

PACE IV Core Work Area #3

Contains the following subtasks:

38.00 Specialized Info Systems

38.01 Space Communications Projects

38.02 Data Systems

38.03 Unmanned Aircraft Systems (UAS) in the NAS/NextGen Support

38.00 – Specialized Information Systems

Orion Command and Data Handling Network Support (SOW Reference 3.8.1)

The task is in support of the Human Exploration and Operations Mission Directorate (HEO) efforts underway at NASA Glenn. In particular, it is in support of the communication and network systems required in support of space exploration. Tasks may include: requirements specification, gathering, verification, and validation; analysis of network architectures, systems, or components; paper studies of submitted or relevant technologies; testing or implementing prototype components; attendance at applicable meetings, teleconferences, or symposium.

Orion C&DH System Design Review: Command and Data Handling Network, and Programmatic Support

The Multi-Purpose Crew Vehicle (MPCV) Project is part the Human Exploration and Operations Directorate. Glenn has been assisting Johnson Space Center and its Prime Contractor for the MPCV in the Design, Development, and Deployment of the Onboard Data Network (ODN). NASA is currently construction of the Exploration Flight Test 1 (EFT-1) at Kennedy Space Center for launch in 2014, and is in Design with the European Space Agency for the follow-on launch of EM-1 in the 2017 timeframe. This task is will provide continuing support to the ODN team for these missions, and will require full working knowledge of the Time-Triggered Gigabit Ethernet technology as it is being implementation on the EFT-1 Orion spacecraft. Detailed tasks include:

1. Utilizing knowledge in physical Layer 1 Space Environment wiring and interconnections, assist in the design, development, and monitoring of current and future ODN cable plant.
2. Assist the ODN Team in the efforts to monitor and characterize the ODN performance in NASA labs, prime contractor integration labs, on the launch pad, and in space.
3. Utilize the requisite expertise of the ODN architecture to document and analyze networking requirements, contribute to, and evaluate the proposed EM1 design.
4. Participate with standards bodies to promote the Time Triggered Giga Bit Ethernet protocol as an international standard.
5. Software development and support for Time-Triggered Gigabit Ethernet network management code.

Space Communications and Navigation (SCaN) Compatibility Test Set (CTS) Project Support (SOW Reference 3.8.1)

The purpose of this proposal is to provide development, collaborative, and technical support to the initiative entitled Space Communications and Navigation (SCaN) Compatibility Test Set (CTS).

Specific Work Requirements:

This activity focuses on the development of the Compatibility Test Sets (CTS) data link components. The task must also verify, validate, and ensure physical layer interface compatibility to the CTS modem and controller. The CTS Data Link Layer is responsible for framing the data by implementing specific framing protocols and encoding those data frames. As ground support software, the CTS will need to support several framing and encoding techniques. Specifically, a suite of convolutional coding rates and configurations must be implemented and tested. The implementation must be versatile, allowing for configurable parameters and real-time tuning. Other coding schemes such as Reed-Solomon will also be integrated into the design, and care must be taken to make sure all components can be integrated into the final software.

End Products:

1. Contribute to defining the Data Link architecture.
2. Contribute to the Data Link Trades and Studies.
3. Implement the Data Link convolutional encoder / decoder.
4. Assist development and planning of other Data Link components.
5. Document necessary diagrams of the implemented Data Link components.
6. Construct valid test plans for developed Data Link components.
7. Test and validate Data Link components during system integration.

NASA Space DTN Readiness Project (SOW Reference 3.8.1)

NASA Glenn Research Center has committed to supporting specific efforts under NASA's Space Operations Mission Directorate (SOMD) for Delay/Disruption Tolerant Network. Under this specific tasking, the Contractor will support specific networking and protocol task areas to further the research and development in specific areas of interest as defined in the detailed tasks below.

Delay/Disruption Tolerant Network Programming Support

IT Support for the Space DTN Readiness Project. The Contractor shall provide IT engineering support for:

1. Continued development of the DTN Experimental Network (DEN), a multi-facility testbed that will be used to perform simulations and emulations of space networking scenarios. The DEN will also be used to support the development and operation of various flight demonstrations. GRC will use the DEN to evaluate space DTN implementations for performance and interoperability with the DTN2 reference implementation.
2. Performing independent cross-check audits on all ROI studies performed by the other Centers.
3. Defining applications that will be operationally useful for Network Management
4. Providing Security consultation for flight testing and the ROI experiments defined in the NASA Space DTN Readiness Project plan.

5. Team PACE personnel will:
6. Assist GRC personnel in implementation and maintaining the DEN.
7. Assist GRC personnel in utilizing the OpenNet for DTN research.
8. Provide and analysis of what DTN metrics to measure and how to measure it.
9. Develop Network Management Tools (Applications).
 - a. DTN Simple Network Management Protocol (DTN-SNMP).
 - b. DTN performance test and analysis tools (for example: iperf or nuttcp for DTN).
10. Assist in analysis and development of security mechanisms and protocols for DTN.

Additional Work Requirements:

1. Write a specification sheet for the DTLSR routing protocol
2. Assist in an ION-based DTSLR routing protocol
3. Assist in adding naming flexibility in ION

Assumptions:

1. All network hardware, firmware, and software is provided by NASA GRC.
2. All test facilities and equipment are provided by NASA GRC.
3. All Team PACE employee workstation equipment is provided by NASA GRC.
4. It is mutually understood that the deliverables/schedules will be adjusted and/or removed to fit the contract performance period as necessary to fit the resources available.

FAA Next Generation Air Transportation System - Future Communications Engineering Support (SOW Reference 3.8.1)

NASA Glenn Research Center has committed to supporting specific efforts under a Space Act Agreement with the Federal Aviation Administration. More specifically, the effort is directed at the FAA Next Generation Air Traffic Management (ATM) System, Future Communication Study Project Level Agreement for C-Band research and experimentation. The Contractor will support the security analysis of the proposed technologies and document these results. Additionally, the task area will support the design, implementation and testing of C-Band communications network as a part of the Airport Surface Testbed.

Airport Surface Operations and Wireless Communications Network Development and Support NASA Glenn Research Center (GRC) performs research and experimentation intended to foster the development of robust, interoperable satellite/terrestrial mobile communications networks. These efforts are leveraged by the Federal Aviation Administration for increased aviation system capacity, safety, and the overall transformation of the National Airspace System (NAS). This task's scope encompasses the technologies, architectures, and testbed that support the Aeronautical Mobile Airport Communications System (AeroMACS) in the C-Band frequencies in support of the FAA's Next Generation Air Transportation Management System.

The Contractor shall support NASA, its grantees, and other contract entities, in characterizing and implementing, and testing and evaluating AeroMACS network technologies, performance, and services within both fixed and mobile environments as directed.

The Contractor shall also support NASA, its industry partners, and other contract entities, in the development, testing and implementation of network applications for the NASA-CLE CNS Testbed facilities co-located at the NASA-Glenn Research Center and adjacent Cleveland Hopkins International Airport (CLE), and other related facilities as directed. This shall include extension and/or relocation of testbed wireless network capabilities to additional areas of the NASA GRC campus.

Specific Work Requirements:

The Contractor shall support the efforts of NASA GRC, and other partnership entities in the continued development, testing, and troubleshooting of the AeroMACS prototype network testbed and demonstration facility to support NextGen development by:

Working with NASA partners in the installation, testing and demonstration of AeroMACS capabilities, including any related infrastructure software and hardware to continue the development of the airport surface wireless communications network test capability within the NASA-CLE CNS Testbed.

Ensure long-term viability of the testbed by aligning future testbed capabilities with technologies capable of supporting NextGen through planning and implementation.

Support the development, interfacing, and testing and demonstration of airport surface applications in the NASA-CLE CNS Testbed, as defined by NASA and its partners. This activity will occur as funding of individual applications is made available.

End Products:

1. Documentation of installed and tested AeroMACS equipment and related infrastructure (only for items requested and not documented by ITT or other NASA GRC partners).
2. Documentation of test results, evaluation results, and demonstration results.
3. Research publications, presentations and status reports as mutually agreed upon.

Assumptions:

1. All hardware and software for the airport surface testbed is provided by NASA GRC or its designated partners.
2. All task required desktop and telephone equipment is provided by NASA GRC.

38.01 – Specialized Information Systems

Space Communications Project Technical and IT Support

Space Communications Project Technical and IT Support (SOW Reference 3.8.1 and 3.1.2)

NASA Glenn Research Center's Space Communication Program is to support specific mission and operational needs of NASA, enable NASA's utilization of commercial communications systems, and transfer advanced capabilities to the nation and other federal agencies by advocating, developing, demonstrating, and inserting enabling technology for high performance space communications systems.

In addition, a specific function within the Space Communications Program is to evaluate communications technology at lower levels of technology readiness with regard to NASA mission requirements. These evaluations will define and develop projects that will identify, investigate, and mature these technologies as flight demonstrations and/or operational implementation. Areas covered in this task include technical support the mission directives including: support for advanced concepts, systems studies, NASA's transition to commercial communications, aeronautical communications, and corresponding experiments, educational opportunities, demonstrations and promotion.

Space Network Ground Segment Sustainment (SGSS) Project Support (SOW Reference 3.8.1)

The Space Communications Office at NASA GRC is involved in multiple projects and tasks which requires Information System(IS) and IT skills and tools for various activities within the agency's Space Communication and Navigation System (SCaN) Program. It is instrumental in ensuring consistency between infrastructure networks (e.g., DSN, GN, SN, NISN) and customers, specifically including NASA missions. These activities require IS and IT expertise specifically in terrestrial and space communications, networking, computing, software systems and integration, human-machine interface, documentation and IS/IT general specializations. The Space Network (also known as TDRSS) Ground Segment is being planned for major upgrades and changes in the coming years. These include addressing the current aging and decreasingly-available equipment and increasing the operator situational awareness, availability of standard interfaces for data processing and service management, and enhancing reliability, maintainability, and availability through a new architecture. A large –scale project known as SGSS has been set up to implement the upgrades by 2016.

The Contractor will assist NASA GRC personnel in creating and analyzing the operational and systems documents and review inputs to the contractor documents. This task may require using architecture modeling, supporting the construction of an advanced concepts laboratory for the project, and production of high-quality IS products for project reviews. This will also involve close interaction with project management and systems engineering staff at GRC and Goddard Space Flight Center. The support will also be required as an IT document specialist in creating project reports etc. and other duties as requested.

Compatibility Test Set (CTS) Support (SOW Reference 3.8.1)

Support the Space Communications and Navigation (SCaN) Compatibility Test Set (CTS) Project in the areas of data/configuration management, 7120 Project Management and GLPR project requirements management, project controls, and documentation deliverables from the IT perspective. Provide configuration control and knowledge management using available information technology tools and databases. Specific knowledge, skills and abilities are required in the use of Microsoft Office suites, configuration management and software tools to support the CTS Project in the following significant areas:

Document Support

1. Provide support for Project level deliverable documents for the performance period including all documents required for 7120 Project Management compliance.
2. Provide support to assure document compliance to the GLPRs.
3. Support the project team in the creation and review cycle for all documents including the CTS Project Plan, Requirements, Architecture Design, Operational Concept, Data/Configuration Management, Systems Engineering Management Plan and Verification and Validation documents.
4. Complete Project level presentations for the performance period include standard monthly and quarterly reviews and special reviews when CTS is the primary focus or benefactor of the meeting or review.
5. Merge information provided from multiple sources and formats into a cohesive independent deliverable document.

6. Provide configuration control for project documents, support of document review processes, change tracking, revisions, maintenance and storage on a suitable limited access server.
7. Review and Meeting Support for:
8. Project level reviews and meetings for the performance period include standard monthly and quarterly reviews and special reviews supporting the CTS Requirements, Architecture, Operational Concept documents
9. Support project document meetings and reviews as requested by the Project Manager
10. Coordinate IT services required for local and remote presentations and participant interaction.
11. Provide logistical support when CTS is the primary focus or benefactor of the meeting or review
12. Maintain a list of decisions, directives, and requests for action resulting from meetings and reviews for the project record, response and closure.
13. Requirements Data Management, Revision and Tracking

SCaN Compatibility Test Set (SCTS) Software Development Support (SOW Reference 3.8.1)

Contractor shall support of the Space Communications and Navigation (SCaN) Compatibility Test Set (CTS) Project in the area of GUI/Controller. Lead the development of the GUI/Controller functions required in the CTS project as well as integration with other technical functions.

Specific knowledge, skills and abilities are required in the use of software development tools and processes to support the CTS Project in the following areas:

1. Lead the effort to develop, integrate and verify the GUI/Controller software for CTS Delivery #2 Ka-Band relay.
2. Lead the effort to develop, integrate and verify the GUI/Controller software for CTS Delivery #3 local test set.
3. Develop the required GUI/Controller CTS review presentations and software documents for each delivery.
4. Provide support to the CTS project by integrating the GUI/Controller functions required in each CTS product to meet all the requirements.

38.02 – Specialized Information Systems
Data Systems

Test Facilities Information Technology and Electronic Support (SOW Reference 3.8.3)

The Contractor shall furnish management, technical/engineering, administrative, and support (including logistics and procurement) labor; supplies, spare and replacement parts planning and budgeting; documentation and reports; and services required for the timely and effective installation/removal, coordination of calibration by the GRC Calibration Lab and, where applicable, Insitu by the contractor in accordance with NASA Policy Directive 8730.1 (as revised), preventative and remedial maintenance, engineering revision maintenance, operation,

administration, component fabrication and configuration management of the centralized and distributed systems in approximately 50 operational facilities. Typically, the data system operations for this sub-task take place on the centralized systems located in the RAC building. In addition, The Contractor shall provide the services required by this sub-task for all new systems (data, control and instrumentation) that may be commercial off the shelf (COTS) or developed by the Testing Division (Org. FT) in the future, once they are implemented at facilities. All duties listed below must comply and assist in the development of GRC ISO9000 procedures and work instructions as they apply to the work performed.

This work area consists of the following duties:

1. Systematic/Programmatic Installation, Removal and Reconfiguration of Test Facility Systems (Data, Instrumentation, and Control) including electronics.
2. Facility Hardware Preventative Maintenance
3. Diagnostic and Calibration Equipment Maintenance
4. System Asset Management
5. System Remedial Maintenance - Hardware, Software, System Administration
6. Data Backup and Restoration
7. Software Maintenance
8. Specialized System Support
9. Reporting and Planning

Test Facilities Systems Administration, Maintenance, and Operations Support

Contractor shall provide systematic/programmatic installation, removal and reconfiguration of data, instrumentation, and control systems including electronics.

Provide the labor, transportation, and technical support to install/remove/reconfigure and test a system or system component to perform work requested by the Government via work requests. This element includes but not limited to, equipment burn-in/acceptance testing; coordination of system physical layout at the site; retiring/archiving data application jobs; determination of cabling layout, fabrication of required cables, panels and components; movement of the system components to the site; installation/removal/reconfiguration at the site; and the development and execution of system check-out procedures.

1. The Government will provide the due date/time, equipment to be installed, the facility contact information (if different than the PACE maintained contact list). The Contractor shall review the information provided and either accept as issued or negotiate with the Government an alternate due date/time.
2. Perform equipment removal, which entails either preparing for reutilization at another facility location, replenishing equipment inventories or preparing for excess.
3. Perform equipment reconfiguration to address specific program requirements which may include configuring a system for open or protected mode testing
4. All equipment transfers require the necessary paperwork to be submitted per NASA guidelines.
5. The Contractor shall process purchase requests. Problems with delivery delays shall be reported to the task monitor or their designee. The contractor shall remediate delivery issues with the vendor to satisfy government requirements.
6. The Contractor shall coordinate with the government in developing baseline testing and checkout instructions for all new devices/components/subcomponents prior to them being transferred to the Contractor for maintenance responsibilities.

Facility Hardware Preventative Maintenance (PM) (SOW Reference 3.8.3)

The Contractor shall develop a preventative maintenance plan for the task equipment and submit it for Government review. The quality and scope shall be consistent with that provided by the OEM specifications, the performance level required for the equipment and the GRC BMS Procedures for control of inspection, measuring and test equipment regarding instrumentation maintenance and calibration. The plan shall include Insitu calibration (where applicable) in accordance with NASA Policy Directive 8730.1 (as revised), and OEM specification and also the status of the facility that the equipment is located. The facilities have 4 status categories which affect the PM scheduling, Operational (an actively maintained facility available for customer usage), Standby (no testing is planned for 6 months), Mothballed (no maintenance is to be performed), and Abandoned (no work is to be performed). During these different status levels the PM schedule shall be quarterly, biannually, annually and none as appropriate. In special circumstances, the Government or Facility Contacts shall request a schedule variance for performance of preventative maintenance of the task equipment to minimize disruption of critical experimental facility run schedules.

Diagnostic and Insitu Calibration Equipment Maintenance (SOW Reference 3.8.3)

The Contractor shall ensure that all equipment used to execute the preventative maintenance plan and perform Insitu calibration of task equipment is calibrated in accordance with NASA Policy Directive 8730.1 (as revised). To ensure that this equipment is not out of tolerance, the Contractor shall send the equipment out for calibration prior to its use unless a government variance has been granted. Out of tolerance is defined as not calibrated or a calibration that has expired. A rating of Poor shall be given for the rating period if out of tolerance equipment is used to calibrate a data system. The Contractor is responsible for coordinating the calibration of the equipment it uses and the Data Systems Branch equipment. Maintenance of the task equipment shall not impact the task.

Task Equipment Asset Management (SOW Reference 3.8.3)

The Contractor shall provide hardware and software configuration management and periodic (not less than twice per year) status reports including; but not limited to, engineering revision maintenance, logistics (includes, but is not limited to, up-to-date equipment tracking, coordination of equipment procurement/delivery, organized hardware/software storage, facility specific hardware configurations, facility specific software configuration, facility specific data storage capacity), life cycle planning and tracking, assessment and maintenance of spares, proactive obsolescence planning, and warranty monitoring.

The Contractor performs the hardware and software configuration management for the task equipment. The Contractor shall maintain an inventory of systems equipment and spares and provide information to appropriate parties to maintain the Center's asset tracking systems per policy and guidelines established for property management (not less than twice per year).

Work requests and/or service requests involving the change of hardware and/or software configuration information shall be reflected in appropriate documentation.

The Government may request a physical audit and report of a specified system or specific type of task equipment at any time. The Contractor shall review the request provided and either accept or negotiate with the Government an alternate due date/time. The results of all audits shall be submitted within five business days of that request.

For all operational systems, The Contractor shall support the hardware and software configuration management efforts including, but not limited to, the following: distributing and loading operating systems software and Testing Division (FT) software to facility located systems; retiring/archiving data application jobs as requested, firmware updates, engineering change orders/factory change orders (ECO/FCOs). For systems under development, The Contractor shall assist in the development of hardware and software guidelines and procedures, working in conjunction with the Testing Division teams and the configuration management system.

The Contractor shall coordinate with the government in developing a baseline configuration plan for all new devices/components/subcomponents prior to them being transferred to The Contractor for maintenance responsibilities.

The Government will provide an agreed upon report that shall be used to measure the performance metrics. The agreed upon report shall be maintained in a configuration plan for future reference. In its absence, The Contractor shall check as applicable for each system/subsystem device and component the points that are necessary to ensure the reliability of the task equipment.

The Government will provide initial and changes of facility status and points of contact information. If the Contractor receives information from a facility that contradicts the current status, the Contractor shall pass the information to the government. The Contractor shall maintain this information and provide feedback to the Government.

System Remedial Maintenance - Hardware, Software, System Administration (SOW Reference 3.8.3)

The Contractor shall develop and maintain remedial maintenance plans, available to the Government for review, for the task equipment. The plan shall address escalation procedures and original equipment manufacturer warranty coordination.

The Contractor shall maintain all task equipment remedial maintenance activities history. The entry shall include the date and time, system identification, a description of the problem and its resolution. The Government reserves the right to review any and all log entries at any time.

The Contractor shall determine a method used to track the return to service time on all service calls (remedial maintenance activities). This information shall be made available to the Government for use in the performance metrics calculations.

The Contractor shall provide and support a method for operational/running facilities to obtain services necessary for the return to service of their systems covered under this task. An on-site response is required in 30 minutes (or less) for Lewis Field and 90 minutes (or less) for Plum Brook Station during coverage hours. Return to service start time shall begin after the service request method has been invoked and ends once the system is back to operational status and the facility is satisfied and has accepted the system. If further checkout determines that a problem still exists or the technician returns after being required to stop, than the start and stop times are repeated and then added to the prior total time for that event. Each service call is considered one event until the system is deemed operational by a facility representative.

Provide and support a method for facilities to request services performed under this task which includes; but not limited to, remedial maintenance, additions, removals, and modifications to the facility systems.

The Contractor shall be released from remedial maintenance responsibility, with TM approval, if the facility personnel accept the system problem "as is" due to current facility requirements.

Data Backup and Restoration (SOW Reference 3.8.3)

The Contractor shall perform daily, weekly and monthly backups in accordance with established Work Instructions and special backups identified in work orders. In the case of facility located equipment, The Contractor shall perform weekly confirmation checks with the facility contacts of at least 10% of the facilities to verify that the appropriate backups are being performed. Data must be restored to the original system or a designated target system in the event of data loss.

Systems shall be available for normal operation during the time that they are scheduled for use including facility setup, facility run and post processing time frames.

The Government will provide the period of time that the backup data shall be retained as well as a storage location and means for destruction upon expiration date for retention.

Software Maintenance (SOW Reference 3.8.3)

For COTS packages and operating system software used in the task systems, The Contractor shall maintain commercial software maintenance agreements with OEM vendors to receive timely software updates and telephone support or coordinate the commercial software maintenance agreements with other IT service providers at the GRC.

Systems have Government approved vendor releases for software and have all Government approved patches installed.

Specialized System Support (SOW Reference 3.8.3)

The Contractor shall perform software and/or hardware installation of specialized systems including but not limited to, system administration of HP, SUN, PC systems running data acquisition, graphics, database, program development, security encryption and data analysis products. The systems and customers are both in the central (RAC Building) and distributed facility locations. Special circumstances arise where specialized system support is required with short notice to support an active facility run schedule. Specialized System Support is defined as support that occurs outside of the normal baseline of the test facility.

Reporting (SOW Reference 3.8.3)

A monthly report shall be provided by the 5th business day of the month. The report shall include resource utilization data to support cost reimbursement; and a narrative summary of monthly activities.

A report for each metric in this task shall be provided to the TM by the 5th business day of the month.

A weekly report on hardware, software, system administration and any open activities shall be provided to the TM by COB Friday of each week. This report shall include events occurring from Friday the prior week to Thursday the current week.

Training (SOW Reference 3.8.3)

Provide training to ensure the staff remains competent and current with new maintenance practices and technology changes applicable to maintaining the task equipment.

Ensure that The Contractor personnel maintain awareness of current technologies and changes to existing technologies that are being or going to be used in task systems.

Participate to the fullest extent possible, with government provided courses and classes applicable to performing hardware/software maintenance of task equipment.

Ensure newly hired personnel are trained to perform hardware/software maintenance of the task equipment using approved Work Instructions (WIs) and procedures.

The Government will ensure that training or funding is provided to procure training, for newly introduced, specialized equipment that are being added to The Contractor`s area of responsibility prior to The Contractor`s acceptance of maintenance responsibilities for those systems. The Contractor shall provide a plan with an acceptance schedule, maintenance methodology and labor requirements prior to the Contractor assuming responsibility of that system. The Government shall review and approve the plan.

Hardware (SOW Reference 3.8.3)

The test facilities information technology hardware and electronics includes but not limited to the following:

1. HP Alpha Servers/Stations
2. Sun
3. Neff
4. System 8400
5. PACS PC
6. Personal Computers (PCs)
7. Video Overlay
8. X-terminals
9. Individual Digital Displays
10. Number and Push Button Entry Panels
11. Time Code equipment
12. Facility Dedicated LAN Equipment
13. Media converters
14. Bus extenders
15. Standard protected network
16. Printers and print servers
17. Dewetron
18. DataMax
19. Emerson Ovation
20. Measurement Specialties Netscanner
21. DSPCon
22. EDAS

23. Digital Temperature Scanners

Planned Changes to hardware environment are agreed upon and fully funded by the Government:

1. COBRA Data Systems, and Media Distribution Systems

Software (SOW Reference 3.8.3)

The test facilities information technology software includes but not limited to the following:

1. In-House Government Software (e.g. Escort)
2. Open VMS
3. In-House Diagnostics (e.g. HCHECK, LeakCheck)
4. Visual Basic Applications
5. WIN95, WIN98, Windows 2000, Windows XP, Windows 7, Linux, Various Unix OS (Solaris, Tru64 Unix)
6. Visual Numerics/PV Wave
7. Development Data Servers
8. Labview

Planned Changes to the software environment are agreed upon and fully funded by the Government:

1. Operating System upgrades
2. Application program version upgrades (e.g. Dewesoft Version 6 to Dewesoft Version 7)
3. Firmware upgrades

Security (SOW Reference 3.8.3)

The Contractor shall provide Information Technology security expertise to properly configure and maintain the varying security requirements (FISMA – Low, Moderate, and High Impact Levels, and Classified) for the fifty (50) plus experimental test facilities each with dedicated, standardized IT systems.

The Contractor shall maintain and enhance existing security plan for Information Technology covered under this task. Additional security tasks include but not limited to, maintaining and developing task equipment security configuration guidelines and procedures, briefing facility staff and facility customers on Testing Division Information Technology Security.

External Interfaces (SOW Reference 3.8.3)

The testing facilities information technology and electronics depend on the reliable services from the following external projects. Memorandums of understanding with accompanying service level agreements are to be established.

1. Inter and Intra-Center Networking
Provided and Supported by OCIO, Code V via I3P contract.
2. Broad Desktop Scope Services
Test facilities maintenance and operations support area will interface with many of the services provided by the I3P contractor including Help Desk, Asset Management, maintenance and equipment identified as ACES “seats”.
3. Calibration Services
Calibration Laboratory

4. Transportation Services
Shipping and Receiving

Facilities, Supplies, and Services (SOW Reference 3.8.3)

The Government will provide The Contractor with work space. The Contractor shall provide transportation services for task personnel and equipment to/from work sites. Make use of existing Government equipment transportation services whenever possible, but not to cause impact to the performance of the task.

Documentation (SOW Reference 3.8.3)

The Contractor shall maintain and develop procedures, guidelines, and maintenance plans for task systems/equipment.

Subtask Order Format for Discretionary Projects (SOW Reference 3.8.3)

Periodically, the Contractor shall be required to perform subtask orders to accomplish installations, de-installations, and reconfigurations of Task Systems.

The Government will provide the following information:

1. Schedule (due date for work completion and expected start date)
2. Program number and facility that the work shall be charged to
3. Equipment to be installed
4. Contact information (if different than the PACE maintained contact list)

The Contractor shall provide proposals to complete Discretionary Projects to the Government for approval. The due date for proposals will be specified at the time of the request.

Place of Performance/Work Location

The Contractor is expected to conduct work on-site at the NASA John H. Glenn Research Center in Cleveland, Ohio, and Plum Brook Station in Sandusky, Ohio. The Government will provide work space including storage space.

Hours of Work

The experimental test facilities normally operate between 7:00 a.m.–12:00 midnight Mon-Fri. Some experimental facilities operate 24-hours-per-day, 7-days-per-week. The work is staffed during core hours from 7:00 a.m. to 8:00 p.m. Mon-Fri. The customer may request support beyond 8:00 p.m. The Government will pay additional for support beyond the core hours and days. Hardware and/or Software on-site or on-call pager support outside core hours may be requested at additional cost to support facilities that are scheduled to run outside the core hours. A minimum of one week advanced notice to provide and 72 hours to cancel is required to be provided to the Contractor for this support. Total annual requests shall not exceed 20% of the normal working hours. Delivery of products shall be during normal Federal workdays.

Procurement Support (SOW Reference 3.8.3)

The procurement support is planned and budgeted for the totality of all procurements to typically range from \$500K to \$3000K per year. Support above that level will most likely require additional funding to be added to the task prior to being accomplished.

Reference Documents that apply to PACE Data System Task Area

Listed below are the NASA policies and procedures that have relevance to the support required in the PACE Task Support area.

- NPR 2810.1A Security of Information Technology
- NPR 2810.1C NASA Information Security Policy
- NPR 7150.2a Software Engineering Requirements
- NPR 1600.1 NASA Security Program Procedural Requirements
- GLPR 7150.1 GRC Software Engineering Requirements
- GLPR 2090.1 Intellectual Property Protection of Program/Project-Sensitive Data
- GLPR 1270.1 Corrective and Preventive Action
- GLPR 8830.1 Facilities Management
- GLPR 8730.6 Control of Inspection, Measuring, and Test Equipment
- GLPR 2090.1 Intellectual Property Protection of Program/Project-Sensitive Data
- GRC-W7100.029 Ops 911 Notification Process

Purchasing Related:

- GLPR 5100.1 Procurement
- GLPR 6000.1 Handling, Storage, Packaging, Preservation and Delivery

All Code FT-related documents shall be reviewed the following are Data System Task Area specific:

- GLP-FT-8080.08 Data System Service Requests
- GLP-FT-8080.09 Data System Software Management
- GLP-FT-8080.10 Experimental Testing Applications
- GRC-P7100.005 Customer Service Request Resolution Process

Definitions:

Programmatic: Facility hardware/software installation, removal and/or reconfigurations that are required by a test program and generated as a result of a program/management directive. Failure to achieve would impact the Government mission, program milestones, and reputation of Glenn and the testing facilities. A programmatic directive would be issued via the appropriate Testing Division Branch Chief, Division Chief or representative.

Systematic: Encompasses Day-to-Day activities, including but not limited to: Preventative Maintenance, Remedial Maintenance (repair jobs), Calibration, add/Remove/Reconfiguration of Subsystems/Components. These are well known items and have been repeatedly performed in the past.

Special Circumstances: Typically takes place when a requirement is misunderstood or not explicitly specified. This may result in a short time frame.

Out of Tolerance: Not Calibrated or Calibration has expired.

Facility Terminology

Operational: An actively maintained facility available for customer usage.

Standby: A Government designation in which no testing is planned for 6 or more months.

Mothballed: A Government designation in which no maintenance is to be performed. Data system configuration information is to be maintained.

Abandoned: A Government designation in which no work is to be performed

Work Request Definitions:

Small: 2 or less business days for completion

Medium: greater than 2 but less than or equal to 5 business days for completion

Large: greater than 5 but less than or equal to 30 business days for completion

Special Services: mission specific

Business Day: 7:00 a.m. – 8:00 p.m., Monday – Friday

38.03 – Specialized Information Systems

Unmanned Aircraft Systems (UAS) in the NAS/NextGen Support

Unmanned Aircraft Systems (UAS) in the NAS/NextGen Support (SOW Reference 3.8.1.5)

This task is to support the planning and technical efforts required to fly Unmanned Aircraft Systems (UAS) in the National Airspace System (NAS). In particular, this tasking provides requires specific network communication research and analysis efforts necessary to support the flight of UAS in the NAS.

The task will support the UAS in the NAS program as defined in the following text pulled from the GRC program description:

"GRC will support the Integrated Systems Research Program, addressing operational and safety issues related to the integration of unmanned aircraft systems (UAS) into the national airspace by providing expertise in: communications related to allocation of radio frequency spectrum; communication links (satellite, line of sight, network and data link protocols); and simulations (NextGen communication schemes scalable to support the introduction of UAS)."

Overall Objectives:

The research for this task focuses on future voice and data communication system concepts and operational profiles to enable unmanned aircraft systems to safely communicate with ground controllers. This task supports the research, analysis, and development of networked communication systems to enable the safe operation of Unmanned Aircraft Systems (UAS) in the National airspace.

Specific Work Requirements:

The contractor shall have an understanding and knowledge of current developments in networking and protocols as well as wireless communications and have the requisite expertise to apply that knowledge to Airspace Systems (especially the US national airspace) and Unmanned Aircraft Systems.

Although all work on this task will be managed and directed at Glenn, the contractor shall work with colleagues in other organizations who are supporting the NASA UAS effort. This includes colleagues located at any of the four NASA Aeronautics Centers (NASA ARC, DFRC, GRC and LaRC).

Contractor support shall include attendance at NASA (or NASA-directed) meetings. These may be local, via telephone, web or video-conference or at off-site locations.

- Support the research and technical efforts required to develop and validate candidate UAS safety critical command & control (C2) system/subsystem prototypes. These prototypes shall comply with UAS international/national frequency regulations, ICAO Standards and Recommend Practices, and FAA/RTCA Minimum Operational Performance Standards/Minimum Aviation System Performance Standards for UAS.
- Support the analysis, testing, and mitigation against security risks to the confidentiality, availability, and integrity of the integrated Air Traffic Control (ATC) and C2 communication/network systems; propose requirements and develop architectures/standards to support these requirements; and support integrated testing to validate performance in a relevant environment.
- Testing will require the towing of a Data Collection Trailer. To accomplish the requirements detailed in this task, the contractor shall provide a tow vehicle that the contractors can drive (GRC and GSA avenues for obtaining this vehicle have been explored and exhausted to the contract).
- Support the IT, networking, communications and data collection/analysis activities of NASA UAS CNPC flight testing. This includes both channel sounding and CNPC radio flight testing.
- Programming in C+ and other suitable languages (Perl, Python, etc.) to support the data collection, transmission of telemetry, and other support software necessary to conduct the requisite testing and analysis. This includes lab and flight test programming support.

End Products:

- Documents, presentations, spreadsheets, or other appropriate format to display the requested research, analysis, data, or results.
- Create the necessary test environment(s) to support the communication/network/security research both in the laboratories and on flight platforms to support the research.
- Perform testing, collect data, and conduct analysis as appropriate to develop/validate the prototype communication/network/security systems.

Assumptions:

- All network hardware, firmware, and software is provided by NASA GRC.
- All required facilities and equipment are provided by NASA GRC.
- All Team PACE employee workstation equipment is provided by NASA GRC.

