



The State of New Hampshire  
**Department of Environmental Services**

JUL 22 '15 AM 11:52 DAS



**Thomas S. Burack, Commissioner**

July 21, 2015

Her Excellency, Governor Margaret Wood Hassan  
and the Honorable Council  
State House  
Concord NH 03301

**REQUESTED ACTION**

Authorize the Department of Environmental Services (DES) to enter into a **SOLE SOURCE** Joint Funding Agreement with the U.S. Geological Survey (USGS), National Geospatial Technical Operations Center, Rolla, Missouri (VC # 175772), in the amount of \$587,500.00 for acquisition of airborne light detection and ranging (LiDAR) elevation data, effective upon Governor and Council approval through September 30, 2017. 100% Capital (General) Funds.

Funding is available in the account as follows:

	<u>FY 2016</u>
03-44-44-440030-50410000-034-500161	\$587,500.00
Dept. of Environmental Services, Enhanced Elevation Data for New Hampshire, Capital Projects	

**EXPLANATION**

A capital budget appropriation was requested and approved to match an equal amount of funds previously awarded under the USGS 3D Elevation Program (3DEP) to acquire airborne LiDAR elevation data for an approximately 3,500 square mile area encompassing the Connecticut River watershed in New Hampshire. Federal funding contributors include the USGS, the Natural Resources Conservation Service, and the Federal Emergency Management Agency. This agreement is **sole source** because USGS, with its federal partners, is funding 50-percent of the cost of the project. Furthermore, in order to be eligible for funding under the USGS 3DEP grant, LiDAR data are subject to nationally prescribed standards. USGS uses pre-qualified contractors and administers data quality assurance and quality control (QA/QC) to insure that all deliverables meet or exceed these specifications. See attachment A for the Statement of Work and a map of the area being scanned.

Existing topographic data for most of the state is too inaccurate to fully utilize modern digital technologies that enable detailed mapping of natural and manmade features of the land surface with a geographic information system (GIS). This request is to acquire airborne LiDAR elevation data that will significantly expand coverage beyond what is currently available for New Hampshire (i.e., south-eastern and south-central areas of the state and a portion of the White Mountain National Forest), supporting a range of land development and resource management uses. LiDAR data are required to accurately map

flood inundation zones in order to protect public safety and infrastructure and avoid costs associated with flood damage, but these data also provide many other benefits such as reducing engineering costs of new roadway designs and other land development projects.

Under this agreement, the USGS will utilize the established USGS Geospatial Products and Services Contracts (GPSC) as the vehicle to accomplish the LiDAR mapping for the Connecticut River watershed. The contracts include acquisition, processing, and quality assurance of LiDAR and other source geographic data. These federal contracts are already in place and have been awarded through a competitive process, consistent with the Competition in Contracting Act and the Brooks Act. Firms on GPSC have been selected based on their qualifications and performance in providing the professional services needed for LiDAR mapping.

This Agreement has been approved by the Department of Justice as to form, content and execution.

We respectfully request your approval.

*M. Kevin O'Keefe*  
*Acting Assistant Commissioner*

*for*

\_\_\_\_\_  
Thomas S. Burack  
Commissioner

**U.S. DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY**

Customer #:  
Agreement #:  
Project #:  
TIN #: 02-6000618  
Fixed Cost  
Agreement NO

**JOINT FUNDING AGREEMENT**

FOR

New Hampshire Connecticut River Valley Lidar

**THIS AGREEMENT is entered into as of the, day of August, 2015 by the U.S. GEOLOGICAL SURVEY, UNITED STATES DEPARTMENT OF THE INTERIOR, party of the first part, and the New Hampshire Department of Environmental Services, party of the second part.**

1. The parties hereto agree that subject to availability of appropriations and in accordance with their respective authorities there shall be maintained in cooperation a project to acquire LiDAR data over approximately 3,500 square miles in the Connecticut River Basin (see attached Statement of Work) herein called the program. The USGS legal authority is 43 USC 36C; 43 USC 50; and 43 USC 50b.

2. The following amounts shall be contributed to cover all of the cost of the necessary field and analytical work directly related to this program. 2(b) includes In-Kind Services in the amount of \$0.00

(a) by the party of the first part during the period

Amount	Date	to	Date
\$218,085.00	date of last signature		September 30, 2017

(b) by the party of the second part during the period

Amount	Date	to	Date
\$587,500.00	date of last signature		September 30, 2017

Additional funding to this project: NRCS National level \$233,495.00 and FEMA \$133,665.00. These funds are being added to the project under separate funding agreements

(c) Contributions are provided by the party of the first part through other USGS regional or national programs, in the amount of:

Description of the USGS regional/national program:

(d) Additional or reduced amounts by each party during the above period or succeeding periods as may be determined by mutual agreement and set forth in an exchange of letters between the parties.

(e) The performance period may be changed by mutual agreement and set forth in an exchange of letters between the parties.

3. The costs of this program may be paid by either party in conformity with the laws and regulations respectively governing each party.

4. The field and analytical work pertaining to this program shall be under the direction of or subject to periodic review by an authorized representative of the party of the first part.

5. The areas to be included in the program shall be determined by mutual agreement between the parties hereto or

their authorized representatives. The methods employed in the field and office shall be those adopted by the party of the first part to insure the required standards of accuracy subject to modification by mutual agreement.

6. During the course of this program, all field and analytical work of either party pertaining to this program shall be open to the inspection of the other party, and if the work is not being carried on in a mutually satisfactory manner, either party may terminate this agreement upon 60 days written notice to the other party.

**9-1366 (Continuation)**

Customer #:

Agreement #:

7. The original records resulting from this program will be deposited in the office of origin of those records. Upon request, copies of the original records will be provided to the office of the other party.
8. The maps, records, or reports resulting from this program shall be made available to the public as promptly as possible. The maps, records, or reports normally will be published by the party of the first part. However, the party of the second part reserves the right to publish the results of this program and, if already published by the party of the first part shall, upon request, be furnished by the party of the first part, at costs, impressions suitable for purposes of reproduction similar to that for which the original copy was prepared. The maps, records, or reports published by either party shall contain a statement of the cooperative relations between the parties.
9. USGS will issue billings utilizing Department of the Interior Bill for Collection (form DI-1040). Billing documents are to be rendered monthly, based on actual expenses, independent of product delivery. Payments of bills are due within 60 days after the billing date. If not paid by the due date, interest will be charged at the current Treasury rate for each 30 day period, or portion thereof, that the payment is delayed beyond the due date. (31 USC 3717; Comptroller General File B-212222, August 23, 1983).

**U.S. Geological Survey  
United States  
Department of the Interior  
USGS Point of Contact**

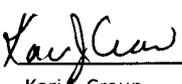
**New Hampshire Department of Environmental Service**

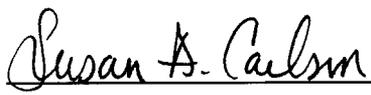
**Customer Point of Contact**

Name: Lin Neifert  
Address: 331 Commerce Way, Suite 2  
Pembroke, NH 03275  
Telephone: (802)522-8275  
Email: lineifert@usgs.gov

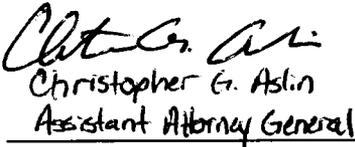
Name: Rick Chormann  
Address: NH Geological Survey  
29 Hazen Drive, PO Box 95  
Concord, NH 03302-0095  
Telephone: (603)271-1975  
Email: Frederick.Chormann@des.nh.gov

**Signatures and Date**

Signature:  Date: 7-16-2015  
Name: Kari F. Craun  
Title: Chief, National Technical Operations Center

Signature:  Date: 7/20/15  
Name: Susan A. Carlson  
Title: Chief Operations Officer

Signature: \_\_\_\_\_ Date: \_\_\_\_\_  
Name: Approval by the Governor and  
Title: Executive Council

Signature:  Date: 7/22/15  
Name: Approval by the Attorney General  
Title: (Form, Substance and Execution)

## STATEMENT OF WORK

# USGS BAA G14PS00574 LIGHT DETECTION AND RANGING (LIDAR) DATA, LIDAR-DERIVED AND ELEVATION PRODUCTS FOR CONNECTICUT RIVER BASIN JUNE 26, 2015

### 1) Purpose:

The USGS will acquire accurate, high-resolution (1 meter) Light Detection and Ranging (LIDAR) data and develop elevation products such as 1 meter bare-earth digital elevation models (DEM) for the area described. The overall objective is to obtain LIDAR data and elevation products for 3,500 square miles or more in the Connecticut River Basin as funding permits. See Attachment A for a project diagram showing the area of coverage.

### 2) Statement of Work

USGS will select a qualified vendor to perform the LiDAR collection and processing via the Bureau's Geospatial Product and Service Contract (GPSC). GPSC task orders are awarded to qualified vendors through federal government solicitation. Current solicitation 09CR14-NoSolicitation was issued March 03, 2009. Qualified consultants are selected in accordance with Public Law 92-528 (Brooks Act) and FAR 36.6 - Architect-Engineering Services, which establishes a qualifications-based selection process, in which contracts for Architectural and Engineering services are negotiated on the basis of demonstrated competence and qualification for the type of professional services required at a fair and reasonable price. Vendor selection is based on the following 6 criteria (1) Professional qualifications necessary for satisfactory performance of required services; (2) Specialized experience and technical competence in the type of work required; (3) Capacity to accomplish the work in the required time; (4) Past performance on contracts with Government agencies and private industry in terms of cost control, quality of work, and compliance with performance schedules; (5) Location in the general geographical area of the project and knowledge of the locality of the project and (6) Acceptability under other appropriate evaluation criteria. This process is aligned with the Department's consultant RFP and selection process.

USGS will contribute funding to the project, administer data quality assurance and quality control (QA/QC), and manage all data deliverables.

The Task Order issued by USGS to the selected GPSC Contractor provides full details regarding project collection requirements and resulting deliverables.

USGS will:

- In combination with FEMA and NRCS, contribute a BAA share of \$587,500.00 in support of total project cost (USGS: \$218,085.00, FEMA: \$133,665, NRCS \$233,495.00).
- Prepare a Task Order for agreed upon products and services.
- Serve as Government Point of Contact during the full period of the Agreement.
- Receive and catalog all project deliverables.
- Inspect all deliverables to meet USGS specifications
- Prepare product Validation Summary Report(s) and distribute to relevant project Points of Contact.
- Return data to Contractor as needed for error correction/rework.

New Hampshire Department of Environmental Services will:

- Provide \$587,500.00 for production activities associated with LiDAR collection, processing, and derivative product generation. This includes the applicable GPSC assessment fee which is calculated by USGS as 5% of the total contracted project cost.

### **3) Specifications and Deliverables**

All specifications and deliverables will meet or exceed the (Quality Level 2) U.S. Geological Survey LiDAR Guidelines and Base Specification, v 1.2 (<http://pubs.usgs.gov/tm/11b4/>). To supplement USGS specifications, FEMA-specific requirements such as cross section surveys, treatment of bridges and other features appearing in FEMA Procedure Memorandum No. 61 – Standards for LiDAR and Other High Quality Digital Topography, (<http://www.fema.gov/media-library/assets/documents/6998?id=2206>) will be adhered to and reflected in final product delivery.

### **4) Project Data Specifications**

- a) Vertical Datum:  
NAVD88 using the most recent approved Geoid model from the National Geodetic Survey (NGS) for purposes of performing conversions from ellipsoidal heights to orthometric heights.
- b) Horizontal Datum:  
Horizontal NAD83/ High Accuracy Reference Network 2011 adjustment (NAD83/2011).
- c) Coordinate System and Projection: New Hampshire State Plane FIPS\_2800, Feet, Transverse Mercator
- d) Tiling Scheme: 5,000 feet x 5,000 feet, named based on concatenation of x,y coordinates of southwest corner of each image

- e) Ground Points:  
Full Point Cloud, LAS 1.4 format
- f) Data Quality and Flight Season  
Data will be collected during leaf-off season, and not during high water events. In the event that this is not possible, discussions with the state and USGS will determine whether another collection window is acceptable.
- g) LiDAR Nominal Pulse Spacing:  
Nominal Pulse Spacing of 0.7-meter or better for this LiDAR collection project. Maximum final post spacing sufficient to accommodate 2 points per square meter in unobstructed areas for random point data.
- h) Vertical Accuracy:  
RMSE<sub>z</sub> 0.32 ft (10 cm) to support 0.5 M contour accuracy (Vegetated Vertical Accuracy 0.96 ft or 29.4 cm).
- i) Tie to Existing LiDAR Data  
LiDAR data collected for this project will be tied to LiDAR-derived elevations collected during previous adjacent projects so as to minimize differences in surface elevations at the intersecting seams of the project areas. The vertical difference along a tie-edge will not exceed the Non-vegetated Vertical Accuracy (NVA) and Vegetated Vertical Accuracy (VVA) in specific vegetation types.
- j) Digital Elevation Model (DEM):  
Bare Earth, hydro-flattened DEM. Delivery will include a mosaiced DEM data set and a set of individually tiled DEMs.
- k) Metadata:  
Processed LiDAR data and derived products will include FGDC-compliant tile-level and project-level metadata.
- l) Data Delivery Media:  
Two hard drives, each with a complete dataset

#### LIDAR and Elevation Products

- a. Break lines
- b. 1 meter hydro-flattened Bare Earth DEM, including individual tiles and mosaiced regional data set
- c. 1 meter resolution Intensity Image: intensity recorded from reflective surface (first return) pulse.
- d. Point cloud in LAS Version 1.4 containing point record formats 0-5; all returns

- e. Ground returns, overlap points, and low/high points should be classified in the full point cloud and all returns .las files.

Metadata:

- a. FGDC-compliant project and tile-level metadata (xml format) shall be provided.

File formats

Mass points: LAS Version 1.4 containing point record formats 0-5

Intensity image: GeoTIFF

DEM: GeoTIFF

Break lines: Arc Shapefile

**5) Schedule and Data Delivery**

The contractor will send all of deliverables to USGS NGTOC Rolla by 01/01/2017. NGTOC will evaluate the data to ensure it meets the project specifications and send a report to the contractor within 60 days of delivery. The contractor will correct all problems identified by NGTOC and return to NGTOC Rolla within 30 days for final acceptance. Once accepted NGTOC Rolla will deliver the data on external hard drives to the USGS Geospatial Liaison in New Hampshire who will then deliver the data to the partners.

All data will be delivered in 5000 X 5000 foot tiles. An extension (e.g., .las) will be used to distinguish between the products.

**6) Financial Arrangements**

The authority for billing reimbursable partners will be derived from the separate, signed joint funding agreements (JFA) between USGS and the respective partners.

Planned Funding Partners and contributions are:

<b>Partner</b>	<b>Contribution</b>
New Hampshire Department of Environmental Services	\$587,500.00
USGS	\$218,085.00
Natural Resource Conservation Service-National	\$233,495.00
Federal Emergency Management Agency	\$133,665.00
<b>TOTAL</b>	<b>\$1,172,745</b>

The funding amounts listed above are based on an Independent Government Cost Estimate (IGCE) and include the USGS 5% Assessment.

**7) Billing**

The amount to be billed to each partner will be based on the actual cost of the task order. Each partner will pay the actual cost not to exceed the specified amount in their JFA unless agreed upon in writing by all parties.

**8) Contacts**

<b>Partner</b>	<b>Technical &amp; Data Delivery</b>	<b>Billing &amp; Administrative</b>
<b>USGS</b>	Lin Neifert	Mark Gewinner
	802-522-8275	573-308-3636
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**9) Term of Agreement**

The term of this Agreement shall be from the date of the last signed JFA until September 30<sup>th</sup>, 2017.

**10) Authority**

43 U.S.C. 36 (c) - provides that "In Fiscal Year 1987 and thereafter the Geological Survey is authorized to accept lands, buildings, equipment, and other contributions from public and private sources and to prosecute projects in cooperation with other agencies, Federal, State, or private."

## 11) Other terms

Every effort will be made to award contract(s) to complete the work as described in this SOW. However, if the total funding amount is not sufficient to complete the work as described, then adjustments will be made to either obtain additional funding, or, the project will be re-scoped to the mutual satisfaction of all stakeholders. Conversely, if funding allows, the project may be expanded to the mutual satisfaction of all stakeholders.

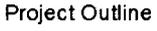
If data acquisition cannot be completed during a single season due to unacceptable capture conditions, then it is possible that the remaining AOI would be acquired during the next suitable collection window which may or may not be in the same calendar year.

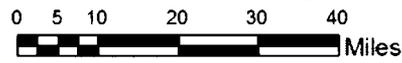
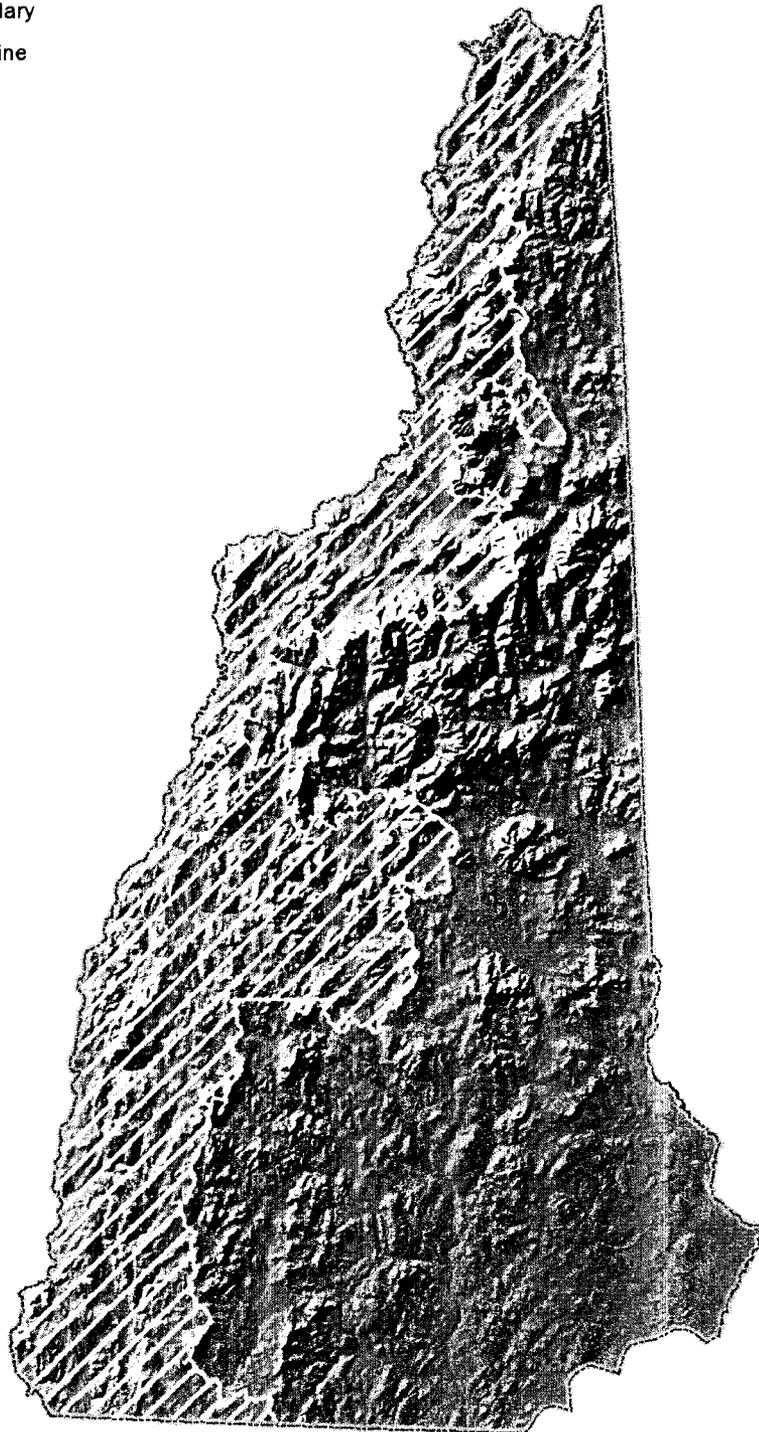
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LiDAR area of coverage is shown as the Yellow area boundary ( 3,500 square miles)

<b>Bound ary</b>	<b>Shapefile</b>	<b>Total mi2</b>	<b>Funds</b>	<b>Source s</b>
Yellow	Potential_lidar_footprint	3,500	\$1,172,745	Current Partners

**Legend**

-  State Boundary
-  Project Outline





## ATTACHMENT A

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<b>Bound ary</b>	<b>Shapefile</b>	<b>Total mi2</b>	<b>Funds</b>	<b>Source s</b>
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**Legend**

-  State Boundary
-  Project Outline

