

TASK ORDER DETAIL

USGS CONTRACT: G10PC00026

CONTRACTOR: GMR, DBA: PHOTOSCIENCE

TASK ORDER NUMBER: G13PD00377

TASK NAME: NRCS Shenandoah, VA LiDAR

The Contractor shall furnish all facilities, labor, materials, and equipment, unless specifically identified otherwise, to provide the mapping services and products in accordance with the specifications, terms, and conditions contained in Contract No. **G10PC00026**, and the following requirements specific to this Task Order, and in accordance with Contractor's proposal dated April 18, 2013, and in the amount of:

Task Order Fixed Price	\$ 458,209.70
-------------------------------	----------------------

SECTION C: DESCRIPTION/SPECIFICATIONS/WORK STATEMENT.

The following **Section C** additional requirements are applicable to this Task Order:

- C.1. **Statement of Work (SOW):** Reference C.1 of the Contract. This task order is for Planning, Acquisition, processing, and derivative products of lidar data to be collected at a nominal pulse spacing (NPS) of 0.7 meters, including overlap. Lidar data, and derivative products produced in compliance with this task order are based on the **“U.S. Geological Survey National Geospatial Program Lidar Base Specification Version 1.0”**, which is incorporated by reference into this task order. This specification may be viewed at <http://pubs.usgs.gov/tm/11b4/>. These lidar specifications are required baseline specifications. In addition to the requirements listed below, variations from the specifications will be shown and noted below. For any item, which is not specifically addressed, the referenced Version 1.0 specifications will be the required specification authority.

This task order requests LiDAR surveys be collected over an area in northwest Virginia. The data is to be acquired and processed under the requirements identified in this task order. The total area of the NRCS Shenandoah, VA LiDAR AOI is approximately **1,512 square miles**. This project will require hydro-flattening.

- C.1.a. **KICK-OFF MEETING:** A kick-off meeting shall be held to outline communication procedures that shall be followed for data acquisition with respect to verification of local ground conditions and vegetation requirements. This meeting shall be used as a forum to clarify and resolve collection condition issues. Local contact(s) shall be established to provide ground condition updates. The kick-off meeting shall be held no later than **two (2) weeks** after contract award and prior to data acquisition.

- C.1.b. **DATA ACQUISITION (COLLECTION):** The contractor shall be responsible for acquisition of lidar data of sufficient density and quality to meet the requirements specified in **the referenced Version 1.0 specification.**
- C.1.b.(i) **Collection area:** The collection area shall be defined as the Defined Project Area, buffered by no less than 100-meters. The Project Area is defined in “**Attachment A – Project Description and Diagram**” and further delineated by the ESRI ArcShape file included as “**Attachment B – Shape File(s)**”
- C.1.b.(ii) **Nominal Pulse Spacing:** Nominal Pulse Spacing (NPS) shall be no greater than 0.7 meters and includes overlap. Assessment to be made against single swath, first return data located within the geometrically usable center portion (typically ~90%) of each swath.
- C.1.b.(iii) **Signal Returns** The laser system shall be configured to collect multiple echoes per pulse, with a minimum of a first return and a last return and at least one additional intermediate return. All returns captured during acquisition shall be delivered. Return number shall be recorded.
- C.1.b.(iv) **GPS Times:** shall be recorded as Adjusted GPS Time, at a precision sufficient to allow unique timestamps for each return. Adjusted GPS Time is defined to be Standard (or satellite) GPS time minus 1×10^9 . See the LAS Specification for more detail.
- C.1.b.(v) **Signal Strength:** The signal strength (intensity) of each return pulse shall be recorded.
- C.1.b.(vi) **Clustering:** The spatial distribution of geometrically usable points is expected to be uniform and free from clustering. In order to ensure uniform densities throughout the data set:
- C.1.b.(vi)(a) A regular grid, with cell size equal to the design $2 \times \text{NPS}$ will be laid over the data.
- C.1.b.(vi)(b) At least 90% of the cells in the grid shall contain at least 1 lidar point.
- C.1.b.(vi)(c) Clustering will be tested against the 1st return only data
- C.1.b.(vi)(d) Acceptable data voids identified elsewhere in this specification are excluded.
- C.1.b.(vii) **Control:** LIDAR shall be acquired using the following control specifications.
- C.1.b.(vii)(a) **Supplemental Ground Control:** Differentially corrected GPS Ground Control used to supplement the Airborne GPS positional accuracy.
- C.1.b.(vii)(b) **Ground Control Quality Check points:** The Contractor shall collect additional Ground Control Check Points in each project area which shall

be delivered in ESRI Arc Shape format and will be used by the Government for validation.

- (01) A minimum of twenty (20) check points shall be collected uniformly dispersed over the project area in **each** of the land cover classifications in which there is **more than 10% coverage** to verify fundamental, supplemental, and consolidated vertical accuracies. **In addition – Points shall be collected for those areas which are classified as Urban, even if there is less than 10% coverage.**
- (02) Fundamental vertical accuracy checkpoints should be located only in open terrain, where there is a high probability that the sensor will have detected the ground surface without influence from surrounding vegetation.
- (03) Checkpoints should be located on flat or uniformly sloping terrain and will be at least five (5) meters away from any breakline where there is a change in slope.
- (04) The checkpoint accuracy shall satisfy a Local Network accuracy of 5-centimeters at the 95% confidence level.
- (05) Most common land cover categories are (**but not limited to**):
 - Bare Earth/Open Terrain
 - Urban
 - Tall Weeds/Crops (do not use Low Veg)
 - Brush lands and Trees (do not use Med Veg)
 - Forested and Fully Grown (do not use High Veg)
- (06) Check points shall not be incorporated into the contractor's vertical solution.
- (07) The USGS landcover analysis tool found that only 60 control checkpoints are required in the 3 categories of Tall weeds/crops, Forest, and Bare Earth. (see below)

-----SVA Landcover Class Report-----

For USGS LiDAR Base Specification Projects each landcover type representing 10% or more of the total project area must be tested and reported as a Supplemental Vertical Accuracy.

- Bare Earth Comprises 5.00796655038% of Landcover for this Project.
- Tall Weeds & Crops Comprises 32.7690082214% of Landcover for this Project.
- Brushlands & Low Trees Comprises 0.419017318478% of Landcover for this Project.
- Forested Areas Fully Covered by Trees Comprises 59.2868678082% of Landcover for this Project.
- Urban Areas with Dense Man Made Structures Comprises 1.25937510135% of Landcover for this Project.
- Open Water Comprises 0.622741114369% of Landcover for this Project.
- Swamp, Marsh, or Wetlands Comprises 0.63502388585% of Landcover for this Project.

- C.1.b.(viii) **Vertical Accuracy Requirements:** Lidar collected under this task order shall meet or exceed these vertical accuracies. Assessment procedures shall comply with NDEP guidelines. See C.1.b.(i)(a) below for complete vertical accuracy reporting requirements.
RMSE_Z = 9.25 cm
FVA = 18.13 cm 95% Confidence Level (Required Accuracy)
CVA = 26.9 cm 95th Percentile (Required Accuracy)
SVA = 26.9 cm 95th Percentile (Target Accuracy)
- C.1.b.(ix) **Positional Accuracy Validation:** The absolute and relative accuracy of the data, both horizontal and vertical, relative to known control, shall be verified prior to classification and subsequent product development. A detailed report of this validation is a required deliverable
- C.1.b.(x) **Relative Accuracy Requirements:** Relative accuracy shall be <= **6-cm** RMSE_Z within individual swaths and <=**8-cm** RMSE_Z or within swath overlap (between adjacent swaths)
- C.1.b.(i) **Acquisition Window:** Acquisition window shall be at a period of annual minimal water level in the fall 2013 leaf off window running through March 1, 2014.
- C.1.b.(ii) **Swath Length:** Long swaths (those which result in a LAS file larger than 2GB) shall be split into segments. Each segment shall thenceforth be regarded as a unique swath. Other swath segmentation criteria may be acceptable, with prior approval.
- C.1.b.(iii) Full Swath data shall be delivered Edge data from each swath shall not be trimmed from the delivered data.
- C.1.b.(iv) **Overlap:** Flight line overlap of 10% or greater, as required to ensure there are no data gaps between the usable portions of the swaths. Collections in high relief terrain are expected to require greater overlap. Any data with gaps between the geometrically usable portions of the swaths will be rejected.
- C.1.b.(v) **Data Voids:** Data Voids [areas => (4*NPS)², measured using 1st-returns only] within a single swath are not acceptable, except:
- C.1.b.(v)(a) where caused by water bodies
- C.1.b.(v)(b) where caused by areas of low near infra-red (NIR) reflectivity such as asphalt or composition roofing; or
- C.1.b.(v)(c) where appropriately filled-in by another swath
- C.1.b.(vi) **Data Acquisition Conditions:**

- C.1.b.(vi)(a) **Atmospheric:** Cloud and fog-free between the aircraft and ground
- C.1.b.(vi)(b) **Ground:**
- (01) Snow free; very light, undrifted snow may be acceptable in special cases, with prior approval.
 - (02) No unusual flooding or inundation, except in cases where the goal of the collection is to map the inundation.
- C.1.b.(vi)(c) **Vegetation:** Leaf-off is preferred, however:
- (01) As numerous factors will affect vegetative condition at the time of any collection, the USGS National Geospatial Program (NGP) only requires that penetration to the ground must be adequate to produce an accurate and reliable bare-earth surface suitable for incorporation into the 1/9 (3-meter) NED.
 - (02) Collections for specific scientific research projects may be exempted from this requirement, with prior approval.
- C.1.b.(vii) **Time of Day:** Time of day is not of concern.

C.1.c. **DATA PROCESSING AND HANDLING:** The contractor shall be responsible for post processing of lidar data of sufficient density and quality to meet the requirements specified in the *National Geospatial Program Lidar Base Specification Version 1.0*. All processing should be carried out with the understanding that all point deliverables are required to be in fully compliant LAS format, v1.2 or v1.3. Data producers are encouraged to review the LAS specification in detail. Specifications of the LAS data sets will be verified.

C.1.c.(i) **ACCURACY REPORTING**

C.1.c.(i)(a) **Data Accuracy:** Data collected under this Task Order shall meet the National Standard for Spatial Database Accuracy (NSSDA) accuracy standards. The NSSDA standards specify that vertical accuracy be reported at the 95 percent confidence level for data tested by an independent source of higher accuracy. For example the metadata statement shall read, “Tested __ (meters, feet) vertical accuracy at 95 percent confidence level.”

- (01) **Accuracy of the Lidar Point Cloud Data:** The Fundamental Vertical Accuracy (FVA) of the Lidar Point Cloud data shall be calculated against TINs derived from the final calibrated and controlled swath data. The required accuracy (ACC_z) is: 18.13 cm at a 95% confidence level, derived according to NSSDA, i.e.,

based on RMSE of 9.25 cm in the “open terrain” land cover category. This is a required accuracy.

- (02) **Accuracy of the Derived DEM:** The accuracy (ACC_Z) of the derived DEM shall be calculated and reported in three (3) ways:
- **Fundamental Vertical Accuracy (FVA):** The required FVA is: 18.13 cm at a 95% confidence level, derived according to NSSDA, i.e., based on RMSE of 9.25 cm in the “open terrain” land cover category. This is a required accuracy.
 - **Supplemental Vertical Accuracy (SVA):** SVAs shall be reported for each of the land cover classes identified in C.1.b.(vii)(b) above. The target SVA is: 26.9 cm at a 95th percentile level, derived according to ASPRS Guidelines, Vertical Accuracy Reporting for LiDAR Data, i.e., based on the 95th percentile error for each required land cover class. These are target accuracies.
 - **Consolidated Vertical Accuracy (CVA):** The required CVA is: 26.9 cm at a 95th percentile level, derived according to ASPRS Guidelines, Vertical Accuracy Reporting for LiDAR Data, i.e., based on the 95th percentile error in all land cover categories combined. This is a required accuracy.

C.1.c.(ii) **Hydro Flattening Requirements:**

C.1.c.(ii)(a) **Inland Ponds and Lakes:**

- (01) ~2-acre or greater surface area (~350’ diameter for a round pond)
- (02) Flat and level water bodies (single elevation for every bank vertex defining a given water body).
- (03) The entire water surface edge must be at or just below the immediately surrounding terrain.
- (04) Long impoundments such as reservoirs, inlets, and fjords, whose water surface elevations drop when moving downstream, should be treated as rivers.

C.1.c.(ii)(b) **Inland Streams and Rivers:**

- (01) 100’ **nominal** width: This should not unnecessarily break a stream or river into multiple segments. At times it may squeeze slightly below 100’ for short segments. Data producers should use their best professional judgment.
- (02) Flat and level bank-to-bank (perpendicular to the apparent flow centerline); gradient to follow the immediately surrounding terrain.
- (03) The entire water surface edge must be at or just below the immediately surrounding terrain.
- (04) Streams should break at road crossings (culvert locations). These road fills should not be removed from DEM. However, streams

and rivers should **not** break at bridges. Bridges should be removed from DEM. When the identification of a feature as a bridge or culvert cannot be made reliably, the feature should be regarded as a culvert.

C.1.c.(ii)(c)

Non-Tidal Boundary Waters:

- (01) Represented only as an edge or edges within the project area; collection does not include the opposing shore.
- (02) The entire water surface edge must be at or below the immediately surrounding terrain.
- (03) The elevation along the edge or edges should behave consistently throughout the project. May be a single elevation (i.e., lake) or gradient (i.e., river), as appropriate.

C.1.c.(ii)(d)

Tidal Waters:

- (01) Water bodies such as oceans, seas, gulfs, bays, inlets, salt marshes, very large lakes, etc. Includes any significant water body that is affected by tidal variations.
- (02) Tidal variations over the course of a collection, and between different collections, will result in discontinuities along shorelines. This is considered normal and these “anomalies” should be retained. The final DEM should represent as much ground as the collected data permits.
- (03) Variations in water surface elevation resulting in tidal variations during a collection should NOT be removed or adjusted, as this requires either the removal of ground points or the introduction of unmeasured ground into the DEM. The USGS NGP priority is on the ground surface, and accepts the unavoidable irregularities in water surface.
- (04) Scientific research projects in coastal areas often have very specific requirements with regard to how tidal land-water boundaries are to be handled. For such projects, the requirements of the research will take precedence.

C.1.d. **DELIVERABLE PRODUCTS:** The following deliverable products shall be produced from the lidar produced in C.1.b above.

C.1.d.(i) **Raw Point Cloud Data:**

C.1.d.(i)(a) Fully compliant LAS v1.2 or v1.3, Point Record Format 1, 3, 4, or 5

C.1.d.(i)(b) LAS v1.3 deliverables with waveform data are to use external “auxiliary” files with the extension “.wdp” for the storage of waveform packet data. See the LAS v1.3 Specification for additional information.

C.1.d.(i)(c) Georeference information included in all LAS file headers

- C.1.d.(i)(d) GPS times are to be recorded as Adjusted GPS Time, at a precision sufficient to allow unique timestamps for each return.
- C.1.d.(i)(e) Intensity values
- C.1.d.(i)(f) Full swaths, all collected points to be delivered.
- C.1.d.(i)(g) 1 file per swath, 1 swath per file, file size not to exceed 2GB, as described in Section II, Paragraph 5.
- C.1.d.(ii) **Classified Point Cloud:**
- C.1.d.(ii)(a) Fully compliant LAS v1.2 or v1.3, Point Record Format 1, 3, 4, or 5, including “File Source ID.”
- C.1.d.(ii)(b) LAS v1.3 deliverables with waveform data are to use external “auxiliary” files with the extension “.wdp” for the storage of waveform packet data. See the LAS v1.3 Specification for additional information.
- C.1.d.(ii)(c) Georeference information included in LAS header
- C.1.d.(ii)(d) GPS times are to be recorded as Adjusted GPS Time, at a precision sufficient to allow unique timestamps for each return.
- C.1.d.(ii)(e) Intensity values
- C.1.d.(ii)(f) Tiled delivery, without overlap
- C.1.d.(ii)(g) Classification Scheme (minimum):
- (01) Code 1 – Processed, but unclassified
 - (02) Code 2 – Bare-earth ground
 - (03) Code 7 – Noise (low or high, manually identified, if needed)
 - (04) Code 9 – Water
 - (05) Code 10 – Ignored Ground (Breakline Proximity)
- C.1.d.(ii)(h) *Note: Class 7, Noise, is included as a convenience for the data producer. It is not required that all “noise” be assigned to Class 7.*
- C.1.d.(ii)(i) *Note: Class 10, Ignored Ground, is for points previously classified as bare-earth but whose proximity to a subsequently added breakline requires that it be excluded during Digital Elevation Model (DEM) generation.*
- C.1.d.(iii) **Bare Earth Surface (Raster DEM):**
- C.1.d.(iii)(a) Cell Size no greater than 0.7 meters, and no less than the design Nominal Pulse Spacing (NPS). *Suggested to use 2.5 ft cell size to be evenly divisible by the 5,000ft x 5,000ft tiles.*

- C.1.d.(iii)(b) Delivery in an industry-standard, GIS-compatible, 32-bit floating point raster format (ERDAS .IMG preferred)
- C.1.d.(iii)(c) Georeference information shall be included in raster file
- C.1.d.(iii)(d) Tiled delivery, without overlap
- C.1.d.(iii)(e) DEM tiles will show no edge artifacts or mismatch
- C.1.d.(iii)(f) Void areas (i.e., areas outside the project boundary but within the tiling scheme) shall be coded using a unique “NODATA” value. This value shall be identified in the appropriate location within the file header.
- C.1.d.(iii)(g) Vertical Accuracy (RMSE_Z) of the bare earth surface is to be assessed using the methods described in the FEMA “Guidelines and Specifications for Flood Hazard Mapping Partners, Appendix A”, Section A.8.5 paragraph 1, Section A.8.6.1, and Section A.8.6.2 (substituting the contracted vertical accuracy requirements (RMSE_Z) for those listed in the FEMA document). All QA/QC analysis materials and results are to be delivered to the USGS.
- C.1.d.(iii)(h) Depressions (sinks), natural or man-made, are not to be filled (as in hydro-conditioning and hydro-enforcement).
- C.1.d.(iii)(i) Water Bodies (ponds and lakes), wide streams and rivers (“double-line”), and other non-tidal water bodies as defined in Section III are to be hydro-flattened within the DEM. Hydro-flattening shall be applied to all water impoundments, natural or man-made, that are larger than ~2 acre in area (equivalent to a round pond ~350’ in diameter), to all streams that are nominally wider than 100’, and to all non-tidal boundary waters bordering the project area regardless of size. The methodology used for hydro-flattening is at the discretion of the data producer.
- C.1.d.(iv) **Control:** Control, as defined in C.1.a. above shall be delivered to the Government as specified in C.2. Digital Deliverables.
- C.1.d.(v) **LiDAR Intensity Image** in grayscale 8-bit GeoTiff format using the same tile structure as the other Lidar deliverables.
- C.1.d.(vi) **Breaklines:** Hydro Enforced/Flattened breaklines shall be delivered in mutually agreeable format, preferably ESRI Arc Shape format.
- C.1.d.(vii) **Contours:** Two (2) foot contours shall be generated from the bare-earth lidar classification and the collected hydro flattened breaklines, minimally processed, and delivered for each delivery tile in Arc Shape File format.

- C.1.d.(viii) **Metadata:** The following requirements for Metadata shall be met:
- C.1.d.(viii)(a) Collection Report detailing mission planning and flight logs.
- C.1.d.(viii)(b) Survey Report detailing the collection of control and reference points used for calibration and QA/QC.
- C.1.d.(viii)(c) Processing Report detailing calibration, classification, and product generation procedures including methodology used for breakline collection and hydro-flattening.
- C.1.d.(viii)(d) QA/QC Reports (detailing the analysis, accuracy assessment and validation of:
 (01) The point data (absolute, within swath, and between swath)
 (02) The bare-earth surface (absolute)
 (03) Other optional deliverables as appropriate
- C.1.d.(viii)(e) Control and Calibration points: All control and reference points used to calibrate, control, process, and validate the lidar point data or any derivative products are to be delivered.
- C.1.d.(viii)(f) Geo-referenced, digital spatial representation of the precise extents of each delivered dataset. This should reflect the extents of the actual lidar source or derived product data, exclusive of Triangular Irregular Network (TIN) artifacts or raster NODATA areas. A union of tile boundaries or minimum bounding rectangle is not acceptable. ESRI Polygon shapefile is preferred.
- C.1.d.(viii)(g) Product metadata (FGDC compliant, XML format metadata). One file for each:
 (01) Project
 (02) Lift (*note: this one per lift – not one per project*)
 (03) Tiled deliverable product group (classified point data, bare-earth DEMs, breaklines, etc.). Metadata files for individual tiles are not required.
- C.1.d.(ix) **Project Report:** The contractor shall deliver a production report which details:
- C.1.d.(ix)(a) A record of field work procedures.
- C.1.d.(ix)(b) Data derivation and adjustments.
- C.1.d.(ix)(c) Quality control procedures and results.
- C.1.d.(ix)(d) Any problems encountered and solutions used in resolving such problems.
- C.1.d.(ix)(e) Statistical report summarizing the results of the airborne GPS adjustment and the overall accuracy of the adjusted IMU data.
- C.1.d.(ix)(f) Production report shall be Microsoft Word, Adobe PDF format or other compatible digital format.
- C.1.d.(x) **Acquisition Reports:** Contractor shall provide regular progress updates to the technical point of contact throughout the data acquisition process.
- C.1.d.(x)(a) Update frequency shall be based upon the collection period, but no less than once a week.
- C.1.d.(x)(b) Reports shall be delivered as shapefiles which represent the geographic extent of the acquired data.

- C.1.d.(x)(c) Updates shall commence at acquisition onset and shall continue until acquisition is complete.
- C.1.d.(xi) **Project Pilot:** Contractor shall deliver a Project Pilot Delivery consisting of the FVA reporting of the UNCLASSIFIED point cloud data, a minimum of five (5) square miles of classified LAS data in each of the primary land cover categories (SVA categories), and corresponding Hydro Flattened Bare Earth DEM's.
- C.1.e. TILING SCHEME AND DATA FORMAT:**
- C.1.e.(i) **Tile Coverage:** Tiles which lie completely within the project area shall be complete to the tile edges. Tiles which lie partially outside the project boundary shall be complete to the project boundary with enough overlap beyond the project boundary to ensure that no parts of the project are omitted. After LiDAR acquisition and supplemental control phases, the contractor will post process the LiDAR data in order to deliver classified, bare earth LAS files in version 1.2 (formatted to Point Record Format 1) adhering to the existing VGIN tiling schema or a similar client and USGS approved tiling schema for Virginia.
- C.1.e.(i)(a) **Tile Size:**
- (01) Tiles shall be 5,000 ft x 5,000 ft to match VBMP tiling scheme
 - (02) Tiled deliverables shall conform to the tiling scheme, without added overlap.
 - (03) Tiling scheme will be used for all tiled deliverables.
 - (04) Tiled deliverables shall edge-match seamlessly in both the horizontal and vertical.
- C.1.e.(i)(b) **Spatial Reference System:**
- (01) The Spatial Reference System shall be: *for the Conterminous United States (CONUS) is: Virginia State Plane, NAD83 Harn, U.S. Survey Feet; NAVD88, U.S. Survey Feet. Data should reference the most recent Geoid model approved by the NGS.*
- C.1.f. **NOTIFICATION:** The Government POC named below shall be notified within 24 hours of the start of acquisition of data. Notification can be made by e-mail and is for information purposes only, not permission to proceed.
- C.1.g. **PERMITS:** The contractor shall be responsible for obtaining all permits which may be required in the performance of this task order, which shall include, but not be limited to any permits for acquisition of data in controlled or restricted airspace, and access to control points on the ground.

- C.1.h. **USE AND DISTRIBUTION RIGHTS:** All deliverable data and documentation shall be free from restrictions regarding use and distribution. Data and documentation provided under this Task Order shall be freely distributable by government agencies.
- C.1.h.(i) **NOTE:** “*National Geospatial Program Lidar Base Specification Version 1.0*”, page 9 “Deliverables”, regarding data provider’s rights to resell data or derivative products as they see fit are specifically exempted from this task order.
- C.1.i. **CERTIFICATIONS:** The contractor shall certify as part of its proposal that the work performed on this task order complies with Section 52.225-05 of the Federal Acquisition Regulations relating to Trade Agreements.
- C.1.j. **THE GOVERNMENT POINT-OF-CONTACT (POC) FOR THIS TASK ORDER:** The Government Point of Contact for this task order and any modifications shall be the POC listed below.
- Address:** USGS/NGTOC **Telephone:**(573) 308-3587
ATTN: Patrick Emmett, MS 666 **FAX:**(573)-308-3810
1400 Independence Road **e-mail:** pemmett@usgs.gov
Rolla, MO 6540
- C.2. **Digital Deliverables:** Reference C.1 of the Contract.
- C.2.a. **The Contractor shall deliver one copy** of the Lidar data products and documentation as specified in Section C.1 of this Task Order.
- C.2.b. **Format:** Data shall be delivered in the formats specified in C.1.c above.
- C.2.c. **Delivery Medium:** The digital data shall be delivered on external hard drive, i.e. (firewire, or USB2 – Less than USB2 is not acceptable). Files shall be stored into appropriate directories on the drive.
- C.2.d. **Deliverable Validation:** Reference C.1 - 3.12 of the Contract. The Government may choose to contract with a separate contractor for validation on all submitted deliverables.

SECTION D: - PACKAGING AND MARKING

- D.1. No additional Section D requirements are applicable to this Task Order.

SECTION E: - INSPECTION AND ACCEPTANCE - The following Section E additional requirements are applicable to this Task Order:

- E.1. **Inspection Period:** Reference GS0720 of the Contract. The inspection period begins the day after the data has been delivered. All deliverables will be validated within a Sixty (60) calendar-day of the inspection period
- E.2. **Inspection and Acceptance Procedures:** Reference E780 of the Contract. The Government will perform a full inspection of all deliverables in accordance with E780 (b) of the Contract.
- E.3. **Nonconforming deliverables:** Nonconforming deliverables returned to contractor for rework shall be delivered in accordance with Contract clause E784 (b).

SECTION F: - DELIVERIES OR PERFORMANCE - The following Section F additional requirements are applicable to this Task Order:

- F.1. **Place of Delivery:** Reference GS0904 of the Contract. Contractor shall submit all requested deliverables to the address of the POC, as shown in Section C of this Task Order.
- F.2. **Delivery Schedule:** Reference F981 of the Contract. The Government requires the following delivery schedule:
- F.2.a. **Lot One (1) Kick-off Meeting:** A kick-off meeting will be held to outline communication procedures that will be followed for data acquisition with respect to verification of local ground conditions and vegetation requirements. The kick-off meeting will be held no later than two (2) weeks after contract award and prior to data acquisition, but no later than **September 1, 2013**.
- F.2.b. **Lot Two (2) Acquisition Updates:** During this time Photo Science will submit regular acquisition updates in the form of shape file(s) which represent the acquired geographic extent. Regular acquisition updates will commence upon data acquisition but not later than **November 15, 2013** and will conclude upon acquisition completion.
- F.2.c. **Lot Three (3): LiDAR Acquisition** will be completed by **March 1, 2014**, weather and ground conditions permitting.
- F.2.d. **Lot Four (4)** Supplemental Control and Ground Control Quality Control Surveys will be completed by **December 31, 2013**.
- F.2.e. **Lot Five (5) Pilot Data:** Project Pilot Delivery consisting of the FVA reporting of the UNCLASSIFIED point cloud data and a minimum of approximately 5 square miles of classified LAS data in each of the primary land cover categories (SVA categories) will be delivered no later than **30 calendar days** following completion of data acquisition, control surveys and LiDAR flight line calibration (whichever occurs later), but in no case later than **April 1, 2014**.

F.2.f. **Lot Six (6):** Consisting of all required deliverables (including metadata) of the LiDAR data and its derived products as specified in the task order, will be delivered no later than **90 calendar days following Government response to Pilot Data, but in no case later than July 1, 2014.**

F.3. **Progress Reports:** Contractor shall submit a monthly progress report for this task order in accordance with Contract clause GS0921 and GS0931.

SECTION G: - CONTRACT ADMINISTRATION DATA

G.1. No additional Section G requirements are applicable to this Task Order

SECTION H: - SPECIAL CONTRACT REQUIREMENTS -The following Section H additional requirements are applicable to this Task Order:

H.1. **Applicable Regulations And Permits -- Aircraft Operations:** Reference H1344 of the contract. The contractor shall be responsible for applying for and obtaining any required permits for access, over-flight, or intrusion into restricted or otherwise limited ground access and/or airspace, which may be included within the requirement of this task order.

H.2. **Government Furnished Property:** Reference H1480 (Conditions Regarding Use Of GFP) of the contract. No Government furnished property is being supplied with this Task Order.

SECTION I: - CONTRACT CLAUSES

I.1. No additional detail is required for this Task Order.

SECTION J: - LIST OF ATTACHMENTS TO THIS TASK ORDER

J.1.	Attachment A -	Project Area Description	1 Page
J.2.	Attachment B -	Shape files	1 Page

**TASK ORDER Attachment B -
NRCS Shenandoah, VA LiDAR – Project Shape Files**

THIS SECTION CONSISTS OF THE FOLLOWING DATA SET(S)

validar_footprint_rev012913_AOI.zip

END “ATTACHMENT B”