

SCOPE OF WORK

High Resolution Digital LiDAR Data Acquisition and Processing for portions of Nebraska 2017-2018

21-JUN-2017

Background and Project Information

The Nebraska USDA-NRCS requires high-resolution digital elevation data developed from airborne LIDAR for an area of approximately 11,110 square miles in Nebraska and Leaf-off imagery for approximately 7,698 square miles in Nebraska (Appendix A). The data will be used by the USDA-NRCS to generate digital elevation models and contours for use in dam safety assessments, engineering design and design reviews, conservation planning, research, delivery, floodplain mapping, and hydrologic modeling utilizing LiDAR technology. The data is to be acquired between Fall 2017 and Spring 2018. The project area will consist of high accuracy classified bare-earth LiDAR data in LAS format, raster Digital Elevation Models (DEMs), and Leaf-off imagery per project requirements. The project LiDAR data will be edge-matched to current Nebraska LiDAR data.

Unless otherwise stated, the USGS-NGP Lidar Base Specifications (Techniques and Methods 11–B4, Version 1.2, November 2014) for Quality Level Two (QL2) will define the technical requirements for the project area(s).

Unless otherwise stated, the National Agricultural Imagery Program (NAIP) Specifications, Section C, will define the technical requirements for imagery collection for the project area (Appendix B). Imagery will be collected in leaf-off conditions rather than the standard NAIP leaf-on requirement.

1 General Requirements

1.1 Project Area

The project consists of 11,110 square miles in south central and eastern Nebraska as shown in Appendix A and available in Esri shapefile format.

Specific details for collection will follow in the General Requirements.

1.2 Project Initiation Plan

A detailed project plan must be submitted for approval within 10 days of receiving notice to proceed and prior to any data acquisition activities. The plan shall consist of the following:

- Schedule (data acquisition, data processing, data delivery)
- Project personnel with contact information of the project and field operation manager(s)
- Proposed flight lines in GIS and graphic format

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- Base station locations in GIS and graphic format as well as supporting NGS control information
- Proposed baseline lengths for aerial collection
- Calibration testing methodology(s)
- LiDAR collection parameters (flying height, Scan FOV full angle, pulse rate, scanner frequency, side-lap percentage, point density etc.)
- Proposed acquisition windows including maximum PDOP values
- Description of internal verification quality control processes;
 - Data validation
 - Pre-processing and accuracy check
 - Processing quality control
 - Product delivery quality control

1.3 LiDAR Data Acquisition Parameters

LiDAR data shall be collected using an approved fully calibrated system capable of collecting multiple echoes per pulse with a minimum of a first, last, and one intermediate return. The system must also be able to collect the intensity (LiDAR pulse signal strength) for each return signal.

1.3.1 Sensor Calibration

Full system calibration and routine maintenance should be up-to-date to ensure full functionality of the LiDAR system to meet and exceed project accuracies and requirements. Full calibration reports should be available if requested. Bore site calibrations shall be performed at the beginning and end of the project and as needed throughout the data collection period. Alternative testing methodologies may be used upon review and acceptance by USDA-NRCS prior to any data acquisition activities.

1.3.2 LiDAR Collection Point Spacing and Density

To meet QL2 requirements, the planned resolution of the LiDAR will be a minimum of 0.71 meter Aggregate Nominal Point Spacing (ANPS). The QL2 requirements are as follows:

Quality Level (QL)	Aggregate nominal pulse spacing (ANPS) (m)	Aggregate nominal pulse density (ANPD) (pls/m²)
QL2	≤0.71	≥2.0

To prevent clustering effects and to ensure uniform densities through the dataset, a regular grid, with cell size equal to the design 2*ANPS will be laid over the data. At least 90% of the cells in the grid shall contain at least one LiDAR point. Assessment to be made against single swath, first return data located within the geometrically usable center portion (typically ~95%) of each swath.

1.3.3 Acquisition Window and Constraints

LiDAR acquisition shall occur between leaf-off conditions in the Fall of 2017 and the Spring of 2018. Prior consent will be required before the initial project data collection.

The acquisition area shall be free of snow and shall be free of flood conditions with rivers remaining in their channels and near average heights. Extraneous environmental conditions such as rain, fog or smoke shall be avoided.

The LiDAR provider shall ensure that the project area is fully and sufficiently covered with no data voids due to data holidays (i.e. gaps between flightlines) and/or from system malfunctions. Data voids in the bare-earth not caused by classification of geographic features shall not exceed three times the point spacing. Data voids of this size are unacceptable and shall be sufficient reason to reject the entire dataset.

1.4 LiDAR Data Format

Point cloud data shall be delivered in ASPRS (American Society of Photogrammetry and Remote Sensing) LAS 1.4 format containing all LAS items of point data record format 6, 7, 8, 9 or 10. The header file should contain all system generated LAS items as defined in the Public Header Block and as a minimum must contain the “File Creation Year Day” and “File Creation Year” which will represent the final deliverable generated LAS date. The projection information for the point data must be specified in the Variable Length Record using the appropriate GeoTIFF tags.

The classification codes will follow the ASPRS Standard LiDAR Point Classes utilizing the following:

- Class 1 – Processed, but unclassified
- Class 2 – Bare-earth ground
- Class 7 – Low noise (low, manually identified, if necessary)
- Class 8 – Model Key points
- Class 9 – Water
- Class 10 – Ignored ground (breakline proximity)
- Class 17 – Bridge decks
- Class 18 – High noise (high, manually identified, if necessary)

Class 1 will be used for feature points that are not in Classes 2, 7, 8, 9, 10, 17 or 18. These typically represent returns from man-made structures, vegetation etc.

Class 7 will be used for artifacts that do not represent the ground, manmade structures or vegetation. Typically these are extraneous points that are below the surface not representing any true feature.

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Class 18 will be used for artifacts that do not represent the ground, manmade structures or vegetation. Typically these are extraneous points that are well above the surface not representing any true feature.

No points shall be deleted from the LAS file.

Note: Classes 7 and 18 are included as a convenience for the data producer. It is not required that all “noise” be assigned to those Classes.

Class 8 is included as a convenience for the data producer to identify Model Key Points, but the appropriate attribute bit flag shall be set to comply with USGS Lidar Base Specification v1.2 and LAS v1.4.

Bare-earth classification shall adhere to the follow specifications using both automated and manual filtering classification routines:

- no more than 2 percent of non-withheld points will have demonstrable errors in the classification value

Special attention must be applied to the classification process due to the geographic nature of the project area which consists of extremely flat terrain mixed with important hydrographic characteristics. Channel geometry of streams and drainage features must be maintained as well as the ability to identify sand bar features within rivers. Dense vegetation data voids must also be minimized by the automatic removal process and “over smoothing” due to aggressive classification must be avoided.

1.5 Ground Control

All survey conducted under this project shall be referenced to National Geodetic Survey (NGS) control monuments in the National Spatial Reference System (NSRS) using appropriate horizontal and vertical control. Ideally checkpoint surveys should utilize or tie into the same base station control monuments used for the aerial acquisition to eliminate the possibility of discrepancies between different control stations. Base station locations should be the “best” horizontal (second order or better) and vertical (third order or better) available and have a stability of “C” or better. In the event that no suitable base station monuments exist, new primary ground control will be required and shall conform to the Standards and Specifications for Geodetic Control Networks (1984), Federal Geodetic Control Committee (FGCC). Primary control monuments established with GPS shall meet or exceed NOS NGS-58 “Guidelines for Establishing GPS-Derived Ellipsoid Heights (Standards: 2 cm and 5 cm)” using the appropriate latest geoid model and should be monumented to maintain stability. Ground control stations are expected to have a local network accuracy at the 95% confidence level of 2 cm horizontally and vertically. Sound geodetic principles should be applied when establishing new stations and must include the appropriate supporting documentation such as processing reports, minimally and constrained 3-D least squares adjustment, pictures of the station, etc.

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For aerial acquisition a minimum of two base stations capable of collecting dual frequency data at 1 Hz is required. Although not a requirement, it is desired that baseline lengths should not exceed 25 miles. Circumstances may allow for exceeding the 25 mile baseline length if necessary as this length is considered conservative. For quality control, forward and reverse processing of the trajectories should yield similar results and these comparisons should be made available if requested. Additionally other quality statistics from the airborne GPS/IMU processing such as DOP values, resolved ambiguity reports, accelerometer and gyro drift and scale factors etc. should be made available if requested.

Non-vegetated Vertical Accuracy (NVA) and Vegetated Vertical Accuracy (VVA) LiDAR checkpoints will be acquired as outlined in Table C.1 (page A19) of the American Society for Photogrammetry and Remote Sensing (ASPRS), 2014, ASPRS Positional Accuracy Standards for Digital Geospatial Data (EDITION 1, VERSION 1.0. - NOVEMBER, 2014). These LiDAR checkpoints and their coordinates will be used in verifying and validating the accuracy of the LiDAR point cloud.

1.6 Accuracy

The absolute vertical accuracy requirement for LiDAR swath data (and DEMs), QL2 is $\leq 10.0\text{cm}$ RMSE_Z (Accuracy_Z $\leq 19.6\text{cm}$ at the 95% confidence level); however, to best match legacy LiDAR projects / data, the following Lidar accuracies are required:

Vertical elevations will meet or exceed 10cm RMSE_Z (Accuracy_Z = 19.6cm at the 95% confidence level).

Horizontal accuracy will meet or exceed 0.6m RMSE (Accuracy_r = 1.04m at the 95% confidence level).

1.6.1 Absolute Accuracy Testing

The bare-earth LiDAR DTM will be tested using both NSSDA/FEMA and the ASPRS/NDEP methods. The NSSDA/FEMA method specifies that accuracy should be reported at the 95% confidence level for data tested by an independent source of higher accuracy for horizontal and/or vertical accuracy using a user defined threshold.

Data tested with the NSSDA/FEMA method shall use the following statements:

Tested___(meters) horizontal accuracy at 95% confidence level

Tested___(meters) vertical accuracy at 95% confidence level

Accuracy_r = RMSE_r X 1.7308 and Accuracy_z = RMSE_z X 1.9600 at the 95% confidence level.

Both NSSDA/FEMA and ASPRS/NDEP does not require independent testing of horizontal accuracy for elevation products. Therefore if not tested, the following statement will be used:

Compiled to meet___ (meters) horizontal accuracy at 95% confidence level

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However it is the intent of the USDA-NRCS to test the horizontal accuracy if possible utilizing the intensity imagery and the full point cloud with intensity values.

1.6.2 Relative Accuracy

The vertical accuracy testing uses survey measurements at discrete locations to compute the errors which verify the absolute error. This coupled with relative accuracy (e.g. how one points fits relative to the next, and how one flight line fits relative to the adjacent line) defines the combined accuracy of the dataset. Data therefore should not have discontinuities between adjacent flight lines or “corn rows” of undulating elevations due to mismatches and sensor anomalies.

Quality Level (QL)	Smooth surface repeatability (cm)	Swath overlap difference, RMSD _Z (cm)	Swath overlap difference, maximum (cm)
QL2	≤6	≤8	±16

Data exceeding these amounts may not cause the whole dataset to fail but may be rejected.

1.7 Datums and Projections

The horizontal datum shall be referenced to the North American Datum of 1983 (NAD 83) using the National Adjustment of 2011 (NA2011).

The vertical datum shall be referenced to the North American Vertical datum of 1988 (NAVD88). GEOID12B shall be used to convert ellipsoidal heights to orthometric heights.

The projection is appropriate UTM Zone 13 or 14 North in meters. All units will be to 1 centimeter resolution.

1.8 Tile scheme

The tile scheme shall be based on the National Grid which defines spatial addresses by using 3 sets of information; the UTM Zone and the hemisphere identifier value, the regional locator value, and the local address. Tile size will be 1,000 X 1,000 m and will be supplied by USDA-NRCS. Tiles may be clipped by the project boundary.

1.9 Hydro-Flattening

Hydro-flattening of the derived DEMs shall be based on the USGS-NGP Lidar Base Specifications, Version 1.2.

1.10 Metadata and Reports

Metadata compliant with the Federal Geographic Data Committee’s (FGDC) ISO 19115:2003 requirements as outlined in the Nebraska Information Technology Commission (NITC) NITC 3-201 Geospatial Metadata Standards (<http://nitc.ne.gov/standards/3-201.html>). Metadata should be created on a tile level for each product deliverable.

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Metadata shall include as a minimum the following sections;

- Identification Information
- Data quality information which will include all process steps, and the horizontal and vertical accuracy as tested by the LiDAR provider
- Spatial Data Organization Information
- Spatial Reference Information
- Entity and Attribute Information
- Metadata Reference Information

Metadata fields shall also include as a minimum;

- Date of acquisitions
- System type and system collection parameters (flying height, Scan FOV full angle, pulse rate, scanner frequency, side-lap percentage, point density etc.)
- Nominal point density
- Calibration procedures
- Base station control information

Metadata may also be supplemented with projects reports where the report conveys additional information not suitable for metadata. If surveying to establish new ground control stations was performed, a survey report is required.

1.11 Media and Data Ownership

All LiDAR data and Leaf-off imagery (and supplemental products) will be delivered on USB external hard drives (2 copies - one for intermediate storage and one for off-site back-up) and will become the property of the USDA-NRCS. All media and data collected under this contract shall be the sole property and can be freely distributed by the USDA-NRCS. No restrictions shall be placed on the data by the LiDAR provider.

2 Deliveries and Performance

2.1 Lidar Deliverables

The following deliverables are detailed in the USGS-NGP Lidar Base Specifications, Version 1.2 starting on page 13.

- **Raw Point Cloud** – fully calibrated LiDAR point cloud delivered by (flight) swath
- **Classified Point Cloud** – LAS files shall be created using the tiling scheme outlined in Section 1.8 and classified as outlined in Section 1.4
- **Hydro-flattening Breaklines** - breaklines delivered in Esri shapefile, or file geodatabase format as PolylineZ and PolygonZ feature classes

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- **Digital Elevation Models** – shall be hydro-flattened and created using an appropriate interpolation method to produce 1 meter resolution DEM's (with no null values) for both the tile scheme and by county. DEM's shall be referenced to the same horizontal and vertical datums as the LAS. DEM's will be in IMG format and tiles will be edge joined and seamless within the project. Cells must be aligned and be fully contained within each tile. Additional DEMs shall be produced for both the tile scheme and by county from the first return point cloud data (i.e. Digital Surface Model [DSM])
- **Intensity Image:** An Intensity Image shall be produced for each tile. Cell size shall be 1.0 meter. Image shall be 8-bit, 256 color gray scale and GeoTIFF format. Images shall be tiled to match the Classified LAS and DEM files. Intensity images shall be organized and shall be delivered **project-wide (by tile) and by county.**
- **2' Engineering Contours** – shall be created by county and provided in Esri geodatabase format. Contours shall include index contours.
- **Hillshades** – shall be created from the 1m countywide DEMs.
- **FGDC Metadata** – shall be created for all deliverables including the LAS files by tile, DEMs by tile and by county, 2' Engineering Contours by county.
- **Flight Lines** – Esri Shapefile of flight lines as flown. Flight dates included in the attribute table.
- **A Project Completion Report** which must include the following:
 - (a) A LIDAR system data report which must include discussions of: data processing methods used, final LIDAR pulse and scan rates, scan angle, capability for multiple returns from single pulses, accuracy and precision of the LIDAR data acquired.
 - (b) A flight report that must document mission date, time, flight altitude, airspeed, and other information deemed pertinent. The report must include information about GPS-derived flight tracks, provide a detailed description of final flight line parameters and GPS controls (i.e. benchmarks), and include ground truth and complementary data. A chart of areas of high PDOP, with curtains (point obstructions) created for each of the receiver sites is required. A site obstruction diagram shall be provided for each receiver site.
 - (c) A ground control report that includes, at a minimum, all pertinent base station information and mission notes, including information on GPS station monument names and stability. Digital pictures to also be provided for each control point surveyed.

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(d) Data processing procedures of posting, and all orthometric values of x, y, and z coordinates for LIDAR returns.

(e) A system calibration report.

2.2 Leaf-off Imagery Deliverables

Leaf-off imagery deliverables are detailed in the National Agriculture Imagery Program (NAIP) Base Specifications, Section F, starting on page 23 (Appendix B).

2.3 Deliveries

All transportation charges and costs appurtenant thereto, are a subsidiary obligation of the Contractor for which no separate payment will be made. DELIVERIES OR PERFORMANCE shall begin immediately after receiving notice to proceed.

- Delivery shall be sent via FEDEX or UPS and the Contractors expense and made according to the following schedule:
- Final delivery of all products shall be completed and delivered within three months of data collection but no later than April 30, 2019. Incremental delivery and acceptance of blocks of data is required to receive partial payment.
- Work will commence immediately after award and notice to proceed by contracting officer.

Deliver all survey data requested in the survey specifications, check feature data, and any additional survey information developed and or collected for the project.

The Contractor shall return all manuscript copies; horizontal and vertical control information, to the government when the project is completed.

The Contractor shall notify the above consignee at least 48 hours in advance of the date on which to expect delivery of the items. USDA-NRCS personnel at the designated delivery points will provide necessary assistance between the hours of 8:00 a.m. and 4:30 p.m., Monday through Friday, for accepting delivery of materials. Delivery shall be made at the location designated below in Section 2.4.

2.4 Time Extension

In the event these schedules are exceeded due to causes beyond the control and without fault or negligence of the contractor, as determined by the Contracting Officer, this delivery order completion date will be extended one (1) calendar day for each day of delay.

Requests for time extensions for an individual task order should be forwarded to the Contracting Officer no later than fourteen (14) days preceding the completion date shown on the task order.

2.5 Shipment

Shipments shall be made to:

PROJECT MANAGER

Shandy Bittle
State GIS Specialist
USDA-NRCS
100 Centennial Mall N. Suite 152
Lincoln, NE 68508
402-437-4020
shandy.bittle@ne.usda.gov

A copy of the detailed transmittal letter on all interim deliveries of data, need to be sent to:

CONTRACTING OFFICERS REPRESENTATIVE (COR)

Timothy W. Saultz
United States Geological Survey
1400 Independence Road, MS 670
Rolla, MO 65401
573.308.3654
Geospatial Product and Service Contract (GPSC)
Contracting Officer's Representative (COR)
Commercial Partnership Team Lead

Final Delivery:

Shandy Bittle
State GIS Specialist
USDA-NRCS
100 Centennial Mall N. Suite 152
Lincoln, NE 68508
402-437-4020
shandy.bittle@ne.usda.gov

Inspection

Inspection of the data deliverables including accuracy and quality assurance will be performed to ensure conformance to these specifications. If the inspection reveals deficiencies or defects the data or issues will be required to be resolved at no additional cost to the USDA-NRCS. Initial inspections does not relieve the LiDAR provider from the responsibility to correct defective work with no further cost to USDA-NRCS for a period of one year following initial acceptance. If the finished items are found to be in full compliance with the specifications, they will be

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accepted. The acceptance of any item by an inspector shall not preclude subsequent rejection if such an item is later found to be defective. Inspection of the finished items to determine their conformance to the specifications will be made by a representative of the Contracting Officer upon delivery to the destination. If the inspection reveals any defect or deviation in the manufacture of the items which would make them unfit for the purpose intended, the Contractor will be required to satisfactorily remedy such conditions at no additional cost to the USDA-NRCS.

3 Reference Documents

The National Standard for Spatial Data Accuracy (NSSDA) is a Federal Geographic Data Committee (FGDC) standard that federal agencies are supposed to use in determining geospatial accuracy.

<http://www.fgdc.gov/standards/projects/FGDC-standards-projects/accuracy/part3/chapter3>

The National Digital Elevation Program (NDEP) has created a set of recommended guidelines for digital data that provides information on digital elevation types, product descriptions, metadata profiles, definitions, and map accuracy standards.

http://www.ndep.gov/NDEP_Elevation_Guidelines_Ver1_10May2004.pdf

American Society for Photogrammetry and Remote Sensing (ASPRS), 2014, ASPRS Positional Accuracy Standards for Digital Geospatial Data (EDITION 1, VERSION 1.0. - NOVEMBER, 2014)

http://www.asprs.org/a/society/committees/standards/ASPRS_Positional_Accuracy_Standards_Edition1_Version100_November2014.pdf

USGS-NGP Lidar Base Specifications (Techniques and Methods 11–B4, Version 1.2, November 2014)

<http://pubs.usgs.gov/tm/11b4/pdf/tm11-B4.pdf>

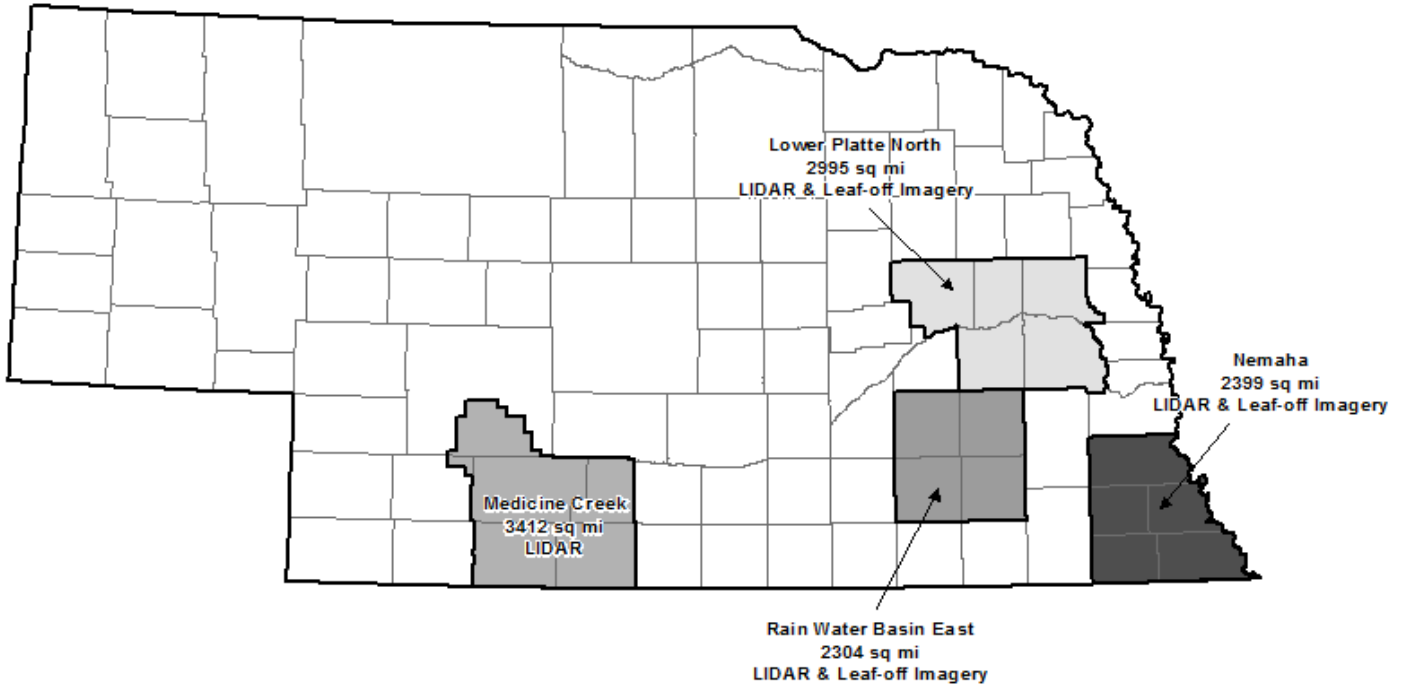
State of Nebraska Elevation Standards. NITC 3-203 Elevation Acquisition using LiDAR Standard

<http://nitc.ne.gov/standards/3-203.html>

State of Nebraska Metadata Standards. NITC 3-201 Geospatial Metadata Standards

<http://nitc.ne.gov/standards/3-201.html>

Appendix A



PART I - THE SCHEDULE

SECTION B - SUPPLIES OR SERVICES AND PRICES/COSTS

B-1 AERIAL PHOTOGRAPHY AND DIGITAL IMAGERY SERVICES

This is a performance-based procurement for nationwide orthophotography designed to promote economy and efficiency of image acquisition and processing by providing offerors flexibility in the equipment used, procedures employed, selection of areas of interest, and quantity of project item areas proposed. Requirements for this contract are to furnish digital imagery and all related services and supplies in accordance with the requirements, specifications, terms, conditions, clauses, and provisions specified herein. This is a single year indefinite-delivery, indefinite-quantity (IDIQ) contract with four option years, effective for the contract performance periods stated in the schedule. The project item areas, quantities, and other parameters will be listed in the individual task order. In the event of conflict between the requirements listed herein and the awarded task order, the contents of this contract shall take precedence.

1.1 Intended use of Products

National Agriculture Imagery Program (NAIP) imagery is available for distribution within 60 days of the end of flying season and is intended to provide current information of agricultural conditions in support of U.S. Department of Agriculture (USDA) farm programs. For USDA Farm Service Agency (FSA), the imagery provides an ortho image base for maintaining Common Land Unit boundaries and other data sets. The NAIP imagery is generally acquired in projects covering full states in cooperation with partnering agencies, who use the imagery for a variety of purposes, including land use planning and natural resource assessment. NAIP imagery is also used for disaster response, often providing the most current pre-event imagery.

1.2 Importance of Timely Image Acquisition and Product Delivery

The principal objective of this contract is to provide timely imagery to USDA Service Centers, acquired during peak agriculture growing seasons. Imagery not acquired during the contracted acquisition period or data products not delivered within the requirements specified herein will significantly impact the Government's ability to complete its mission. Materials not meeting the minimum delivery requirements will be subject to price reduction based on the diminished usability of the product. Due to the time constraints of this procurement, the Government reserves the right to impose price reductions without allowing the Contractor a chance to reacquire or reprocess the imagery.

1.3 Importance of Image Quality

Any imagery submitted to the Government that does not meet the minimum quality requirements may impact the Government's ability to properly use the imagery for its

intended purpose and will be subject to a price reduction based on the diminished usability of the product.

1.4 Optional Award Item

Optional award items for new and innovative technical products or improved methods of acquiring or delivering imagery may be submitted by the Offeror for review and consideration by the Government, or proposed in the task order by the Government. Some optional or alternative award items that may be considered include, but are not limited to: ½ meter resolution imagery, digital elevation model update or creation, stereo imagery, spectral imagery of more than 4-bands, or web image services.

B-2 MINIMUM PROJECT REQUIREMENTS

2.1 General Requirements

(a) The following contract deliverables shall be prepared and submitted by the Contractor in accordance with the requirements identified in the task order:

- (1) Quarter Quadrangle Image Tiles
- (2) Compressed County Mosaics (CCMs)
- (3) Accuracy and Quality Control Reports
- (4) Progress Reports
- (5) Metadata and other text files

(b) All contract materials shall be prepared in accordance with specifications and work statement (Section C), packaging and marking (Section D), inspection and acceptance (Section E), and delivery schedule (Section F) requirements.

(c) A product warranty shall be provided on all deliverables in accordance with Section I-8, Warranty of Supplies of a Noncomplex Nature.

2.2 Project Flight Planning

The contractor is responsible for all necessary flight planning, including, but not limited to determination of exposure locations, altitudes, and flight directions, required to acquire the imagery. See section C-5.2, Flight Planning.

2.3 Imagery Acquisition

Digital acquisitions require the Contractor to comply with the technical requirements and specifications of this contract, and Attachment A: Specification for Digital Camera Based Acquisition which defines the essential elements in securing high quality direct digital imagery. The digital system shall be a tested, stable, geometrically calibrated system with

appropriate documentation, suitable for use in the acquisition and production of precision photogrammetric orthoimagery, and in accordance with NAIP contract requirements.

2.4 Priorities for Project Item Areas

The Contracting Officer or Contracting Officer Representative (COR) may direct, by written order, certain project item areas or regions within those areas listed under a Contract Award Item to be acquired in a priority order, weather and ground conditions permitting. All reasonable effort will be directed toward providing a schedule of operations favorable to both the Government and Contractor.

B-3 GOVERNMENT-FURNISHED PROPERTY

Pursuant to the Government-Furnished Property (GFP) clause (see Section I-9) the Government shall only furnish items of property listed below or identified in the individual task orders.

3.1 Metadata Template

The Contractor will be furnished upon award three (3) data text files (.txt) containing Federal Geographic Data Committee (FGDC) compliant metadata template to be used when creating the CCM metadata (as required in Section C-6.3(f)(1), Mosaic Metadata) and creating the county-based and state-based shapefile metadata (as required in paragraph 6.3(f)(3), Seamline Shapefile Metadata, and 6.2(h)(3), Metadata, respectfully).

3.2 Required Coverage

The Contractor will be furnished upon award one (1) Esri® compatible shapefile containing the required contract coverage. The shapefile contains, at a minimum, the following attributes: USGS Geographic Name Information System (GNIS) quad name, latitude and longitude of the southeast corner (expressed in both decimal degrees and degrees, minutes, seconds), and UTM zone.

3.3 State Project Area – DOQQ List

The Contractor will be furnished upon award one (1) data text file (.txt) containing a list of all Digital Ortho Quarter Quadrangles (DOQQ) tiles required for complete physical coverage of that state project area. The data text file will contain quad name, quadrant, state, latitude and longitude of the SE corner of the quad, USGS quad number, NAPP station number, latitude and longitude of the quad center, USDA arckey number, flying height AGL (for reference only), and the native UTM zone. The following is a sample of the data:

“AZTEC SE”, “SW”, “AZ”, “324500N”, “1131845W”, “3211314”, “1133W-0282”,
“32-46-53N”, “113-20-38W”, “3245001131845”, 20000, 12
“AZTEC SE”, “NW”, “AZ”, “324845N”, “1131845W”, “3211314”, “1133W-0284”,
“32-5038N”, “113-20-38W”, “3245001131845”, 20000, 12
“CALIENTE”, “SW”, “AZ”, “325230N”, “1131845W”, “3211306”, “1133W-0286”,
“32-454-23N”, “113-20-38W”, “3252301131845”, 20000, 12

3.4 Compressed County Mosaic (CCM) Coverage – DOQQ List

The Contractor will be furnished upon award one (1) data text file (.txt) containing a list of all DOQQ tiles required for the creation of the CCM coverage for each county in that state project. The data text file will contain the same information and same format as the state list above (paragraph 3.3, State Project Area – DOQQ List). All CCMs shall be projected in the NAD83 UTM zone listed in this data file.

B-4 TASK ORDERS

4.1 Task Order Quantities

Awarded quantities shall be made by issuance of authorized task orders in accordance with specified ordering procedures. The quantities of services and supplies specified in the task order Request for Proposals (RFPs) are estimates only. See Section I-2, Ordering, and Section L-3, Task Order Procedures.

4.2 Minimum Task Order Award

The guaranteed minimum amount for the NAIP contract shall be a total of \$2,500.00, as met through the issuance of one or more task orders within the contract performance period as stated in Section B-4.3 below. See Section I-5, Order Limitations.

4.3 Contract Performance Period

(a) The contract performance period for the Base Year (FY2017) for issuance of task orders is: **Date of Award through December 31, 2017.**

(b) The contract performance period for the leaf-off acquisition is:
(FY2018) **March 1 through April 15, 2018**

(c) The Government solely reserves the right to exercise the option to extend the term of the contract for option years 1 through 4 based on the evaluation of contractors past performance on previous task orders awarded during the contract performance periods (See Section F-5.4, Option to Extend the Term of the Contract). The guaranteed minimum amount does not apply to option years that have not been exercised by the Government.

4.4 Delivery Order Authorization

Only authorized Contracting Officers from USDA-FSA-Aerial Photography Field Office have authority to issue task orders for the purchase of product and services under this contract. Oral orders are not authorized under this contract.

4.5 Task Order Ombudsman

The Director of USDA-FSA-Aerial Photography Field Office shall serve as the Task Order Ombudsman responsible for reviewing complaints from the contractors and ensuring that all of the contractors are afforded a fair opportunity to be considered for task orders issued under this contract. The task order Ombudsman may be contacted at telephone (801) 844-2907, or mail to: Director, APFO, 2222 West 2300 South, Salt Lake City, UT 84119.

PART I - THE SCHEDULE

SECTION C - DESCRIPTION/SPECIFICATIONS/WORK STATEMENT

C-1 SCOPE OF CONTRACT

The general scope of the contract is to procure precise current year digital orthoimagery. The orthoimagery will be used in the administration of FSA Farm Programs and to update the USDA GIS Orthoimagery Base. Other multi-agency program uses include, but are not limited to agriculture land use analysis, natural resource inventory, disaster preparation and response, and extraction of data by means of photogrammetric interpretation and measurement.

1.1 Introduction

The Contractor is responsible for furnishing imagery and related services and supplies in accordance with requirements, specifications, terms and conditions specified herein.

(a) Technical Requirements and Specifications

The technical requirements and specifications of this contract are described in this section and Attachments A, B and C, which define the essential elements in securing high quality digital orthoimagery. Any deviation from the specifications stated herein may cause increased time and effort in using the imagery as intended.

(b) Delivery and Performance

The delivery and performance requirements of this contract are described in Section F, Deliveries or Performance. All contract materials shall be shipped within the time limits and to the place of delivery specified herein. Performance of the contract shall be authorized and monitored by the Contracting Officer and/or the Contracting Officer's Representative.

(c) Quality Control

Quality control shall be exercised by the Contractor continuously throughout the performance of the contract, see Section C-8, Quality Control.

1.2 Location of Work

The project item area(s), quantities, and acquisition periods will be identified in the individual task orders. The Contractor's place of performance where work will be performed on this contract shall be indicated in Online Representation and Certifications Application (ORCA) Certification.

1.3 Project Management and Flight Planning

The Contractor is required to provide the necessary project management, coordination, and supervision to conduct project planning, flight planning and acquisition, image processing, product delivery, and related technical and progress reports as required in the contract (see Section C-7, Project Management).

1.4 Labor and Materials

The Contractor shall furnish all materials, equipment, transportation, superintendence, and labor as required herein. The Contractor shall execute and finish the imagery acquisition, orthoimagery production and related services for the project specified and shall deliver to the USDA all materials called for in the individual task orders.

C-2 APPLICABLE DOCUMENTS

2.1 Attachments

The following documents attached to this solicitation document are considered requirements and specifications under the resulting contract(s), as applicable to the Contractor's technical proposal:

- (a) USDA Specification for Digital Camera Based Acquisition, dated February 1, 2012
- (b) USDA Digital Imagery Quality Specification, dated February 1, 2012
- (c) NAIP Digital File Format Specification, dated February 1, 2012

2.2 References

The following documents referenced in this solicitation document are considered requirements and specifications under the resulting contract(s), as applicable to the Contractor's technical proposal:

- (a) Federal Geographic Data Committee (FGDC) Specification, FGDC-STD-001-1998 ("Content Standard for Digital Geospatial Metadata")
- (b) **FGDC Specification, FGDC-STD-007.3-1998 ("Geospatial Positioning Accuracy Standards Part 3: National Standard for Spatial Data Accuracy")**
- (c) Code of Federal Regulation (CFR) Title 14 ("Federal Aviation Regulations")
- (d) GeoTIFF Revision 1.0 Specification, dated December 28, 2000 (Version 1.8.2)
- (e) TIFF Specification Revision 6 dated June 3, 1992 (Adobe Systems Inc.)

C-3 GENERAL REQUIREMENTS

The Contractor shall furnish all materials, equipment, transportation, superintendence, and labor required to plan, acquire, manage, process, and orthorectify aerial imagery for the project item areas and requirements specified in the individual task orders.

- 3.1 Ground Control. The Contractor shall be responsible for acquiring all ground control needed to meet the absolute horizontal accuracy specification specified in paragraph C-6.2(b), Horizontal Accuracy.

C-4 EQUIPMENT REQUIREMENTS

4.1 Platform/Camera Requirements

- (a) Platform/Camera Approval. Any equipment (platform and cameras, in addition to those submitted at the time of task order offer) proposed to be used by the Contractor must be approved for use by the Contracting Officer (see Attachment A paragraph 4.0, Digital Camera Approval Requirements, for instructions and process for platform/camera approval). If the platform and camera proposed for use are not owned by the Contractor, a written statement of availability from the owner of the equipment shall be furnished to the Contracting Officer.
- (b) System Malfunctions. The Contracting Officer shall have the right to require the removal of a camera from use when deficiencies in imagery attributable to the camera are found to exist (see Attachment A paragraph 3.7, System Malfunctions). Any platform/camera removed from use by the Contracting Officer shall not be returned to use on any APFO contract until the cause of the malfunction is corrected to the satisfaction of the Contracting Officer. That determination will be based on acceptable samples, field reports, manufacturer reports, and/or calibration reports.

4.2 Aircraft Requirements (airborne platforms only)

- (a) FAA Certification. All aircraft used in the performance of this contract shall be maintained and operated in accordance with all regulations required by the U.S. Department of Transportation, Federal Aviation Administration (FAA). Aircraft operated in the acquisition of aerial imagery under this contract shall be FAA certified to a service ceiling with operating load (crew, sensor system, oxygen, and other required equipment) of not less than the highest altitude required.
- (b) Positive Control Airspace. The project item areas may contain areas of controlled or restricted airspace. It is the responsibility of the Contractor to obtain all approvals necessary to assure that required clearances are achieved. When the flight plan and location of any project area coverage fall within positive-control airspace, the aircraft must contain the appropriate equipment to operate in such positive-control areas within the purview of the Federal Aviation Regulations. In addition, 18 USC Section 795 requires permission of the commanding officer to photograph or map some military and naval installations. If any delay to the acquisition or production schedule is caused due to 18 USC Section 795 or similar statutes, the Contractor is required to notify the Contracting Officer in writing within 72 hours and shall include detail information regarding the issue, point of contact at the installation, and estimated delay. (See Section H-1, Permits and Clearances.)

- (c) Aircraft Configuration. The design of the aircraft shall be such that when the sensor system is mounted with all its parts within the outer structure, an unobstructed field of view is obtained. The field of view shall be shielded from the exhaust gases, oil, effluence, and air turbulence. The sensor system port glass shall be free of scratches and of such quality that it will not degrade the resolution or the accuracy of the sensor system.

C-5 IMAGERY ACQUISITION REQUIREMENTS

5.1 Photographic Conditions

Imagery shall be acquired when skies are clear, free from smoke or excessive haze, and well-defined images can be resolved. Digital Ortho Quarter Quadrangles (DOQQ) image tiles with greater than ten percent (10%) cloud cover or cloud shadows will not be accepted. The ground shall be free from snow below timberline, standing water (other than natural or man-made ponds and lakes), flood waters from streams which have overflowed their banks, and wet ground which obscures field, soil or crop boundary lines. The Contractor shall minimize specular reflections, especially in agriculture areas, by avoiding acquisition during periods of peak solar reflectivity, or by patching the area using imagery from other exposures.

5.2 Flight Planning

The Contractor shall provide flight line planning necessary to acquire precision, high quality imagery for the production of digital quarter quadrangle centered orthoimagery, which shall include at a minimum, exposure locations, flight altitude determinations (airborne platforms only), and overlap stereoscopic coverage.

5.3 Flight Requirements

The Contractor shall obtain precise vertical aerial photography in accordance with the following technical requirements:

- (a) Acquisition Periods. The Contractor shall acquire imagery only during that portion of the day when the sun angle exceeds the minimum thirty degrees (30°). The Contractor shall limit image acquisition to the dates specified in the individual task order or as otherwise provided in writing by the Contracting Officer as stated under Section F-5, Performance of the Work.
- (b) Tilt (airborne platforms only). It is desired that exposures be made when the optical axis of the camera is in a vertical position. The Contractor shall not acquire imagery when the tilt (departure from the vertical) of any exposure exceeds four degrees (4°) or relative tilt between any two successive exposures which exceed six degrees (6°). Tilt shall not average more than two degrees (2°) in any 16 km (10 mile) section of a flight line and shall not average more than one degree (1°) for the entire project.

- (c) Off NADIR Angle (space-based platforms only). The Contractor shall not acquire imagery when the off NADIR angle exceeds 20 degrees (20°).

C-6 DIGITAL IMAGERY PROCESSING

6.1 Digital Orthoimagery

Unless otherwise specified in the individual task order, the Contractor is required to provide 1-meter ground sample distance (GSD), 4-band (color and color near-infrared) digital ortho-rectified imagery. The highest image resolution that may be required under this contract is ½-meter GSD.

6.2 Quarter Quadrangle Image Tiles

Contractor shall provide rectification services to produce 4-band (color and color near-infrared) digital orthorectified imagery at 1-meter GSD in accordance with paragraph 6 of Attachment B, Orthorectified Imagery, unless otherwise stated in the individual task order. The digital image shall cover the entire image area of one USGS standard quarter quadrangle (QQ), with a 300 (±30) pixel buffer on all four sides of the QQ and shall be projected in the NAD83 Datum, using corresponding native UTM zone.

- (a) Image Quality. All tiles shall meet the image quality requirements specified in Attachment B, USDA Digital Imagery Quality Specification. The Government's preference is not to have the tiles "radiometrically balanced" with other neighboring tiles. Unless otherwise allowed by the Contracting Officer, radiometric requirements listed in Attachment C shall have priority over matching a Government-furnished sample. The tile shall not contain any borders, artifacts, or other non-image items.
- (b) Horizontal Accuracy. Unless otherwise specified in the individual task order, all well-defined points tested on DOQQ titles shall fall within **4.0 meters** of true ground at a 95% confidence level (see FGDC-STD-007.3-1998, page 3-10).
- (c) File Format. Unless otherwise specified in the individual task order, the DOQQ tiles shall be an uncompressed, georeferenced tagged image file format (GeoTIFF) in accordance with paragraph 4 of Attachment C, GeoTIFF Requirements.
- (d) Naming Convention. The titles shall be saved using the following naming convention:
<n>_<lat><lon><quad>_<loc>_<xx>_<r>_<yyyymmdd>.tif

Where:

- n – film type/bandwidth designator ("o"=black & white; "n"=natural color;" "c"=color IR, or "m"=multispectral)
- lat - latitude, identified by 2 digit numerical value of a 1° block
- lon - longitude, identified by 3 digit numerical value of a 1° block (including the leading "0" if needed)
- quad - quadrangle number, identified by grid number

loc - quadrangle location, identified by grid letters (nw, ne, sw, se)
xx – two digit UTM zone
r - resolution (“h”=better than 1 meter; “1”=1 meter; “2”=2 meter, etc)
yyyymmdd - date of acquisition (majority date)

File Name Example: m_3509320_ne_15_1_20120721.tif

(e) Media Requirements. All tiles shall be in an uncompressed, georeferenced tagged image file format (GeoTIFF) and be delivered on internal hard drives as defined in Contract Section D-1.1, Internal SATA Hard Drives. No more than one project item area may be placed on a drive. All archive members (file names) on the medium shall be in lower case only.

(1) Table of Contents. The Contractor shall include an ASCII text file which is a listing of all quarter quadrangle tiles included on the medium in the order they appear in the archive file.

<u>Description</u>	<u>Number of Characters in Field</u>
File Name	30

This content file shall be named content_<item#>_<state>_<media#>.txt (i.e., “content_3-12-1_mo_1.txt”). The file should contain only the following attributes: (the attribute shall only contain lower case characters and shall not contain any white spaces before or after the attribute).

File Name Example: m_3509320_ne_15_1_20120721.tif

(2) Archive File. No other archive members will be allowed on any media. Archive files shall not contain symbolic links, use compression of any type, be created using GNU extensions, or as the super user (e.g., root). Archive member names must not contain a directory structure.

(f) Digital Elevation Model (DEM). The Contractor may use any digital elevation model for terrain-correcting the imagery required to meet horizontal accuracy specifications in C-6.2(b), Horizontal Accuracy, and quality requirements specified in Attachment B, USDA Digital Imagery Quality Specification.

(1) Documentation. The Contractor shall document the elevation dataset used during the orthoimagery production process including, but not limited to corrections made to an existing dataset, in the process description metadata in paragraph C-7.3(a), Production Process Description.

(2) Price Proposal Option. If the Contractor uses any DEM other than an uncorrected version of the most current/recent USGS National Elevation Dataset (NED), the Contractor shall deliver a separately priced proposal to the Government for an optional award for the delivery of the dataset used during the orthoimagery production process. The proposal is due no later than sixty (60) days after the acquisition period. The Government reserves the right to award, and will evaluate the proposal based on the

price and data rights granted to the Government. The dataset proposed will be in a file format that is mutually agreeable between the Government and the Contractor.

- (g) Radiometric Sample. For each project item area, the Contractor shall submit a single radiometrically corrected image within 21 days of the first image acquisition for Government review. The sample shall be a TIFF (GeoTIFF preferred), and submitted on a standard CD or DVD. The Government will evaluate and provide an approval or disapproval letter with comments no later than 3 business days, with a goal of 24 hours. Additional project item area samples may be submitted for review if approved by the Contracting Officer Representative (COR).
- (h) Seamline Shapefile. The Contractor shall provide a state-based Esri® compatible polygon shapefile index. The index shall be topologically correct and contain a polygon for each exposure used in the creation of the imagery. The polygons shall completely cover the entire area represented by the extents of the visible imagery and not have gaps (slivers) within the area represented by the extents of the visible imagery. There shall be no overlapping or multiple-part polygons in the shapefile. The smallest area covered by a single polygon shall not be smaller than 40,470 square meters (approx. 10 acres). If any reflights or image reprocessing changes either the actual seamline polygon or one of the attributes, the Contractor shall resubmit a revised shapefile(s) with imagery resubmittal.

(1) Attributes. The shapefiles shall be attributed with the following data columns:

<u>ATTRIBUTE DATA</u>	<u>COLUMN NAME</u>	<u>DATA TYPE</u>	<u>EXAMPLE</u>
Image acquisition date	IDATE	Char(10)	2012-07-23
Polygon start date/time ¹	SDATE	Char(16)	07/23/2012 13:52
Polygon end date/time ¹	EDATE	Char(16)	07/23/2012 13:53
Color Type ²	BCON	Char(3)	M4B
Camera type (Digital or film)	CAM_TYPE	Char(20)	Digital
Camera manufacturer	CAM_MAN	Char(50)	Leica Geosystems
Camera model	CAM_MOD	Char(25)	ADS-80
Camera HW and FW version ³	HARD_FIRM	Char(50)	camera F/W v2.14
Sensor or lens serial number	SENSNUM	Char(50)	30029
Aircraft type ⁴	AC_TYPE	Char(50)	C441
Aircraft tail number	ACTAILNUM	Char(10)	N12345R
Polygon area (square meters)	SHAPE_AREA	Double(19) ⁵	250000.0000
Red electromagnetic spectrum⁶	RED_RNGE	Char(10)	604-664
Green electromagnetic spectrum⁶	GREEN_RNGE	Char(10)	533-587
Blue electromagnetic spectrum⁶	BLUE_RNGE	Char(10)	420-492
NIR electromagnetic spectrum⁶	NIR_RNGE	Char(10)	683-920

¹ Local 24-hour clock. The start/end time will be for the collection of the individual polygon (will be the same for frame-based systems)

² Possible values are: NC (natural color), CIR (color infrared), and M4B (4-band)

³ Top level information specific to camera system. Other hardware information (i.e GPS/IMU) is optional.

⁴ ICAO designator (i.e, use C441 for a Cessna 441 Conquest II)

⁵ Double data type shall be length of 19 (18 precision, 11 scale)

⁶ **Electromagnetic spectrum range in nanometers (no spaces allowed in free text)**

The geometry of the shapefile shall conform to the extents of all QQs delivered in all project item areas in the state (i.e., one shapefile for the whole state). State-level shapefiles shall use the GCS North American 1983 (NAD83) coordinate

system and be delivered with QQs.

- (2) Naming Convention: The State-level shapefiles shall use the standard extensions (i.e., .shp, .shx, .dbf, and .prj) and the following naming convention: “Seamlines_<st abbr><st FIPS>_<yyyy>”. Where:
- <st abbr> - two letter official state abbreviation
 - <st FIPS> - two digit state FIPS code
 - <yyyy> - calendar year of the task order

File Name Example: Seamlines_GA13_2012.shp

- (3) Shapefile Metadata. The Contractor shall create a Federal Geographic Data Committee (FGDC) compliant, per the FGDC-STD-001-1998 specification, metadata file using the Government provided template for each seamline shapefile generated. The metadata must parse cleanly through the USGS metadata parser “mp” version 2.8.10 (or later version) without any errors. The metadata shall use the same file naming convention as the seamline shapefile but with an “txt” extension.

6.3 Compressed County Mosaics

The Contractor shall produce compressed county mosaic (CCM) files using the imagery associated with the tiles created in Section C-6.2, Quarter Quadrangle Image Tiles. For counties that are split by UTM zone lines, the county shall be re-projected to the UTM zone listed in the individual task order.

- (a) Image Quality. The Contractor shall tone balance the composite DOQQs to give the CCM a consistent and uniform image quality appearance that eliminates a checkerboard effect. The resulting CCM should maintain as much of the original color and appearance of the color corrected tiles as practical.
- (b) Horizontal Accuracy. The accuracy requirements from C-6.2(b), Horizontal Accuracy, shall be preserved when creating the CCM using the imagery associated with the quarter quadrangle tiles
- (c) File Format. The CCMs shall be compressed in the file format specified in the individual task order .
- (d) Naming Convention. The CCMs shall be saved using the following naming convention: ortho_<x-x>_<r><n>_<f>_<stnnn>_<yyyy>_<v>.sid where:

x-x - disk number and total count (i.e., “1-2” = disk 1 of 2)
r - resolution (“h”=better than 1 meter; “1” = 1- meter or “2” = 2-meter)
n – film type/bandwidth designator (“o” = black & white; “n” = natural color; “c” = color IR, or “m”=multispectral)
f - compression format (“s”=MrSID®; “j”=JPEG 2000)

stnnn – state and FIPS code
yyyy - year of aerial acquisition
v - version number

Example: ortho_1-1_1m_s_mo137_2012_1.sid

- (e) Media Requirements. The CCMs and related metadata shall be submitted on a single internal hard drive as defined in Contract Section D-1.1, Internal SATA Hard Drives. All files will be stored on the root directory – no sub directories will be permitted. No more than one project item area may be placed on a drive.
- (f) Mosaic Metadata. The Contractor shall create a Federal Geographic Data Committee (FGDC) compliant, per the FGDC-STD-001-1998 specification, metadata file using the Government provided template for each CCM generated. The metadata must parse cleanly through the USGS metadata parser “mp” version 2.8.10 (or later version) without any errors. The file shall use the same CCM file name convention except with a “.met” extension.
- (g) Mosaic Seamline Shapefile.
 - (1) Seamline Shapefile. The Contractor shall provide a polygon seamline shapefile index using the same projection as the CCM and shall be delivered on the same media. The shapefile shall have the same attributes and requirements, including the metadata file, as stated in C-6.2(h), Seamline Shapefile, except the naming convention.
 - (2) Naming Convention: The mosaic shapefiles shall use the standard extensions (i.e., .shp, .shx, .dbf, and .prj) and the following naming convention: ortho_<x-x>_<r><n>_<stnnn>_<yyyy>_<v> where:

x-x - disk number and total count (i.e., “1-2” = disk 1 of 2)
r - resolution (“h”=better than 1 meter; “1” = 1- meter or “2” = 2-meter)
n – film type/bandwidth designator (“o” = black & white; “n” = natural color; “c” = color IR, or “m”=multispectral)
stnnn – state and FIPS code
yyyy - year of aerial acquisition
v - version number

Example: ortho_1-1_1m_mo137_2012_1.shp

- (2) Seamline Shapefile Metadata. The Contractor shall create metadata files for the shapefile using the requirements stated in Contract Section C-6.2(h)(3), Shapefile Metadata, with the exception of the file name as The file shall use the same CCM file name convention except with a “.met” extension.

6.4 Regional Settings

All digital files, including imagery and metadata, shall be created using standard ANSI English-US setting. For example, periods (“.”) shall be used to separate the whole number from the fractional portion when recording decimal numbers, and data representing a long date shall be recorded as “Wednesday, August 17, 2005 5:09:38 PM.”

6.5 Production Sample

Prior to submitting imagery for the first project item, the Contractor shall submit a “true” production sample set for Government review. The Government will evaluate and provide an approval or disapproval letter with comments no later than 5 business days after receipt. Items submitted under the Production Sample requirement are not considered a deliverable for purposes of schedule or performance compliance. Production Sample shall be submitted in an internal hard drive (see D-1.1(a), Internal SATA Hard Drives). Once approved, all items must be resubmitted to be considered meeting deliverable requirements.

The Production Sample set shall meet all contractual requirements and shall include at least one DOQQ (but no more than four DOQQs), a CCM and all related files (if CCM contains multiple volumes, all volumes must be submitted), Production Process Description file, and Project Data File. Items submitted in the Production Sample set must be from the same county.

C-7 PROJECT MANAGEMENT

The Contractor shall establish and maintain a project management system with a designated project manager for this effort. Project management consists of those activities required to plan, manage, administer, and control efforts to accomplish the objective of the contract. The project manager will serve as the primary point of contact for the Contractor’s activity with the Government. The project manager’s name and contact information shall be identified, in writing, to the Contracting Officer within 20 days of contract award.

7.1 Progress Reports

A Progress Report is required for each day progress is made in acquiring project photography. Reports shall be transmitted by e-mail following each day of progress. E-mail address will be provided at contract award. See Section F-5.2 for instructions and Section J, Exhibit 2, Progress Report for syntax and example.

7.2 Subcontract Management

If the Contractor uses subcontractors in the performance of the contract, a plan and procedure will be established to manage its subcontractors. Contractor should give prior notification of any subcontracts in accordance with G-4, Subcontracts. The Contractor is

encouraged to maximize its use of partnerships and subcontractors to accomplish the requirements of this contract. However, the Contractor is solely responsible for the performance and cost control of its partnerships and subcontractors.

7.3 Project Files

(a) Production Process Description. The Contractor shall create detailed descriptions of the digital image processing system from the initial planning phase through delivery which shall include a narrative explanation of the process steps taken to produce the imagery in accordance with Section F-1.6(a) and the FGDC specification, paragraph 2.5.2.1, Process Description. These description files will be ASCII text using Courier New as the font, the Font style will be Regular, and the point size 10. Each line in the process description file will be no longer than 65 characters; the ending character is a line feed/newline character (\n). Separate descriptions are required for the quarter quadrangle image tiles and CCM. If multiple digital camera systems (see Attachment A, paragraph 3.8, Multiple Camera Approval) are used, separate descriptions for each camera system are required. The CCM and QQ Production Process File should be identical to the process description in the FGDC compliant metadata delivered under Paragraph 6.3(f), Metadata and Related Information. The content of the descriptions shall include, at the minimum, the following topics:

- Camera Manufacturer
- Camera Model (e.g. ADS40 SH52)
- Camera Hardware/Firmware Version
- Camera serial number
- Film or Digital Acquisition
- Camera Calibration Detail
- Camera Footprint Description
- Raw Capture Pixel Resolution and Bit-depth
- Final Pixel Resolution of Product
- Total Bands of Data Acquired
- Band IDs and Spectral Range (μm)
- Aircraft Type
- Aircraft Tail Number
- Aircraft Average Flying/Acquisition Height (AGL)
- Use of Ground Control and/or GPS/IMU and Associated Internal Validation or Inspection Processes
- DEM Used and Detail (e.g. date DEM obtained from NED, resolution, did it require repair, etc.)
- Film Scanner Type (If applicable)
- Film Scanning Resolution (If applicable)
- Flight Planning Detail
- Software/Hardware Used During Phases of Acquisition and Production
- Quality Control Detail - Tests for Accuracy (Spatial, Spectral, etc.)

- (b) Project Data Files. The Contractor shall create a project description file in accordance with Section F-1.6(b) of this contract and at a minimum include the following data:

Description:

Project Item Area (name [state] as it appears in the task order)
Task Order Award and Item Number (to be assigned upon award, i.e. 3-12-1)
State (2-letter USPS state abbreviation - MO, KS, etc.)
Nominal Lens Focal Length
Coordinate System Datum
Ortho Rectification System used to produce images: "Free text with quotations"
(50 characters max)

Example:

Missouri, 3-12-1,MO,153mm,NAD83, "production hardware & software description"

- (c) Naming Convention. The project data files shall be saved using the following naming convention: <type>_<to no>_<item>_<st>.txt

type - file type (must be "process" or "project")
to no – task order award number
item - item number
st - state abbreviation

Example: process_3-12_1_mo.txt

C-8 QUALITY CONTROL

Quality control shall be exercised by the Contractor continuously throughout the performance of the contract. Procedures shall be established to assure that all contract materials are delivered in accordance with the delivery schedule and at the required level of accuracy and quality. The Contractor shall inspect and constantly monitor the image quality and coverage, and shall undertake immediate reflights of any imagery where the quality fails to meet minimum requirements of the contract specifications. Any marginal photography/imagery submitted for inspection which does not meet minimum requirements may be rejected. The marginal photography may be accepted, at the Government's convenience, but shall be subject to a price reduction based on the diminished utility of the product. The nature and urgency of this project may require the Government to make equitable financial adjustments for materials deemed rejectable or where product use is adversely impacted. USDA inspection and acceptance procedures are described in Section E, Inspection and Acceptance.

8.1 Accuracy and Quality Control Report

The Contractor shall provide RMSE accuracy reports in RMSE and CE95 and quality control reports generated during the AT or orthorectification processes for all quarter quadrangle image tiles in accordance with Section F-1.3.

PART I - THE SCHEDULE

SECTION D - PACKAGING AND MARKING

D-1 PREPARATION OF MATERIALS FOR SHIPMENT

1.1 Digital Files

All digital imagery and text files shall be labeled and shipped in packaging designed for their protection. The individual task order will specify which digital storage format the files shall be delivered on.

- (a) Internal SATA Hard Drives. All hard disk drives (HDDs) used to deliver imagery shall be internal Serial Advanced Technology Attachment (SATA) 3½ inch, 3.0 Gbit/s transfer-rate hard drives, with a minimum rotation speed of 7,200 rpm. The SATA drives shall be formatted using Microsoft’s NTFS file system. **The drive shall not have a storage capacity that exceeds two terabytes (2TB).** Each drive will be enclosed in a static bag and shall have a label attached directly to the outer surface of the static bag identifying the project contained on the drive in accordance with Section J, Exhibit 1, Hard Drive Label. Labels shall NOT be placed directly on the internal hard drive. The drives shall become property of the Government and will not be returned to the Contractor. External hard drives are not allowed on this contract.

D-2 PACKAGING FOR SHIPMENT

All material shall be packed for shipment in such a manner that ensures acceptance by common carrier and safe delivery at the destination. Containers and closures shall comply with the Interstate Commerce Commission regulations, Uniform Freight Classification rules, or regulations of other carriers as applicable to the mode of transportation. Damaged materials shall be replaced by the Contractor at no cost to the Government.

A packing slip shall accompany each shipment, itemizing all materials included in the shipment.

D-3 SHIPPING RECEIPTS

Receipts from common carriers for shipment of materials shall be retained by the Contractor and made available to the Contracting Officer upon request.

D-4 SHIPPING CONTAINER MARKINGS

All shipping containers shall be clearly marked with the delivery address. See Section F-2.

PART I -THE SCHEDULE

SECTION E - INSPECTION AND ACCEPTANCE

E-1 INSPECTION AND ACCEPTANCE (FEB 1988)(AGAR 452.246-70)

The Contracting Officer or the Contracting Officer's duly authorized representative will inspect and accept the supplies and/or services to be provided under this contract.

Inspection and acceptance will be performed at:

Aerial Photography Field Office
2222 West 2300 South
Salt Lake City, Utah 84119-2020

E-2 INSPECTION PROCEDURE

All materials specified in Section F-1, Materials to be Delivered will be inspected to determine conformance to all contract requirements and specifications. (Refer to FAR 52.246-2, Inspection of Supplies-Fixed Price and FAR 52.246-4, Inspection of Services-Fixed Price.)

If the inspection of materials reveals deficiencies that may cause increased time and effort in using the digital imagery and aerial photography as intended, the Government may require the Contractor to perform the services again in conformity with contract requirements, at no increase in contract amount. When the defects in services cannot be corrected by re-performance, the Government may:

- (a) Require the Contractor to take necessary action to ensure that future performance conforms to contract requirements and
- (b) Reduce the contract price to reflect the reduced value of services performed.

E-3 INSPECTION SCHEDULE

The Government will make every effort to inspect the Quarter Quadrangle Image Tiles, Compressed County Mosaics, and related data material within 12 months after they are received at the point designated. Should the inspection procedure be delayed longer than 12 months, the Contractor will be notified of the reason(s) for delay and given the estimated completion date. Contract materials will be inspected in the order of their receipt, unless otherwise prioritized by the Government.

The Contractor will be notified in writing whether the materials are satisfactory and what materials, if any, shall be remade because of non-conformance with contract requirements.

E-4 PRELIMINARY INSPECTION

USDA will perform a comprehensive inspection of all contract materials submitted to determine compliance to contract requirements. A preliminary inspection of the Digital Ortho Quarter Quads submitted will be prioritized to expedite delivery to users. Based on this preliminary inspection, a contract status report will be generated recording all acceptable imagery as well as rejectable imagery and the deficiencies discovered. Final acceptance will be determined from the combined inspection results covering all contract materials submitted.

E-5 PARTIAL COVERAGE

If the Contractor obtains only partial coverage for any project item area and/or county during the season, then all partial imagery shall be processed and delivered according to the requirements specified for completed imagery. The requirement for processing partial coverage may be waived only by the Contracting Officer.

E-6 ACCEPTANCE

Final acceptance will be made after inspection by the Government of all required materials delivered at the specified destination. Delivery dates for individual products by project item areas are specified in Section F-3. The acceptance date will be the date of the letter by the Government to the Contractor stating all materials are acceptable and an invoice may be submitted.

Partial acceptance on any fully completed project due to rejection of deficient or non-compliant material will be made based on both preliminary inspection results of the digital imagery and the final inspection results of all remaining materials. A partial acceptance will result in a price reduction based on the final determination of material compliance to contract requirements and specifications.

Partial acceptance on any uncompleted area will be made only after the photographic season has ended and all materials required for the partial area have been delivered, inspected, and accepted by the Government. The acceptance date will be the date of the letter by the Government to the Contractor identifying the amount of partial acceptance and the amount to invoice.

E-7 CLAUSES INCORPORATED BY REFERENCE (FEB 1998) (FAR 52.252-2)

This contract incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text

available. Also, the full text of a clause may be accessed electronically at the following address:
www.arnet.gov/far.

FEDERAL ACQUISITION REGULATION (48 CFR CHAPTER 1) CLAUSES:

- 52.246-02 Inspection of Supplies - Fixed Price (AUG 1996)
- 52.246-04 Inspection of Services - Fixed Price (AUG 1996)
- 52.246-16 Responsibility for Supplies (APR 1984)

PART I - THE SCHEDULE

SECTION F - DELIVERIES OR PERFORMANCE

F-1 MATERIALS TO BE DELIVERED

For the Project Item Area(s) identified in the individual task orders, the Contractor shall deliver the items listed below. The Government strongly encourages the Contractor to submit quarter quadrangle image tiles when available and not wait for a “complete set” prior to submitting. This incremental approach will allow the Government to inspect the data more efficiently and provide a more timely acceptance/rejection turnaround to the Contractor.

1.1 QUARTER QUADRANGLE IMAGE TILES

Item	Requirement
Format	GeoTIFF, unless specified in the task order
Media	Internal hard drive, unless otherwise stated in the task order
Naming Convention	See Paragraph C-6.2 (i.e. “c_3509320_ne_15_1_20040721.tif”)
Quantity	One (1)
Date of First Submittal	No later than 30 calendar days after acquisition period Early and/or incremental delivery is highly encouraged to ease USDA program time constraints.
Submittal Frequency	Once
Government Approval Required	Yes (see Section E)
Required Metadata	Yes (see Section C-6.2(h), <u>Seamline Shapefile</u>)

1.2 COMPRESSED COUNTY MOSAICS

Item	Requirement
Format	See task order
Media	Internal hard drive, unless otherwise stated in the task order
Naming Convention	See Paragraph C-6.3 (i.e. ortho_1-1_1n_s_mo137_2004_1.sid)
Quantity	One (1)
Date of First Submittal	No later than forty five (45) calendar days after acquisition period.
Submittal Frequency	Once (a second submittal is required if a flying season extension is granted) (See Para 5.3 below)
Government Approval Required	Yes (see Section E)

Required Metadata	Yes (see Section C-6.3(f), <u>Mosaic Metadata</u> and Section C-6.3(g), <u>Mosaic Seamline Shapefile</u>)
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1.3 ACCURACY AND QUALITY CONTROL REPORTS

Item	Requirement
Format	Contractor format (ASCII preferred)
Media	Same media as CCMs (see Section F-1.2)
Naming Convention	None
Quantity	One (1) report on each media deliverable
Date of First Submittal	Delivered with CCMs
Submittal Frequency	Once
Government Approval Required	No
Required Metadata	None

1.4 PROGRESS REPORTS

Item	Requirement
Format	See Exhibit 3
Media	Electronic mail
Quantity	One per day per crew
Date of First Submittal	Daily (as required in accordance with Section C- 7.1)
Submittal Frequency	Daily (for all days within the acquisition period until 100% completion, whether aerial acquisition was accomplished or not)
Government Approval Required	No
Required Metadata	None

1.5 PROJECT DATA FILES

(a) PRODUCTION PROCESS DESCRIPTION

Item	Requirement
Format	ASCII text file
Media	Same media as CCMs (see Section F-1.2)
Naming Convention	See Paragraph C-7.3
Quantity	One (1) description for DOQQ and one (1) description for CCM on each media deliverable
Date of First Submittal	No later than 30 calendar days after acquisition period
Submittal Frequency	Once
Government Approval Required	No

Required Metadata	None
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(b) PROJECT DATA FILE DESCRIPTION

Item	Requirement
Format	ASCII comma delimited text file
Media	Same media as CCMs (see Section F-1.2)
Naming Convention	See Paragraph C-7.3
Quantity	One (1) description on each media deliverable
Date of First Submittal	Delivered with CCMs
Submittal Frequency	Once
Government Approval Required	No
Required Metadata	None

F-2 PLACE OF DELIVERY - FOB DESTINATION, WITHIN CONSIGNEE'S PREMISES

The materials to be furnished hereunder shall be delivered, all transportation charges paid by the Contractor, and in accordance with FAR Clause 52.247-35, F.o.b. Destination, Within Consignee's Premises, to:

USDA Aerial Photography Field Office
Attn: Contracting Officer
2222 West 2300 South
Salt Lake City, Utah 84119-2020

Offers submitted on a basis other than F.o.b. Destination within consignee's premises will be deemed unacceptable or rejected as non-responsive.

F-3 SCHEDULE FOR DELIVERY OF MATERIALS

All delivery materials required in this contract shall be shipped within the time limits specified below. Failure to ship within this period will be considered as failure by the Contractor to prosecute the work as to ensure completion and will render the contract subject to default. Date of shipment will be shown by postmark or carrier receipt.

3.1 Original Materials - Delivery Schedule

The Quarter Quadrangle Image Tiles and related data material shall be shipped as soon as completed, but no later than 30 calendar days after the acquisition period end date for each project area. The QQ image tiles shall be shipped prior to shipment of all remaining contract materials, to provide timely data to the user.

The required delivery schedule for all remaining, such as the CCMs, contract materials required for a project item shall be shipped no later than 45 calendar days after the acquisition period has ended, or any season extension thereof.

It is recommended that materials be shipped when completed, since prompt delivery of materials will better assure timely inspection and avoidance of peak seasonal workload delivery.

3.2 Remake Materials - Delivery Schedule

Remake materials shall be shipped as soon as possible after correction is made, but no later than 30 days after receipt in the Contractor's facility of the materials or data required to make the corrections. Only materials as specifically requested by USDA to be remake shall be submitted for inspection. Signed delivery receipts will be required to verify date of receipt of such data or materials by the Contractor.

F-4 CONTRACTOR'S RESPONSIBILITIES

The Contractor shall: furnish all materials, superintendence, labor, transportation, and equipment; execute and complete the imagery acquisition of the area(s) specified and deliver to the USDA the materials called for; execute all work expeditiously, to the satisfaction of the Contracting Officer or authorized Contracting Officer's Representative(s).

F-5 PERFORMANCE OF THE WORK

The Contracting Officer will authorize and direct the acquisition period to begin or end anytime within thirty (30) days before or after the approximate acquisition dates given in the individual task orders, depending upon the weather, ground, foliage, and sun angle conditions required for the project item or area. No imagery shall be undertaken before the Notice to Proceed is issued or after the final date of the acquisition period (or its extension) has occurred. Weather and ground conditions for all project locations will be monitored daily to determine Contractor compliance to performance requirements.

5.1 Notice To Proceed

The Notice to Proceed will be given by telephone and confirmed in writing by regular mail. Failure of the Contractor to proceed with flights on a project item area within 10 calendar days after a "Notice to Proceed" is given, may be considered as evidence of failure to prosecute the work so as to ensure its timely completion. As evidence of performance, Progress Reports shall be submitted.

5.2 Progress Reports

Progress Reports indicating the progress made in acquiring project aerial photography shall be prepared in accordance with instructions in Section J, Exhibit 2, Progress Reports. Reports shall be submitted on a daily basis during the acquisition period whether aerial acquisition was accomplished or not. On days that no imagery was collected, the body of the report should state “No progress”.

Each progress report shall be sent by email transmission not later than the day following performance. In the event that day is a holiday or non-business day, the report shall be sent on the next business day. Separate reports are required from each photographic crew assigned to a project item. Such "next day" reporting shall start when the Contractor receives the Notice to Proceed, and continue until the item is completed or the photographic season and any extension ends.

If it is determined that a season extension or additional flying is required, or reflights are ordered by USDA, reports covering such performance periods shall be submitted.

5.3 Acquisition Period Extension

The Government reserves the right to extend the acquisition period of this contract beyond the approximate period indicated in the individual task orders. A lower minimum sun angle requirement may be necessary to allow the season extension.

The Government may extend the season of this contract, at no increase in price, by written notice to the Contractor at any time prior to the end of the acquisition period. (Refer to FAR 52.217-08 "Option to Extend Services".)

5.4 Option to Extend the Term of the Contract (MAR 2000) (FAR 52.217-09)

- (a) The Government may extend the term of this contract by written notice to the Contractor within **90** days of the end of the base and any option period; provided that the Government give the Contractor a preliminary written notice of its intent to extend at least **30** days before the contract expires. The preliminary notice does not commit the Government to an extension.
- (b) If the Government exercises this option, the extended contract shall be considered to include this option clause.
- (c) The total duration of this contract, including the exercise of any options under this clause, shall not exceed **5 years**.

F-6 CLAUSES INCORPORATED BY REFERENCE (FEB 1998) (FAR 52.252-2)

This contract incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. Also, the full text of a clause may be accessed electronically at this address: www.arnet.gov/far.

FEDERAL ACQUISITION REGULATION (48 CFR CHAPTER 1) CLAUSES:

52.211-11 Liquidated Damages-Supplies, Services, or Research and Development
(SEP 2000)

52.242-15 Stop Work Order (AUG 1989)

52.242-17 Government Delay of Work (APR 1984)

PART I - THE SCHEDULE

SECTION G - CONTRACT ADMINISTRATION DATA

G-1 CONTRACTING OFFICE

The Aerial Photography Field Office (APFO) of the United States Department of Agriculture (USDA), Farm Service Agency (FSA), is responsible for the solicitation, award, and administration of this contract.

Communications shall be directed to:

Contracting Officer, USDA - FSA
Aerial Photography Field Office
2222 West 2300 South
Salt Lake City, Utah 84119-2020
Telephone (801) 844-2910
Facsimile (801) 956-3641

Written correspondence shall reference the contract number and/or task order number plus project item number.

G-2 CONTRACTING OFFICER'S REPRESENTATIVE

Each awarded task order may have a Contracting Officer's Representative (COR). Such designations will be made either at the time of award or by appointment letter.

G-3 CONTRACT INTERPRETATION

Technical assistance regarding interpretation of the specifications and/or terms of the contract will be provided by the Contracting Officer or the COR. Only the Contracting Officer has authority to award, modify, and terminate contracts. The Contractor is encouraged to visit the USDA-APFO facilities and discuss the contract and inspection procedures.

3.1 Discrepancies

Any discrepancy in the schedule or official flight data shall be immediately called to the attention of the Contracting Officer for decision. A discrepancy shall not be adjusted without approval of the Contracting Officer, except at the Contractor's own risk and expense.

G-4 SUBCONTRACTS

Before entering into a subcontract covering any part of the work called for, the Contractor shall inform the Contracting Officer and submit information required to determine acceptability and approval of the proposed subcontractor.

G-5 CHARGES TO CONTRACTOR

The USDA may, at its option, correct deficiencies found to exist in connection with materials submitted by the Contractor and deduct from the Contractor's vouchers the cost thereof to the Government. When the deficiencies to be corrected are such that the cost exceeds \$500.00 at current prices, such corrections will be made only with the prior approval of the Contractor, except in the event of termination for default.

G-6 INVOICES

All payment requests shall be submitted electronically through the U.S. Department of the Treasury's Invoice Processing Platform System (IPP). The IPP website address is: <https://www.ipp.gov>.

To constitute a proper invoice, the invoice must include the following information and/or attached documentation:

- (a) Name and address of the Contractor
- (b) Invoice date.
- (c) Contract number, or other authorization for supplies delivered or services performed.
- (d) Description, quantity, unit of measure, unit price, and extended price of supplies delivered or services performed.
- (e) Shipping and payment terms.
- (f) Name (where practicable), title, phone number, and complete mailing address of responsible official to whom payment is to be sent.
- (g) Any other information or documentation required by the contract.
- (h) While not required, contractors are strongly encouraged to assign an identification number to each invoice.

Notice of an apparent error, defect, or impropriety in an invoice will be given to the Contractor within 7 days of receipt of an invoice and suitable documented.

G-7 PERFORMANCE-BASED PAYMENTS

The Contractor shall adhere to the following performance-based payment description and schedule. Reference Section I-7, Performance-Based Payments (FAR 52.232-32).

7.1 Performance-Based Payments

- (a) Proper invoices, see Section G-6, Invoices, for authorized performance-based payments shall be submitted by a Project Item Area basis.
- (b) Upon publishing the first Early Access Web Service (EAWS) image for the first project item area, the Contractor may submit an invoice for a maximum of \$50,000 for full payment of the EAWS performance covering all awarded project item areas. This one-time payment will not reduce the eligible invoice amount listed in paragraph c or d below.**
- (c) Upon the completion of either the imagery acquisitions or at the end of an established acquisition period (or any granted extension to the period), the Contractor may submit an invoice for a maximum of sixty percent (60%) of the total number of DOQQs acquired multiplied by the awarded unit price.
- (d) Upon final delivery of all required products for each Project Item Area, the Contractor may submit an invoice for a maximum of thirty percent (30%) of the total number of DOQQs acquired multiplied by the awarded unit price. The final delivery invoice will be based upon the delivery of all required products for the Project Item Area. Invoices based on acquisition period areas will not be considered.
- (e) No other performance-based payments shall be issued without the Contracting Officer's approval.

7.2 Reserved

7.3 Final Acceptance

Upon final acceptance by the Government of a Project Line Item, a proper invoice may be submitted to the Contracting officer.

G-8 SMALL BUSINESS SUBCONTRACTING PLAN

Pursuant to FAR Clause 52.219-09, Small Business Subcontracting Plan (see I-9, Clauses Incorporated by Reference), large business concerns proposing contract awards exceeding \$650,000 shall submit a subcontracting plan that separately addresses subcontracting with small business, veteran-owned small business, service-disabled veteran-owned small business, HUBZone small business concerns, small disadvantaged business and women owned small business concerns. A large business concern is defined as a business with average annual revenues of over \$7 million under the NAICS Code 541922 for aerial photography services. Small business concerns are not required to submit small business subcontracting plans. The

subcontracting plan shall be included and made a part of any resultant task order award and be negotiated with the Contracting Officer during the task order negotiation period. Failure to submit and negotiate the subcontracting plan shall make the offeror ineligible for award. Subcontracting plan data shall subsequently be entered into the Small Business Administration's new Electronic Subcontracting Reporting System (eSRS) upon award.

PART I - THE SCHEDULE

SECTION H - SPECIAL CONTRACT REQUIREMENTS

H-1 PERMITS AND CLEARANCES

It shall be the responsibility of the Contractor to determine and secure all necessary permits and clearances for controlled or restricted airspace areas.

The Contractor shall contact the Federal Aviation Administration (FAA) watch supervisor in charge of the Air Traffic Control (ATC) facility to gain approval to operate within controlled airspace. It is suggested that pre-flight coordination be completed at least one week in advance. The FAA suggests that on the day of the flight the photo mission pilot contact the ATC facility and:

- (a) Confirm previous arrangements,
- (b) State that "this is a photo survey mission" via air/ground communications, and subsequently inform the controller when the flight line is commenced.

Military Operation Areas (MOA) will be identified in advance, and if necessary a contact for airspace clearance established. The Contractor is responsible for obtaining flight approvals and security clearances if required by the U.S. Department of Defense. Photographic and digital materials of classified areas shall be stored, handled, and shipped in accordance with existing security regulations. In the event of difficulty, the Contracting Officer shall be contacted for guidance and/or assistance.

The Contractor, and any flying subcontractors, shall contact the Contractor Officer for instructions prior to requesting clearance in the vicinity of "VIP" type airspace with Temporary Flight Restrictions (TFR). The notification to the Contracting Officer should include information such as aircraft tail number, requested clearance (i.e, time and flying location), and contact information.

H-2 AIRCRAFT REGULATIONS AND CERTIFICATIONS

All aircraft used in the performance of the work under this contract shall be maintained and operated in accordance with all regulations required by the U.S. Department of Transportation, Federal Aviation Administration (FAA). Aircraft operated in the acquisition of aerial photography under this contract shall be FAA certified to the highest flying altitude required to obtain proposed imagery.

H-3 OWNERSHIP OF CONTRACT MATERIALS

The Government shall receive copyright and ownership to all data delivered under this contract, including but not limited to photographic materials, orthorectified imagery, databases, and paper products, upon formal acceptance. The Contractor agrees to transfer copyright to the Government upon payment of the final delivery invoice (see G-7.1(c), Performance-Based Payments) or final acceptance, whichever occurs first. The Contractor may maintain copyright and ownership of all original or derived works which are not required submittals under this contract. The Contractor is encouraged to create, market, and sell derived works not related to or in direct competition with the data delivered under this contract. For example, if this contract requires 1-meter orthorectified imagery be delivered to the Government, the Contractor may create 5-meter imagery from the original product, prior to its submittal to the Government, and resell it to other Government agencies or the general public. However, the Government also maintains the rights to derive additional products from the data delivered under this contract. No public distribution of the original or derived works shall be made prior to acceptance by the Government unless specified in the contract or authorized by the Contracting Officer.

H-4 NOTICE TO THE GOVERNMENT OF DELAY

The Contractor shall immediately, upon becoming aware of any difficulties in meeting performance requirements during the photographic season or when difficulties are encountered which may delay deliveries under the contract, notify the Contracting Officer in writing thereof. Such notification shall identify difficulties, the reasons therefore, and the estimated period of anticipated delay.

FAILURE OF THE CONTRACTOR TO GIVE SUCH NOTICE MAY PRECLUDE LATER CONSIDERATION OF ANY CLAIM FOR NON-PERFORMANCE DUE TO WEATHER CONDITIONS OR ANY REQUEST FOR AN EXTENSION OF CONTRACT TIME.

H-5 WAGE DETERMINATION

The Wage Determination applicable to any contract resulting from this solicitation is determined by the location of the Contractor's establishment.

Wage Determination number 1995-0222, Revision **39**, dated **July 8, 2015** will be applicable for Contractors located nationwide. See Section J, Exhibit 4, Wage Determination.

H-6 INDUSTRY SMALL BUSINESS STANDARD

The small business industry size standard for the type of services covered by this procurement, under NAICS code 541922, is the average annual receipts of the concern and its affiliates for the preceding three (3) years not in excess of \$7 million.

H-7 PERMITS AND RESPONSIBILITIES

The Contractor shall, without additional expense to the Government, be responsible for obtaining any necessary licenses and permits, and for complying with any Federal, State, and municipal laws, codes, and regulations applicable to the performance of the work. The Contractor shall also be responsible for all damages to persons or property that occur as a result of the Contractor's fault or negligence. The Contractor shall also be responsible for all materials delivered and work performed until completion and acceptance of the entire work, except for any completed unit of work which may have been accepted under the contract.

PART II - CONTRACT CLAUSES

SECTION I - CONTRACT CLAUSES

I-1 STATEMENT OF EQUIVALENT RATES FOR FEDERAL HIRES (MAY 1989) (FAR 52.222-42)

In compliance with the Service Contract Act of 1965, as amended, and the regulations of the Secretary of Labor (29 CFR part 4), this clause identifies the classes of service employees expected to be employed under the contract and states the wages and fringe benefits payable to each if they were employed by the contracting agency subject to the provisions of 5 U.S.C. 5341 or 5332.

THIS STATEMENT IS FOR INFORMATION ONLY.
IT IS NOT A WAGE DETERMINATION.

<u>Employee Class</u>	<u>Monetary Wage - Fringe Benefits</u>
Aircraft Pilot	\$53,456
First Officer (Co-Pilot)	\$48,672
Aerial Photographer	\$26,707

I-2 ORDERING (OCT 1995) (FAR 52.216-18)

(a) Any supplies and services to be furnished under this contract shall be ordered by issuance of delivery orders or task orders by the individuals or activities designated in the Schedule. Such orders may be issued from **April through December** for the base and option periods.

(b) All delivery orders or task orders are subject to the terms and conditions of this contract. In the event of conflict between a delivery order or task order and this contract, the contract shall control.

(c) If mailed, a delivery order or task order is considered "issued" when the Government deposits the order in the mail. Orders may be issued orally, by facsimile, or by electronic commerce methods only if authorized in the Schedule.

I-3 AVAILABILITY OF FUNDS FOR THE NEXT FISCAL YEAR (APR 1984) (FAR 52.232-19)

Funds are not presently available for performance under this contract beyond 2012. The Government's obligation for performance of this contract beyond that date is contingent

upon the availability of appropriated funds from which payment for contract purposes can be made. No legal liability on the part of the Government for any payment may arise for performance under this contract beyond 2012, until funds are made available to the Contracting Officer for performance and until the Contractor receives notice of availability, to be confirmed in writing by the Contracting Officer.

I-4 MINIMUM AND MAXIMUM CONTRACT AMOUNTS (FEB 1988)
(AGAR 452.216-73)

During the period specified in FAR clause 52.216-18, ORDERING, the Government shall place orders totaling a minimum of \$2,500.00 but not in excess of \$**50.0** million.

I-5 ORDER LIMITATIONS (OCT 1995) (FAR 52.216-19)

- (a) Minimum order. When the Government requires supplies or services covered by this contract in an amount of less than \$2,500.00, the Government is not obligated to purchase, nor is the Contractor obligated to furnish, those supplies or services under the contract.
- (b) Maximum order. The Contractor is not obligated to honor -
 - (1) Any order for a single item in excess of \$10.0 million;
 - (2) Any order for a combination of items in excess of \$10.0 million; or
 - (3) A series of orders from the same ordering office within 30 days that together call for quantities exceeding the limitation in paragraph (b)(1) or (2) of this section.
- (c) If this is a requirements contract (i.e., includes the Requirements clause at subsection 52.216-21 of the Federal Acquisition Regulation (FAR), the Government is not required to order a part of any one requirement from the Contractor if that requirement exceeds the maximum-order limitations in paragraph (b) of this section.
- (d) Notwithstanding paragraphs (b) and (c) of this section, the Contractor shall honor any order exceeding the maximum order limitations in paragraph (b), unless that order (or orders) is returned to the ordering office within 15 days after issuance, with written notice stating the Contractor's intent not to ship the item (or items) called for and the reasons. Upon receiving this notice, the Government may acquire the supplies or services from another source.

I-6 INDEFINITE QUANTITY (OCT 1995) (FAR 52.216-22)

- (a) This is an indefinite-quantity contract for the supplies or services specified, and effective for the period stated, in the Schedule. The quantities of supplies and services specified in the Schedule are estimates only and are not purchased by this contract.

- (b) Delivery or performance shall be made only as authorized by orders issued in accordance with the Ordering clause. The Contractor shall furnish to the Government, when and if ordered, the supplies or services specified in the Schedule up to and including the quantity designated in the Schedule as the "maximum." The Government shall order at least the quantity of supplies or services designated in the Schedule as the "minimum."
- (c) Except for any limitations on quantities in the Order Limitations clause or in the Schedule, there is no limit on the number of orders that may be issued. The Government may issue orders requiring delivery to multiple destinations or performance at multiple locations.
- (d) Any order issued during the effective period of the contract and not completed within the period shall be completed by the Contractor within the time specified in the order. The contract shall govern the Contractor's and Government's rights and obligations with respect to that order to the same extent as if the order were completed during the contract's effective period; provided, that the Contractor shall not be required to make any deliveries under this contract after **March 31, 2017**.

I-7 PERFORMANCE-BASED PAYMENTS (AUG 2010) (FAR 52.232-32)

- (a) Amount of payments and limitation on payments. Subject to such other limitations and conditions as are specified in this contract and this clause, the amount of payments and limitations on payments shall be specified in the contract's description of the basis for payment.
- (b) Contractor request for performance-based payments. The Contractor may submit requests for payment of performance-based payments not more frequently than monthly, in a form and manner acceptable to the Contracting Officer. Unless otherwise authorized by the Contracting Officer, all performance-based payments in any period for which payment is being requested shall be included in a single request, appropriately itemized and totaled. The Contractor's request shall contain the information and certification detailed in paragraph (1) and (m) of this clause.
- (c) Approval and payment of requests.
 - (1) The Contractor shall not be entitled to payment of a request for performance-based payment prior to successful accomplishment of the event or performance criterion for which payment is requested has been successfully accomplished in accordance with the terms of the contract. The Contracting Officer may, at any time, require the Contractor to substantiate the successful performance of any event or performance criterion which has been or is represented as being payable.
 - (2) A payment under this performance-based payment clause is a contract financing payment under the Prompt Payment clause of this contract and not subject to the

interest penalty provision of the Prompt Payment Act. The designated payment office will pay approved requests on the 30th day after receipt of the request for performance-based payment. However, the designated payment office is not required to provide payment if the contracting Officer requires substantiation as provided in paragraph (c)(1) of this clause, or inquires into the status of an event or performance criterion or into any of the conditions listed in paragraph (e) of this clause, or into the Contractor certification. The payment period will not begin until the Contracting Officer approves the request.

- (3) The approval by the Contracting Officer of a request for performance-based payment does not constitute an acceptance by the Government and does not excuse the Contractor from performance of obligations under this contract.

(d) Liquidation of performance-based payment.

- (1) Performance-based finance amounts paid prior to payment for delivery of an item shall be liquidated by deducting a percentage or a designated dollar amount from the delivery payment. If the performance-based finance payments are on a delivery item basis, the liquidation amount for each such line item shall be the percent of that delivery item price that was previously paid under performance-based finance payments are on a whole contract basis, liquidation shall be by either predesignated dollar amount. If the performance-based finance payments are on a whole contract basis, liquidation shall be by either predesignated liquidation amounts or a liquidation percentage.
- (2) If at any time the amount of payments under this contract exceeds any limitation in this contract, the Contractor shall repay to the Government the excess. Unless otherwise determined by the Contracting Officer, such excess shall be credited as a reduction on the unliquidated performance-based payment balance(s), after adjustment of invoice payments and balances for any retroactive price adjustments.

(e) Reduction or suspension of performance-based payments. The Contracting Officer may reduce or suspend performance-based payments, liquidate performance-based payments by deduction from any payment under the contract, or take a combination of these actions after finding upon substantial evidence any of the following conditions:

- (1) The Contractor failed to comply with any material requirement of this contract (which includes paragraphs (h) and (i) of this clause).
- (2) Performance of this contract is endangered by the Contractor's:
 - (i) Failure to make progress; or
 - (ii) Unsatisfactory financial condition.

(3) The Contractor is delinquent in payment of any subcontractor or supplier under this contract in the ordinary course of business.

(f) Title.

(1) Title to the property described in this paragraph (f) shall vest in the Government. Vestiture shall be immediately upon the date of the first performance-based payment under this contract, for property acquired or produced before that date. Otherwise, vestiture shall occur when the property is or should have been allocable or properly chargeable to this contract.

(2) "Property," as used in this clause, includes all of the following described items acquired or produced by the Contractor that are or should be allocable or properly chargeable to this contract under sound and generally accepted accounting principles and practices:

- (i) Parts, materials, inventories, and work in process;
- (ii) Special tooling and special test equipment to which the Government is to acquire title;
- (iii) Nondurable (i.e., noncapital) tools, jigs, dies, fixtures, molds, patterns, taps, gauges, test equipment and other similar manufacturing aids, title to which would not be obtained as special tooling under paragraph (f)(2)(ii) of this clause: and
- (iv) Drawings and technical data, to the extent the Contractor or subcontractors are required to deliver them to the Government by other clauses of this contract.

(3) Although title to property is in the Government under this clause, other applicable clauses of this contract (e.g., the termination clauses) shall determine the handling and disposition of the property.

(4) The Contractor may sell any scrap resulting from production under this contract, without requesting the Contracting Officer's approval, provided that any significant reduction in the value of the property to which the Government has title under this clause is reported in writing to the Contracting Officer.

(5) In order to acquire for its own use or dispose of property to which title is vested in the Government under this clause, the Contractor must obtain the Contracting Officer's advance approval of the action and the terms. If approved the basis for payment (the events or performance criteria) to which the property is related shall be deemed to be not in compliance with the terms of the contract and not payable (if the property is part of or needed for performance), and the Contractor shall refund the related performance-based payments in accordance with paragraph (d) of this clause.

(6) When the Contractor completes all of the obligations under this contract, including liquidation of all performance-based payments, title shall vest in the

Contractor for all property (or the proceeds thereof) not -

- (i) Delivered to, and accepted by, the Government under this contract; or
- (ii) Incorporated in supplies delivered to, and accepted by, the Government under this contract and to which title is vested in the Government under this clause.

(7) The terms of this contract concerning liability for Government-furnished property shall not apply to property to which the Government acquired title solely under this clause.

- (g) Risk of Loss. Before delivery of and acceptance by the Government, the Contractor shall bear the risk of loss for property, the title to which vests in the Government under this clause, except to the extent the Government expressly assumes the risk. If any property is lost, stolen, damaged, or destroyed, the basis of payment (the events or performance criteria) to which the property is related shall be deemed to be not in compliance with the terms of the contract and not payable (if the property is part of or needed for performance), and the Contractor shall refund the related performance-based payments in accordance with paragraph (d) of this clause.
- (h) Records and controls. The Contractor shall maintain records and controls adequate for administration of this clause. The Contractor shall have no entitlement to performance-based payments during any time the Contractor's records or controls are determined by the Contracting Officer to be inadequate for administration of this clause.
- (i) Reports and Government access. The Contractor shall promptly furnish reports, certificates, financial statements, and other pertinent information requested by the Contracting Officer for the administration of this clause and to determine that an event or other criterion prompting a financing payment has been successfully accomplished. The Contractor shall give the Government reasonable opportunity to examine and verify the Contractor's records and to examine and verify the Contractor's performance of this contract for administration of this clause.
- (j) Special terms regarding default. If this contract is terminated under the Default clause,
 - (1) The Contractor shall, on demand, repay to the Government the amount of unliquidated performance-based payments, and
 - (2) Title shall vest in the Contractor, on full liquidation of all performance-based payments, for all property for which the Government elects not to require delivery under the Default clause of this contract. The Government shall be liable for no payment except as provided by the Default clause.
- (k) Reservation of rights.
 - (1) No payment or vesting of title under this clause shall -

- (i) Excuse the Contractor from performance of obligations under this contract;
or
 - (ii) Constitute a waiver of any of the rights or remedies of the parties under the contract.
- (2) The Government's rights and remedies under this clause -
- (i) Shall not be exclusive, but rather shall be in addition to any other rights and remedies proved by law or this contract; and
 - (ii) Shall not be affected by delayed, partial, or omitted exercise of any right, remedy, power, or privilege, nor shall such exercise under this clause or the exercise of any right, power, or privilege of the Government.
- (l) Content of Contractor's request for performance-based payment. The Contractor's request for performance-based payment shall contain the following:
- (1) The name and address of the Contractor;
 - (2) The date of the request for performance-based payment;
 - (3) The contract number and/or other identifier of the contract or order under which the request is made;
 - (4) Such information and documentation as is required by the contract's description of the basis for payment; and
 - (5) A certification by a Contractor official authorized to bind the Contractor, as specified in paragraph (m) of this clause.
- (m) Content of Contractor's Certification. As required in paragraph (l)(5) of this clause, the Contractor shall make the following certification in each request for performance-based payment:

I certify to the best of my knowledge and belief that -

- (1) This request for performance-based payment is true and correct; this request (and attachments) has been prepared from the books and records of the Contractor, in accordance with the contract and the instructions of the Contracting Officer;
- (2) (Except as reported in writing on _____, all payments to subcontractors and suppliers under this contract have been paid, or will be paid, currently, when due in the ordinary course of business;
- (3) There are no encumbrances (except as reported in writing on _____ against the property acquired or produced for, and allocated or properly chargeable to, the contract which would affect or impair the Government's title;

(4) There has been no materially adverse change in the financial condition of the Contractor since the submission by the Contractor to the Government of the most recent written information dated _____; and

(5) After the making of this requested performance-based payment, the amount of all payments for each deliverable item for which performance-based payments have been requested will not exceed any limitation in the contract, and the amount of all payments under the contract will not exceed any limitation in the contract.

I-8 WARRANTY OF SUPPLIES OF A NONCOMPLEX NATURE. (JUN 2003)
(FAR 52.246-17)

As prescribed in 46.710(a)(1), insert a clause substantially as follows:

(a) Definitions. As used in this clause-

"Acceptance" means the act of an authorized representative of the Government by which the Government assumes for itself, or as an agent of another, ownership of existing supplies, or approves specific services as partial or complete performance of the contract.

"Supplies" means the end items furnished by the Contractor and related services required under this contract. The word does not include "data."

(b) Contractor's obligations.

(1) Notwithstanding inspection and acceptance by the Government of supplies furnished under this contract, or any condition of this contract concerning the conclusiveness thereof, the Contractor warrants that until December 31 of the following year after the end of the acquisition period:

- (i) All supplies furnished under this contract will be free from defects in material or workmanship and will conform with all requirements of this contract; and
- (ii) The preservation, packaging, packing, and marking, and the preparation for, and method of, shipment of such supplies will conform with the requirements of this contract.

(2) When return, correction, or replacement is required, transportation charges and responsibility for the supplies while in transit shall be borne by the Contractor. However, the Contractor's liability for the transportation charges shall not exceed an amount equal to the cost of transportation by the usual commercial method of shipment between the place of delivery specified in this contract and the Contractor's plant, and return.

(3) Any supplies or parts thereof, corrected or furnished in replacement under this clause, shall also be subject to the terms of this clause to the same extent as supplies initially delivered. The warranty, with respect to supplies or parts thereof, shall be equal in duration to that in paragraph (b)(1) of this clause and shall run from the date of delivery of the corrected or replaced supplies.

(4) All implied warranties of merchantability and "fitness for a particular purpose" are excluded from any obligation contained in this contract.

(c) Remedies available to the Government.

(1) The Contracting Officer shall give written notice to the Contractor of any breach of warranties in paragraph (b)(1) of this clause within 30 days after discovery of the defect.

(2) Within a reasonable time after the notice, the Contracting Officer may either-

(i) Require, by written notice, the prompt correction or replacement of any supplies or parts thereof (including preservation, packaging, packing, and marking) that do not conform with the requirements of this contract within the meaning of paragraph (b)(1) of this clause; or

(ii) Retain such supplies and reduce the contract price by an amount equitable under the circumstances.

(3) (i) If the contract provides for inspection of supplies by sampling procedures, conformance of supplies or components subject to warranty action shall be determined by the applicable sampling procedures in the contract. The Contracting Officer-

(A) May, for sampling purposes, group any supplies delivered under this contract;

(B) Shall require the size of the sample to be that required by sampling procedures specified in the contract for the quantity of supplies on which warranty action is proposed;

(C) May project warranty sampling results over supplies in the same shipment or other supplies contained in other shipments even though all of such supplies are not present at the point of reinspection; provided, that the supplies remaining are reasonably representative of the quantity on which warranty action is proposed; and

(D) Need not use the same lot size as on original inspection or reconstitute the original inspection lots.

(ii) Within a reasonable time after notice of any breach of the warranties specified in paragraph (b)(1) of this clause, the Contracting Officer may exercise one or more of the following options:

(A) Require an equitable adjustment in the contract price for any group of

supplies.

(B) Screen the supplies grouped for warranty action under this clause at the Contractor's expense and return all nonconforming supplies to the Contractor for correction or replacement.

(C) Require the Contractor to screen the supplies at locations designated by the Government within the contiguous United States and to correct or replace all nonconforming supplies.

(D) Return the supplies grouped for warranty action under this clause to the Contractor (irrespective of the f.o.b. point or the point of acceptance) for screening and correction or replacement.

(4) (i) The Contracting Officer may, by contract or otherwise, correct or replace the nonconforming supplies with similar supplies from another source and charge to the Contractor the cost occasioned to the Government thereby if the Contractor-

(A) Fails to make redelivery of the corrected or replaced supplies within the time established for their return; or

(B) Fails either to accept return of the nonconforming supplies or fails to make progress after their return to correct or replace them so as to endanger performance of the delivery schedule, and in either of these circumstances does not cure such failure within a period of 10 days (or such longer period as the Contracting Officer may authorize in writing) after receipt of notice from the Contracting Officer specifying such failure.

(ii) Instead of correction or replacement by the Government, the Contracting Officer may require an equitable adjustment of the contract price. In addition, if the Contractor fails to furnish timely disposition instructions, the Contracting Officer may dispose of the nonconforming supplies for the Contractor's account in a reasonable manner. The Government is entitled to reimbursement from the Contractor, or from the proceeds of such disposal, for the reasonable expenses of the care and disposition of the nonconforming supplies, as well as for excess costs incurred or to be incurred.

(5) The rights and remedies of the Government provided in this clause are in addition to and do not limit any rights afforded to the Government by any other clause of this contract.

(End of clause)

I-10 CLAUSES INCORPORATED BY REFERENCE (FEB 1998) (FAR 52.252-2)

This contract incorporates the following clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. Also, the full text of a clause may be accessed electronically at this address: www.arnet.gov/far.

FEDERAL ACQUISITION REGULATION (48 CFR CHAPTER 1) CLAUSES:

- 52.202-01 Definitions (JAN 2012)
- 52.203-03 Gratuities (APR 1984)
- 52.203-05 Covenant Against Contingent Fees (APR 1984)
- 52.203-06 Restrictions on Subcontractor Sales to the Government (SEP 2006)
- 52.203-07 Anti-Kickback Procedures (OCT 2010)
- 52.203-08 Cancellation, Rescission, and Recovery of Funds for Illegal or Improper Activity (JAN 1997)
- 52.203-10 Price or Fee Adjustment for Illegal or Improper Activity (JAN 1997)
- 52.203-12 Limitation on Payments to Influence Certain Federal Transactions (OCT 2010)
- 52.204-04 Printing/Copying Double-Sided on Recycled Paper (MAY 2011)
- 52.204-07 Central Contractor Registration (APR 2008)
- 52.209-06 Protecting the Government's Interest When Subcontracting With Contractors Debarred, Suspended, or Proposed for Debarment (DEC 2010)
- 52.215-02 Audit and Records - Negotiation (OCT 2010)
- 52.215-08 Order of Precedence - Uniform Contract Format (OCT 1997)
- 52.215-14 Integrity of Unit Prices (OCT 2010)
- 52.217-08 Option to Extend Services (NOV 1999)
- 52.217-09 Option to Extend the Term of the Contract (MAR 2000)
- 52.219-04 Notice of Price Evaluation Preference for HUBZone Small Business Concerns (JAN 2011)
- 52.219-08 Utilization of Small Business Concerns (JAN 2011)
- 52.219-09 Small Business Subcontracting Plan, Alternate II (JAN 2011)

- 52.219-16 Liquidated Damages – Subcontracting Plan (JAN 1999)
- 52.222-03 Convict Labor (JUN 2003)
- 52.222-04 Contract Work Hours and Safety Standards Act - Overtime Compensation (JUL 2005)
- 52.222-19 Child Labor – Cooperation with Authorities and Remedies (JUN 2010)
- 52.222-21 Prohibition of Segregated Facilities (FEB 1999)
- 52.222-26 Equal Opportunity (MAR 2007)
- 52.222-35 Equal Opportunity for Special Disabled Veterans, Veterans of the Vietnam Era, and Other Eligible Veterans (SEP 2010)
- 52.222-36 Affirmative Action for Workers with Disabilities (OCT 2010)
- 52.222-37 Employment Reports on Special Disabled Veterans and Veterans of the Vietnam Era, and Other Eligible Veterans (SEP 2010)
- 52.222-41 Service Contract Act of 1965, as Amended (NOV 2007)
- 52.222-44 Fair Labor Standards Act and Service Contract Act - Price Adjustment (SEP 2009)
- 52.222-50 Combating Trafficking in Persons (FEB 2009)
- 52.223-06 Drug-Free Workplace (MAY 2001)
- 52.225-03 Buy American Act - North American Free Trade Agreement - Israeli Trade Act (JUN 2009)
- 52.225-13 Restrictions on Certain Foreign Purchases (JUN 2008)
- 52.227-01 Authorization and Consent (DEC 2007)
- 52.227-02 Notice and Assistance regarding Patent & Copyright Infringement (DEC 2007)
- 52.227-14 Rights in Data - General - Alternate I (DEC 2007)
- 52.229-03 Federal, State, and Local Taxes (APR 2003)
- 52.232-01 Payments (APR 1984)

- 52.232-08 Discounts for Prompt Payment (FEB 2002)
- 52.232-11 Extras (APR 1984)
- 52.232-17 Interest (OCT 2010)
- 52.232-18 Availability of Funds (APR 1984)
- 52.232-23 Assignment of Claims (JAN 1986)
- 52.232-25 Prompt Payment (OCT 2008)
- 52.232-33 Payment by Electronic Funds Transfer – Central Contractor Registration (OCT 2003)
- 52.233-01 Disputes (JUL 2002)
- 52.233-03 Protest After Award (AUG 1996)
- 52.233-04 Applicable Law for Breach of Contract Claim (OCT 2004)
- 52.242-02 Production Progress Reports (APR 1991)
- 52.242-13 Bankruptcy (JUL 1995)
- 52.243-01 Changes - Fixed Price - Alternate II (APR 1984)
- 52.244-06 Subcontracts for Commercial Items (DEC 2010)
- 52.245-01 Government Property (AUG 2010)
- 52.245-09 Use and Charges (AUG 2010)
- 52.246-25 Limitation of Liability - Services (FEB 1997)
- 52.247-35 F.o.b. Destination, Within Consignee’s Premises (APR 1984)**
- 52.248-01 Value Engineering (OCT 2010)
- 52.249-04 Termination for Convenience of the Government (Services) (Short Form) (APR 1984)
- 52.249-08 Default (Fixed-Price Supply and Service) (APR 1984)
- 52.253-01 Computer Generated Forms (JAN 1991)

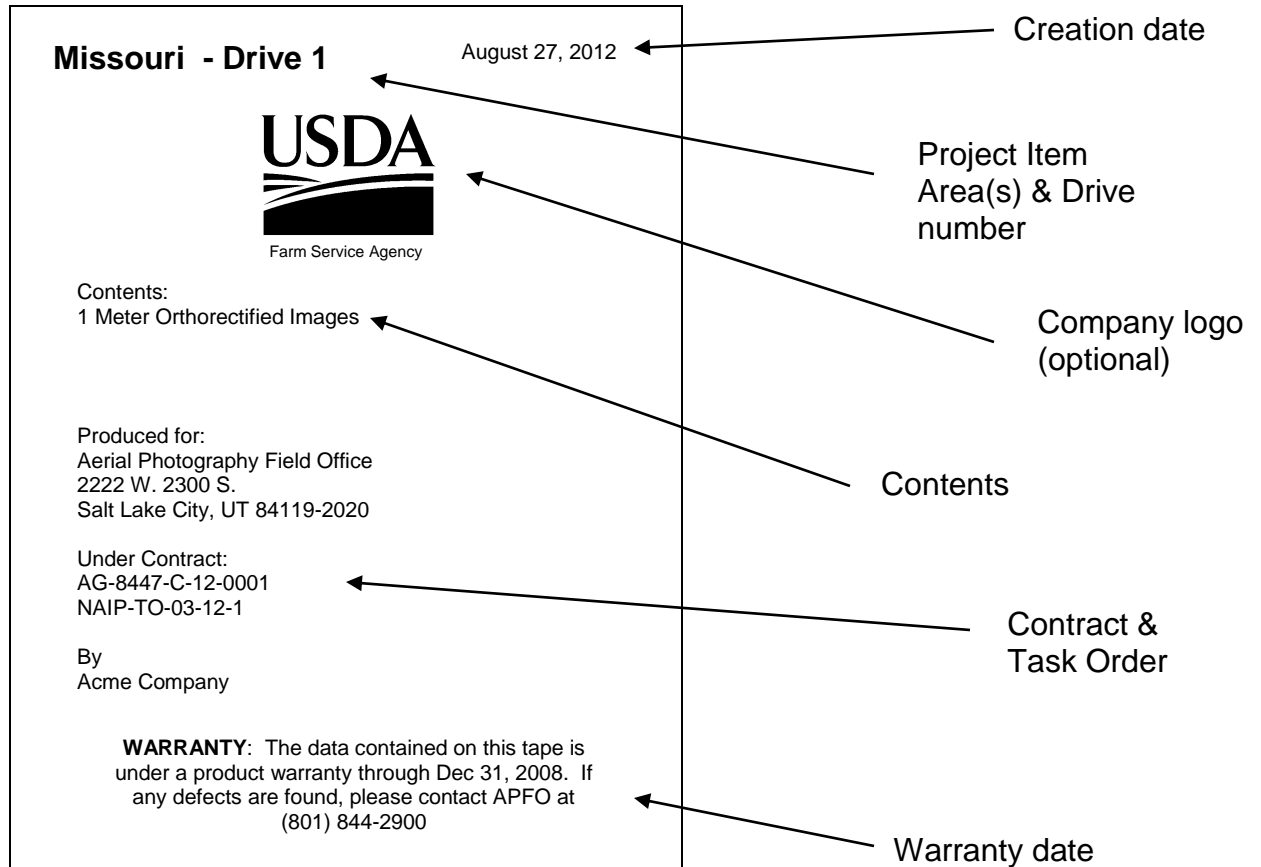
PART III - LIST OF DOCUMENTS, EXHIBITS, AND OTHER ATTACHMENTS

SECTION J - LIST OF ATTACHMENTS

<u>Exhibit</u>	<u>Description</u>	<u>Page</u>
Exhibit 1	Labeling Requirements (1 page)	50
Exhibit 2	Progress Report (2 pages)	51-52
Exhibit 3	Image Scan Naming Logic (1 page)	53
Exhibit 4	Wage Determination (4 pages)	54-57
Exhibit 5	Glossary and Definitions (2 pages)	58-59
Attachment A: APFO Specification for Digital Camera Based Acquisition (4 pages)		
Attachment B: APFO Digital Imagery Quality Specification (4 pages)		
Attachment C: NAIP Digital File Format Specification (10 pages)		

EXHIBIT 1

Hard Drive Labeling Requirements



ELEMENT	EXAMPLE*
Company name & logo	Acme Company
Contents	1 Meter Orthorectified Images
Contract number	AG-8447-C-12-0001
Task Order number	NAIP-TO-3-12-1
Creation date	August 27, 2012
Project item area & drive number	Missouri – Drive 1
Warranty date	Dec 31, 2013

* Example labeling requirements indicate Base Year (2012) contract dates and numbers. Subsequent Option Year Task Orders shall indicate current year dates and numbers.

Approximate label dimensions: 3-1/2" (width) x 4-1/2" (height)

EXHIBIT 2

PROGRESS REPORT CONVENTION

The goal of the progress report is to accurately report daily image acquisition and to identify no progress days due to weather or other conditions. The report shall also indicate those areas that a contractor has determined the acquired imagery to be unusable which will result in a reflight for a particular area.

Syntax:

HEADER ITEMS: field-name “:”[field-body][CRFL]
 BODY ITEMS: body item [CRFL]

Header Items:

All four header items are required to be submitted in each and every submittal.

<u>DESCRIPTION</u>	<u>KEYWORD</u>	<u>FORMAT</u>
Contractor Name	CONTRACTOR	Alphanumeric
Task Order Award Number	CONTRACT	Numeric (N-YY)
Task Order Award Item	ITEM	Numeric (N)
Date Flown	DATE	Date (YYYYMMDD)

Body Items:

All data elements are required for each line of data submitted. Data elements are to be separated by 5 ASCII decimal 32 (white space). Acquisition and rejected exposure stations can be submitted as separate reports or as a combined report.

<u>DESCRIPTION</u>	<u>KEYWORD</u>	<u>FORMAT</u>
DOQQ Id	N/A	Char(9)
Latitude	N/A	DD.DDDDD
Longitude	N/A	-DDD.DDDDD
Status	N/A	Char(1)*
Aircraft tail number	N/A	Char(6)

* Status Field:

A - Indicates the Exposure Station has been collected

R – Indicates the contractor has rejected a previously acquired Exposure Station

When an exposure station is rejected the exposure station will appear in a later report marked with an “R”. Each report submitted should include only one status indicator for a particular exposure station.

PROGRESS REPORT CONVENTION (CON'T)

Sample:

CONTRACTOR: Acme Photography
CONTRACT: 3-12
ITEM: 1
DATE: 20120827

4210337nw	34.87500	-86.28139	A	N12345
4210337sw	34.90639	-86.28139	A	N12345
4210345nw	34.93750	-86.28139	A	N12345
4210345sw	34.96889	-86.28139	A	N12345

Notes:

- 1) Text is case insensitive.
- 2) Header fields are not required to occur in any particular order.
- 3) Body items must occur after the headers.
- 4) Each header item must be on a single line (no “folding”)
- 5) Keywords may not contain spaces and must be followed immediately by a colon.
- 6) The header items and body items may be separated by a NULL line (a blank line with a carriage-return/line-feed (CRLF)(ASCII 13 and 10).
- 7) Body items can only contain one data item per line and must be terminated by a carriage-return/line-feed.
- 8) Task order award number must be sent without prefix (i.e., NAIP-TO-3-12-1 should be sent as 3-12).
- 9) Date must be transmitted as YYYYMMDD.
- 10) No e-mail attachments.
- 11) Reports shall be submitted as a plan text e-mail.

EXHIBIT 3

IMAGERY NAMING LOGIC

121° 00' 00"
 49° 00' 00" •

01	02	03	04	05	06	07	08
09	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32
33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56
57	58	59	60	61	62	63	64

• 48° 00' 00"
 120° 00' 00"

NW	NE
SW	SE

The image ID for this scan would be:
4812043_ne

Each Block (ie: 43) is a full Quad within the 1 degree grid; it is further subdivided into 4 quarter-quads

Sample: **4812043_ne** Where:

Latitude: Identified by 2 digit numerical value of a 1 degree block.

Longitude: Identified by 3 digit numerical value of a 1 degree block, including a leading "0" as needed.

Quadrangle Number: Identified by grid number (01, 02, 03, ... 63, 64).

Quarter Quadrangle Location: Identified by grid letters (nw, ne, sw, se)

EXHIBIT 4

WD 95-0222 (Rev.-39) was first posted on www.wdol.gov on 07/14/2015 Aerial Photographers/Seeding/Spraying

 REGISTER OF WAGE DETERMINATIONS | U.S. DEPARTMENT OF LABOR
 UNDER THE SERVICE CONTRACT ACT | EMPLOYMENT STANDARDS ADMINISTRATION
 By direction of the Secretary of Labor | WAGE AND HOUR DIVISION
 | WASHINGTON, D.C. 20210
 Daniel W. Simms Division of Wage | Wage Determination No: 1995-0222
 Director Determinations | Revision No: 39
 | Date Of Revision: 07/08/2015

 Note: Executive Order (EO) 13658 establishes an hourly minimum wage of \$10.10 for 2015 that applies to all contracts subject to the Service Contract Act for which the solicitation is issued on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.10 (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract. The EO minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts. Nationwide: Applicable in the continental U.S. Alaska, Puerto Rico, Hawaii and Virgin Islands.

****Fringe Benefits Required Follow the Occupational Listing****

Employed on U.S. Government contracts for aerial photographer, aerial seeding, aerial spraying, transportation of personnel and cargo, fire reconnaissance, administrative flying, fire detection, air taxi mail service, and other flying services.

OCCUPATION CODE - TITLE	FOOTNOTE	RATE
31010 - Airplane Pilot		28.36
(not set) - First Officer (Co-Pilot)		25.82
(not set) - Aerial Photographer		14.17

EXCEPT SCHEDULED AIRLINE TRANSPORTATION AND LARGE MULTI-ENGINE AIRCRAFT SUCH AS THE B-727, DC-8, AND THE DC-9.

ALL OCCUPATIONS LISTED ABOVE RECEIVE THE FOLLOWING BENEFITS:

HEALTH & WELFARE: \$4.27 per hour or \$170.80 per week or \$740.13 per month

VACATION: 2 weeks paid vacation after 1 year of service with a contractor or successor, 3 weeks after 5 years, and 4 weeks after 15 years. Length of service includes the whole span of continuous

service with the present contractor or successor, wherever employed, and with the predecessor contractors in the performance of similar work at the same Federal facility. (Reg. 29 CFR 4.173)

HOLIDAYS: A minimum of ten paid holidays per year: New Year's Day, Martin Luther King Jr.'s Birthday, Washington's Birthday, Memorial Day, Independence Day, Labor Day, Columbus Day, Veterans' Day, Thanksgiving Day, and Christmas Day. (A contractor may substitute for any of the named holidays another day off with pay in accordance with a plan communicated to the employees involved.) (See 29 CFR 4.174)

VACATION (Hawaii): 2 weeks paid vacation after 1 year of service with a contractor or successor; 3 weeks after 10 years, and 4 weeks after 15 years. Length of service includes the whole span of continuous service with the present contractor or successor, wherever employed, and with the predecessor contractors in the performance of similar work at the same Federal facility. (Reg. 29 CFR 4.173)

HEALTH & WELFARE (Hawaii): \$1.69 per hour, or \$67.60 per week, or \$292.93 per month hour for all employees on whose behalf the contractor provides health care benefits pursuant to the Hawaii prepaid Health Care Act. For those employees who are not receiving health care benefits mandated by the Hawaii prepaid Health Care Act, the new health and welfare benefit rate will be \$4.27 per hour.

HAZARDOUS PAY DIFFERENTIAL: An 8 percent differential is applicable to employees employed in a position that represents a high degree of hazard when working with or in close proximity to ordnance, explosives, and incendiary materials. This includes work such as screening, blending, dying, mixing, and pressing of sensitive ordnance, explosives, and pyrotechnic compositions such as lead azide, black powder and photoflash powder. All dry-house activities involving propellants or explosives. Demilitarization, modification, renovation, demolition, and maintenance operations on sensitive ordnance, explosives and incendiary materials. All operations involving re-grading and cleaning of artillery ranges.

A 4 percent differential is applicable to employees employed in a position that represents a low degree of hazard when working with, or in close proximity to ordnance, (or employees possibly adjacent to) explosives and incendiary materials which involves potential injury such as laceration of hands, face, or arms of the employee engaged in the operation, irritation of the skin, minor burns and the like; minimal damage to immediate or adjacent work area or equipment being used. All operations involving, unloading, storage, and hauling of ordnance, explosive, and incendiary ordnance material other than small arms ammunition. These differentials are only applicable to work that has been specifically designated by the agency for ordnance, explosives, and incendiary material differential pay.

**** UNIFORM ALLOWANCE ****

If employees are required to wear uniforms in the performance of this contract (either by the terms of the Government contract, by the employer, by the state or local law, etc.), the cost of furnishing such uniforms and maintaining (by laundering or dry cleaning) such uniforms is an expense that

may not be borne by an employee where such cost reduces the hourly rate below that required by the wage determination. The Department of Labor will accept payment in accordance with the following standards as compliance:

The contractor or subcontractor is required to furnish all employees with an adequate number of uniforms without cost or to reimburse employees for the actual cost of the uniforms. In addition, where uniform cleaning and maintenance is made the responsibility of the employee, all contractors and subcontractors subject to this wage determination shall (in the absence of a bona fide collective bargaining agreement providing for a different amount, or the furnishing of contrary affirmative proof as to the actual cost), reimburse all employees for such cleaning and maintenance at a rate of \$3.35 per week (or \$.67 cents per day). However, in those instances where the uniforms furnished are made of "wash and wear" materials, may be routinely washed and dried with other personal garments, and do not require any special treatment such as dry cleaning, daily washing, or commercial laundering in order to meet the cleanliness or appearance standards set by the terms of the Government contract, by the contractor, by law, or by the nature of the work, there is no requirement that employees be reimbursed for uniform maintenance costs.

The duties of employees under job titles listed are those described in the "Service Contract Act Directory of Occupations", Fifth Edition (Revision 1), dated September 2014, unless otherwise indicated.

REQUEST FOR AUTHORIZATION OF ADDITIONAL CLASSIFICATION AND WAGE RATE Standard Form 1444 (SF-1444)

Conformance Process:

The contracting officer shall require that any class of service employee which is not listed herein and which is to be employed under the contract (i.e., the work to be performed is not performed by any classification listed in the wage determination), be classified by the contractor so as to provide a reasonable relationship (i.e., appropriate level of skill comparison) between such unlisted classifications and the classifications listed in the wage determination. Such conformed classes of employees shall be paid the monetary wages and furnished the fringe benefits as are determined (See 29 CFR 4.6(b)(2)(i)). Such conforming procedure shall be initiated by the contractor prior to the performance of contract work by such unlisted class(es) of employees (See 29 CFR 4.6(b)(2)(ii)). The Wage and Hour Division shall make a final determination of conformed classification, wage rate, and/or fringe benefits which shall be retroactive to the commencement date of the contract (See 29 CFR 4.6(b)(2)(iv)(C)(vi)). When multiple wage determinations are included in a contract, a separate SF-1444 should be prepared for each wage determination to which a class(es) is to be conformed.

The process for preparing a conformance request is as follows:

- 1) When preparing the bid, the contractor identifies the need for a conformed occupation(s) and computes a proposed rate(s).

- 2) After contract award, the contractor prepares a written report listing in order the proposed classification title(s), a Federal grade equivalency (FGE) for each proposed classification(s), job description(s), and rationale for proposed wage rate(s), including information regarding the agreement or disagreement of the authorized representative of the employees involved, or where there is no authorized representative, the employees themselves. This report should be submitted to the contracting officer no later than 30 days after such unlisted class(es) of employees performs any contract work.
- 3) The contracting officer reviews the proposed action and promptly submits a report of the action, together with the agency's recommendations and pertinent information including the position of the contractor and the employees, to the Wage and Hour Division, U.S. Department of Labor, for review (See 29 CFR 4.6(b)(2)(ii)).
- 4) Within 30 days of receipt, the Wage and Hour Division approves, modifies, or disapproves the action via transmittal to the agency contracting officer, or notifies the contracting officer that additional time will be required to process the request.
- 5) The contracting officer transmits the Wage and Hour decision to the contractor.
- 6) The contractor informs the affected employees.

Information required by the Regulations must be submitted on SF-1444 or bond paper.

When preparing a conformance request, the "Service Contract Act Directory of Occupations" (the Directory) should be used to compare job definitions to ensure that duties requested are not performed by a classification already listed in the wage determination. Remember, it is not the job title, but the required tasks that determine whether a class is included in an established wage determination. Conformances may not be used to artificially split, combine, or subdivide classifications listed in the wage determination.

**** OCCUPATIONS NOT INCLUDED IN THE SCA DIRECTORY OF OCCUPATIONS ****

Aerial Photographer

The aerial photographer must be skilled in reading flight maps, capable of assisting the pilot to adhere to flight lines, be able to level and operate a cartographic camera and its auxiliary equipment mounted in the aircraft so that the photographs that are taken will have the required forward lap and side lap for use in photogrammetric mapping equipment, and possess a working knowledge of aerial films and camera filters to insure proper exposure of the films.

First Officer (Co-Pilot)

Is second in command of commercial airplane and its crew while transporting passengers, mail, or other cargo on scheduled or nonscheduled flights. Assists or relieves an airline captain in operating the controls of an airplane; monitoring flight and engine instruments; and maintaining air-to-ground communications.

EXHIBIT 5

GLOSSARY AND DEFINITIONS

Acquisition Period: The calendar period in which the project item area imagery is required to be acquired.

Camera System: The key components of the imagery capture device such as the camera, lens, camera mount, onboard data storage, and camera management software.

Contract Award Item: A separately awarded contract that may contain one or more project item areas awarded to a single contractor. Contract award items are indicated by the numeric solicitation number followed by sequential award item numbers (i.e., 3-04-1, 3-04-2, 3-04-3, etc).

Contracting Officer's Technical Representative (COTR): A person contract who has the responsibility of providing technical information such as site ground and weather conditions on a contract.

Contracting Officer's Representative (COR): A person who is responsible for specific technical and administrative duties related to a contract.

Direct Digital Imagery: Vertical, high resolution imagery directly captured using a digital sensor. Either airborne or space-borne systems.

Ground Sample Distance: The ground sample distance is the distance on the ground represented by each pixel in the x and y components.

Hyperspectral Imagery: Imagery acquired with a camera that captures a specific portion or portions of the spectrum and is divided into bands of equal increments, such as 10-20 nm each. A large number of bands are acquired, usually more than 100. The bands do not necessary target specific information as is generally the case with multispectral imagery.

Multispectral Imagery: Imagery acquired with a camera that captures bands of varying portions and increments of the spectrum. The number of bands is usually no more than 10-20. The bands generally target specific information such as water, vegetation, and so forth.

Original Photography: All aerial photography, as secured by the Contractor, prior to its inspection by the USDA, including any reflights made at the discretion of the Contractor.

Orthophotography: an aerial photograph geometrically corrected ("orthorectified") such that the scale is uniform: the photo has the same lack of distortion as a map.

Project Item Area: An area or areas described in the Schedule for which an award shall be made to one offeror.

Quarter Quadrangle: A full quadrangle is defined as a 7½ by 7½ minute area as established for the USGS topographic mapping series. A quarter quadrangle is one-fourth the size and is 3 minutes 45 seconds by 3 minutes 45 seconds.

Reflight Photography: Photography reflown to replace original photography rejected by USDA.

Remake Materials: Any contract materials, other than the original aerial film, ordered remade by USDA.

Seamline Shapefile: An Esri® compatible polygon vector data file that annotates the seamlines of the mosaic image.
index.

AERIAL PHOTOGRAPHY FIELD OFFICE (APFO) SPECIFICATION FOR DIGITAL CAMERA BASED ACQUISITION

(Dated February 1, 2012)

1.0 INTRODUCTION AND BACKGROUND

The U.S. Federal Government has not established an independent government evaluation and calibration policy for digital cameras since sensor technology is still rather new. Until a policy is developed and implemented, the U.S. Department of Agriculture (USDA), Farm Service Agency (FSA) has proceeded to validate the quality and capabilities of current digital cameras by obtaining relevant information from camera manufacturers, data providers, and other government agencies and organizations. The following specifications and requirements have been developed to ensure that any digital camera proposed for use on USDA contracts meets minimum requirements to provide the highest quality orthoimagery products.

2.0 DIGITAL CAMERA SPECIFICATIONS AND REQUIREMENTS

This document covers camera specifications and requirements for any direct-digital imagery acquisition under contract to APFO. Acquisition of the imagery may be from airborne or space-based platforms. Cameras for acquiring precise vertical digital imagery are required to be tested and calibrated. Cameras proposed for use must be of comparable, or better, precision and quality as traditional film-based stereoscopic mapping cameras. Imagery captured with digital cameras must also be compatible with analytical mensuration procedures used in photogrammetric surveys and in preparing accurate orthophotography. Documentation and sample imagery will be reviewed and verified by the Government before approval is granted. Only approved digital cameras shall be used on contracts administered by APFO.

3.0 GENERAL REQUIREMENTS

Digital cameras must be tested and calibrated with manufacturer certification documentation. The camera must be geometrically stable and suitable for use in precise, high-accuracy photogrammetric orthoimagery applications. All delivered imagery shall be acquired and processed in such a way as to eliminate or minimize pixel or band offset or misalignment between bands. The camera shall provide the following:

3.1 Spatial Resolution

The camera shall provide the spatial resolution and field of view necessary to meet the ground sample distance (GSD) requirement as specified in the contract.

3.2 Image Fusion

Pan sharpening will be permitted to achieve the necessary spatial resolution requirements. The multi-spectral bands may be used at a ratio no greater than 1:5 (multi-spectral to panchromatic) to achieve the required spatial resolution.

3.3 Radiometric Resolution and Accuracy

The camera's sensor shall capture and record a minimum of 12-bits of image information per color channel. If more than one lens and more than one shutter are used in the camera, the difference in radiometric values between two panchromatic or two multi-spectral sensors shall be less than $\pm 5\%$. For example, a 12-bit image shall not have more than ± 205 difference in gray values.

3.4 Spectral Resolution

The camera shall capture, as a minimum, natural color (approximately 440– 850 nm) and near infrared color (approximately 780 – 850 nm) channel data simultaneously or near simultaneously using a single camera (near simultaneously is defined as less than 500 milliseconds). Additional multi-spectral bands may be collected with a secondary or auxiliary camera and/or system.

3.5 Camera Operation

The digital camera and its mount shall be checked for proper installation prior to each mission. An automatic exposure control device is permitted, but a manual override capability is required for some types of terrain to achieve proper coverage and exposure. The camera mount shall be regularly serviced and maintained and shall be insulated against aircraft vibration.

3.6 Camera Maintenance

The contractor shall perform all maintenance in accordance with the manufacturers recommended and established procedures. The contractor shall maintain a complete history of all maintenance done to the camera system and have it available for Government inspection. The contractor shall provide certification that the system has been maintained, preventive maintenance and calibration performed, to the manufacturers requirements.

3.7 System Malfunctions

The contracting officer shall be notified of all camera malfunctions within 72 hours with a written report of the malfunction. A malfunction is defined as a failure in any element or process of the camera that causes an interruption of the normal operations of the camera system (camera system is defined as the camera and any key components, such as camera mount, airborne global positioning system, and on-board data storage).

All malfunctions or failures of global positioning systems or inertial measurement unit systems shall also be reported directly to the contracting officer.

3.8 Multiple Camera Approval

The use of more than one type of an approved digital cameras (i.e.: DMC and ADS80) in the acquisition of the same project item area is allowed. The use of multiple digital cameras within the same project item area do not eliminate the Contractor's obligation to meet all accuracy and quality requirements and specifications of this contract.

4.0 DIGITAL CAMERA APPROVAL REQUIREMENTS

All digital cameras must be approved by the Contracting Officer before acquiring imagery under any APFO contract. When requesting approval, the Contractor shall submit, or have on file with APFO, a report of calibration (see Paragraph 4.1), sample digital imagery (see Paragraph 4.2), and camera documentation (see Paragraph 4.3).

4.1 Calibration Reports

Calibration reports for each digital camera proposed for use shall be submitted to the contracting officer with the contractor's proposal and prior to project imagery acquisition if the digital camera is removed and remounted. The contractor shall follow manufacturer's specifications for appropriate calibration and recalibration. The calibration reports shall address the geometric performance of the camera, and at a minimum, include:

- (a) Date of report
- (b) The name of the person or company performing the calibration
- (c) The methodology and procedures used for calibration
- (d) Final calibration parameters, such as calibrated focal length, lens distortion values, radiometric calibration parameters, and principal point location.

NOTE: The government recognizes that individual calibration reports, procedures, and parameters may be unique to a certain manufacturer since equipment and systems vary from manufacturer to manufacturer.

4.2 Sample Imagery Requirements

The Contractor shall acquire and submit with their proposal, sample images from the digital camera proposed for use. The sample imagery shall provide the following minimum characteristics:

- (a) Display the same GSD resolution required in the solicitation.
- (b) Represent the type of terrain (agriculture, cropland, forest, etc.) that is similar to the proposed project area.

- (c) Re-sampled and submitted as an 8-bits per band image (unless the solicitation requires only 16-bit per band image delivery, in which case the sample imagery shall be submitted as a 16-bits per band image).
- (c) If ortho-rectification is required under the proposed solicitation, the sample image shall be ortho-rectified with the projection specified in the solicitation (for example, North American Datum 1983 (NAD83) and UTM Zone 12).
- (d) Sample shall be produced and submitted in the footprint and file format specified in the solicitation (for example, DOQQ formatted, GeoTIFF image).
- (e) The sample imagery shall fit on one standard CD or DVD. Delivered media will become part of the official Government contract file and will not be returned.

4.3 Camera Documentation Requirements

The Contractor shall provide with their proposal detailed documentation of the digital camera proposed for use. Documentation may include brochures, technical specifications, marketing material, manufacturer's user manuals, or other descriptive literature. The documentation shall contain at a minimum the following information:

- (a) General overview information
- (b) Product configuration description
- (c) Camera component description
- (d) Technical specifications
- (e) Computer management and storage systems
- (f) Image acquisition and processing workflow

AERIAL PHOTOGRAPHY FIELD OFFICE (APFO) USDA DIGITAL IMAGERY QUALITY SPECIFICATION

(Dated February 1, 2012)

1.0 SCOPE

This document establishes the image quality criteria to be used in the production of digital imagery products for all contracts issued by the United States Department of Agriculture's (USDA) Aerial Photography Field Office.

2.0 APPLICABLE DOCUMENTS

In the event of conflict between the contents of this specification and the documents referenced herein, the contents of this specification shall take precedence.

- 2.1 National Agriculture Imagery Program (NAIP) Suggested Best Practices – Final Report, dated Feb 1, 2007 (ITT Space Systems Division)

3.0 GENERAL REQUIREMENTS

USDA uses imagery for various programs including, but not limited to forest management, agriculture land use analysis, natural resource inventory, and extraction of data by means of photogrammetric interpretation. The complex nature and need for consistent imagery requires adherence to exact format and content of this specification.

- 3.1 Image blemishes, scratches and artifacts. Imagery shall be free of blemishes, scratches, and artifacts that obscure ground feature detail. The following table defines the maximum acceptable limits for blemishes, scratches, and artifacts. Clusters of blemishes, scratches, and artifacts that do not individually meet these criteria may be considered unacceptable.

ACCEPTABLE, IMAGE BLEMISHES, SCRATCHED, AND ARTIFACTS	
1 pixel wide	100 pixels in length
2 pixels wide	60 pixels in length
3 pixels wide	20 pixels in length
4 – 12 pixels wide	12 pixels in length

- 3.2 Band-to-Band Registration Accuracy. Misregistration between any color bands shall not exceed 1 pixel.

- 3.3 **Original Image Resolution.** The original image, original scan, or original capture used to create the imagery shall not be resampled from the original image resolution greater or less than the following numbers in order to meet the Ground Sample Distance (GSD) specified in the contract:

GROUND SAMPLE DISTANCE (GSD)	ORIGINAL IMAGE RESOLUTION	
	MAXIMUM (meters)	MINIMUM (meters)
0.3-meter	0.15	0.32
0.5-meter	0.25	0.53
1-meter	0.50	1.05

4.0 UNPROCESSED IMAGERY

Unprocessed imagery is defined as imagery that has been minimally processed before exporting to a non-camera specific file format, such as a TIFF. Unprocessed imagery is the closest “match” to a traditional film negative that the direct-digital camera can provide without having the end-user employ special and/or non-standard software.

- 4.1 **Non-image data.** Imagery shall only use a pixel digital number (DN) of zero (0) for non-data values.
- 4.2 **Image Quality.** The Contractor shall not make any radiometric enhancements, such as gamma correction, histogram stretching, dodging, or other Look Up Table (LUT) adjustments, to the acquired imagery. The imagery shall not contain any borders, artifacts, or other non-image items.

5.0 COLOR CORRECTED IMAGERY

Imagery required to be color-corrected shall be adjusted so that the image matches the ground at the time of exposure. Adjustments shall include, but not limited to, any dodging, gamma correction, histogram stretching, brightness adjustments, and/or color balancing. The files shall not contain any borders, artifacts, or other non-image items.

- 5.1 **Non-image data.** Imagery shall only use a pixel digital number (DN) of zero (0) for non-data values.
- 5.2 **Natural Color Image Quality.**
- (a) **Clipping.** Imagery shall have a tonal range that prevents the clipping of highlight or shadow detail from the image. When calculated against the luminosity histogram, the cumulative pixel count between the first and last five histogram bin

values (5 and 250 respectively for 8-bit depth) shall not be less than 98.0%, with a preferred value greater than 99%.

- (b) **Contrast.** When calculated against the luminosity histogram, the difference between the histogram digital number (DN) value that contains 99.0% of the cumulative pixel count and the DN value that contains 1.0% shall be greater than $\pm 59\%$ of the bit depth, $\pm 4\%$ (aim point of 150, ± 10 for 8-bit depth). If the cumulative pixel count percentage falls between two histogram bin values, the closest value shall be used. For example, if an 8-bit image has a luminosity DN value 222 contains 99% of the cumulative pixel count and DN value 44 contains 1% count, therefore the difference is 178.

BIT DEPTH	DN DIFFERENCE		
	TARGET	MINIMUM	MAXIUMUM
8-bit	150	140	160
16-bit	38,550	35,930	41,170

- (c) **Brightness.** Imagery shall have a mean pixel count within $\pm 7.5\%$ of the middle DN value allowed for the bit depth. For example, an 8-bit depth image must have the histogram mean value between 108 and 147.

BIT DEPTH	MEAN DN	
	MINIMUM	MAXIUMUM
8-bit	108	147
16-bit	27,853	37,683

- (d) **Color Balance.** Imagery should have a neutral tonal range without the dominance of any individual color. The difference between the minimum and maximum DN value in a RGB triplet of any nearly neutral objects within the image shall be less than 5.

5.2 **Color infrared Imagery.** All color infrared imagery shall have proper contrast to allow highlight and shadow detail.

5.3 **Multispectral Imagery.** Multispectral Imagery shall be radiometrically processed such that the natural color bands (RGB) meet the quality requirements in paragraph 5.1.

6.0 ORTHORECTIFIED IMAGERY

All orthorectified imagery shall be color-corrected in accordance with paragraph 5.0.

6.1 **Geographic Extent.** Imagery shall cover the entire image area, including the required minimum buffer on all four sides. Extents shall be computed by projecting the geographic corners and side midpoints to the appropriate projection, then adding the buffer on each side of the resulting minimum bounding rectangle.

- 6.2 Specular reflections. Specular reflections in the imagery should be minimized, especially in agriculture areas, by patching the area using “chips” from different imagery but shall be from the same type of camera and must be from the same acquisition season. Any chips used in the imagery shall not have more than ± 3 pixels offset or the specified horizontal accuracy, whichever is the lesser distance, between the chip and principal image. Any chips used shall be radiometrically balanced in accordance with paragraph 6.3(a).
- 6.3 Image Mosaicking. Imagery may be created using multiple image segments from the same acquisition collection to produce the final product.
- (a) Radiometric Balance. When a mosaic is made from two or more image segments, the brightness and color values between the image segments will be adjusted to match that of neighboring image segments. The join lines between the overlapping image segments will be chosen to minimize tonal variations. Localized adjustment of the brightness and color values will be done to reduce radiometric differences between join areas.
- (b) Edge-Matching. Horizontal offset between neighboring image segments, within an image or between adjacent images, shall not exceed twice the stated linear component of the horizontal accuracy distance requirements. For example, if the horizontal accuracy requirement is “95% confidence level of well-defined points tested fall within 6 meters of true ground,” then the horizontal offset between any two image segments cannot exceed 12 meters.
- 6.4 Spatial. All orthoimagery shall meet the horizontal accuracy requirement of the specified project.

7.0 DEFINITIONS

Chip – Each separate piece of a mosaicked image that contributes to the final image.

Clipping – The presence of pixels exhibiting the minimum or maximum digital number in an image’s dynamic range.

Digital Number – The value (0-255 for an 8-bit image) that depicts the pixel radiance for that color band.

Dodging – Manipulating the intensity of part of a photograph by selectively shading or masking.

Resample – Interpolation of pixel values based upon neighboring pixel values.

Unprocessed Imagery – Imagery that has been minimally processed, including no radiometric enhancements, such as stretching, dodging, or other Look Up Table (LUT) adjustments, to the acquired imagery.

NATIONAL AGRICULTURE IMAGERY PROGRAM (NAIP) DIGITAL FILE FORMAT SPECIFICATION

(Dated February 1, 2012)

1.0 SCOPE

This document establishes the file format criteria to be used in the production of digital imagery for all contracts issued by the United States Department of Agriculture's (USDA) Aerial Photography Field Office.

2.0 APPLICABLE DOCUMENTS

In the event of conflict between the contents of this specification and the documents referenced herein, the contents of this specification shall take precedence.

- 2.1 TIFF Specification Revision, 6 dated June 3, 1992 (Adobe Systems Inc.). The Tagged Image File Format (TIFF) is a copyrighted standard of Adobe Systems, Inc.
- 2.2 GeoTIFF Revision 1.0 Specification, dated December 28, 2000 (Version 1.8.2). The GeoTIFF Format Specification is a public domain extension of TIFF that provides a robust and flexible method of storing georeferencing information in a TIFF file.
- 2.3 JPEG 2000 Image Coding System, ISO/IEC 15444-1:2004 (JPEG Committee)

3.0 TIFF REQUIREMENTS

Imagery shall be readable by older applications that assume TIFF 5.0 or an earlier version of the specification. Files that use designated "Extended TIFF 6.0 file" features, as defined in Section 2 of the TIFF Specification, shall not be used. This includes, but not limited to, any of the major new extensions such as "tiled images." Features designated as "not recommended for general data interchange" are considered extensions to the baseline TIFF 6.0 specification and shall not be used. List 1, Tag Listings, List 2 and "tiffinfo" Output shows an example of a TIFF tag listing.

- 3.1 All public tags shall conform to the TIFF Specification and shall not be modified outside of the parameters given in the specification. Use of tag numbers not specified in the TIFF Specification for either Grayscale or RGB full color images, depending on color band of the imagery, is not permitted. As a minimum, the TIFF tags listed in Table 1, Required TIFF Tags, shall be included when creating imagery under this specification.
- 3.2 Tags numbered 32,768 or higher, sometimes called private tags, are reserved and shall not be used unless listed in Table 2, Approved Private Tags. Enumeration constants numbered 32,768 or higher are reserved and shall not be used.

- 3.3 Tags numbered in the “reusable” 65,000-65,535 range shall not be used.
- 3.4 Imagery files shall be created using the little-endian byte order as specified in the TIFF Specification. Bytes 0-1 of the Image File Header must be “II” (4949.H).
- 3.5 Imagery files shall only have a single Image File Directory (IFD).
- 3.6 Tiled TIFF files are not allowed.

Table 1, Required TIFF Tags

TAG NAME	DESCRIPTION
ImageDescription tag (270.d, 10e.h)	The ImageDescription tag shall contain the project item name. For example, under the NAIP contract the tag will read: “Image courtesy of USDA Farm Service Agency’s National Agriculture Imagery Program (NAIP) under Aerial Photography Field Office contract AG-8447-12-C-xxxx. Imagery has been placed in the public domain and may be used and reproduced without permission or fee. Please credit ‘NAIP imagery provided by USDA Farm Service Agency’ on any use.” (replace AG-8447-12C-xxxx with the actual contract number)
DocumentName tag (269.d, 10d.h)	Unless otherwise specified in the contract, the DocumentName tag shall have the following form: <Quad Name> <Quadrant> <Quad id> where: <Quad Name> is the name of the quadrangle taken from the provided list of quarter quadrangles for a county. <Quadrant> Is the quadrant identifier for a quadrangle. <Quad id> is the “Usgsqdno” field taken from the provided list of quarter quadrangles for a county

Table 2, Approved Private Tags

TAG NAME	ID
ModelPixelScaleTag	33550 (SoftDesk)
ModelTransformationTag	34264 (JPL Carto Group)
INGR Packet Data Tag	33918 (Intergraph)
INCR Flag Registers	33919 (Intergraph)
IrasB Transformation Matrix	33920 (Intergraph)
UnUsed	33921 (Intergraph)
ModelTiepointTag	33922 (Intergraph)
GeoKeyDirectoryTag	34735 (SPOT)
GeoDoubleParamsTag	34736 (SPOT)
GeoAsciiParamsTag	34737 (SPOT)

4.0 GeoTIFF REQUIREMENTS

Georeferenced tagged image format (GeoTIFF) imagery shall meet all requirements listed in paragraph 3.0, TIFF Requirements, and be produced in accordance with this specification, the GeoTIFF 1.0 Specification, and the baseline TIFF 6.0 Specification (stated in order of precedent). List 3, ListGeo Output shows an example of a GeoTIFF tag listing.

- 4.1 A GeoTIFF file is a TIFF 6.0 file, and inherits the file structure as described in the corresponding portion of the TIFF Specification. All GeoTIFF specific information is encoded in several additional reserved TIFF tags, and contains no private Image File Directories (IFD's), binary structures, or other private information invisible to standard TIFF readers.
- 4.2 The GeoTIFF 1.0 standard uses a MetaTag (GeoKey) approach to encode dozens of data elements into just six TIFF 6.0 tags. GeoKeys are structurally similar to TIFF 6.0 tags, but at one lower level of abstraction. As a minimum, the four tags listed in Table 3, Required GeoTIFF MetaTags, shall be included when creating imagery under this specification..

Table 3, Required GeoTIFF Specific Tags

TAG NAME	DESCRIPTION
ModelPixelScaleTag (33550.d, 830e.h)	The X and Y values must be populated and be equal to the ground distance of one pixel.
ModelTiepointTag (33922.d, 8482.h)	This tag specifies the (X,Y) ground coordinates of the (0,0) image pixel, by convention in the upper left corner of the image. GeoTIFF 1.0 allows considerable flexibility in how an image is tied to the ground, but image data should be tied to the (0,0) pixel. The Z coordinate value should be set to 0. See section 2.6.1 of the GeoTIFF 1.0 standard.
GeoKeyDirectoryTag (34735.d, 87af.h) (required)	This tag references all non-ASCII GeoKeys. All projection and datum information is stored in GeoKeys. See section 2.10.2.2 of this standard and section 2.4 of the GeoTIFF 1.0 standard.
GeoAsciiParamsTag (34737.d, 87b1.h) (required)	This tag is used to store all the ASCII-valued GeoKeys. See section 2.4 of the GeoTIFF 1.0 standard.

- 4.3 At a minimum, the TIFF tags listed in Table 1, Required TIFF Tags, and Table 4, Required GeoTIFF Specific Tags, shall be included when creating imagery under this specification

Table 4, Required GeoTIFF MetaTags

TAG NAME	DESCRIPTION
GTModelTypeGeoKey (1024.d, 400.h) (required)	The required value is 1 (ModelTypeProjected).
GTRasterTypeGeoKey (1025.d, 401.h) (required)	<p>a. The required value is 1 (RasterPixelIsArea) which is the default value.</p> <p>b. The "PixelIsArea" raster grid space uses coordinates I and J, with (0,0) denoting the upper-left corner of the image, and increasing I to the right, increasing J down. The first pixel-value fills the square grid cell with the bounds top-left = (0,0), bottom-right = (1,1) and so on; by extension this one-by-one grid cell is also referred to as a pixel. An N by M pixel image covers an area with the mathematically defined bounds (0,0),(N,M).</p> <p>c. This raster space designates the upper-left corner of an image. The coordinate pair values for this location shall be "a whole number of pixels." Each value "must be integer multiple of the resolution" of the imagery. For a 1-meter resolution image this pair can be odd or even whole numbers, for a 2-meter resolution image this pair needs to even whole numbers.</p> <p>d. The desired result is to have "Exact Pixel Registration," meaning that pixels from multiple images line up exactly. This should not be confused with overlaps or gaps, but the cells have to fall on an even multiple of the cell width and height from one another, and adjacent images cannot have cells starting halfway, or partially into the cells of the original image</p>
ProjectedCSTypeGeoKey (3072.d, c00.h) (required)	This key contains a coded value for the projection, datum, and possibly plane coordinate zone. Legal values for this key are listed in section 6.3.3.1 of the GeoTIFF 1.0 standard.
PCSCitationGeoKey (3073.d, c01.h) (required)	<p>This is a free text field for describing the projection and datum. These fields shall describe the datum and projection using <datum>/<projection> format.</p> <p>For example: NAD83 / UTM zone 15N</p>

<p>GTCitationGeoKey (1026.d, 402.h) (required)</p>	<p>This is a free text field for providing a description of the imagery. The GeoKey contents shall be in the following form.</p> <p>a. <project> <year> <n>_<lat><lon><quad>_<loc>_<xx>_<rr>_<yyyymmdd></p> <p>Where:</p> <p><u>project</u> – Project (i.e., NAIP). <u>year</u> - Program year (i.e., 2012). <u>n</u> – Spectrap type (n=natural color, c=color infrared, or m=multispectral) <u>lat</u> – Latitude, identified by 2 digit numerical value of a 1° block (including the leading “0” if needed). <u>lon</u> – Longitude, identified by 3 digit numerical value of a 1° block (including the leading “0” if needed). <u>quad</u> – Quadrangle location, identified by a 2 digit numerical value to identify the position in a one degree block. <u>loc</u> – Quarter quadrangle location, identified by grid letters (nw,ne,sw,se). <u>xx</u> – Two digit UTM zone. <u>r</u> – Image resolution in centimeters <u>yyyymmdd</u> – date of acquisition.</p> <p>b. Example: NAIP2012n_3309403_nw_13_30_20100827</p>
<p>ProjLinearUnitsGeoKey (3076.d, c04.h) (required)</p>	<p>This key contains a coded value for the linear units used by the projection. Legal values for this key are listed in section 6.3.3.1 of the GeoTIFF 1.0 standard. Imagery shall use the code value of 9001 (“Linear_Meter”).</p>

5.0 LizardTech's MrSID[®] REQUIREMENTS

MrSID imagery shall be compressed and saved in Generation Three (MG3) format. When encoding the image, the following settings shall be applied:

- compression block size of 64
- both the transparency and background values set to an RGB value of 0,0,0 (black)
- use the “maximum zoom level” applicable to the input image, for example: - checking the “Use Maximum Zoom Levels for Image” button in the encoding options menu.

- (a) Compression Ratio. Compression ratio shall be 15:1 if no ratio is specified differently for the specified project. All CCM compression shall be at the same ratio and settings ("region of interest" compressed at a different ratio will not be accepted). All

compression shall be at the same ratio and settings ("region of interest" compressed at a different ratio will not be accepted).

- (b) Header Information. The image header shall contain correct Esri® compatible projection information for the mosaic.
- (c) Required Files. All standard MrSID® MG3 files generated by the LizardTech software (i.e., .sid, .sdw, and .txt) shall be included.
- (d) Configuration File. The Contractor shall provide the text file created when generating the CCM. The file shall use the same naming convention as the CCM but with a ".txt" extension.
- (e) Auxiliary File. The Contractor shall provide an ".aux" file containing Esri® projection information for each CCM. The auxiliary file shall contain the proper projection information for the mosaic and shall match the information in the CCM header. The file shall use the same naming convention as the CCM but with an ".aux" extension.

6.0 JPEG2000 REQUIREMENTS

JPEG2000 imagery shall be compressed and saved in the JPEG 2000 format with an unsigned, 8-bit depth. A target compression ratio shall be 1:15 if no ratio is specified in the individual contract. When encoding the image, the following settings shall be applied:

- Tiling:	None
- Code blocks:	64
- Precincts:	256 x 256
- Strip height:	12
- Progression order:	rpcl
- Quality layers:	8
- Packet length markers:	Yes
- Filter:	9-7
- Tile length markers:	No
- Transparency:	Yes
- Background:	Transparent, Black, White (stated in order of preference)

All compression shall be at the same ratio and settings ("region of interest" compressed at a different ratio will not be accepted).

7.0 DEFINITIONS

Band – A range of wavelengths of electromagnetic radiation. Also, image data gathered at this wavelength range.

Field – Refers only to the entire field, including the value, of the geokey (as defined in the TIFF Specification).

Image File Directory – Contains information about the image. There must be at least 1 IFD in a TIFF file and each IFD must have at least one entry.

Metadata – Description of the content, quality, condition, and other characteristics of the data.

Private tags – TIFF tags numbered 32,768 or higher. Private tags are not defined in the TIFF Specification.

Public tags – TIFF tags that are defined by the TIFF Specification.

Tag – Refers only to the identifying number portion of the geokey (as defined in the TIFF Specification).

List 1, Tag Listings

The following table summarizes the TIFF 6.0, GeoTIFF 1.0, and GeoKey requirements. The values in the table are consistent with the TIFF 6.0 and GeoTIFF 1.0 standards, but there are fewer options than are allowed by TIFF. Additional guidelines and requirements for the values of tags and keys are detailed in the body of this standard. Additional public tags and keys may be used at the data producer's option, providing they do not conflict with the required tags.

TIFF tags required by baseline TIFF:

TagName	Decimal	Hex	Type	Value
ImageWidth	256	100	SHORT or LONG	
ImageLength	257	101	SHORT or LONG	
BitsPerSample	258	102	SHORT	8,8,8
Compression	259	103	SHORT	1
PhotometricInterpretation	262	106	SHORT	2
Orientation	274	112	SHORT	1
StripOffsets	273	111	SHORT or LONG	
SamplesPerPixel	277	115	SHORT or LONG	3 or 4
RowsPerStrip	278	116	SHORT or LONG	1
StripByteCounts	279	117	SHORT or LONG	
ExtraSamples*	338	152	SHORT	0

* Tag required only if SamplesPerPixel is greater than 3.

TIFF tags defined by GeoTIFF:

TagName	Decimal	Hex	Type	Value
ModelPixelScaleTag	33550	830E	DOUBLE	
ModelTiepointTag	33922	8482	DOUBLE	
GeoAsciiParamsTag	34737	87B1	ASCII	
GeoKeyDirectoryTag	34735	87AF	SHORT	

GeoKeys defined by GeoTIFF and used by APFO:

TagName	Decimal	Hex	Type	Value
GTModelTypeGeoKey	1024	400	6.3.1.1 code	1
GTRasterTypeGeoKey	1025	401	6.3.1.2 code	1
GTCitationGeoKey	1026	402	ASCII	
ProjectedCSTypeGeoKey	3072	C00	6.3.3.1 code	
PCSCitationGeoKey	3073	C01	ASCII	
ProjLinearUnitsGeoKey	3076	C04	SHORT	

List 2, "tiffinfo" Output

This listing is an output of the libtiff utility program "tiffinfo".

```
TIFF Directory at offset 0x2370bc4
Image Width: 3247 Image Length: 3815
Resolution: 200, 200 (unitless)
Bits/Sample: 8
Compression Scheme: none
Photometric Interpretation: RGB color
Document Name: "Garvin NE 3309401:
Image Description: "USDA-FSA-APFO National Agriculture Imagery Program"
Samples/Pixel: 3
Rows/Strip: 1
Planar Configuration: single image plane
```

List 3, ListGeo Output

The following is an example of a GeoTIFF tag and GeoKey listing from a NAIP image. This listing is the output of the libgeotiff utility program "listgeo". The projection information below the line "End_Of_Geotiff" is implied by the standard projection and is not stored explicitly in the data file. The descriptions are retrieved from libgeotiff lookup tables in the listgeo application.

```
Geotiff_Information:
Version: 1
Key_Revision: 1.0
Tagged_Information:
  ModelTiepointTag (2,3):
    0      0      0
    337962  3763838  0
  ModelPixelScaleTag (1,3):
    2      2      1
  End_Of_Tags.
Keyed_Information:
  GTModelTypeGeoKey (Short,1): ModelTypeProjected
  GTRasterTypeGeoKey (Short,1): RasterPixelIsArea
  GTCitationGeoKey (Ascii,45): "2004 NAIP n_3309403_nw_15_2_20050714"
  ProjectedCSTypeGeoKey (Short,1): PCS_NAD83_UTM_zone_15N
  PCSCitationGeoKey (Ascii,21): "NAD83 / UTM zone 15N"
  ProjLinearUnitsGeoKey (Short,1): Linear_Meter
  End_Of_Keys.
End_Of_Geotiff.
PCS = 26915 (name unknown)
Projection = 16015 ()
Projection Method: CT_TransverseMercator
```


ProjNatOriginLatGeoKey: 0.000000 (0d 0' 0.00"N)
ProjNatOriginLongGeoKey: -93.000000 (93d 0' 0.00"W)
ProjScaleAtNatOriginGeoKey: 0.999600
ProjFalseEastingGeoKey: 500000.000000
ProjFalseNorthingGeoKey: 0.000000
GCS: 4269/NAD83
Datum: 6269/North American Datum 1983
Ellipsoid: 7019/GRS 1980 (6378137.00,6356752.31)
Prime Meridian: 8901/Greenwich (0.000000/ 0d 0' 0.00"E)
Projection Linear Units: 9001/metre (1.000000m)

Corner Coordinates:

Upper Left (337962.000,3763838.000) (94d45'16.56"W, 34d 0' 9.55"N)
Lower Left (337962.000,3756208.000) (94d45'11.47"W, 33d56' 1.94"N)
Upper Right (344456.000,3763838.000) (94d41' 3.51"W, 34d 0'13.09"N)
Lower Right (344456.000,3756208.000) (94d40'58.63"W, 33d56' 5.47"N)
Center (341209.000,3760023.000) (94d43' 7.54"W, 33d58' 7.53"N)