

SECTION C -- DESCRIPTIONS AND SPECIFICATIONS

C.1 C303 - DESCRIPTION/SPECIFICATIONS/SOW

1 - PURPOSE

The U.S. Geological Survey (USGS) requires professional mapping services to provide the timely production of graphics and spatial vector and raster digital data to support USGS production goals. The USGS focus is to address the mapping needs of various Federal and State agencies, local governments, and individual customers by populating and maintaining databases of cartographic and geospatial data. In order to accomplish this goal USGS will establish partnership relationships with a select group of private contractors. This broad-based contract will serve to accelerate the population of the databases, meet customer expectations, and will ensure that USGS meets mission requirements.

2 - GENERAL

2.1 - Except for those items specifically identified in Section C.1 Clause C303, 3.6 of this contract and in individual task orders as Government furnished property, the contractor, operating as an independent contractor and not as an agent of the Government, shall furnish all facilities, labor, material, and equipment necessary to provide goods and services in accordance with the terms, conditions and specifications set forth in this contract. The contractor shall plan, schedule, and coordinate performance of all work associated with task orders in accordance with the requirements described in Section C of this contract. Products and services to be acquired under these multiple award Best Value contracts will include but are not limited to:

- thematic mapping, e.g. land characterization
- product generation
- GIS Services
- multi-temporal data manipulation and interpretation
- hyper-spectral data manipulation and interpretation
- acquisition of ancillary data
- photo and image manipulation and interpretation
- map digitizing
- metadata creation
- image scanning and processing
- product validation
- standard USGS products, e.g. DEMs, DLGs, DRGs
- second generation orthophotos

This could include performing photogrammetric mapping and photointerpretation required to furnish the USGS with hard copy and soft copy maps, digital datasets of land

features, digital terrain data, change analysis, reports, and other data together with supporting material as may be required for various projects requested by the National Geospatial Program Office (NGPO) of the USGS.

When it is determined by a Contracting Officer(s) and their technical staff that a particular project does not specify or require the performance or approval by a registered or licensed architect, engineer, or professional photogrammetrist other services may be acquired such as:

- LIDAR
- IFSAR
- satellite data acquisition
- photogrammetric mapping
- aerotriangulation
- some types of first generation orthophotography when it is not available as a commercial product that meets project requirements

Other USGS disciplines, Department of the Interior bureaus, Federal and State agencies, and local governments that negotiate Memorandums of Understanding (MOU) or interagency agreements with the NGPO may be provided support through this contract.

2.2 - USGS mapping products are frequently used to support end user activities such as basic site planning, land use/land cover classification and planning, terrain analysis, resource monitoring, census, and geographic information system (GIS) studies. During the performance of the work, the contractor shall provide adequate supervision and quality control to assure the timeliness, accuracy, quality, completeness, and progress of the work.

2.3 - Unless specifically stated otherwise, the term "contractor" as used in this Clause and in this Contract, shall be interpreted as the prime contractor and any approved subcontractor performing work under the contract.

3 - STATEMENT OF WORK

3.1 - SCOPE

The contractor shall have the capability to provide all services/products described in the Statement of Work. The nature of the work to be performed under this contract primarily involves photogrammetric and mapping services.

Services that may be acquired include but are not be limited to:

- thematic mapping, e.g., land characterization
- product generation of new or revised standard and non-standard graphic products,
- graphic publication separates meeting USGS and other specifications
- standard and non-standard digital products meeting USGS and other specifications
- analog and digital imagery applications
- geographic information system services which may include web mapping services

- LIDAR, IFSAR and satellite data
- acquisition of ancillary data, e.g., boundaries, name information, road classification guides
- the ancillary use of ground-based and airborne GPS as part of the production process of other data
- photo and image manipulation and interpretation
- map digitizing (both vector and raster)
- data manipulations (e.g., transformations, conversions, integration and conflation)
- metadata creation
- image scanning and processing
- validating deliverables produced by other contractors and other providers

When it is determined by a Contracting Officer(s) and their technical staff that a particular project does not specify performance or approval by a registered or licensed architect or engineer or professional photogrammetrist:

- photogrammetric mapping
- first generation orthophotography services
- photogrammetric aerotriangulation
- acquisition and processing of primary source data, e.g., aerial photography
- multi-temporal, multi-spectral, and hyper-spectral data acquisition

Deliverables include, but are not limited to:

Products supporting USGS programs such as the National Digital Orthophoto Program (NDOP) and the National Digital Elevation Program (NDEP)

Standard USGS products defined by formal and informal product specifications and standards such as:

- Digital Line Graphs (DLGs) and the National Hydrographic Dataset (NHD)
- Digital Elevation Models (DEMs) and the National Elevation Dataset (NED)
- Digital Orthophoto Quadrangles (DOQs)
- Digital Raster Graphics (DRGs)
- graphic products
- thematic datasets
- evolving products under development
- non-standard and custom graphic and digital products
- associated metadata

All deliverables shall meet all applicable international, national and Federal information technology and geographic information standards, particularly those identified by the Federal Geographic Data Committee (FGDC) as supporting the National Spatial Data Infrastructure (NSDI). Some tasks may require the use of a classified facility (not mandatory).

Work shall be performed within a quality system and deliverables shall meet quality standards based upon defined formal and informal specifications and standards. Product deliveries shall meet defined schedules. Multiple project task orders will be issued for the NGPO which will state project specific information.

3.2 - TELECOMMUNICATIONS

3.2.1 - INTERNET CONNECTION

If directed by the Government, the contractor shall set up Internet telecommunications with the USGS for the primary purposes of transmitting digital deliverables and receiving digital files provided by the USGS as Government-furnished property. The contractor is required to submit digital deliverables by Internet, unless alternative delivery methods are specified by the USGS in a task order or subsequently in writing by the Contracting Officer(s). The USGS will identify a directory to store the deliverable on a USGS computer at a USGS site. All expenses for deliveries to the USGS shall be paid by the contractor.

3.2.2 - ELECTRONIC MAIL SERVICE

The contractor shall also establish an electronic mail service link with the USGS for the primary purposes of exchanging contract or task order documents, receiving product standards and other task-specific information, and submitting task status reports.

At some point in the life of this contract, the USGS may adopt the use of electronic security devices to safeguard electronic mail exchanges between the contractor and USGS contracting personnel. When these security measures are required by the USGS, the USGS will provide the necessary technical expertise, any additional hardware required by USGS for security, software, installation, and training. Any necessary hardware or software will be provided to the contractor rent-free but title of such hardware or software shall remain with the USGS. (See Section I, Clause 52.245-2 Alt I of this contract)

3.3 - TECHNICAL FLEXIBILITY & TRAINING

3.3.1 - TECHNICAL FLEXIBILITY

In order to maximize productivity and meet the evolving needs of users, changes are occasionally made to the standards in hard copy or soft copy form. Changes may require modifications in operating practices and software. The contractor shall maintain the flexibility to adapt to such changes. The USGS will provide assistance in support of major specification changes.

Modification to technical capabilities may become necessary at some time in the life of the contract. This may be the result of the redefinition of the product to accommodate user needs and to maximize production potential. The NGPO will publicize these developments in advance of implementation and the contractor shall be responsible for keeping abreast of such developments. In addition, the NGPO will provide advance information on future products directly to the contractor. The contractor shall familiarize himself with the new product information in the event these new products are ordered under this contract. It is anticipated that the general theory of data collection will remain the same, but that the encoding rules and product format may be modified based on

modernization concepts. The USGS will adhere to the agreed upon standards and product specifications for a given project, but cannot guarantee this for the life of the contract.

3.3.2 - TRAINING

Following award of this contract, and with input from the contractor, the USGS will evaluate the need to provide training to facilitate the contractor's understanding of the requirements contained in this contract. At times, this training could be held at a USGS facility, or at the contractor's site, or through teleconferencing. The NGPO will provide training in support of any task order product or service if the contractor believes that such training is essential to successful task order completion. Transportation, per diem, and any other costs incurred by contractor employees who attend such training will be borne in full by the contractor and are not allocable or allowable costs under this contract.

Any "changes" as referred to in Section C.1 C303 Clauses 3.3.1 and 3.3.2, above, will be issued in accordance with Section I Clause 52.243-01 of this contract, Changes-Fixed Price, Alternate III.

3.4 - PUBLICATIONS & STANDARDS

3.4.1 - PUBLICATIONS

The NGPO Geospatial Standards are a suite of technical documents that describe the specifications for NGPO digital and graphic products.

3.4.2 - STANDARDS

3.4.2.1 - General

Because the USGS is a participant on the FGDC, existing NGPO standards, as well as NGPO standards under development, are transitioning toward compliance with international, national, and Federal information technology and geographic information standards that support the NSDI. Some of these standards that guide the development of NGPO standards include:

- FGDC-STD-001-1998: Content Standard for Digital Geospatial Metadata (version 2.0)
- FGDC-STD-003: Cadastral Data Content Standard
- FGDC-STD-007.1-1998: Geospatial Positioning Accuracy Standards, Part 1: Reporting Methodology
- FGDC-STD-007.3-1998: Geospatial Positioning Accuracy Standards, Part 3: National Standard for Spatial Data Accuracy
- FGDC-STD-008-1999: Content Standard for Digital Orthoimagery

Information regarding the activities of the FGDC, or the NSDI can be found at the following web site:

<http://www.fgdc.gov/standards/>

3.4.2.2 - NGPO Standards

Unless modified, augmented, or clarified in a task order, all deliverables requested and delivered under this contract shall be compliant with:

- standards documents cited in Section C.1 Clause C303, 3.4.2.1 above
- current applicable NGPO Standards found at the following website:
<http://nationalmap.gov/gio/standards/>
- Appendix B, NAPP Specifications and Requirements
- any customer-supplied standards, technical instructions, or other guidance documents, which would be cited in and provided with the task order
- other applicable standards listed in Section C.1 Clause C303, 3.4.2.3 below

3.4.2.3 - Other Applicable Standards

Other standards or technical instructions that will apply include the National Institute of Standards and Technology (NIST) Federal Information Processing Standards Publications (FIPS PUBS).

Unless specified otherwise in task orders, all deliverables must conform to the relevant portion or portions of the current version of the NIST FIPS PUBS designated as mandatory.

FIPS PUBS are sold by the National Technical Information Service (NTIS). Requests for single or quantity orders of FIPS PUBS should be sent to:

National Technical Information Service (NTIS)
U.S. Department of Commerce
5285 Port Royal Road
Springfield, VA 22161

Web site: <http://csrc.nist.gov/publications/fips/index.html>

3.4.2.4. - Conformance to Evolving Standards

The contractor shall plan for the evolution of the standards to which geographic information is selected, represented, and communicated during the life of the contract. Contractors shall to be able to support emerging standards quickly, if not immediately, upon their release. The contractor is expected to engage in the standards-development process in order to understand the technologies and requirements of emerging standards. Relevant standards organizations are listed in Section C.1 Clause C303, Section 3.4.2.5 of this contract.

3.4.2.5 Sources of Emerging Standards

These are two main sources of emerging standards in the domain of geographic information, as listed below with their web sites:

- FGDC -- <http://www.fgdc.gov/>
- Open Geospatial Consortium (OGC) -- <http://www.opengeospatial.org>

The contractor is encouraged to monitor the web pages published by these organizations to identify the technologies needed to support emerging standards.

3.4.2.6 - Introduction of New Standards

As new products are developed, their accompanying standards will appear as drafts. After new or revised standards are finalized they will be incorporated by unilateral contract modification into this contract. The contractor should always consult USGS prior to the start of each task order to confirm the correct standards version.

3.5 - QUALITY CONTROL & QUALITY ASSURANCE

3.5.1 - GENERAL

Quality is a key element of this contract. Many task orders will require the production of a large number of data items with few, if any, errors tolerated. Achieving virtually error free production requires a conscientious and comprehensive quality program that consistently builds quality into the product. The USGS must have full confidence in the quality of the deliverable to allow the USGS to use statistical sampling techniques to minimize the deliverable acceptance process. To achieve this level of quality, all work shall be performed within a quality system that complies with ANSI/ISO/ASQC 9001-2000.

3.5.2 - QUALITY SYSTEM

The contractor's quality system shall, at a minimum, be composed of the basic quality system elements in ANSI/ISO/ASQC Q9001-2000, Quality Management Systems. In accordance with Section E.1 Clause 52.246-04, Inspection of Services-Fixed Price, the USGS reserves the right to inspect all contractor processes and documentation to assess the contractor's compliance with and commitment to the basic Quality System. The ANSI/ISO/ASQC Standard Q9001-2000 can be purchased from:

American Society for Quality (ASQ) or American National Standards Institute (ANSI)	
P.O. Box 3005	25 West 43 Street
Milwaukee, WI 53201-3005	New York, NY 10036

Phone: (800)-248-1946
(414)-272-8575

Phone: (212)-642-4900

Web site: <http://www.asq.org>

Web site: <http://www.ansi.org>

3.6 - GOVERNMENT-FURNISHED PROPERTY (GFP)

The USGS will normally provide the contractor with one or more of the following GFP items to support various mapping task orders, if available, and in accordance with the following paragraphs, Section H.16 Clause H1480, and Section I Clauses 52.245-02, Government-Furnished Property, Alternate I, and 52.245-19, Government Property Furnished 'As Is,' of this contract. The task order will stipulate which of the Section I Government-Furnished Property clauses will apply to each GFP item being provided.

3.6.1 - IMAGERY SOURCE

If available and when appropriate, the USGS will provide imagery to the contractor to support various mapping projects in the form of NAPP photography or low flying

photography (film positives or prints), DOQs, Image Derived Product (IDP), or satellite imagery. The contractor shall have the capabilities to use imagery source as part of an overall mapping process.

3.6.2 - SOFT COPY MAP SOURCE

If available and when appropriate, the USGS will normally provide the contractor with digital map source, such as DLGs, CFFs, DRGs, shapefiles, Topologically Integrated Geographic Encoding and Reference system (TIGER) data, other mapping organization (OMO) data, etc., for a given project area. The contractor shall have the capability to convert, integrate, and conflate digital map sources of various scales and datums as part of an overall mapping process to produce updated, revised, or new product deliverables.

3.6.3 - ORIGINAL MAP SOURCE

If imagery source or soft copy map source is not available, or if the contractor's process requires them, the USGS may provide the contractor with a set of stable base film reproductions (positive or negative) of the original map color separations for quadrangles in a given project area. The contractor shall have the capability to use USGS supplied hard copy map source as part of an overall mapping project effort.

3.6.4 - ANCILLARY MATERIAL/DATA

Depending on the requested deliverable, the USGS may research, evaluate, and provide the contractor with ancillary (project support) material or data such as:

- published topographic maps
- Geographic Names Information System (GNIS) names listings
- Federal Information Processing Standards Publication 55 (FIPS PUBS 55)
- established vertical and horizontal control

The contractor shall also have the capability to acquire and effectively use these sources, as part of an overall mapping project effort.

3.6.5 - AVAILABLE USGS SOFTWARE

If there is public domain USGS (or other) software for the creation, processing, and verification of some of the USGS standard products that may be requested under this contract, it will be provided to the contractor upon request.

3.7 - METADATA REQUIREMENT

For each deliverable requested in a task order, the USGS will state whether or not the contractor is required to submit metadata to accompany the deliverable. Some task orders may require the contractor to provide a hard copy report or complete a USGS-prepared form for only a portion of the metadata description. In other task orders, the contractor shall provide a complete, FGDC-compliant metadata in XML format that can be validated using Metadata Parser (mp) software. Metadata received from the Contractor shall be delivered in the same delivered package as the data.

The contractor shall ensure that the metadata delivered is compliant with the Federal Geographic Data Committee Standard "Content Standard for Digital Geospatial Metadata", FGDC-STD-001-1998.

At some point in the life of this contract, the USGS may provide the contractor with software tools for collecting metadata. Prior to requiring the contractor to provide metadata using the software tool, the USGS will provide the necessary technical expertise, software, and training. The software tool will be provided to the contractor rent-free but title of such software shall remain with the USGS.

Metadata received from the contractor shall, at the USGS's discretion, be subject to inspection prior to acceptance. Metadata received from the Contractor must be capable of being imported and processed by the Metadata Parser (mp) software (for a free copy of the mp software see web site: <http://geology.usgs.gov/tools/metadata/tools/doc/mp.html>), or equivalent, free of errors. The USGS will notify the contractor of any rejected metadata within 60 days of receipt of the metadata from the contractor. Any metadata rejected by the USGS will be returned to the contractor for correction and returned by the contractor to the USGS within 30 days from the rejection notification date. The USGS will make payment to the contractor upon final acceptance of the metadata.

3.8 GEOSPATIAL PRODUCTS AND SERVICES

3.8.1 - MAP COLLECTION & REVISION

3.8.1.1 - General

In general, the contractor shall have the trained personnel and equipment to perform photogrammetric collection, compilation or revision leading toward the creation of feature-oriented or theme-oriented digital datasets, plot files, or finished graphic maps in various scales, map projections, and datums.

Specifically, the contractor shall be:

- Able to produce unrevised USGS standard and non-standard DRGs, DEMs, DLGs, NHD, or raster maps collected from existing graphics in the form of scanned original map separates, scanned lithos, DRGs, or other sources
- Able to revise USGS standard and non-standard DRGs, DEMs, DLGs, NHD, or other data based on various data sources supplied as GFP by USGS
- Knowledgeable of graphic revision procedures to produce USGS Basic Revision and Complete Revision graphic products (to include non-standard forms) from aerial photography, scanned map separates, DOQs, DRGs, CFFs, or other sources
- Knowledgeable of digital revision procedures to produce USGS Digital Limited Update and Digital Standard Update DLG-3, NHD, revised DEMs, replacement DRGs, or other standard and non-standard digital products from aerial photography, scanned map separates, DOQs, DRGs, CFFs, or other sources

The contractor shall also be capable of performing the following activities associated with this requirement:

- Calculating and setting stereo models for feature extraction

- Capturing or revising topographic and planimetric features that are identifiable or interpretable from image source (primarily aerial photography or DOQs) into specified data themes or categories in accordance with X, Y, and Z positions, attributes, and content accuracies associated with the requested standard or non-standard product
- Identifying and establishing features, feature IDs, and feature relationships using data conflation, integration, conversion, and feature building/joining techniques to create customer-defined data "packages" such as NHD as part of an overall feature-based DLG effort
- Developing and documenting the methods and procedures used by photogrammetrists to mitigate unusual compilation circumstances or difficulties, both on the project and individual quadrangle level
- Assimilating USGS-supplied, or contractor-obtained ancillary data of various scales, projections, and datums (both soft copy and hard copy) into the final digital or graphic product through the use of conversion, conflation, and integration tools and methods
- Applying symbols to compiled or revised planimetric and topographic features by analog or digital means in accordance with USGS (or other organization) specifications
- Applying feature names to compiled or revised planimetric and topographic features on graphic products obtained from existing sources such as GNIS, TIGER, U.S. Board on Geographical Names, and other sources
- Applying graphic "collar" information in accordance with USGS-supplied style (layout) sheets and standards
- Map editing for the purposes of ensuring compliance to content and positional accuracy specifications, and proper feature labeling, density, portrayal, and clarity
- Providing hard copy plots of digital data to support USGS inspection

3.8.1.2 - Deliverables/Task Orders

In addition to a variety of unrevised and revised standard and non-standard geospatial products, other deliverables associated with this requirement could include: plotter orientation parameters and statistical outputs for each stereo model setup; submitting a report on the methods and procedures used at the individual or project level; producing press-ready map separates; providing validation plots; and submitting a report on the use of ancillary data acquired or owned by the contractor.

Task orders will identify the type of deliverable(s), the appropriate specifications; the availability of GFP and ancillary information; the datums, projections, and scales to be used; the use of style sheets (when provided by the USGS); and examples provided by the USGS as guides.

3.8.2 - SCANNING SERVICES

3.8.2.1 - General

In general, the contractor shall have the equipment and expertise to perform scanning services and associated activities. Specifically, the contractor shall be able to:

- Scan and convert aerial photographs into soft copy image files for use as photogrammetric mapping source, or to create USGS DOQs or other orthophotography products
- Scan and convert existing black & white or color graphic maps, or stablebase film reproductions (positive or negative) of map separates to produce raster files used as source for creating or revising a variety of USGS standard and non-standard products, such as DLGs, DEMs, and DRGs
- Scan stablebase film reproductions with a "real" scan resolution of up to and including 1000 dots per inch (DPI)
- Scan aerial photographs using an aperture size as small as 15 microns (1700 DPI)
- Properly geo-reference raster files to a theoretically known domain through resampling and best-fit registration
- Integrate, merge, register, and align a raster file with other raster and vector files

3.8.2.2 - Deliverables/Task Orders

Deliverables associated with scanning services are raster files of varying resolutions and formatted to a variety of USGS and industry-recognized file formats.

Task orders will specify the desired scanning resolution or scanning range, associated Standards, geo-referencing technique, degree of resampling, color quantization scheme, output file format, file naming convention, and the nature and availability of GFP.

3.8.3 - ACQUISITION OF ANCILLARY DATA

3.8.3.1 - General

The contractor may be authorized to acquire data necessary to support photogrammetric mapping. The contractor shall have the capability to effectively research, obtain, and evaluate ancillary materials/data which may entail: contacting various Federal, State, county, city, public and private entities; researching various publications, databases, and web sites; conducting surveys; and converting hard copy or soft copy information sources for subsequent conflation or integration with source data.

Any ancillary data acquired or owned by the contractor that the contractor intends to use in the formation of the deliverable shall be reviewed and approved by the USGS prior to its use. The contractor shall also submit the acquired or owned ancillary data to the USGS with the deliverable, along with a brief explanation stating how and where the data were used. Any ancillary data acquired by the contractor shall become USGS property upon receipt. Any ancillary data owned by the contractor will be returned to the contractor after deliverable acceptance.

3.8.3.2 - Deliverables/Task Orders

Examples of ancillary data that the contractor may be authorized to acquire may include, but is not limited to, any or all of the items mentioned in Section C.1 Clause C303, 3.6.4 as being provided as GFP. Task orders will state what ancillary data items will need to be acquired by the contractor to supplement photogrammetric mapping.

3.8.4 - PRODUCT GENERATION

3.8.4.1 - General

The contractor shall have the equipment and trained personnel to perform product generation services, which consist primarily of producing graphic publication separates and other hard copy products from digital plot files and scribed compilation manuscripts. This requirement may be part of an overall graphic/digital compilation or revision mapping request, or may be a standalone requirement to support NGPO mass printing or publication efforts.

Specifically, using theme-oriented digital plot files of different formats, or scribed compilation manuscripts, the contractor shall be able to perform the following activities associated with product generation:

- Developing or using symbology tables, map projection software, and perform scaling, e.g., enlargements and reductions
- Producing photographic film products, multiple-color proofs, or color/B&W hardcopy graphic products. Photographic film products include the range of film products associated with aerial photography (e.g., diapositives, contact prints), and film products associated with mass producing paper maps. The contractor shall be capable of providing film products for the latter having characteristics that fall within the following parameters:
 - Film material type may be clear, matte, or opaque-backed
 - Image may be positive or negative
 - Location of the image emulsion may be either "right-reading" (emulsion located on top of film), or "left-reading" (emulsion located on bottom of film) when the image "reads" correctly
 - Film material thicknesses may be specified up to, and including .007 inch (.18 mm)
 - Film material sizes may range up to an estimated maximum of 30 inches by 48 inches (76.2 cm by 121.9 cm), although it is anticipated that most requests will be for the 24 inches by 30 inches (61 cm by 76.2 cm) size
- Punch registering film using the Standard Stoesser Punch system, or a similar punch system which will not interfere with the NGPO later repunching the materials using a Standard Stoesser Punch. Punch registering film will be necessary when multiple thematic outputs are requested to yield a single printed product.

3.8.4.2 - Deliverables/Task Orders

Task orders shall state the characteristics of the plot files and the desired characteristics of both the film and litho products, including applicable standards and USGS symbology tables.

3.8.5 - THEMATIC MAPPING

3.8.5.1 - GENERAL

The contractor shall have the equipment, personnel, and expertise to process, interpret, and integrate multiple sensor image data to support mapping and data collection projects, predominately thematic mapping.

Specifically, the contractor shall possess the necessary skills to perform the following activities associated with thematic mapping:

- Interpreting, and processing data obtained from a variety of single or multiple data sources, such as aerial photography, satellite imagery, elevation data obtained from airborne laser and radar sensors, or other multi/hyper-spectral, multi-temporal, multi-scale sensing devices
- Performing digital image processing skills, to include, at a minimum, geo-registration, radiometric correction, rectification, mosaicing, image enhancement, restoration, classification, feature information extraction, and accuracy assessment
- Integrating digital image data with graphic ancillary data, which may involve digitizing features, and classifying raster images associated with land use/land cover classification schemes
- Merging digital thematic data with other mapping data to enhance existing mapping databases to support geographic modeling in a Geographic Information System (GIS) environment

3.8.5.2 - DELIVERABLES/TASK ORDERS

Deliverables associated with thematic mapping include datasets representing, but not limited to: land characterization, terrain modeling, plant vitality, soil moisture, thermal variance, and vegetation themes. Other deliverables may include high resolution elevation data derived from laser and radar sensor data, such as Light Detection and Ranging (LiDAR) or Interferometer Synthetic Aperture Radar (IFSAR).

Task orders requesting thematic mapping deliverables will specify such items as:

- the area of coverage
- what active or passive sensors are required
- existing ancillary data, examples and references
- required data formats, parameters and limitations
- the required image sensing range
- the classification scheme to be used
- the extent of data rights

3.8.6 – AERIAL DATA ACQUISITION

3.8.6.1 – General – Film and Digital

The contractor or subcontractor shall have access to the aircraft, equipment, film laboratory and personnel with the expertise to acquire and process aerial data. It is anticipated that some tasks will require aerial photography to assist in the mitigation of natural disasters and to support scientific studies. Task orders may request vertical or oblique aerial photography. Task orders may require the use of a variety of films or digital sensors.

The USGS recognizes that there are numerous data providers, using a wide variety of digital sensor systems to provide geospatial products to the user community. The quality assurance for digital imagery is the responsibility of the Contractor. The current version of the guidelines for the Digital Aerial Imagery Quality Assurance is available at the following web site: <http://calval.cr.usgs.gov/>

The plan is composed of four elements:

- manufacturers calibration process
- data providers best practices to ensure that the sensor system remains in good operating order
- the contracting process to select qualified contractors who have well calibrated systems and good operating procedures
- the quality checking of final products delivered by the contractor

These elements are discussed in detail in these guidelines and, if used, will lead to more quality assurance of products for the end-user.

3.8.6.2 - Calibrated Camera System

In general, all analog cameras, used for any image acquisition tasks under this contract must have a current calibration report and all digital sensors must have a current product characterization report.

To meet photography requests using an analog camera, the contractor shall possess camera systems which meet the requirements contained in USGS Film Camera Calibration, as determined by a current USGS camera calibration test report.

For digital cameras/sensors, a manufacturer's calibration report must be provided to the USGS. The use of Digital sensor systems shall follow the Guidelines for Digital Aerial Imagery Quality Assurance. It is expected that these guidelines will evolve over the life of the contract.

USGS Film Camera Calibration and Guidelines for Digital Aerial Imagery Quality Assurance are discussed at the following web site: <http://calval.cr.usgs.gov/>

3.8.6.3 - Deliverables/Task Orders

Deliverables typically associated with aerial data collection requests include, but are not limited to, standard analog photography and digital acquisitions including all other forms of digital sensor system technologies.

Task orders requesting aerial photography deliverables may be written to clarify and accommodate photography requests in any format as required for particular projects.

3.8.7 – ANALYTICAL AEROTRIANGULATION

3.8.7.1 - General

The contractor shall have the equipment and expertise to perform analytical aerotriangulation (AT) in accordance with the Digital Orthophoto Standards located at the following website: <http://nationalmap.gov/gio/standards/>, for the purposes of controlling aerial photography for subsequent use in photogrammetric mapping, to support DOQ production, or in developing other orthophotography products.

The contractor shall be capable of performing the following activities associated with this requirement:

- Utilizing existing ground surveyed control points to control AT adjustments
- Performing AT block adjustments using analytical techniques. AT software shall be sufficiently rigorous to meet USGS requirements for photogrammetrically derived control, both horizontal and vertical, and be able to use as source control ground GPS, airborne GPS, conventional control, or any combination of the three
- Identifying and labeling aerotriangulation source with all ground control and supplemental control points

3.8.7.2 - Deliverables/Task Orders

Deliverables associated with performing AT could include:

- a plot or printout of the AT block adjustment showing the distribution of all control points, pass points, and tie points
- digital control source files (e.g., GPS, etc) of horizontal and vertical input control, adjusted ground coordinates, refined photo coordinates, and measured occurrences of the horizontal and vertical control with their respective residuals (adjusted control point positions)
- a statistical summary of block adjustments
- a printout showing a cross-reference between control point labels and AT point number assignments

Task orders will indicate the accuracy requirement of the AT adjustment; the distribution, location, and minimum number of ground vertical and horizontal control points necessary to control subsequent production activities; and the required deliverables.

3.8.8 - ORTHOPHOTOGRAPHY

3.8.8.1 - General

The contractor or subcontractor shall have the equipment, personnel, and expertise to provide the USGS with standard and other forms of digital orthophoto data files. Specifications and Requirement which detail the nature of orthophoto deliverables will be supplied with each task order.

Depending on the availability or suitability of GFP, the contractor may be required to perform the following activities:

- Scan aerial film diapositives
- Identify AT control points and perform AT block adjustments
- Produce USGS DEMs from scanned hard copy contour separates or other means to support DOQ creation

Additionally, the contractor shall be able to perform orthophoto digital rectification, produce digital orthophoto mosaics, and perform horizontal datum transformations.

3.8.8.2 - Deliverables/Task Orders

Task orders requiring orthophotography and related products may be written with reference to this website: <http://nationalmap.gov/gio/standards/>, but may be modified, augmented, or clarified to address special requirements.

3.9 - OTHER REQUIREMENTS

3.9.1 - GENERAL

The NGPO anticipates requests for mapping, mapping support services, and mapping assistance from agencies of a nature where the requirement cannot be readily assigned to any of the previously described sections in this contract. Examples of such requests could include:

- Providing data resulting from new, emerging hardware or software technology for the purposes of testing and researching its usefulness and viability in cartographic applications or geographical information system (GIS) environments
- Assemble, composite, convert, and reformat graphic map materials, digital data, and other sources of map information on behalf of a requesting agency for use in a GIS application, analysis study, or research
- Develop and test computer programming aids, such as translation or conversion software, macros, routines, etc., to streamline map production or product generation processes
- Assist, coordinate, or review standards, specifications, or procedural documents pertaining to mapping processes or applications, quality assurance and quality control, or the technical use of mapping tools or equipment
- Remediation site mapping or other physiographic features that can be mapped using traditional or unconventional mapping methods, in support of hazardous

waste disposal, terrain analysis, hydrologic studies, natural and manmade hazards mitigation, etc.

- Perform, or assist in, quality assurance or quality control on deliverables produced by other qualified contractors under contract with the USGS, or on deliverables produced by various agencies under a work-share agreement, innovative partnership, or similar agreement with the USGS.

3.9.2 - TASK ORDERS.

Task orders will be written to accommodate customer needs and will cite what standards apply (if any), available source and ancillary data, timeframes, and other parameters associated with the mapping or mapping assistance effort.

3.10 - DIGITAL DELIVERABLES

All vector and raster digital deliverables (including metadata files) produced by the contractor shall be submitted in accordance with the following:

3.10.1 - ACCURACIES

The positional, content, attribution and metadata accuracies for digital deliverables shall conform to specifications stated in each task order.

3.10.2 - DELIVERY MEDIUM

All digital deliverables shall be submitted to the USGS by portable media that is mutually agreeable by the USGS and the Contractor

3.10.3 - FORMAT

Because some digital deliverables can be formatted differently, the digital data shall be formatted as stated in each task order.

3.10.3.1 - The digital deliverable shall be fully operational, by translation or other process, on the operating system prescribed in each task order.

3.10.3.2 - If requested by the USGS in a task order, the contractor shall be able to submit deliverables compressed using industry-recognized compression routines.

3.10.4 - FILENAMING CONVENTION

For the purposes of identifying and tracking, each individual digital deliverable shall be named in accordance with a file naming convention described in each task order.

3.11 - DELIVERABLE VALIDATION

Task orders will specify who shall be responsible for performing deliverable validation if other than the USGS, and what shall constitute an acceptable validation procedure and supporting documentation. Any errors found during the contractor's internal review, or as of a result of validation shall be corrected by the contractor at the contractor's expense:

3.11.1 - USGS VALIDATION

The USGS may perform validation in accordance with Section E.5 Clause E780 of this contract.

3.11.2 - CONTRACTOR VALIDATION.

The contractor may perform validation and present documented proof as to the accuracy or performance of the deliverables in accordance with guidelines specified by the USGS in task orders.

3.11.3 - CUSTOMER or OUTSOURCED VALIDATION.

An outsourced validator under contract with USGS or the customer may perform validation, if stated in the task order.

3.11.3.1 - In the event that validation is performed by an outsourced validator, the identity of the contractor will remain anonymous. The outsourced validator will perform a very complete independent QA/QC and provide reports to the USGS to communicate with the contractor if there are problems. If a deliverable is ultimately rejected by the USGS, the outsourced validator will not be awarded the rejected project.

3.11.3.2 - Circumstances that might prompt utilization of an outsourced validator to perform QA/QC of the contractor's deliverables include start-up production of a new product or production of a very unique deliverable, or where the USGS may not have sufficient staffing to perform a validation.