy using NDEP/ASPRS methodology :
* Fundamental Vertical Accuracy (FVA) <= 24.5 cm ACCz, 95% (12.5 cm RMSEz)
* Consolidated Vertical Accuracy (CVA) <=36.3 cm, 95th percentile
* Supplemental Vertical Accuracy (SVA) <=36.3 cm 95th percentile
* FGDC-Compliant Metadata for each tile
  1. First Return (Raster Digital Elevation Model (DEM))
* Horizontal DEM grid spacing of 1 meter
* ERDAS .IMG format
* Tiled 5,000 m x 5,000 m, without overlap
* FGDC-Compliant Metadata for each tile
  1. Hydro Polygons collected for LAS classification and water flattening
* Delineation of water bodies > ¾ acre and streams > 50 ft wide
* ESRI Geodatabase format
  1. Intensity Images from First Return
* 8-bit (recorded gray scale values from 0-255)
* ERDAS .IMG format
* Tiled 5,000 m x 5,000 m
* FGDC-Compliant Metadata for each tile
  1. Project Reports/Metadata
* Collection Report detail mission and flight logs
* Survey Report detailing collection of control and reference points used for calibration and QA/QC.
* Processing Report detailing calibration, classification, and product generation
* QA/QC Reports
* Control and Calibration points
* Product metadata (FGDC compliant, XML format metadata) for each product tile

7.8 Delivery Schedule: LIDAR will be provided to KITO beginning June, 2013 through December 1, 2013. LIDAR will be provided to USGS in December 2013 through March 2014.

7.9 Use and Distribution Rights: All deliverable data and documentation shall be free from restrictions regarding use and distribution.

**Project Area**

