1. TASK ORDER TITLE:

Spatial Data Management and Decision Support for Langley Research Center‘s (LaRC) Center Operations Directorate (COD)

2. INTRODUCTION/BACKGROUND

The NASA/LaRC Geographic Information Systems (GIS) Team was formed in May 1995 with a charter to accomplish the tasks laid out in the GIS Business Plan (http://gis-www.larc.nasa.gov/bplan). This effort has evolved beyond the initial goal of GIS and now addresses associated spatial data technologies.

This effort includes major components of Spatial Data Management and Decision Support such as Geographic Information System (GIS), Relational Database Management Systems (RDBMS), Building Information Modeling (BIM), and measurement technologies or Survey, as well as many smaller subcomponents of the aforementioned areas of technology such as Computer Aided Design and Drafting (CADD), Laser Scanning, and Imaging.
GIS and other emerging CADD tools contribute to an intuitive spatial data management and decision support model as opposed to just drawings. At present, the majority of LaRC’s spatial information management system is built around an Oracle relational database consisting of data that includes or is derived from such records as: aerial photographs, topographic maps, descriptions and engineering drawings of buildings and facilities, utility plats, geological data, climatic records, financial data, and personnel locator records. The location of objects such as buildings - or even individual offices - is given with high accuracy in coordinates derived from the satellite-based Global Positioning System (GPS). Other measurement technologies such as Optical Total Station (OTS), Digital level, and laser Scanning similarly contribute to completeness and accuracy of data through efforts such as in-field data collection or Survey and through related efforts such as Dig Permitting to ensure human safety and to prevent interruption of services to LaRC and Langley Air Force Base (LAFB) during new construction and maintenance/repair efforts to ensure continuity of operations. Attributes of features ranging from buildings to rooms to utility systems to specific pieces of equipment are available for query. Services include standard and emergency dig permitting, marking of existing facility and utility features, collection of data for newly installed features, update of LaRC’s spatial data in the GIS environment, and measurement and alignment support.

Similarly, recently embraced technologies such as BIM are being supported to not only improve design and construction process but also provide valuable detailed information to support operations and maintenance for the life of the structure. GIS at LaRC strives to integrate functions such as Master Plan, Real Property, Space Utilization, Facility Maintenance and Operations to increase accuracy and sustainability of data.

Interoperability between the various databases is pursued as much as is practical based on capabilities currently available with the technologies. Web interfaces are heavily pursued to extend benefits of these databases. Web browser interfaces allow interactive query through web pages to extract up-to-date maps, plans, or statistics restricted to selected features or to produce reports relating selected data. Examples are: maps depicting the effects of flooding correlated to tidal stages; maps and reports detailing

utility systems; maps and reports in support of master planning (e.g. land use, security, emergency evacuation, traffic flow, parking, landscaping and environmental monitoring); and reports on space utilization (e.g., office occupancy densities for both contract and civil service personnel, and associated full cost accounting for facilities). Automated space allocation optimization is an area where spatial data technologies are being applied to increase overall efficiency and effectiveness. Other information can be extracted from the available data on a case-by-case basis.

Additionally, Memorandums of Agreement (MOA) with GIS partners (such as other NASA centers, USAF ACC, LAFB, Navy, and Municipalities) may require support at remote sites. Dependent on the magnitude of these efforts the support may be provided under the LaRC task or via separate tasks.

3. OBJECTIVE

The objective of this task order (TO) is to provide spatial data technology support. This effort will support Langley's strategic facility plan as outline in the 20 year VITAL Plan with data gathering, data management, updates, and development of analysis tools for: Scenario planning, Space use analyses, Sequencing Plans for Projects, Capacity analysis and use recommendations, Space optimization plans, Gap Analysis for lowering Total Cost of Ownership, Portfolio Analysis such as Master Facilities List, and in depth analysis of existing facilities - location, capability, utilization and condition surveys.

4. SCOPE OF WORK

The scope of this task order shall include, but not be limited to, the following: software system design, implementation and maintenance of software systems, geospatial analysis, map generation, field measurement and data acquisition, Global Positioning System (GPS) and level loop control network development planning and execution, other measurement technologies, spatial and relational database administration and applications development, aerial photo planning and execution, image rectification, manipulation, and analysis and computer systems administration, implementation and deployment. In-field data collection or surveying support includes the West Area of LaRC (primary LaRC facilities), East Area of LaRC (located on LAFB), and occasionally at offsite locations.

5. DESCRIPTION OF TASKS/TECHNICAL REQUIREMENTS

Requirements specific to this work area include:

5.1 System Support Services

5.1.1 System Operation, Maintenance, and Enhancement

The contractor's primary responsibility under the current task is to maintain preexisting systems (hardware and software), data, and tools. Where efficiency improvements and obsolescence and cost avoidance warrant, changes to systems shall be supported under this task. Criteria for acceptable changes include improved speed or detail to customers or precluding extensive future investment to correct deficiencies, such as obsolete versions. Proposed major updates and new initiatives shall be documented

and submitted to the TM for consideration and subsequent consideration by IT Governance process if deemed appropriate by COD management. The contractor shall provide a comprehensive review of all applicable processes and provide a report regarding level of compliance and suggestions to address any identified variances.

5.1.2 Buildings Spatial Data and Master Plan Support

The contractor shall provide for continuing maintenance and obsolescence avoidance of software products to support the display, maintenance, and publication of buildings spatial and tabular data and Master Plan related data. The contractor shall provide, pending requirements definition, a complete operational environment at NASA/LaRC for the acquisition, analysis, maintenance, and publication/dissemination of spatial data to assist in spatial decision management. This should include development of a formal configuration management plan. The contractor will support development of maps and PDF files reflecting updated data from data acquisition efforts. Support migration to SDE and ArcGIS Server web visualization tools. Additionally, provide support for maintenance and obsolescence avoidance of several GIS tools including, but not limited to, the LaRC Flood Prediction Tool, the LaRC Building and Room Locator, the LaRC Equipment Locator, Utility Viewer, and the LaRC Floor Plan Viewer. These tools shall be modified and or rewritten for deployment under the SDE GIS databases, ArcGIS Server, and Portal software and pending resource availability. This will include use of ESRI City Engine to develop visualizations of center resources and changes.

5.1.3 Support for and Interfaces to Building Information Model (BIM) Systems

The contractor shall support systems and software related to BIM activities as LaRC, including, but not limited to, the following activities.

Provide supplemental support for NASA LaRC Program Managers (PMs) and Maintenance Managers (MMs) to facilitate access to the evolving BIM environment. Effort includes both informal familiarization training and recommendations and coordination for formal training events. Effort similar includes coordination with PM and MM: to establish roles for Clarity BIM management environment, to support continuous review design activities and formal design reviews, and to support continuous improvement for maintenance, including gap analysis between BIM and Maximo.

Support shall include loading BIM deliverables into management environment at designated stages where project deliverables are available from primary contractors to ensure latest data is available for distributed use at LaRC as soon as possible after release by contractors. If changes are suggested in a version of BIM this request shall be documented, and as changes occur, the updated data shall be loaded into the model to ensure all users have access to the most current data.

Support will include checks against laser scan data for validation of design, process scan-to-BIM, with discrepancies documented and reported to PM for consideration in As-built.

Support will include development of initial models for remodeling of existing facilities. This includes export of facility data from GIS, digitization of as-built drawings, and incorporation and validation against Scan-to-BIM and data from other measurement technologies such as GPS and integrated survey of the facility.

Support integration of data into BIM (Manufacturer, Model, Serial, specifications such as name plate values, photos) as equipment arrives and goes through preliminary inspection and/or 491 process, including export of data such as CoBIE for population of maintenance management database, with gap analysis between BIM and Maintenance Management database.

Track changes with industry tools and advise on changes that should be investigated or pursued for efficiency and effectiveness improvements (such as Navisworks vs. Solibri and migration of data between GIS and BIM and Civil 3D).

Export geometry and clean as necessary for integration into GIS to support functions such as base map/locator/RPI/SU/Room number. This includes support through all phases of project from initial through subsequent changes. Effort also includes prototype efforts to automate aforementioned integration and move toward interoperability.

Support generation of visualizations such as animated fly-through, tabletop models, view sheds, and perspective renderings, and develop views to meet evolving needs for the electronic model and support web enabling for various uses such as maintenance.

5.1.4 Spatial Data Standards:

In order to ensure data compatibility and facilitate the aforementioned analyses, unless otherwise specified, all spatial data must be geographically referenced to the same projection and datum as follows:

Horizontal coordinates shall be reported in NAD83 HARN (1993) US State Plane Coordinate System, Virginia South Zone, in meters.

Vertical coordinates shall be reported in NAVD88, as orthometric heights derived from GEOID03 in meters.

The LaRC GIS team has established a common geodetic control network for LaRC. Coordinates in this network are physically depicted by a set of monumented control points, (mainly brass disks set in concrete) at various strategic locations around the Center. All surveys and design work completed for LaRC should be consistent with, and referenced to this network. The network report, adjusted control coordinates, and locating maps are available at:
http://gis-www.larc.nasa.gov/control_networks/langley/

Note: support for Science applications may require reference to ITRF datums for Transition from current ITRF00 (epoch 1997.0) to the most current realization.

5.1.5 GIS Facility and Utility Data Management Support

The contractor shall provide support for the operation and maintenance of existing systems as the first priority. Support shall include update and maintenance of NASA LaRC's facility and utility spatial data contained in the GIS to reflect the as-built configuration in accordance with Facility Safety Requirements, per LPR 1740.2 "*Facility Safety Requirements*".

All support for surveying services shall be initiated by customers using the Work/Survey/Digging Permit system, which tracks requests and status of the various efforts in the system and supports reporting for environmental compliance. Surveyors shall ensure all requests and status are logged in electronic format on the Government's server. General digging permits shall only be issued once all applicable information and approvals (such as LF461) are in place and appropriately referenced. All proposed ground penetrations should include a map of impacted location in the GIS system. Emergency dig permits may initially be supported without advance documentation in the system, but are the responsibility of person issuing the emergency permit to ensure appropriate documentation is submitted.

Survey support shall be responsible for the accuracy and completeness of all updates/revisions to NASA-LaRC underground utility data. Facility and utility data shall be maintained in accordance with all current applicable GIS standards. All attributes contained in the GIS database shall be populated to the fullest extent possible using all available data sources *(field notes, photographs, survey data, etc.).* All field data collection shall include daily check shots of one of LaRC's many "control" monuments per; http://gis-www.larc.nasa.gov/control_networks/langley/

If resources permit, efficiency and obsolescence and cost avoidance enhancements of the GIS databases and associated applications, including, but not limited to, Facility and Utility database, Real Property and Space Utilization databases, and building interior data shall be pursued after submittal through TM and approval by COD. Additionally, efforts to collect, verify, and disseminate historical data as well as data for new systems shall be supported pending resource availability.

5.1.6 Measurement Systems and Field Data Management Systems Support

The contractor shall provide support for GPS and related activities, including use of the Optical Total Station (OTS), laser scanning systems, and systems to collect and use spatial data in the field. This task includes, but is not limited to, base station operation and repeater setup, field observation, network solutions, equipment readiness, training, and report generation. The contractor shall support research into minimum operational requirements to keep existing capabilities at LaRC operational. Pending resource availability the contractor will advise on technology improvements which shall be submitted to GIS Team and TM for consideration by COD. In the course of support, it may be necessary for the contractor to purchase unidentified miscellaneous ODC/Direct Materials for the successful completion of an

activity. Based on previous purchases made on this task, an estimate for unidentified miscellaneous ODC/Direct Materials would be $240000.

5.1.7 Measurement Systems Management

Survey or field measurement hardware and software shall be configuration managed. All equipment shall be labeled either experimental or production so as to clearly delineate experimental equipment to avoid inadvertent use in production environment. Production labeling shall carry date, version, and certifying officials name. Software shall also be clearly delineated being Production and experimental by directory naming.

5.1.8 Accuracy of Field Measurement for Survey Support

Three distinct types of accuracy regarding spatial data shall apply to Survey work as follows:

Marking of Utilities: Accuracy requirements for marking utilities shall be + 0.25 feet for horizontal location and + 0.10 feet for vertical location (elevation). Accuracy is measured by comparing the actual absolute location of exposed utilities to the Contractor's markings.

Absolute Coordinates: Provides coordinates referenced to the world-at-large, i.e. to the current datum/projection in use. Each point shall be within + 3 cm (0.1 feet) for horizontal location and + 4.5 cm (0.15 feet) for vertical location (elevation). These accuracy requirements are consistent with the use of Real Time Kinematic Global Positioning System (RTK GPS) survey at a 95% confidence level. In general, this is typical for survey data when locating features, buildings, boundaries, etc. However, more precise measurements may periodically be required for research or special facility projects.

Relative measurements: Provides for highly accurate positions relative to a project or assembly. Points shall be within + 0.3 cm (0.01 feet) for construction layout surveys and + 0.15 cm (0.005 feet) for machinery alignment. These accuracy requirements are consistent with the use of a properly referenced Optical Total Station at a 95% confidence level. These points may or may not be directly referenced to a datum/projection, but if they are, it should be noted. In general this work supports efforts like levels for drain pipe or aligning a machine to its base. However, more precise measurements may periodically be required for research or special facility

All field data collection shall include daily check shots of one of LaRC's many "control" monuments.)

5.1.9 Spatial Data Transfer support

Data Transfer (from contractors):
All deliverables of spatial data from outside and sub-contractors, including new designs, as-builts, design changes and modifications to existing elements, shall be provided to the Government as follows:

File Geodatabase, Shape File, Revit, or AutoCAD .dwg file with all points and vectors, properly georeferenced to the datums listed above, and including FGDC-compliant metadata.
A job information file, listing at minimum, the contractor's company name, address and phone number, project supervisors' and field leaders' names and contact information, contract number and or job name, NASA COTR name and contact information, completion date, datum and projection of all coordinate data, and a data dictionary or expanded feature code library. The filename shall indicate the job name or contract number, (e.g. jobname.txt)
In the case of general purpose surveys by outside or sub-contractors, check shots on at least two monuments in the control network shall be performed as a matter of quality assurance prior to performing any production work. Check shot deltas, (showing monument name and H & V deltas from listed values), shall be included in this file as well.
All requests for changes, licenses, GIS data products or other concerns may be directed to larc-gis@lists.nasa.gov.

Data Transfer (to on-site contractor):

On-site Contractor shall use the Center Operations Directorate's GIS software applications, (both desktop, with appropriate licenses, and Web-enabled <http://gis-www.larc.nasa.gov>), to interact with the various spatial database coverages included in the GIS. This data includes, but is not limited to; aerial orthophotos, contours, transportation, green spaces, environmental features (wells, runoff areas), buildings, (including building interior details & layout, roof compositions, floor coverings, etc.), and utilities.
Utility coverages includes all utility systems above and below ground, including power, communication, domestic water, sanitary, storm water, steam, chilled water, compressed air and other gases, fuel, and miscellaneous systems.
The on-site Contractor will be supplied with licenses as required for the desktop tools. Said contractor shall provide updates and edits using the GIS software desktop and/or web-enabled tools. These changes to the database will be incorporated pending QA/QC review by GIS analysts. All data and metadata shall be in forms consistent with the existing GIS database.

All requests for changes, licenses, GIS data products or other concerns may be directed to larc-gis@lists.nasa.gov.

Data Transfer (to off-site contractors):

All deliverables of spatial data from outside and sub-contractors, including new designs, as-builts, design changes and modifications to existing elements, shall be provided to the Government as follows:
File Geodatabase, Shape File, or AutoCAD .dwg file with all points and vectors, properly georeferenced to the datums listed above, and including FGDC-compliant metadata.

A job information file, listing at minimum, the contractor's company name, address and phone number, project supervisors' and field leaders' names and contact information, contract number and or job name, NASA COTR name and contact

information, completion date, datum and projection of all coordinate data, and a data dictionary or expanded feature code library. The filename shall indicate the job name or contract number, (e.g. jobname.txt)

In the case of general purpose surveys by outside or sub-contractors, check shots on at least two monuments in the control network shall be performed as a matter of quality assurance prior to performing any production work. Check shot deltas, (showing monument name and H & V deltas from listed values), shall be included in this file as well.

All requests for changes, licenses, GIS data products or other concerns may be directed to larc-gis@lists.nasa.gov.

5.1.10 Digging Permits Support

Surveyors shall perform surveying work in the field for locating and marking existing underground utilities to preclude damage during digging projects for construction and maintenance activities (See reference LPR 1740.2 "*Facility Safety Requirements*" Section 2.3, Underground Utilities / Digging Permits). All activities shall be thoroughly documented in the Work/Dig Permit system so that efforts may be monitored and support reporting requirements by various Government functions, such as Environmental. The utility marking shall be thorough, and marked in accordance with American Public Works Association Color Codes for Utilities.

The Contractor shall coordinate with project managers, inspectors, and construction contractors to ensure that as-built location information for all below-grade utilities is recorded prior to backfill. For instances where survey is not practical before back fill the surveyors may coordinate with the construction contractor to establish a method of locating features in advance of backfill, such as installation of known lengths of PVC pipe, which can be surveyed to project horizontal and vertical position of the buried feature and then pulled out after survey.

If the requested area for a dig permit deviates from the design area previously concurred on by Environmental for ground penetration per LF461 by more than fifteen (15) feet, the dig permit shall not be issued without written or electronic concurrence from Environmental. Furthermore, dig permits shall not be issued for excavation that impacts trees or environmentally sensitive areas (contaminated, cultural, historic) unless specifically identified in design which has previously received concurrence for ground penetration per LF461, without written or electronic concurrence from Environmental. It is the responsibility of the Survey resource issuing the dig permit to document the approval in the electronic dig permit system. In the instance of single hole ground penetration for efforts such as signs, digging permits may be issued without LF461 for efforts which are within ten (10) feet of hardened surface and for digging that is less than two (2) feet in diameter and less than three (3) feet deep.

Dig permits for emergency repairs, such as water system leaks, shall be issued and documented in the Work/Dig Permit system. Emergency Repair is defined as restoration of an existing facility or component(s) after a major breakdown or accident, as authorized by the National Aeronautics and Space Act of 1958, as amended. HQ FED defines "emergency" as so urgent that it cannot wait to go

through the normal budget cycle or process. For all emergency repairs, the replacement of components or materials will be of the size or characteristic currently required to meet demands or needs.

This effort shall support attendance of a weekly meeting with Air Force personnel at LAFB to discuss surveying requirements and coordination of work in the East Area of LaRC that may impact LaRC infrastructure.

5.1.11 Construction and Research Projects Support

Typical efforts for construction and research project support include, but are not limited to, locating features, benchmarks, pins, utilities stakeout, layout of foundations, walls, walkways, parking areas, utility ducts, utility features, archaeological features, planting areas, trees, roadways, test ranges, or any other point, line or area designated by the Government. Effort also includes measurement support for research apparatus, support systems, machinery, or other items requiring precise placement. Feature geometry, coordinates, feature codes, and other related data from electronic survey/stakeout or digitization shall be stored on government server and accessible to GIS for analysis.

Effort may periodically require involvement by state licensed surveyor, to provide professional certification of data, or involvement of specialists to support unique measurement requirements.

5.1.12 Support for Next-Generation GIS Systems

The contractor shall maintain and operate GIS web-based network analysis tools for LaRC utility systems to support Outside Plant and Inside Building level analysis pending availability of resources.

The contractor shall provide support for continuing research of next-generation GIS systems. The contractor shall support the specification of software, hardware, and peripheral components to support this effort. Additionally, the contractor shall recommend implementation improvements for an institutional decision support system that integrates existing and to-be-developed infrastructure information applications pending resource availability.

5.1.13 Geospatial and Optimization Tools Support

The contractor shall support the maintenance, operation, and refinement of infrastructure decision support tools such as the Move Tool and Organizational Projection Tool to address web management of personnel moves between organizations, pending resource availability. When necessary, this effort will include the specification of resources to support this effort.

Similarly, the contractor shall provide support for the maintenance and operation of GIS-related tools and techniques to aid in the optimization of office and technical space pending resource availability.

5.1.14 Interfaces between GIS and Other Systems

The contractor shall support maintenance of GIS interfaces between the GIS and systems supporting LaRC Maintenance Management, Configuration Management, Environmental, Safety, Security, and other similar functions, pending resource availability. Design, development, and implementation shall be supported pending resource availability.

5.1.15 System and IT Security Administration

The contractor shall provide Product specialists to address System and IT Security Administration for all systems associated with Spatial Data Maintenance and Decision Support unless otherwise directed.

The contractor shall provide GIS product support on a continuing basis for all systems that support GIS activities at NASA/LaRC. The contractor shall support the specification of technically current software and/or hardware components to ensure capabilities to support efforts at LaRC and partner sites are retained pending resource availability. The contractor shall be responsible for the daily operational support of all GIS Team systems. Additionally, the contractor shall support the GIS Task Tracking System (TASKMAN) in tracking GIS work efforts as well as Concurrent Version System (CVS) to manage versions of tools.

The contractor shall provide the basic level of Customer Support and IT Consultation and Training for all systems associated with Spatial Data Maintenance and Decision Support unless otherwise directed.

All spatial and tabular data applications must be compatible with current ESRI, Oracle, or Autodesk product suite and shall be maintained using the Concurrent Version System (CVS) and/or similar products such as Git.

5.1.16 Support for GIS Team Partners

The contractor shall provide support for the aforementioned areas as defined under MOA, Memorandums of Understanding (MOU), and internal LaRC agreements for partners/workgroups such as the USAF, Office of Education, Office of Public Affairs, Safety Office, Emergency Operations Center, and NASA Headquarters. Support shall be provided in the aforementioned areas for other NASA centers as designated by the customer pending resource availability. Additionally, the contractor will provide spatial data measurement equipment setup and training support as to affect the transfer of such equipment to Johnson Space Center. This effort will involve travel to Johnson Space Center.

5.2 PROCUREMENT AND TRAINING

Where requirements for deliverables necessitate the procurement of hardware, software, GIS-related data, and additional labor resources, the contractor shall document those items that are needed for the successful and timely completion of task activities for COD consideration. Additionally, if training or travel is suggested by the contractor to improve efficiencies or for successful completion of designated task

activities, the Technical Monitor shall be notified in writing for coordination with COD. An estimate for unidentified miscellaneous ODC/Direct Materials through the current contract year is $240000, as noted earlier.

5.3 WORK WITH OTHER LARC CONTRACTORS

ENABLING CLAUSE BETWEEN LITES GIS, AND OTHER LaRC CONTRACTORS

(a) NASA has entered into contracts with various entities for other support services at LaRC:

Contractor	Services
Jacobs Technology	CMOE -- Maintenance, Operations, and Engineering
SQAA (follow-on)	Inspection, Quality Assurance, (IQA)
Hewlett Packard, Inc.	Agency Consolidated End-User Services (ACES)
Grounds Maintenance, Inc.	Grounds keeping and Pest Control Services
NSR-Integrity	Custodial Support Services
GSA, ACoE and MACC	Major CoF and Maintenance contracts

(b) In the performance of this contract, the GIS Team personnel shall support personnel shall cooperate with the other Contractors by: Responding to invitations from authorized personnel to attend meetings; providing access to technical information and research, development and planning data, test data and results, schedule and milestone data; limited financial data including estimates, all in original form or reproduced, discussing/coordinating matters related to projects; providing access to Contractor facilities utilized in the performance of this contract; allowing observation of technical activities by appropriate support Contractor technical personnel, and provide training for operations of systems.

5.4 JOINT REVIEW REQUIREMENTS

There will be a joint review of the work of this task at meetings to be held on an as needed basis, at an agreed upon time. The following persons or their alternates are requested to attend: NASA TM and Contractor personnel assigned to task. Technical performance, timeliness, cost, and staffing will be discussed. As requested, the contractor shall maintain minutes from each meeting, which will be emailed to participants for review and corrected where necessary. An archive of minutes will be maintained on a mutually agreed upon NASA/LaRC/GIS website.

6. DELIVERABLES or DELIVERABLES/MILESTONES

Number	Deliverable Item	Deliverable Schedule
1	GIS Data Products (maps, plots, diagrams, IT Governance documents, and reports)	10/31/2015 in general, specific requirements per ongoing customer requests. Specific deliverable and schedule per requested item defined through consultation with customer.
2	Training reports	Within ten (10) working days of return from activity
3	GPS Level, and Laser Scan Data Acquisition and Analysis Reports	Preliminary data organization within ten (10) working days from return from effort. Final report due 30 working days after return from effort (unless delay requested by NASA due to priority shift)
4	System Administration Problem Reports and Resolution	Requests for support posted within two (2) working days; support provided to requestor within five (5) working days (unless priority modified by NASA); resolution information posted within two (2) working days of completion of effort
5	General Dig Permit Request	Surveyors shall respond within the next business day for general requests.
6	Emergency Dig Permit Request	For emergency digging permit requests (e.g. broken water lines), the Surveyors shall report to the specified site location within 15 minutes of notification during normal working hours. Occasionally (two [2] to four [4] times per year), emergency survey support for digging permits is required during weekends or outside normal working hours. The Contractor shall respond within two (2) hours for these requests.
7	Construction and Research Projects survey support	Surveyors shall respond within two (2) hours for these requests. Surveyors shall be responsible for submission to the Survey Work/Digging Permit System after the fact within two (2) days. Feature geometry, coordinates, feature codes, and other related data from electronic survey/stakeout or digitization shall be stored on government server and accessible to GIS for analysis within seven (7) days of observations.

8	Facility/Utility updates	Updates based on field measurements shall be submitted within seven (7) days of the observation to GIS for incorporation into production GIS. Edited versions of data shall be submitted through the Survey Work/Digging Permit System. A brief description of changes being made shall be attached to the task. Any edits not related to the task, but included in the submission shall be noted in the task. Surveyors may use field notes and other as-built information during feature data collection process; however, all information necessary for future use with dig permits or utility / facility system analysis shall be incorporated into GIS within seven (7) days.
9	Spatial Data Changes	Requests for changes to building data documented via email within five (5) working days, geometry changes implemented within ten (10) working days (unless priority changed by NASA). Resolution of request change documented via email within five (5) working days of completion. Requests for change to Master Plan level data documented via email within five (5) working days, geometry changes implemented within ten (10) working days (unless priority changed by NASA) Resolution of request change documented via email within five (5) working days of completion.
10	New construction projects	This effort shall support integration of all proposed infrastructure changes on “design” layers to support interference analysis and subsequent project planning. Proposed project data shall be available in GIS within three (3) days of receipt of the various design versions. As construction projects progress surveyors shall support validation of accuracy of proposed vs. as-built, with

		data available for monthly review with GIS and/or Project Manager, with a goal to reduce requirement of 100% survey to 10% validation of as-built conditions. A report on progress is required within one (1) year from initiation of this effort.
11	GIS Software Products	10/31/2015 in general. As definition and requirements for software products are developed as specified by the customer, specific schedule and deliverable items will be defined and added as revisions to this task order, when necessary.
12	Historic survey data	All essential data to support digging permits and future decisions regarding LaRC infrastructure shall be incorporated into GIS within one (1) year of initiation of this effort. This effort shall result in elimination of routine use of historic manual drawings, AutoCAD files, and field notes; which will be archived but not available for routine reference.
13	Request for spatial data export	The effort shall support export of LaRC's spatial data in various formats to support design of various projects. The Contractor shall respond within two (2) days for these requests. Contractor shall be responsible to ensure request is documented in the Work/Digging Permit System within two (2) days of the request.
14	Electronic Field Display	Within one year of initiation of this support surveyors shall demonstrate electronic field display of utility data based on GPS and/or integrated survey for the purposes of increasing efficiency and accuracy of marking utilities.
15	NSRS transition plan	Within 6 months provide a transition plan to move LaRC horizontal datum from NAD83 (1993) Virginia HARN to NAD83 (2011) NSRS and evaluate future impact of a new GRAV-D vertical datum. Transition to NSRS is expected to result in a shift of approximately 3 cm

		that will need to be applied to all GIS data and may require coordination with any ongoing projects where that level of accuracy is an issue.
16	Field note processing	Information that is addressed in field notes and other as-built information that may not be readily integrated into existing GIS environment shall be captured electronically with copies added to the NASA-LaRC as-built files. This data that does not fit within current processes for spatial database update shall be brought to the attention of GIS Team management within one (1) week. All physical records shall be returned to the NASA-LaRC Underground Utilities Coordinator at contract completion.
17	3D data model migration	Effort shall support evolution from the current 2D drawing framework to a full 3D model, which may be manipulated to produce legacy process type drawings, within six (6) months from initiation of this task migration of one utility to full 3D environment shall be accomplished to evaluate approach and difficulties.
18	Work/Survey/Digging Permit system	Within three (3) months implement Work/Survey/Digging Permit system that is RDBMS based with web interface and integrated with LF461
19	Task Technical Status Report	Per Contract
20	Task Financial Management Report	Per Contract
21	Task Final Reports	Per Contract

7. PERFORMANCE STANDARDS AND METRICS:

7.1. Performance Standard (quality)

All Task Plan support and deliverables are provided and meet all TO requirements and acceptance criteria for quality.
Exceeds: The contractor exceeds the performance level if all support and deliverables exceed all TO requirements and are accepted by the customer with no problems reported.

Meets: The contractor meets the performance level if all support and deliverables meet all TO requirements and are accepted after minor problems are reported and fixed.
Fails: The contractor fails to achieve the “Meets” performance level defined above.

7.2. Performance Standard (timeliness):

All Task Plan support and deliverables are provided and meet all TO requirements and acceptance criteria for timeliness.
Exceeds: The contractor exceeds the performance level if all assigned activities are accomplished satisfactorily ahead of the pre-determined schedule.
Meets: The contractor meets the performance level if all assigned activities are accomplished satisfactorily. Any deficiencies or slippage within the contractor’s control in one or more activities are offset by improvements or gains in other activities.
Fails: The contractor fails to achieve the “Meets” performance level defined above.

7.3. Performance Standard (responsiveness):

All Task Plan support and deliverables are provided and meet all TO requirements and acceptance criteria for responsiveness.
Exceeds: The contractor exceeds the performance level if response to all TO requirements is provided in less response time than what was specified in the TO requirements.
Meets: The contractor meets the performance level if response to TO requirements is provided in line with the TO specified response time requirements.
Fails: The contractor fails to achieve the “Meets” performance level defined above.

7.4. Performance Standard (overall task performance):

All Task Plan support and deliverables are provided and meet all TO requirements and acceptance criteria.
Exceeds: The contractor exceeds the performance level if all TO requirements have been met and at least two of the metrics for Quality, Timeliness, and Responsiveness are exceeded.
Meets: The contractor meets the performance level if all TO requirements have been met and acceptable resolution was provided for identified problems
Fails: The contractor fails to achieve the “Meets” performance level defined above.

7.5. Performance Standard (overall satisfaction):

All Task Plan support and deliverables are provided and meet all TO requirements and acceptance criteria.
Exceeds: The contractor exceeds the performance level if the metric for Overall Task Performance is rated as “Exceeds” and the contractor has been effective in interfacing with the customer.
Meets: The contractor meets the performance level if the metric for Overall Task Performance is rated as “Meets” and the contractor has been effective in interfacing with the customer.
Fails: The contractor fails to achieve the “Meets” performance level defined above.

7.6. Performance Standard (Backup and Restore):

All systems supported on this TO have met the following performance level for any required restoration of restored data. Files modified since last scheduled incremental back-up are not factored into this calculation.
Exceeds: The contractor exceeds the standard performance level if the contractor successfully reconstitutes at least 99% or more of the requested restoration of systems' applications and data sets can be 100% reconstituted.
Meets: The contractor meets the standard performance level if the contractor successfully reconstitutes at least 98% of the requested restoration of systems' applications and data sets can be 100% reconstituted.
Fails: The contractor fails to achieve the "Meets" performance level defined above.

8. CONTRACTOR FURNISHED ITEMS

The Contractor shall furnish and maintain the balance of required incidental or expendable equipment and supplies for this effort (such as shovels, ground probes, tape measures, cameras, marking paint, nails, flags, stakes, etc.). Similarly the contractor shall be responsible for providing vehicles, and communications equipment. Additionally, for field workers, the contractor shall provide personal protective equipment (safety shoes, vests, hard hats, gloves, glasses, boots/waders.

9. GOVERNMENT FURNISHED ITEMS

The government shall provide workspace, desks and ACES seats for on-site performance of this Task Order; specialized equipment, software; materials, facilities and office space, and government data.
The Government will furnish all surveying equipment for measurement and data collection such as Global Positioning System, Optical Total Station, Levels, Laser scanners, and Utility tracers. All surveying and spatial data shall be maintained on Government provided spatial data servers.

10. OTHER INFORMATION NEEDED for the PERFORMANCE of TASK

Contractor shall not exceed stated funding guidelines.

11. PERIOD OF PERFORMANCE

This TO is effective until 10/31/2015.