Technical Representative: Cierchacki, Irene-TR

Task Number: NNC06E001T - 13

Task Title: ED MIO Web Support

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

The performance of this task order will provide information technology, resource management, and configuration management support to the Management Integration Office (MIO) of the Engineering Directorate (ED).

Task Order Description
Description of Services to be procured

NASA requires contractor support to provide the necessary personnel and materials to develop, maintain and update the GESS2 Contract Management System (CMS), including electronic submission of Contract Task Requests, evaluation criteria, periodic amendments to the Statements of Work, task responses. and configuration management of the CMS, ***with minimal support on the funding application.*** NASA will require various data from these systems relative to programmatic, management, and performance reports on a mandatory or adhoc bases.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

Subtask 1: GESS2 Contract Management Systems (CMS) Support:

The contractor shall support, maintain and update the web-based GESS2 CMS used by the Contracting Officer's Technical Representative (COTR), Technical Representatives (TR) and Contracting Officer (CO) for the Glenn Engineering and Scientific Support 2 (GESS2) Contract for the processing of task orders

Additionally, the Contractor shall:
*support a CMS Help Desk
*provide and support training of GESS-2 government and contractor personnel relative to input and processing of actions within CMS.
* provide adhoc and mandatory reports.
*be responsible for the monthly reconciliation of ATOMS/CMS.
*acquire and deliver to the government all unique equipment necessary to house and operate CMS, other sites in support of ED, hardware sufficient to permit simultaneous programming and software viewing functions, and various equipment approved by the NASA TR, considered necessary to the efficient performance of work under this task
*support and comply with IT Sercurity requests and updates
*funding application

Subtask 2: RESERVED

Subtask 3: Configuration Management CMS

The contractor shall provide Configuration Management support of the CMS.

The contractor shall work toward providing an automated configuration management process, assign Configuration Items, setup a status accounting systems, and update the Configuration Management Plans as necessary.

The contractor shall jointly develop a schedule with the COTR on changes and due dates of approved CMS changes.

The contractor shall refer to the GESS-2-CMS PLAN-001, “Glenn Engineering and Scientific Support (GESS-2) Contract Management System (CMS) Configuration Management Plan (CMP)”.

Subtask 4: RESERVED

Subtask 5: Training & Travel
The contractor shall propose training requirements as necessary , to ensure personnel are up-to-date on current programming version and skills to support the task requirement.

The contractor shall use judgment in requesting training. The contractor shall ensure that local training is not available prior to requesting training/travel.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

Milestones and Deliverables

Entire Task

Monthly Technical progress report.

The contractor shall submit to and brief the COTR monthly on technical progress and finances, This shall , include open risks, mitigation activities, hours associated by each subtask proposed activities for the following month, and notification of a cost variance that exceeds 5 percent of estimated cost during the award fee period.

Subtask 1:

Provide Award Fee Period reports and other ad hoc reports as needed by the COTR and TR.

Subtask 3:

Schedule Configuration Management Change Board Meetings for CMS at a minimum quarterly, maximum monthly.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	Weights
Performance	60
Schedule	20
Cost	20

Desired Personnel Skill Sets

The contractor shall provide personnel who has a skill and knowledge base to support the requirements of this task

Government Furnished Property

The following servers will be provided and maintained by NASA:
-Amicus (sandbox)
-Amicus1 (shared server)
-GRGESS (production)
-GRGESS DEV (test server)

Safety and Assurance Plans

None Selected.

Technical Representative: Envia, Edmane

Task Number: NNC06E003T - 12

Task Title: Propulsion System Aeroacoustic Research

Task Details

Period of Performance
2/9/2009 - 8/31/2011

Background
Why the project is being pursued

This Task was formerly GESS Task 5.
BACKGROUND:

The Acoustics Branch conducts research aimed at understanding and mitigating aircraft engine noise. Experimental and analytical methods are used to improve the understanding of the fundamental aspects of noise generation mechanism in aircraft engines. Knowledge gained from such research is used to develop noise reduction technologies for aircraft propulsion systems. In this task, research is directed toward fan noise diagnostic and jet noise diagnostic & modeling. Model scale fan and jet systems are acoustically evaluated using rig tests in wind tunnel or other facilities by employing suitable diagnostics techniques. Computer codes to predict aeroacoustic performance of jets are developed and validated using rig data.

Task Order Description
Description of Services to be procured

TASK ORDER DESCRIPTION:

Support development of analytical models and computer codes to predict jet noise and validate the models using experimental data obtained in jet rig tests. Support development of advanced diagnostic techniques to localize and quantify sound field produced by fans and jets using model scale hardware in wind tunnels or other facilities including engine test stands.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

*** Government's Estimated Period of Performance is April 1, 2009 to August 31, 2011 ***

Specific Work Elements

1. Support development and application of analytical models and computer codes to predict the acoustic fields radiated from jet exhausts. Validate the codes with experimental data.

2. Support development and implementation of two- and three-dimensional phased

arrays concepts/systems for noise diagnostic measurements in wind tunnel, free jet facilities or engine test stands.

3. Publish results in NASA reports, conference and/or journal papers.

4. Government's estimated period of performance is from April 1, 2009 through September 30, 2011.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

MILESTONES AND DELIVERABLES:

********* NEW AS OF AFP7 - AUGUST 13, 2009 *********

Investigate source modeling for heated jets. This activity shall include the following element(s):

1. Predict jet noise for a parametric set of hot round single stream jet cases and compare the results with measured NASA data.
(12/31/2009)

2. Predict jet noise for a parametric set of hot round dual stream jet cases and compare the results with measured NASA data.
(3/31/2010)

Investigate aeroacoustic influence of solid surfaces on jet noise. This activity shall include the following element(s):

3. Outline an acoustic analogy based approach for modeling the influence of nearby solid boundaries on jet noise.
(1/31/2010)

4. Develop and document a computer code embodying the theoretical model for predicting noise form jet/surface interactions for a class of configurations that are applicable to conventional pylon-mounted engines as well as hybrid wing body aircraft configurations.
(09/30/2010)

5. Assess the ability of such a code for predicting noise for a set of appropriate benchmark cases.
(06/30/2011)

Investigate the use of power laws for jet noise prediction:

6. Define an appropriate parameter space for a set of jet noise rig tests that would supply data for developing scaling law(s) for predicting noise from round dual stream jets.
(10/31/2009)

7. Develop and document scaling law(s) for predicting noise from round dual stream jets.
(10/31/2010)

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	Weights
Performance	50
Schedule	25
Cost	25

Desired Personnel Skill Sets

PERSONNEL PROFILE:

A Ph.D. in engineering with extensive knowledge and experience in the following areas are required: fluid dynamics and aeroacoustics; development of the underlying mathematical framework and its translation into functional computer codes. Critical skills required include expert knowledge of the statistical theory of aerodynamic noise with particular emphasis on jet noise, sound/flow/surface interactions, and the propagation of sound through inhomogeneous media.

Government Furnished Property

None.

Safety and Assurance Plans

None Selected.

Technical Representative: Chato, David

Task Number: NNC06E004T - 16

Task Title: Cryogenic Fluid System Research & Engineering

Task Details

Period of Performance
2/12/2009 - 8/31/2011

Background
Why the project is being pursued

This Task was formerly GESS Task 7.
BACKGROUND:

The Propulsion and Propellants Branch (RPP) has responsibility for developing technology for storage and transfer of liquid cryogens. One aspect of this technology development is conducting experiments using cryogens or cryogenic simulants. These tests are conducted in either ground based (one-g), or low gravity environments.

Task Order Description
Description of Services to be procured

TASK ORDER DESCRIPTION:

The contractor shall provide research and engineering in the Propulsion and Propellants Branch.

Research responsibilities shall include definition of experimental requirements, design of experiment hardware, reduction and analysis of data, and program support to define and advance technologies advocated by the Propulsion and Propellants Branch.

Engineering responsibilities will include conducting tests, writing check sheets, test stand safety (including safety permits, adequacy of hardware, acquisition of data and coordination of project engineers and technicians). Will also be responsible for the design and build up of new test facilities.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

Broad Scope of Work:
Government's Estimated Period of Performance is April 1, 2009 to August 31, 2011*

The contractor shall provide research and engineering in the Propuslion and Propellants Branch.

Research responsibilities shall include definition of experimental requirements, design of experiment hardware, reduction and analysis of data, and program support to define and advance technologies advocated by the Propulsion and Propellants Branch.

Engineering responsibilities shall include conducting tests, writing check sheets, test stand safety (including safety permits, adequacy of hardware, acquisition of data and coordination of project engineers and technicians). Will also be responsible for the design and build up of new test facilities.

Specific Work Elements

a. Engineering analysis, design, and test for cryogenic components and systems. These experiments will be tested at GRC and Plum Brook cryogenic test facilities (Small Multipurpose Research Facility, Plum Brook facilities, etc.).

b. Engineering analysis, design, and test for low gravity cryogenic and cryogenic simulant test beds. These experiments will be designed to be flown on NASA low gravity test platforms.

c. Engineering analysis, design, and test of other cryogenic components and systems as required by agreements with other NASA and industry agencies.

d. Proposal preparation in response to NRA's RFP's, etc. in the area of cryogenic components or systems.

e. Technical analysis in support of multilayer insulation performance testing and heat load calculation.

Travel Requirements:

Travel should be included for technical interchange meetings with other parties and for presentation of test results at appropriate conferences.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

Deliverables and Milestones to be met
*************NEW AS OF AFP7 - OCTOBER 1, 2009 *******
Milestones:
1. LCH4 Integrated feed system test kick off (10/31/09)
2. NASA/Boeing ICD's defined for Boeing LN2 calorimeter test (11/15/09)
3. LOX helium solubility test rig operational (11/15/09)
4. LOX helium solubility testing complete (11/30/09)
5. All CFM Project documentation required for FY10 (resource loaded schedule, CRCC test facility schedules, CFM Products and Milestones) complete (11/30/09)
6. Training for use of Thermal Desktop software complete (12/15/09)
7. Boeing LN2 calorimeter test in bldg 301 tank 6 vacuum facility complete (1/31/10)
8. Methane Lunar Surface Thermal Control Test (MLSTCT) complete (3/15/10)
9. Planning for CFM technology required for in-space cryogenic propellant depots (including flight experimentation) complete (3/31/10)

Deliverables:
1. LCH4 Integrated CFM feed system "prototypical" test hardware development plan complete (10/31/09)
2. NASA/Boeing ICD's for Boeing LN2 calorimeter test complete (11/15/09)
3. All CFM Project FY 10 documentation (resource loaded schedule, CRCC test facility schedules, CFM Products and Milestones) complete (11/30/09)
4. LCH4 Integrated CFM feed system requirements definition/SOW's complete

(12/31/09)
5. For MLI performance variability research program
a. Complete the Thermal control data base assessment (12/15/09)
b. Select MLI candidate configurations and develop a draft test matrix (12/15/09)
6. Heat Load/Boil Off analysis for Propellant Scavenging research program (1/31/10)
7. Preliminary analysis of Methane Lunar Surface Thermal Control Test (MLSTCT) data using Cryo SIM complete (3/31/10)
8. CFM Project FY11 PPBE draft complete (3/31/10)
9. LCH4 Integrated CFM feed system hardware contracts awarded (3/31/10)
10. Project tracking and schedule updates for CFM Project (monthly)

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	Weights
Performance	40
Schedule	40
Cost	20

Desired Personnel Skill Sets

Senior engineering and mid-level experience in cryogenic and vacuum system design and operation shall be required to perform this work. Additional support from expert engineer(s) and/or consultant(s) will be utilized on an as-needed basis. Additional limited support from qualified engineer(s) will be utilized on an as-needed basis.

Government Furnished Property

GOVERNMENT PROPERTY:
None

Safety and Assurance Plans

None Selected.

Technical Representative: Mccartney, Timothy

Task Number: NNC06E005T - 13

Task Title: Advanced Aircraft Research & Technology Project

Task Details

Period of Performance
2/13/2009 - 8/31/2011

Background
Why the project is being pursued

The Advanced Aircraft Project Office has an interest in performing fundamental and focused interdisciplinary research to study the behavior of candidate high temperature materials for consideration in a variety of aerospace applications. Highly specialized experimental and modeling techniques in material science, solid state physics and electronic engineering are required to evaluate the properties and durability of advanced materials to support the technical needs of the Office.

Task Order Description
Description of Services to be procured

TASK ORDER DESCRIPTION: The Contractor shall perform fundamental and focused interdisciplinary research to study the behavior of candidate high temperature materials for consideration in a variety of aerospace applications.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

SCOPE OF WORK: The Advanced Aircraft Branch has had, and will continue to have, a materials research role. The Branch supports materials development, testing, analysis and performs modeling to provide specialized materials that meet performance requirements identified by the AAP and their DoD and industry collaborators.

Government's Estimated Period of Performance is April 1, 2009 to August 31, 2011.

SPECIFIC WORK ELEMENTS:

The specific work elements of this task include:
1. Apply existing and develop appropriate science-based models to convert test measurement data into material property values for material/component design and selection.
2. Provide guidance and conduct experimental research to support model development and verification of properties.
3. Document and report research results, via oral presentations and written technical articles, which could include joint authorship with government and/or industry counterparts.

REQUIREMENTS:

A top secret security clearance is required to perform the assigned tasks and maintain technical exchange discussions with NASA and their contracted industry counterparts. The details are classified.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

It should be noted that milestones and deliverables do not clarify content of task requirements due to the nature of the program. The deliverables/milestones to be met include:

1. Modify existing software to maintain an accurate and efficient state-of-the-art approach to analysis for use in candidate material property measurement data calculations on an on-going basis.

2. Investigate the use of the CST Microwave Studio electromagnetic field simulation code to establish the limitations of measurement and analysis procedures. Recommend and provide guidance on the implementation of improvements.

3. Continue interactions with DoD and industry counterparts to evaluate and make use of the best measurement and data analysis procedures. NASA measurement/analysis procedures must yield the most accurate and consistent data. Document any changes and impact on industry standards of measurement.

4. Participate in industry/government round-robin on measurement and analysis techniques. Incorporate the best approaches into NASA measurement systems.

5. Investigate magnetic sample measurement methods and identify an appropriate procedure, and work to implement its use within the project. Instruct Branch technician in use of procedure. Provide written documentation for referencing.

6. Provide measurements of project samples from in-house and contracted sources. Anticipate approximately 50 samples per year. Complete analyses within 2 months of receipt of samples.

7. Provide facility measurement system design, build and support. Provide measurements of project hardware in the AAP facility. Work with research engineers to provide data reduction to guide the test effort and complete analyses.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	50
Schedule	30
Cost	20

Desired Personnel Skill Sets

Research Electronics Engineer(s) with a top-secret security clearance. Contractor shall have technical exchange discussions with NASA personnel and their contracted industry counterparts.

Government Furnished Property

None

Safety and Assurance Plans

None Selected.

Technical Representative: Dever, Joyce

Task Number: NNC06E006T - 26

Task Title: Environmental Durability of Advanced Materials

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

This Task was formerly GESS Task 10..

The Durability & Protective Coatings Branch within the Structures and Materials Division is responsible for evaluating the durability of advanced materials, identifying the causes of materials degradation, and developing protective coatings for use as structural and/or functional materials at high temperatures and in aggressive environments. Materials of interest include metals, ceramics, polymers and composites. This task shall provide support for developing, testing and characterizing advanced materials and coatings for high temperature, aggressive aerospace environment applications.
Specific testing techniques to address these research needs include exposure to simulated aircraft engine combustion environments and high temperature isothermal and cyclic furnace experiments. Test techniques also include vacuum hot pressing of two or more materials, performing experiments and analysis of thermogravimetric analysis (TGA) furnace data, preparing pre- and post-test specimens for characterization, maintaining and calibrating experimental equipment and establishing safe working conditions in and around the laboratory site. This research also requires development and deposition of plasma sprayed and physical vapor deposited coatings. NASA projects specify coating requirements necessitating development of deposition techniques and optimizations to achieve compositions with desired physical and microstructural properties to meet these requirements. This research requires preparation of test materials, demonstration pieces and end-use components.

Task Order Description
Description of Services to be procured

Subtask 01: Coatings Development

The contractor shall conduct robotic-based plasma spraying under ambient conditions and in a low pressure vacuum chamber, and physical vapor deposition to apply coatings to substrates of various types, sizes, and shapes for subsequent testing and characterization; to provide protective overlay coatings on components for use in NASA durability rigs; or as deliverables to mission project or industrial partners/customers. The contractor shall also evaluate properties of the deposited coatings using available laboratory techniques. NASA will provide necessary equipment and materials for these activities.

Subtask 02: Environmental Durability Testing

Eight Mach 0.3 Burner Rigs and the High Pressure Burner Rig (HPBR) are the test systems used to evaluate the durability and life of research materials in simulated gas turbine (jet fuel) and other hydrocarbon-fueled engines (which could potentially include kerosene or methane-fueled combustion). In addition, the Quick Access Rocket Exhaust Exposure Rig (QARE) simulates the combustion environment of O2/H2-fueled engines and is used to evaluate the durability and life of materials and subcomponents for rocket engine applications. The contractor shall perform testing using these specialized test systems. NASA projects will provide specifications and materials to be tested. In order for the contractor to perform work in these systems, it is necessary for the contractor to have expertise operating similar test equipment, to be able to modify testing fixtures and configurations to adapt to the specimens and materials to be tested and to use and adapt specialized electronics and instrumentation systems for these tests.

Subtask 03: Oxidation Studies

Evaluating the durability of metals, ceramics, polymers, composites and coating materials requires measuring the physical/thermal properties, establishing the oxidation-, corrosion-, erosion-, and/or diffusion-resistance. To perform this work, the contractor shall have expertise in the operation of laboratory testing/analysis equipment, equipment set-up/evaluation, preparation/assembly for unique experiments set-ups, evaluation techniques, and pre/post-test specimen preparation.

General Scope of Work

SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

For each subtask, NASA projects will provide material and test specifications and the contractor shall provide coating development and/or testing to meet these NASA-provided requirements. Research activities which are deemed to require rig design and/or modification should be reviewed with the NASA TR prior to initiating any changes.

Subtask 1:

The contractor shall maintain close collaboration with the NASA research team lead and practice careful handling of the research materials before and after coating. The contractor shall provide regular and conscientious maintenance, modification, calibration, operation and accurate record keeping of the plasma spray rigs and associated instrumentation is very important to the success of the research activities.

The Performance-Based Contractor shall:

1. Develop and optimize deposition parameters, and apply single- and multiple-layered coatings for structural and functional research materials.
2. Apply/optimize coatings by plasma spray deposition onto various substrate materials required to meet NASA programmatic goals.
3. Conduct routine rig maintenance and continuing assessment of rig performance and reproducibility in spraying the various coatings the proper and timely calibration of research equipment.
4. Practice and maintain awareness of safe operating procedures in the laboratories.
5. Continue development, upgrade and operation of the test rigs to provide the appropriate test parameters/procedures to best evaluate the performance of the aerospace propulsion and power materials for NASA and industry technology development projects.
6. Attend required training for handling and disposing of hazardous materials, for selecting/using the proper protective equipment, or other safety-related training required for performing the work.

7. Keep abreast of the laboratories, equipment, chemical storage, characterization, and safety-related equipment operational status/failures or other issues to support the proper operation and ready availability of the Plasma Spray Facility.

Subtask 2:

Mach 0.3/0.8 Burner Rig, High Pressure Burner Rig (HPBR)and QUick Access Rocket Exhaust (QARE)Rig studies of these research materials are required by this subtask. Testing under extreme conditions, such as high heat flux, high temperature and possibly corrosion conditions, high flow velocities and elevated pressures are necessary. Burner rig operations require hearing protection and annual auditory testing as well as fuel handling/spill prevention. The oxygen and hydrogen-fueled QARE requires special training in handling hydrogen tanks and working with high concentration mixtures of hydrogen and oxygen. Close collaboration with team lead research scientist/engineer and conscientious maintenance, rig modifications, equipment calibration and operation and accurate record keeping of the testing facilities and associated instrumentation is critical to the overall success of the research tasks.

Performance Based Contractor shall:

1. Conduct oxidation, corrosion, erosion and hot corrosion tests of advanced materials under simulated engine conditions.
2. Develop techniques and perform experiments to determine the thermal shock resistance of advanced materials.
3. Perform experiments on processing and characterizing of advanced materials.
4. Continue development, up-grades and operation of the test rigs to provide the appropriate test parameters/procedures to best evaluate the performance of the aerospace propulsion and power materials for NASA and industry technology development projects.
5. Conduct pre/post-test evaluation/sample documentation for reporting, along with the test parameters and data to the team lead.
6. Practice and maintain awareness of safe operating procedures in the laboratories and maintain properly and timely calibration of equipment.
7. Keep abreast of the laboratories, equipment, chemical storage, characterization, and safety-related equipment operational status/failures or other issues to support the proper operation and ready availability of the laboratories in Buildings 24 and 34.
8. Attend required training for handling and disposing of hazardous materials, for selecting/using the proper protective equipment, or other safety-related training required for performing the work function.

Subtask 3:

Characterizing advanced material behavior and degradation behavior in aerospace propulsion environments requires carefully controlled, high-temperature laboratory tests. A variety of tests are conducted to determine the environmental durability of various materials in controlled environments. Diffusion-bonding experiments are important in the study of the chemical compatibility of different materials. Conscientious operation, maintenance and calibration of sensitive laboratory equipment is required. In addition, complete knowledge and experience in machining appropriate test specimens and performing post-test metallographic sample preparation is needed.

The Performance Based Contractor shall:

1. Perform experimental system set-up, execute furnace-based testing of research material specimens, which would include metals, ceramics, polymers and their composites, and prepare for/coordinate obtaining chemical, microstructural analysis and evaluation.

2. Conduct thermogravimetric analysis (TGA), furnace and vacuum hot press testing of advanced materials and coatings.
3. Perform machining of specimens, conduct metallographic preparation of research materials for microscopic characterization, and determine/measure specimen physical properties important to the individual studies.
4. Practice and maintain awareness of safe operating procedures in the laboratories, and around laboratory sites, and maintain proper and timely calibration of instruments.
5. Keep abreast of the laboratories, equipment, chemical storage, characterization, and safety-related equipment operational status/failures or other issues to support the proper operation and ready availability of the laboratories in Buildings 100-Annex and 106.
6. Attend required training for handling and disposing of hazardous materials, for selecting/using the proper protective equipment, or other safety-related training required for performing the work.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

1. Monthly activity reports. The contents of the monthly reports are evaluated at the end of the 6 month award fee period. At the request of the TR, the contents of these reports should have emphasis on the following items:
a) Technical work performed including research activity, effort level, status, and other research engineers involved in project.
b) Facility issues such as equipment operation, maintenance, calibration activities, downtime, and facility or equipment needs.
c) General issues related to work, progress, schedules, equipment and laboratory needs, safety issues, etc.

2. Technical highlights describing significant accomplishments within on-going laboratory and testing studies shall be drafted and submitted to the NASA TR for organizational reporting to NASA management.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

******* NEW AS OF AFP7 – OCTOBER 1, 2009 ************

Bring new 1650 C TGA system to operational condition by 12/1/2009 in support of the Hypersonics Project.

Initiate furnace testing of advanced thermal barrier coatings by 2/1/2010 for research under the Supersonics Project.

****

Criteria to Be Used for Evaluation	Weights
Performance	50
Schedule	30
Cost	20

Desired Personnel Skill Sets

This work will be assigned to the Materials Durability Section of the contractor. Progress reviews will be conducted regularly with the cognizant NASA TR. Any revisions to the personnel requirements which may result from these reviews and will be mutually agreed upon by the TR and Contractor supervisor.

Subtask 01: Contractor shall provide professional expertise to perform the task activities. The work in plasma spraying requires senior engineering ability with extensive experience in various aspects of plasma spray coating technology. Must be able to program and execute programs for two six axis industrial robotic systems, (Asea Brown Boveri S3 AAB IRB 2400) ability to program, edit, and execute robotic programs using ABB Robotware software application and Programaker. Contractor shall provide engineering support to perform the task activities.

Subtask 02: Contractor shall provide professional expertise with detailed knowledge and experience in burner rig operations, general electronics, sample preparation techniques, high temperature furnaces, design and fabrication of specialized fixtures, mechanical, thermal and electrical property testing, and data acquisition systems. Professional should also have experience in computer programs such as Matlab, Testpoint, visual basic, and HP basic.

Subtask03: Contractor shall be capable of providing hands-on technical support and must possess a signficantly detailed background and expertise in oxidation and corrosion testing, thermogravimetric experiments, general electronics, data acquisition techniques, vacuum systems and leak detection, metallographic analysis, microscopy, and high temperature furnaces.

Government Furnished Property

NONE

Safety and Assurance Plans

None Selected.

Technical Representative: Politi, Michael

Task Number: NNC06E007T - 12

Task Title: Service Module Mechanisms Support

Task Details

Period of Performance
2/6/2009 - 8/31/2011

Background
Why the project is being pursued

Entered as WISE Task 20061121 on 11/29/2006, ljm

This Task was formerly GESS Task 526.
No Bid form and email received 07/10/2006, ljm.

Entered as WISE Task 20060703, ljm.

GRC has been given responsibility for the Crew Exploration Vehicle (CEV) Service Module (SM) and Spacecraft Adapter (SA). As part of this GRC will be developing requirements, performing design cycles for government reference configurations, providing insight/oversight of the contractor's development of SM/SA and performing Independent Verification and Validation (IV&V) of contractor efforts.

Task Order Description
Description of Services to be procured

Provide mechanical engineering services in support of design cycles for the Prime Contractor vehicle. Provide engineering consultation regarding mechanism designs and layouts. Support IV&V activities of contractor efforts. Some data will be considered NASA Sensitive but Unclassified (SBU) and must be handled accordingly.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

*** Government's Estimated Period of Performance April 1, 2009 to Completion of GESS-2 Contract

The contractor shall:

Provide consulting on vehicle mechanism designs
Support the CEV design analysis cycles
Perform conceptual layouts of mechanisms using Pro/Engineer
Assist in refining specific mechanisms through investigation of previous spacecraft applications.
Review documents in support of vehicle requirements reviews.

The Government will provide:

Pro/E models of existing vehicle configurations
Access to Pro/E
Access to documentation

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

The following are the milestones and deliverables for this task:

1. Review of inputs by contractor for the Master Equipment List, including mass, volume and power.

2. Review of inputs to design analysis cycle Engineering Reports.

3. Monthly Technical Progress Report.

4. Technical comments to documents for vehicle requirements reviews, including peer reviews, technical reviews, and Vehicle PDR.

5. Support Project level reviews for sub-system and module PDR.

6. Weekly technical progress reports.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	70
Schedule	20
Cost	10

Desired Personnel Skill Sets

Seasoned engineers who have experience with space flight hardware, Pro/E, mechanisms, and mechanical design and analysis.

Government Furnished Property

GRC shall provide:

1. Access to Pro/ENGINEER models of existing vehicle configurations

2. Access to Pro/ENGINEER for use by the contractor.

3. Access to Windchill

4. Access to Ansys

Safety and Assurance Plans

None Selected.

Technical Representative: Sil, Ajit

Task Number: NNC06E008T - 9

Task Title: RTM Data Management

Task Details

Period of Performance
10/1/2009 - 2/24/2010

Background
Why the project is being pursued

This Task was formerly GESS Task 12.
BACKGROUND:

The RTM Branch is a branch within the NASA John Glenn Research Center tasked with the evaluation of advanced propulsion technologies and systems. This mission requires the use of a number of analysis codes. Creation of the input files and input data for these codes, the resulting output data, and the reports and presentations used to communicate these results constitute the major work product of this office. Management of these data and files is of critical importance to RTM.
The primary focus of this task shall be to create and maintain a system to manage the retention of this data and to assist the RTM engineers in utilizing this system.

The overall objective is to facilitate the average ASAO engineer in performing their work while at the same time making sure that the data ASAO generates is retained in a format that will assist other users now and in the future.

Task Order Description
Description of Services to be procured

TASK ORDER DESCRIPTION:

Provide Configuration Management support for Aeropropulsion Systems Analysis Office (ASAO). The primary focus of this task shall be to create and maintain a system to manage the retention of this data and to assist the ASAO engineers in utilizing this system.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

The scope of this work shall be to provide data management for CODE RTM using appropriate tools including the ClearCase program to maintain configuration and version control of all input, results data, and files used in RTM analyses, as well as documents reporting the results of the analysis. The scope shall also include creation of scripts and other automation to assist the user in setting up their analysis environment in the proper configuration as specified by the RTM Data Management Plan. The work shall also include keeping up to date documentation, including the Data Management Plan, the RTM users guide, and the RTM Clear Case administrator's data management plan.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

MILESTONES AND DELIVERABLES:

Perform daily ClearCase maintenance. This includes; creating branches & views/work areas, merging to mainline, creating labels, download requested NPSS versions, & troubleshooting issues on VOB. (On-going)

Issue reports of Data Management system activity, including monthly progress report. (Monthly)

Document and provide training in the use of ClearCase to the PSAB, both UNIX and Windows inter-operational environment. This includes individualized training to PSAB VOB users so that they have a hands-on experience and a better understanding of how they will use the system. (On-going)

Continue to encourage PSAB members to transition to Windows ClearCase to prepare for the transition to an all Windows ClearCase instead of interoperations. Get PSAB VOB documentation updated to a Windows only. (On-going)

Support the development of the Database & Design Characteristics & Trends task.(as-needed)

Develop configuration management plan for the P-Beat tools and associated inputs.

Work with the SPACE team to start them using the VOB to do VAC analysis to determine if this is the way they would like to work in the future.

*************NEW AS OF AFP7 - AUGUST 21, 2009 *******
Attend Enterprise Configuration Management training as compatible with scheduling and training availability.
****

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	40
Schedule	30
Cost	30

Desired Personnel Skill Sets

PERSONNEL PROFILE:

N/A

Government Furnished Property

GOVERNMENT FURNISHED PROPERTY:

None

Safety and Assurance Plans

None Selected.

Technical Representative: Nathal, Michael

Task Number: NNC06E010T - 13

Task Title: Advanced Metallics Technology

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

This Task was formerly GESS Task 15.
Advanced metallic/intermetallic alloys are required in future aerospace systems to meet the demands of high operating temperatures, high strength-to-weight ratio, resistance to aggressive environments, and fabrication. The Advanced Metallics Branch is conducting basic research on these materials in the areas of materials development, durability evaluation, processing, and joining technology of both monolithic and composite materials.

Task Order Description
Description of Services to be procured

The objective of this task is to conduct experimental research functions where the overall objective and scope of work is to develop and test advanced alloys, intermetallics, and their composites. The second area will to optimize the materials processing conditions and properties of monolithic and composite materials (both metallic and intermetallic).
There are two main areas of performance under this task. One is in the area of mechanical creep testing. Here, the contractor staff shall support, operate, and maintain numerous creep lab facilities. Duties include sample preparation, test setup, and experimental testing in conjunction with developing quality test methodologies. A second area of focus are the activities related to a heat treatment lab. Here, numerous high temperature furnaces must must be operated and maintained in support of the targeted materials research. Processing equipment that spans testing in air, vacuum, and inert environments will be operated and maintained.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

Broad Scope of Work
The contractor shall perform this task with an objective to conduct experimental research functions where the overall objective and scope of work is to develop and test advanced alloys, intermetallics, and their composites.

Specific Work Elements

1. Conduct experimental and analytical research to optimize and test monolithic and composite metallic materials; to determine, tabulate, and evaluate physical, mechanical, and metallurgical properties of monolithic and composite metallic materials.

2. Operate and maintain equipment in research laboratories including, but not limited to, creep-rupture; air, vacuum, and inert gas furnaces, metallography and optical microscopy, and metal working.
3. Develop new test methods based on specific material behavior and programmatic requirements.

4. Specific work elements include various aspects of materials processing and testing, such as: prepare, test, and evaluate advanced alloys, intermetallic compounds and metal matrix composites. Specimen preparation includes cutting, chemical etching, glass encapsulation, metallography and checking for dimensional tolerances. Tests include set-up, operation, and maintenance of creep rupture test stands, annealing furnaces, thermal cycling, tensile testing, vacuum systems, and hot isostatic pressing machines. Many of the above tasks require the use of computer controlled machines. Evaluation will include use of data acquisition systems and data reduction using appropriate software packages, photography and microscopy.
5. Communicate research progress and results to NASA TR via oral discussions and written monthly progress reports and to engineers requesting service through frequent oral discussions.
6. Travel in accord with requirements for attendance at technical meetings, technology transfer, presentation of research, and in acquiring training or course work useful for enhancing capabilities to perform the task.

Deliverables and Milestones to be met

Examples include: reports, analysis, and audits

*****************1. Monthly Technical Progress Reports.

The contents of monthly activity reports will be evaluated at the end of the current Award Fee Period.
At the request of the TR, the contents of these reports will emphasize:
a) technical progress in the various specific work elements cited and any special achievements and/or new technologies developed in the process,
b) information relating the details of installation, operation, and maintenance of laboratory equipment,
c) number of task orders processed and associated response times, and
d) an explanation of any down time, date, time duration, type of delay and reason, and the resolution.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	60
Schedule	25
Cost	15

Desired Personnel Skill Sets

******** This task requires trained technician support with a minimum of 5 years relevant experience in the areas of materials processing and materials characterization and testing. Limited direct labor support will be required for task management.********

Government Furnished Property

None.

Safety and Assurance Plans

None Selected.

Technical Representative: Soulas, George

Task Number: NNC06E013T - 16

Task Title: Ion Thruster Hardware Development

Task Details

Period of Performance
2/6/2009 - 8/31/2011

Background
Why the project is being pursued

This Task was formerly GESS Task 19.
BACKGROUND:

The NASA Glenn Research Center is responsible for conducting programs utilizing various on-board propulsion technologies for a number of applications. These technologies include gridded ion thrusters, which offer performance benefits over other advanced chemical and electric propulsion systems for certain high energy earth orbital and deep space missions. Propulsion systems utilizing ion thrusters need to be brought to a high level of development to enable these missions. This requires both theoretical and experimental evaluation of long-life/high performance ion thrusters and ion thruster systems. Contractor personnel have been working in the area of electric propulsion research at GRC,and are well suited to support future activities of this type.

Task Order Description
Description of Services to be procured

It is the goal of NASA GRC to develop a high-performance, 1.0 kW-10 kW throttle-able ion thruster, and associated power processing technology, appropriate for both earth-orbit applications of national interest, and for primary propulsion for deep-space interplanetary missions. It is also the goal of NASA GRC to develop sub-kilowatt, and 30-kilowtt class ion thruster technology. The contractor shall provide engineering design, fabrication, and assembly functions for the development of current and next generation ion thrusters in these power ranges.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

Broad Scope of Work:

The NASA Glenn Research Center (GRC) ion propulsion program addresses the need for high specific impulse ion propulsion systems and technology across a broad range of mission applications and power levels NASA GRC is involved in essentially all U.S. government ion propulsion development activities in either a leadership position and/or in a technical management role. Development areas include: high-power - both high-throughput and high-specific impulse - engine components, engines, and power processing technology, lightweight high-efficiency sub-kilowatt ion propulsion, and fundamentals. NASA GRC is also leading two highly focused activities: development of the Next Generation Ion propulsion system for the agency (NEXT – NASA's Evolutionary Xenon Thruster) under the In-Space Program, and development of high-power high-specific impulse ion thruster technology applicable to nuclear systems (HiPEP – High Power Electric Propulsion) under Project Prometheus. NASA GRC is also supporting a number of other agency ion propulsion initiatives: flight thruster hardware component manufacturing and flight thruster and power processor technical support for the DAWN flight project; post-life test analysis of the flight spare NSTAR thruster; technical oversight of carbon-based ion optics activities and high-power ion thruster technology activities at JPL; and support of United States Air Force materials contracts for carbon-based ion optics fabrication. NASA GRC also continues to support on-orbit operations of the International Space Station plasma contactor systems, which use hollow cathodes manufactured at GRC, for spacecraft charge control.

The Contractor shall provide engineering design, fabrication, and assembly functions for the development of current and next generation ion thrusters in these power ranges.

Specific Work Elements:

1. Assist with the completion of design analyses, manufacturing, fabrication, assembly, performance, and rework of large-area (nominal 40 cm beam diameter) ion thruster technology compatible with 5/10-kW class ion propulsion design goals and requirements.

2. Transfer manufacturing knowledge to NASA contractor off-site personnel for advanced thruster development activities.

3. Support and conduct manufacturing of sub-kilowtt, and 30-kW class ion thruster technology.

4. Support and conduct manufacturing, test, and integration of space flight hardware including hollow cathode technology for the International Space Station Plasma Contactor Unit, and cathode technology for electric propulsion.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

MILESTONES AND DELIVERABLES:

Specific Milestones:

*** NEW as of Award Fee Period 7 ***

1. Support EM thruster life testing, NEXT thruster testing (including the system integration test), and thruster component life testing including propellant isolator, cathode, and cathode heaters, to be completed 09/30/10.

2. Support NEXT thruster and system level testing to be implemented off-site at The Aerospace Corporation, JPL, and other potential locations. By 09/30/10.

3. Support any integration & testing associated with the ISS PCU & HCA packages, to be completed by 09/30/10.

4. Support electric propulsion project tasks including manufacturing and testing of ion optics, high power ion and Hall thrusters, and thruster manufacturing infrastructure upgrades, by 09/30/10.

****

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	Weights
Performance	45
Schedule	45
Cost	10

Desired Personnel Skill Sets

Prior experience in ion thruster design, fabrication, and assembly.

*** NEW as of Award Fee Period 7 ***********************************

Prior experience in hollow cathode design, fabrication, and assembly.

****

Prior experience in space flight hardware fabrication and integration.

Government Furnished Property

*** NEW as of Award Fee Period 7 ***********************************

Thruster hardware and components, as well as manufacturing facilities.

****

Safety and Assurance Plans

None Selected.

Technical Representative: Melcher, Kevin

Task Number: NNC06E014T - 24

Task Title: Health Monitoring Technology

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

The NASA Glenn Research Center conducts research programs in the area of aerospace vehicle and subsystem health management. Research is conducted to improve aerospace systems reliability, maintainability and operability. Specific research areas include the investigation and implementation of artificial intelligence techniques to solve real-time (on-board) and post-test/flight condition monitoring problems, the development of robust and generally applicable condition monitoring techniques, and component and system modeling to support the development and validation of these techniques.

Task Order Description
Description of Services to be procured

The contractor shall provide technologies to improve aerospace systems reliability, maintainability and operability, and shall provide system simulations under nominal and degraded conditions to support the validation of these technologies.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

NOTE: Revisions for this initial Period 7 statement-of-work are preceded by an asterisk (*)

Broad Scope of Work: Contractor shall research and develop diagnostic and prognostic condition monitoring algorithms. Contractor shall develop real-time and non-real-time condition monitoring systems which can monitor, analyze, prognose, diagnose and enable remediation of space flight and ground support systems and components. Contractor shall develop software that will enable the implementation of these condition monitoring systems. Contractor shall develop and implement strategies to validate these condition monitoring techniques and resulting systems using hardware and software testbeds.

To accomplish the previously stated work objectives, the contractor shall:
1. Support the planning of new system health management projects and re-planning of existing system health management projects by providing input for technical content and schedule.
2. Participate in meetings and telecons required to coordinate work with other NASA, government, industry, and/or academic partners.
3. Conduct system performance analysis to define condition management requirements.

Systems include current and planned reusable and expendable launch vehicles, as well as, ground support systems, aircraft, and other systems to which the technology can be transferred.
4. Develop, modify and exercise appropriate system simulations in support of health management and condition monitoring activities.
5. Develop methods to introduce and/or improve sensor validation, anomaly detection, automated diagnostics and life prediction for current and future aerospace systems.
5a. Implement and demonstrate methods in project-defined context (e.g., software simulations, real-time with hardware testbed).
5b. Analyze methods to assess performance, benefits, applicability.
6. Interact with appropriate specialists to understand and interpret system and component operation under nominal and fault conditions.
7. Develop and maintain expertise in current state-of-the-art health management and condition monitoring strategies based on conventional and artificial intelligence techniques, in particular, neural networks, expert systems, genetic algorithms and model-based reasoning.
8. Review SBIR proposals associated with vehicle health management topics.
9. Provide written documentation of technical work. Present work at appropriate meetings and conferences. Represent GRC at health monitoring technical interchange meetings.
10. Support transfer of technologies developed under this task to other industries such automotive, medical and process control.
11. Clearly communicate progress and issues in a timeframe and manner commensurate with their impact.
*12 The contractor shall follow applicable NASA and RHC procedures when conducting work in support of the branch.

NOTE: Revisions for this initial Period 7 statement-of-work are preceded by an asterisk (*)

Specific Work Elements:
Ares I Program/Upper Stage (US) Project/Thrust Vector Control (TVC) Project
1. Reporting work
1a. The contractor shall document results of the fault propagation timing study completed during the previous performance period.
1b. The contractor shall document work relevant to the US TVC Diagnostic Model and present that work at a Conference.
2. Develop updates to US TVC portions of the Ares I Abort Conditions Report (ACR)
2a. The contractor shall develop updates to US TVC portions of the ACR
*2b. The contractor shall support integration and approval of the ACR by the Ares I Vehicle Integration Project.
3. Develop updates to US TVC portions of the Ares I Fault Detection Notification and Response (AFDNR) System Definition Document (SDD)
3a. The contractor shall develop updates to the Ares I US TVC Abort Condition Detection Algorithms for the AFDNR SDD.
3b. The contractor shall develop updates to Ares I US TVC Caution and Warning information for the AFDNR SDD.
3c. The contractor shall develop updates to the Ares I Upper Stage TVC Fault Detection Isolation and Response information for the AFDNR SDD.
4. Develop Ares I US TVC TEAMS-based Diagnostic model in support of Ares I Functional Fault Analysis (FFA) and Advanced Ground-based Diagnosis
4a. The contractor shall incorporate US TVC Architecture/FMEA/Fault Propagation Timing changes into US TVC TEAMS-based Diagnostic model. NASA will provide changes to Architecture/FMEA/Fault Propagation Timing.
4b. The contractor shall conduct US TVC Fault Effects Propagation Timing Studies.
*4c. The contractor shall support FFA review of the US TVC TEAMS-based Diagnostic model and its integration into the Ares I integrated Diagnostic model.

5. Level of Effort Tasks
5a. The contractor shall support coordination of work with teams working the Ares I Project. For example: the Integrated Upper Stage Thrust Vector Control Team; the Functional Fault Analysis Team; and the Fault Detection, Diagnosis and Response Working Group.
5b. The contractor shall review official Ares I documents in support of official and unofficial reviews. For example: Table top review of Fault Detection Notification and Response System Definition Document.
6. Travel in accord with requirements for attendance at technical and/or technology transfer meetings, presentations or research papers, and in acquiring training or course work useful for enhancing capabilities in performing this task.
*6a. Contractor to make one trip to attend the Functional Fault Analysis Technical Interchange Meeting for TEAMS Modelers.
7. Other
7a. The contractor shall complete and submit a status report summary for the entire performance period that addresses performance criteria for each milestone/deliverable described in this statement of work.
*7b. Provide nominal hardware/software maintenance for workstations located in building 77, room 112/124 and utilized by the Controls & Dynamics Branch for research and development activities. Install new operating system releases, COTS software and updates, and computer hardware. Develop software, where appropriate and install patches, if available, to meet NASA specified security standards.
7c. As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.
7d. The contractor shall comply with the Center Level Procedure GRC-P2.6.4, "Implementation - Software Development".

NOTE: Revisions for this initial Period 7 statement-of-work are preceded by an asterisk (*)

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

NOTE: Revisions for this initial Period 7 statement-of-work are preceded by an asterisk (*)

Ares I Program/Upper Stage (US) Avionics Project/Thrust Vector Control (TVC) Project
1. Conduct fault timing study using integrated models for US TVC and Ares I vehicle.
*1a. The contractor shall deliver a final report that documents results of the fault propagation timing study completed during the performance period 5. The final report shall have completed RHC technical and managerial review and be suitable for publication as a NASA TM. Due by 10/30/2009.
*1b. The contractor shall develop and submit to the 2010 Infotech@Aerospace Conference an abstract for a paper documenting work that is relevant to the US TVC Diagnostic Model. Due by 10/23/2009.
*1c. The contractor deliver a draft paper to the US TVC team for review. Said paper to document work that is relevant to the US TVC Diagnostic Model. Due by 3/1/2010.
2. Develop updates for US TVC inputs to Ares I Abort Conditions Report
2a. The contractor shall deliver US TVC inputs to the Abort Conditions Report (Rev. A). Due by 1/20/2010.
3. Develop updates to US TVC portions of the Ares I Fault Detection Notification and Response (FDNR) System Definition Document (SDD)
*3a. The contractor shall deliver updates to the Ares I US TVC Abort Condition Detection Algorithms for the AFDNR SDD. Due by 10/30/2009.
*3b. The contractor shall deliver updates to Ares I US TVC Caution and Warning

information for the AFDNR SDD. Due by 10/30/2009.
*3c. The contractor shall deliver updates to the Ares I Upper Stage TVC Fault Detection Isolation and Response information for the AFDNR SDD. Due by 10/30/2009.
4. Develop US TVC TEAMS-based Diagnostic model in support of Ares I Functional Fault Analysis
*4a. The contractor shall complete and deliver an updated Upper Stage TEAMS-based Diagnostic Model (Rev. 2) revised to address comments from prior FFA review of the model. Due by 10/30/2009.
*4b. The contractor shall deliver an updated TVC TEAMS-based Diagnostic model (Rev. 3) incorporating changes to the US TVC Architecture/FMEA/Timing changes. Due by 1/4/2010.
*4c. The contractor shall complete and deliver an updated Upper Stage TEAMS-based Diagnostic Model (Rev. 3) revised to address comments from prior FFA review of the model. Due by 2/26/2010.
*4d. The contractor shall complete and deliver results from US TVC Fault Effects Propagation Timing Study (Rev. 3). Due by 3/31/2010.
6. Travel
*6a. Attend Functional Fault Analysis Technical Interchange meeting for TEAMS Modelers. Meeting date and location TBD.
7. Other
*7a. Deliver status report summary for the entire performance period addressing performance criteria for each milestone/deliverable. Due by 3/31/2010.

NOTE: Revisions for this initial Period 7 statement-of-work are preceded by an asterisk (*)

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	Weights
Performance	35
Schedule	35
Cost	30

Desired Personnel Skill Sets

Highly skilled in development and implementation (including real-time) of health management technologies for space systems. Advanced programming in Fortran, C/C++, Matlab/Simulink, and proficiency with TEAMS software.

Government Furnished Property

Health Management Testbed hardware and software. Matlab/Simulink software – License No’s 254274, 18747, 220189, & 321084. TEAMS software - two licenses.

Safety and Assurance Plans

None Selected.

Technical Representative: Braunscheidel, Edward

Task Number: NNC06E015T - 13

Task Title: Turbomachinery Technology Research

Task Details

Period of Performance
10/1/2009 - 3/31/2010

Background
Why the project is being pursued

BACKGROUND: The Turbomachinery and Heat Transfer Branch (RTT) conducts research on a number of turbomachinery components for aircraft turbine engines. In order to further improve the efficiency and operability of propulsion systems, novel approaches must be investigated. Research is aimed at providing the enabling turbomachinery technology for future high performance gas turbine engines. Component types include fans, compressors and turbines. The work on axial compressors, centrifugal compressors, and turbines is focused on providing an understanding of the flow physics associated with the aerodynamics of steady and unsteady flows. Advanced experimental techniques are being applied, including optical non-intrusive methods, pressure sensitive paint, miniature unsteady flow probes, and thin film (hot wire) elements. The research is applicable to high-speed aircraft, general aviation/commuter aircraft and subsonic transports.

Task Order Description
Description of Services to be procured

TASK ORDER DESCRIPTION:

The general goal of this task is to improve understanding of the flow physics of advanced turbomachinery components and provide experimental data in a centrifugal compressor. The above objectives are to be achieved by applying advanced experimental techniques focusing on dynamic probe development.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

Statement of Work:
Government's Estimated Period of Performance is Oct 1, 2009 to March 31,2010

Execute the development of a dynamic pitor cylinder probe that is compatible with turbomachinery flow fields with temperatures up to 500 Deg F, and pressures up to 60 psia. Probe drawings generated under this task will be fabricated inhouse at NASA GRC. Contractor will provide input on fabrication approach, and monitor effort. Contractor will perform probe assembly, calibration, and performance testing of the probe using NASA provided equipment and facilities.

The general goal of this task is to improve understanding of the flow physics of

advanced turbomachinery components
Specific Work Elements:

For the period of 10/1/2009 through 3/31/2010

1. Execute the mechanical design of the probe

2. Monitor fabrication of the probe in-house at NASA GRC

3. Develop data aquisition software and perform calibrations of the probe

4. Assist in aquiring data in the CC3 centrifugal compressor in test cell CE-18

5. Provide final report on data acquired with probe, and manual of unsteady data reduction procedures.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

MILESTONES AND DELIVERABLES:

1. Deliver Final Probe design drawings (Nov, 2009)

2. Perform and document calibrations of probe (Jan, 2010).

3. Assist in the data acquisition, reduction and reporting of unsteady data taken in the CC3 centrifugl compressor (Feb 2010)

4. Final report on probe performance and software program.(March 2010)

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	50
Schedule	30
Cost	20

Desired Personnel Skill Sets

PERSONNEL PROFILE:

Ph.D. in Aerospace or Mechanical Engineering with at least 15 years of experience in advanced experimental measuring techniques involving specifically, build-up, and operating of advanced measurement systems with a heavy emphasis on unsteady pressure measurement instrumentation and unsteady diagnostics in general. A background in turbomachinery and cascade testing is essential.

Limited administrative support may be needed

Government Furnished Property

GOVERNMENT FURNISHED PROPERTY:

All experimental testing will be done in GRC facilities with necessary instrumentation and hardware furnished by the government.

Safety and Assurance Plans

None Selected.

Technical Representative: Cooper, Sylvia

Task Number: NNC06E016T - 13

Task Title: Software Config/Document Mgmt

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

The core teams managed under Code R at NASA GRC support complex simulation modeling tools used for systems analysis throughout NASA as well as industry partners, academia, and other government agencies. Tools and development activities supported include, but are not limited to the Multidisciplinary Analysis Design & Optimization (MDAO) capability and the Numerical Propulsion System Simulation (NPSS).

Task Order Description
Description of Services to be procured

Performing software configuration management (SCM) for the complex simulation tools supported in Code R is the primary focus of this task. Providing SCM for the new capabilities being developed and generating builds will be completed throughout the performance period. SCM support is needed to support other projects and tools as required.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

******* NEW as of 10/1/09 Government's Estimated Period Of Performance October 1, 2009 to March 30, 2011

The contractor shall provide software configuration management using selected software configuration management and tracking tools to support the software development effort and to maintain control of all team software, documentation, and software tools. The contractor shall provide support on platforms including Windows, python, and Linux in a networked environment.

The contractor shall provide support for the evaluation, configuration, implementation, and maintenance of the selected software configuration management and problem tracking tools.

Specific Work Elements:

The contractor shall:

1. Configure, implement, and maintain selected software configuration management and problem

tracking tools.

2. Provide training, database access, and help desk support to project teams in using the CM tools.

3. ****NEW as of 10/1/2009***Write the Software Configuration Management Plan and implement using the automated CM tools.

4. Update the Software Configuration Management Plan and related software configuration management documentation as needed.

5. Implement and maintain (using automated tools) all aspects of configuration identification (including the numbering scheme for software and documentation and labeling of baselines), control (including the release process for software and documentation), and status accounting in accordance with the Software Configuration Management Plan.

6. Develop and maintain configuration management procedures and forms to achieve a controlled, effective and efficient software development environment.

7. Prepare software and documentation releases including Version Description Documents (VDD) using the automated SCM tools upon request.

8. Establish and maintain paper files and CD releases as required.

Desktop office computing hardware, software and support will be charged to task as a distributed cost.

If travel and/or training are required under this task, the cost has either been budgeted into the accompanying cost plan, or an amendment will be issued to cover the additional task requirements.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

MILESTONES AND DELIVERABLES:

Create the official Software Release packages (as required).

Update Software Configuration Management Plan and related software configuration management documentation (****NEW as of 10/1/09 - 3/30/10)***.

Maintain software configuration management environments (on-going).

Document and provide training in use of CM tools(on-going).

Create and maintain baselines and releases for builds, incremental releases, and full releases (as required).

Provide status accounting reports as new baselines are established upon request.

Monthly Progress Reports.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	80
Schedule	10
Cost	10

Desired Personnel Skill Sets

PERSONNEL PROFILE:

CM Analyst

Government Furnished Property

GOVERNMENT FURNISHED PROPERTY:

None

Safety and Assurance Plans

None Selected.

Technical Representative: Crandall, Karen

Task Number: NNC06E017T - 15

Task Title: Program Support for the Projects Liaison and Integration Office

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

This Task was formerly GESS Task 25.
Program management support to the Aeronautics projects at GRC.
This task is being used to provide a broad range of program management support to the Projects Liaison and Integration Office at GRC.

Task Order Description
Description of Services to be procured

Description of Services to be procured
The contractor shall provide the following program management support:

Scheduling
-- Develop and maintain the official GRC Fundamental Aeronautics (FA) project schedules, as required
-- Provide what-if schedule analyses to the project managers, as required
-- Maintain a milestone and deliverables registry, as required
-- Coordinate the schedules as part of the FA Program scheduling team
-- Provide leadership for the scheduling effort within the office

Database Management
-- Develop and maintain an award tracking system for tracking the Fundamental Aeronautics (FA) Program NASA Research Announcements (NRAs) as they are awarded, funded and completed. Support evaluation phase as required. Work with the Projects' NRA managers and the FA Program Business Manager.
-- Develop and maintain database system of reporting Hypersonics Project Financials at the Discipline level on a monthly basis.

Project Reports
-- Collect and produce input to the NASA 90 day reports from the Aeronautics projects, as required
-- Provide weekly project calendar updates, as required

Configuration and Risk Management
-- Assist in the implementation of configuration and risk management by the projects as required
Records Management
-- Maintain an archival and retrieval system for recent and on-going GRC Aeronautics Projects

utilizing and following the NASA Records Management guidelines.

ARES I-X Mission Management Support
-- Provide and maintain calendars of major events and of detailed events for the ARES I-X Mission.
-- Provide meeting support on weekly basis by obtaining IPT inputs and consolidating into report to brief Mission Manager and serves as foundation of reporting to Ares I Management.
-- Run Web Ex and telecons for calendar reviews and senior management tag ups.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed
The contractor shall:
Provide scheduling assistance to Project Management including GRC Project and Associate Project Managers in the Research and Technology Directorate. Serve as the focal point for NASA GRC Fundamental Aeronautics project schedules, milestones, and deliverables. Perform impact analysis of monthly schedule status.

Maintain the NRA Award Tracking System for the FA Program, generating reports of data as required.

Maintain Hypersonics Discipline Financial Data, generating reports of data as required.

Maintain the Ares I-X calendars for the Constellation Program, generating reports as required.

The tasks may also include resource planning and tracking, risk management and configuration management support, and records management.

The government will provide the requirements for the tasks, parameters/guidelines to bound the work, and the technical interaction with the appropriate project people to obtain the required project information to complete the tasks.

The contractor shall provide the expertise to accomplish the tasks within the budget specified and the timeframe required.

Travel and Training may be required to support these tasks.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

The following list is the milestones and deliverables for this period:

1. Current (within 2 months) schedules for the Fundamental Aeronautics Projects at GRC
2. Schedule status updates, as required
3. Database of available NRA information as provided by FA Projects
4. A 90 day calendar of all Ares I-X major events as identified by the government
5. A current (within 2 months or as entries are received) inventory of all archived materials from completed or canceled projects as required by this task

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	Weights
Performance	55
Schedule	40
Cost	5

Desired Personnel Skill Sets

Being able to work on a multifaceted team, across projects and NASA Centers.

Government Furnished Property

None

Safety and Assurance Plans

None Selected.

Technical Representative: Miller, Sharon

Task Number: NNC06E019T - 24

Task Title: Space Environmental Durability Research & Technology Support

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

This Task was formerly GESS Task 27.
The Space Environment and Experiments Branch of the Space Processes and Experiments Division is interested in advancing the state of technology in the areas of space power system materials and coatings as well as for spin-off applications. Mechanical and electrical engineering competencies are required to conduct these research and technology efforts.

Task Order Description
Description of Services to be procured

******NEW AS OF AFP6 4/01/09; Removed "fabrication" in first sentence as this is no longer needed*****************
Activities include the design, development, acquisition, assembly, checkout and operation of test facilities and experiment assemblies for ground laboratory and space experiments as well as for industrial, commercial and biomedical spin-off applications. Analysis and reporting of test results is also included in the scope of this task. In addition, the task may require miscellaneous small hardware purchases in order to complete task deliverables.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

**** New for AFP7 8/14/09; changed estimated period of performance from "04/01/2009-03/31/2010" to "10/01/2009-9/30/2010" *****

Period of Performance: 10/01/2009-9/30/2010

Broad Scope of Work:

***********NEW AS OF AFP6 4/01/09; Removed "fabrication" in first sentence and in both item 1 under Electrical and item 1 under Mechanical as this is no longer needed******************

Activities include the design, development, acquisition, assembly, checkout and operation of test facilities and experiment assemblies for ground laboratory and space experiments as well as for industrial, commercial and biomedical spin-off applications. Analysis and reporting of test results is also included in the scope of this task.

Specific Work Elements:

Electrical and electronics research and technology support for activities including:

1. Design, development, acquisition, assembly, checkout and operation of electrical and electrical aspects of test facilities, target and sample manipulator systems, ground based and space experiments as well as spin-off applications supported and operated by the Space Environment and Experiments Branch for various projects.

2. Design and coordination of build up or alterations to electrical/electronic portions of test hardware.

3. Conduct tests, gather and analyze data and report preparation for tests supported by the Space Environment and Experiments Branch.

4. Proposal preparation related to electrical/electronics support for cooperative agreements with other organizations and agencies for development, transfer, and testing of technologies advocated by the Space Environment and Experiments Branch.

Mechanical research and technology support for activities including:

1. Design, development, acquisition, assembly, checkout and coordination of mechanical aspects of test facilities, sample and target manipulator systems, ground based and space experiments as well as spin-off applications supported and operated by the Space Environment and Experiments Branch for various test programs.

2. Design and coordination of build up or alterations to the mechanical portion of test hardware.

3. Conduct tests, gather and analyze data and report preparation for tests supported by the Space Environment and Experiments Branch.

4. Proposal preparation related to mechanical research and technology support for cooperative agreements with other organizations and agencies for development, transfer, and testing of technologies advocated by the Space Environment and Experiments Branch.

Travel requirements will be determined as required

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

Milestones:

1. Automate adhesion rig feedthrough by January 31, 2010 (electrical support)
2. Support efforts to develop ground laboratory facilities and experiments as well as space experiments for:
- Durability evaluation of polymers and thermal control coatings for exploration missions
- Lunar dust durable radiators
- Sputtered and evaporated coatings
- Sputter etched and atomic oxygen textured surface modifications
- Environmentally durable seals for exploration missions
- Support proposal efforts to develop facilities and experiments to be conducted by the Space

Environment and Experiments Branch by March 31, 2010.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	Weights
Performance	60
Schedule	30
Cost	10

Desired Personnel Skill Sets

Senior mechanical engineering support with experience in mechanism design, vacuum systems and plasma generating systems.
Electrical engineering support with experience in vacuum and plasma generating systems, control and data acquisition systems, and programming will be assigned to this task.

Government Furnished Property

None.

Safety and Assurance Plans

None Selected.

Technical Representative: Manzo, Michelle

Task Number: NNC06E020T - 13

Task Title: Advanced Battery Development and Evaluation

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

Advanced battery technologies are required for future NASA Exploration missions. Improvements to the specific energy, energy density and safety are needed to meet EVA (extravehicular activities), Altair Lunar Lander and Lunar surface Systems customer performance metrics. NASA is developing advanced components and cells as part of the next generation of batteries for these lunar exploration missions. The successful development of these advanced technologies will also have significant impact on commercial and terrestrial applications.

Task Order Description
Description of Services to be procured

Cell Development - Development and implementation of test approaches and procedures for the evaluation of cell components for advanced secondary Li-ion battery systems. Development of advanced components for lithium-ion batteries. Development and maintenance of a model used to predict cell characteristics.

1. Characterization
Characterize and determine electrochemical performance of candidate anodes, cathodes, and electrolytes developed in-house and by NRA and SBIR contractors. The characterized materials shall be evaluated for their applicability to meeting the overall goals for the advanced battery systems.

2. Development of Advanced Battery Cell Components
Provide definition and support to the development of alternative anodes and separators for advanced Li based cells. Silicon-based anodes with the potential to exceed 1000 mah/g are of particular interest.

3. Demonstrate functioning of candidate electrodes and electrolytes in a cell configuration.
Prepare full-cells using representative cathodes, anodes and electrolytes. Develop methods for component and cell fabrication. Evaluate performance of full cells - at a minimum; determine capacity, efficiency, cycle ability, and specific capacity/energy.

4. Li-Ion Cell Model
Maintain excel based modes used to predict cell characteristics that include specific energy, energy density, mass, volume, energy … as a function of materials and design features

Li-Ion Test and Evaluation

Cell and Battery Test Support
Provide support to validation verification efforts that ensure the readiness of advanced battery technologies to flight applications. Develop and execute test plans that validate performance characteristics for NASA mission applications. Provide overall coordination and scheduling of NASA battery test facilities.

General Scope of Work

SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

Cell Development - Development and implementation of test approaches and procedures for the evaluation of cell components for advanced secondary Li-ion battery systems. Development of advanced components for lithium-ion batteries. Development and maintenance of a model used to predict cell characteristics.

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Characterize and determine electrochemical performance of candidate anodes, cathodes, and electrolytes developed in-house and by NRA and SBIR contractors. The characterized materials shall be evaluated for their applicability to meeting the overall goals for the advanced battery systems.

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Provide support to validation verification efforts that ensure the readiness of advanced battery technologies to flight applications. Develop and execute test plans that validate performance characteristics for NASA mission applications. Provide overall coordination and scheduling of NASA battery test facilities.

Deliverables and Milestones to be met

Examples include: reports, analysis, and audits

Cell Development Support

Development Milestone 1 -

Complete report summarizing KPP assessments on anode and separator materials developed in-house and via contracted NRA efforts - component characteristics (Batch 2 reports complete by 1/29/10) per test procedures previously established

Development Milestone 2 –

Contribute to evaluation of next generation high capacity cathodes, advanced electrolytes and safety devices. Provide input to respective leads at JPL and JSC. As needed – complete of evaluation of round 2 NRA and in-house deliverables by 1/29/10.

Development Milestone 3 -

Support trade studies with comparative projections of cell characteristics using ETDP developed materials and cell design parameters. Provide review and comparison with Saft Trade studies - (Saft submission 11/24/09) - review and comparison due 12/24/09

Cell Testing

Testing Milestone 1.

Establish and maintain master test schedule that documents overall test capability and the assignment and distribution of test articles and the scheduling of the required tests. (Maintain as needed - at a minimum provide monthly updates)

Testing Milestone 2.

Identify and obtain candidate commercial cells that offer high specific energy and energy density and other performance characteristics targeted in the Exploration Technology Development Energy Storage Project Battery Development effort. Evaluate cells against ETDP goals via test plans previously established - complete interim test report by February 15, 2009.
Report should include a complete survey of products of interest that have been identified as well as test results on cells that have been obtained and evaluated.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	60
Schedule	30
Cost	10

Desired Personnel Skill Sets

Senior engineering or scientific support with a background in battery technology and chemical laboratory experience will be assigned to this task.

Experience with Arbin Test equipment and the testing Li-ion cells and batteries.

Limited administrative support may be required.

Government Furnished Property

Facilities and materials needed for evaluations.

Safety and Assurance Plans

None Selected.

Technical Representative: Liu, Nan-Suey

Task Number: NNC06E022T - 11

Task Title: Three-D Combustor Flow Code Development

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

This Task was formerly GESS Task 35.
BACKGROUND: Computer codes currently used by aerospace industries for gas turbine combustor analysis are based on methodologies, algorithms, and models developed over twenty years ago. New 3-D codes are being developed which take advantages of the progress made during the intervening time in such areas as algorithms, submodels, and computational technologies. A new combustion code that NASA GRC has played a key role in developing is the National Combustion Code (NCC) for unstructured grids. This task order encompasses work on the code to enhance it, to validate it, and to ensure that the physical modeling and mathematical algorithms are as consistent as possible and to clearly define the relative merits of the code. This improved tool will be made available to the aeropropulsion industry and will also directly impact NASA technology programs.

Task Order Description
Description of Services to be procured

TASK ORDER DESCRIPTION: Develop advanced numerical algorithms for 3-D combustor configurations, develop advanced numerical treatments of finite-rate chemical reactions, develop advanced spray models including the fuel atomization,and incorporate these into 3-D reacting flow codes.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

Broad Scope of Work:
Develop advanced numerical algorithms for 3-D combustor configurations, develop advanced numerical treatments of finite-rate chemical reactions, develop advanced spray models including the fuel atomization, and incorporate these into 3-D reacting flow codes.

*******New for AFP7
Specific Work Elements:
1. Implement JP8 properties into the NCC. (Completion by 11/30/2009)
2. Integrate UTRC/UMASS atomization and vaporization models into NCC and verify the implementation (Completion by 3/31/2010)
3. Assist NCC team members to conduct their validation calculations of NCC (as required)

Quality Assurance:
The contractor shall submit Technical Progress and Resource Management Reports for this task monthly. Progress reviews will be conducted regularly with the cognizant NASA TR. Any revisions to the above schedule that may result from these reviews will be jointly agreed upon by the TR and the contractor supervisor.

Travel as required

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

******* New for AFP7
Specific Work Elements and Milestones :
1. Implement JP8 properties into the NCC. (Completion by 11/30/2009)
2. Integrate UTRC/UMASS atomization and vaporization models into NCC and verify the implementation (Completion by 3/31/2010)
3. Assist NCC team members to conduct their validation calculations of NCC (as required)

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	50
Schedule	30
Cost	20

Desired Personnel Skill Sets

PERSONNEL PROFILE:

Ph.D. in Mechanical/Aeronautical Engineering with extensive experience in computational fluid mechanics of combustion. Experience in multi-dimensional CFD code development including real gas and non-equilibrium (i.e. combustion) effects as well as sprays and turbulence.

Government Furnished Property

GOVERNMENT PROPERTY:
None.

Safety and Assurance Plans

None Selected.

Technical Representative: Simon, Donald

Task Number: NNC06E023T - 12

Task Title: Integrated Diagnostics and Controls for Enhanced Safety

Task Details

Period of Performance
2/6/2009 - 8/31/2011

Background
Why the project is being pursued

A high priority area of research at the NASA Glenn Research Center is engine gas path health management being conducted under the NASA Aviation Safety Program Integrated Vehicle Health Management Project.

For the NASA Aviation Safety Program, the broad objectives of this task are to develop and demonstrate health management technologies to detect and isolate safety significant propulsion malfunctions. This will include developing engine fault models, and algorithms to detect and isolate (diagnose) malfunctions. A promising area for safety enhancement on large subsonic turbine engines is Model-Based Diagnostics. Work will be done to develop estimation logic (tracking filters) to tune associated component level model (CLM) of the engine embedded in engine control logic. Work will also be done to develop and demonstrate safety enhancing fault detection and isolation logic that utilizes tuned CLM outputs.

Contractor personnel shall be responsible for the science aspects of experiments. High levels of both technical and interpersonal skills are required as there are frequent interactions with other investigators and other portions of the Glenn laboratory.

Task Order Description
Description of Services to be procured

The task involves the research and development of techniques for engine fault detection, isolation, and avoidance. The goals are 1) demonstrate fault detection and isolation techniques, given a suite of engine sensors and actuators, and 2) identify beneficial improvements in models and instrumentation to enhance these techniques.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

General Scope of Work
******Government's Estimated Period of Performance: October 1, 2009 to Completion of GESS-2 Contract. Base plus 3 Options******

SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed
Broad Scope of Work:

The broad objective of this task is to develop and demonstrate health management technologies to detect and isolate safety significant propulsion malfunctions. This will include developing engine fault models, and algorithms to predict or detect malfunctions.

Specific Work Elements:

1. Analyze propulsion system component interrelationships in the presence of safety significant component degradations and faults, using suitable gas turbine engine aerothermal models. This analysis will encompass quasi-steady-state, transient, and dynamic operation for the engine model, and will require some fault model development.

2. Design and evaluate aircraft engine gas path diagnostic systems capable of trending and estimating engine performance parameters; and detecting and isolating engine malfunctions.

3. Travel in accord with requirements for attendance at Technical and/or technology transfer meetings, presentations of research papers, and in acquiring training or course work useful for enhancing capabilities in performing task.

*******NEW AS OF AFP7 – October 1, 2009 (ds)***********************
3a. Attend the training course, “Diagnostics, Prognostics, and Condition-Based Maintenance: A Practical Course on Designing, Developing, and Implementing Automated Health Management Systems,” sponsored by Impact Technologies and to be held in Long Beach, CA, January 19-21, 2010.
****

4. Provide written documentation of technical work. Present work at appropriate meetings and conferences.

5. Clearly communicate progress and issues in a timeframe and manner commensurate with their impact.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

MILESTONES & DELIVERABLES:

1. Monthly progress reports which shall include:
a. Technical developments, progress and analysis, and evaluation of all task specific projects.
b. Technical achievements or issues

*******NEW AS OF AFP7 – October 1, 2009 (ds)**********************

2. The contractor shall evaluate and compare aircraft engine thrust estimation techniques applied to the C-MAPSS engine model. These simulation evaluations shall include transient flight profiles, engine deterioration, and varying environmental conditions. The estimation techniques to be evaluated shall include an interpolation model approach previously developed by the contractor, and linear Kalman filter estimation approaches. The contractor shall deliver to NASA the developed software, associated documentation, and a summary of the thrust estimation accuracy results. Due by 3/31/2010.

3. The contractor shall initiate the development of an on-line aircraft engine gas path performance deterioration trend monitoring approach. This work shall be conducted in

simulation and applied to the C-MAPSS engine model. Document and report findings to NASA.
****

Performance based task reviews will be conducted bi-annually for the purpose of evaluating task performance according to predetermined measurables. Revisions, if required, to the above performance based deliverables will be tracked via monthly reports and modifications will be jointly agreed upon by the Task Manager and the TR as they relate to the performance rating of this task.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	50
Schedule	40
Cost	10

Desired Personnel Skill Sets

PERSONNEL PROFILE:

The task requires Master's Degree level expertise with experience in flight controls, control theory, simulation, and experimental design.

Government Furnished Property

Individual Mathworks Matlab software license for a PC

Safety and Assurance Plans

None Selected.

Technical Representative: Freeman, Carmela

Task Number: NNC06E024T - 14

Task Title: Drawing Management and Configuration Control Support.

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

This Task was formerly GESS Task 42.
BACKGROUND: The Code F Business Management Office (FB) will provide oversight of the electronic document storage system used by various facilites groups in the Facilities and Test Directorate. In addition this office will provide the coordination required for the facilities change request process as described in GLP-FB-8820.1 Configuration Control of Facilities.

Task Order Description
Description of Services to be procured

TASK ORDER DESCRIPTION: The contractor shall provide support for the management of drawings which will include the day-to-day operation and management of the electronic document management system (Adept). Support shall also be provided to manage the configuration change control process. The Contractor shall provide support and direction in the creation, storage, recovery, and reproduction of electronic copies of engineering drawings.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

The following support shall be provided to the Business Management Office:
Management of drawings which will include the day-to-day operation and oversight of the electronic document management system (Adept), operation and maintenace of the Glenn Drawings Information System (GDIS),provide support for facilities engineering drawings retrieval or assistance,and maintain the Web pages for the drawings related areas.

Support the Facility Managers, Central Process Systems Managers, the Institutional Systems Managers and the Document Administators for FD and FT by managing the Change Control process described in BMS document 8820.1.

Personnel assigned to this task may be required to move electronic or hardcopy files of restricted or proprietary drawings or documents. As such they should have suitable clearances to work with or around these materials. No secret documents or drawings shall be covered by this task and clearances to that level are not required.

Provide guidance, recommendations and implementation strategies relative to requested modifications to the GDIS, FEDMS (Adept) and how changes to the Process Systems Database managed by others may affect GDIS performance.

Support shall include making additions and corrections to data elements within the GDIS and performing a QA check to insure that the information link between the drawings, components and change request records are accurate and up to date.

Produce scanned files of electronic drawings to produce aperture cards. Submit the electronic file to the appropriate document management systems. Prepare and submit services performed and production reports.

Maintain NASA reproduction hardware (plotter, copiers, computers, and specialized equipment), to include oversight of maintenance agreements.

Issue NASA standard numbers to be attached to engineering files for filing purposes.

Maintain archived engineer documents.

Analyze and research unusual engineering customer requests when sufficient data is not available for routine processing. Validate engineering requiests for drawing information. Perform database searches for drawings based on content, organization, or project supported. Correct drawing document deficiency to preculde recurrence.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

The milestones and deliverables for this period shall include: A monthly report detailing the breakdown of hours by project or area supported along with a financial report with total hours and dollars used to date and cumulative by month.

Quarterly reports listing:
Facility Change Requests completed
Facility Change Requests in process
BMS Change Requests completed
BMS Change Requests in process
Summary of drawing activity for the division
Progress of uploading as-built backlog
Number of database records updated/changed

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	50
Schedule	25
Cost	25

Desired Personnel Skill Sets

Experience with Adept system (or other comparable drawing management systems). Experience with GDIS and the Center's change control process.

The contractor shall provide personnel who have the skill and knowledge base to support the requirements as a team and provide back-up or additional suport within this task.

Government Furnished Property

Facilities Engineering Division's Synergis/Adept drawing management software, electronic drawing files and servers.
Facilities Configuration Program change request records.

Safety and Assurance Plans

None Selected.

Technical Representative: Schreiber, Jeffrey

Task Number: NNC06E026T - 10

Task Title: EMC, Design and Analysis for Stirling Engine

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

Stirling Engine and linear alternator technology development is being completed for transition to formal flight development. The prototypes have to be designed and tested to the flight requirements that include long life, high performance, structural, EMI/EMC. This technology has been chosen by NASA and DOE for development as an alternative to the less efficient RTGs. This task requires engineering support so that the Stirling generator will meet the stringent requirements in terms of EMI, launch vibration, long life, high reliability, and manufacturability. ** End of Updated Background Statement **

Task Order Description
Description of Services to be procured

The contractor shall provide review and consultation to support the design evaluation, recommend modification, and advise on advanced concepts, including measurements of developmental Stirling power systems. Develop EMI/EMC reduction strategies and facilitate EMI/EMC testing as required. Support documentation of the design and test activities.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

The contractor shall provide review and consultation to the NASA GRC project office in support of concept development and evaluation, facilitate the EMI/EMC design effort, mechanical design & structural analysis, in-house test efforts in support of Stirling radioisotope power conversion. The contractor shall support tests of Stirling cycle machines at GRC as requested.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

The milestones and deliverables for this period shall include:

1. By October 30, 2009, develop conceptual design for mechanical hardware for ASC-E3 test.

2. By November 30, 2009, complete design of hardware needed for Durability Testing of ASC-E2 convertors.

3. By January 31, 2010, complete fit check of hardware for testing of ASC-E3 convertors.

4. By March 31, 2010, support development of the design documentation of the ASC-E3 the through the GRC Engineering Review Board process.

5. By March 31, 2010, support preparation for the ASC-E3 Production Readiness Review.

6. By March 31, 2010, support extended operation testing of Stirling converters by monitoring purity of working fluid, and consulting on gas analysis techniques.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	30
Schedule	40
Cost	30

Desired Personnel Skill Sets

Flight EMI experience, test development and operation, technical documentation.

Government Furnished Property

None

Safety and Assurance Plans

None Selected.

Technical Representative: Loyselle, Patricia

Task Number: NNC06E029T - 20

Task Title: Power Systems for Aerospace Applications

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

This Task was formerly GESS Task 69.

Fuel cells have the potential to be efficient, environmentally benign, lightweight, of low cost, and durable. They are also capable of operating on multiple fuel types. For this task, fuel cells and accompanying ancillary components must be designed and evaluated to maximize performance while minimizing mass and volume. Successful demonstrations of sub-scale fuel cell systems are also of immediate interest to NASA; hence, the purpose of this effort is to identify, develop and characterize pertinent fuel cell technology and to demonstrate the operational benefits of fuel cells for aircraft and exploration applications.

Task Order Description
Description of Services to be procured

The contractor shall provide technology development to achieve, develop and evaluate fuel cells, ancillary components and powerplants for NASA's future exploration missions as well as reduced emissions aircraft operations.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

Candidate fuel cell technologies must be identified and assessed for suitability to exploration and aeronautics applications. Technologies and fuel cell types must be assessed for further consideration, including analyses of fuel cell systems and experimental testing. The analyses shall include performance estimates subject to mission requirements. These systems may be stand-alone fuel cells or they may be hybrid energy conversion technologies. The optimum configurations must then be recommended for the specific missions. The subject assessment, analyses, and laboratory efforts are to be performed in collaboration with RPC/Electrochemistry Branch technical staff and other team members.

Specific Work Elements are as follows:
1. Fuel Cell Technology Assessment: Starting with the known requirements description furnished by NASA, the technology development status of proton exchange membrane (PEM) fuel cells, solid oxide fuel cells (SOFCs) and other technologies must be assessed. The assessment must conclude with recommendations for which type(s) of fuel cell technology should be considered for the project and future follow-on projects and which fuel cell stack suppliers should be

considered for this effort.

2. System Analyses: The performance characteristics of the selected fuel cell types must be estimated in order to aid in assessing the feasibility of those systems for future aircraft and exploration use. The operating efficiencies, transient capabilities, and emissions must be quantified to the greatest extent possible. In addition, an approximation of the ancillary subsystem requirements must be completed. Performance limitations must also be identified.

3. Experimental Fuel Cell Characterization: Testing of selected fuel cell technologies must be conducted. In conjunction with NASA GRC technical staff, operating manuals must be devised and full safety measures must be taken into account. Fuel cell characterization will be required for various proton exchange membrane and solid oxide fuel cell test programs. The contractor must generate operating procedures, check sheets, and serve as a qualified operator for testing of fuel cell power plants and stacks. The contractor must lead the effort for the selection, incorporation and evaluation of fuel cell based systems into various vehicle configurations. The contractor must provide support to run a series of characterization tests on fuel cell stacks, ancillary components and powerplants and monitor performance over each individual condition. The contractor will report the outcome of these tests and provide recommendations for further research and development.

Contractor shall purchase Hardware and software in support of the program.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

1. Technical monthly progress reports that summarize work performed during the performance period.

2. Complete analysis and evaluation of data collected during tests of fuel cells under various levels of helium. (Due: 3/31/10)

3. Provide test report summarizing the results of tests conducted under the Propellant Scavenging Program including potential power system design options for optimal performance. (Due: 3/31/10)

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	40
Schedule	30
Cost	30

Desired Personnel Skill Sets

Chemist or Chemical Engineer with extensive experience in electrochemistry, the development and evaluation of electrochemistry, fuel cell systems, components and test facilities.

Government Furnished Property

None

Safety and Assurance Plans

None Selected.

Technical Representative: Guo, Ten-huei

Task Number: NNC06E030T - 14

Task Title: Design, Implementation & Testing of Advanced Control Systems for Aerospace Propulsion

Task Details

Period of Performance
2/5/2009 - 8/31/2011

Background
Why the project is being pursued

The Control and Dynamics Technology Branch at NASA Glenn Research Center is tasked with developing, implementing and, validating advanced control systems for future aerospace propulsion systems. The branch currently has research activities focused on developing a variety of control and health management technologies for air and space systems. This task will provide controls and dynamic modeling expertise in support of the work conducted by the branch. The effort will result in the successful design, implementation, and demonstration of advanced control systems and dynamic modeling technologies.

Task Order Description
Description of Services to be procured

This task will procure the engineering design, implementation and testing services required to develop advanced control systems that are enabling technologies for air and space propulsion systems. This task is to support the Integrated Resilient Aircraft Control project under Aviation Safety Program. During this reporting period, the task will primarily focus on the development and implementation of realistic aircraft engine simulation and controller design for large commercial airplanes. This task will also perform the software maintenance for the integration for the engine simulation software developed from other group.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

******Government's Estimated Period of Performance: April 1, 2009 to Completion of GESS-2 Contract. Base plus 3 Options******

Broad Scope of Work:

Primary duties include control requirements definition, selection of appropriate control strategies, and design, development, and implementation of control laws for targeted aerospace propulsion systems and subsystems. Duties may also include some support for planning activities, simulation development to support control design efforts, software maintenance, documentation, and implementation and validation testing of control algorithms in simulation, ground test, and/or flight test environments.

Specific Work Elements:
****

1. Support the development, implementation, and distribution of a closed-loop, generic commercial gas turbine engine simulation in support of the Aviation Safety projects.
1a. Develop tools to assist with the comparison and validation of component models for the C-MAPSS2 (Commercial Modular Aircraft Propulsion System Simulation-2) engine simulation.
1b. Select and implement an appropriate solver strategy for C-MAPSS2
1c. Develop and implement GUI (Graphic User Interface) and API (Application Programming Interface) for C-MAPSS2
1d. Develop generic engine controller for fast response engine research.
1e. Develop simulations for high level control architecture for fast response engine to demonstrate the information flow and risk propagation.
1f. Prepare and update the user's guide for C-MAPSS2 software package.
****

2. Travel in accord with requirements for attendance at technical and/or technology transfer meetings, presentations or research papers, and in acquiring training or course work useful for enhancing capabilities in performing this task.

3. Obtain training as required to conduct research being performed under this task and maintain core competency in control systems design and analysis.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

MILESTONES:
****

1. The contractor shall complete baseline controller (Power management and limit logics) for C-MAPSS2 engine model to match the characteristics of the SOAPP (State of Art Propulsion Program) model by December 31st, 2009.
2. The contractor shall complete baseline C-MAPSS2 engine simulation to include stall margin models and develop a stall margin estimation algorithm based on available sensor set by December 31st, 2009.
3. The contractor shall develop a GUI for C-MAPSS2 for public release by March 31st, 2010.
****

Deliverables:
****

1. Documentation for the C-MAPSS2 baseline controller performance comparing to SOAPP model. Due by December 31st, 2009.
2. Document for stall margin model and stall margine estimation algorithm C-MAPSS2. Due by December 31st, 2009.
3. Draft paper for stall margin model and margin estimation algorithm. Due by March 31st, 2010.

Monthly progress reports shall be submitted which describe technical achievement, issues, developments, progress, analysis, and evaluation of all task specific projects.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.
****

Criteria to Be Used for Evaluation **Weights**

Performance	60
Schedule	30
Cost	10

Desired Personnel Skill Sets

This task requires the support of personnel with an advanced degree in a field related to controls engineering (e.g., aerospace, mechanical, or electrical) and a broad background in the development, implementation, testing, and validation of control algorithms. “Broad background” implies a practical understanding of classical, modern, and intelligent control-based approaches. Some familiarity with real-time implementation of controls is also required. Proficiency in Matlab and Simulink is also required.

Contractor personnel shall be responsible for the science aspects of experiments. High technical and interpersonal and skills are required as there are frequent interactions with other research and administrative personnel at NASA Glenn.

Government Furnished Property

NASA Glenn Engine Simulation Lab. Matlab software package.

Safety and Assurance Plans

None Selected.

Technical Representative: Heidmann, James

Task Number: NNC06E031T - 12

Task Title: Experimental and Computation Investigation of Turbine Aerodynamics & Heat Transfer

Task Details

Period of Performance
2/12/2009 - 8/31/2011

Background
Why the project is being pursued

This Task was formerly GESS Task 79.
BACKGROUND:

Gas turbine efficiency is increased by improved ability to predict turbine aerodynamics and heat transfer. To verify predictions highly detailed data are needed. These data are best obtained in research facilities. In addition to decreased costs due to improved efficiency, emissions are also reduced. The CW22 facility is unique cascade facility, which is able to test large scale turbine blade at very high Mach numbers. The data are used to verify analyses developed at Glenn to predict the aerodynamics and heat transfer.

Task Order Description
Description of Services to be procured

TASK ORDER DESCRIPTION:

Acquire experimental data and conduct simulations of turbine aerodynamics and heat transfer to improve CFD predictive capability.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

Government's Estimated Period of Performance is April 1, 2009 to 8/31/2011*

Broad Scope of Work:

Acquire experimental data and conduct numerical simulations of turbine aerodynamics and heat transfer to improve CFD predictive capability.

Specific Work Elements:

1. Provide guidance regarding the research requirements for a turbine test facility. This is done to ensure that highly accurate and detailed measurements can be obtained in this facility.

2. Provide guidance for tests to evaluate the effects of tip clearance on heat transfer and aerodynamic performance

Travel to GE (2)
Approximate cost $1000

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

MILESTONES AND DELIVERABLES:

1. Provide experimental dataset for aerodynamic and heat transfer effects of turbine tip clearance flows in CW22 (transonic turbine cascade) facility.

2. Ensure that CW22 facility is operable with respect to pressure certification issues.

3. Work with NASA personnel to compare experimental results with existing CFD data and generate research report of results.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	Weights
Performance	50
Schedule	25
Cost	25

Desired Personnel Skill Sets

PERSONNEL PROFILE:

Ph.D. in Aerospace or Mechanical engineering. Experience in experimental data acquisition and numerical simulation of surface heat transfer.

Government Furnished Property

No government furnished property is required, but the experimental work is to be performed in the CW-22 test cell. Computational work is to be performed on both government owned and contractor owned computer systems. The computational work may require the use of the NASA facility or Glenn multiprocessor computer system.

Safety and Assurance Plans

None Selected.

Technical Representative: Okojie, Robert

Task Number: NNC06E033T - 10

Task Title: Surface Analysis Task

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

This Task was formerly GESS Task 86.
Background: The Sensors and Electronics Technology Branch conducts research and development programs in sensing concepts, sensor technology, high temperature electronics and related areas such as materials and materials processing techniques. Emphasis is on developing advanced capabilities for measurement and control of aeropropulsion systems. Specific areas of work include thin film and wire thermocouples and strain gages, remote temperature sensors, heat flux gages, chemical species sensors, SiC based electronic devices and sensors, and MEMS. The branch is equipped to fabricate the sensors and electronic devices including crystal growth facilities, clean rooms for device fabrication, and facilities for test and evaluation of the sensors and devices. This area of research needs state-of-the-art surface analysis capabilities in order to determine the behavior of these devices during fabrication and operation.

Task Order Description
Description of Services to be procured

TASK ORDER DESCRIPTION: Perform surface analysis and characterization in support of research programs of the Instrumentation and Controls Division at NASA Glenn Research Center.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

The contractor shall provide surface analysis and characterization for the Instrumentation and Controls division as required. This work shall include the analysis of samples using Scanning Electron Microscopy, Auger Electron Spectroscopy, Atomic Force Microscopy, and X-ray Photoelectron Spectroscopy.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

MILESTONES AND DELIVERABLES:

1. Monthly progress reports which shall include:
A. Technical developments, progress and analysis, and evaluation of all task specific projects, including ASG Database output.

B. Technical achievements or issues.

2. Supply computer software or hardware or miscellaneous equipment as needed for task.

Task reviews will be conducted bi-annually for the purpose of evaluating task performance according to predetermined measure. Revisions, if required to the above deliverables will be tracked via monthly reports.
As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	70
Schedule	25
Cost	5

Desired Personnel Skill Sets

The contractor shall provide support qualified and experienced in the use of Auger Spectroscopy, Scanning Electron Microscopy, Atomic Force Microscopy, and X-Ray Electron Microscopy.

Government Furnished Property

The government will provide on a non-interference basis: Scanning Electron Microscopy, Auger Spectroscopy, Scanning Electron Microscopy, Atomic Force Microscopy, and X-Ray Electron Microscopy.

Safety and Assurance Plans

None Selected.

Technical Representative: Hull, David

Task Number: NNC06E034T - 23

Task Title: Analytical Science Lab Operations

Task Details

Period of Performance
2/12/2009 - 8/31/2011

Background
Why the project is being pursued

*************NEW AS OF AFP6 - APRIL 1, 2009 *******

Background:
The Structures and Materials Division (RX00) at NASA Glenn Research Center is involved in research and development of high temperature materials for use in aerospace propulsion systems. Understanding the behavior of these materials requires complete materials characterization by several techniques. These techniques are implemented in the Advanced Metallics Branch, Structures and Materials Division. The materials characterization requires special knowledge, skills, and laboratory capabilities to prepare specimens properly, examine, and record the results. The contractor has been involved in conducting preparation and characterization of materials and has the special skills required to conduct this task.

Broad Scope of Work:
The objective of this task is to provide materials characterization services for research programs in GRC's Structures and Materials Division. Material Characterization support is required for the characterization of metals, ceramics, polymers and composites.

Task Order Description
Description of Services to be procured

*************NEW AS OF AFP6 - August 20, 2009 *******

Shall provide metallographic services, materials characterization, and electron microscopy services for research programs and technical support to the materials research effort in Materials and Structures Division at NASA Glenn Research Center. Support for NASA Glenn and other NASA centers and contractors may also be required.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

*************NEW AS OF AFP6 - APRIL 1, 2009 *******

Government Estimated Period of Performance: April 2009 to Completion of GESS-2 Contract,Base puls 3 Options.

The objective of this task is to provide materials characterization services for research programs in NASA GRC's Structures and Materials Division(RX00). Material characterization support is required for the characterization of metals, ceramics, polymers and composites.

General:

1. Shall perform sample preparation, conduct analysis, and report results.

2. Shall maintain laboratory equipment, instrumentation, and supplies necessary to insure precise and accurate analyses in a timely manner. Shall perform routine calibration and maintenance on equipment. Shall notify government personnel of impediments in performing analysis.

3. Shall provide consultation to research staff as to the most appropriate analytical techniques.

4. Shall maintain awareness of 'state of the art' analytical instrumentation, techniques, computer hardware, and software for analytical applications. Shall specify and make recommendations for the procurement of new equipment and/or upgrades.

5. Shall provide concise operational procedures, and instruct/train research staff on the use and operation of equipment.

6. Shall utilize computer software tools to measure, and perform statistical analysis for enhanced record keeping.

7. Shall practice and maintain awareness of safe operating procedures in the laboratories.

8. Shall travel in accord with requirements for attendance at technical and/or technology transfer meetings, presentations of research papers, and in acquiring training or course work useful for enhancing capabilities in performing the task.

9. Shall assist in decommissioning of analytical instrumentation in preparation for installation of new or upgraded equipment.

10. Shall perform analysis following ISO 9001 instructions.

Specific:

A. Metallographic Laboratory:
1. Shall mount, polish, and etch specimens for microstructural examination. Shall document results using optical microscopy techniques, and interpret results.
2. Shall provide precision machining of flat samples to surface finishes of less than one micron.
3. Shall assist in performing micro-hardness testing and image analysis.
4. Shall maintain records of material preparation guidelines (MPG's).

B. Electron Microscopy Laboratory:
1. Shall prepare and analyze samples using scanning electron microscopy (SEM), x-ray energy dispersive spectroscopy (XEDS), electron back scattered diffraction (EBSD), and electron microprobe analysis using wavelength dispersive spectroscopy (WDS).
2. Shall perform fractographic analysis of failed test samples.
3. Shall perform microchemical characterization on metallographic samples.
4. Shall perform calibration/maintenance on SEMs, XEDS, EBSD, microprobe, and sputter/carbon

coaters.
5. Shall provide nickel plating of samples prior to metallography for samples requiring analysis to a sample's edge.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

MILESTONES & DELIVERABLES:

1. Monthly progress reports which shall include:

A. Technical developments, progress and analysis, and evaluation of all task specific projects, including Analytical Science Group Database output.

B. Technical achievements or issues.

2. Supply computer software or hardware or miscellaneous equipment as needed for task.

Task reviews will be conducted bi-annually for the purpose of evaluating task performance according to predetermined measure. Revisions, if required to the above, deliverables will be tracked via monthly reports and modifications will be jointly agreed upon by the Task Manager and the TR as they relate to the performance rating of this task.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	50
Schedule	30
Cost	20

Desired Personnel Skill Sets

*************NEW AS OF AFP6 - APRIL 1, 2009 *******

The contractor shall provide the necessary personnel required for each of the two subtask areas making up this task.

1. The Metallography Laboratory requires metallographer specialist personnel with the following qualifications:

a)Associates degree in Chemistry or Materials Science and/or 5 years or more of metallographic experience. This experience will include a minimum of 5 years conducting metallography on metal, ceramic, polymers, and composite materials. Also, experience in plasma etching, interference layering, optical microscopy and digital imaging.

2. The electron microscopy laboratory requires:

a) Electron microscopy personnel with greater than 10+ years extensive experience. Shall be experienced in working with metals, intermetallics, ceramics, fibers and composites with particular capabilities in fractography of ceramic fibers for reinforcing composites. Shall be capable of SEM characterization and analysis of materials including imaging and chemical characterization via XEDS and WDS techniques. Shall have a minimum of 5 years experience operating a field emission scanning electron microscope (FE-SEM)with thorough understanding of all operating parameters to obtain optimum performance. Shall be experienced in maintaining such equipment and in preparing samples via coating techniques such as physical vapor deposition. Shall have a minimum of 5 years experience in electron microprobe microanalytical chemical analysis.

Limited administrative and supervisory support is required for this task.

Government Furnished Property

*************NEW AS OF AFP6 - APRIL 1, 2009 *******

On-site materials characterization laboratories. Metallographic laboratory in building 49 rooms 141, 146, 148, and 149. Electron optics laboratory in building 49 rooms 6-17, and 32.

Safety and Assurance Plans

None Selected.

Technical Representative: Meador, Michael

Task Number: NNC06E036T - 39

Task Title: Chemical & Instrumental Analysis of Organic Compounds & Polymers

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

Background:
The Polymers Branch of the NASA Glenn Research Center is involved in the development of high performance polymers and polymer matrix composites for advanced aerospace propulsion, power, and communications applications. This effort involves the synthesis, processing, characterization, and evaluation of new materials. Timely and accurate chemical characterization of these materials is critical to this effort. While many of the characterization techniques employed are based upon known methods, these often need to be modified for use with advanced materials. The contractor has been involved in conducting such chemical and instrumental analysis of organic compounds and polymers.

Broad Scope of Work:
The objective of this task is to provide chemical analysis of organic compounds, polymers, and polymer matrix composites using spectroscopic, chromatographic, thermal analytical, and rheological techniques using instrumentation available in-house. The contractor shall also perform routine maintenance and "trouble-shooting" of equipment, maintain the inventory of chemicals and supplies, and make recommendations on the purchase of new analytical equipment plus equipment and software upgrades.

Task Order Description
Description of Services to be procured

Provide analytical support and service in Chemical and Physical Characterization of Monomers, Oligomers, Polymers and Model Compounds

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

Broad Scope of Work:

The objective of this task is to provide chemical analysis of organic compounds, polymers, and polymer matrix composites using spectroscopic, chromatographic, thermal analytical, and rheological techniques using instrumentation available in-house. The contractor shall also perform routine maintenance and "trouble-shooting" of equipment, maintain the inventory of chemicals and supplies, and make recommendations on the purchase of new analytical equipment plus equipment and software upgrades.

General:

1. Perform sample preparation, conduct analysis, and report results with documentation of operating conditions, and calibration standards.

2. Maintain laboratory equipment, instrumentation, and supplies necessary to insure precise and accurate analyses in a timely manner. Notify government personnel of impediments in performing analysis.

3. Provide consultation to research staff as to the most appropriate analytical techniques.

4. Maintain awareness of "state of the art" analytical instrumentation, techniques, computer hardware, and software for analytical applications. Specify and make recommendations for the procurement of new equipment or upgrades.

5. Modify existing methods and/or develop new techniques to analyze new advanced materials.

6. Utilize computer software tools to control measurement, perform statistical analysis, and enhance record keeping.

7. Practice and maintain awareness of safe operating procedures in the laboratories.

8. Travel in accord with requirements for attendance at technical and/or technology transfer meetings, presentations of research papers, and in acquiring training or course work useful for enhancing capabilities in performing the task.

Specific:

1. Perform chemical analysis of samples provided by GRC scientists and engineers in response to written work requests via any or all of the following techniques as required:

a. Infrared spectroscopy (FTIR and TGA-FTIR)
b. Raman spectroscopy
c. Ultraviolet-visible spectroscopy
d. Emission spectroscopy
e. HPLC (reverse phase, absorption, or gel permeation)
f. Thermal analysis (differential scanning calorimetry, thermal gravimetric analysis, thermal mechanical analysis, and dynamic mechanical analysis)
g. Other techniques as required (e.g. viscosity and density measurements, rheological measurements, resin/fiber content determinations, contact angle measurements, etc.)
h. Wet Chemistry Techniques

2. Report all data and pertinent information to the requesting scientist/engineer upon completion of the test. Consult with requesting scientist/engineer on any special problems or difficulties encountered in the analysis.

3. Develop and revise methodologies for evaluation of new materials.

4. Perform routine maintenance and calibration of chemical instrumentation, "trouble-shoot" equipment when needed, promptly notify appropriate GRC personnel and contractor supervisor when such instrumentation is in need of outside service, and make arrangements for outside service.

5. Make recommendations on the purchase of new analytical equipment, computer hardware and software as well as equipment/software upgrades.

6. Maintain the Polymers Branch inventory and supply of laboratory chemicals and supplies. Notify designated personnel when new chemicals/supplies should be ordered.

7. Travel in accordance with requirements for attendance at technical meetings, technology transfer, making presentations of research papers, and in acquiring training or course work useful for enhancing performance of the task.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

MILESTONES & DELIVERABLES:

1. A monthly activity report which summarizes task charges, production data, types of techniques, and special achievements and issues.

2. Task reviews will be conducted bi-annually for the purpose of evaluating task performance according to predetermined measure. Revisions, if required to the above performance based deliverables will be tracked via quarterly progress report and modifications will be jointly agreed upon by the Task Manager and the TR as they relate to the performance rating of this task.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Milestones:

- Complete preliminary chemical and thermal analysis of polymeric materials (resins, composites, adhesives) in support of the Advanced Composites Technology Project's preliminary resin and composite screening program by 3/30/2010

Criteria to Be Used for Evaluation	**Weights**
Performance	40
Schedule	40
Cost	20

Desired Personnel Skill Sets

The contractor shall provide competent support with a minimum of a ACS certified B.S. degree in chemistry, and with research experience in organic and polymer chemistry. The task performer will have experience with computers and instrumental methods of chemical analysis, mechanical testing, chromatography, rheological property measurement, and polymer processing as well as a reasonable degree of manual dexterity and good communication skills.

Limited supervisory support is required for this task.

Government Furnished Property

None

Safety and Assurance Plans

None Selected.

Technical Representative: Zalewski, Robert

Task Number: NNC06E037T - 13

Task Title: Engineering Directorate Technical Support

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

This Task was formerly GESS Task 95.
The Engineering Directorate (ED)is a multi-disciplined organization that provides engineering and manufacturing services to various customer organizations at the Glenn Research Center. The ED relies upon a complex Engineering Support Environment to accomplish its mission. The ED utilizes the contractor to maintain and operate this environment.

Task Order Description
Description of Services to be procured

TASK ORDER DESCRIPTION: Provide technical support to the Code D/Engineering Directorate.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

Engineering Support Environment:

A) Support of all engineering/manufacturing based applications as required by ED including client/server applications, client installation scripts, standalone client installs, and engineering menus on the client desktop. The following list provided detailed examples of the Engineering Applications to be supported, however, this list can and will change as new Engineering Applications required to support the mission of ED become available.

1. Applied Flow Technology – Arrow
2. Applied Flow Technology - Engineering Utility Suite
3. Applied Flow Technology - Fathom
4. Ansoft – Maxwell 2D
5. Ansoft - Maxwell 3D
6. Ansys - Mechanical
7. Ansys – Connection for ProE
8. FEMAP
9. Ansys - CFX-5
10. Autodesk – AutoCAD
11. ESI Group – AutoSEA2
12. Computational Mechanics Group – BEASY

13. BETAsoft – Board
14. Cadence Design Systems – Allegro, PCB Design Studio, Affirma,
15. Cadence Design Systems - OrCAD (Express, Layout, Layout Plus, Capture, Pspice)
16. COADE, Inc. – CAESAR II
17. COADE, Inc. - PVElite
18. ABZ - Design Flow Solutions
19. DEI - The Desktop Engineer 2000
20. Telelogic – DOORS, DOORSnet
21. Agile Software – DyRoBeS
22. EMA – MHARNESS
23. ADEPT
24. Express Metrix - Express Meter
25. Kamel Software - FastLook Plus
26. Macrovision Corporation – FLEXlm, SAMsuite
27. C&R Technologies – Sinda/Fluint,
28. C&R Technologies – Thermal Desktop,
29. C&R Technologies – FloCAD,
30. C&R Technologies – RadCAD,
31. C&R Technologies – SinapsPlus
32. EDAS – GageMapII
33. AeroSoft – GASP
34. Cryodata – GASPAK
35. Collier Research and Development Corporation - HyperSizer
36. UGS– NX,
37. UGS - I-deas
38. UGS – NX-Nastran
39. ORA – LightTools
40. PTC – Mathcad
41. Wolfram Research – Mathematica
42. The MathWorks – MATLAB,
43. The MathWorks - Simulink
44. MSC.Software – MSC.Nastran,
45. MSC.Software - MSC.Patran
46. BK – I-DEAS, Reporter
47. Media Cybernetics – OPTIMAS
48. Oracle – Oracle
49. Jasc Software - Paint Shop Pro
50. palmOne - Palm Desktop
51. PTC - Pro/ENGINEER Wildfire,
52. PTC - Pro/PDM
53. UTS Software - TK Solver
54. NASA - TPSX Material Database
55. Spacedesign Corporation – TSS
56. Microsoft – Visual Basic,
57. Microsoft - Visual C++
58. ZEMAX Development Corporation - ZEMAX
59. PTC - WindChill
60. Applications will be added or removed from this list as required by the current work to be performed.

A-1.) The contractor shall create and maintain a software vendor database which includes the following information for each application. The contractor shall input the fields marked with an "*":

i) Name of Application and appropriate modules * (Gov't provided)
ii) Vendor info (Gov't provided)
(1) Vendor Name *

(2) URL link to vendor *
(3) Vendor point of contact, if available/required *
iii) NASA Contract Info (input provided by Gov't POC)
(1) Contract Number *
(2) NASA Buyer's name *
(3) Contract terms *
iv) Version info (Gov't provided)
(1) Version in production *
(2) Version in evaluation/test * as needed
(a) What's new in new version *
(b) expected release date to production *
(c) Date received *
(d) date installed *
(e) Number of licenses *
(f) Current Server location *
(g) License expiration date *
(h) Maintenance expiration date (Gov't provided) *
v) NASA Responsible person (provided by Gov't POC)
(1) name *
(2) phone *
(3) email *
vi) Special info (Gov't or Contractor provided, as needed) *
vii) flexLM, Operating system. *

A-2.) The contractor shall create and maintain a website where there is a web page for each application. Information on web pages is a subset of them information contained in the Microsoft Access database defined in above item.

A-3.) The Contractor shall prepare a summary of maintenance/upgrades performed on applications during the previous month and those planned for the next 2 months. It is anticipated that all software maintenances/upgrades will be installed within 30 days of receipt and all new software applications will be installed within 60 days. Scheduling issues will be discussed with the NASA TR.

A-4.) Provide an "able to Print" level of support for Engineering Applications.

A-5.) Problems to be addressed such that return to service within 8 work hours.

A-6.) Establish and maintain usage data for Server based applications: Number/Names of Users for each application

A-7.) Data shall be available electronically with ad-hoc reports available within 8 work hours of request.

A-8) Prepare procurement specifications for software purchases as requested.

B) Administer and assist in the customization and rework of CAD applications installation and configuration. Customization includes the creation, upgrade, maintenance, and documentation of the customization files.

1. Pro/E
a) Support the creation, upgrade, and maintenance of the custom software configuration files.
b) Install, administer, upgrade, and maintain PTC software.
c) Support the configuration of PTC products, to be functional in ED environment.
d) Provide user support for PTC software related administrative issues.

e) Set up and administer Pro/ENGINEER part libraries.
f) Document customizations and administrative information
2. UGS - NX
3. I-deas
4. AutoCAD

C) Support and maintain engineering architecture associated with engineering applications. Administer and assist in the customization, installation, and configuration of the Engineering Data Manager. Customization includes the creation, upgrade, maintenance, and documentation. Support of the engineering architecture associated with engineering applications. Support of the resource domain-engineering infrastructure includes maintaining file/print/plotting services, SMS/SQL services, backup services, intranet web services, UNIX connectivity, shared/public drives, HP blade and storage technology and maintenance vendor support, and project shares.

C-1.) Contractor shall maintain a spreadsheet accessible to R. Zalewski and K.Spence which includes the following information for ESD's non-ODIN computers, non-ODIN monitors, Network Attached Devices (NADs), and available ODIN computers:

i) NASA Tag Number, Hardware Type, Manufacturer, Model Number, Size, CPU, Building, and Room

ii) Provide EMAIL notification to R.Zalewski and K.Spence when any changes are made to spreadsheet.
iii) Track Vendor Support hours.

C-2.) Contractor shall recommended hardware and/or software upgrade to the engineering architecture and environment. Recommended changes in configuration to optimize performance and utilization of environment resources

C-3) Provide diagnostics/trouble shooting and minor maintenance of hardware.

C-4) Prepare procurement specifications for hardware purchases.

C-5) Coordinate scheduling of installation.

C-6) Engineering Data Manager Support

i) Install, configure, and maintain Engineering Data Manager software on test, development, and production servers.

ii) Install, configure, and maintain Engineering Data Manager companion products including viewers, and MCAD integrations.

iii) Develop, install, and maintain custom code and user interfaces to provide ED-required customizations.

iv) Obtain training and services require to effect items a-c as approved.

D) Assist ODIN service providers to work problems that may arise within the ODIN desktop environment when it effects engineering applications or related work.

D-1) Engineering Help Desk / Problem Tracking

i) Provide help desk support for Engineering Applications.
ii) Use Web-based Problem Reporting and Tracking System.

iii) Monthly Deliverable Notification via EMAIL TO Zalewski and SPENCE
1) Report Number of Problem Items Opened, Closed, In-Work.
iv) Develop user-help procedures and post on Support Center.
v) Expected engineering application help/problem response:
1) first response to user within 2 hours
2) problem assessment/estimate resolution within 8 hours

E) Perform system administration on desktop and server machines (non-ODIN computers and Network Attached Devices (NADs)) as needed to enable engineering applications or related work to be performed. This includes designated equipment used in the ED Engineering Labs. Support non-ODIN peripheral hardware (printers, scanners, projectors, shared systems, plotters, and switches) as necessary.

F) Technical support including research, coordination, tracking and documentation for the purpose of planning, facilitating and enhancing all ED engineering related operations. (e.g., equipment database, newsletter/FAQ pages, software usage, committee support, system administrator backup, technology and product review/enhancement, seminars, demonstrations, user training/instruction, various organizational meeting support, stock/purchase requests, computer supply distribution, H/W and S/W upgrades and the development of computer related procedures and policies.)

G) ED Web Page Development and Maintenance
G-1) Support 508 compliance testing for submitted pages
G-2) Acts as technical ED representative at GRC web development meetings
G-3) maintain ED site on external web pages

H.) Perform IT Security documentation development, updates as required by HSPD-12 and other Federal and Center mandates in coordination with the Code D Organization Computer Security Official.
H-1) Maintain Security Plans currently in system for ED.
H-2) Support and create new plans and subplans as required by ED within the IT Security System.
H-3) Maintain knowledge-base of current, changing, a new security regulations and requirements of the Agency, Center, and Directorate.

I) Database Architecture and Management
Designs and maintains back-end databases (ie. MYSQL and Oracle) for Engineering Applications, License Management, and Web presence.
I-1) Maintains FlexNet Manager for providing access to, monitoring, and reporting of Engineering Application licenses.
I-2) Provides ad-hoc license reporting used to determine org/project usage for purpose of assigning cost and shared funding.
I-3) Maintains Oracle database which back-ends Web-site development activities.

J) Application Data Administration
J-1) Processes User account requests provisioned through the IdMAX system for applications such as GRC Windchill, DOORS, and additional applications as they become available through IdMAX.
J-2) Creates PRODUCTS and PROJECTS for GRC Windchill, DOORS, and other application involving database activity such as HyperSizer, Cradle, Genoa, and Subversion.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

MILESTONES AND DELIVERABLES:

• Maintenances/upgrades will be installed within 30 days of receipt.

• New software applications will be installed within 60 days.

• Monthly deliverable: report, which includes all requested information from the Technical Summary section. Report due the following month.

• Monthly deliverable: Review and update database. Notification via EMAIL to B.Zalewski and K.Spence.

• Monthly deliverable: Review and update website. Maintain change log and notify via E-MAIL to B.Zalewski and K.Spence

• Monthly deliverable: Maintenance/Upgrade/License renewal report covering previous month and next two months via EMAIL to B. Zalewski and K.Spence.

• Monthly deliverable: Update and maintain engineering software database and report changes to TR.

• Monthly Deliverable Notification via EMAIL TO ZALEWSKI and SPENCE. Report Number of Problem Items Opened, Closed, In-Work from web based problem reporting and tracking system.

• Monthly Progress Reports
As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	50
Schedule	30
Cost	20

Desired Personnel Skill Sets

PERSONNEL PROFILE:

The contractor is to provide appropriate technical staff. Personnel designated as system administrators will be subject to Center defined security and qualification certification.

Government Furnished Property

GOVERNMENT FURNISHED PROPERTY:

For the period of performance, the Government will provide office space in Room 200B of Building 86 to accommodate task.

Applications furnished include all ED provided applications in order to support task.

Safety and Assurance Plans

None Selected.

Technical Representative: Naiman, Cynthia

Task Number: NNC06E038T - 13

Task Title: Parallel Processing Testbed H/W, S/W Development

Task Details

Period of Performance
10/1/2009 - 3/31/2011

Background
Why the project is being pursued

Code R of the NASA Glenn Research Center (GRC) is conducting research to gain a fuller understanding of internal and external flow phenomena associated with advanced aerospace propulsion systems. That understanding is being built into improved analytical models and numerical simulation codes that will be able to predict the physical behavior and performance of new propulsion system designs. The research involves physical experiments, numerical simulations, and analyses of inlets, compressors, turbines, nozzles, etc. for propulsion applications. Code R supports the Aeronautics Research Mission Directorate and the Exploration Systems Mission Directorate in activities such as the Multidisciplinary Analysis & Optimization (MDAO) capability and the Numerical Propulsion System Simulation (NPSS) tool to further enable propulsion and vehicle system analyses.

Parallel processing is being used increasingly to perform both the analytical and experimental computational work. This requires Code R to deal with a number of different parallel architectures and the software that supports each.

Task Order Description
Description of Services to be procured

TASK ORDER DESCRIPTION:
Perform software development of tools and utilities to assist researchers with the implementation and execution of parallel (CFD) and Multidisciplinary Design and Optimization (MDAO) applications on HPCC and GRC distributed / parallel test-bed systems.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

******* NEW Government's Estimated Period Of Performance October 1, 2009 to March 31, 2011

The contractor shall perform software development of tools and utilities to assist researchers with the implementation and execution of parallel (CFD) and MDAO applications on HPCC and GRC distributed / parallel test-bed systems.

Specific Work Elements:

The contractor shall:
1. Develop general software tools and utilities for enhancing the programming, implementation, and execution of parallel applications, in areas such as computational steering, load balancing, performance monitoring, debugging, etc. The software approach taken should consider possible reuse of, or build on, available existing software and allow for easy porting to commercial distributed/parallel systems.
2. Port selected serial (single processor) simulations to the distributed/parallel test bed systems as required. Use portability tools in this process to allow the codes to be easily moved to commercial distributed/parallel systems.
3. Support testing and/or enhancement of parallel/distributed software developed under other NASA contracts and grants.
4. Develop and verify software for MDAO, concentrating on the infrastructure, varible fidelity, and multi-discipline capabilities: including requirements definition, analysis, design, implementation, documentation, and testing.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

MILESTONES AND DELIVERABLES:

1. Develop application deployment mechanisms to support distributed multi-fidelity and multi-discipline numerical zooming system simulations. NEW*** 3/31/10

2. Develop software tools enabling full engine simulations on NAS supercomputer and local GX cluster. Submit simulations and compare with cycle / experimental data. NEW*** 3/31/10

3. Develop MDAO framework capabilities. NEW*** 3/31/10

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	Weights
Performance	80
Schedule	10
Cost	10

Desired Personnel Skill Sets

PERSONNEL PROFILE:

1. B.S. or M.S. in Electrical or Computer Engineering with at least 10 years experience in systems programming, algorithm development, and parallel processing. Shall have knowledge of the UNIX o/s, C programming. Shall also have several years experience with parallel processing concepts (both software, e.g. message-passing libraries such as PVM and MPI, and hardware) and general knowledge of FORTRAN, C++, CORBA, and python.

Government Furnished Property

GOVERNMENT PROPERTY:

None.

Safety and Assurance Plans

None Selected.

Technical Representative: Lerch, Bradley

Task Number: NNC06E039T - 13

Task Title: Fatigue & Structures (FAST) Laboratory Testing Support

Task Details

Period of Performance
2/9/2009 - 8/31/2011

Background
Why the project is being pursued

BACKGROUND: The FAST Laboratory was set up at NASA GRC to investigate elevated temperature deformation and fatigue behavior in advanced materials under complex loading conditions typical of gas turbine engine applications. Monolithic alloys and advanced polymer, metal, and intermetallic matrix composites (PMCs, MMCs, and IMCs) are currently being researched and evaluated with specific applications to several NASA programs.

Task Order Description
Description of Services to be procured

TASK ORDER DESCRIPTION: The work shall involve conducting experimental investigations to characterize the deformation, damage, and life behaviors of advanced structural materials at elevated temperatures, designing and fabricating custom fixtures to fit into existing test systems, analyze test data, and completing other duties consistent with laboratory operations. Deliverables shall include test results, quality assurance plans and equipment calibrations and documentation.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

******Government's Estimated Period of Performance: April 1, 2009 to Completion of GESS-2 Contract. Base plus 3 Options******

Scope of Work:

1. Prepare test specimens, which includes measuring specimen's size and density, polishing the gauge surfaces, and instrumenting the specimen with thermocouple and strain gages.

2. Conduct tests on a wide variety of computer-controlled servohydraulic test systems. This necessitates a knowledge of various test procedures and standards for conducting tensile, fatigue, thermomechanical fatigue and bend tests on monolithic and composite materials.

3. Install, calibrate and troubleshoot various heating systems associated with material test systems. Employ the most appropriate temperature measurement system for each type of heating and test material such as thermocouple and optical/laser pyrometery, and calibrates such systems.

4. Comply with all aspects of the laboratory quality assurance plan to calibrate and maintain all

testing and associated equipment. Assures that the quality assurance plan is maintained and regularly updated.

5. Align load frames per appropriate ASTM and NASA Fatigue Lab standards.

6. Understand the usage of, and install, calibrate and document thin film strain gages, resistance extensometers and laser/optical extensometers for measuring displacements.

7. Participate in data reduction using personal computers and standard software.

8. Oversee machining operations of test specimens and fixtures.

9. Act as an informal liaison between engineers and fabrication personnel.

10. Perform other duties consistent with daily laboratory operations.

11. Maintain test rigs and central hydraulic and cooling water systems.

11. Training and/or continuing education courses as necessary to assist in performing the above cited work elements. A limited amount of travel may be required.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

Deliverables and Milestones:

Deliverables:

1. Monthly progress reports which shall include:

A. Technical developments, progress and analysis, and evaluation of all task specific projects.
B. Technical achievements or issues to include:

a) Technical progress in the various specific work elements cited and any special achievements and/or new technologies developed in the process.
b) Information relating the details of installation, operation, and maintenance of laboratory equipment
c) Number and description of work requests processed and associated response times.
d) An explanation of any down time, date, time duration, type of delay and reason, and the resolution.

2. Computer hardware and software necessary for performing and maintaining the task work. This may include a NASA GRC integrated desktop environment compatible personal computer, data reduction software and software used for technical report writing.

3. Material supplies which will be used to maintain and upgrade existing, NASA tagged equipment, which is directly related to Task performance. This will include:
i) consumables such as filters, gaskets, seals and the like associated with test equipment,
ii) assemblies and components used to prepare test equipment for performance, and
iii) internal upgrades to experimental equipment associated with completing Task Statements of Work.

4. Participate in weekly Lab Operations Meeting to discuss scheduling, ongoing work, problems and ISO issues. Weekly submission of Progress sheets.

Milestones:

The milestones are many and may change weekly. They shall be provided by NASA on the Progress sheets and discussed at the weekly Lab meeting.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	70
Schedule	20
Cost	10

Desired Personnel Skill Sets

PERSONNEL PROFILE:

The task performer who will perform the work will have a minimum of 15 years or more of related aerospace technology experience and will possess all required skills and knowledge to fulfill all task duties.

Limited supervisory support is required for this task.

Government Furnished Property

None.

Safety and Assurance Plans

Quality Assurance Plan
System Safety Plan

Technical Representative: Lee, Chi-Ming

Task Number: NNC06E042T - 17

Task Title: Combustion Optics Research

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

This Task was formerly GESS Task 111.
Nonintrusive instrumentation to investigate internal fluid dynamics and combustion chemistry is critical to the development of advanced propulsion systems. Intrusive instrumentation probes frequently cannot survive the test environment and adversely affect the system or the measured parameter. Laser spectroscopy is one applicable measurement area, which has been widely researched in the laboratory and which is now being applied in aerospace research facilities. However, implementation of non-intrusive optical diagnostics directly into major combustor test hardware is limited by the requirement to calibrate and test the techniques first on lab-scale hardware. Diagnostics capabilities that have been demonstrat-ed at GRC will be reconfigured and implemented in the Advanced Subsonic Combustor facility.

Broad Scope of Work:
The contractor shall develop nonintrusive, laser-based measurement systems and apply these systems to GRC research rigs/facilities used for combustion and emissions research related to advanced propulsion systems for the present and future aeronautic programs. The combustion systems will be hydrocarbon-fueled. The combustion environments of interest are characterized by high velocity, high pressure and high temperature. The goals of the systems application efforts are to evolve and evaluate new techniques and to correct system limitations. The contractor shall also perform the setup, calibration and validation of three optical diagnostic techniques using lab scale burners. This will include conducting advanced laser-based, experimental, diagnostics research for advanced engine research programs in NASA test cells. Contractor engineers shall also be responsible for coordinating in-house, NASA customer research efforts.

Task Order Description
Description of Services to be procured

Perform analytical and experimental research to evolve advanced, low emission gas turbine combustor concepts for present and future aeronautic programs.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

Broad Scope of Work:

The contractor shall develop nonintrusive, laser-based measurement systems and apply these systems to GRC research rigs/facilities used for combustion and emissions research related to advanced propulsion systems for the present and future aeronautic programs. The combustion systems will be hydrocarbon-fueled. The combustion environments of interest are characterized by high velocity, high pressure and high temperature. The goals of the systems application efforts are to evolve and evaluate new techniques and to correct system limitations. The contractor shall also perform the setup, calibration and validation of three optical diagnostic techniques using lab scale burners. This will include conducting advanced laser-based, experimental, diagnostics research for advanced engine research programs in NASA test cells. The contractor engineers shall be responsible for coordinating in-house, NASA customer research efforts.

Specific Work Elements:

1. Due to the severity of the operating conditions, ongoing analysis is required to provide data fidelity and ensure safety of the research hardware. Determines necessary design modifications for improving the performance or durability of research hardware.

2. Analyze data, extracts design principles, compares experimental results with theoretical analysis, develops new theories.

3. Setup, test and calibrate laser and detector system to measure soot in a flame burner using lasers, PMTs and CCD cameras, configure and install optical train, setup and install data collection system.

4. Conduct tests for different combustors for advanced engine research programs. Determine the test matrix for all operating conditions.

5. Analyze the test system to ensure the data fidelity and safety of the research hardware for each test run, and analyze and process the performance and emission data of each combustor test.

6. Configure, and install optical train, setup and install data collection system for soot measurements and demonstrate satisfactory operation for the system.

7. Evaluate, and implement diagnostic methods based on Laser Induced Florescence (LIF), Raman and/or Rayleigh, and other flow imaging techniques, with emphasis on planar technology for application to both in-house and customer research rigs and components. Provide recommendations for measurement system application.

8. Consult with researchers on new diagnostic techniques and systems, which could be incorporated into a nonintrusive instrumentation system.

9. Evaluate NO measurement calibration method using NO injection system

10. Write reports and travel in accord with requirements for attendance at technical and/or technology transfer meetings, presentations of research papers, and in acquiring training or course work useful for enhancing capabilities in performing the task.

Travel as required for training, contacting with engine companies' engineers and meeting.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

MILESTONES & DELIVERABLES:

1. Monthly progress reports which shall include:

A. Technical developments, progress and analysis, and evaluation of all task specific projects.

B. Technical achievements or issues.

2. Computer hardware and software, and miscellaneous equipment and optics as required for experimental data acquisition and analysis.

Task reviews will be conducted bi-annually for the purpose of evaluating task performance according to predeter-mined measurables. Revisions, if required, to the above performance based deliverables will be tracked via monthly reports and modifications will be jointly agreed upon by the Task Manager and the TR as they relate to the performance rating of this task.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	5
Schedule	90
Cost	5

Desired Personnel Skill Sets

The contractor shall provide the necessary personnel with a Ph.D. in Physical Chemistry, or related fields with a minimum of 15 years experience in experimental combustion research.

Knowledge required for the task is as follows:

1. Professional knowledge of gas turbine combustor design principles.

2. A working knowledge of experimental design, data evaluation and processing procedures.

3. Extensive experience in applying non-intrusive experimental diagnostics to combustion systems. Familiarity with image processing methods to analyze laser diagnostic test data from gas turbine flow fields.

Limited supervisory support is required for this task.

Government Furnished Property

None

Safety and Assurance Plans

None Selected.

Technical Representative: Naiman, Cynthia

Task Number: NNC06E043T - 11

Task Title: Computational Technolgy Support for Complex Systems Analysis

Task Details

Period of Performance
10/1/2009 - 3/31/2011

Background
Why the project is being pursued

Full vehicle and engine simulations require a detailed analysis of multi-fidelity and multi-discipline interactions to correctly determine mission performance parameters. The integration technologies NEW***developed and*** tested in this task will support the development of the Multidiscipline Design Analysis and Optimization (MDAO) capability being developed under the Fundamental Aeronautics Program.

Task Order Description
Description of Services to be procured

The work will NEW***involve developing and testing*** integration techniques to support the complex analyses of full vehicle and engine systems. The scope includes finite element analysis (FEA) models, NEW***systems level analysis models, integrating discipline component codes, and supporting the MDAO framework development.***

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

******* NEW Government's Estimated Period Of Performance October 1, 2009 to March 31, 2011

For a given model effort, NASA will provide the configuration, geometry, fluid type, and model task objective. The Contractor shall obtain fluid properties as required, generate the model, perform analysis using the model, and generate a summary report that describes and interprets the model results.

The modeling effort will evolve comprehensively from simple configurations to more complex configurations that build upon prior work in the task.

Techniques to integrate variable fidelity and multi-discipline tools shall be developed and tested by the contractor to support the MDAO capability under development.

SPECIFIC WORK ELEMENTS AND MILESTONES:

The contractor shall:

1. Develop secondary flow system models to integrate with full engine simulations.

2. Support MDAO framework development, testing, and contribute to documentation.

3. Provide a monthly status update summary report.

4. Travel as required.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

MILESTONES AND DELIVERABLES:

Provide input to MDAO framework development process. This may require the development of use cases, requirements development, NEW*** implementing capabilities,*** and testing procedures. This will also include testing various MDAO capabilities throughout the development process. (3/31/10)

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	Weights
Performance	80
Schedule	10
Cost	10

Desired Personnel Skill Sets

Bachelors Degree, Masters Degree, or Ph.D. in Mathematics, Physics, Mechanical Engineering or Computer Science with several years experience in design or analysis.

Government Furnished Property

None

Safety and Assurance Plans

None Selected.

Technical Representative: Crandall, Karen

Task Number: NNC06E045T - 8

Task Title: Project Support to the Research and Technology Directorate

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

This Task was formerly GESS Task 119.
The Research & Technology Directorate plans, conducts and directs research, technology and development (in-house, grant, and contract). The products span fundamental research results to demonstration of components and systems. This work is conducted in collaboration with multiple organizations within the Center, other NASA Centers, and other Government and non-Government external organizations.

Task Order Description
Description of Services to be procured

Provide cost accounting services including the recording, classifying, examining, and analyzing of data and records of financial transactions for the NASA Glenn Research & Technology Directorate.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

Broad Scope of Work:

Provide cost accounting services including the recording, classifying, examining, and analyzing of data and records of financial transactions. This work is analytical, creative, evaluative, and advisory. This involves the following eight elements:

1. Review Directorate financial transactions and records for accuracy.
2. As part of the annual fiscal budgeting process, present historical data and trends and suggest accounting solutions for budget challenges.
3. Apply work breakdown structures to Glenn tasks.
4. Prepare Task Status reports based on budget vs. actual expenditures.
5. Submit draft Operating Account Plan broken down by Division. Correlate plan with actual commitments and obligations and resolve discrepancies-with RAMO financial representatives.
6. Develop and maintain various reports for tracking and reporting on Directorate transactions.
8. Provide reports on Division spending, as well as in-house Division Office expenditures.

Deliverables and Milestones to be met

Examples include: reports, analysis, and audits

Deliverables:
1. Status reports on handling of Directorate financial records including
a) Maintaining record of transactions
b) Reviewing them for accuracy
c) Identifying discrepancies and solutions to budgeting problems
d) Developing funding status reports and plans for Directorate management, including monthly labor reports showing planned versus actuals.

List of reports that the contractor shall develop: budget, budget vs. actuals, and projections for commitments, obligations, costs, and ad hoc (quarterly).

2. Contractor shall submit monthly Technical Progress and Resource Management Report (monthly)

Progress reviews will be conducted periodically with the NASA TR.

As part of the reporting requirements of this Task Order, contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	80
Schedule	15
Cost	5

Desired Personnel Skill Sets

Senior Project Control Analyst with >15 years experience in providing budget, funding, and resource analysis services to NASA Glenn.

Government Furnished Property

None.

Safety and Assurance Plans

None Selected.

Technical Representative: Colantonio, Renato

Task Number: NNC06E046T - 26

Task Title: Aircraft Icing Research

Task Details

Period of Performance
2/12/2009 - 8/31/2011

Background
Why the project is being pursued

This Task was formerly GESS Task 122.
BACKGROUND:
The accumulation of ice on aircraft/rotorcraft lift surfaces and engine inlets poses a serious hazard to flight safety. Flight testing, wind tunnel experiments, and computational analyses all have vital roles in understanding the icing phenomena, and the Icing Branch at NASA Glenn is heavily involved in all three areas. Flight tests with specially modified aircraft provide icing data under actual icing conditions, but are costly. Wind tunnel tests provide data under more carefully controlled conditions at less cost. Analytical tools (such as NASA Glenn's LEWICE program) aid in understanding the underlying physics.

Task Order Description
Description of Services to be procured

TASK ORDER DESCRIPTION:
The contractor shall provide the necessary technical expertise to support the development of experimental methods related to icing research as defined below.
As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

Broad Scope of Work:
Conduct and support experimental research for: 1) validation of icing computational tools, 2) development of new test methods for icing research, and 3) improvements in the knowledge of icing physics/ice shape growth and the associated aerodynamic changes. Support the development of training materials and information management.

Note work under this task relating to the use of Ka band radar for icing sensing is undergoing programmatic changes and the start date shall be delayed to March, 2010.

Travel as required.

Government's Estimated Period of Performance is April 1, 2009 to September 30, 2011

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

MILESTONES AND DELIVERABLES:
1. Iced Aerodynamics: support the aerodynamic simulation wind tunnel tests (icing and dry) for the Aero Simulation project. Investigate the performance degradation on an airfoil as a function of duration of an icing encounter.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	Weights
Performance	50
Schedule	20
Cost	30

Desired Personnel Skill Sets

PERSONNEL PROFILES:
Ph.D. in Aeronautical/Astronautical Engineering with knowledge of icing, heat transfer, flight dynamics, and applied aerodynamics in experimental testing required.

Government Furnished Property

None.

Safety and Assurance Plans

None Selected.

Technical Representative: Burke, Kenneth

Task Number: NNC06E047T - 18

Task Title: Regenerative Gas Dryer Set-Up

Task Details

Period of Performance
3/3/2009 - 8/31/2011

Background
Why the project is being pursued

No-Bid by DR received on 12/28/2006, ljm

No-Bid by DE received on 12/20/2006, ljm

No-Bid by R received on 12/13/2006, ldk

Entered as WISE Task 20061208 on 12/11/2006, ljm

This Task was formerly GESS Task 123.
Thermal components are being developed to passively control the temperature of unitized regenerative fuel cell systems. These thermal components include advanced heat fins and advanced planar heat pipes. The current research involves testing of candidate heat fins and heat pipes from outside sources and testing these under expected fuel cell conditions. The research also involves fabrication of advanced heat fins and planar heat pipes based on a NASA GRC designs.
This task will also provide for the research and development of Balance of Plant (BOP) hardware for up to a 3kW fuel cell system. The BOP should include the reactant handling, cooling, water storage, and purge functionality.

Task Order Description
Description of Services to be procured

The contractor shall provide the personnel necessary to assist with research of advanced heat fins and planar heat pipes using the NASA GRC designs.

The contractor shall provide the personnel necessary to operate the test rig(s) necessary for the testing of advanced heat fins and planar heat pipes. The test rig(s) will be used to test both advanced heat fins and heat pipes that are either procured from an outside source or developed at NASA GRC.

The contractor shall provide the personnel necessary to support the initial checkout and performance testing of the advanced heat fins and planar heat pipes.

The contractor shall provide the personnel necessary to assist with research of the passive fuel cell system heat exchanger.

The contractor shall provide the personnel necessary to support the initial checkout and performance testing of the advanced heat fins and planar heat pipes integrated with the fuel cell system heat exchanger.

The contractor shall provide the personnel necessary to assist with research of the BOP for a 3kW fuel cell system.

The contractor shall provide the personnel necessary to bench test the BOP .

The contractor shall provide the personnel necessary to support integrated testing with the fuel cell stacks received from non-flow thru stack vendors.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

** *Government's Estimated Period of Performance is April 1, 2009 to August 31, 2011***

1.0 Assist with the research of advanced heat fins and planar heat pipes using the NASA GRC designs.

2.0 Support the testing of the advanced heat fins and planar heat pipes.

3.0 Assist with the research of the passive fuel cell system heat exchanger.

4.0 Operate the test rig(s) necessary for the testing of the advanced heat fins and planar heat pipes integrated with the passive fuel cell system heat exchanger.

5.0 Assist with the research of the BOP for the fuel cell system and for the BOP for a 3 kW fuel cell system.

6.0 Support the testing of the BOP prior to integration with the fuel cell stacks from the non-flow thru fuel cell stack vendors.

7.0 Integrate with BOP with the non-flow-thru fuel cell stacks.

8.0 Support integrated testing of the BOP with the non-flow-thru fuel cell stacks.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

The milestones for this period shall include the following:

1. Provide monthly task reports describing the prior month's activities.
2. Provide monthly burn rate reports describing the expenditure of task funds for the prior month's activities.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	65
Schedule	30

Cost	5

Desired Personnel Skill Sets

None

Government Furnished Property

All material procurements are to be directed through the task technical representative.

Safety and Assurance Plans

None Selected.

Technical Representative: Johnson, Sandra

Task Number: NNC06E048T - 12

Task Title: Integrated Communictions Technology Work Area Support

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

Not Applicable

Task Order Description
Description of Services to be procured

TASK ORDER DESCRIPTION: The contractor shall provide qualified personnel for facility development and operations of state-of-the-art phased array antenna development testing and the development of an open architecture for software defined radios for space.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

1. Provide support as required for a Test and Validation Laboratory configuration, installation, and test for reconfigurable transceiver.

2. Install and operate Architecture Compliance tools and programs.

3. Update and/or create relevant databases containing information of current and potential technologies for SDR, including RF front end technologies that could be considered in the future.

4. Initiate and maintain an STRS web site for both internal and external connection. Provide the ability, through the web site, to receive comments from the outside community.

5. Document and run available waveform models.

6. Initiate and maintain a “STRS Waveform Library”

7. Participate in the development of the STRS Change Board Procedure, support the STRS Change Board process, and update STRS documentation as determined by the STRS Change Board.

8. Support specification/acquisition of Operating Environment components for STRS Reference Implementation.

9. Develop and/or evaluate software, interfaces, APIs necessary to implement STRS architecture.

10. Install a version of the STRS infrastructure on at least one vendor provided space platform.

11. Assist the reference implementation team on the development of the specifications for the reference implementation.

12. Assist in the development of the reference implementation.

13. Provide support as required for SDR Technology Lab computers residing on the internal standalone network.

14. Maintain expertise on the Joint Tactical Radio System (JTRS) Software Communications Architecture (SCA).

15. Support modeling programs required for estimating the resources required for implementation of SDRs and open architectures.

16. Provide a representative to the OMG on behalf of NASA to track and convey interests of SDR for space.

17. Monitor JTRS JPO SCA Change Board pending proposals and share information with NASA.

18. Provide support to the NASA liaison to JPL for the Electra installation and operation.

19. Recommend upgrades to the TVL including the addition of an RF channel simulator and test equipment control.

20. Support the integration, operation, and STRS assessment of the CONNECT software defined radio breadboards and engineering models.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

Note: All CONNECT related milestones will be dependent on the availability of the CONNECT vendor hardware and software.

• November 2009 : Update the database of the current licensed software being used in the TVL and software purchased with STRS and CONNECT WBS 8.0 funds installed outside of the TVL including owners, expiration date, and other pertinent details.

• December 2009 (or within one month of receipt of software and hardware appropriate for testing) - Complete compliance testing of the JPL breadboard system and provide results report.

• December 2009 - Provide an updated STRD for the CONNECT CDR.

• December 2009 - Report detailing the status and available results of the verification of the GRC/GSFC waveform against requirements, focusing on the control and telemetry interface to the GPP.

• January 2010 - Report detailing the EDS assembly status and remaining issues.

• January 2010 - Complete compliance testing of the CONNECT GD breadboard system and provide results report.

• January 2010 - Witness acceptance test of RT Logic TSIM and write a summary report.

• March 2010 - Complete compliance testing of the CONNECT JPL Engineering Model system and provide results report.

• March 2010 - Report describing results of the CONNECT JPL flight unit pre-ship review.

2 weeks after attendance at all conferences and training - Provide a trip report detailing the information obtained to the NASA GRC STRS team.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	Weights
Performance	50
Schedule	35
Cost	15

Desired Personnel Skill Sets

Communications Engineering support, RF Technician support, Task Manager

Government Furnished Property

Unique software applications required to perform the work on this task will be identified by the contractor, as required, and will be provided by the customer to meet the deliverables of the task.

Safety and Assurance Plans

None Selected.

Technical Representative: Dunlap, Patrick

Task Number: NNC06E051T - 13

Task Title: Seal Development Technical Services

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

**** Updated on 8/19/09 ****
BACKGROUND:
The Seal Team at the NASA Glenn Research Center is currently involved in aggressive projects to develop and demonstrate seal technologies for the CEV Low Impact Docking System (LIDS) and for a single-use high-speed vehicle application for the U.S. Army. These projects require the design, fabrication, and installation of test fixture hardware in preparation for experimental testing of candidate seal designs. Due to the number of experimental programs that the Seal Team is involved in, there is a need for technical services to support these programs in addition to engineering and fabrication services. The contractor has the requisite capability and manpower to provide these services for NASA GRC. Contractor engineering technician support shall conduct performance-based tasks in the seal test facilities in the Tribology and Mechanical Components Branch of the Structures and Materials Division at NASA GRC.

Task Order Description
Description of Services to be procured

**** Updated on 8/19/09 ****
TASK ORDER DESCRIPTION:
The contractor shall perform technical, engineering, and fabrication tasks to conduct performance based activities according to the predetermined milestones as they relate to required seal development research.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

**** Updated on 8/19/09 ****

The personnel assigned to this task shall complete the following activities autonomously or cooperatively with government personnel to meet the desired milestones:

1. Provide support in conducting seal leakage, permeability, compression, adhesion, and scrub tests.
2. Provide support in the fabrication of prototype seal designs.
3. Assist in design of new test rigs and test rig components.
4. Review design of test fixtures for manufacturability, functionality, and serviceability.

5. Install seal test rigs, fixtures, and support hardware.
6. Assist in checkout of new test rigs and fixtures.
7. Provide support in fabrication of necessary brackets and small fixtures.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

**** New as of 8/19/09 ****
MILESTONES AND DELIVERABLES:

1. Complete installation and setup of test fixtures for sub-scale LIDS seal testing, 11/30/09
2. Complete modifications and installation of test fixtures for Army seal testing, 3/30/10
3. Provide monthly financial and task summary.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	70
Schedule	20
Cost	10

Desired Personnel Skill Sets

Senior level engineering assistant/technician support with experience in test hardware design and fabrication as well as test facility set-up, modification and operation shall be assigned to this task.

Government Furnished Property

None

Safety and Assurance Plans

None Selected.

Technical Representative: Lewandowski, Beth

Task Number: NNC06E053T - 12

Task Title: Experimental Research/Technical Support for Biomedical Projects in the Bioscience & Technology Branch

Task Details

Period of Performance
7/27/2009 - 8/31/2011

Background
Why the project is being pursued

This Task was formerly GESS Task 146.
BACKGROUND:
The optical diagnosis project at NASA JSC/GRC conducts a variety of research related to non-invasive measurement of physiological markers of interest in space physiology studies.

Task Order Description
Description of Services to be procured

TASK ORDER DESCRIPTION:
Conduct design and modifications of the NASA Eye and finger Probes to meet the needs of NASA JSC/GRC researchers as determined by the PI (Dr. Ansari). Conduct experiments and collect data using the eye probe, the finger probe, and other optical devices (Raman) according to the test protocols developed by the NASA PI's.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

Government's Estimated Period of Performance is October 1, 2009 to August 31, 2011

Broad Scope of Work:
The object of this task is to provide technical services to the Human Research project, within the Bio-Science and Technology Branch (REB) and the Human Research Program at GRC.

The object of this task is to provide technical services to the research programs in GRC's Bio-Science and Bio-Engineering Technology Branch REB for the project in oxidative stress studies in astronauts and divers and blood perfusion studies in fingertips.

Specific Work Elements: 10/01/09 - 09/30/10

Design modifications to the existing optical diagnostic equipment, located at GRC. The modifications will allow the use of these probes (DLS, Raman, and LDF) to study oxidative stress in the eye and blood flow in fingertips. This will require performing experimentation, analyzing and publishing results.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

The task/time is divided as follows:

NBL Diver Study (SOMD) – 35% (WBS #: 599 891.01.03.01)
Astronaut Fingertip Study (HRP-EPSP) -15% (WBS # 516 724.02.02.06.03)
Biofuel Fiberoptic-turbidity Sensor -15% (WBS #: 561581.02.08.03.16.02)

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

A summary of the identified milestones and deliverables to NASA is defined as follows:
Deliverables:
Provide monthly reports to include a status of activities and financial information including hours spent on the task during the month.

This task does not require any OSAT plans.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	50
Schedule	25
Cost	25

Desired Personnel Skill Sets

Personnel shall be assigned to this task that have the necessary skills and training for the successful performance of this task. Continued availability of personnel with necessary skills to support this task is crucial for success of these efforts.
Personnel with appropriate background in optics, optical devices, specialized research hardware design, fabrication and testing shall be assigned to this task.

Government Furnished Property

None.

Safety and Assurance Plans

None Selected.

Technical Representative: Sil, Ajit

Task Number: NNC06E055T - 12

Task Title: Engineering & Computer Development for RTM

Task Details

Period of Performance
2/23/2009 - 8/31/2011

Background
Why the project is being pursued

*************NEW AS OF AFP7 - AUGUST 21, 2009 *******

This Task was formerly GESS Task 153.

BACKGROUND:
The Multidisciplinary Design, Analysis, and Optimization (MDAO) branch of the NASA Glenn Research Center has played an integral role in defining advanced technology options and pay-off areas of research for many of the critical technology programs in the Aeronautics Research Mission Directorate. Current efforts within the branch support projects within the Fundamental Aeronautics Program, the Aviation Safety Program and, beginning in FY10, the Integrated Systems Research Program. This work encompasses propulsion/aircraft R&T across all flight regimes, environmental impact and energy R&T, system safety and capacity analyses and related methods development. This task supplies access to specialized talents and resources to help MDAO accomplish its mission.
****

Task Order Description
Description of Services to be procured

*************NEW AS OF AFP7 - AUGUST 21, 2009 *******
TASK ORDER DESCRIPTION:

Provide analysis/tool development and support to the Multidisciplinary Design, Analysis, and Optimization branch, Code RTM.
****

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

Government's Estimated Period of Performance: April 1, 2009 to August 31, 2011**

*************NEW AS OF AFP7 - AUGUST 21, 2009 *******
Specific Work Elements:

Subtask 1

a) Provide information research, data mining and regression analyses in support of MDAO engineering activities. Perform reduction/redaction of data and document archival information in support of relevant branch mission objectives & project milestones.

b) Provide engineering methods development support using basic programming skills within the standard desktop environment. Assure programming portability through installation and testing on relevant MDAO computing platforms. Programming skills include applications using Visual Basic for MS-Excel, MS-Access, XML, etc, as well as interfacing new methods with existing applications in FORTRAN, C++, Python, etc.
****

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

*************NEW AS OF AFP7 - AUGUST 21, 2009 *******
MILESTONES AND DELIVERABLES:

Subtask 1

a) Deliver monthly coordination memos summarizing information gathered and sources referenced. Deliver annual report documenting data reductions and archive contributions.

b) Deliver programming/application source code, user documentation, and engineering support summaries for methods development activities.
****

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	80
Schedule	10
Cost	10

Desired Personnel Skill Sets

*************NEW AS OF AFP7 - AUGUST 21, 2009 *******
PERSONNEL PROFILE:

Analysis Assistant - Associate of Business (or equivalent/higher degree) and experience in office automation, microcomputer graphics, desktop programming, spread sheet and data base use. Limited administrative support may also be needed.
****

Government Furnished Property

GOVERNMENT PROPERTY:

None.

Safety and Assurance Plans

None Selected.

Technical Representative: Polansky, Beth

Task Number: NNC06E056T - 13

Task Title: Glenn Office of the CFO

Task Details

Period of Performance
2/19/2009 - 8/31/2011

Background
Why the project is being pursued

********NEW AS OF AFP6 - APRIL 1, 2009***********
Due to CFO Reorganization, this Task has been combined with formerly Tasks 72.

Background:
********NEW AS OF AFP6 - APRIL 1, 2009***********
The Glenn Office of the Chief Financial Officer (CFO) is responsible for management or oversight of a number of Information Technology (IT) projects related to finance and budgeting activities. These include the Coordination of the Planning, Programming, Budgeting and Execution (PPBE) activities and other business functions. The CFO also performs a broad range of computerized tasks ranging from manipulation of mainframe and client server financial budgeting systems, to all facets of using a personal computer. In order to make most efficient use of their resources and maintain its reliability the Directorate requires support in the planning and maintenance of their IT infrastructure.

Task Order Description:
Description of Services to be procured

Support Project management activities, computer systems analysis, microcomputer functions, networking and related administration, integrating all hardware and software requirements for all CFO organizations.

Task Order Description
Description of Services to be procured

********NEW AS OF AFP6 - APRIL 1, 2009***********
Support Project management activities, computer systems analysis, microcomputer functions, networking and related administration, integrating all hardware and software requirements for all CFO organizations.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

Scope of Work

********NEW AS OF AFP6 - APRIL 1, 2009***********
Hardware, software, and necessary tools may be procured via NASA channels at the GESS Task Representatives discretion pending the need and/or requirements to meet

NASA driven initiatives or directives relating to IT compliance or organizations specific requirements
********NEW AS OF AFP6 - APRIL 1, 2009***********
Governments estimate period of performance extends from April 1, 2009 to August 31, 2011.

Subtask 01
********NEW AS OF AFP6 - APRIL 1, 2009***********
Modified to support entire CFO organization and CFO projects (instead of IEM Projects)
Information Technology (IT) activities:
1. CFO Office Systems. The contractor shall perform administrative functions on the CFO server system, including systems and application software installation and configuration and maintenance of Internet and local network connectivity in support of the CFO Organization and related World Wide Web sites.
2. The contractor shall also support the acquisition of equipment and services in support of the CFO organization, including development of specifications and facilitation of the procurement process.
3. CFO Application Software and Data. The contractor shall develop and maintain computer applications in support of CFO activities, and where appropriate, shall support Civil Servants and other contractors in the development of related systems. Support may range from direct participation to expert consultation on Internet, database, and other development. Applications will include:
• Programs and databases for program management
• Program Web Site
• Program/project activity planning and monitoring
• action item tracking,
• team and mailing list maintenance
• equipment inventory
• document library
• calendar
• risk management
• budget integration and financial reporting
• Support PPBE integration activities
• Maintain budget trace sheets
****
********NEW AS OF AFP6 - APRIL 1, 2009***********
Modified to support entire CFO organization and CFO projects (instead of IEM Projects)
Project Management Activities:
4. As requested by the customer, develop programs and databases to support component or related projects.
********NEW AS OF AFP6 - APRIL 1, 2009***********
5. Project management, business analysis and Systems Analysis.
• Project and Change Management Support. The contractor shall support the implementation of CFO projects through analysis of Glenn business systems, development of documentation, prototype development, meeting facilitation, and participation in training and testing, working closely with civil servants and contractors in related tasks.
• Data Management. The contractor shall support the implementation of CFO projects through application data modeling, data system documentation (data flows, entity-relationship diagrams, process flows) and support of the Agency-level data management process.
• Configuration Management. The contractor shall perform configuration management (CM) on software and documentation developed locally and coordinate with CM activities elsewhere in the project.
• Project Support. The contractor shall support other project activities (e.g., meeting minutes, meeting coordination and facilitation, budget, schedule and risk integration) as requested.

6. Support of Component Projects. Contractor shall monitor the Glenn activities of the projects but which is not the direct responsibility of the CFO, in order to assist in coordination of activities.
****
7.. Development and Maintenance of CFO-related Web Sites. The contractor will develop and maintain Web sites for the CFO Office and for designated offices of the CFO such as the Glenn Exchange. Additionally, the contractor will act as a technical focal point to coordinate all other Web sites falling within the CFO Directorate.

9. Provide miscellaneous IT support (problem identification/resolution, laptops, printers, palms, s/w). Provided user account management (central directory, distribution lists, systems administration), and equipment management (ODIN seats & service levels, NASA equipment, and IEM training facility).

*******NEW AS OF AFP6 - APRIL 1, 2009***********
Subtask 02 is working being cosolidated from task 72
Subtask 02
The Contractor SHALL Analyze and RESPOND TO SYSTEM FAILURES, MAKE AN INITIAL PROBLEM ASSESSMENT TO DETERMINE CAUSE OF FAILURE AND DEVELOP COURSE OF ACTION TO RESTORE FUNCTION AS SOON AS POSSIBLE."

Perform computer systems analysis and technical services, integrating CFO specific software and hardware requirements and NASA initiatives such as ODIN, security, and ISO 9001. Includes all areas of information systems support, development, maintenance, enhancements, and interconnectivity with internal and external computer systems and servers. Provide coordination and facilitation within the entire CFO organization and GRC as required..

Specific Work Elements

1.0 Task Communications

1.0 Project Status

The contractor shall meet with the customer monthly, or when deemed necessary by the customer to review status on tasks and/or projects, and discuss task requirements.

1.2 Contractor Reporting

The contractor shall provide a written report once a month describing work accomplished, for whom the work was accomplished, and the time required to complete the work; problems identified and resolved, and work to be accomplished in the next reporting period and the schedule to be maintained. Provide status on projects and computer related changes. Produce computer budget status report when requested.

1.3 Technical Representative

Act as Code B point of contact for the Outsourcing Desktop Initiative for NASA (ODIN), Glenn ODIN Project Office. Support the Organization Computer Security Representative (OCSR). Serve as primary Code B computer administrator.

Represent the division in all other computer-related areas, providing IT related plans and recommendations, as requested by CFO management.

2.0 Technical Services and Support

2.1 Support CFO and agency developed Applications

Provide custom application integration of internal and external systems, and development of client and server solutions including the following:
- N2
- Other GRC and NASA system integration: CORE module
within SAP,Outlook,etc.

2.2 Client Computer Systems

Integrate, maintain, and enhance functionality of CFO client computers in accordance with GRC's ODIN environment, and other GRC and NASA initiatives, policies, directives, and standards as required or requested. Includes identification, testing, migration, phase-out/excess, upgrade/conversion of CFO hardware/software applications and data, integration with requirements, and development of cost-effective solutions and/or automated techniques. Comply with all Security rules and regulations.

2.3 Server Computer Systems

Integrate, develop, maintain, and enhance functionality of CFO resource servers in accordance with GRC and NASA initiatives, policies, and standards and Security rules and regulations.

Develop and integrate server components including web, database, application, print, and files services for CFO specific requirements. Provide maintenance on server logs and auditing, reporting pertinent findings to GRC security in accordance with incident reporting policy.

Develop and perform resource domain server administrator functions including weekly backup, virus scanning/updates, defragmentation, GRC and local account/group access security, documentation, and maintenance. Install, configure and automate server system applications, utilities, updates and patches.

2.4 Web Development/Support

Develop, maintain, and enhance website (Intranet) in conjunction with the WEB teams for the CFO directorate, conforming to GRC/Security Web policies. Develop organization-specific Intranet solutions per request, including database integration, scripting, graphics, and security to provide creative and innovative suggested uses to support CFO business functions.

Provide web page integration and development including PPBE, Phasing Plans, Workforce planning, ISO 9001, financial cost estimating, reimbursable management, Web feedback mechanism, organizational structure, and other requested or recommended business functions.

2.5 General Support

Troubleshoot and resolve all computer related technical issues that impact work schedules and job performance for the entire CFO Organization with near immediate response time, acting as a liaison to other GRC resources. Provide consultation and staff training as directed.

Perform maintenance on computers such as file management, configuration/compatibility issues with GRC IT directives, training computer users on software, processes, including recently implemented computer developments.

Develop software solutions and automated techniques using office automation tools,(e.g., spreadsheet, database, desktop publishing, presentation graphics, and word processing) or through use of Intranet, server, or other effective means.

Maintain the remote communications links for CFO users. Support maintaining peripheral including PDA's, scanners, notebooks, projectors, and all printing requirements, acting as liaison to ODIN or other GRC resources as deemed necessary.

2.6 Planning

Provide recommendations and solutions including future upgrades and enhancements on as-needed basis to ensure continued productivity improvements. Evaluate impacts of industry and ODIN implemented IT initiatives.

Facilitate and work with developers, program analysts, contractors, and others as needed, providing training on processes, procedures, and developed solutions, to meet customer deadlines, and improve efficiency of business operation. Coordinate with support staff as deemed necessary.
Includes Windows XP, security, web and network integration, and server automation/maintenance.

ISO 9001: Support includes files retention, archive, livelink integration, creation of PDF files, audit compliance to ensure commitment to continuous improvement and innovation ensures quality products, timely services and satisfied customers.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

Review and update as needed the CFO Security Plan and make necessary changes in consultation with CFO management, as required by agency/center policy and procedures. Submit by required date. Will be part of quality of performance metric.

Monthly Progress Reports.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	50
Schedule	40
Cost	10

Desired Personnel Skill Sets

PERSONNEL PROFILE:
********NEW AS OF AFP6 - APRIL 1, 2009***********
The contractor shall provide personnel who have the skill and knowledge base to support the requirements as a team and provide back-up or additional support within

this task. (Computer and Project Management)
****

Government Furnished Property

GOVERNMENT FURNISHED PROPERTY:

None, but the following government installation accountable may be utilized:

Hardware, software, and necessary tools may be procured via NASA channels at the GESS Task Representatives discretion pending the need and/or requirements to meet NASA driven initiatives or directives relating to IT compliance or organizations specific requirements.

Safety and Assurance Plans

None Selected.

Technical Representative: Heidmann, James

Task Number: NNC06E058T - 10

Task Title: 3-D Turbomachinery Heat Transfer

Task Details

Period of Performance
2/12/2009 - 8/31/2011

Background
Why the project is being pursued

This Task was formerly GESS Task 162.
BACKGROUND:

Conjugate heat transfer capabilities would allow improved CFD predictions of flows in such diverse areas as cooled turbines and impingement-heated anti-icing aircraft wing geometries. Also, improvements are required in grid generation procedures and interface boundary conditions to enable these improved predictive capabilities.

Task Order Description
Description of Services to be procured

TASK ORDER DESCRIPTION:

Investigate available computational fluid dynamic methodologies for improving convective heat transfer prediction accuracy and speed, especially in internal and impingement flows. Enable conjugate heat transfer capability in Glenn-HT code. Study automatic topology generation schemes.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

Government's Estimated Period of Performance is April 1, 2009 to 8/31/2011

Broad Scope of Work:

Contractor shall investigate potential conjugate heat transfer implementation strategies in the Glenn-HT code, implement the desired method, and ensure that the solver is able to model a realistic cooled turbine geometry. Contractor shall also enable multiple blade row unsteady calculations through incorporation of an interpolation scheme for two adjacent grids having relative motion.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

MILESTONES AND DELIVERABLES:

Apply and evaluate general interface capability (GIF) of Glenn-HT code for unsteady turbine stage having relative motion between blade rows. Incorporate and perform initial testing of multiple blade row interpolation scheme.

Work with development of 3D medial axis surface for potential use in automatic topology generation for turbomachinery.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	50
Schedule	25
Cost	25

Desired Personnel Skill Sets

PERSONNEL PROFILE:

Ph.D. in Aerospace or Mechanical engineering, experience in numerical analysis of heat transfer and unsteady flows.

Government Furnished Property

None.

Safety and Assurance Plans

None Selected.

Technical Representative: Bilardo, Vincent

Task Number: NNC06E061T - 11

Task Title: Project Control Support for Exploration Systems

Task Details

Period of Performance
2/13/2009 - 8/31/2011

Background
Why the project is being pursued

This Task was formerly GESS Task 171.
BACKGROUND: The Advanced Capabilities Project Office (ACPO) is responsible for providing deliverables for a multitude of Technical Projects under Exploration Technology Development Program, ETDP. The ETDP Program (GRC is the responsible NASA Center for the various ETDP Projects) supports the Exploration Systems Mission Directorate.

Task Order Description
Description of Services to be procured

TASK ORDER DESCRIPTION: Support for project level scheduling that includes roll-up of schedules from the Advanced Capabilities Projects. The task involves top level schedule and resource loaded planning and development which coordinates milestones and objectives through communication and interaction with Project Management and technical leads. The task will involve deriving on overall scheduling plan, regular communication and technical interchanges with Project managers, technical leads, and development/maintenance of schedules within this system to accurately track project progress.

Support for Advanced Capabilities Projects also includes budget resources planning and tracking, including Purchase Request generating and tracking, labor reports and tracking, and full cost analysis and tracking.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

** *Government's Estimated Period of Performance is April 1, 2009 to August 31, 2011***

The ACPO requires the support of experienced schedulers and budget analyst(s) with the ability to develop and organize activity based (WBS product oriented) on the ACPO technical tasks GRC maintains. Expert proficiency in the following software applications is required: Power Point, Excel, Microsoft Project, Fast Track, Access, and Word.

The task will require an integrated project schedule to track major activities, milestones, and resources for ACPO management. The work will require the development of all project schedules and the tracking and identification of scheduling issues that cross project boundaries and will require reporting of feedback on individual critical path scheduling items. For this task, all schedule inputs and changes, provided by Project technical task managers, are to be reviewed by the analyst for consistency and viability and reported on to ACPO management.

Task requires proficient schedule analyst capabilities at a high level. This requirement should involve personnel with proficient oral and written communication skills for project activity coordination.

The ACPO requires support for budget planning and resource tracking analysis. Proficiency and knowledge of the NASA IEMP system is required, along with knowledge and efficiency in Microsoft PowerPoint, Word & Excel.
The work will require assisting the project manager with the development of the annual budget and the 12 month project planning. The work requires the tracking of commitments, obligations, cost, and workforce associated with the projects. Monitor and evaluate cost changes that varies from plan and report explanation of change to project manager. Develop end-of-year estimates of project costs. Preparation of financial charts reporting of full cost required monthly and periodic update as applicable.
The task will require project budget realignments to be requested through the Civil Servant Analyst as required.
This task will require that project budgets will be analyzed and the results communicated to the project manager at least on a monthly basis. Preparation and approval of purchase requisitions for the projects is also included.

This task requires on a monthly basis, verification of accuracy of the plans (as maintained in the E-room) and financial data (that is down-loaded from the government financial system).

If travel and/or training are required under this task, the cost has either been budgeted into the accompanying cost plan, or an amendment will be issued to cover the additional task requirements.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

1. Prove Lead Analyst support in all areas of Code MA in financial and workforce tracking and analysis.
2. Monthly Financial detail report due the 3rd working day of the month.
3. Phasing Plan due to the Lead Analyst on the date indicated in the Call letter. All actions should be completed timely as indicated on E-Mail correspondence.
4. Financial Summary chart due the 4th working day of the month.
5. Obligations and Cost due by the 5th/6th working day of the month.
6. Provide monthly financial analysis.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	40
Schedule	30
Cost	30

Desired Personnel Skill Sets

Database/Budget Analyst/Scheduler

Government Furnished Property

Any unique property resources required for this task deliverables will be provided by NASA.

Safety and Assurance Plans

None Selected.

Technical Representative: Geng, Steven

Task Number: NNC06E065T - 11

Task Title: Aging and Static Characterization of Rare Earth Permanent Magnets for Stirling Engine Linear Alternator

Task Details

Period of Performance
2/9/2009 - 8/31/2011

Background
Why the project is being pursued

This Task was formerly GESS Task 181.
Linear alternators, coupled to free piston engines and excited by rare earth permanent magnets, have shown in recent tests to be promising candidates for reliable and efficient sources of electrical power for future planetary spacecraft. To achieve a high power density linear alternator requires the use of high flux density rare earth permanent magnets (REPM) of the Neodymium-Iron-Boron (NdFeB) type and the higher temperature REPMs of the Samarium-Cobalt (SmCo) type. Effective utilization of REPMs requires that the magnets must be able to withstand severe demagnetizing fields at elevated temperatures for long times of perhaps decades without any significant loss in either flux density or intrinsic coercivity. Data indicating long-term magnet aging properties of NdFeB and SmCo magnets under the combined stresses of temperature and applied demagnetizing field is not available from either the magnet's manufacturer or from the literature.

Task Order Description
Description of Services to be procured

Develop an experimental data base and theoretical guidelines that characterize the short and long term stability of the magnetization properties of rare earth permanent magnets under the combined stresses of temperature and demagnetizing fields expected in linear alternators designed for space applications. Develop an experimental data base and theoretical guidelines that characterize Stirling linear alternator performance.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

The contractor shall develop an experimental data base and theoretical guidelines that characterize the short and long term stability of the magnetization properties of rare earth permanent magnets under the combined stresses of temperature and demagnetizing fields expected in linear alternators designed for space applications. The contractor shall develop an experimental data base and theoretical guidelines that characterize Stirling linear alternator performance.

The contractor shall assist the Government in theoretical and experimental evaluations of recent advances in Low Energy Nuclear Reactions (LENRs), in particular participating in the inter-Center collaboration with Langley Research Center to devise evaluation tests on the Widom-Larsen theories.

Specific Work Elements

1. The contractor shall design, develop, upgrade, calibrate and implement test fixtures, test equipment and instrumentation to conduct static magnetization characteristic tests of rare earth permanent magnets (REPMs) under the combined conditions of temperature and demagnetizing field.

2. The contractor shall design, develop, upgrade, calibrate, and implement data acquisition systems for M-H characterization of REPMs.

3. The contractor shall design, develop, upgrade, calibrate, and implement data acquisition and control systems for static magnetization characterization of REPMs for short and long-term aging tests under the combined conditions of temperature and demagnetizing field.

4. The contractor shall design, develop, upgrade, calibrate, and implement data analysis computer programs for analyzing, plotting and cross-plotting M-H characterization test data.

5. The contractor shall develop on a continuous basis a database of static M-H characterization curves for selected candidate REPMs at selected temperatures.

6. The contractor shall conduct NdFeB and SmCo type magnet aging characterization tests under the combined stresses of temperature and applied demagnetizing field.

7. The contractor shall select promising candidate magnet materials for long duration space power linear alternator applications based on experimental data obtained in items 5 and 6 above.

8. The contractor shall consult on in-house linear alternator designs and multi-converter control schemes as they impact magnet performance and reliability.

9. The contractor shall document test procedures and establish data logs for the aging tests.

10. The contractor shall design, develop, upgrade, calibrate, and implement data analysis computer programs and instrumentation for analyzing, plotting and cross-plotting linear alternator test data.

11. The contractor shall conceive/identify/plan research and testing of linear alternators using GRC's Alternator Test Rig (ATR).

12. The contractor shall write reports and papers on results obtained in items 1 through 11 above.

13. The contractor shall evaluate proposals such as NASA's Small Business Innovative Research (SBIR) proposals and NASA's Research Announcements (NRA's) in the applicable areas of research described above.

14. The contractor shall review technical papers and reports in the applicable areas of research described above.

15. The contractor shall consult on in-house linear alternator magneto-static modeling.

16. The contractor shall consult on DOE laboratory radiation testing of REPMs.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

Milestones:
1. Provide Training for the operation of all magnet aging & characterization equipment, the Helmholtz Coils, and the magnetization equipment. (3/31/10)
2. Acquire 18,000-hour aging data for Sm-Co magnets (5/31/10)
3. Perform general comparison between five linear alternator types:
a) STC/Infinia (Nasar)
b) Vulcan (Holliday)
c) Sunpower (Redlich)
d) MTI (Mechanical Technology Inc.)
e) STAR (Clever Fellows Innovation Consortium) (7/31/10)

Note milestones (2 and 3) are not due this Award Fee Period and are included for information only.

Deliverables:
1. Document detailing the operation of the Magnet Aging Apparatus (10/15/09)
2. Document detailing the operation of the Magnet Characterization Apparatus (10/31/09)
3. Document detailing the operation of the Magnet Pulse Magnetizer (11/30/09)
4. Document detailing the operation of the Helmholtz Coils (12/31/09)
5. Report of 18,000 hour Sm-Co magnet aging test results (7/31/10)

Note deliverable 5 is not due this Award Fee Period and is included for information only.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	65
Schedule	25
Cost	10

Desired Personnel Skill Sets

Physicist support with experience in permanent magnet technology, materials and measurements, magnet test equipment and instrumentation, data acquisition systems, and vacuum systems shall be assigned to this task.

Government Furnished Property

A laboratory equipped with appropriate test equipment and instruments for the characterization and evaluation of rare earth permanent magnets shall also be provided for this task. A magnet charger capable of pulse magnetizing rare earth magnet samples shall also be provided.

Safety and Assurance Plans

None Selected.

Technical Representative: Dever, Timothy

Task Number: NNC06E066T - 16

Task Title: Advanced Aerospace Power System Test Bed Program

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

This Task was formerly GESS Task 184.
BACKGROUND:
NASA Glenn Research Center is the center of excellence for Aerospace Electrical Power System. The Electrical Systems Development Branch leads NASA's effort to advance enabling technologies leading to the next generation of Aerospace Electrical Power Management and Distribution Systems. NASA's Vision for Space Exploration to extend human presence across the solar system and beyond includes the completion of the International Space Station, to safely fly the Space Shuttle until 2010, to develop and fly the Crew Exploration Vehicle no later than 2014 , and to return to the Moon no later than 2020. To accomplish this vision, NASA needs to develop supporting innovative technologies, knowledge, and infrastructures and promote international and commercial participation in exploration.

Task Order Description
Description of Services to be procured

TASK ORDER DESCRIPTION:
Provide engineering labor, management, material tools, and related expertise necessary to develop advanced technologies for Aerospace Electrical Power Systems.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

The Contractor shall provide design, construction, and evaluation of power system elements for aerospace applications. Investigate and experimentally verify the benefits of innovative power system components in a systems context. Provide integration of any combination of these components into system-level demonstrations.

An electrical system testbed for Ares I Upper Stage EPS was approved to support the Ares I program at GRC. Three EPS elements need to be designed, fabricated and tested. They are the Power Distribution and Control Unit, the Battery Unit, and the Pump Motor Inverter Unit. Each of these elements will involve electrical and mechanical design work. Upon completion of the design, these elements will need to be fabricated and integrated together into a test platform which is representative of the Ares I EPS. In addition, supporting elements like a flight computer simulator, a battery charger, and a set of loads will need to be made to complete test bed.

Specific Work Elements;
• Provide design, fabrication, installation and checkout for electric power components and systems
• Develop test plans and procedures
• Design test-beds

Contractor shall allocate training and travel as associated with this task during this period of performance.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

All deliverables and milestones will be evaluated on the timeliness of the deliverable, the amount of relevant data, the accuracy of the data, technical contents, and analyses.

Milestones and Deliverables

1) Ares I Upper Stage Electrical Power System (EPS) prototype Power Distribution and Control Unit (PDCU).

2) Labview software to operate Ares I Upper Stage Electrical Power System prototype PDCU.

3) Report describing the difference between the prototype PDCU and the flight PDCU, how to operate the prototype PDCU, with appendix including: mechanical and electrical drawings used to build the box and circuits, a parts list, and a software items list.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	Weights
Performance	40
Schedule	30
Cost	30

Desired Personnel Skill Sets

Electrical, electronic, Labview software, other software, mechanical design and fabrication skills are required for this task.

Government Furnished Property

None.

Safety and Assurance Plans

None Selected.

Technical Representative: Shook, Tony

Task Number: NNC06E067T - 21

Task Title: Subsonic Fixed Wing Aeronautics Research Program Support

Task Details

Period of Performance
2/18/2009 - 8/31/2011

Background
Why the project is being pursued

These design efforts will provide the necessary support to fabricate and install hardware that will provide "state-of-the-art" acoustic research in the area of fan/stator noise. These efforts will support the Subsonic Fixed Wing Aeronautics research programs at GRC including the UHB Cycle Noise Reduction Technology Maturation Testing and the Open Rotor Propeller Rig testing planned in April 2009.

Task Order Description
Description of Services to be procured

TASK ORDER DESCRIPTION:

Provide design/drafting services including 3D solid modeling using Pro-E to support a variety of hardware development activities required to support testing in the 9x15 and the AAPL
1) Support follow-on hardware requirements for the AAPL if required.
2) Provide design and manufacturing services to support UHB Cycle Noise Reduction Technology Maturation Test.
3) Provide design and manufacturing services to support new bearing seal test rig hardware.
4) Provide engineering, design, and fabrication services to support Counter Rotation Rig refurbishment and upgrade activities including a new Telemetry System.

********** Added 8/26/09 ****************

5) Provide design engineering and fabrication to develop hardware in support of the 9x15 acoustic testing required in support of the ORPR program.
6) Transfer all Linear Microphone development activities from this task to a new GESS-2 task to allow separate accounting of allocated funding
7) Revise work elements within sub-task 3; SE-18 Finger Seal Test Rig to including infrared temperature measurement capabilities in order to make accurate temperature measurements on the seal near the seal / rotor interface. Additionally procure some measurement services and also fabrication and alterations of parts for the existing rig.

****

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

** *Government's Estimated Period of Performance is April 1, 2009 to August 31, 2011***

The GESS Team shall perform the following:

The current activities are planned to focus on the completion of engineering and design support activities for the Open Rotor Propeller Rig (ORPR) refurbishment and telemetry system. In addition, on-going support may be required for planning of new phases of test hardware associated with the previous completion of the UHB Cycle Noise Reduction Technology Maturation Testing. It is also expected that engineering and related procurement services for the SE-18 Non-contacting Finger Seal Design activities may be required.

Specific Work Elements:
1) Task Management
a) Manage resources on a day-to-day basis; execute the task; resolve problems and keep the technical representative informed of all issues. The contractor shall prepare and forward to the technical representative a monthly progress report defining the month's technical progress and the future month's planned activities.

2) ANCF Layout/Design & Fabrication Support (Sub-task S1)
a) All current design support activity had been completed in previous periods, sub-task to remain active for future support if needed. An amendment may be required to adjust cost plan if required.

3) Acoustic Test Hardware Development (Sub-task S2)
a) Provide mechanical engineering, design and procurement services to support UHB Cycle Noise Reduction Technology Maturation Testing as needed.
b) Complete hardware procurements and drawing documentation for the hardware developed in the previous periods. Additional engineering support will be provided as requested however an amendment may be required to adjust cost plan if required.

4) SE-18 Non-contacting Finger Seal Design and Procurements (Sub-task S3)

**************Added 8/27/09 *********************

a) Contractor shall have an existing rotor re-coated per specifications provided by the researcher. Obtain quotes for a new Inconel rotor based on the existing design.
b) Provide fabrication services and drawing updates for the seal test rig (non-contacting finger seals, rotor coating modifications, etc). Most of this will be modifications of existing drawings.
c) If funding is available, procure piping components for the high pressure air line in SE-18 (450 psig regulated down to 250 psig) to replace existing line that has cracked welds. (Estimated cost is $4,500)

Optical Engineering
Perform optical analysis, design and laboratory work to perform the following series of tasks:
a) Perform research on the existing pyrometry system as well as new infrared temperature measurements systems and other systems that may be applicable to the Seal Test Rig and familiarize with the test rig operations.
b) Install and operate, calibrate, and test existing pyrometer.
c) Design mounting brackets and optical component mounts for existing pyrometer
d) Specify, procure, install and test new modern pyrometer. Some optical lens design may be necessary to mount optical components to make temperature measurements on the seal near the seal/rotor interface.

e) Specify, procure, install and test new infrared thermometer system to achieve lower temperature ranges of interest. Some optical lens design will be necessary to measure temperatures in a concentrated area on the seal.
Note: Items d) and e) are lower priority and may not be funded until a later time.

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5) TPS Refurbishment and Engineering Support (Sub-task S4)
a) All current support activity had been completed in previous periods, sub-task has been closed.

6) ORPR Rig - Force Balance Refurbishment and Engineering Support (Sub-task S5)
a) Provide engineering oversight and procurement services to refurbish the existing two component dynamic force balance for each rotor.
b) Contractor shall utilize NASA shipping to ship hardware to vendor for refurbishing activities if required
c) Provide engineering and design services to develop and deliver an upgraded Telemetry system for the Counter Rotation Rig.

**********NEW AS OF AFP6 - April 1, 2009**************

d) Provide procurement services if needed to support ORPR hardware build-up in the 9x15 and the 8x6 facilities.
e) Provide engineering, design and procurement support to develop interface hardware for traversing acoustic microphones and related test hardware.

****

Desktop office computing hardware, software and support will be charged to task as a distributed cost.

If travel and/or training is required, the cost has either been budgeted into the accompanying cost plan, or an amendment will be issued to cover the additional task requirements.

Government's Estimated Period of Performance is April 1, 2009 to September 30, 2009

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

MILESTONES AND DELIVERABLES:

Milestones:

********* Added 8/27/09 **************

• Complete infrared temperature measurement system(s) designs, buildup, assembly and testing as outlined in scope of work.

****

Deliverables:

• Fabrication cost estimates and procured hardware related to task objectives

*********Added 8/27/09 *************

• Temperature calibration and test data pertaining to the measurement systems and to the seal(s) under test within the rig.

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• SE-18 Finger Seal test rig hardware as defined by the TR.
• 3D solid models and drawings submitted into the required Windchill database to support identified milestones.
• Refurbished 9x15 Force Balances
• ORPR fwd & aft Telemetry Systems
• Traversing acoustic microphone stand hardware

• Monthly Progress Report

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities

Criteria to Be Used for Evaluation	**Weights**
Performance	50
Schedule	25
Cost	25

Desired Personnel Skill Sets

None

Government Furnished Property

GOVERNMENT FURNISHED PROPERTY:

Pro/ENGINEER
Windchill
AutoCAD

Safety and Assurance Plans

None Selected.

Technical Representative: Crandall, Karen

Task Number: NNC06E069T - 8

Task Title: R&T Directorate Database Analyst

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

This Task was formerly GESS Task 189.
BACKGROUND: The Contractor shall provide Database Analyst support for various projects within the Research & Technology Directorate, primarily the Aeronautics projects, at the NASA Glenn Research Center, Ames Research Center, Dryden Flight Research Center, and Langley Research Center.

Task Order Description
Description of Services to be procured

TASK ORDER DESCRIPTION:

The work to be performed includes:

* Multi-media web-page design and development
* Generation of reports utilizing GRC financial computer systems
* Database programming and development to maintain financial and labor information
* Office automation support including spreadsheets, databases and multi-media presentation software.

The work to be performed shall require an experienced database programmer with knowledge of NASA financial and budgeting practices. In addition, knowledge of the Internet is required, including programming and posting to WEB pages.

The contractor staff shall:
* Gather, review, and evaluate user requirements to generate a set of specifications.
* Design, implement and test financial database to specifications.
* Possess demonstrated expertise on the process and the development of the Integrate Financial Management (IFM) financial database, and be able to utilize that knowledge to train individuals, as required.
* Be responsible for the maintenance of the financial database to ensure its smooth operation.
* Take additional training classes to enhance their knowledge in programming and web applications. Funds shall be added to the contract as required to cover training costs.

TASKS TO BE PERFORMED:

The contractor shall perform tasks in the following major areas (see Deliverables and Milestones section for specific deliverables and dates):

1.0 Contract Management and Administration
The contractor shall provide the necessary program management and coordination to accomplish the tasks in this Statement of Work. The contractor shall develop and deliver documents to the NASA Technical Representative (TR) on a monthly basis which describes the work completed on this contract. The contractor shall provide the staff necessary to accomplish the contract tasks.

******Edited/Reworded as of AFP7 - August 11, 2009 ************

2.0 Financial and other Database Applications and Programming
The contractor shall provide services in the design, development, and maintenance of an integrated financial information systems database utilizing the Center's financial system. Contents of the database shall be agreed upon by the NASA TR and the contractor staff. Programming shall include weekly maintenance of programs, and reports that need adjustment; year-end processing which involves closing all records for the year and ensuring a proper financial start to the new fiscal year; and any new development requested by the NASA TR in regard to financial data gathering and reporting from the financial information systems database. Programming shall be done to place the weekly, monthly, and year end financial and labor data on the Internet. Documentation of the system includes identifying data sources, constructing data decomposition diagrams, providing data flow diagrams and documenting the process to facilitate the transfer of knowledge and to facilitate a clear understanding of the extraction, transformation, and loading (ETL) process.
Build Access database based on client specifications. Track and report on project-related information. Custom programming in VBA (Visual Basic for Applications) within Microsoft Access and SQL query solution to Databases.

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3.0 Report Generation
The contractor shall:
* Create, implement, and maintain Business Warehouse Queries. Download financial data from the SAP R/3 and Business Warehouse. Create and run reports, evaluate and recommend new reports and procedures. Format and level of detail for the reports shall be agreed upon by the NASA TR and the contractor staff. Charts of financial and labor information shall be prepared as required.
* Document all information related to each report generated (code, process to run report, how exactly how report is run, etc.).
* Archive prepared reports.
* Create and maintain labor queries where needed to download labor data from the GRC financial system.
* Design, modify, install, configure, monitor, maintain, and troubleshoot database systems.
* Deal with storage management issues to backup and recover data, security issues to ensure authorized access to data, and performance issues to increase speed and reliability of database systems.

4.0 Internet Site/Multimedia Presentation Development
The contractor shall design, develop, maintain and update new and existing capabilities of multimedia web sites for financial database applications. The contractor shall also design and develop electronic presentations for meetings and subsequent posting on the Internet.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and

specific tasks to be performed

SCOPE OF WORK:

The contractor shall provide all necessary management, personnel, and services (not otherwise provided by the Government) to support the tasks described in this Statement of Work. The contractor shall manage the work to be performed under this contract, and assure availability of qualified personnel for timely response to tasks. Contractor staff members shall interface with their civil servant counterparts on a regular basis.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

The milestones and deliverables include:

1.0 Contract Management and Administration 1. The NASA TR shall receive a monthly technical progress report within ten (10) working days after the contractor's accounting month. The contractor shall include any open risks associated with this task (cost, schedule, and technical requirements), including any mitigation activities.
2. Contractor TR shall meet with NASA TR as required.

2.0 Financial Database Applications and Programming Requests for financial database applications and programming shall be reviewed, developed and delivered as agreed to by the NASA TR and contractor staff for each individual request.

3.0 Report Generation
1. Weekly, monthly, and year end financial and labor reports shall be posted to the financial web page, or e-mailed upon request, within five (5) working days of financial and/or labor closing date. At year end, an additional delay of seven (7) working days is allowable.
2. Individual requests for reports shall be reviewed and delivered by the stated date as agreed upon by the NASA TR and contractor staff.
3. Examples of reports include, but are not limited to:
* Purchase Request Detail for current and prior fiscal year (direct and reimbursable)
* Purchase Request Detail/Cost Pool for current and prior fiscal year
* Travel Detail
* Labor (Civil Servant and Contractor)
* Contracts
* Grants
* Charts, as required
* Various reports for the Fundamental Aeronautics Program
* Other reports, as required

4.0 Internet Site/Multimedia Presentation Development Requests for enhancements of the existing Internet site, development of future Internet applications, new presentations and postings shall be reviewed, developed and delivered as agreed to by the NASA TR and contractor staff for each individual request. This includes integration of financial and labor data with WEB applications.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**

Performance	50
Schedule	40
Cost	10

Desired Personnel Skill Sets

SAP R/3
Labor reporting
Business Warehouse
Microsoft Word
Microsoft Excel
Microsoft Access (including database programming)
Microsoft PowerPoint
Visual Basic
SQL Server
Macromedia Dreamweaver
Adobe Photoshop

Government Furnished Property

None

Safety and Assurance Plans

None Selected.

Technical Representative: Bilardo, Vincent

Task Number: NNC06E071T - 17

Task Title: Space Flight Systems – Project Support

Task Details

Period of Performance
2/18/2009 - 8/31/2011

Background
Why the project is being pursued

This Task was formerly GESS Task 194.
BACKGROUND:
Summer 2005 amendment Requested on WISE Task 20050524, NO BID received, 5/27/2005, ldk
The Space Flight Systems Directorate is responsible for a large number of tasks involved with developing next generation launch systems and the NASA Vision for Exploration. Projects range from small one-year in-house projects to very large multi-million dollar efforts from multiple sources.

Task Order Description
Description of Services to be procured

TASK ORDER DESCRIPTION: The contractor shall provide Management of Electronic Data Resources.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

Government's estimated period of performance is April 1, 2009 to August 30, 2011.

Specific Work Elements:

Management of Electronic Data Resources

It is expected that all of the contractor personnel will be able to support each other on this task as well as support all of SFSD's and/or its successor organizations servers.

1. Contract Administration
a. The contractor shall provide the necessary program management and coordination to accomplish the tasks in this task plan.
b. The contractor shall develop and deliver documents to the NASA MSD TR on a monthly basis, which describes the work completed on this contract.
c. The contractor shall provide the staff necessary to accomplish the contract tasks.

2. Point of Contact (POC) for ODIN contract

a. Maintain proficient knowledge of the ODIN contract and ensure it is enforced. This includes looking at and analyzing ODIN trouble reports. This process requires taking a proactive and professional approach to working with the ODIN contract and related issues.
i. Seat management/Sign up for new and/or existing employees
ii. Seat management/Sign up for temporary systems (e.g.: summer students/visiting faculty, etc.)
iii. Seat option management – ensuring appropriate selection of seat options for ODIN services. Advise users of the appropriate choices they have that meet their application needs.
b. Maintain and update Asset Outlook database (ODIN database) within the MSD in a timely and accurate manner.
c. New employee and move coordination
i. Assist in personnel setups and reassignments with ODIN including transfers of all ADP equipment and all telephone devices (phones, fax machines, cellular phones, etc.).
d. Coordinate refresh management of systems between ODIN and user.
i. Provide user with advice for appropriate upgrades. Refresh anomalies will be brought to the attention of MSD management.
c. Review all ADP purchases.
i. All purchase requests for ADP equipment within the division will be verified and reviewed for the appropriate classification and/or justification. This task will verify that the ODIN requirements are met.

3. Support for machines that are not ODIN, NADS, or MA
a. The type of machines supported include: video capture systems, video frame grabbing systems, data monitoring devices, data analysis systems, data capture systems with specific scientific instrumentation devices installed (including voltage, optics, etc.).
i. Hardware support for machines classified as NADS and MA will be called in under the ODIN contract support but this task will provide software support for these machines. In addition, for machines classified as "not ODIN", this task provides both hardware and software support.
ii. Load software and install unique hardware specific to aforementioned machinery.
iii. Install and maintain network connectivity issues with above machines when necessary.
iv. Assist in troubleshooting any machines after ODIN's requirements of fixing a machine are met.
v. Provide expert advice in selection of hardware and software for lab computers. See ADP purchases in section 2 above.

4. Central Directory Computer Administrator
a. Create/Delete/Manage accounts for ESD employees (e.g., IDE accounts, Business Systems access, email accounts, mainframe accounts, mass storage accounts, Remote Access accounts, etc.) including password resets, changes, and deletions/freezes/transfers.
b. Oversee the maintenance of the various ESD group E-mail Address lists in a timely and accurate manner.

5. Software Support for Unique Applications
a. Non-ODIN supported commercial software.
b. Custom-written software applications and/or programs.
i. All Software for ODIN machines will be tested in the ODIN test lab before installation where necessary.
ii. Have shared control administration for ESD Servers. Administering the directories and application/database environments.

6.0 Have shared control administration for ESD Servers. Administering the directories and application/database environments.

a. Windows NT domain administration
i. Maintain SSFP_LERC domains for lab computers, notebooks, and non-IDE systems
ii. Nightly backups
b. File administration
i. Active Server pages permissions
ii. K, O, and S drive permissions
iii. K, O, and S drive file clean ups
iv. Financial, Grants, Drop Tower and other project-specific shares
c. IT Security
i. Ensure that the servers are in total conformance to NASA and GRC security policies and requirements.

7.0 Occasional additional contractor requirements include support of ESD's audio-visual equipment such as projectors, televisions, VCRs, telecomunnications (polycom) gear, etc.

Travel & Training required in support of task functions (such as conferences, customer and vendor site visits, etc.) is planned under this task and the cost associated is budgeted in the accompanying cost plan.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

The milestones and deliverables for this period shall include:

A. MANAGEMENT OF ELECTRONIC DATA RESOURCES
Electronic Database:
Provide development and support for the ESD electronic database of text and graphics including server maintenance, electronic file cabinet development, user training and support, data security, and the development of access policies and procedures.

1. Contract Administration
2. A Point of Contact (POC) for MSD ODIN contract
3. Provide Support for machines that are not ODIN, NADS, or MA
4. Provide a Central Directory Computer Administrator
5. Support Software Support for Unique Applications
6. Provide shared control administration for ESD Servers and administering the directories and application/database environments.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	40
Schedule	30
Cost	30

Desired Personnel Skill Sets

Background in project scheduling with extensive Microsoft Project experience.

Appropriate background with computers, networking, and computer security to provide adequate support on the ADP portion of this task.

Government Furnished Property

None

Safety and Assurance Plans

None Selected.

Technical Representative: Suarez, Vicente

Task Number: NNC06E073T - 13

Task Title: Structural Dynamics Lab Test Engineering Support

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

This Task was formerly GESS Task 200.

The NASA Glenn Structural Dynamics Lab (SDL) and Microgravity Emission Labs (MEL) are multipurpose dynamic measurement and environmental simulation facilities managed by the Engineering & Technical Services Directorate, DDV0/Structural Systems Dynamics Branch. Test engineering support for the Labs will be provided under the Glenn Engineering and Scientific Support (GESS) contract.

The NASA Glenn Research Center's Plum Brook Station Space Power Facility (SPF), the world's largest space simulation chamber, is in the process of performing facility modifications and upgrades in order to be fully capable of supporting all Crew Exploration Vehicle (CEV) Qualification Tests, including full deployment of CEV appendages. The unique volume capacity of the test chamber makes SPF the only facility in the United States capable of supporting current CEV requirements and future Constellation Program testing in a low-risk, one-stop test facility.

Task Order Description
Description of Services to be procured

This task will have two major sub-tasks. The first sub-task shall be to supply the engineering manpower to plan, conduct and document, a multitude of individual test programs that require usage of the Glenn Structural Dynamics Lab and Microgravity Emissions Lab. Tasks will encompass: dynamic test requirements review or preparation, test fixture preparation, direct test execution, data interpretation, and test results documentation.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

Government's Estimated Period of Performance is October 1, 2009 to March 31 2010. The primary focus of this task shall be to supply the engineering manpower to plan, conduct and document, the multitude of test programs that require usage of these unique facilities. Tasks will encompass: dynamic test requirements review or preparation, test fixture preparation, direct test execution, data interpretation, and test results documentation.

WORK ELEMENTS:
The Contractor shall provide the necessary personnel to accomplish the following work elements:
1. Test Planning and Preparation
1.1. Meet with potential customers, provide estimate of individual tasks to SDL manager, and allocate SDL resources to support task. Maintain SDL master schedule on Web Site.
1.2. Provide engineering support to Org DE engineering and design personnel, in the conceptual, and detailed design of any test fixtures, or support hardware, to be provided by the SDL and/or MEL. Fixture and/or hardware fabrication or procurement coordination will primarily be the task of the Civil Servant SDL facility engineer and/or designer. Contractor shall support these efforts as necessary.
1.3. For environmental vibration tests, review customer provided test plan for feasibility and completeness. If a Test Plan is not provided by the customer, prepare a test plan to current SDL standards, to document as a minimum, the planned input test specifications, and proposed fixture and instrumentation concepts. Obtain customer and SDL manager concurrence to the Test Plan.
1.4. For MEL testing, work with Customer to develop a test matrix of test article operational modes and physical configurations to be run, and integrate into the standard MEL Test Plan.
1.5. For field measurement work, investigate task scope and develop formal or informal test/instrumentation plans, as requested.
1.6. Work with SDL facility engineer, manager, and Customer, in the coordination of Safety Permits, specimen handling, or cleanliness requirements, as applicable, while the test article is located within the SDL.
1.7 Provide technical insight/oversight for the VTS including his components (foundation review, seismic mass, HSDAS, and other).

2. Test Execution
2.1. Direct operations of SDL/MEL during test execution consistent with the SDL standard practices and requirements defined in the appropriate Test Plan or requirements document.
2.2. Produce documentation in the form of engineering notes and photographs, for all test events and any test anomalies that may occur. Notify SDL manager, within 24 hours, of any anomalies due to misapplication of simulated dynamic environments caused by SDL equipment or personnel.

3. Data Reduction and Reporting
3.1. Provide monthly progress reports on test activities to the SDL manager.
3.2. Reduce and interpret test data products consistent with the requirements defined in the Test Plan.
3.3. Produce a Test Report consistent with SDL/MEL standards.

PERIOD OF PERFORMANCE:
Work elements shall be completed according to the requirements of the SDL master schedule. To the extent that schedule changes are required due to manpower or work load fluctuations, or Customer hardware delays or changes in scope, they shall be negotiated between the Government (NASA SDL manager) and Contractor on a case by case basis, in the context of cost and compliance to project milestones.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

Work elements shall be completed according to the requirements of the SDL master schedule. To the extent that schedule changes are required due to manpower or work load fluctuations, or Customer hardware delays or changes in scope, they shall be negotiated between the Government (NASA SDL manager) and Contractor on a case by case basis, in the context of cost and compliance to project milestones.

The milestones and deliverables for this period shall include:

• Final task specific test reports shall be due within eight weeks of final data completion by SDL technical staff for the duration of the FCF testing
• Intermediate Milestones as directed by the SDL Manager and coordinated with cognizant facility Customers.
• Work elements shall be completed according to the requirements of the SDL master schedule.
• Monthly Progress Reports.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	Weights
Performance	50
Schedule	25
Cost	25

Desired Personnel Skill Sets

PERSONNEL PROFILE:

Senior level test engineering is required to support SDL and MEL growing complexity tasks. Other test engineers with appropriate background in vibration testing are required to support testing at SDL and MEL.

Government Furnished Property

GOVERNMENT FURNISHED PROPERTY:

Structural Dynamics Lab
SDRC/MTS I-DEAS Software
Data acquisition hardware and instrumentation
Facility maintenance tools

Safety and Assurance Plans

None Selected.

Technical Representative: Dunlap, Patrick

Task Number: NNC06E077T - 22

Task Title: Seal Development Engineering and Design Support Services

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

**** Updated on 8/19/09 ****
The Seal Team at the NASA Glenn Research Center is currently involved in an aggressive project to develop and demonstrate candidate seal technologies for the Low Impact Docking System (LIDS) for the CEV. This includes the design, fabrication, and installation of test fixture hardware in preparation for experimental testing of these new seal designs. Due to the number of experimental programs that the Seal Team is involved in, there is a need for engineering and design services to support these programs in addition to fabrication services. The contractor has the requisite capability and manpower to provide these services for NASA GRC. The contractor engineer(s) and designer(s) shall conduct performance-based tasks to help design and track the fabrication and installation of new seals and seal test hardware in the Tribology and Mechanical Components Branch of the Structures and Materials Division at NASA GRC.

Task Order Description
Description of Services to be procured

**** Updated on 8/19/09 ****
The contractor shall provide engineering and designer support to help design and track the fabrication and installation of new seals and seal test hardware in the Tribology and Mechanical Components Branch of the Structures and Materials Division at NASA GRC.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

**** Updated on 8/19/09 ****

The engineering and design services personnel assigned to this task shall complete the following duties autonomously or cooperatively with Government personnel:

Mechanical Engineer(s)/Designer(s):

1. Work with Seal Team engineers on design and features for new seal designs and test rigs
2. Perform necessary engineering calculations for design of test rig components (e.g., stress calculations, thermal expansion, heat transfer, cooling requirements, pressure vessel calculations, vibrations) as required for safety committee review
3. Use inputs and specifications from Seal Team engineers to produce complete sets of

mechanical drawings for new seal designs, test rig components and their assemblies in appropriate format for fabrication. Prepare Bill of Materials lists for new test rigs
4. Drawings are to be produced using Pro/ENGINEER or other agreed upon package
5. Ensure that seals and test rig components meet design specifications and assemble properly. Review designs for manufacturability, functionality, and serviceability.
6. Ensure that seals and test rig designs meet budget constraints
7. Hardware shall be purchased in support of the program. Work with Seal Team engineers to place orders for fabrication of test rig components. Specify and order commercial parts and hardware associated with new test rigs. Cost to purchase hardware shall not exceed $150,000 for this period of performance.
8. Track fabrication and orders for test rig components through to delivery
9. Ensure that delivery of hardware meets project schedule
10. Work with Seal Team engineers to plan laboratory layout and test rig installation procedures
11. Use input and specifications from Seal Team engineers to produce models and drawings of new seal concepts in Pro/ENGINEER or other agreed upon package
12. Perform analyses on new seal concepts to optimize seal designs (i.e., dimensions, materials)
13. Maintain confiuration control of seal designs and drawings

Mechanical Drawing Detailer(s):

1. Assist mechanical engineer/designer in completing mechanical drawings for new seal and test hardware designs.
2. Assist in performing necessary engineering calculations for design of test rig components (e.g., stress calculations, thermal expansion, heat transfer, cooling requirements, pressure vessel calculations, vibrations).
3. Help track fabrication and orders for test rig components through to delivery.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

The following are the milestones and deliverables for this task:

1. Complete design manual for Gen 2 LIDS full-scale non-actuated ("base") seal test rig, November 30, 2009

2. Complete design of humidity enclosure for LIDS full-scale actuated seal test rig, November 30, 2009.

3. Provide inputs on LIDS main interface seal design in support of Gen 2 EDU 58 seal design review, December 11, 2009

4. Provide recommendations on LIDS seal bulb and retainer designs for final Gen 2 EDU 58 seal design, January 29, 2010

5. Prepare draft work instruction documenting activities to be completed for LIDS seal pre-ship reviews, March 31, 2010.

6. Monthly Technical Report: Contractor shall provide a report detailing technical accomplishments on a monthly basis.

7. Monthly Financial Report - Contractor shall provide a monthly report detailing cost and labor hours incurred to date.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	50
Schedule	40
Cost	10

Desired Personnel Skill Sets

**** Updated on 8/19/09 ****
Contractor personnel assigned to this task shall be qualified to perform the duties outlined in the above scope of work and shall have knowledge and experience with the following software products:
Pro/ENGINEER
Pro/MECHANICA
ANSYS
MS Word, Powerpoint, Excel

Government Furnished Property

GRC shall provide access to one seat of Pro/ENGINEER & Pro/MECHANICA for use by the contractor designer.

Safety and Assurance Plans

None Selected.

Technical Representative: Miller, Sharon

Task Number: NNC06E078T - 15

Task Title: Electro-Physics Research Assistant Support

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

This Task was formerly GESS Task 210.
The Space Environment and Experiments Branch conducts research for NASA and external organizations that require support involving experimental tests. This testing must be completed in a timely, efficient manner to support the Branch's many customers.

Task Order Description
Description of Services to be procured

Support of testing involving the application of surface coating and modification technologies developed by the Space Environment and Experiments Branch to support customers from NASA and external organizations. Thin film depositions, surface modifications, surface and bulk characterization tests, analysis and reporting of results shall be performed. Space environmental duarbility of materials, surfaces, coatings and components shall also be performed.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

*** NEW for AP7, as of 8/7/09*** Government's Estimated Period of Performance changed from "April 1, 2009 to March 31,2010" to "October, 1, 2009 to September 30, 2010"
Government's Estimated Period of Performance is October 1, 2009 to September 30, 2010.
Broad scope of work: Activities involve research relating to thin film coatings and surface modification for aerospace, commercial, industrial and biomedical applications as well as space environmental durability of materials, surfaces, coatings and components. Work shall be performed to support NASA and external customers. Activities include purchase of needed materials, surfaces, coatings and components and the performance of experiments and characterization tests, analyzing results and reporting results.

Specific Work Elements:

1. Support research and development of new or improved products through application of surface coatings or modifications technologies developed in-house.

2. Conduct and support experiments involving atomic oxygen, ion beam sputtering, and

simulation of the space, Lunar and planetary environment to assess materials and component durability.

3. Support external organizations, universities and industry with experimental investigations applying NASA's Space Environment and Experiments Branch aerospace and spin-off technologies.

4. Apply depositions and characterizations of thin film coatings on materials and components.

5. Conduct surface chemical and/or texture modification and characterization of industrial, commercial and biomedical materials and products.

6. Present papers, attend relevant conferences as required to promote the transfer of technology as well as the advocacy of Space Environment and Experiments Branch projects.

Travel requirements will be determined as required.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

MILESTONES & DELIVERABLES:
*** NEW for AP7, as of 8/7/09*** Dates changed on milestones and deliverable. Criteria are still the same****

Support NASA Reimbursable Space Act Agreements and in-house research and technology programs through NASA and Space Act Agreement funded efforts.

MILESTONES:

1. Support spacecraft materials testing through materials aquisition,testing and reporting through 3/31/2010.

2. Support Fixed Wing program coatings deposition, surface modification and characterization testing and reporting through 3/31/2010.

3. Support Reimbursable Space Act Agreements with various external organizations through 3/31/2010.

DELIVERABLES:

1. Reports on Reimbursable Space Act Agreement and Fixed Wing investigations through 3/31/2010

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	70
Schedule	20
Cost	10

Desired Personnel Skill Sets

*** New for AP7, as of 8/7/09*** Added chemistry to background needed**** Personnel with a background in physics, chemistry, and experimentation shall be assigned to this task. Limited administrative support may be included as required.

Government Furnished Property

none

Safety and Assurance Plans

None Selected.

Technical Representative: Cooper, Sylvia

Task Number: NNC06E081T - 12

Task Title: Launch Systems Projects Office Documentation/Data Management

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

The Launch Systems Projects Office (LSPO) projects require sound configuration management document and records management to achieve its goals and objectives. This task order provides that support to the LSPO projects.

These projects will be staffed by NASA civil servants from several NASA centers with some efforts being NASA-Led and others being conducted by contractors. The projects require the establishment of configuration, documentation, and records management to achieve objectives in an effective time frame.

Task Order Description
Description of Services to be procured

Provide a process for control of the records in accordance with NPR 1441.1, NASA Records Retention Schedules (NRRS) and NPR 7120.5, Program and Project Management Processes and Requirements. Implementation will ensure that the LSPO projects collect and properly disposition all documentary materials, regardless of physical form or characteristics, made or received by the projects as evidence of the organization, functions, policies, decisions, procedures, operations, or other activities of the projects, or because of the informational value of the data contained therein.

Provide functions for project reviews to be held at GRC including: taking and preparing minutes and notes of the daily meetings; noting, tracking, and processing of action items; making copies of needed data, providing logistics, and other duties as needed.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

For the LSPO projects at GRC, conduct connfiguration/ documentation/data identification, configuration /documentation/data control, configuration/documentation/data status accounting, configuration/documentation/data verification, and records control in accordance with program/project requirements.

The GESS CM Team shall perform the following Subtasks:

The Major subtasks shall be supported as identified below:

Subtask 01 Overall CLV CM Support
Subtask 05 GRC Integration CM Support

The CM Analyst support for the LSPO projects focuses on documentation management, hardware and software process improvement, and training.

The Configuration Management Analyst shall work toward predictable, repeatable, consistent, and measurable processes leading to robust quality management of documents, hardware and software.

Specific Work Elements:

Be knowledgeable of new modifications and features of the WindChill CM software.

Perform Project Manager duties for GRC Integration Project in Windchill
ProjectLink - includes assisting in the implementation, developing folder structure, creating roles, adding/inviting team members, setting access permissions.

Provide training, database access, and help desk support to individual project teams in using the CM tools.

Implement the requirements of the CLV and Upper Stage Configuration Management Plans using the Automated CM tools.

Using the automated CM tools, implement and maintain all aspects of configuration identification (including the numbering scheme for hardware software and documentation and labeling of baselines), control (including the release process for hardware software and documentation), and status accounting in accordance with the CLV Configuration Management Plan.

Coordinate and provide logistic support for Technical reviews as required by Sub-project schedule.

Update and maintain CM requirements in CM Plan.

Update and maintain CM processes.

Implement CM Plan and Processes.

Implement records control.

Travel, as needed, to Subsystem Contractors, MSFC, LaRC, KSC, JSC and ARC or other locations to work configuration/document management issues with the NASA centers and contractors.

Travel to support the Constellation Management Systems Quarterly and CMDM working group meetings.

If additional travel and/or training are required under this task, the cost has either been budgeted into the accompanying cost plan or an amendment will be issued to cover the additional task requirements.

Desktop office computing hardware, software, and support will be charged to task as a distributed cost.

The performance of the work under this task/amendment does not require an increase to the staffing complement of any GESS team member.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

MILESTONES AND DELIVERABLES:
Update Vehicle Subsystems Configuration Management Plans. (As required)

Track receipt, review and disposition of Data Requirement documents.

Configuration items/documentation/requirements numbered according to CM Plan.

Secretariat to Configuration Control Boards.

Documentation changes implemented within 2 working days of approved change.

Status accounting database accurate within 2 working days of changes.

Final report for project reviews, as needed, within 1 week of review closure.

Records collected, controlled, and dispositioned according to NPR 1441.1 and NPR 7120.5

Provide status accounting reports as new baselines are established and upon request.

Monthly Progress Reports.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	34
Schedule	33
Cost	33

Desired Personnel Skill Sets

PERSONNEL PROFILE:

Senior Configuration Management Professional and CM Specialist(s).

Government Furnished Property

None

Safety and Assurance Plans

None Selected.

Technical Representative: Santiago, Walter

Task Number: NNC06E084T - 16

Task Title: Electromechanical Systems Development

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

This Task was formerly GESS Task 254.

NASA Glenn Research center is responsible for providing the Ares I Upper Stage Electrical Power System (EPS) The purpose of the EPS is to supply the complete electrical power for the upper stage, and interstage, of the ARES 1 vehicle, except for the Flight Safety System(FSS). GRC is responsible for the design and developing the specifications for the components of the EPS, the Instrument Unit Assembly Contractor (IUAC) is responsible for the procurement and integration of the EPS. The Ares I US is managed out of NASA MSFC, with the exception of EPS, Thrust Vector Control (TVC) system, and advanced sensor development, which are managed by GRC.

Task Order Description
Description of Services to be procured

The contractor shall provide engineering support to design, build, procure, and evaluate the ARES Upper Stage Electrical Power System (EPS).

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

The GESS-2 Team shall provide engineering services to design and develop specifications for the upper stage EPS, including building prototype designs and test beds and facilities as required to support the EPS development. The GESS 2 team shall provide design and and analyis support for the Ares I Upper Stage EPS project for the overall design, the PMIU design, and Change Request impact statements. Additionally, the GESS 2 team will provide services to integrate the EPS into system-level demonstrations.

If travel and/or training are required under this task, the cost has either been budgeted into the accompanying cost plan, or an amendment will be issued to cover the additional task requirements.

Desktop office computing hardware, software and support will be charged to task as a distributed cost.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

1. Provided design and analysis insight and oversight for the Pump Motor Inverter Unit (PMIU).

2. Provide specification updates for Ares I US EPS Pump Motor Inverter Unit (PMIU)

3. Provide power input for monthly Ares I Upper Stage Electrical Power System report.

4. Provide technical expertise for change requests related to the Ares I US EPS.

5. Provide technical mentoring for Ares I US EPS test-bed build-up.

6. Support design Technical Interchange meetings at MSFC approximately once every two months.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	30
Schedule	40
Cost	30

Desired Personnel Skill Sets

Services will require electrical, electronic, and rocket avionics integration skills.

Government Furnished Property

None

Safety and Assurance Plans

None Selected.

Technical Representative: Manzo, Michelle

Task Number: NNC06E086T - 11

Task Title: Electrochemical Cell Component Analyses

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

Advanced battery and fuel cell/electrolyzer technologies are required to meet the energy storage and primary power related needs of future NASA missions. Advanced technologies offer significant performance advantages and cost benefits over state-of-the-art technologies. Major projected advantages include a reduction in the mass and volume of the energy storage system, enhanced safety and system reliability and flexibility and lower power system life-cycle costs.

Efforts within the Electrochemistry Branch contribute to the development of these advanced technologies. Major efforts are related to the development and assessment of improved anodes, cathodes and electrolytes for advanced lithium-based batteries and investigations into the benefits of nanotechnology advances as they apply to fuel cells, electrolyzers and batteries. Advanced analytical techniques are used to characterize and gain insight into the properties of the materials and components of interest and into the mechanisms related to their operations.

Task Order Description
Description of Services to be procured

Perform the characterization of cell components and their constituents using SOA electrochemcial and analytical techniques. This task will involve the setup of the equipment, the development and maintenance of procedures associated with sample preparations and analysis, performance of the analyses and interpretation of the results as well as the communication of the results of the analyses to the researchers.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

1. Develop and improve proficiency for the preparation of samples and the performance of the analysis and the interpretation of results for the instrumentation in the Electrochemistry Branch laboratories, these include the following:

Scanning Electron Microscope with EDAX
Differential Scanning Calorimetry
Raman Spectroscoper
Thermogravimetric Analyzer
Atomic Force Microscope
BET Surface Area Analysis

Accelerating Rate Calorimeter
Particle Size-Analyzer
FTIR
ICP
Stereo Microscope
Dynamic Mechanical Analyzer (Also requires development of operational procedures)
GC/Mass Spectrometer

2. Provide recommendations relating to the most appropriate method for analysis. Perform analyses on samples as requested and provide an interpretation of the results. Provide documentation of operating conditions and calibration standards.

3. Ensure that the laboratory equipment is properly maintained and calibrated to insure precise and accurate analyses in a timely manner. Notify government personnel of impediments to performing analyses.

4. Maintain awareness of 'state-of-the-art' analytical instrumentation, techniques, computer hardware, and software for material analyses. Specify and make recommendations for the procurement of new equipment or upgrades. Maintain an awareness of additional techniques and capabilities available on-site at GRC.

5. Perform general electrochemical characterization for cell components - anodes, cathodes, and electrolytes. Construct cells and evaluate performance in a cell configuration.

6. Practice and maintain awareness of safe operating procedures in the laboratories.

7. Travel as required to attend technical and/or technology transfer meetings and to acquire training or course work useful for enhancing the ability to perform the task.

8. Ensure compliance with all applicable elements of the ISO 9001 standard.

9. Provide and support infrastructure to maintain integrity of data generated and stored on computers that control analytical equipment.

10. Equipment/Data Networking Support

Aid in the development and maintenance of back-up data systems for the battery test facilities and analytical equipment.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

MILESTONES & DELIVERABLES:

Analytical Support Milestone 1
Complete evaluation of advanced component materials received from NRA and other contracted efforts using previously developed procedures - Round 2 of NRA deliverables complete by January 24, 2010.

Analytical Support Milestone 2
Provide periodic reports summarizing the analytical results on component evaluations as completed.

Analytical Support Milestone 3

Become Qualified Operator on Acclerating Rate Calorimetet - October 15, 2009

Computer System Backup and Maintenance

Maintain existing backup systems for battery test equipment and analytical equipment - Provide assessment of data security and equipment in a summary report – March 15, 2010

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	60
Schedule	30
Cost	10

Desired Personnel Skill Sets

None

Government Furnished Property

None

Safety and Assurance Plans

None Selected.

Technical Representative: Soeder, James

Task Number: NNC06E087T - 17

Task Title: Power Research and Development

Task Details

Period of Performance
2/5/2009 - 8/31/2011

Background
Why the project is being pursued

This Task was formerly GESS Task 264.
NASA Glenn Research Center is leading the development of space-based power generating stations. Facilities, test fixtures, and research hardware are required to support these development tasks.

Task Order Description
Description of Services to be procured

The contractor shall provide the necessary engineering to design, build, procure, and evaluate the test equipment (rigs, fixtures, load machines, etc.) needed for evaluating the research equipment as well as designing the research hardware for Constellation projects.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

Government's Estimated Period of Performance is April 1, 2009 to August 31, 2011

Provide engineering to design, build, and evaluate the performance of power system elements for use in electic power systems. In particular, provide engineering to design and fabricate experimental hardware and test-fixtures for evaluating the performance of power system elements such as: electrical power distribution centers, electrical generators and turbo-alternators, flight or thrust vector control actuators, mechanical and electrical energy storage devices, voltage converters and frequency inverters, and photovoltaic array controllers. Additionally, provide engineering to integrate any combination of these elements into system-level demonstrations. Investigate high heat flux thermal management. Identify thermal power dissipation and temperature requirements for the most current electric power systems concepts. Identify priomary heat flow paths and key thermal design drivers. Enginering will require mechanical; electrical and electronic; heat transfer; materials and stresses; machine design; fluid power; piping and instrumentation; design/layout, machining, and fabrication; test-bed engineering; and management skills. Contractor shall purchase hardware and software. Hardware and software purchases shall not exceed 100k$.

Reduced design and reporting activities in response to changing NASA priorities.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

1. Develop analysis and model for electric power systems.

2. Reporting Details – The following task technical reporting requirements shall consist of but not be limited to the following:
Monthly financial status and technical reports, graphs, and analysis.
Drawings, design review records, and calculations for each task.
Minutes of design and project meetings.
Design archives and configuration control for the tasks.
Final reports for the tasks.
Design and project review participation.
Fabricated and purchased items.
Subcontracted studies.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	50
Schedule	25
Cost	25

Desired Personnel Skill Sets

None

Government Furnished Property

None

Safety and Assurance Plans

None Selected.

Technical Representative: Mason, Lee

Task Number: NNC06E089T - 12

Task Title: Fission Surface Power Engineering Support

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

Advanced nuclear power systems are being pursued for various NASA mission applications. The project has two major elements: 1) in-house power system testing, and 2) system analysis, design and integration. The in-house testing provides a means for demonstrating technologies and evaluating operational strategies to support future designs. The system design task includes system and component studies, thermal and mechanical analyses, and contract review to support the development of advanced power systems.

Task Order Description
Description of Services to be procured

The contractor shall provide engineering support to the Project.

The contractor shall purchase hardware and software. Hardware and software purchases shall not exceed $50000 per year.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

The contractor shall provide engineering support to the Project as described below.
SCOPE OF WORK:

Subtask 1: Power System Testing
1. Oversee operations and maintenance of the 2 kW Brayton Power Conversion Unit
2. Oversee operations and maintenance of the 50 kW Brayton Alternator Test Unit
3. Oversee operations and maintenance of the 25 kW Dual Brayton Power System
4. Oversee operations and testing of the 2 kW Stirling Power Conversion Unit
5. Oversee operations and testing of the Stirling High Power LInear Alternator Test Rig
6. Prepare task orders for Test Installations Division support
7. Prepare purchase requests for material and equipment purchases as needed
8. Support safety permit acquisition and maintenance
9. Prepare test procedures in response to NASA specified test objective
10. Conduct test operations and maintain logbook
11. Process test data and prepare test reports
12. Prepare monthly reports documenting accomplishments and plans
13. Develop plans for the design, analysis and integration of new components into existing test

rigs including, but not limited to:
a. New power conversion equipment
b. Advanced electrical controllers
c. Alternative heat source assemblies
d. Alternative cooling systems
e. Advanced heat exchangers

Subtask 2: System Analysis, Design, and Integration
1. Support system and component studies related to the implementation of fission surface power systems for future NASA missions
2. Develop thermodynamic cycle models and perform analysis on power system concepts
3. Develop thermal models and perform analysis on heat rejection concepts
4. Develop 3-D Computer Aided Design models for power system concepts
5. Support contract reviews of system and component designs
6. Establish and maintain a reference library
7. Prepare reports that document modeling techniques and analytical results
8. Prepare graphics, posters, models, and displays for space nuclear power

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

1. Oversee the integration, checkout, and testing of a thermodynamically-coupled 2 kW Stirling Power Conversion Unit and write a conference paper documenting test results.

2. Oversee the integration, checkout, and testing of a Stirling PMAD module with the High Power Linear Alternator Test Rig and write a conference paper documenting test results.

3. Provide contract review support and independent design verification for the Full-scale Power Conversion Unit contracts with Barber Nichols and Sunpower.

4. Support the development of a Facility Cooling System for the FSP Technology Demonstration Unit.

5. Support the development of an Electric Load Simulator for the FSP Technology Demonstration Unit.

6. Support other Brayton and Stirling test activities as required.

7. Support analytical tool development for Brayton and Stirling power systems as required.

8. Provide FSP layout drawings and mechanical design support as required.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	40
Schedule	40
Cost	20

Desired Personnel Skill Sets

Thermodynamics, heat transfer, electrical circuits, electrical controls, testing, analysis, mechanical design, technical writing.

Government Furnished Property

None

Safety and Assurance Plans

None Selected.

Technical Representative: Dunlap, Patrick

Task Number: NNC06E092T - 16

Task Title: Turbine/TPS Seal Development Engineering and Design Support Services

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

**** Updated on 8/19/09 ****
The Seal Team at the NASA Glenn Research Center is currently involved in aggressive projects to develop and demonstrate seal technologies for the heat shield and back shell Thermal Protection Systems (TPS) of the CEV as well as for a single-use high-speed vehicle application for the U.S. Army. These efforts require the design, fabrication, and installation of test fixture hardware in preparation for experimental testing of candidate seal designs. Due to the number of experimental programs that the Seal Team is involved in, there is a need for engineering and design services to support these projects in addition to fabrication services. The contractor has the requisite capability and manpower to provide these services for NASA GRC. The contractor engineer(s) and designer(s) assigned to this task shall conduct performance-based activities to help design and track the fabrication and installation of new seal test hardware, rig modifications and test fixtures in the Tribology and Mechanical Components Branch of the Structures and Materials Division at NASA GRC.

Task Order Description
Description of Services to be procured

**** Updated on 8/19/09 ****
The contractor shall provide design, engineering and fabrication support for new test hardware and rig modifications on a performance-based approach for the Tribology and Mechanical Components Branch of the Structures and Materials Division at NASA GRC. The contractor shall also provide design support for sealing locations in the TPS of the CEV and for the single-use high-speed Army vehicle application.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

**** Updated on 8/19/09 ****

The engineering and design services personnel assigned to this task shall perform the following duties autonomously or cooperatively with Government personnel:

Mechanical Engineer(s)/Designer(s):

1. Work with Seal Team engineers on designs and features for new test rigs and modifications to

existing test rigs
2. Perform necessary engineering calculations for design of test rig components (e.g., stress calculations, thermal expansion, heat transfer, cooling requirements, pressure vessel calculations) as required for safety committee review. Provide technical support through Safety Permit review process.
3. Use input and specifications from Seal Team engineers to produce complete sets of mechanical drawings for new test rig components and their assemblies in appropriate format for fabrication. Prepare Bill of Materials lists for new test rigs
4. Drawings are to be produced using Pro/ENGINEER or other agreed upon package
5. Ensure that test rig components meet design specifications and assemble properly. Review designs for manufacturability, functionality, and serviceability.
6. Ensure that test rig designs meet budget constraints
7. Hardware shall be purchased in support of the program. Work with Seal Team engineers to place orders for fabrication of seals and test rig components. Specify and order commercial parts and hardware associated with test rigs. Cost to purchase hardware shall not exceed $75,000 for this period of performance.
8. Track fabrication and orders for test rig components through to delivery including conducting vendor visits to ensure fabrication stays on track and issues are properly resolved.
9. Ensure that delivery of test rigs meets project schedule
10. Work with Seal Team engineers to plan laboratory layout and rig installation procedure
11. Use input and specifications from Seal Team engineers to produce models and drawings of new seal concepts in Pro/ENGINEER or other agreed upon package
12. Perform analyses on new seal concepts to optimize seal designs (i.e., dimensions, materials)
13. Support off-site seal testing (e.g., arc jet testing) as needed
14. Support telecons with NASA and Lockheed Martin personnel for design of CEV TPS seals.
15. Support telecons with NASA and Army personnel for design of seals for Army vehicle application

Mechanical Drawing Detailer(s):

1. Assist mechanical engineer/designer in completing mechanical drawings for new test rigs.
2. Assist in performing necessary engineering calculations for design of test rig components (e.g., stress calculations, thermal expansion, heat transfer, cooling requirements, pressure vessel calculations).
3. Help track fabrication and orders for test rig components through to delivery.

Travel may be required in support of this task plan. Travel costs shall not exceed $1000.

Other cost required in support of task functions is planned under this task and the cost associated is budgeted in the accompanying cost plan. This cost includes periodic recognition of task members as part of NASA group awards or for other commendable service to the task, safety shoes, safety glasses, and books.

"As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities."

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

The following are the milestones and deliverables for this task:

1. Complete design of seal test fixtures for Army seal testing project, October 30, 2009.

2. Complete fabrication of seal test fixtures for Army seal testing project, February 26, 2010.

3. Monthly Technical Report - Contractor shall provide a report detailing technical accomplishments on a monthly basis.

4. Monthly Financial Report - Contractor shall provide a monthly report detailing cost and labor hours incurred to date.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	50
Schedule	40
Cost	10

Desired Personnel Skill Sets

Contractor personnel assigned to this task shall be qualified to perform the duties outlined in the above scope of work and shall have knowledge and experience with the following software products:
Pro/ENGINEER
Pro/MECHANICA
MS Word, Powerpoint, Excel

Government Furnished Property

**** Updated on 8/19/09 ****
The Government will provide access to one seat of Pro/ENGINEER & Pro/MECHANICA for use by the contractor designer.

Safety and Assurance Plans

None Selected.

Technical Representative: Geng, Steven

Task Number: NNC06E094T - 12

Task Title: Data Acquisition System Development and Support for Testing Free-Piston Stirling Engines

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

This Task was formerly GESS Task 294.
The free-piston Stirling power convertor is being considered as an advanced power conversion technology to be used for future space missions requiring long life radioisotope power systems. This technology has a conversion efficiency of over 25%, which is significantly higher than the efficiency of the previously used Radioisotope Thermal-electric Generators (RTG). This advanced technology should reduce the inventory of plutonium fuel used by a factor of 4. The benefits are measured in the cost savings for the fuel, reduced usage of the limited plutonium resource, and also in the lessened environmental impact in the unlikely event of release of the plutonium.

As a result of the findings of a 1999 government/industry Technology Readiness Team, the Stirling convertor has now been identified for use on future space science missions, possibly as soon as a 2014 launch. In partnership with the Department of Energy (the power system supplier) and the Jet Propulsion Laboratory (the mission office), GRC plays a critical role in the development of the technology. GRC has long been recognized as the lead center in Stirling technology expertise within the government, and now is responsible for many aspects of Independent Validation and Verification (IV&V) for the upcoming flight systems, and is also responsible for the development of advanced technologies that are intended to significantly improve key characteristics of the Stirling convertor.

Task Order Description
Description of Services to be procured

The advanced radioisotope power systems being developed are driven by requirements that originate from a range of missions. The advanced technologies identified for development also consider the requirements of potential future missions and the new capabilities that have become available in the associated technical areas.

The effort required is to provide the engineering labor, management, and tools as needed, and related support necessary to complete the advanced technology activities described below.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

1. Build future ASC-E2 data acquisition system racks.

The contractor shall be responsible for building several new data acquisition systems. This work includes the design, build, and testing of circuit boards, and installation of data acquisition system hardware and software, power supplies, loads, instrumention, controllers, etc. The contractor is also reponsible for performing rack check-out to ensure that the rack can be safely used to operate the Stirling convertors.

2. Support the development of short-term Stirling convertor test racks.

The contractor shall assist in the modification of the LabVIEW data acquisition system for the short-term Stirling convertor test racks.

3. LabVIEW data acquisition system support.

The contractor shall make any necessary upgrades to the LabVIEW data acquisition system as required. The contractor shall also help maintain a database that contains the configuration of software and instrumentation for all 10 Stirling data acquisition system racks. The contractor shall maintain and make any necessary upgrades to the Stirling convertor database.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

Deliverables

*********July 31, 2009 Update - Modified deliverables list***********
1) ASRG LabVIEW data acquisition system User's Manual - October 2009

2) Deliver ASC-E2 data acquisition system rack - November 2009
****

3) Weekly status reports describing task status, technical accomplishments, plans and any issues, due by close of business Fridays.

4) Monthly Progress Report with technical details of the effort including findings, decisions, measurements, circuit diagrams such that the technical effort is fully documented.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	50
Schedule	40
Cost	10

Desired Personnel Skill Sets

Fluent in use of LabVIEW software in coordination with National Instruments hardware and a strong background in electrical engineering.

Government Furnished Property

None

Safety and Assurance Plans

None Selected.

Technical Representative: Freeman, Carmela

Task Number: NNC06E098T - 24

Task Title: Designer support for Facility and Systems managers

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

This Task was formerly GESS Task 318.
The task was established to rebalance the work between tasks 130, 99 and 98 as a result of an FD reorganization to better match requirements to the branch supported.

Background
Systems Managers for the Central Process Systems and the Institutional Systems require design support to field check and update the system drawings they are responsible for. The Facility Engineers for the Aero and Space Facilities likewise require this support. The systems and facilities are those listed in GRC BMS document GLP-FB-8820.1.

Task Order Description
Description of Services to be procured

Task Order Description
Field check systems and facilities and provide new and revised drawings using Autocad and Adept. Convert CADAM file conversion into current Autocad format. Perform updates on drawings affected by change requests to allow configuration to close out the changes.

Additionally, for AFP 7, hire a temporary Electrical Designer to work specifically on backlog.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

Contractor shall work to the schedule provided by the Systems or Facility managers for their respective areas regarding system audits and updates of isometrics, piping schematics and 1 line diagrams. Effort provided shall consist of working with the systems managers or test facility engineers to update exisiting drawings to as-built condition and/or create new drawings as needed. The systems or facility managers will request effort via a Facilities Change Request. The contractor shall record progress of effort in a quarterly report.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

1. Quarterly Report due October 15, 2009
2. Quarterly Report due January 15, 2010

3. Drawing updates to reduce change request backlog (On-going)
4. Conversion of CADAM files to AutoCAD (On-going)

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	50
Schedule	25
Cost	25

Desired Personnel Skill Sets

Experienced mechanical and electrical facility designers.

Government Furnished Property

Manual and electronic drawing files.

Safety and Assurance Plans

None Selected.

Technical Representative: Freeman, Carmela

Task Number: NNC06E099T - 13

Task Title: Engineering and Design support for Facilities

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

This Task was formerly GESS Task 319.
Background: The reason the task was established was to rebalance work between tasks 130, 99 and 98 as a result of an FD reorganization. There was be no new work associated with the ammendments.

The Facilities Division, FD, is responsible for the design and rehabilitation of facilities at the Glenn Research Center. The Facilities Engineering and Architectural Branch requires additional engineering and design support to meet their ongoing commitment to the Center.

Task Order Description
Description of Services to be procured

Task Order Description
Provide electrical engineering and design support to the Facilities Engineering and Architectural Branch.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

SOW
The contractor shall:
Provide project engineer duties performing planning, coordination, design, development, installation, check out and problem solving for large projects. Provide analysis, design studies, reviews and evaluations and advise on issues affecting the high voltage system.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

1. Quarterly report due October 15, 2009
2. Quarterly report due January 15, 2010

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	Weights
Performance	50
Schedule	25
Cost	25

Desired Personnel Skill Sets

Engineers with Facilities Engineering and Power Systems background.

Government Furnished Property

None

Safety and Assurance Plans

None Selected.

Technical Representative: Hunter, Gary

Task Number: NNC06E105T - 11

Task Title: MicroActuator and Sensor Research and Development Task

Task Details

Period of Performance
2/9/2009 - 8/31/2011

Background
Why the project is being pursued

This Task was formerly GESS Task 342.
Present day actuators are limited in the temperature, force, and frequency range. These limits are traditionally below ~250C, and with corresponding force and frequency limits of 100 Hz and 100 psi depending on the actuator size and design. Often actuators are very large which allow large force but limit frequency and temperature capability. For both larger and smaller actuators, the temperature limitations force their location away from hot spots where their use would be the most advantageous. For example, in the case of fuel actuators, the limited temperature capability of the actuators mandate that they be placed a distance from the point of operation. This decreases their capability to real-time influence the fuel flow into the combustion chamber and thus decreases their use in a feed-back control loop. For an intelligent engine, changes in the engine configuration are made more difficult if the actuators which perform the reconfiguration cannot withstand high temperature conditions. To control components in engine environments, new designs of high temperature, high force, high frequency microactuators are needed which new approaches, new materials, and are of minimal size.

The application of Microsystems in general, including microactuators and microsensors, is an active area of research with a range of applications. The same techniques used for microactuator fabrication are also applicable to microsensor and microsystem research.

Task Order Description
Description of Services to be procured

The first goal of this task is to research and develop new microfabricated actuators for engine self-configuration in high temperature environments. In particular, the nearer term objective will be to develop high temperature actuators for flow control operable up to 500 oC and in environments such as gaseous and liquid flow regimes as well as investigation of new microactuation approaches.

The contractor shall also use the methods derived in the microactuation development and available in the state-of-the-art and apply them to the fabrication and development of microsensors and supporting technology. The contractor shall also provide technical input related to the state-of-the-art in microsensor development.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and

specific tasks to be performed

********Government's Estimated Period of Performance: April 1, 2009 to Completion of GESS-2 Contract. Base plus 3 options******

To research and develop new microfabricated high temperature, high force, high frequency actuators as well as microsensors for a variety of applications. This includes the responsibility for:

o Conceptual development, modeling and interaction with modelers as appropriate of alternate design structures for microfabricated high temperature actuators in order to determine factors such as natural frequency, damping coefficient, squeeze number, stress profile and maximum linear displacement for a given actuator design. Knowledge of computational fluid dynamics modeling of solid-liquid and solid-viscous flow interactions necessary.

o Reduction of optimized parameters of models from new design concepts to mask layouts and to supervise the prototype fabrication of such.

o Investigation of the use of SiC materials esp. the high temperature capabilities to fabricate high temperature actuators, electronics, and sensors.

o Investigation of the use of ceramic piezoelectric materials and high temperature shape memory alloys material to produce micofabricated actuators based on their bulk material.

o Use microfabrication techniques derived in the above activities in the development and application of microsensors and supporting technologies.

o Investigation of the use of other types of actuators including solenoids, thermally driven actuators, electrostatics, and magnetoresistive actuators for microactuator purposes.

o Design and interact with relevant Branch personnel regarding new modeling concepts and the fabrication and testing of microactuators for high temperature operation, as well as microsensors for a range of applications including chemical and biological sensing.

o Participate in branch activities as appropriate including interfacing with other team members in a non-supervisory role. These include in-house personnel as well as grantees and contractors.

o Other duties as appropriate associated with the above development of microactuators and microsensors.

The contractor shall perform the following:

1. Model or interact with modelers on the design of various high temperature microfabricated actuators optimizing specific approaches to microactuation in, for example, high temperature, hot liquid environments.

2. Design and interact with clean room personnel in the fabrication of a SiC-based actuators and sensors based on the corresponding modeling.

3. Interaction with NASA GRC personnel in the investigation of alternate actuation materials including such as high temperature piezoelectrics and shape memory alloys for high temperature actuation. Interact with clean room personnel in the fabrication of these materials as appropriate.

4. Be involved, as appropriate, in the fabrication and demonstration of the microactuators and microsensors in relevant environments.

5. Keep the NASA technical representative apprised of progress with reports and verbal communication.

6. If travel or training is required under this task, the cost has either been budgeted into the accompanying cost plan or an amendment will be issued to cover the additional task requirements.

7. Desktop office computing hardware, software, and support will be charged to task as a non-labor recurring charge.

********** New as of AFP6- April 1, 2009*************
8. Identify and initiate concepts independently and prove their feasibility;

9. Responsibility , as appropriate, in validating an assigned concept either analytically, experimentally, or a combination of both.

****

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

MILESTONES & DELIVERABLES:

The Deliverables shall include:

1. Monthly progress reports which shall include:

A: Technical developments, progress and analysis, and evaluation of all task specific projects.
B: Technical achievements or issues.
2. Supply computer software or hardware or miscellaneous equipment as needed for task.

Task reviews will be conducted bi-annually for the purpose of evaluating task performance according to predetermined measurables. Revisions, if required, to the above deliverables will be tracked via monthly reports and modifications will be jointly agreed upon by the Task Manager and NASA TR.

As part of the reporting requirements of this task order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	40
Schedule	30
Cost	30

Desired Personnel Skill Sets

PERSONNEL PROFILE:

Professional(s) with minimum of a Master's Degree in Mechanical Engineering, Electrical Engineering, physics, or materials engineering is required for this task. The candidate(s) should have extensive experience in MEMS scale modeling and fabrication of moving structures in solid and liquid flow regimes plus a good working knowledge of actuation mechanisms. The candidate(s)should have experience in microfabrication.

Great emphasis is placed on having excellent interpersonal skills and the ability to work well in a close-knit team. Excellent communications skills (both oral and written) are also required.

Limited administrative and supervisory support is also required for this task.

Government Furnished Property

The microfabrication processing associated with this task shall take place predominately in the Sensors and Electronics Branch cleanroom at NASA GRC. The testing and analysis of sensors shall take place predominately at GRC and using equipment such as high temperature ovens, SEM, Auger, Atomic Force Microscopy associated with the Sensors and Electronics Technology Branch at NASA GRC. Government Property shall not be removed from GRC without the correct approval process

Safety and Assurance Plans

None Selected.

Technical Representative: Jankovsky, Robert

Task Number: NNC06E112T - 21

Task Title: Space Propulsion Engineering Support

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

The NASA Glenn Research Center is responsible for providing engineering support to various programs requiring space propulsion expertise. Expertise is required in both chemical and electric propulsion systems. This task is to supplement the GRC civil servant workforce.

Task Order Description
Description of Services to be procured

Service Module Orion Main Engine (OME) Development - Participate in the development of the service module main engine. Perform independent engine and component level analysis as validation of the engine provider's design, independent sizing analyses should be conducted on the pneumatic pack and TVC. Participate in engine and component level reviews including preliminary design review, engineering review boards and technical interchange meetings.

Service Module Propulsion Ground Operations - Identify issues and negotiate interface requirements between ground systems developers and propulsion systems developers. Support the development of a SM propulsion servicing GSE concept. Specifically, provide an independent assessment of the design interface to GSE, service panel design, selection of service valves, GSE interfacing filters and other equipment.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

Support the development of space propulsion systems and components. Efforts will include studies, modeling, hardware design and fabrication, and testing. Generate drawings as needed to support design and development effort. Publication of work as needed.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

Milestones:

Completion of PnP sizing and requirements definition task. (10/1/09)

Review of PnP valve vendor specs. (12/30/09)

Participation in TVC vendor kickoff and SRR (3/31/10)

Complete an independent trade study to analyze the benefits and draw backs of implementing an SM Propulsion tank isolation valve. (1/30/10)

Deliverables:

Monthly progress report for all sub-tasks (on-going)

Memo summarizing the PnP design and relevant trades leading to final design (3/31/10)

Executive summary of PnP valve and TVC vendor procurement specifications (12/31/09)

Analyses documentation uploaded to Space Propulsion eROOM by 3/30/10.

Any models or tools developed should be documented and placed on the Space Propulsion eROOM by 3/31/10.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	60
Schedule	30
Cost	10

Desired Personnel Skill Sets

SM propulsion ground operations support: demonstrated exceptional interpersonal skills, fluid system background.

Service Module Propulsion Support - propulsion background required, demonstrated exceptional interpersonal skills, fluid system background required.

Government Furnished Property

Pro/ENGINEER
AutoCAD
NPSS or analytical software

Safety and Assurance Plans

None Selected.

Technical Representative: St. Onge, Thomas

Task Number: NNC06E114T - 16

Task Title: ESD/PT Program and Project Management Support

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

This Task was formerly GESS Task 364.
Provide financial, document, web page development and schedule support to ISS and Human Research projects.

Task Order Description
Description of Services to be procured

• Financial Management Support:
o Develop resource plans for the ISS and Human Research projects that will be used for POP, Operating Plans, Monthly Status Reporting, BMR, PMC and other reporting requirements. Use full cost methodology that is current with the NASA costing models;
o Provide monthly financial and workforce plan versus actual charts and variance analyses to support the data;
o Institute the appropriate level of EVM for ISS Research projects;
o Generate purchase requests and track cost accounts;
o Plan and track CS, and Prime and SSC contractor workforce utilizing GRC workforce databases. Input data into the PRD and WIMS, and monitor WEBTADS for proper labor charging;
o Provide reports and presentation material as required.

• Schedule Support:
o Develop and maintain individual project schedules, and the Project Office Master Schedule;
o Manage electronic schedule data resources, integrate data provided by the project managers into project master schedules, and manipulate data as required;
o Participate in the GRC Schedule Working Group;
o Provide technical assistance in the creation and publication of monthly reports and presentations.

• Website Support:
o Create and maintain the GRC ISS and Human Research Project Office websites;
o Create and maintain Exploration outreach & education websites;
o Develop graphics, interactive programming, interface with GRC network personnel on web server & network issues, and compliancy with requirements.

• Document Management Support:
o Provide Confirguration Management of the SpaceDOC contract effort including delivery order processing, review and approval, current status and updates;
o Maintain SpaceDOC deliverables in an eRoom for document archival;

o Maintains FCF and other project documents including project plans, science requirements documents, and Experiment Data Management Plans;
o Reviews and makes recommendations for document disposition and archival;

• Customer Interface – work with the GRC Program and Project Managers, Headquarters Program Element Manager, Level II Program Offices at JSC and LaRC.
• Some travel (local and non-local) may be required on non-recurring basis for training, program/project reviews, and outreach and education activities and events.
• Desktop office computing hardware, software and support will be charged to the task as a distributed cost.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

Government will provide location/hardware to store database files, provide direction and prioritize tasks.
Contractor shall provide web pages in accordance with regulations for approvals of published information.
Contractor shall provide financial analysis of ISS and Human Research projects.
Automated database reports for PR's and other monthly charts on financial and workforce data as needed.
Contractor shall supply coding of financial and schedule data in order to populate EVM reports.
Government will supply travel funds necessary for travel associated with outreach and educational activities.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

The Milestones and deliverables shall consist of the following:

1. Monthly financial, workforce and schedule reports, monthly SpaceDOC Delivery Order status report, charts and analysis;
2. Monthly reports as specified, in the GESS contract.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	65
Schedule	25
Cost	10

Desired Personnel Skill Sets

Financial analysis with an understanding of NASA's budgetary process, earned value management and financial systems, including software; WebMaster with a knowledge of creating and maintaining web sites within the NASA guidelines; scheduler with skills in developing and maintaining project and program level schedules; and a Document

Specialist with knowledge of NASA's documentation requirements and the basics of configuration management, as well as general organizational skills.

Government Furnished Property

The Government will supply GRC facilities, test equipment, and computers to conduct the majority of the GRC on-site activities associated with testing and operations of development hardware and Ground Support Equipment (GSE). In certain instances, on a case-by-case basis, project specific software items (compilers, etc.) ordered by the project may be used in contractor-based facilities to promote more efficient work completion.

Safety and Assurance Plans

None Selected.

Technical Representative: Acosta, Roberto

Task Number: NNC06E116T - 19

Task Title: ACAD Antenna

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

This Task was formerly GESS Task 371.
The Office of Space Communications and Navigation(ScAN) at the NASA Glenn Research Center is responsible for identifying emerging system concepts in space communications. The work includes antenna and system concept development, including support of the antenna/interferomter design .

Task Order Description
Description of Services to be procured

The contractor shall provide antenna design, analysis, fabrication and characterization of prototype system interferomter for the Office of Space Communications and Navigation (ScAN) Program at the NASA Glenn Research Center.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

The task provides support for the research and development of antenna/interferometr for the Office of Space Communications and Navigation(ScAN) of the NASA Glenn Research Center.

For each candidate antenna/interferometer design identified by the ScAN Program, the contractor shall provide computer simulated results and system characterization of all sub-system in the design and provide recommendations to the design based on the results obtained.

When NASA has determined that computer simulations indicate that a particular design achieves specifications, the contractor shall fabricate the antenna. The contractor shall proceed to characterize the antenna, primarily using the appropriate laboratory facilities at NASA GRC. The results of the antenna measurements shall be provided to NASA GRC.

Determination of the various types and number of antennas to be investigated and fabricated will be guided by the results produced during the performance of this task.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

1. Design, fabrication and characterization of two K-Band (20.7 and 20.2 GHz) Atmospheric

Phase Interferometers.

2. Monthly Reports

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	50
Schedule	25
Cost	25

Desired Personnel Skill Sets

The contractor should provide qualified personnel at the Senior Ph.D. level

Government Furnished Property

None

Safety and Assurance Plans

None Selected.

Technical Representative: Ritzert, Frank

Task Number: NNC06E118T - 16

Task Title: ADVANCED METALLICS PROCESSING

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

This Task was formerly GESS Task 385.
Advanced metallic/intermetallic alloys are required in future aerospace systems to meet the demands of high operationg temperatures, high strength-to-weight ratio, resistance to aggressive environments, and fabrication. The Advanced Metallics Branch is conducting basic research on these materials in the areas of materials development, durability evaluation, processing, and joining technology of both monolithic and composite materials.

*************NEW AS OF AFP7 - AUGUST 1, 2009*******
NO CHANGES to the task
****

Task Order Description
Description of Services to be procured

The objective of this task is to conduct experimental research functions where the overall objective and scope of work is to develop and maintain processing techniques and facilities for advanced alloys, intermetallics, and their composites.

There are two main areas of performance under this task. One is in the area of materials research and development. Here, the contractor staff shall support, operate, and maintain numerous experimental facilities to support research-related tasks and programmatic milestones. A second area of focus are the activities related to the heat treatment lab. Here, numerous high temperature furnaces must be operated and maintained in support of the targeted materials research.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

Broad Scope of Work

The contractor shall perform this task with an objective to conduct research functions where the overall objective and scope of work is to develop and test advanced alloys and intermetallics for high-temperature application. Processing-microstructure-property relationships will be investigated in support of ongoing research teams.

Specific Work Elements

1. Perform research and development activities to support materials research programs. Independently schedule, perform, and analyze data from experiments designed by a materials research engineer. Determine, tabulate, and evaluate physical, mechanical, and metallurgical properties. Areas include, but are not limited to advanced metallics processing (vacuum induction melting, arc-melting, extrusion, rolling, single crystal casting, powder processing), perform metallographic preparation (cutting, grinding, polishing, etching), perform evaluations using scanning electron microscopy (SEM) and in-situ chemical analyses (EDS), photography and light microscopy. Display a working knowledge of x-ray techniques and chemical processing, understand and apply statistical concepts to generate meaningful experimental results, create reports and presentations to transfer information of interest to the technical community, perform the mechanical testing of materials (creep, tensile, fatigue), generate/write software to facilitate improved data acquisition of results, perform quantitative metallography and understand several computer data analysis routines. Testing-related duties include sample preparation, test setup, and experimental testing in conjunction with developing quality test methodologies. Working knowledge of programming using Delphi and Matlab. Perform as-needed machining (drill press, lathe, milling machine, K.O. Lee) including microprocessor controlled machines.

2. Be responsible for the all aspects relating to the Heat Treatment Facility for the Materials Division. Responsibilities include but are not limited to total familiarity of all equipment including controllers, overtemps, thermocouples, and data acquisition. Primary point of contact for scheduling, quality and safety (ISO-related activities) including record-keeping, furnace profiling, and calibrations for critical equipment. Direct all laboratory users to be familiar with safety issues and be intimately familiar with all aspects of the Laboratory Management and Control (LMAC) form. Perform quality checks for every experiment consistent with ISO document preparation. Develop written procedures for all equipment, both for operation and profiling. Collect data for each experiment using computer-related data acquisition. Maintain facility notebooks (activity log, research runs, facility updates, argon consumption and calibration, calibrations due, profiles due, thermocouple inventory/calibrations, furnace tube stock, ceramic consumables stock, runsheets, individual furnace notebooks). Backup run data for all furnaces (archival). Maintain inventory (ceramic consumables, thermocouples, inert gases, general necessities) and track calibration and profile deadlines. Maintain orderly and safe working environment.

3. Act as acting laboratory manager for Heat Treatment Facility and Satellite Metallographic Laboratory. Assist in the oversight of Vacuum Creep Testing Laboratory. Coordinate all facility upkeep and improvements relating to optimum operation.

4. Communicate research progress and results to NASA TR via oral discussion and written monthly progress reports and to engineers requesting service through frequent oral discussions.

5. Travel in accord with requirements for attendance at technical meetings, technology transfer, presentation of research, and in acquiring training or course work useful for enhancing capabilities to perform the task.

6. Interact with and coordinate with other team members and external service providers.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

1. Monthly Technical Progress Reports

The contents of monthly activity reports will be evaluated at the end of the current Award Fee

Period.
At the request of the TR, the contents of these reports will emphasize:
a) technical progress in the various specific work elements cited and any specific achievements and/or new technologies developed in the process,
b) information relating the details of installation, operation, and maintenance of laboratory equipment,
c) number of task orders processed and associated response times, and
d) an explanation of any down time, date, time duration, type of delay and reason, and the resolution.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

*************NEW AS OF AFP7 - AUGUST 1, 2009*******
NO CHANGES
****

Criteria to Be Used for Evaluation	Weights
Performance	80
Schedule	10
Cost	10

Desired Personnel Skill Sets

This work will be assigned to the Materials Durability Section of the contract. Progress reviews will be conducted regularly with the cognizant NASA TR. Any revisions to the personnel requirements which may result from these reviews and will be mutually agreed upon by the TR and Contractor Supervisor.

Contractor shall provide the personnel for this task. This task requires a Bachelors of Science (B.S.) degree in an engineering field with 3+ years of experience in material design, processing and research. Advanced knowledge of machining of CNC machining. 5+ years of computer aided design.

Limited direct labor support will be required for task management, project control analysis, and risk management. These associated costs are budgeted in the cost model.

*************NEW AS OF AFP7 - AUGUST 1, 2009*******
NO CHANGES
****

Government Furnished Property

None.

Safety and Assurance Plans

None Selected.

Technical Representative: Patterson, Richard

Task Number: NNC06E120T - 13

Task Title: Wide Temperature Electronics Applicable to NASA Missions

Task Details

Period of Performance
2/17/2009 - 8/31/2011

Background
Why the project is being pursued

Interplanetary spacecraft must able to operate over a wide range of temperatures. Electronic components and systems aboard these spacecraft must, of course, operate over the same wide temperature range. Often a heat source delivers heat to the spacecraft, but that wastes power or, if radioisotope heating units are used, extra weight and complexity will be added. The operation and reliability of on-board Electronic components which may be used, then, for deep space missions, must be evaluated for their capability to operate reliably under under the wide range of temperatures that will be encountered. This update changes the end of the period of performance to 8/31/2011.

Task Order Description
Description of Services to be procured

Commercial off-the-shelf (COTS) electronic parts and flight-like hardware will be identified and evaluated as a function of temperature. The experimental data will help establish the suitability of the tested devices and circuits for use in the harsh environment of space.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

1. Identify and perform characterization of selected commercial-off-the-shelf (COTS) advanced electronic parts and mission specific circuit boards under extreme temperatures.
2. Perform thermal cycling on the devices and circuits to establish their reliability.
3. Identify failure modes and degradation mechanisms affecting the operation of the tested articles at extreme temperatures.
4. Recommend,issue guidelines, and transfer technologies to NASA mission planners and system designers.
Government's Estimated Period of Performance is February 17, 2009 to August 31, 2011.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

Deliverables:

1. Document experimental results obtained on the tested electronic devices and flight-like circuits in a technical report. (3/31/2010)

2. Disseminate information to NASA mission planners and circuit designers, and publish results in technical journal and conferences. (3/31/2010)

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	65
Schedule	25
Cost	10

Desired Personnel Skill Sets

Senior engineering personnel with experience in power system design, component design, analysis and testing will be assigned to this work.

Government Furnished Property

A test facility for electronic device and circuit characterization with the following equipment will be provided for duties carried out under this task:

1. Environmental chambers
2. Various power supplies
3. Data acquisition and measurement instrumentation
4. Computer station for test control and documentation.

Safety and Assurance Plans

None Selected.

Technical Representative: Bilardo, Vincent

Task Number: NNC06E121T - 13

Task Title: Space Flight Systems - Information Systems Programming

Task Details

Period of Performance
2/18/2009 - 8/31/2011

Background
Why the project is being pursued

This Task was formerly GESS Task 399.
The Space Operations Division is responsible for GRC tasks involved with the International Space Station, Shuttle, Spectrum Management, Launch Services, Space Communications and Navigation Technology Program, Rocket Propulsion Testing and SCIP.

Task Order Description
Description of Services to be procured

The Space Operations Division is responsible for GRC tasks involved with the International Space Station, Shuttle, Spectrum Management, Launch Services, Space Communications and Navigation Technology Program, Rocket Propulsion Testing and SCIP. The contractor shall provide Management of Electronic Data Resources; Database design, development and programming; Technical assistance for web publication of the weekly/monthly resources reports; Development and maintenance for the Space Operations website; Graphic Arts and Design services; serve as the BMS/ISO point of contact for the Space Operations Division; Microsoft Project/Primavera Scheduler support; and provide resource analyst support to ISS, Shuttle, RPT, SCIP, and Space Communications Projects.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

The scope of this task has increased. The contractor shall provide Management of Electronic Data Resources; Database design, development and programming; Technical assistance for web publication of the weekly/monthly resources reports; Development and maintenance for the Space Operations website; Graphic Arts and Design services; serve as the BMS/ISO point of contact for the Space Operations Division; Microsoft Project/Primavera Scheduler support; and provide resource analyst support to ISS, Shuttle, RPT, SCIP, and Space Communications Projects.
Specific Work Elements:

Management of Electronic Resources

-- Maintain and operate the Space Operations electronic database and file server.
-- Provide electronic information security services for the Space Operations server.
-- Develop and edit content for the Space Operations electronic database and websites.
-- Provide computer administration and support for members of the Space Operations Division

including both desktop systems (Macintosh and PC) and laptops, as well as the servers. Provide support for Space Operations interactions with ODIN.
-- Provide artistic direction for Space Operations displays, projects, reports and logos.

Database Development

-- Provide services for the design, development and maintenance of an internal, web-based financial information systems database. This database will contain all elements of Full Cost, by providing plan vs. actual data, workforce and travel reports, broken down to the WBS level, as well as roll-up reporting.
-- Provide highly experienced database programming effort with knowledge of NASA financial and budgeting practices, strong knowledge of mainframe to PC electronic data transfer, and strong knowledge of PC and MAC environments. In addition, knowledge of the Internet is required to provide programming and posting to Internal Web pages.
-- Work to be performed includes strong knowledge of spreadsheets, databases, and multi-media presentation software.
-- Programming will include the development and maintenance of programs and reports in Microsoft Access, which uses electronic data from official lab systems including SAP, the official Labor file, and the travel system.
-- Ad-hoc queries from the financial information systems database will be developed upon request from the NASA TR.

Tasks to be Performed: The contractor shall perform tasks in the following major areas: Contract management and administration, PC financial database programming, monthly report generation, Grant and SDB financial reporting, management of electronic resources, web design and maintenance, BMS/ISO representative and consultant. Each of these major areas is described below.

-- Contract Management and Administration: The contractor shall provide the necessary program management and coordination to accomplish the tasks in this Statement of Work. The contractor shall develop and deliver documents to the NASA TR on a monthly basis, which describe the work accomplished on this contract. The contractor shall provide the staff necessary to accomplish the contract tasks. Deliverables for this element are listed in the deliverables section.

-- PC Financial Database Applications and Programming: The contractor shall provide services in the design, development and maintenance of an integration financial information systems database. This database will contain actual commitment, obligation, and cost data, budget data, and workforce data broken down by the various projects with the Programs. Programming will include monthly maintenance of programs and reports that need adjustment, year-end processing which involves closing all records for the year and ensuring a proper financial start to the new year, and any new development requested by the NASA TR in regard to financial data gathering and reporting from the financial information systems database. Also, as required, programming shall be done to place the monthly financial data on the Internet.

-- Monthly Report Generation: On a monthly basis, the contractor shall perform financial close-out activities, verify accuracy of budget and actual financial data and make any needed corrections, and distribute reports electronically via the Internet. The contractor shall provide logging, tracking, and coordination of financial data and workforce data as it relates to the Space Operations Division. This includes providing electronic information to several different personnel levels: Division Chief, Project Managers and Resource Analysts.

-- The contractor shall provide resource analyst support services for the International Space Station (ISS) Program and in their work with other customers.

-- The contractor shall provide resource analyst support to the Space Communications Project.

-- The contractor shall provide resource analyst support to the Shuttle, RPT, and SCIP Projects.

Scheduler

-- Provide services for the development and documentation of Space Flight Schedules for the Space Operations Division.

BMS/ISO Representative and Consultant

-- Provide services for the development and documentation of BMS/ISO Procedures for the Space Operations Division.
-- Review and update the BMS/ISO Procedures for the Space Operations Division.
-- Serve as the Space Operations Representative on the GRC ISO QSR Team and attend and support the scheduled meetings (such as the Center Level Management Review, etc.)
-- Provide narrative and verbal status of Space Operations BMS/ISO Procedures to the NASA TR and Space Operations Division Chief.
-- Solicit input from Space Operations Division personnel and provide status/updates regarding GRC Center and Space Operations BMS/ISO Procedures.

Travel and training required in support of task functions, such as conferences, vendor site visits, etc. is planned under this task and a total of $15,000 for this entire task is available during the Award Period.

Government's estimated period of performance is April 1, 2009 to August 30, 2011.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

The following list is the milestones and deliverables for this period:

Management of Electronic Data Resources

Electronic Database: Provide development and support for the Space Operations electronic database of text and graphics including server maintenance, electronic file cabinet development, user training and support, data security, and the development of access policies and procedures.

1. Deliverable: Electronic Database of text and graphics Provide security plans and updates to the plans for the Space Operations Server.
Provide training materials as necessary.
Provide procedures.

2. Computer administration: Provide day-to-day computer administration functions for the Space Operations desktop and laptop computers (PC and Macintosh). This task will involve troubleshooting, maintenance, set-up, and administration.

3. Space Operations Website(s): (a) Maintain the baseline Space Operations internal website on the Space Operations File Server. Migrate the Space Operations website appropriate pages and links to the Space Operations Server. (b) Provide support to the Programs & Projects PA Office for the set-up and maintenance of the external website. (c) The task will require use of HTML, programming and scripting and will require continuous updating of the websites. At least one training course per year is anticipated for this task in order to remain current with HTML and

Scripting Technology.

4. ADP Hardware Management: Provide inventory support for the Space Operations computational and telecommunications hardware in response to request for ODIN, IFMP, and other initiatives as required.

Deliverables:
a. Property Inventory Database
b. Accurate tally of ODIN seat count and hardware requirements c. ODIN Data submittals (as required).

Database Programming:

1. The NASA TR will receive a monthly technical progress report by the 10th working day of the contractor's accounting month.

2. Contractor TR will provide any information on potential risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Monthly Report Generation:

1. Monthly programming to support month end closing of financial and workforce records will be performed so reports can be delivered.

2. Requests for new reports, additions to on-line reporting system, and other new work will be reviewed and delivered by stated date for each individual request.

3. Year-end programming and close-out work will be performed on the financial database to ensure that year-end financial and workforce reports are distributed. This involves file close-out, updating authority numbers, carry-in calculations, project/task additions and deletions, and other year end procedures. This will add 14-21 additional business days to the normal distribution.

4. By the 7th business day of each month, provide the TR: cumulative purchase requests by current fiscal year, sorted by type; cumulative purchase requests for the current fiscal year sorted by subtask; labor report down to the WBS level; prior year uncosted report; travel report; other reports as warranted.

5. By the 10th business day of each month, provide the TR: Plans vs. actuals by elements of full cost at the UPN level; Grant and SDB. Report; Graphs measuring performance of plans vs. actuals, by element of full cost, as well as at the total full cost level.

6. Provide assessments of programmatic Fiscal Year dollar and labor requirements, assist PA Analyst in developing operating plan, assist in implementing the operating plan, assess new and/or changing requirements and recommend changes, and support Program Review.

BMS/ISO Representative and Consultant:

1. Review and update the BMS/ISO Procedures for the Space Operations Division to meet the established deadlines set forth by the BMS/ISO QSR Team.

2. Submit the draft BMS/ISO Procedures to the NASA TR for review and comments 5 business days before submitting to the BMS/ISO QSR Team, ensuring that established deadlines are met.

3. Provide quarterly, or more frequently as needed, verbal and/or narrative reporting to the Space Operations Division Chief regarding status/actions required for the BMS/ISO Procedures and the Center Level Management Review.

Microsoft Project/Primavera Scheduler support will be provided for the various projects within the Space Operations Division.

It is understood that the above deliverable dates for monthly reporting will not be possible at year-end close of financial books. A delay at year-end of 7-14 business days is possible.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	40
Schedule	30
Cost	30

Desired Personnel Skill Sets

Database/Budget Analysis, IT Support specialist(s), BMS/ISO specialist(s), Scheduler.

Government Furnished Property

Any unique property resources required for this task deliverables will be provided by NASA.

Safety and Assurance Plans

Risk Management Plan

Technical Representative: Dunlap, Patrick

Task Number: NNC06E123T - 14

Task Title: Seal Development Modeling, Analysis, and Design Support Services

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

**** Updated on 8/19/09 ****
The Seal Team at the NASA Glenn Research Center is currently involved in an aggressive project to develop and demonstrate candidate seal technologies for the Low Impact Docking System (LIDS) for the CEV. This effort includes the modeling, design, and fabrication of candidate seal concepts. Due to the number of experimental programs that the Seal Team is involved in, there is a need for engineering support including analytical and design services to support the LIDS project. The contractor has the requisite capability and manpower to provide these services for NASA GRC. The contractor's engineer(s), analyst(s), and/or designer(s) shall conduct performance-based tasks to help achieve the goals for this project in conjunction with members of the Tribology and Mechanical Components Branch of the Structures and Materials Division at NASA GRC.

Task Order Description
Description of Services to be procured

**** Updated on 8/19/09 ****
The contractor shall provide engineering, analysis, and design support to help members of the Tribology and Mechanical Components Branch of the Structures and Materials Division at NASA GRC model, design, and analyze new seal designs for the LIDS project.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

**** Updated on 8/19/09 ****

The personnel assigned to this task shall complete the following activities autonomously or cooperatively with Government personnel:

1. Perform finite element analyses on candidate seal and preloading device concepts such as:
a. Elastomeric and metallic docking system seals
b. Other elastomeric and metallic seal designs
c. Canted coil springs
d. Compression springs
e. Wave springs
f. Pressure-activated seals

2. Optimize seal and preloading device designs to meet desired technical performance metrics

3. Perform necessary engineering calculations and analyses for seal and preloading device designs (e.g., stress calculations, thermal expansion, vibrations)

4. Finite element analyses are to be performed using Marc, ANSYS, or other agreed-upon software package

5. Work with Seal Team engineers to get quotes for seal and preloading device materials and fabrication, as needed.

6. Present results of analyses to senior engineers and assist with interpretation of results.

7. This task may include travel during this period of performance. Travel costs shall not exceed $2000.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

The following are the milestones and deliverables for this task:

1. Complete analyses on LIDS seal bulb and retainer designs in support of Gen 2 EDU 58 seal design review, December 11, 2009.

2. Complete analyses on LIDS seal bulb and retainer designs for final Gen 2 EDU 58 seal design, January 29, 2010

3. Evaluate results of finite element analyses of key structural interface points for LIDS tunnel seals (e.g., main interface, mid-tunnel, bottom seals) for implications on seal performance, March 31, 2010.

4. Monthly Technical Report: Contractor shall provide a report detailing technical accomplishments on a monthly basis.

5. Monthly Financial Report - Contractor shall provide a monthly report detailing cost and labor hours incurred to date.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	50
Schedule	40
Cost	10

Desired Personnel Skill Sets

**** Updated on 8/19/09 ****

Contractor personnel assigned to this task shall be qualified to perform the duties outlined in the above scope of work and shall have knowledge and experience with the following software products:
ANSYS
Marc
MS Word, Powerpoint, Excel

Government Furnished Property

**** Updated on 8/19/09 ****
The Government will provide access to one seat of ANSYS & Marc for use by the contractor analyst.

Safety and Assurance Plans

None Selected.

Technical Representative: Envia, Edmane

Task Number: NNC07E125T - 9

Task Title: Turbomachinery Computational AeroAcoustic (CAA) Research

Task Details

Period of Performance
2/9/2009 - 8/31/2011

Background
Why the project is being pursued

The Acoustics Branch conducts research aimed at understanding, modeling and mitigating aircraft engine noise. Experimental and analytical methods are employed to improve the understanding of the noise generation mechanisms. Knowledge gained from such research is used to develop noise prediction methods and noise mitigation techniques for aircraft

Task Order Description
Description of Services to be procured

Support development of efficient CAA algorithms, non-reflecting boundary conditions and simulation capability to predict turbomachinery broadband noise and validate the capability using experimental data obtained in model- or full-scale tests. All these elements shall be directly incorporated into the BASS code. An oral review shall be scheduled at NASA Glenn upon completion of each milestone/deliverable.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

1. Submit work plan to NASA that details the approach that will be used to complete all work elements described below.

2. Extend the BASS code to simulate fan broadband noise and validate the results using suitable wind tunnel data supplied by NASA.

3. Support development and validation of a rotor acoustic transmission simulation capability within the general framework of the BASS code.

4. Support development and validation of a coupled blade-row simulation capability including the viscous flow effects within the general framework of the BASS code.

5. Support development of capabilities to model turbine noise.

6. Publish results and user manual in NASA Contractor Report(s).

7. Government's estimated period of performance is April 1, 2009 to September 30, 2011

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

********** NEW AS OF AFP7 - AUGUST 13, 2009 **********

Develop and assess the utility of BASS code for predicting fan broadband noise. This activity shall include the following element(s):

1. Complete simulation of rotor-stator interaction broadband noise using the BASS Code for a representative 2D benchmark test case. Assess the validity of the results by comparing with published results.
(10/31/2009)

2. Complete simulation of rotor-stator interaction broadband noise using the BASS Code for a representative 3D benchmark test case. Assess the validity of the results by comparing with NASA data.
(4/30/2010)

Assess the utility of BASS code for modeling blade row transmission. This activity shall include the following element(s):

3. Evaluate the ability of the BASS code to simulate blade row acoustic transmission effects using a representative 2D stator geometry. Assess the validity of the results by comparing with published results.
(6/30/2010)

4. Evaluate the ability of the BASS code to simulate blade row acoustic transmission effects using representative 2D rotor geometry including blade motion. Assess the validity of the results by comparing with published results.
(09/30/2010)

5. Evaluate the ability of the BASS code to simulate 3D rotor acoustic transmission effects. Validate the results using NASA data.
(2/28/2011)

Extend BASS code to include viscous effects. This activity shall include the following element(s):

6. Incorporate viscous flow capability into the framework of the BASS code using highly efficient Navier-Stokes algorithms.
(12/31/2009)

7. Evaluate the ability of the viscous BASS code to simulate coupled blade row aeroacoustics using an appropriate 2D benchmark problem. Assess the validity of the results by comparing with published results.
(12/31/2010)

8. Complete a benchmark 3D simulation to evaluate the capability of viscous BASS code to model aeroacoustics of realistic geometries. Validate the results using NASA data.
(06/30/2011)

9. Complete a NASA Contractor Report that summarizes results from all work elements and user's manual for the new version(s) of the BASS code.
(09/30/2011)

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	Weights
Performance	50
Schedule	25
Cost	25

Desired Personnel Skill Sets

Ph.D. in Engineering with extensive knowledge and experience in the following areas are required: fluid dynamics and aeroacoustics; development and application of advanced CAA algorithms; development and application of modular and parallel CFD and CAA codes; familiarity with Linux-based computer clusters, Fortran 90 compiler and MPI protocols; and experience in the use of the BASS code.

Government Furnished Property

The Acoustics Branch computing cluster resources shall be made available for this work. All versions of the BASS codes developed as part of this task shall be made compatible for execution on the Acoustics Branch's computing cluster(s).

Safety and Assurance Plans

None Selected.

Technical Representative: Acosta, Roberto

Task Number: NNC06E126T - 16

Task Title: Propagation Measurement and Analysis

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

This Task was formerly GESS Task 413.
Background

Develop an RF propagation terminals to enable future characterization and modeling of the effect of rapidly varying atmospheric conditions on Ka-band signal transmission from spacecraft to ground.

Task Order Description
Description of Services to be procured

Engineering design, development, upgrades, build-up and operation/maintenance of one-of-kind RF propagation ground terminal equipment to be used for K-band, rain propagation experiments.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

Development of one-of-kind K-Band (20.7 GHz) RF propagation system.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

1) Monitor the health and performance of the propagation remote terminals throughout the experiment period (October 1, 2009 - October 1, 2010) on a daily basis or as determined necessary by the experiment PI. Provide weekly reports on station performance.
2) Design and fabricate component hardware/materials required to complete the build-up of one-of-kind K-Band (20.7 GHz) propagation ground stations to support experiment objectives. (August 1, 2010).
3) Upgrade software as required to improve the quality and operation capabilities of the propagation terminals (August 1, 2010).
4) Travel to remote site(s) to repair and maintain station hardware as needed.
5) Submit weekly progress.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	Weights
Performance	50
Schedule	25
Cost	25

Desired Personnel Skill Sets

Senior Electrical or Mechanical Engineer

Government Furnished Property

Any unique property resources required for this task deliverables will be provided by NASA.

Safety and Assurance Plans

None Selected.

Technical Representative: Thorp, Scott

Task Number: NNC06E127T - 14

Task Title: W8 GE/RTA Fan Rig Integration

Task Details

Period of Performance
10/1/2009 - 9/30/2010

Background
Why the project is being pursued

No-Bid by D received on 08/07/2008, kcm

Entered as WISE Task 20080812 on 08/05/2008, kcm

The W8 single stage compressor facility is operational to support multiple test programs. Design/drafting, engineering and fabrication procurement services may be required to support the hardware development, integration and facility modifications. Activities may include conceptual design and drawing development in support of potential future programs in the W8 facility.

Task Order Description
Description of Services to be procured

Provide engineering, procurement, design modeling/layout and drafting services as required to support the W8 facility and compressor testing programs.

Test cell research engineering and instrumentation support is required in the later part of this period.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

*************NEW AS OF AFP7 - October 1, 2009 *******
The GESS Team shall perform the following:

This task was initiated in the previous evaluation periods. The W-8 compressor facility support continues to be required as needed to address hardware issues that develop during facility operations. The contractor shall work closely with the research engineer to provide engineering, design modeling, layout and detail drawing support to develop hardware concepts to address new research requirements including support for hardware modifications, procurements, build-up, and documentation. These requirements may be further defined as the task continues and could require an amendment to be generated in the future

Test cell research engineering and instrumentation planning support is also expected in the later part of this period. Associated cost plan reflects a “level of effort” that is expected during the period. An amendment may be required if work scope is different than expected.

Specific Work Elements:

1) Task Management
a) Manage resources on a day-to-day basis; execute the task; resolve problems and keep the technical representative informed of all issues. The contractor shall prepare and forward
to the technical representative a monthly progress report defining the month's technical progress and the future month's planned activities.

2) Engineering & Design/Drafting Support
a) Provide design consulting and liaison to support W8 facility hardware installation
b) Maintain drawing package with any "as-built" changes that may be required
c) Submit and maintain all drawings in Windchill for archive of the latest information
d) Based on actual needs that develop for specific engineering or design services, an estimate will be provided for an amendment to processed to adjust current cost plan accordingly
e) Support ongoing research and instrumentation requirements related to the W7 facility test plans.

3) Fabrication Liaison and Procurement Services
a) Provide procurement services to support W8 cell operations equipment, tools and material purchases up to the allocated funding to be defined in the associated cost plan for this period. Based on actual procurement requests, an amendment to the task may be submitted if required to adjust cost plan accordingly.
b) Fabrication sub-contracts shall be closely followed and a periodic status report provided to the GRC technical representative.

When fabrication and material cost estimates are identified in the associated cost plan, they have been determined based on the currently defined task requirements in this SOW, historical data and contractors' past experience for budgetary purposes. Once designs are finalized and approved by the TR, competitive bids will be obtained as required by the FAR prior to award.

Desktop office computing hardware, software and support will be charged to task as a distributed cost.

If travel and/or training is required, the cost has either been budgeted into the accompanying cost plan, or an amendment will be issued to cover the additional task requirements.

Government's Estimated Period of Performance is October 1, 2009 to September 30, 2010
****

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

Milestones:
Continue facility support related to applicable research hardware integration to support program schedule and testing.

Deliverables:
Maintain drawing files to reflect "as-builts"

Hardware or material purchases as required
Monthly Progress Reports.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	Weights
Performance	50
Schedule	30
Cost	20

Desired Personnel Skill Sets

Mechanical Engineers and Designers with experience in High Speed Rotating Machinery. Also, experience with the methods, standards, and practices used for test articles in the GRC High Speed Compressor Test Facilities.

Government Furnished Property

GOVERNMENT FURNISHED PROPERTY:

Pro-Engineer
Unigraphics (if required)
Windchill
AutoCAD

Safety and Assurance Plans

None Selected.

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Technical Representative: Main, Leslie

Task Number: NNC06E130T - 14

Task Title: Engineering and Design support for Facilities Division

Task Details

Period of Performance
2/18/2009 - 8/31/2011

Background
Why the project is being pursued

This Task was formerly GESS Task 435.
Background The Facilities Division is responsible for the design and rehabilitation of facilities at the Glenn Research Center. The Facilities Engineering and Architectural Branch requires additional engineering and design support to meet their ongoing commitment to the Center.

Task Order Description
Description of Services to be procured

Description of Services to be procured and specific tasks to be performed

The contractor shall provide experienced facilities engineering and CAD technician support in the Architectural, Electrical, Civil, Mechanical, and Structural disciplines.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

SOW Summary should define respective responsibilities of Government and Contractor

SOW

Government's Estimated Period of Performance is April 1, 2009 to August 31, 2011.

The contractor shall provide:
Architectural services to prepare designs for renovations of laboratory spaces and offices, layouts and designs for ADA access into and within buildings, life safety code analysis of impacts of renovations, and construction estimates for architectural renovations.

Civil and Structural engineering services to support renovations of laboratory spaces and offices, designs for equipment support and access platforms, evaluate cranes and crane structures, site design, storm and sanitary sewer design, roads and pavement design, and prepare construction estimates for the Civil/Structural designs.

Electrical engineering support with knowledge experience and education in electrical engineering principles, design, practices and codes necessary for the design and installation of facility projects. Ability to provide electrical engineering with emphasis on controls, power distribution, fire alarm, and lighting.

Mechanical engineering services to support renovations of laboratory spaces and offices, modifications to water (chilled water, cooling tower water, domestic water, fire protection,) natural gas, steam, and air piping systems, upgrades to HVAC systems, and perform pipe stress analyses.

Provide CAD design and drafting services in support of the discplines listed above. The CAD technicians will need to perform field verifications and measurements, to review record drawings, to size and select equipment, and to provide "as-built" drafting to modify record drawings for completed construction projects.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

1. Quarterly Report due October 16, 2009
2. Quarterly Report due January 15, 2010

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	40
Schedule	35
Cost	25

Desired Personnel Skill Sets

None

Government Furnished Property

None

Safety and Assurance Plans

None Selected.

Technical Representative: Romanofsky, Robert

Task Number: NNC06E131T - 11

Task Title: Reflectarray Power Supply and Controller

Task Details

Period of Performance
2/23/2009 - 12/31/2009

Background
Why the project is being pursued

*Updated 8/20/2009
Funding for thi task discontinues in FY'10. Task will be funded throug 12/31/2009 with remaining F '09 funds to complete MSSE-8 reflectarra space expriment.

This Task was formerly GESS Task 438.
NASA GRC has developed a new type of scanning phased array antenna based on thin ferroelectric film phase shifters. The patented ferroelectric reflectarray antenna combines favorable attributes of conventional phased array antennas and gimbaled parabolic reflectors. These features include at least a tenfold cost and power consumption reduction compared to GaAs MMIC type phased arrays. This task will support the antenna operation with the development of a high voltage controller that can steer the array.

Task Order Description
Description of Services to be procured

*Updated 8/20/2009
Remained of task will focus on completion of MISSE-8 power/interface board and support of reflectarra experiment.

The purpose of this task is to develop a reflectarray antenna high voltage power supply and controller. This task augments previous work where a prototype controller was produced. This task will produce a space qualifiable controller that meets enhanced performance specifications. Key objectives include low mass, low power, small volume, and fast transient response.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

*Updated 8/20/2009
*Change in period of performance. The estimated Period of Performance is April 1, 2009 to 12/31/2009

*Remained of work is to finish design, fab and test of MISSE-8 power/interface baord
The GESS Team shall perform the following:

This task will be broken down into a requirements and engineering phase and a design and development phase.

The first phase of the task is planned to provide requirements for the controller, by developing a requirements document that describes the performance and packaging specifications. These specifications will be developed in conjunction with meetings with the TR. Design approaches will be investigated, and may culminate into single channel breadboard systems to investigate the performance characteristics. Research will be performed in the environmental requirements for the controller, and the design of a controller built from suitable radiation hardened components that meet the environmental requirements. Testing with the original controller may be performed to augment this investigation.

After initial development of requirements and / or testing, the task will be evaluated and amended for the second phase, which will be the actual design and development of the controller.
Specific Work Elements

1) Task Management
a) Manage resources on a day-to-day basis; execute the task; resolve problems and keep the technical representative informed of all issues. The contractor shall prepare and forward to the technical representative a monthly progress report defining the month's technical progress and the future month's planned activities.

2) Requirements Definition
a) Meetings and engineering for initial requirements gathering.
b) Environmental requirements definition.
c) Development of a requirements document.
d) Single channel prototype breadboarding and testing.
e) Support of reflectarray testing with initial controller.

3)
a)Complete remaining 6 128 channel controller boards
b)complete software/firmware (FPGA)
c)Test complete controller

Desktop office computing hardware, software and support will be charged to task as a distributed cost.

If travel and/or training is required, the cost has either been budgeted into the accompanying cost plan, or an amendment will be issued to cover the additional task requirements.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

MILESTONES AND DELIVERABLES:
*updated 8/20/2009
Complete MISSE-8 power interface board in time for 1/1/2010 delivery to NRL.

Deliverables:

Monthly progress reports.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities

Criteria to Be Used for Evaluation	**Weights**
Performance	30
Schedule	40
Cost	30

Desired Personnel Skill Sets

PERSONNEL PROFILE:

The continuation of this task requires previous knowledge of the reflectarray antenna high voltage power supply and controller concepts that have been developed under the previous conract.

Government Furnished Property

GOVERNMENT FURNISHED PROPERTY:

Sample ferroelctric phase shifter for power supply load simulation

Safety and Assurance Plans

None Selected.

Technical Representative: Gefert, Leon

Task Number: NNC06E133T - 14

Task Title: Exploration Vehicle Mission Analysis Guidance Algorithm Development

Task Details

Period of Performance
2/18/2009 - 8/31/2011

Background
Why the project is being pursued

The NASA Glenn Research Center is responsible for managing the design and development of the Crew Exploration Vehicles Service Module. The design and development of the CEV vehicle requires that guidance and targeting software algorithms. Development and validation through analyses of these algorithms are required to give NASA management clear understanding of various requirement impacts and implications.

Task Order Description
Description of Services to be procured

This task will perform a variety of system and mission analysis studies applying and updating in-house trajectory analysis and system modeling tools. Perform 3-DOF guidance algorithm developments and perform mission performance analysis using these algorithms for CEV lunar orbit operations. Assess the impacts and capabilities of the CEV to perform LLO maneuvers. This task will consist of several subtasks including

1) Use analysis and development tools to support Exploration Level III guidance development, integration and testing of guidance and targeting software for Lunar Architecture missions,

2) Develop LLO operations database that will include required maneuvers, magnitudes of the maneuvers and other key parameters as a function of Lunar landing site and LLO maintenance approaches.

3) Prepare written reports and presentations on analysis results for internal and external (agency distribution, conferences and workshops, archival) distribution.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

*************NEW AS OF AFP6 - APRIL 1, 2009 *******
The contractor shall provide the necessary personnel to perform the tasks specified. During the Government's Estimated Period of Performance is April 1, 2009 to August 31, 2011.
****

The government will supply the assumptions and baselines for the studies, and furnish dates and deadlines for work as appropriate. It is anticipated that much work with other centers will occur via teleconferences. Occasional travel for face-to-face meetings at other centers or labs may be necessary. Attendance at conferences to brief the scientific community on study results is desired but not mandatory.

Support to both the CEV On-Orbit Performance Working Group (OOPWG) and the CEV Guidance and Targeting Working Group (GTWG) will be provided, for which weekly teleconferences are held in which the review of working group analysis and software deliverables are performed.

If travel and/or training are required under this task, the cost has either been budgeted into the accompanying cost plan, or an amendment will be issued to cover the additional task requirements.

Desktop office computing hardware, software and support will be charged to task as a distributed cost.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

The CEV OOPWG Milestones and deliverables shall consist of the following:

1. Provide updated global sortie LOI targets database that considers orbit maintenance and altitude adjust/plane change reducing magnitude of the maneuver requirements. This delivered dataset will assume impulsive maneuvers. The resulting data set will detail maneuver magnitudes as a function of landing site
2. Provide updated polar sortie LOI targets database that considers CEV orbit maintenance, altitude adjust/plane change maneuvers and Altair arrival maneuvers. This delivered dataset will assume impulsive maneuvers and is intended to reduce the overall required maneuver magnitudes.
3. Support the development LLO altitude adjust/plane change databases that include finite burn effects associated with the use of the SM AUX thrusters.

The CEV GTWG Milestones and deliverables shall consist of the following:

1. Delivery of LLO guidance and targeting algorithms in the form of Matlab code compliant with CEV flight software standards. These algorithms will be created in support of the Lunar algorithms flight software translation effort.

Additionally this task will deliver reports as specified in the GESS contract. As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	40
Schedule	35
Cost	25

Desired Personnel Skill Sets

Engineering support with a background in mission design and analysis of spacecraft and propulsion systems will be required.

Proficiency with mission analysis tools and software development tools, including SNAP and Matlab.

Be able to communicate with other analyses groups both inside and outside the Center and with Exploration project management

Government Furnished Property

The Government will supply GRC facilities,and computers to conduct the majority of the GRC on-site activities associated with the mission analysis and design work associated with this task.

Safety and Assurance Plans

None Selected.

Technical Representative: Tornabene, Robert

Task Number: NNC06E135T - 17

Task Title: Ares I Thrust Vector Control

Task Details

Period of Performance
2/9/2009 - 8/31/2011

Background
Why the project is being pursued

This SOW outlines the overall work elements with specific contractor milestones and deliverables required to meet the TVC Project schedule. This task is a portion of the entire project which also includes NASA GRC civil servants and off-site contractors. The specific work elements for this portion of the project are listed below. Travel will be required on an as-needed basis.

Task Order Description
Description of Services to be procured

1) Systems Operations Engineering - Responsible for maintaining the TVC Operations Concept Document. Defines the TVC operations for all phases of the TVC lifecycle, including ground and flight operations. Communicates operations information to the TVC team, Upper Stage, Flight Systems, Ground Systems, and other operations groups. Participates as the TVC representative to the Ground Operations Working Group, the Flight Operations Working Group, the Stage Operations group, the Integrated Logistics Support Working Group, and other working groups as needed. Provides input for and reviews the Upper Stage flight computer software requirements documents, the ground computer software requirements documents, the Ground Operations Requirements document, the Flight Operations Data Handbook, the Integrated Master Timeline, Upper Stage Events Sequence, and other documents as needed.

2) Scheduling - The TVC team requires experienced scheduling effort with the ability to develop and organize activities using Microsoft Project Schedule producing an integrated master schedule to track all project activities and milestones. The schedule needs to be resource loaded and cost loaded to show phasing of project purchases. This schedule needs to be maintained regularly by working with the various project leads to gather information on progress and new tasks. The scheduler should review the inputs for consistency across the different work areas of the project and generate schedule variance reports. A critical path will need to be identified. The scheduler is also expected to provide outputs from the Microsoft schedule to keep the team informed of tasks that are behind and upcoming milestones and deadlines.

The task requires proficient schedule analysis skills with proficient oral and written communications skills for coordination of both internal project activities as well as coordination/integration of the TVC schedule with the integrated upper stage schedule maintained at MSFC. Schedule updates will be required weekly and monthly for earned-value reporting.

3) Provide Mechanical Engineering support for the Thrust Vector Control Two Axis Test Rig. Responsible to finalize the assembly, and provide functional checkout, tuning, and evaluation of

the two axis test rig and engineering model hardware. Document evaluations and calibrations. Create procedures in support of rig operations. Assist in preparations of integrated testing of the TVC engineering model system. Support the Integrated TVC system checkout tests 1 through 6. Update rig calibrations and operating procedures as required prior to Integrated TVC System tests.

4) Electrical Engineering Support: Provide electrical engineering support for the design, assembly, and test of the TVC electrical systems for the Engineering Model (EM), and for the flight design. Coordinate with all of the TVC system leads, contractors, and other NASA Centers, in developing the TVC electrical designs.

Provide electrical engineering support of the harnessing required for the connectivity between the Hydraulic System, Turbine Pump Assembly, Electrical Power System, Ground Support Equipment, Data and Control Units (DCU), and Upper Stage Flight Computers.

Provide engineering and designer support during the development of all system level electrical drawings. Drawings will include TVC system level electrical connection, system schematic and block diagrams. Detailed assembly drawings shall be provided for all harnessing.

Provide electrical support and oversight to DCU contractor during development of the actuator controller and data acquisition systems. Specific duties shall be directed by the lead electrical engineer for TVC, in support of the Production Contract and the GRC TVC team.

Provide electrical engineering support for the assembly and test of the DCU test equipment required to verify the operation of the data acquisition portion of the DCU.

Provide electrical engineering support for the electromagnetic interference (EMI) testing of the actuator system. This includes the setup and test of the equipment in the GRC EMI Laboratory.

5) Provide engineering for actuator systems used to control rocket engine thrust vectoring. In particular, provide engineering to analyze (via Matlab/Simulink) and design flight and experimental actuator systems; and, analyze, design, and fabricate experimental hardware and test-fixtures for verifying thrust vector control system performance. Contractor shall provide design alternatives and prepare trade-off analyses for actuator systems. The engineer will require mechanical; electrical and electronic; heat transfer; materials and stresses; machine design; fluid and pneumatic power; piping and instrumentation; dynamic simulation and numerical techniques; test-bed engineering; and technical management skills.

6) Secondary Structures Support: Serve as lead for the design, fabrication, assembly and test of the TVC EM and flight component brackets/isolation mounts and thermal design and analysis. Follow fabrication of EM hardware and provide technical oversight during assembly and test of EM hardware. Coordinate the efforts of structural designers, structural dynamicists, structural analysts and thermal analysts. Coordinate TVC assembly mounting and packaging. Provide stress analysis support as required. Generate conceptual and detail drawings of TVC component brackets for Engineering Model and flight hardware.

7) Provide hydraulics systems support in the following areas:
a) Develop TVC flight system hydraulic fluid draining procedures. Consider gravity drain, gas pressurized displacement, and vacuum assisted fluid removal. Compare alternatives considering ease of operation, timeliness, and contamination control. Identify support equipment attributes and work with GSE lead to ensure support equipment is developed with appropriate capability.
b) Prepare descriptions of TVC component change-out scenarios requiring complete or partial fluid drainage and re-filling. Consider change-out of TPA, actuator, reservoir, accumulator, filter/manifold assembly, circulating pump, instrumentation, hoses and lines. Identify draining

procedure, component change-out, and refill process for each scenario. Evaluate relative difficulty of each scenario in terms of accessibility, relative time required, contamination control, and re-establishment of fluid fill and air content limits. Make suggestions/recommendations for design modifications to improve maintainability and indicate potential effect on LRU status of various components.
c) Hydraulics System Support: Assist in fill and bleed operations in support of 2-axis rig test preparations. Evaluate effectiveness of baseline filling operations and procedures for draining and refilling, make suggestions for improvements, evaluate revised procedures, and update written procedures accordingly.

8) Cradle Engineering Lead - Serves as the TVC Cradle point of contact for the project internally and to the Upper Stage for Cradle engineering. Attends working groups and telecons about the Cradle implementation by the Upper Stage. Obtains TVC information needed for input into the Cradle database. Coordinates the input of TVC information into the Cradle database and enters information as required. Maintains the TVC information in the Cradle database for updates and changes. Generates TVC subsystem requirements document and specifications as requested. Exports information from the Cradle database as requested. Deliverables for this subtask include minutes and notes from working groups, telecons, and significant meetings (within 1 week of occurrence), running logs of entries and updates made in Cradle, and running logs of exports made from Cradle and TVC documents as requested.

9) TVC RID Processor - Responsible as the TVC point of contact for the processing of RIDs, comments, and RFAs from TVC formal design reviews. Tracks the status of the TVC RIDs, comments, and RFAs to completion. Assists the TVC team to resolve issues so that RIDs, comments, and RFAs can be closed. Leads the TVC team in preparation of information needed to close RIDs, comments, and RFAs. Provides logistics for implementing the RID closure process. Maintains and updates the RID and comment databases in eRoom as items are worked and closed. Deliverables for this subtask include RID, comment, and RFA closure information as it is generated, monthly status showing RID, comment, and RFA metrics of total number, number open, number closed, and number with significant issues and monthly status showing the trending history of each of the above categories.

10) Structural Dynamics Engineering
This task involves reviewing and assessing the required Constellation and Upper Stage documentation for vibration and shock data on the Upper Stage thrust cone (where all TVC components will be mounted). The following subtasks are being requested.
a) Update the individual TVC component design loads for bracket stress analysis and design. Work with GRC analysts in assessing load definition and evaluation of stress results.
b) Update the Structural Analysis Plan for the TVC subsystem, including coordination with Fracture Control and Materials and Process personnel on the project. Structural Development Plan to include Structural Design Requirements, Verification Requirements, Structural Development Practice
c) Develop TVC component structural qualification plans.
d) Develop the loads and life requirements for TVC component structural qualification
e) Provide TVC Finite Element Model (FEM) Development Support

11) TVC Interfaces Lead Engineer
Responsible for being the TVC point of contact for the internal interfaces among the TVC components and external interfaces with the J-2X Engine, the Upper Stage subsystems, and the ground systems. Develops and maintains knowledge of the TVC subsystem and its interfaces. Resolves interface issues. Communicates interface information to the TVC team, Upper Stage, J-2X Engine, and ground systems. Attends working group meetings and telecons covering interfaces. Travels to attend remote meetings at other locations as requested. Develops and maintains the TVC Interface documentation. Compiles and prepares inputs needed for the Upper

Stage Internal Interface Requirements Document and the Upper Stage Interface Control Document. Prepares updates for interface requirements in the TVC Subsystem Requirements Document.

12. TVC Test Support Engineer
Responsible for providing support to the TVC Test Lead for integrated tests, such as the Upper Stage Integrated Stage Test and the TVC Qualification Unit Test. Develops and maintains knowledge of the TVC subsystem and the tests. Compiles and prepares test information for documents and products. Resolves test issues as assigned. Attends working group meetings and telecons. Travels to attend remote meetings at other locations as requested. Travels to observe key tests.

13). TVC Operations Support Engineer
Responsible for providing support to the TVC Operations Lead for TVC operations activities at locations such as the Michoud Assembly Facility (MAF) and the Stennis Space Center (SSC). Develops and maintains knowledge of the TVC subsystem and the operations. Supports assembly and integration studies. Works with facility coordinators and appropriate requirements document owners to assure that facility services necessary for TVC activities are available. Compiles and prepares operations information for the Upper Stage Manufacturing and Assembly documentation, and the Upper Stage Green Run documentation. Resolves operations issues as assigned. Attends working group meetings and telecons. Travels to attend remote meetings at other locations as requested. Assists in other areas of operations, as needed.

14) Reporting: The contractor shall submit monthly technical and cost progress reports for this task in accordance with the ASRC Contract. Completion Date: Monthly.

This task may require the purchase of hardware or software programs for compliance with project standards.

Travel costs have been budgeted into the accompanying cost plan.

Desktop office computing hardware, software and support will be charged to task as a distributed cost.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

Government Estimated Period of Performance: April 1, 2009 to August 31, 2011**

The TVC system is a hydraulic-based system consisting of two redundant power strings to the actuators. Hydraulic pressure to both strings will be provided by gas turbine driven hydraulic pumps. In order to complete the design definition phase and move to CDR, the following skills are needed to augment the in-house team: systems engineering, project scheduling, mechanical, structural and electrical engineering design, drafting and analysis and procurement support.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

1. TVC Operations Concept Document Revision B, draft due 10/1/09, final due 10/30/09.

2. TVC input for and comments on the Upper Stage flight computer software requirements documents, the ground computer software requirements documents, the Ground Operations

Requirements document, the Flight Operations Data Handbook, the Integrated Master Timeline, Upper Stage Events Sequence, and other documents as needed.

3. Generate monthly 1-page schedule updates and schedule variances report for TVC Project Manager.

4. Formal submittal of TVC IMS to MSFC US office at the beginning of every month.

5. Develop detailed Operating Plan Schedule for Fiscal Year 2010 with updates for the out years.
6. Update design of TVC flight electrical system by 3/31/2010. Provide updated set of electrical drawings including connection diagram, block diagram, bonding and grounding diagram, and cable assembly drawings by 3/31/2010.

7. Complete functional tests of the DCUs by 3/31/2010.

8. Complete EMI tests of the actuator system by 3/31/2010.

9. Update electrical design for the 2-axis test rig by 3/31/2010. Provide updated set of 2-axis rig electrical drawings including connection diagram, block diagram, bonding and grounding diagram, and cable assembly drawings by 3/31/2010.

10. Perform two axis rig checkout and tuning, and calibration by 11/01/09.

11. Deliver baselined version of Structural Analysis Plan by April 17, 2009.

12. Complete mathematical model of DCU in Matlab/Simulink environment by 01/29/10. Model will respond to requests for health and status data, accurately model DCU BIT check and model DCU modes including acceptance of ICD compliant commands for enabling and inhibiting actuator movement.

13. Running logs of entries and updates made in Cradle, and running logs of exports made from Cradle and TVC documents as requested.

14. RID, comment, and RFA closure information as it is generated, monthly status showing RID, comment, and RFA metrics of total number, number open, number closed, and number with significant issues and monthly status showing the trending history of each of the above categories.

15. Omitted.

16. Two-axis Rig calibration reports due 12/1/09.

17. Two-axis Rig operation procedures and software for system checkout tests due 1/15/10.

18. Updated rig calibrations and operating procedures due 3/15/10.

19. TVC Interface documentation maintained and updated as requested.

20. TVC inputs to the Upper Stage Internal Interface Requirements Document, the Upper Stage Interface Agreement Document, and the TVC Subsystem Requirements Document are on-going, as requested.

21. TVC inputs to test documents and products are ongoing, as requested.

22. TVC inputs to operations documents and products are ongoing, as requested.
23. Deliver updated version of Structural Analysis plan by 3/31/2010.

24. Finalize flight bracket stress and vibration analyses and deliver completed models to project by 11/30/2009.

25. Minutes of working groups and telecons, and trip reports are prepared and distributed within one week of the event.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	40
Schedule	30
Cost	30

Desired Personnel Skill Sets

None

Government Furnished Property

Any unique property resources required for this task deliverables will be provided by NASA.

Safety and Assurance Plans

None Selected.

Technical Representative: Needham, Kathleen

Task Number: NNC06E136T - 13

Task Title: Technology Transfer Services 1

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

This Task was formerly GESS Task 450. ****Work in Award Fee Period 7 will be the same as that performed in AFP6****
The Technology Transfer and Partnerships Office (TT&PO) at the NASA Glenn Research Center (GRC) is responsible for implementing the requirements of the NASA Innovative Partnerships Program (IPP) to provide leveraged technology for Mission Directorates, Programs, and Projects through investments and technology partnerships with industry, academia, government agencies and national laboratories.

Task Order Description
Description of Services to be procured

The Contractor shall provide services in support of the TTPO in the areas of technology assessment, licensing assistance, entrepreneurial and start-up company counseling and partnership development assistance.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

2.1 Technology Assessment

The contractor shall manage the assessment of all new technology disclosures received by the TTPO. Recommendations shall be made to the TTPO Chief on recommended disposition including publication potential for TechBrief Magazine, advisability of additional market research, patenting, licensing and partnering potential.

2.2 Licensing Assistance

The Contractor shall help develop and assist in the implementation of marketing campaigns aimed at the licensing of NASA GRC technology. The Contractor shall assist in the evaluation of license applications and the development of negotiation terms and strategies.

2.3 Entrepreneurs and Start-Up Company Counseling

The Contractor shall counsel entrepreneurial and start-up companies as leads are received by TTPO, or as received by contacts in the intermediary community in the state. Counseling may include areas such as business planning and strategy, product and market development, and sources of capital and professional services. Relationships shall be maintained with organizations such as JumpStart, BioEnterprise, OMERIS, Ohio Venture Association and the Edison incubators. Assistance in planning may also be provided to other organizations at GRC in the areas of incubation, technology park development, and development of other business acceleration services.

2.4 Partnership Development Assistance
The Contractor shall participate in collaborative efforts undertaken by TTPO to develop partnerships at the Center. This may range from technical writing, company visits, coordination with other NASA Centers and IPP staff and contractors, drafting and review of marketing materials.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

2.1 Technology Assessment
• Monthly summaries of new technology disclosures and recommended disposition shall be provided during the monthly TTPO Partnership Team meetings held the fourth Thursday of every month.

2.2 Licensing Assistance
Monthly status summaries of potential licensing activities planned and in process shall be provided during the monthly TTPO status meetings held the second Thursday of every month. .

2.3 Counseling of Entrepreneurs and Start-up Companies
• A summary of activities under this task shall be provided Quarterly to the TTPO Chief that includes the following information: meetings attended, companies counseled, referrals made, results of prior consultations, and the assistance provided to other GRC organizations.

2.4 Partnership Development
• A list of activities under this task shall be provided during the monthly TTPO status meetings held the second Thursday of every month.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	Weights
Performance	30
Schedule	40
Cost	30

Desired Personnel Skill Sets

Desired Personnel Skill Sets

The position requires a bachelor degree in engineering or other scientific or technical subject matter. A Masters of Business Administration degree is desired but not required.

The position requires a demonstrated ability to identify and evaluate high-tech inventions including comparisons against existing state of the art technologies and products, and a track record of successful partnership development and/or licensing in a university, government or large corporate environment.

Experience in an incubator, technology accelerator or similar position requiring the counseling of entrepreneurs and start-up companies is preferred. A demonstrated ability to counsel firms on business strategy, product and market development, sources of capital and professional services is required.

The position requires strong communication and organizational skills and the ability to operate within a highly regulated environment.

Government Furnished Property

The Contractor shall be located on-site and provided with office space and equipment.

Safety and Assurance Plans

None Selected.

Technical Representative: Eckel, Andrew

Task Number: NNC06E138T - 12

Task Title: Scheduling and Project Office Support for the Science Project Office

Task Details

Period of Performance
2/18/2009 - 8/31/2011

Background
Why the project is being pursued

The Science Project Office is responsible to provide the programmatic interface for research and technology development for NASA GRC in support of the NASA Science Mission Directorate. Assigned tasks utilize beneficial partnerships with other government agencies, industry and academia to explore and advocate new opportunities in space and Earth science to develop, demonstrate and insert enabling technologies for the benefit of NASA GRC and U.S. industry.

This task shall also provide support to set up configuration management system components for the Radioisotope Power System (RPS) Office. Components are required for RPS and project level elements.

Task Order Description
Description of Services to be procured

The contractor shall provide a broad array of support services for development and operation of the Science Project Office. These services shall include support for program level scheduling that includes roll-up of schedules from program related, technically oriented projects. The task involves top-level schedule planning and development which coordinates milestones and objectives through communication and interaction with Program/Project Management personnel. The task will involve deriving on overall scheduling plan, regular communication and technical interchanges with Program managers and Project managers, and development/maintenance of schedules within this system to accurately track program progress. The task shall also include administrative services such as website development for individual programs as well as the overall Office and related Program web pages, monitoring of financial data in SAP and the production of reports, the processing of purchase requests, production of presentation materials, monthly status report integration, and other general administrative tasks. This task also provides the configuration management (CM) support for the SMD RPS Program.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

** *Government's Estimated Period of Performance is April 1, 2009 to August 31,2011***

Scheduling: Develop and organize activity based (WBS product oriented) individual schedules for major projects. Expert proficiency in the following software applications is required: Power point, Excel, Microsoft Project, Access, and Word. The task will also require an integrated high level program schedule to track major activities and management milestones for the office chief.

The work will require the development of all programs/project schedules and the tracking and identification of scheduling issues that cross project boundaries and will require reporting of feedback on individual critical path scheduling items. For this task all schedule inputs and changes, provided by Project managers are to be reviewed by the analyst for consistency and viability and reported on to Office management. The schedule analyst who performs this work, along with program and project management, will approve all official schedules.

Task requires proficient schedule analyst capabilities at a high level for independent creation, maintenance and performance monitoring. This requirement should involve personnel with proficient oral and written communication skills for project activity coordination. Also, it is anticipated that additional scheduling support personnel, as deemed necessary to meet the task deliverables, may be required to support complex individual tasks as they become funded.

Resource Management: Provide assessments of programmatic Fiscal Year dollar and labor requirements; assist Program Area Managers in developing operating plans; assist in implementing operating plans; assess new and/or changing requirements and recommend changes, perform analysis; and attend Program reviews. Using and understanding the Integrated Enterprise Management system and workforce planning and reporting systems at GRC is also required.

Science Project Office Support: Provide Microsoft Office support, working knowledge of MS word, Excel, Access, Project, and PowerPoint is required.

Database Development: Provide support in developing a web-based interface to the Advanced Technology Database; develop and enhance software that controls the modification to and viewing of database records; working knowledge of Perl and Microsoft Access is required.

Web Site Development: Support of the Office, Division, Program, and Directorate web sites is required. Working knowledge of common web page development software is required.
The Configuration Management Analyst will work toward predictable, repeatable, consistent, and measurable processes leading to robust quality management of documents, hardware and software.

The GESS CM Team shall provide the following CM Support for the Radioisotope Power Sytems (RPS) Program:
a. Develop and track the documentation, implementation, and maintenance of the Configuration Management Plan and processes.
b. Initiate, process, and track change requests submitted to the RPS Configuration Management Team within the RPS Program.
c. Track and report all action items from the RPS project meetings and design reviews.
d. Establish and maintain Project Library containing documentation under CM control of the RPS configuration data.
e. Provide CM support for the Design reviews as identified by the project.
f. Implement records control according to NPR 1441.1 and NPR 7120.5

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

The following list is the milestones and deliverables for this period:

Detailed planning schedules for individual projects in the office (InSpace Propulsion & Radioisotope Power Systems integrated schedules, project-specific: NEXT, Stirling, others as funded)
Monthly updates of above for individual project managers.
Track and report on an integrated set of milestones/deliverables.
Analyze individual project schedules for GRC resource conflicts.

Attend related project planning meetings.

Provide scheduling reports as required.

Weekly and/or monthly financial status and technical reports, graphs, and analysis.

Draft Configuration Management Plan.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	40
Schedule	40
Cost	20

Desired Personnel Skill Sets

Schedule Analyst Lead, Budget/Database Analyst(s)

Staff with Certification in Configuration Management

Government Furnished Property

Any unique property resources required for this task deliverables will be provided by NASA

Safety and Assurance Plans

None Selected.

Technical Representative: Zernic, Michael

Task Number: NNC06E142T - 16

Task Title: SCaN Systems and Networks Architecture Project

Task Details

Period of Performance
2/20/2009 - 8/31/2011

Background
Why the project is being pursued

GRC Systems and Network Project residing in Space Operations Project Office is tasked to support the Space Communications and Networks (SCaN) Program's Core Systems Engineering Team at NASA HQ. This team is responsible for the SCaN Level-1 and Level 2 system engineering and activities which span the SCaN integrated networks and the future Lunar and Mars Network capabilities. The functions performed by this team require GRC SNAP to carry out the following tasks:
- Develop, define, and produce the architecture documents.
- Develop and produce content for the concepts of operation.
- Support the development of system requirements documents.
- Perform architecture concept and design trade studies.

Task Order Description
Description of Services to be procured

At GRC, the Systems and Networks Architecture Project (SNAP) supports the Space Communications and Networks (SCaN) Systems Engineering Core Team (SECT), which is responsible for the SCaN system engineering and activities through Level-2 concerning the SCaN integrated network encompassing the SN, NEN, DSN, and the future Lunar and Mars Relay capabilities. In that regard, the functions performed by the SECT requiring GRC SNAP support include the following:

1. Defining the architecture for the SCaN integrated network.
2. Establishing a roadmap for realizing the integrated network architecture by the SCaN.
3. Defining an operations concept for the SCaN integrated network.
4. Developing a set of system requirements on the SCaN integrated network.
5. Performing and/or task the trade studies for the technical issues identified at Level-2.

The contractor is responsible for the development and delivery of the systems architecture and engineering products as directed by the SNAP Manager, including document and product development support as required.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

This Statement of Work specifies the tasks to be performed and approach in providing Engineering and Simulation support to the Glenn Research Center, C&T Network Architecture Project. The work involved includes Systems Engineering and

Modeling/Simulation support to develop architecture concepts and exercise analysis for proposed communications system/networking architecture infrastructures for near earth and lunar communications systems.
**********NEW AS OF FEB 5, 2009***********

The scope of this task effort will involve engineering support for SCaN Concept of Operations definition and scenario development.
*** The contractor shall provide personnel with expertise and background in systems engineering and communication systems modeling. The contractor shall use model and simulation results perform evaluations aimed at predicting system performance. The contractor shall provide requirements reports and systems definition documentation as part of this task effort.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

Subtask 1: SCaN

The contractor shall be responsible for the following system engineering and architecture product deliverables:

1. Upgrades, enhancements, maintenance of the SCaN Architecture Definition Documents (ADDs) and products.
• Provide technical information research/reports to assist with ADD updates.
2. The Operations Concept Document products for the SCaN Program
• Participate in SCaN Concept of Operations discussions and meetings
• Create ConOps analysis, diagrams, text products (including documentation) related to the operational features and operational scenarios of the SCaN Integrated Network
• Integrate and respond to comments on the full SCaN Concept of Operations document
• Travel may be required to support this effort
3. Provide reports for assigned architecture trade studies.
4. The SCaN Level-2 system requirements products (SRD).
5. Providing inputs, reviews and analysis to the SCaN System Engineering products

Subtask 2: Earth Science

1. Provide monthly activity reports in the format provided by ESM Systems Engineer through October 31, 2009.
2. Provide Presentation packages through October 31, 2009.
3. Attend approximately 4 working group meetings at JPL in Pasadena, Ca. to meet reporting Deliverables.
4. Provide GESS-2 Task Monthly reports

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	25
Schedule	50
Cost	25

Desired Personnel Skill Sets

Communications Engineering, Communications System Engineering, Task/Project Management and Product Integration Support.

Government Furnished Property

Any unique property resources required for this task deliverables will be provided by NASA.

Safety and Assurance Plans

None Selected.

Technical Representative: Seablom, Kirk

Task Number: NNC06E144T - 14

Task Title: CEV Support

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

This Task was formerly GESS Task 463.
Assist the CEV Project Office in implementing tasks assigned by the CEV program.

Task Order Description
Description of Services to be procured

Provide support to the PP&C Office in the CEVPO. Primary responsibities are resource management, including resource planning, monitoring, and evaluation of project status from a business management point of view, including EVM. Multi-personnel team shall be proactive in getting the required information from the CEV team. Unique knowledge in business management tools such as Microsoft Project, Primavera, NASA financial systems and the capability to provide database programming support for generation of custom fincial reports to the CEV program is required. The Orion Project Office is divided into the following work groups: Service Module, SET, and the remaining office work falls under the umbrella of GRC Orion Project Office. The GRC PP&C Office of which this work falls under is supported by a mix of SSC's provided under this SOW The SSC support for resource analyst is also responsible for overall resource roll-up of Orion resources provided to GRC.
****** Provide expert support in the modification, testing, disassemble and shipping of the PSL heater in support of the Orion 80-AS testing task*****

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

Contractor **shall** set up reporting of monthly PR's, labor and automating our charts for the internal reviews with the workpackage managers. Contractor ***shall*** also be automating actuals and providing data for EVM.
Anticipated Travel: One trip to JSC each month, one trip to Denver each month.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

The milestones and deliverables for this period shall include the following:

• Monthly report(s) to each of the work-package managers and office management on current financial and schedule status.

• Automated database reports for PR's and other monthly charts on financial and workforce data as needed.

• Coding of financial and schedule data in order to populate EVM reports

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	20
Schedule	40
Cost	40

Desired Personnel Skill Sets

Budget Analyst, Database Programmer, Schedule Analyst

******* Expertice in Stahl heater assembly and utilization

Government Furnished Property

Any unique property resources required for this task deliverables will be provided by NASA.

Safety and Assurance Plans

None Selected.

Technical Representative: Grady, Joseph

Task Number: NNC06E147T - 12

Task Title: Ceramic Materials and Composites II

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

This Task was formerly GESS Task 470.
The Ceramics Branch within the Structures and Materials Division is actively pursuing the development and characterization of ceramic and ceramic matrix composites for airframe, power, and propulsion systems for aeronautic and space applications. Major areas of research activities are broken into four subtasks; Processing, Joining and Repair; Modeling; Design; and, Model Validation and Characterization.
This task is synergistic with task 021. It is administered separately to address the distinct needs of various funding projects at NASA.

Task Order Description
Description of Services to be procured

Subtask 01: Processing, Joining and Repair

A major area of emphasis is the processing, joining and repair of ceramics and composites in advanced airframe, aeropropulsion and power systems. Advanced ceramic material processing is a key technology for both structural and functional systems. For example, monolithic ceramics and ceramic matrix composites have been identified as key to hot structures for advanced subsonic (fixed and rotary wing), supersonic and hypersonics engines, and spacecraft propulsion and airframe systems. Likewise, ceramic membranes are a key element of solid oxide fuel cells and ceramic piezoelectric and thermoelectric materials hold promise as for power harvesting and high temperature sensors and actuators. This task consists of engineering support for the processing, joining and repair of ceramic and ceramic matrix composites and constituents. This includes practicing conventional and practicing and investigating advanced processing techniques and for bulk materials and structures, fibers, matrices, joints, membranes and coatings.

Subtask 02: Modeling

The emphasis is on process, design and life modeling of ceramic and ceramic matrix composite materials. The materials may be structural (e.g., hot structural components) or functional (e.g., fuel cell membranes, piezoelectrics, thermoelectrics). The task will develop process, design and life models. The models may be analytical or experimentally based. For example, process modeling may combine analytically derived thermal treatment conditions with variations explored via experimental iterations. The work will be performed in a team environment in collaboration with several other researchers working in this area and in conjunction with the processing and model validation subtasks.

Subtask 03: Design

The emphasis is on the design of ceramic and non-ceramic structures and devices. Examples of design activities include: advanced airframe or propulsion system structural concepts fabricated of ceramic materials; advanced multifunctional hot structures with power harvesting features; and fixtures for testing and instrumenting ceramic materials and structures.

Subtask 04: Model Validation and Characterization

The emphasis is on validation of models through experiments. The validation work is conducted by microstructural, mechanical, thermomechanical, chemical and electrochemical characterization. The materials may be structural (e.g., hot structural components) or functional (e.g., fuel cell membranes, piezoelectrics, thermoelectrics). This is performed in a team environment in collaboration with several other researchers working in this area and in conjunction with the processing and modeling subtasks.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

Subtask 1: Processing, Joining and Repair
In general, the primary emphasis is the processing, joining and repair of ceramics and composites. The contractor shall provide the technical expertise necessary to (1) process ceramic and ceramic matrix composites, (2) develop fiber coatings for composites, (3) to identify fibers and coatings for advanced composites, and (4) coordinate and perform mechanical and microstructural testing and analysis.

Specific Work Elements

1. Identify advanced ceramic material processing concepts at the constituent and/or composite levels.
2. Establish process feasibility and optimized processing, joining and repair techniques for bulk ceramic, ceramic membrane, ceramic coatings, and ceramic matrix composites.
3. Document and report results via patents, monthly reports, topical reports for publication and presentations at project reviews and technical meetings.

Subtask 02: Modeling

In general, the primary emphasis of this work is process, design and life modeling of ceramic and ceramic matrix composite materials. The contractor will provide the technical expertise necessary to develop process, design and life models for ceramic and ceramic matrix composite materials. The materials may be structural (e.g., hot structural components) or functional (e.g., fuel cell membranes, piezoelectrics, thermoelectrics). The models may be analytical or experimentally based.

Specific Work Elements

1. Develop process models for fabricating ceramic and ceramic matrix composites from polymer precursor materials.
2. Document and report results via patents, monthly reports, topical reports for publication and presentations at project reviews and technical meetings.

Subtask 03: Design

The emphasis is on the design of ceramic and non-ceramic structures and devices. Examples of design activities include: advanced airframe or propulsion system structural concepts fabricated of ceramic materials; advanced multifunctional hot structures with power harvesting features; and fixtures for testing and instrumenting ceramic materials and structures.

Specific Work Elements

1. Develop designs for ceramic and ceramic matrix composites structures and devices.
2. Document and report results via patents, monthly reports, topical reports for publication and presentations at project reviews and technical meetings.

Subtask 04: Model Validation and Characterization

The emphasis is on validation of models through experiments. The validation work is conducted by microstructural, mechanical, thermomechanical, chemical and electrochemical characterization. The materials may be structural (e.g., hot structural components) or functional (e.g., fuel cell membranes, piezoelectrics, thermoelectrics). This is performed in a team environment in collaboration with several other researchers working in this area and in conjunction with the processing and modeling subtasks.

Specific Work Elements

1. Conduct validation testing and characterization for ceramic and ceramic matrix composite materials, structures, and devices.
2. Document and report results via patents, monthly reports, topical reports for publication and presentations at project reviews and technical meetings.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

All Subtasks:
1. Monthly Technical Progress Reports. The contents of the monthly reports are evaluated at the end of the 6 month award fee period. The contents of these reports should emphasize the following for technicians:
a) Technical support work performed including research activity, effort level, status, and research engineer.
b) Facility issues such as equipment operation, maintenance, calibration activities, downtime, and facility or equipment needs.
c) General issues related to work, progress, schedules, etc.
Professionals will emphasize:
a) Technical progress, program status, research planning, and related issues, which may impact work.
b) Papers, patents, presentations, and travel completed/planned.
c) Any facility, support, and other issues/needs.

Subtask 01: CMC Development
1.Continue to develop processing techniques for ceramic and ceramic composites

Subtask 02: Ceramic Materials Modeling

1.Continue to develop process models for ceramics and ceramic matrix composites

Subtask 03: Design of Ceramic Materials and Supporting Elements
1. Coordinate and participate in GRC advanced concepts testing and evaluation. (on-going)

Subtask 04: Model Validation and Characterization
1. Continue to perform model validation of ceramic and ceramic composite materials.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	70
Schedule	20
Cost	10

Desired Personnel Skill Sets

This work will be assigned to the Materials Durability Section of the contractor. Progress reviews will be conducted regularly with the cognizant NASA TR. Any revisions to the personnel requirements which may result from these reviews and will be mutually agreed upon by the TR and Contractor supervisor.

Contractor shall provide the necessary professionals to perform the task:

Subtask 01 will involve professionals with appropriate experience in ceramic processing and joining and repair techniques.

Subtask 02 will involve professionals with appropriate experience in process modeling and life modeling. Individuals with design experience, particularly with ceramic materials is desired. The work may require the guidance of professional with a Ph. D. degree in chemistry or materials science. In addition a professional with a B.S. in materials science and ceramic engineering, or an associate degree with significant relevant experience is desired.

Subtask 03 will require individuals with mechanical aptitude and at least 10 years experience or an engineering degree and 2-3 years of experience. A background in working with ceramic material is preferred. Appropriate experience in designing of test hardware is desired.

Subtask 04. The professionals assigned to this task will have the appropriate experience in general materials validation testing, designing of engine testing hardware, and skill in coordinating the efforts of a diverse group of technical staff is desired The individual(s) assigned to this task will have the appropriate experience in general materials testing, designing of test hardware, ceramic processing and working knowledge of Labview data acquisition software. Additionally, the individual will have familiarity with thermogravimetric analysis equipment and techniques.

Limited direct labor support will be required for task management, administrative support, project control analysis, and risk management will be required. These associated costs are also budgeted in the cost model

Government Furnished Property

The government will provide, for the specific work elements listed above, the laboratory equipment, facilities, and supplies necessary to conduct the task. This includes collocated office space and furnishings.

Safety and Assurance Plans

None Selected.

Technical Representative: Lee, Chi-Ming

Task Number: NNC06E149T - 13

Task Title: Combustion Emissions Research

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

This Task was formerly GESS Task 472.
To develop future ultra-low-emission combustion systems demands research efforts on advance concepts of fuel injector design and combustor tests ranging from flame tube to sector at extremely high pressure environment (up to 900 psi). Critical steps include conduct of performance and emissions test with real-time data analysis, and thorough analysis of data after tests. Development of advanced measurement systems is a must for both monitoring the combustor performance and analyzing the combustion emissions

Task Order Description
Description of Services to be procured

The contractor shall define research test plans, coordinate them with customers, conduct NASA GRC combustor rig tests, and analyze performance, acoustic, and emissions data to advance knowledge on new combustor concepts and designs. The contractor shall also conduct field aircraft engine gaseous emissions measurements to anchor the engine performance correlation with ambient conditions that will provide the foundation to improve the understanding of aircraft particulate emissions. In addition, the contractor shall evaluate new methodologies and develop non-intrusive emissions measurement systems and apply these systems to GRC research combustion rigs for combustor performance and emissions research related to advanced propulsion systems for the present and future aeronautic programs. The contractor shall be responsible for coordinating in-house, NASA customer research efforts.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

1. Due to the severity of the operating conditions, ongoing (real-time?) analysis is required to provide data fidelity and ensure safety of the research hardware. Determines necessary design modifications for improving the performance or durability of research hardware.

2. Analyze data, extracts design principles, compares experimental results with theoretical analysis, develops new theories.

2a. Resolve existing combustor EI NOx correlations and expand to include other emissions correlations e.g. EI HC, EI CO, etc.

3. Setup, test and calibrate laser and detector system to measure soot in a flame burner using lasers, PMTs and CCD cameras, configure and install optical train, setup and install data collection system.

4. Conduct tests for different combustors for advanced engine research programs. Determine the test matrix for all operating conditions.

5. Analyze the test system to ensure the data fidelity and safety of the research hardware for each test run, and analyze and process the performance and emission data of each combustor test.

6. Configure, and install optical train, setup and install data collection system for soot measurements and demonstrate satisfactory operation for the system.

7. Perform combustion exhaust emissions research. Conduct gaseous emissions tests with different measurement methodologies including procedures defined by SAE ARP and regulated by ICAO and FAA, and alternative approach proposed to SAE E-31 for consideration of future ARP

8. Develop a transportable conventional gaseous emissions system to measure regulated gaseous emissions for test rig and field measurements

9. Develop a transportable multi-gas measurement system (based on FTIR) to measure regulated gaseous emissions and multiple hydrocarbon species for test rig and field measurements

10. Plan and conduct experiments relating to in-house and customer combustor code validation efforts. Coordinate activities with in-house and customer researchers.

11. Write reports and travel in accord with requirements for participation in field measurements, coordination and data comparison meetings/workshops, and presentations of papers in technical conferences, attendance at technical and/or technology transfer meetings, presentations of research papers, and in acquiring training or course work useful for enhancing capabilities in performing the task.

Travel as required for training, contacting with engine companies' engineers and meetings.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

1. Monthly progress reports which shall include:
A. Technical developments, progress and analysis, and evaluation of all task specific projects.
B. Technical achievements or issues.
2. Computer hardware and software, and miscellaneous equipment and optics as required for experimental data acquisition and analysis.

A Task review will be conducted bi-annually for the purpose of evaluating task performance according to predetermined measurables. Revisions, if required, to the above performance based deliverables will be tracked via monthly reports and modifications will be jointly agreed upon by the Task Manager and the TR as they relate to the performance rating of this task.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including and mitigation activities.

Criteria to Be Used for Evaluation	Weights
Performance	5
Schedule	90
Cost	5

Desired Personnel Skill Sets

The contractor shall provide the necessary personnel with a Ph.D. in Aerospace Engineering with a minimum of 20 years experience in experimental combustion research.

Limited administrative and supervisory support is required for this task.

Government Furnished Property

None

Safety and Assurance Plans

None Selected.

Technical Representative: Crandall, Karen

Task Number: NNC06E150T - 15

Task Title: Programmatic Conference Support & Technical Writing

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

This Task was formerly GESS Task 473.
This work was spun out of GESS Task 025 in June 2005 in order to better identify and track conference related expenditures.
This task is being used to provide conference/logistic support to a variety of NASA programs/offices including the Aeronautics Programs, the Research and Technology Directorate following NASA published guidelines and to provide technical writing for Center publications, award submittals, outreach materials and other technical submittal packages as required.

Task Order Description
Description of Services to be procured

Conference/Workshop Logistics Coordinator
-- Provide overall logistics coordination
-- Provide detailed financial requirements for each conference/workshop/meeting
-- Coordinate contract negotiations with hotel or other site locations
-- Work with technical and organizational leads to determine event scope/strategy
-- Coordinate required logistic support
-- Procure conference/workshop materials for example: awards, signs, pamphlets, and incidental office supplies used in support of the task (cds/dvds, badges, colored toner cartridges, special paper if required, etc.)
-- To support meetings and conferences held locally, limited purchases of audio visual equipment may be required to save the government money over the life of the task as daily rental costs are prohibitively high

-- Provide initial estimate and final report for each conference/workshop
-- Include a lessons learned section in the final report for each large event, over 100 attendees
-- Compile an annual lessons learned document to cover all other events supported
-- Provide real-time troubleshooting and event facilitation

Workshop and Conference Support/Staffer
-- Develop and maintain credit card payment capability
-- Maintain interface capability with existing GRC conference web registration site
-- Provide day-of-event registration support for credit cards
-- Suggest improvements to overall system as technological, event type, and organizational changes occur

Technical Writer
-- Generate organizations' final input to NASA HQ's Annual Reports and Center's Strategic Implementation Plans, R&T Annual Reports, and other technical publications
-- Serve as supported organizations' focal point for award packages, nominations, etc.
-- Facilitate award presentations
-- Serve as a coordinator and facilitator for Center-wide TGIR Award nominations, selection and submittal of final award packages to NASA HQ
-- Provide web content and consultation for organizations' websites

Outreach Liaison
-- Produce and distribute promotional material for organizations supported
-- Facilitate team participation/presence in external and internal events
-- Facilitate appropriate and timely responses to internal customer and external partner requests

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

The contractor shall:

Provide technical writing, events coordination and corresponding logistic support.

The government will provide the requirements for the tasks, parameters/guidelines to bound the work and the technical interaction with the appropriate project people to obtain the required project information to complete the tasks.

The contractor shall provide the expertise to accomplish the tasks within the budget specified and the timeframe required.

Travel and training will be required to support these tasks.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

The Milestones and Deliverables are as follows:

1. Coordination of the logistics for Aeronautics Program meetings and other required workshops and conferences.

2. Documentation of final expenditures for conferences/workshops/meetings, including, for large events over 100 attendees, a section on lessons learned.

3. Compilation of an annual lessons learned document to cover all other events supported.

4. Coordination of external award nomination packages for supported organizations.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**

Performance	70
Schedule	10
Cost	20

Desired Personnel Skill Sets

Being able to support a variety of NASA Programs/Projects and Mission Directorates, across and within the Centers.

Government Furnished Property

None

Safety and Assurance Plans

None Selected.

Technical Representative: Steele, Gynelle

Task Number: NNC06E154T - 12

Task Title: SBIR Program Support

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

This Task was formerly GESS Task 486.
The Small Business Innovation Research (SBIR) and Small Business Technology Transfer Programs (STTR) both seek to encourage private sector commercialization of innovations and, whenever possible, support and encourage minority and disadvantaged businesses. Each of the eleven government agencies administers its own individual SBIR/STTR programs while adhering to the guidelines established by the U.S. Small Business Administration.
The SBIR Program is administered through an annual solicitation for proposals. Funding is provided by allocating 2.5% of each agency's extramural research and development budget for SBIR.
The STTR Program is similar in structure to the SBIR Program. The STTR Program, authorized until 2009, receives at least 0.3% of the agency's extramural research and development budget. However, it is up to the small business and its partnering research institution to decide how any intellectual property will be shared between them.
Both SBIR and STTR Programs are valuable at the NASA Glenn Research Center and for small businesses. For NASA Glenn Research Center, they provide innovations to enhance and complement research and technology in critical mission areas. For businesses, they provide a low-risk way to develop and commercialize innovations.

Task Order Description
Description of Services to be procured

Administrative support for the SBIR/STTR program to include drafting of the annual project schedule for approval by GRC; assistance in coordination of proposals reviews, technical analyses of proposals, preparation of documentation of each critical process step, and development of required reports and presentations supporting the function of technology integration manager for GRC.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

The contractor is responsible for providing administrative and technical support for execution of the SBIR/STTR program beginning with delivery of a draft work plan with critical milestones and timelines consistent with the established program schedule with particular emphasis on the technology integration management responsibilities set forth by the Level 2 SBIR Program Management Office.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

Deliverables:
1. Prepare draft action plan with critical milestones, funding forecast and timelines for executions of SBIR and STTR projects (three phases) at GRC.
2. Review topics/subtopics submitted for completeness, accuracy, and relevancy.

3. Provide support for establishment of proposal reviews (includes coordination of schedule, location, notice to participants, dissemination of proposal with assignments, drafting agendas for meetings, and summary of outcomes)
4. Provide administrative support for GRC report to be presented at NASA HQ meetings
5. Attend monthly telecoms and ViTS re: SBIR/STTR program
6. Provide weekly updates for Code XT staff meetings
7. Provide monthly narrative reports on SBIR/STTR project progress and infusion successes
8. Assist in facilitating and identify opportunities for infusing SBIR technologies into GRC programs and projects.
As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	55
Schedule	35
Cost	10

Desired Personnel Skill Sets

Candidate must have the ability to Reviews manuals, technical guides, and other documents and to develop operational plans to achieve objectives with-in prescribed guidelines. Coordinates and directs the development of reports, correspondence, and other documents to communicate SBIR related service policies and procedures. Candidate has demonstrated competency in preparation of draft reports and other presentations on program planning and project implementation. This task requires skill in coordination across organizational units in the formative stages of program initiation and project implementation to ensure effective communication of processes and objectives. The ability to adjusts priorities to meet new requirements or unforeseen situations is a critical asset.

Government Furnished Property

None

Safety and Assurance Plans

None Selected.

Technical Representative: Bilardo, Vincent

Task Number: NNC06E155T - 11

Task Title: CLV- Project Management Scheduling Support

Task Details

Period of Performance
2/18/2009 - 8/31/2011

Background
Why the project is being pursued

No-Bid by D received on 01/21/2009, kcm

Entered as WISE Task 20081208 on 12/16/2008, kcm

This Task was formerly GESS Task 487.
No Bid form and email received on 12/6/2005, WISE Task No. 20051118 ljm
WISE TASK #20051118 11/26/2005 mbb

The Launch Systems Project Office (LSPO) is responsible providing deliverables for CLV Upper Stage, J-2 Engine Testing at B2, ARES I-1 Technical Tasks with MSFC. Assigned CLV Upper Stage Technical Tasks include work in Avionics, Vehicle Integration, Thrust Vector Control, and Structures and Thermal. The CLV Program (MSFC is the responsible NASA Center for the CLV Program) supports the Exploration Systems Mission Directorate.

Task Order Description
Description of Services to be procured

Support for project level scheduling that includes roll-up of CLV Upper Stage, J-2X Testing and ARES-1-I schedules from project related, technical task oriented projects. Also provide support for project level scheduling for GRC Upper Stage test efforts, the Integrated P&HG project and the integrated GRC S&MA effort. The task involves top level schedule and resource loaded planning and development which coordinates milestones and objectives through communication and interaction with Project Management and technical leads. The task will involve deriving on overall scheduling plan, regular communication and technical interchanges with Project managers, technical leads, and development/maintenance of schedules within this system to accurately track project progress. Technical writing and editing for P&HG in addition to content development and publication on the “This Month in Space Exploration” website, is also included.

Support for LSPO which includes budget resources tracking, including Purchase Request tracking, labor reports and tracking, and full cost analysis and tracking.

Support the CLV ARES-1-I element in the areas of Integration and Systems Engineering.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

Government's estimated period of performance is April 1, 2009 to August 30, 2011.

The LSPO requires the support of experienced schedulers and budget analyst(s) with the ability to develop and organize activity based (WBS product oriented) on the CLV technical tasks GRC has with the MSFC. Expert proficiency in the following software applications is required: Power Point, Excel, Microsoft Project, Access, and Word. The task will also require an integrated project schedule to track major activities, milestones, and resources for LSPO management and CLV Upper Stage, J-2X Engine Testing and ARES-1-I Project Management.

The work will require the development of all programs/project schedules and the tracking and identification of scheduling issues that cross project boundaries and will require reporting of feedback on individual critical path scheduling items. For this task all schedule inputs and changes, provided by CLV Project technical task managers, are to be reviewed by the analyst for consistency and viability and reported on to LSPO management.

Task requires proficient schedule analyst capabilities at a high level. This requirement should involve personnel with proficient oral and written communication skills for project activity coordination.

The LSPO requires support for CLV of budget resource tracking analysis. Proficiency and knowledge of the NASA IEMP system is required, along with knowledge and efficiency in Microsoft PowerPoint, Word & Excel.

The CLV J-2X Engine Testing at B2 element requires support for Systems Engineering. The Systems Engineer support shall consist of (but not limited to) assisting in the development of Integrated, resource loaded, project schedule.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

The milestones and deliverables for this period shall include:

Detailed integrated, resource loaded schedules for the CLV technical tasks.

Monthly updates of above for individual technical task managers and the CLV Project Office.

Track and report on an integrated set of milestones/deliverables.

Analyze individual technical task schedules for GRC resource conflicts.

Attend related project planning meetings.

Provide scheduling reports as required.

Provide weekly and/or monthly financial status and reports, graphs, and analysis.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**

Performance	30
Schedule	40
Cost	30

Desired Personnel Skill Sets

Experienced Scheduler(s), Financial/Budget Analyst(s)

Government Furnished Property

Any unique property resources required for this task deliverables will be provided by NASA.

Safety and Assurance Plans

None Selected.

Technical Representative: Kaustinen, Brad

Task Number: NNC06E158T - 10

Task Title: NCAS Contract Managment System

Task Details

Period of Performance
2/3/2009 - 8/31/2011

Background
Why the project is being pursued

No-Bid by D received on 08/15/2008, kcm

Entered as WISE Task 20080830 on 08/11/2008, kcm

THIS TASK IS NON-ENGINEERING/NON-RESEARCH WORK. REVIEW IS NOT REQUIRED. T.BURKE 1/17/07

This Task was formerly GESS Task 494.

Task Order Description
Description of Services to be procured

The NCAS Contract Management System is used by Center Technical Liasons across the Agency to enter and modify task orders for Safety and Quality related engineering support to their Centers and/or Programs. This task will provide the on-going operation and maintenance of the Contract Management System (CMS) and it's Funding Application (FA) including the configuration management of the CMS and FA.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

******Government's Estimated Period of Performance: April 1, 2009 to August 31, 2011. Completion of GESS-2 Contract. Base plus 3 Options ******

The contractor shall manage the following Software Plans: the Software Management Plan, Configuration Management Plan, and IT Security Plan for the CMS.Customer service will be provided to customers accessing this CMS. Maintain the online manuals for users so that self help can be obtained on the site. Maintain the report requirements as defined by the NCAS customer base. The Contractor shall provide any necessary programming changes to accommodate the NCAS team customer requirements. Provide "help desk" services for Government and Contractor customers.
The contractor shall maintain the FA as required by the NCAS CO and COTR. Customer service and documentation will be provided to customers accessing this system.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

Support the NCAS COTR's request for ad hoc reports required to prepare for the Award Fee meeting in June.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Provide troubleshooting and estimates for any modifications identified/requested during this award fee period.

Criteria to Be Used for Evaluation	Weights
Performance	25
Schedule	50
Cost	25

Desired Personnel Skill Sets

N/A

Government Furnished Property

Amicus server for production, amicus1 and grgessdev servers for testing

Safety and Assurance Plans

None Selected.

Technical Representative: Pachlhofer, Peter

Task Number: NNC06E162T - 13

Task Title: Single Spool Turbine Facility

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

This Task was formerly GESS Task 500.

In 1999, an effort began for design and construction of a Dual Spool Turbine Facility (DSTF) in the W-2 Test Cell in ERB. This effort, part of the Ultra Efficient Engine Technology (UEET) program, was to develop and demonstrate technologies required for lightweight, reduced-stage turbine cores, high pressure (HP) and low pressure (LP) turbine systems, and high-performance, high-efficiency and environmentally compatible propulsion systems. A Preliminary Engineering Report was completed by General Physics/Belcan and used as a basis to begin the actual facility design. The Facility Design was completed by Aero Systems Engineering.

In late 2003, program changes within the Vehicle Systems Sector of which UEET is a part, and the increased construction costs on the DSTF necessitated the cancellation of the that program. However, further review of the research objectives with NASA and industry partners revealed that a Single Spool Turbine Facility (SSTF) could achieve 50-80% of the original objectives. A plan was developed to reactivate the mothballed W-6A Warm Core Turbine Facility for this purpose. The Glenn Research Center (GRC) Director's Strategic Management Team (DSMT) approved this plan in March 2004.

The original SOW required that the Facility be operational for research in April 2007. However, due to budget constraints, the engineering and design for this Single Spool Turbine Facility was been put on hold January 2005.

Funding for the SSTF effort was restored in February 2006, and it is anticipated that after restart (March 2006), the Design effort will take approximately 18 months, followed by a 1-year construction effort, and then a facility checkout using a a bladeless rotor of comparable size and mass to the actual test article.

Task Order Description
Description of Services to be procured

Provide Engineering and Design services to complete the design of the installation of the Single Spool Turbine Facility into Cell W-6 of the Engine Research Building. This work will be comprised of all aspects except for the Electrical Engineering and Controls aspect of the work.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor

and specific tasks to be performed

Statement of Work

For the Single Spool Turbine Facility W-6A, Bldg 23

Prepared by Peter Pachlhofer
Research Test Division
July 2004

1. Introduction

In 1999, an effort began for design and construction of a Dual Spool Turbine Facility (DSTF) in the W-2 Test Cell in ERB. This effort, part of the Ultra Efficient Engine Technology (UEET) program, was to develop and demonstrate technologies required for lightweight, reduced-stage turbine cores, high pressure (HP) and low pressure (LP) turbine systems, and high-performance, high-efficiency and environmentally compatible propulsion systems. A Preliminary Engineering Report was completed by General Physics/Belcan and used as a basis to begin the actual facility design. The Facility Design was completed by Aero Systems Engineering.

In late 2003, program changes within the Vehicle Systems Sector of which UEET is a part, and the increased construction costs on the DSTF necessitated the cancellation of the that program. However, further review of the research objectives with NASA and industry partners revealed that a Single Spool Turbine Facility (SSTF) could achieve 50-80% of the original objectives. A plan was developed to reactivate the mothballed W-6A Warm Core Turbine Facility for this purpose. The Glenn Research Center (GRC) Director's Strategic Management Team (DSMT) approved this plan in March 2004.

A Requirements Document for the SSTF, in Appendix A, has been developed and is the basis for the following Statement of Work. The Statement of Work is for the Engineering, Design, Drafting and Specifications necessary to begin construction of the SSTF. It is anticipated that portions of the DSTF design can be used in the SSTF, in particular the Power Absorption System and its related subsystems.

The original SOW required that the Facility be operational for research in April 2007. However, due to budget constraints, the engineering and design for this Single Spool Turbine Facility was put on hold January 2005.

Funding for the SSTF effort was restored in February 2006, and it is anticipated that after restart (March 2006), the Design effort will take approximately 18 months, followed by a 1-year construction effort, and then a facility checkout using a bladeless rotor of comparable size and mass to the actual test article.

2. SCOPE OF REQUIRED SERVICES

2.1. Required Disciplines

The disciplines required for the final design services include architectural, civil/structural, mechanical, aeronautical, and electrical engineering. Specialized technical services that will be required include thermal, structural, and rotor dynamic and vibration computational analysis. Extensive knowledge of rotating equipment design, gearing and bearing design, and large motor/generator design and integration is also required.

2.2. Basis for Final Design

This Statement of Work (SOW), the SSTF Requirements Document, the Dual Spool

Turbine Facility Design, and field investigation shall be used as the basis for the final design.

2.3. Units of Measure

The final design shall utilize the English Standard measurement system.

2.4. Summary of Deliverables

Furnished services shall result in detailed final design drawings, assembly drawings, specifications for equipment purchases, specifications for component fabrication, construction and assembly procedures, procurement and fabrication of hardware.

2.5. Required Services

Services required under this contract shall include the following:

2.5.1. Review of existing DSTF and W-6 drawings and systems along with detailed field visits and investigations as necessary to become familiar with and to verify and record the existing conditions. Update drawings of existing fluid and electrical systems as needed. These field investigations will allow the Contractor to prepare new drawings and to determine the interfaces with the existing systems and potential interferences with the work being designed. The Contractor shall prepare drawings detailing the interfaces between the SSTF and existing systems.

2.5.2. The Glenn Facilities Division will retain overall responsibility for engineering related to the High Voltage Electrical and the Glenn Variable Frequency System. The Research Test Division will retain overall responsibility for engineering related to the Facility controls. The contractor will work with the Research Test Division to specify and integrate facility instrumentation. Design and drafting service are needed to support the High Voltage Electrical and Facility controls.

2.5.3. Design development calculations.

2.5.4. Detailed analyses for validation of the proposed design. These analyses shall include:

2.5.4.1. Piping flexibility analysis: Inlet Temperature range: 70-1000ºF
Exhaust Temperature range: 20-350ºF
2.5.4.2. Rotordynamics analysis.
2.5.4.3. Driveline system Factor of Safety analysis.

2.5.5. Preparation of detailed final design drawings, diagrams, sub and total assembly drawings, and technical specifications to meet requirements set forth herein. As applicable, these shall include architectural, structural, mechanical, and electrical plans, sections, and details, piping & instrumentation diagrams (P&ID), power one-line diagrams, etc.

2.5.5.1. Where applicable, existing drawings shall be updated with the most current information on that system.

2.5.6. Design validation coordination and reviews with the NASA project team and material vendors and fabricators during the design phase.

2.5.7. Coordination between disciplines for well-integrated construction drawings and specifications.

2.5.8. Development of and modifications to facility assembly procedures.

2.5.9. Updating of the existing W-6A Warm Core Turbine Hazard Analysis.

2.5.10. Assistance in the preparation of construction specifications.

2.5.11. Input into modifications to the Facility Operating Procedures.
2.5.12. Procurement and fabrication of hardware.
2.5.13. Support during construction on RFIs.
2.5.14. Support for Safety Reviews (Process Systems, Area 2).
2.5.15. Support for the Integrated Systems Review.
2.5.16. Support during the Facility Checkout Tests
2.5.17. Complete As-built drawings.

3. PROGRAMMATIC REQUIREMENTS

3.1. Required Meetings and Conferences

The following are the project requirements for meetings and conferences:

3.1.1. Design meetings between the Contractor and NASA shall be held two times per month for the duration of the Task. The purpose of these meetings will be to address current issues or concerns and to compare the current design status against scheduled milestones. The Contractor may request the cancellation of a meeting if there are no current issues. The Contractor shall generate formal meeting minutes for each meeting and e-mail them to the NASA Technical Representative
3.1.2 Other meetings and telephone communications between the Contractor and the NASA Project Team may take place if required to assure complete communications and agreement of ideas to achieve the final objective.

4. TECHNICAL REQUIREMENTS

The SSTF Requirements Document is the basis of the Technical Requirements and is attached in Appendix A.

In particular, it is anticipated that portions of the Specifications and drawings from the DSTF High Voltage System, Motor, Gearbox, and their related lubrication systems shall be used as the basis for the SSTF design with minor modifications.

5. DELIVERABLES
5.1. Hand Calculations and Description of Design Approach

The Contractor shall provide a bound and organized set of all calculations (i.e. rough pipe or equipment sizing, flow analyses including losses and valve Cv calculations, containment calculations, structural calculations, etc.) along with a description of the design approach. This shall also include the Driveline system Factor of Safety analysis. The driveline, including all flexible couplings, torquemeter, shafts, and gearbox, must be designed with a Factor of Safety that is adequate to ensure that the synchronous machine remains mechanically connected to the turbine shaft in order to avoid catastrophic turbine overspeed. The use of redundant couplings will be required in the design. The calculations shall be organized according to the various subsystems.

5.2. Analysis Reports

The Contractor shall provide a brief report for all computer analyses required for the final design.

The report for each analysis shall clearly describe the formats for all input and output files such that they are easily understandable by persons not familiar with the specific software packages or the intricacies of the analysis. In addition, input and output file data shall be organized in easily understandable tables.

As a minimum, the Contractor shall provide reports for the following analyses;

5.2.1. Piping Flexibility Analysis Report
5.2.1.1. The report shall include a brief introduction (1-2 paragraphs) describing the piping system that was analyzed, the analysis conditions (pressure, flow, fluid temperature, external conditions, etc.), the types of analyses performed (i.e. pressure, pressure + weight, pressure + weight + temperature, etc.), and the piping allowables used for compliance (in accordance with ANSI B31.3).
5.2.1.2. The input file and an isometric diagram of the piping system being analyzed shall be included in the report. Software-generated isometric diagrams are acceptable if they can be easily understood by persons not familiar with the software package.
5.2.1.3. The report shall include a brief (1-2 paragraph) conclusion that indicates the modifications required to the piping system to attain ANSI B31.3 code compliance (i.e. anchor and guide locations, the addition of expansion joints, support locations changes, etc.). The report shall also indicate areas of high stress and a summary of forces and moments on equipment flanges (Inlet and Exhaust Manifold flanges, etc.). The output shall indicate maximum loads at the tie-in points to all GRC Central Systems.
5.2.1.4. The output file and an isometric diagram of the piping system, including supports, anchors, and expansion joints, shall be included in the report. Software-generated isometric diagrams are acceptable if they can be easily understood by persons not familiar with the software package.
5.2.1.5. The report shall include an appendix that contains the computer-generated run data.
5.2.2. Rotordynamics Report
5.2.2.1. The Contractor shall perform a critical speed analysis on all custom-designed shafts. For these designs the bent shaft frequency for all custom-designed shafts shall not be lower than 125% of the maximum operating rotational speed, calculated with rigid bearings: since these are rolling element bearings and do not have squeeze-film dampeners. The critical speed analysis for each shaft shall be performed assuming the most robust turbine requirements projected for the facility. Rigid shaft frequencies shall allow a 15% speed margin with any steady state operating speed.
5.2.2.2. A separate critical speed analysis shall be performed for each IST and research test article currently available.
5.2.2.3. A torsional analysis shall include the complete drive train shafting and shall be performed for each IST and research test article.
5.2.2.4. Analyze the effect of gearbox shafting sets on the torsional frequency.
5.2.2.5. Review all test articles for mechanical integrity, including rotor burst analysis, single blade out containment and over-speed analysis.
5.2.2.6. The analysis report shall include a brief description of the shaft system (including the size and weight of the shaft, the bearing locations, the couplings used, etc.). In addition, the report shall include all assumptions used for the analysis including material properties, bearing limits, bearing spring rates, turbine size and weight, and the bearing overhung distance.
5.2.2.7. The analysis report shall include a brief description of the methodology used to determine the shaft critical speeds including a discussion of the assumed inertial properties of the turbine test article and the boundary conditions applied to the shaft(s).
5.2.2.8. The report shall include an output file showing the mode shapes, lateral and torsional frequencies, critical speed maps, and unbalance response plots resulting from the critical speed analysis.
5.2.2.9. The report shall include an appendix that contains the computer-generated run data.
5.2.3. Facility Hazards Report

The Contractor shall update the existing hazards analysis for the new facility. The analysis shall be performed in accordance with the guidelines given in the “Safety Permit Requestors Guide” and the ISO9000 document GRC-P7030.010 “Hazard Analysis Development”.

5.2.4. Pressure Systems Office (PSO) Report

The Contractor shall provide all necessary documentation and support to comply with engineering requirements and all Glenn PSO requirements for process systems recertification.

Support shall include (but not limited to) any necessary inspections, design, analysis, FEA, hydrotests, hardware fabrication and procurement.

Targeted areas for recertification include:

W6B: (Design a new 12" carbon steel exhaust line for the 15x15 Supersonic Wind Tunnel to replace the existing line left over from the Hot Cascade Rig. The new line should tap into the exhaust system just upstream of valve EL357 instead of the existing entry at the spray cooler. The design should include new valves to replace the 3 existing valves AC040, AC041, and AC042. No relief valves are currently required, however, blanked off flange provisions should be included if they are needed in the future.)

5.3. Drawings

5.3.1. General Drawing Format Requirements

5.3.1.1. All drawings shall be made using the latest GRC available AutoCAD Release and conform to the existing GRC Drafting Standard for Facilities Drawings.

5.3.1.2. The Contractor shall provide a cover sheet for the project (to be given the first drawing number in the overall drawing set). The cover sheet shall indicate the project title and fiscal year, the project location (shown on a scaled plot plan with the work area circled), and a listing of drawings included in the project. The drawings following the cover sheet shall be organized according to work discipline in the following order: Architectural, Structural, Mechanical, and Electrical. For each discipline, demolition work shall be shown first, followed by drawings depicting “new” work.

5.3.1.3. All units of measurement shown on drawings shall be in English Standard units.

5.3.1.4. All drawings shall be cross-referenced between disciplines and to the cover sheet.

5.3.1.5. Demolition and new construction shall not be shown on the same drawing unless approved by the TR. Disciplines shall not be mixed on a drawing unless approved by the TR.

5.3.1.6. All original drawings shall become the property of the Government and shall be delivered to the TR upon completion of work by the Contractor.

5.3.1.7. Where applicable, existing drawings shall be updated with the most current information on that system.

5.3.2. Architectural/Civil/Structural Drawing Requirements

The following is a minimum list of architectural/civil/structural drawings required for this project:

5.3.2.1. Plans and sections of Cell W-6 showing the entire cell and complete SSTF layout and the background arrangement of all Primary Air, Exhaust, and Cooling Air piping. Drawing notes shall include all structural design load values.

5.3.2.2. Plans, sections, and details for all equipment foundations and equipment support structures, both inside and outside Cell W-6, in the Basement, or on the roof.

5.3.2.3. Plans, sections, and details for all specially designed supports and anchors for piping and equipment. Details shall include all attachment requirements to existing structures.

5.3.2.4. Sections and details for architectural changes including masonry wall modifications (if required), building penetrations to accommodate major piping components, and roof penetrations for ducting.

5.3.2.5. Plans, sections, and details for equipment rigging options (including installation

of structural steel below existing floor slabs if required).
5.3.2.6. Painting/finish schedules and details shall be shown on the drawings as required.

5.3.3. Mechanical Drawing Requirements
5.3.3.1. All mechanical piping drawing notes shall indicate the piping design criteria, the piping materials, and the pressure testing requirements for all piping systems shown on the drawing.
5.3.3.2. Where possible, mechanical Piping and Instrumentation Drawings (P&IDs) shall show fluid flow from left to right. P&IDs shall be formatted accordingly to match the existing test cell drawings. Settings for alarms, shutdown settings, and PLC I/O channel assignments shall be shown on all system P&IDs.
5.3.3.3. Detailed component sheets (CP Sheets) shall accompany each P&ID drawing. CP sheets shall be 8-1/2 x 11 tables that provide information on each component identified on the P&ID.
5.3.3.4. The following is a list of new or updates to existing mechanical drawings required for the project:
5.3.3.4.1. P&IDs for all process systems including the Combustion Air Subsystem (Primary Air, Cooling Air Circuits, etc.), Exhaust Subsystem, cooling water systems, lube oil systems (for gearbox, synchronous machine), hydraulic system for valve actuation, and Natural Gas System for the Primary Air Heater.
5.3.3.4.2. Piping plans, sections, and details. The drawing notes shall include information on the maximum allowable working pressure, the fluid operating temperature, the fluid flow rate range, and all information necessary to perform a hydrostatic pressure test of the piping system.
5.3.3.4.3. Assembly and detail drawings for all non-commercial hardware. Assembly and detail drawings shall include information such as construction/fabrication specifications, material selections, minimum fastener requirements and torque requirements, surface finishes, testing requirements, and all commercial hardware used for the fabrication.
5.3.3.4.4. Assembly and detail drawings (as required) for all commercial systems used such as motors, gearboxes, and lubrications systems. These drawings may be vendor drawings if they contain the necessary assembly/installation information.
5.3.3.4.5. Drawings for assembly and installation of all commercial and non-commercial hardware. These drawings shall include alignment procedures for installations performed at room temperature, including any offsets to maintain centerline control at steady state operating conditions.
5.3.3.4.6. Drawings for rotating IST checkout and research test articles requires procedures for assembly and instrumentation routing.

5.3.4. Electrical Drawing Requirements
The following is a minimum list of electrical drawings required for the project:

5.3.4.1. Plan - Control Drawings.
5.3.4.2. Plan - Instrumentation Drawing.
5.3.4.3. Plan - Power Conduit Routing.
5.3.4.4. Control flow chart.
5.3.4.5. Valve actuator/positioner controls elementary and control diagrams.

5.3.4.6. Valve installation and connection diagrams.
5.3.4.7. Instrumentation elementary and interconnection diagrams.
5.3.4.8. PLC I/O drop cabinet and layout drawings. Digital and Analog wiring shall be separated.
5.3.4.9. 7200 Volt Switchgear installation detail.
5.3.4.10. 7200 Volt Switchgear cabling and interconnection diagrams.
5.3.4.11. Facility one-line diagram.
5.3.4.12. Terminal strip cabinet connection diagrams.
5.3.4.13. Excitation system installation detail.

5.3.4.14. Protective relay installation and connection diagrams.
5.3.4.15. Lube oil pump installation for each system.
5.3.4.16. Lube control elementary and interconnect for each system.
5.3.4.17. Ventilation system power.
5.3.4.18. Ventilation control, interlocks and interconnection.
5.3.4.19. Safety Shutdown, Emergency Stop and Alarm hardwire control diagrams.
5.4. CONSTRUCTION SPECIFICATIONS
5.4.1. General Construction Specification Information
5.4.1.1. The Contractor shall assist in the preparation of construction specifications.

Appendix

Single Spool Turbine Facility

Requirements Document

Deliverables and Milestones to be met

Examples include: reports, analysis, and audits

As stated in SOW, including:
Rotating checkout hardware (for balancing purposes) - December 2009
Flow test checkout hardware – July 2010
Monthly Progress Reports

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	Weights
Performance	30
Schedule	40
Cost	30

Desired Personnel Skill Sets

The disciplines required for the final design services include architectural, civil/structural, mechanical, aeronautical, and electrical engineering. Specialized technical services that will be required include thermal, structural, and rotor dynamic and vibration computational analysis. Extensive knowledge of rotating equipment design, gearing and bearing design, and large motor/generator design and integration is also required.

Government Furnished Property

Drawing Files/reports from the Dual Spool Turbine Facility and W-6 Test Facility.
Pro-Engineer
AutoCad
Caesar
Dyrobes - Critical Speed Analysis Program

Safety and Assurance Plans

None Selected.

Technical Representative: Krivanek, Thomas

Task Number: NNC06E165T - 14

Task Title: Independent Validation and Verification of CLV Structural and Sizing Analysis

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

This Task was formerly GESS Task 503.

This task is in support of the Exploration Systems Mission Directorate, Constellation Project CLV IV&V to assure all vehicle requirements are met and the design fulfills all mission objectives.

Task Order Description
Description of Services to be procured

This task is to perform the engineering analysis for the structural sizing and optimization of the Ares V EDS and Payload Shroud for a Constellation Exploration mission.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

The contractor shall perform an integrated vehicle analysis with primary focus on the structural systems including an independent analysis of all load conditions for the optimized trajectory specified for a Lunar Exploration mission. Vehicle loading will be provided based on a trajectory analysis optimized by the OTIS program and will account for the aero, acceleration, acoustic, ground wind, vibration, thermal, maximum Q-alpha, POGO, abort, and recovery loading. The SIZER program shall be used to verify initial sizing and perform trade studies to optimize the vehicle configuration including structural and tank properties with select verification of systems. Concept of operations has been identified as a mission to transport a crew to a staging orbit for an Exploration mission. Events shall include ground operations, vehicle launch, staging, rendezvous and docking.

Systems to be included are the first stage, EDS, Payload and all interface hardware and support systems including the main propulsion, RCS, fluid acquisition and delivery system, thermal control system, GN&C and safing systems, and power and avionics. Facilities required for support of the above systems shall also be considered. Vehicle sizing analysis shall be presented at each DAC and as applicable at the SRR and TIM's as required. This design and analysis shall be conducted to meet the mission requirements inclusive of trades in tank design, tank material, power requirements, interstage support structures and propulsive requirements.
The contractor shall also provide design support of Ares V payload shroud structure and subsystems including modeling and composite concept analysis.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

The schedule for all TM documentation activities to be completed is 12/30/10.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	Weights
Performance	40
Schedule	30
Cost	30

Desired Personnel Skill Sets

Engineering personnel qualified in the use of the SIZER program and in advanced structural design and modeling is required.

Government Furnished Property

None

Safety and Assurance Plans

None Selected.

Technical Representative: Wernet, Mark

Task Number: NNC06E167T - 19

Task Title: Planar Optical Diagnostics for Flow Field Measurements

Task Details

Period of Performance
2/6/2009 - 8/31/2011

Background
Why the project is being pursued

Addition of procurement item. No new engineering or research effort. Excluded from review. T. Burke 4/4/07

No-Bid by DE received on 09/19/2006, ljm

No-Bid by RPC received on 09/18/2006, ldk

No-Bid by DR received on 09/14/2006, ljm

Entered as WISE Task 20060913 on 09/13/2006, ldk

The NASA Glenn Research conducts research in advanced propulsion systems to develop revolutionary new propulsion concepts and also to improve the efficiency and performance of more traditional propulsion systems under the Aeronautics Research Mission Directorate. In addition, NASA Glenn supports testing of entry vehicles for inter-planetary science missions under the Science Mission Directorate. Nonintrusive measurements of flow field velocities within and around these advanced propulsion systems and/or re-entry vehicles are required in order to gain insight into the fundamental flow physics and also for validation of Computational Fluid Dynamics (CFD) models of the flow field. Nonintrusive techniques are preferable over intrusive probes which may disturb the flow and also may not survive the harsh environments encountered in these advanced propulsion systems. Test facilities supported include aeroacoustic research facilities, turbomachinery facilities, Propulsion Systems Lab and the 8x6, 9x15 and 10x10 research wind tunnels at GRC. Within the genre of nonintrusive velocimetry techniques, planar techniques such as Particle Image Velocimetry (PIV) and Doppler Global Velocimetry (DGV) are more desirable than traditional point based techniques such as Laser Doppler Velocimetry (LDV). PIV and DGV provide instantaneous planar measurements of the flow velocity that can be used to compute first and second order flow statistics for validation of CFD predictions and verification of prototype propulsion system performance.

Task Order Description
Description of Services to be procured

Develop minimally intrusive, laser-based velocity measurement systems for application to turbomachinery, Pulse Detonation Engine systems, and aeroacoustic ground based propulsion research. These optical diagnostics systems may also be applied in subsonic and supersonic wind tunnel facilities. For the aeroacoustics research efforts flow fields of interest shall at a minimum include subsonic to supersonic flows at temperatures up to 1000C. Multi-planar, high repetition rate velocity data are required. Specific development tasks include working with and/or developing fiber optic light delivery and imaging, high temperature flow seeding, molecular flow seeding, data acquisition and processing, high rep-rate laser development, and high frame-rate imaging. Work requires substantial initiative and problem solving abilities; broad objectives will be given but specific implementation methods are to be determined by the contract engineer.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

SOW Summary Should define respective responsibilities of Government and Contractor and specific task to be performed
******Government's Estimated Period of Performance: April 1, 2009 to August 31, 2011. (Completion of GESS-2 Contract. Base plus 3 Options)******

Specific Work Elements:

1. Study the flow measurement requirements of present and future GRC aeronautic and space exploration programs. Provide reports summarizing determinations when appropriate.

2. Develop, evaluate and implement diagnostic methods based on Particle Imaging Velocimetry, Doppler Global Velocimetry, Filtered Rayleigh Scattering and other flow imaging techniques, with emphasis on planar measurement methods for application to both in-house and customer research rigs and components. Provide recommendation for measurement system application.

3. Consult with researchers on new diagnostic techniques and systems, which could be incorporated into nonintrusive instrumentation systems. Stay abreast of current measurement technologies and improvements in laser and detector technology with regard to their application and enhancement of nonintrusive measurement systems development.

4. Develop software required for improved data acquisition, processing and display of research data. Process acquired research data and provide researchers with flow measurement velocity data in physical units. Develop techniques for integration of flow measurement data with CFD predictions.

5. Determine requirements for implementation of complimentary nonintrusive optical diagnostic techniques for measuring velocity and temperature, preferably molecular based techniques.

6. Write reports and present conference papers.

7. Assist in the preparation of research proposals to support continuation of optical diagnostics technology development and application.

8. Travel in accord with requirements for attendance of technical and/or technology transfer meetings, presentation of research papers, and in acquiring training or course work useful for enhancing capabilities in performing the task. Travel may also be required for support of research tests at other NASA Centers or customer facilities.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

Specific Deliverables:

1. Monthly progress reports shall include:
A. Technical developments, progress and analysis, and evaluation of
all task specific projects.
B. Technical achievements or issues.

2. Software/hardware, testing equipment/materials, and optics shall be procurred as needed to meet task requirements.

Performance based on task reviews will be conducted bi-annually for the purpose of evaluating task performance according to predetermined measurables. Revisions, if required, to above performance based deliverables will be tracked via monthly reports and modifications will be jointly agreed upon by the Supervisor and the TR as they relate to the performance rating of this task.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	20
Schedule	50
Cost	30

Desired Personnel Skill Sets

Ph.D in mechanical or electrical engineering or a related discipline and at least 5 years of laser and optical diagnostic research experience in lab scale or preferable large scale facilities. Specific experience with both Particle Imaging Velocimetry and Doppler Global Velocimetry techniques and data processing is highly desirable. Experience with molecular flow tagging and planar laser induced fluorescence (PLIF) and laser diode absorption spectroscopy is beneficial. Familiarity with fiber optics and fiber bundle imaging is also desirable. Experience with surface measurement probes and knowledge of instrumentation electronics is desirable. Programming experience in C, C++ and Fortran are required and proof of competency must be presented. Familiarity with digital image file formats is required. Experience with high energy pulsed laser systems is desirable. Experience with digital image processing techniques is also desirable. The ability to work effectively in multidisciplinary teams and/or independently is required. Good time management skills, oral and written communication skills are required.

Limited administrative support is required to support this task.

Government Furnished Property

None

Safety and Assurance Plans

None Selected.

Technical Representative: Envia, Edmane

Task Number: NNC06E178T - 8

Task Title: Aerodynamic Test Research

Task Details

Period of Performance
2/18/2009 - 8/31/2011

Background
Why the project is being pursued

This Task was formerly GESS Task 518.
No Bid form and email received 06/23/2006, ljm.

Entered as WISE Task 20060613, ldk.

Task to start July 1, 2006

Fan/nacelle models are tested in wind tunnel to determine their acoustic, aerodynamic, and aeroelastic performance. Data obtained from such tests are used to validate fan noise reduction concepts and flow and noise prediction codes. These tests are also sometimes used to demonstrate the feasibility of advanced flow and noise diagnostic techniques when applied to propulsion systems.

Task Order Description
Description of Services to be procured

Serve as the aerodynamic research test engineer in support of aeroacoustic wind tunnel tests of scale model fans and open rotors.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

*** Government's Estimated Period of Performance is April 1, 2009 to August 31, 2011 ***

The contractor shall:

1. Support development of test plans for, and execution of, wind tunnel aeroacoustic tests of fan/nacelle/open rotor models including hardware design, instrumentation selection, data reduction requirements, and data acquisition & analysis.

2. Shall develop comparisons of wind tunnel aerodynamic measurements with previous test results, design intent, and/or analytical computations.

3. Shall document the the results in NASA reports, conference and/or journal papers.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

********** NEW AS OF AFP7 - AUGUST 13, 2009 *********

1. Document aerodynamic results from a recently completed test of advanced fan noise reduction concepts in the ultra high bypass ratio ADP fan.
(12/31/2009)

2. Support development and execution of a wind tunnel test plan for assessing the aeroacoustic performance of open rotors.
(12/31/2009)

3. Support development of wind tunnel test plans for evaluating advanced fan noise reduction concepts including the second generation soft vane and over-the-rotor technologies.
(6/30/2010)

****

(As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.)

Criteria to Be Used for Evaluation	Weights
Performance	50
Schedule	25
Cost	25

Desired Personnel Skill Sets

Personnel Profile

Masters in Mechanical Engineering with extensive knowledge and experience in the following areas are required: fluid dynamics, aerodynamics, wind tunnel testing technology including; advanced instrumentation and diagnostic test techniques such as dynamic and static force balance measurement techniques including data acquisition, reduction and analysis software development; rotating machinery performance measurements techniques for pressure and temperature including data acquisition, reduction and analysis software development; expert knowledge in wind tunnel propulsion related scale model design and fabrication; expert knowledge in propulsion simulation technology and operation; expert knowledge in online, real-time data acquisition and analysis systems and operation including software development; ability to lead large team of test engineers during wind tunnel testing projects, including planning schedules, developing test plans, and conducting testing.

Government Furnished Property

None

Safety and Assurance Plans

None Selected.

Technical Representative: Grantier, Julie

Task Number: NNC06E179T - 12

Task Title: CEV Vehicle Integration Support

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

This Task was formerly GESS Task 519.
Background

Task Order Description
Description of Services to be procured

No updates to the Task Order Description.*

The Vehicle Integration Team requires Systems Engineering with background in spacecraft power, propulsion, structures, flight dynamics, and vehicle operations. This task includes to items:

Orion to Program Requirements Definition
1) Execution of integration activities with the Cx Program required to develop the Orion design and integration requirements for the project (Cx CR activity, major reviews, etc...)
2) Orion IRD Manager - responsible for providing the Orion IRD Book Developers direction to ensure IRDs are on schedule and leveled across the project
3) Orion IRD Book Development - responsible for providing the Orion technical input to the Cx program for generation of the Orion IRDs including traceability to the CARD and Orion SRD

Orion Verification Requirements Convergence/Development
1) Lead the effort to work verification requirements issues between Constellation (CxP), Orion, ISS, and other CxP Projects and Lockheed Martin; Current NASA verification requirements set contained within Orion and Constellation documentation --- such as Orion SRD, CxP Human Systems Interface Requirements Document, Orion-to-Ares I IRD, Orion-to-Altair IRD, Orion-to-Communications and Tracking Network IRD, Orion-to-EVA IRD, Orion-to-Mission Systems IRD, Orion-to-Ground Systems IRD, Orion-to-Portable Equipment, Payloads, and Cargo (PEPC) IRD, Orion-to-ISS IRD, and other applicable CxP/Orion requirements documentation.
2) Lead the effort to work Joint Verification requirements with CxP and Orion/Lockheed Martin for the External IRDs and the CxP Architecture Requirements Document.
3) Review and upgrade, as necessary, the Orion SRD requirements verifications appearing in Section 4 of the SRD document. Perform an analysis of the CARD and the LM Spacecraft Specification verification requirements for traceability to the program level requirements. This will establish consistent relationships between VRs in those documents to VRs in the Orion SRD.

Requirements Baseline Management

1) The objective is to perform the necessary tasks to realize a system and method for tracking and reporting technical differences within the various project requirement baselines. This analysis shows the differences in the NASA requirements baseline and the Orion requirements baseline. It also provides the data to show compliance between the current architecture and the baseline requirements.

Support for Prime Contractor Oversight
1) Interfacing with LM to ensure proper implementation of the Orion requirements and generation of the needed specifications and ICD documentation from the contractor.
2) Verification of the allocation and traceability of the Orion requirements to LM specifications thru participation in the LM system, sub-system and IRD specification development. Working with the contractor, project requirement owners, project T&V and program requirement owners to resolve discrepancies in flowdown of the verification requirements.
3) Participation in the LM/NASA Requirements Interface Working Group to facilitate proper identification, allocation, flow-down and management of the requirements and internal/external interfaces for the Orion spacecraft, modules, sub-systems and components.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

SOW

See task order description above

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

Specific milestones and deliverables include the following.

1. Orion to Program Requirements Definition: October - September DAC4/5 support.
2. Orion Verification Requirements Management: October - September DAC4/5 support.
Orion CDR support - Joint & Other VR discrepancies burn down (Deliverable)
3. Requirements Baseline Management
October - September Orion CDR support - Requirements compliance matrices (Deliverable)
4. Support for Prime Contractor Oversight
October 2009 Firm Negotiations with Prime - SRD VR discrepancies (Deliverable)
Other VR discrepancies burn down (Deliverable)

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	33
Schedule	33
Cost	34

Desired Personnel Skill Sets

Knowledge of NASA systems engineering processes and procedures.

Government Furnished Property

None

Safety and Assurance Plans

None Selected.

Technical Representative: Cressman, Thomas

Task Number: NNC06E180T - 11

Task Title: Service Module Structures

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

GRC has been given responsibility for the Crew Exploration Vehicle (CEV) Service Module (SM) and Spacecraft Adaptor (SA). As part of this, GRC will be developing requirements, performing design cycles for government reverence configurations, performing insight/oversight of the contractors developing SM/SA vehicle and subsystems, and performing Independent Verification and Validation (IV&V) of contractor efforts.

Task Order Description
Description of Services to be procured

Provide structural engineering services in support of design cycles for the government reference vehicle. Provide engineering consulting in support of reviews and technical interchange meetings with government and contactors. Support IV&V activities of contactor efforts.

Some data will be considered NASA Sensitive but Unclassified (SBU) and must be handled accordingly.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

The contractor shall:
-Provide consulting on vehicle design and construction.
-Perform sizing and structural optimization for minimum mass for primary and secondary structural elements, to support trade studies and IV&V for Sevice Module and Spacecraft Adaptor.
-Perform structural analyses of the solar arrays.
The Government Shall provide:
-Vehicle loads.
-Vehicle configuration.
-Access to Hypersizer.

The Contractor shall track the engineering support for the solar arrays as a seperate sub-task.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

Support Orion DAC4 POD ERB by 10/15/09
Support Orion DAC4 Closeout ERB by 4/15/10

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	50
Schedule	25
Cost	25

Desired Personnel Skill Sets

Seasoned engineers who have experience with vehicle and structural sizing and who are experienced users of Hypersizer and MSC/NASTRAN.

Government Furnished Property

None

Safety and Assurance Plans

None Selected.

Technical Representative: Doehne, Thomas

Task Number: NNC07E186T - 11

Task Title: Ares I-1 Upper Stage Simulator (USS) GESS-2 Task

Task Details

Period of Performance
6/26/2009 - 8/31/2011

Background
Why the project is being pursued

No-Bid by D received on 08/18/2008, kcm

Entered as WISE Task 20080847 on 08/14/2008, kcm

No-Bid by DE received on 10/24/2006, ldk

No-Bid by R received on 10/18/2006, ldk

No-Bid by DR received on 10/16/2006, ljm

Entered as WISE Task 20061015 on 10/16/2006, ljm

The Ares I vehicle is the new crew launch vehicle that will replace the shuttle in support of the Exploration Vision. The first test flight of the new vehicle is Ares I-1. Glenn Research Center (GRC) has the responsibility to build the Upper Stage Simulator (USS) for this first flight. For this flight only, the USS consists of the Interstage, Upper Stage, Spacecraft Adapter and Service Module. The USS is an element of the Flight Test Vehicle (FTV)and the other elements are the First Stage, Crew Module/Launch Abort System, Roll Control System, and Avionics. Ares I-1 SE&I at Langley Research Center (LaRC) performs the FTV integration. The FTV Team and the Kennedy Spaceflight Center (KSC) Ground Systems (GS) Team makeup the Ares I-1 Flight Test Team.

Task Order Description
Description of Services to be procured

This task requests a continuation for System Engineering and Integration support for Ares I-1 USS Element team at GRC.

Most of this task is NOT NEW WORK- in order to help track costs using EVM the task is being broken off an existing task.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

The period of performance is from October 1, 2009-October 31, 2009.

Systems Engineering and Integration (SE&I) support
The SE&I support staff shall
Modified o Provide oversight for review and comment input to Ares I-X FTV change requests and integration documents.
o Travel to technical interchange meetings or to KSC as needed to support reviews and hardware processing.
o Assist in planning and development of any documentation for the Flight Test Readiness Review (FTRR) which includes the Certificate of Flight Readiness (CoFR).

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

1. Provide weekly coordination for distributing, reviewing, and responding to the change requests distributed by the Ares I-X XCB.
2. Provide inputs for documentation to support Flight Test Readiness Review (FTRR) and the Certificate of Flight Readiness (CoFR) to support a October 17th 2009 launch.

As part of the reporting requirements of this Task Order, The GESS-2 Team shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	40
Schedule	30
Cost	30

Desired Personnel Skill Sets

Experience with Microsoft Powerpoint
Experience in decomposing requirements and identifying interfaces
Experience in integration of space flight hardware
Experience in the verification process

Government Furnished Property

None.

Safety and Assurance Plans

None Selected.

Technical Representative: Omalley, Terence

Task Number: NNC07E189T - 16

Task Title: Extra Vehicular Activity (EVA) Engineering and Technical Services Support

Task Details

Period of Performance
10/1/2009 - 9/30/2010

Background
Why the project is being pursued

Glenn Research Center is leading the development of the Power, Communications, Avionics, and Informatics (PCAI) subsystem for the Constellation EVA project that is managed by JSC. The EVA systems encompass suits and vehicle interface hardware systems that are to be used for launch, re-entry, and contingency EVA (Configuration 1), as well as lunar surface operations (Configuration 2).

Task Order Description
Description of Services to be procured

Subtask 1: Technical Writing
The contractor shall provide technical writing services to produce engineering documentation **and presentations ** for the EVA PCAI subsystem team, as well as the Constellation (Cx) EVA Project overall. The contractor shall collect input from multiple engineering sources within the EVA team. The Contractor shall provide technical writing services to EVA Project personnel at both JSC and GRC **according to NASA standards**, apply configuration management to documents **and presentations** developed by the EVA Project team, and document and maintain PCAI team meeting agendas, minutes and actions.

Subtask 2: Power Engineering
The contractor shall provide the Lead Power Engineer for the Constellation EVA Systems Project. The contractor shall perform system and interface requirements definition, decomposition and validation, perform trade studies to support the requirements definition process, develop Power System Specification(s), develop a conceptual and a preliminary design of EVA Power subsystem, and develop breadboards in order to develop preliminary designs and validate feasibility of requirements. The contractor shall interface with GRC and JSC EVA personnel at Level II, such as the Power Systems Integration Group (SIG), Level III (EVA Project), as well as Level IV (EVA Suit Element and EVA Vehicle Interface Element). The contractor shall provide the Power representative to the Vehicle Interface Element Team. **The contractor shall participating in program level reviews and respond to change requests that involve the power systems. The contractor shall monitor the power systems being developed by the CSSE Prime Contractor.**

Subtask 3: Radio Communications and Network Engineering:
The contractor shall provide Radio Communications and Network Engineering expertise. The contractor shall interface with appropriate Constellation Program communications and **networking discipline** groups, perform trade**s,** studies and simulations to

identify candidate architectures **and technologies**, identify and analyze appropriate standards, and develop concepts, breadboards and prototypes for lunar surface EVA Radio Networking needs. **The contractor shall develop software to provide the necessary networking and link layer functionality as described by the current design of the radio.**

Subtask 4: Software Engineering
The contractor shall provide SW engineering support to the GRC EVA project. The contractor shall develop SW prototypes and breadboards to evaluate the various functions and capabilities required for the PCAI suit system. The contractor shall interface with GRC and JSC EVA team members, as well as members of the Cx program, as necessary. **The contractor shall produce reports from the prototypes and breadports.**

Subtask 5: Audio and Navigation Systems Testing and Analysis
The contractor shall provide testing and analysis of developmental EVA audio and navigation systems. **The contractor shall interface with appropriate system engineering and design groups within and external to Constellation; these groups will help to establish the future direction for the NASA lunar communication infrastructure. The contractor shall support trade studies, simulation, and field testing to develop breadboards and prototype systems.**

Subtask 6: PCAI Systems Engineering and Integration Support
The contractor shall provide overall systems engineering support to the PCAI **Subsystem** Manager, interfacing with the GRC and JSC EVA team, as necessary. The contractor shall manage the Suit PCAI requirements **and the** definition process **as established by Suit SE&I. The contractor shall create and update ** the detailed Suit PCAI schedules as well as the DAC tracker. The contractor shall maintain and update risks, as necessary, in Cx IRMA for the monthly PCAI risk reviews.** Additionally, the contractor shall interface with the Pressure Garment Subsystem, the Life Support Subsystem, the Ground Support Equipment Subsystem, and the Suit Element SE&I personnel.

**Subtask 7: Power Quality Engineering Development
The contractor shall evalute and develop a testbed for power conversion and distribution systems to determine their viability for incorporation into the lunar PCAI architecture. The contractor shall interface with appropriate power systems groups within and external to Constellation.**

General Scope of Work

SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

Subtask 1. Technical Writing

The Government shall furnish technical specifications, standards templates, notes, and summaries, and rough drafts to be integrated into official project documentation **and presentations**. The contractor shall:

A. Provide technical writing services in order to accomplish the goals identified in the deliverables.

B. Attend weekly EVA Software and Avionics and PCAI meetings at GRC.

**C. Maintain configuration control over the PCAI documentation within Windchill.

D. Setup, configure, and support adhoc telecons and webexs for the PCAI group.**

Subtask 2. Power Engineering

The government shall provide Cx Requirements Documents, EVA System Requirements Document, Element Requirements Documents, and a draft CEV – EVA Integration Requirements Document.

The contractor shall:
A. Provide updates to the **Orion** to EVA Interface Requirements Document (IRD) and the Ground Operations (GO) to EVA IRD, resolving relevant Power Subsystem TBDs and TBRs. Additionally, the contractor shall **maintain and support the** umbilical interfaces and requirements.

B. Provide insight and oversight of prime contractor **responsible for** Configuration 1 Power Subsystem Specification(s) and preliminary designs and drawings for both the Suit Element and Vehicle Interface Element (VIE) for the Cx EVA Systems Project.

C. Provide conceptual designs and drawings of the Configuration 2 Suit Power subsystem and the VIE Hardware Power subsystem (if different from the Configuration 1 VIE Hardware).

D. Develop Breadboards: The contractor shall design and build a power subsystem breadboard for the space suit and vehicle interface hardware system, including prototypes of designs for proof-of-concept and eventual integration into an avionics system test bed. The breadboard shall eventually address vehicle interfaces, grounding and bonding, switching and isolation concepts, power conversion, etc. Eventually, the prototype(s) should address mass, volume, thermal, EMI/EMC, radiation, etc., requirements for flight systems.

E. Author and/or review a Power Equipment List (PEL) for the PCAI equipment. The PEL will include a list of the PCAI equipment along with the power requirements needed for that specific configuration or option.

F. Attend relevant EVA VIE Team meetings and telecons and participate as a full team member. A two - three day trip to NASA Johnson Space Center will be required approximately once every 6 **months**.

G. Attend weekly EVA Level 3 Software and Avionics meetings at GRC, as well as Level 4 PCAI weekly team meetings and PCAI lunar architecture meetings.

Subtask 3: Radio Communications and Networking Engineering

RF communications and networking requirements will need to be incorporated into the Constellation Space Suit Element (CSSE) Configuration 2 PCAI subsystem conceptual design for lunar surface EVA. This area is not yet well defined for the CSSE. It will depend on the Exploration lunar surface communications architecture; lunar surface navigation architecture; operations concepts relevant to surface EVA; radio design; scenarios; data flows; and RF interfaces.

Design considerations for the radio include operational requirements, air interface definition, coding and modulation scheme, multiple access method, network infrastructure, **data rates,** and navigation signals. The lunar surface path loss is different from Earth, because of the electromagnetic properties of the Moon, so modeling of surface-to-surface line-of-site radio links and over-the-horizon radio links are needed.

CSSE will have to determine which standards are applicable and analyze them for requirements. Data flow analyses will help define data processing requirements. The radio packaging, power requirements, thermal considerations, and interfaces will need to be defined. Hardware versus software implementations need to be analyzed through trade studies.

The contractor shall:

A. Participate in communications and **networking** architecture development to provide and derive EVA requirements that address EVA integration into Constellation architecture, data flows, RF interfaces, radio requirements, and packaging considerations for the radio, the antenna, and astronaut radiometric tracking.

B. Perform trade studies and simulations to develop specifications for the procurement of a first generation EVA Radio System prototype that can interface with the developing Constellation communications and navigation infrastructure.

C. Develop draft requirements and verifications for EVA RF communications and decompose higher level requirements into detailed requirements, suitable for inclusion in the Suit Element Requirements Document (ERD).

D. Analyze standards for applicability.

E. Attend weekly EVA Level 4 PCAI meetings and PCAI lunar architecture meetings at GRC.

Subtask 4: Software Engineering

The contractor shall develop SW prototypes and breadboards to support the development of an overall suit software architecture that includes meeting interoperability requirements as defined in the Constellation Program C3I specifications. Specifically, breadboards will be developed and evaluated for all the C3I required functions allocated to EVA, such as Voice Over IP, Security, and Data Exchange capabilities. Trade studies, architecture development, breadboarding, testing and reporting are required. The contractor shall:

A. Develop and decompose suit element requirements related to software.

B. Develop a C3I breadboard, test the C3I breadboard, and evaluate its impacts on the overall suit SW architecture (such as CPU utilization, memory utilization, etc.).

C. Develop use-case diagrams or other means of documenting software requirements and resulting architectures.

D. **Report the results of the breadboarding and prototyping efforts. Present the result at the appropriate venues, such as the Suit Control Board and the EVA Systems Engineering Panel.**

Subtask 5: Audio and Navigation Systems Testing and Analysis
The government will provide developmental audio and navigation concepts and prototype equipment. The contractor will develop the testing capability and perform the testing of EVA developmental audio communication and navigation systems. The contractor shall:

A. Perform EVA audio and navigation system test cell build-up.

B. Develop and document specific audio system testing procedures based on standards from ITU, ANSI, etc. for conducting tests on developmental EVA PCAI audio systems.

C. Document audio and navigation test setups with diagrams, photographs and narrative descriptions.

D. Conduct system integration, testing and evaluation of developmental EVA audio and navigation systems, and report results and collect data in support of post-test analysis including detailed synopsis of testing procedures conducted (tabular form), descriptions of in-situ observations made and anomalous conditions.

E. Perform post-test analysis of EVA audio and navigation systems test data. Develop and execute data reduction scripts and procedures including scripts and procedures for creating graphical displays of data.

F. Provide written documentation of data reduction procedures and narratives of reasoning chains employed in deriving conclusions and recommendations.

G. Development and testing of field test equipment and prototypes. May include travel to JSC and field sites.

Subtask 6: PCAI Systems Engineering and Integration Support

The government will provide baselined and draft versions of Suit Element PCAI requirements documentation.

The contractor shall:

A. Provide systems engineering and integration support to the PCAI Suit Subsystem Manager (SSM), representing PCAI within the Suit Element if the PCAI SSM is unavailable.

B. Manage the requirements and definition process for all Suit PCAI requirements and verifications, gathering inputs from the team, and maintaining the burn down of relevant TBR and TBDs in the requirements documentation

C. Represent Suit PCAI at Suit SE&I working groups and control panels.

C. Develop detailed schedules of activities for the entire Suit PCAI team **with input from the PCAI members. Detailed schedule shall be made available to PCAI team members via Windchill.**

D. Attend weekly EVA Level 4 PCAI meetings at GRC.

** E. Manage and collect status and mitigation plans for risks in Cx IRMA.

Subtask 7: Power Quality Engineering Development
The contractor shall provide trade studies, design, assembly, testing and evaluation of power conversion and distribution systems.

A. Develop and write market surveys that determines vendors and viability of various dc-dc converters for the power conversion and distribution system.

B. Design a dc-dc converter for subsequent evaluation.

C. Procure and obtain needed parts for the dc-dc converter for subsequent assembly.

D. Assemble the dc-dc converter test systems.

E. Produce test procedures and execute those procedures to test the dc-dc converter systems.

F. Produce functional test and evaluation reports of the dc-dc testbed systems, including an analysis of radiation, environmental, and functional issues associated with the power conversion and distribution systems.

G. Interface with appropriate power systems groups within and external to Constellation.**

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

The following are the milestones and deliverables for this task:

Subtask 1. Technical Writing and Administrative Support
A. Technical writing and editing of project documentation and presentations, ongoing.
B. Meeting minutes as needed, ongoing.
C. Maintain document repositories for EVA PCAI team, and access EVA Project Team documentation sites, such as the CSSS Server and Windchill, ongoing.
D. Coordinate and support meetings (e.g., rooms, Webex, telecom #), ongoing.

Subtask 2. Power Engineering
A. Disposition Power-related TBRs and TBDs in the EVA Suit Element and VIE Element Requirements Documents (ERDs), by 3/31/2010.
B. PDAC-2 Power Concepts Estimates, and Architecture, by 4/30/2010
C. Resolution of Power Issues, such as TBRs and TBDs, and content in external IRDs, by 6/1/10.
D. Provide Power Engineering evaluation of prime contractor developed preliminary designs, such as specifications, design documentation, and drawings, for the Suit Element, by 9/1/10.

Subtask 3. Radio Communications and Network Engineering
A. OPNET Modeling, by 3/31/10.
B. Link/Mac algorithm build specifications by 8/31/2010.
C. Data supporting resolution statements for TBDs/TBRs of Radio Reqs in the EVA Suit Element Requirements Document, ongoing.

Subtask 4: Software Engineering
A. C3I breadboard assembly incorporating Data Exchange and Security requirements by 12/31/2009.
B. C3I Data Exchange and Security breadboard evaluation and test report updated by 12/31/2009.
C. C3I breadboard assembly incorporating Command and Control & Information requirements by 9/30/2010.
D. C3I Command and Control & Information breadboard evaluation and test report updated by 9/30/2010.

Subtask 5: Audio and Navigation Systems Testing and Analysis
A. Develop objectives, goals, and test procedures for the audio breadboard tests by 1/31/2010.
B. Audio breadboard test, evaluate, and characterize by 3/31/2010.
C. Report the results from the breadboard tests by 6/30/2010.
D. Data supporting demonstration testbed field test and evaluation, by 12/31/2009.
E. Integrate procured sensors into Data Collection Testbed by 12/31/2009.

F. Support the upgrade of the Data Collection Testbed by 8/31/2010.

Subtask 6: PCAI Systems Engineering Support
A. Weekly updates of the PCAI section of the Suit Element Schedule.
B. Monthly updates of the PCAI TBRs and TBDs in the Suit ERD.
C. PCAI requirements to Suit Panels, as scheduled.
D. Data collection and update in Cx IRMA for risks, ongoing.

Subtask 7: Power Quality Engineering Development
A. Dc-dc converter market survey report by 11/27/2009.
B. Design and develop a dc-dc converter testbed by 3/1/2010.
C. Develop test procedures and objective for dc-dc converter testbed by 3/31/2010.
D. Final evaluation report for dc-dc converters by 9/30/2010.

Monthly Progress Reports: The contractor shall prepare and forward to the technical representative a monthly progress report defining the month's technical progress and the future month's planned activities.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	60
Schedule	30
Cost	10

Desired Personnel Skill Sets

Contractor shall have experience in coordinating technical input from multiple engineers and integrating information into engineering documents including technical summaries, concept of operations documents, engineering requirements, engineering design, quad charts, graphic presentation formats, etc. Additionally, the contractor shall have space flight hardware experience, with special expertise in power systems, radio, communications, navigation, software, avionics and systems engineering.

Government Furnished Property

Lab facility, Bldg 54, Rm 34 and Rm 26.

Safety and Assurance Plans

None Selected.

Technical Representative: Fite, Brian

Task Number: NNC07E190T - 7

Task Title: Developmental Aerodynamic/Aeroacoustic Modeling, Design, and Simulation

Task Details

Period of Performance
10/1/2009 - 3/31/2010

Background
Why the project is being pursued

No-Bid by DE received on 11/13/2006, ljm

No-Bid by DR received on 11/01/2006, ljm

No-Bid by R received on 10/30/2006, ljm

Entered as WISE Task 20061031 on 10/30/2006, ljm

Current day aviation design practice requires detailed understanding of the acoustic performance of vehicles and components to achieve overall system design objectives. Commercial aircraft must meet stringent noise requirements to be certified for flight and be competitive in the marketplace. Military vehicles have seen increasing importance for acoustic emissions to meet operational performance goals. Crewed space flight systems need quiet atmospheric revitalization fans and electronic equipment cooling fans to provide a safe, productive, and comfortable environment during long duration exploration missions. The RTA/Acoustics Branch conducts research to understand the fundamental physics responsible for noise generation and mitigation. Additionally, capability is developed to model, analyze, and predict noise levels for these applications with a primary research focus on civil aviation noise reduction.

Task Order Description
Description of Services to be procured

*** SOW Updated as of August 2009 for AFP 7 ***

The contractor shall provide the necessary technical expertise to support the development of computational tools and procedures for Aeroacoustic simulations. Expertise is needed to perform complex 2D and 3D aerodynamic simulations which supply necessary parameters for subsequent acoustic analysis. Additionally, conceptual and detailed aerodynamic design for low noise fans, ducts, inlets, etc. will be needed. Hardware designs, when tested, are expected to match design intent operating performance parameters which will be measured in subsequent experiments. Design parameters will be provided by NASA and/or as a result of analysis and research on existing systems or system components. Experimental support will be provided as required.

General Scope of Work

SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

******The governments estimated overall period of performance for this task is April 1, 2009 though August 31, 2011. The governments estimated period of performance for the current deliverables is October 1, 2009 through March 31, 2010.****The contractor shall use demonstrated skills and validated 3D viscous CFD tools, specifically SWIFT (or validated tool with same or better capability), to model and analyze design and off-design performance of modern low noise fans and flow systems. Acceptable code validation data must include hardware within acoustic branch experience. Work shall be completed independently with minimal guidance once overall objectives are established. If possible, analytical results will be validated using existing test data provided by NASA. Once analyses are validated, analytical flow field parameters will be used for subsequent acoustic assessment by NASA.

Demonstrated aerodynamic design capability shall be utilized to generate new aerodynamic designs that solve specific problems deemed responsible for noise generation in fans, ducts, and flow components of turbomachinery systems.

Contractor shall possess programming skills required to perform tasks such as: create and implement new subroutines and/or code modifications that generate grid, implement improved turbulence models, implement new solution algorithms, apply loading, extract parameters, or generate design geometry.

Proven capability will be required for coupling independent analytical solutions of specific components and flow regions to obtain an overall “system” solution as required by the particular problem of interest. This allows simultaneous solution of disparate grids that are linked by common boundaries as may be the case for bypass ducts, flow passages, etc.

Experimental research support will be provided as needed to define and calibrate measurement systems, acquire data, and process data to meet research requirements and support ongoing acoustic research.

Specific tasks include:

1. Complete documentation of space fan CFD analysis completed during performance period 6 but not documented due to funding limitations.
2. Provide CFD analysis of over-rotor acoustic treatment tested with the Fan Trailing Edge Blowing fan blades. Unsteady analysis shall be used if deemed appropriate. Define detailed flow characteristics of tested configuration and consult on potential flow impact on acoustic treatment. Prepare report documenting results of analysis and present to interested parties.
3. Complete aerodynamic design of a new fan and fan exit guide vane for an existing air-driven turbo-propulsion simulator (TPS). The fan shall have higher bypass ratio suitable for studying high bypass installed aerodynamics. The specific design parameters are to be defined cooperatively with NASA. Document design in an engineering report and present at two review meetings.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

Deliverables and Milestones:

1. Deliver 2 (option for 3) contractor reports, and associated DVD of grid and solution files, for task 1. These reports will document work completed for: 1) the existing fan, 2) the new design, and, as an option, 3) a comparison of the two designs. These are to be

completed by November 13, 2009.
2. Provide over-rotor CFD analysis and associated report by March 31, 2009.
3. Provide TPS design and documentation by January 31, 2010.
4. Travel to support 4coordination meetings per year (this includes all tasks).

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	Weights
Performance	40
Schedule	30
Cost	30

Desired Personnel Skill Sets

Advanced engineering degree, PhD preferred, with extensive knowledge of turbomachinery fluid dynamics. At least 15 years of professional aerodynamics experience is desired. Candidate should have demonstrated accomplishments in code application and development as well as turbomachinery aerodynamic design of research hardware. Possess ability to understand, articulate, and propose actions related to unusual and complex aerodynamic phenomenon in research hardware. The incumbent must be capable of working independently with only general guidance. Must be proficient in oral and written communication skills to clearly and succinctly describe and document experimental results.

Advanced engineering degree, MS or PhD, with prior experience in flow measurements inside rotating machinery using thermal anemometry. The incumbent shall have prior experience with Matlab. The incumbent must be capable of working independently with only general guidance. Must be proficient in oral and written communication skills to clearly and succinctly describe and document experimental results.

Government Furnished Property

Government furnished property will include files and data describing geometry, loads, experimental results, etc. Any measurement systems or sensors required will be provided as well as access to appropriate calibration and test facilities.

Safety and Assurance Plans

None Selected.

Technical Representative: Cressman, Thomas

Task Number: NNC07E191T - 14

Task Title: SM Loads and Dynamics Support

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

The Crew Exploration Vehicle (CEV) is one system of the overall Constellation Project and is America's new spacecraft for human space exploration. It will be able to carry four astronauts to and from the moon and deliver six crew members and supplies to the International Space Station. The CEV system consists of four elements: the Launch Abort System (LAS), Crew Module (CM), Service Module (SM), and the Spacecraft Adapter (SA).

The NASA Glenn Research Center has been given the responsibility to manage the SM and SA portion of the program. The SM/SA Structures element is the effort to design, develop, integrate, test, certify, and deliver the SM primary structure, secondary structure, and all structural components of vehicle equipment, including spacecraft and component loads, dynamics, and stress analysis. This element includes the spacecraft adapter structural capability to transition between the launch vehicle and the CEV.

In the area of Loads and Dynamics, additional support is needed to aguement the in-house staff.

Task Order Description
Description of Services to be procured

The effort required to augment tasks in suport of SM Load and Dynamics.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

Provide services to integrate loads and dynamics effort for Service Module:

1) Plan and Coordinate loads and dynamics support within the SM Structures Team.
2) Be THE point of contact (POC) within the NASA SM team for information on loads and dynamics (i.e., what are the latest loads and environments for design, for qual, etc.)
3) Be the SM Team's interface with the LM Loads and Dynamics team (Nancy Tengler, Keith Schlagel, etc.) and with the Orion Loads and Dynamics Working Group (JSC/George James).
4) Be the SM Team's eyes and ears into the Constellation loads and dynamics community (Eli Rayos).
5) Support Orion PDR.

Key areas currently for SM include:
1) Check-out of SM FEMs for load cycle deliverables
2) Design load factors for primary and secondary structures
3) Vibration levels for SM component qualification
4 In-space loads (primarily on the arrays and high-gain antenna)
5) Involvement/coordination with Level 2 and Level 3 Loads Panel
6) Environmental testing at component and system levels.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

Deliverables:
Weekly activity report and quad chart (as required).

Milestones:
Support Orion DAC4 POD ERB by 10/15/09
Support Orion DAC4 Closeout ERB by 4/15/10
Support LC5 Loads FEM drop to Level II by 11/15/09

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.)

Criteria to Be Used for Evaluation	Weights
Performance	50
Schedule	25
Cost	25

Desired Personnel Skill Sets

Engineering skills familiar with Constellation Level II documentation regarding system requirements. Must also possess space flight hardware design, development and testing experience, in particular in the loads and dynamics area.

Government Furnished Property

None

Safety and Assurance Plans

None Selected.

Technical Representative: Thorp, Scott

Task Number: NNC07E196T - 10

Task Title: W7 ERB Multistage Compressor Support & Upgrade

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

No-Bid by D received on 08/07/2008, kcm

Entered as WISE Task 20080813 on 08/05/2008, kcm

No-Bid by D received on 06/02/2008, ljm

Entered as WISE Task 20080544 on 05/30/2008, ldk

TR Responsiblity Transfer to Code R on 2/27/2007, ldk
No-Bid by DR received on 12/08/2006, ldk
No-Bid by DE received on 11/29/2006, ljm
Entered as WISE Task 20061120 on 11/28/2006, ldk

GRC has proposed the re-installation of the existing 76A and/or 76B compressor hardware to perform facility checkout tests, returning the W7 facility to its originally designed capabilities.

Task Order Description
Description of Services to be procured

Provide engineering, procurement, design modeling/layout and drafting services as required to support the W7 facility and compressor testing programs. This continued activity shall focus on the re-installation of the existing 76A and/or 76B compressor hardware to return the W7 facility to its originally designed capabilities.
Test cell research engineering and instrumentation support is required in the later part of this period.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

*************NEW AS OF AFP7 - OCTOBER 1, 2009 *******
The GESS Team shall perform the following:

Provide engineering, design modeling/layout and drafting services to support the proposed re-installation of the 76A and/or 76B compressor hardware to return the W7 facility to its originally designed capabilities. Early calculations demonstrate a 9:1 pressure ratio machine will require hardware to be designed to exhaust temperatures of around 740 degrees. Activities shall include the development of final designs, analyses and procurements to provide new hardware and recondition existing hardware that will be needed.

This task was initiated in the previous evaluation periods. Design activity is near complete for the Phase “A” Test hardware. Current work effort is expected to be limited to following of the Phase “A” installation of hardware, finalizing assemblies and revising documentation to reflect as-built changes. Design support is also expected to support feasibility studies and possible new phases of testing. Test cell research engineering and instrumentation planning support is also expected in the later part of this period. Associated cost plan reflects a “level of effort” that is expected during the period. An amendment may be required if work scope is different than expected.

Specific Work Elements

W7 Design Engineering Support

a) Finalize Basic Rig related assembly drawings and remaining documentation in support of Phase “A” hardware and facility “check-out” testing in FY10.
b) Provide W7 facility support during hardware installation as needed
c) Prepare drawings and documentation as needed to support new hardware development.
d) Develop project ROM estimates for labor and hardware costs based on previous work and experience to support new proposed test configurations. Based on actual work definition, an amendment will be processed if required to adjust work plan.
e) Conduct project status meeting with the customer to continually review facility status.
f) Support ongoing research and instrumentation requirements related to the W7 facility test plans.

Fabrication Liaison and Procurement Services

a) Continue to provide fabrication and procurement services for W7 facility support and test hardware as requested by the GRC technical representative. The associated cost plan has allocated funding for this period to finalize hardware procurements that had been initiated in previous periods. Based on actual fabrication/procurement requests, an amendment to the task may be submitted if required to add specific fabrication and procurement dollars.
b) Provide procurement services to support W7 cell operations including calibration services, equipment and material purchases up to the allocated funding defined in the associated cost plan for this period. Based on actual procurement requests, an amendment to the task may be submitted if required to adjust cost plan accordingly.
c) Fabrication sub-contracts shall be closely followed and a periodic status report provided to the GRC technical representative.

When fabrication and material cost estimates are identified in the associated cost plan, they have been determined based on the currently defined task requirements in this SOW, historical data and contractors' past experience for budgetary purposes. Once designs are finalized and approved by the TR, competitive bids will be obtained as required by the FAR prior to award.

Desktop office computing hardware, software and support will be charged to task as a distributed cost.

If travel and/or training are required under this task, the cost has either been budgeted into the accompanying cost plan, or an amendment will be issued to cover the additional task requirements.

Government's Estimated Period of Performance is October 1, 2009 to August 31, 2011
****

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

Milestones:
• Flow Test and facility checkout in FY10

Deliverables
• Interface design layout/model of multiple compressor configurations in W7 facility for review and evaluation for feasibility.
• Supporting drawings, engineering analysis and calculations.
• Project planning and ROM estimates for required labor and hardware
• Final design layout & detail drawings required in support of project schedule
• Monthly Progress Reports.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	Weights
Performance	50
Schedule	30
Cost	20

Desired Personnel Skill Sets

Mechanical Engineers and Designers with experience in High Speed Rotating Machinery. Also, experience with the methods, standards, and practices used for test articles in the GRC High Speed Compressor Test Facilities.

Government Furnished Property

Existing research hardware to refurbish/modify
Pro-Engineer
Windchill
AutoCAD

Safety and Assurance Plans

None Selected.

Technical Representative: Solano, Paul

Task Number: NNC07E200T - 10

Task Title: L/IMX Installation in 10X10

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

To support aeronautics research model into the 10x10 facility.

Task Order Description
Description of Services to be procured

Engineering, design and possibly fabrication services to aid in the installation of the L/IMX model from ATK.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

Details of the work needed include:
1) Attend regularly scheduled project meeting between research customer and ATK.
2) Interface with research customer.
3) Verify model installation is consistent with facility requirements as outlined in User Manual for NASA Lewis 10-by 10- Supersonic Wind Tunnel, NASA TM-105626.
4) Develop installation drawing of L/IMX model into the 10x10 with appropriate supporting hardware.
5) Identify any hardware necessary for facility integration.
6) Upon approval, design and possibly fabricate necessary hardware for facility integration.
7) Provide support for the project in any design and safety reviews.
8)Adaptor interfaces such as the bleed plug hardware that will mate up
with ATK pipe/tube elbows with the existing bleed plugs. Alternate
seal design is another example as Some contingency is still prudent as the ATK/NASA interfaces are still being discussed.
9) Procure 100* dynamic pressure transducers. For estimation, this
are nominally 0.062" dia. Kulites capable of 305 deg. F. Actually specification will be developed within 6 weeks. [*70 needed + 30 spares, 40 would replace the compressor face (AIP) rake transducers].
10) Procure new servo-actuator valves per LIMX specification.
11) Calibration rigs for both the existing 10" plug (for the high speed flowpath) & for the new 12" plug for the low speed flowpath. Estimate these test to be similar to the 15'/16" plug cals. that used the 10x10 as a vacuum source.
a) design of adaptor hardware / coordinate use of bellmouths
b) fabricate hardware

c) conduct testing (this may be done with civil servant or FT
labor - but an estimate would be helpful in case we
can't support with existing CS or TFOME folks).
12) Design and fabricate an alternate low speed cowl surface. Max deviation from the baseline cowl geometry should be less than 0.25" and nominally 0.1"
13) Conceptual design of an oxygen make-up system for the 10x10 SWT
heaters. System would be mounted in the tunnel heater arrays and targeted for nominal flows of 30#/sec at the Mach 3.1 matched flight temperature. Maximum flow capability sizing of 60#/sec should designed into the system to allow growth for nominal Mach 4 temperatures.
14) Conceptual design of a second throat insert for the 10x10 SWT. The hardware would nominally span the height of the tunnel (10')
on centerline with a maximum thickness of about 1' and a length of 15 to 20 feet. Provisions for bleed would be designed into this hardware as well as by modifying the existing second throat walls.
15) Modify translating probe per research
16) Modify bypass valves if needed
17) Develop, design & fab stereolithography model of LIMX
18) Design/fab inclinometer
19) Independent verification of strut extension analysis that was performed by ATK
20) Provide design/fab services to change the height of model in facility per research request
21) Government's estimated period of performance is 4/1/2009 thru 8/31/2011

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

1) Installation drawing.
2) Drawings of any designed new hardware.
3) Analytical report showing that the installation of the L/IMX meets the required safety factors for the required design load cases as described in NASA TM-105626.
4) Fabrication of any identified & approved necessary hardware.
5) Any/all hardware design and fabrication to be consistent with anticipated L/IMX model delivery consistent with project schedule.
6) Stereolithography model
7) Monthly Progress Reports
As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	45
Schedule	45
Cost	10

Desired Personnel Skill Sets

Mechanical project engineering support, mechanical designing support, possibly fabrication support.

Government Furnished Property

Pro/E models of existing 10x10 test section and upper strut box.
Pro-Engineer

Safety and Assurance Plans

None Selected.

Technical Representative: Palaszewski, Bryan

Task Number: NNC07E202T - 11

Task Title: Design and Fabrication of Mars EDL Model Hardware

Task Details

Period of Performance
2/13/2009 - 8/31/2011

Background
Why the project is being pursued

The plan for the Supersonic Entry, Descent, and Landing (EDL) project – Propulsive Deceleration - is to investigate novel approaches for using rocket propulsion for slowing an entry vehicle through the supersonic speed regime in a planetary atmosphere (specifically focusing on Mars vehicle for human landings).

Testing in NASA 1x1 Supersonic Wind Tunnel (SWT) is planned for small scale engines and entry vehicle models to demonstrate techniques for effective ignition, nozzle flow fields, and engine start up transients.

Provide design and fabrication support to develop Mars EDL model hardware to be tested in the 1x1 SWT. The government will provide specific requirements for each planned phase of testing throughout the program.

Task Order Description
Description of Services to be procured

Provide design and fabrication support to develop Mars EDL model hardware to be tested in the 1x1 SWT. The government will provide specific requirements for each planned phase of testing throughout the program.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

Government's Estimated Period of Performance is April 1, 2009 to 03/31/2010

The GESS Team shall perform the following:

Specific Work Elements

1) Task Management
a) Manage resources on a day-to-day basis; execute the task; resolve problems and keep the technical representative informed of all issues. The contractor shall prepare and forward to the technical representative a monthly progress report defining the month's technical progress and the future month's planned activities.

2) Design Engineering
a) Provide engineering and design services to develop the design of Mars EDL model

hardware meeting the criteria established in the document - "Requirements Document (3.0); Supersonic Entry, Descent, and Landing (EDL): Propulsive Deceleration 1x1 SWT Testing" and also meeting the requirements for models installed in the 1x1 SWT.

3) Fabrication and Procurements
a) Provide fabrication and procurement services to support the development of the required Mars EDL model hardware. Contractor shall also provide procurement services as required to obtain cell hardware required to support the EDL testing, such as a high speed camera, data acquisition system hardware and related accessories based on specifications defined by the cell test engineers. After a design is finalized, cost estimates will be refined and a task amendment may be required to adjust planned costs accordingly.
b) Initiate, monitor and complete instrumentation of diffuser scale model hardware.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

Milestones:
• Mars EDL model design and hardware to be provided to support testing.

Deliverables
• Results of analysis documenting model hardware meets all required criteria.
• Assembly and fabrication drawings of all Mars EDL model hardware
• Mars EDL model hardware shall be delivered to NASA Glenn in a shipping container free from all damage and shall include an inspection report showing compliance of all dimensions with the tolerances specified
• Monthly Progress Reports

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	30
Schedule	40
Cost	30

Desired Personnel Skill Sets

N/A

Government Furnished Property

Pro/ENGINEER
AutoCAD

Safety and Assurance Plans

None Selected.

Technical Representative: Melcher, Kevin

Task Number: NNC07E205T - 11

Task Title: Advanced Controls Research for Aerospace Propulsion Systems

Task Details

Period of Performance
2/13/2009 - 8/31/2011

Background
Why the project is being pursued

The NASA Glenn Research Center conducts research programs in the area of aerospace propulsion system control. Research is conducted to improve propulsion system reliability, maintainability and operability through the development, implementation, and demonstration of advanced control and health management methodologies. Specific research areas include:
• The development and implementation of robust and intelligent control methodologies for advanced turbine engine systems.
• The development of robust and generally applicable condition monitoring techniques.
• Component and system modeling to support the development and validation of these techniques.

Task Order Description
Description of Services to be procured

The contractor shall provide technologies to improve aerospace propulsion system reliability, maintainability and operability, and shall provide propulsion system simulations under nominal and degraded conditions to support the validation of these technologies.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

NOTE: Revisions for this statement-of-work are preceded by an asterisk (*)

Broad Scope of Work: Contractor shall research and develop advanced control and health management methodologies. Contractor shall develop real-time and non-real-time implementations of the methodologies and simulations to extend the current capabilities of aerospace systems and components. Contractor shall validate all developed techniques and resulting systems.

1. Support the planning of new advanced control projects and re-planning of existing advanced control projects by providing input for technical content and schedule.
2. Develop, modify, exercise, and demonstrate propulsion system simulations in support of advanced controls activities.
3. Develop and maintain expertise in current state-of-the-art real-time simulation and control.
4. Provide written documentation of technical work. Present work at appropriate

meetings and conferences.
5. Review SBIR proposals in system simulation for advanced controls area.
6. Clearly communicate progress and issues in a timeframe and manner commensurate with their impact.
*7. The contractor shall follow applicable NASA and RHC procedures when conducting work in support of the branch.

Specific Work Elements:
1. Aviation Safety Program/Integrated Resilient Aircraft Control (IRAC) Project
1a. The contractor shall propose, test and evaluate various options for real-time operation of C-MAPSS2 in flight simulator. Real-time operation shall be concurrent with rendering of graphical out-the-window displays.
*1b. The contractor shall upgrade and configure the RHC Flight Simulator hardware and software to implement and integrate NASA's Risk Management Architecture (from AIAA-2009-1873) with the C-MAPSS2/C-17 real-time simulation.
2. Aviation Safety Program/Integrated Vehicle Health Management (IVHM) Project
*2a. The contractor shall evaluate alternative formulations of the portion of the Systematic Sensor Selection System (S4) merit function associated with fault isolation performance. The correlation of this portion of the merit function to actual fault isolation performance, including fault correct classification rate and fault mis-classification rate, shall be evaluated through Monte Carlo simulation-based studies.
*2b. The contractor shall update the Systematic Sensor Selection Strategy (S4) User's Guide and software based on peer review feedback received through the C-22 review process.
3. Travel in accord with requirements for attendance at technical and/or technology transfer meetings, presentations or research papers, and in acquiring training or course work useful for enhancing capabilities in performing this task.
3a. NASA does not intend to fund any trips by the contractor during this performance period.
4. Other
4a. The contractor shall complete and submit a status report summary for the entire performance period that addresses performance criteria for each milestone/deliverable described in this statement of work.
4b. As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.
4c. The contractor shall comply with the Center Level Procedure GRC-P2.6.4, "Implementation - Software Development".

NOTE: Revisions for this statement-of-work are preceded by an asterisk (*)

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

NOTE: Revisions for this statement-of-work are preceded by an asterisk (*)

1. Aviation Safety Program/Integrated Resilient Aircraft Control (IRAC) Project
*1a. Based on contractor's previous recommendations, the contractor shall further investigate and document potential improvements to the out-the-window display enabled by the use of the Microsoft ESP graphical software. Due by 3/31/2010.
*1b. The contractor shall evaluate and document approaches for implementation of NASA's Risk Management Architecture with the real-time integrated C-MAPSS2/C-17 simulation running on NASA Glenn's flight simulator hardware. Due by 1/31/2010.
*1c. The contractor shall implement the generic structure of NASA's Risk Management Architecture with the real-time integrated C-MAPSS2/C-17 simulation running on NASA

Glenn's flight simulator hardware. Due by 3/31/2010.
2. Aviation Safety Program/Integrated Vehicle Health Management (IVHM) Project
*2a. The contractor shall document and deliver to NASA the fault isolation merit function evaluation results. These results shall include analysis of the correlation between the merit function and fault isolation performance (correct classification rate and mis-classification rate), and a recommendation for the diagnostic merit function to apply within S4. Due by 3/31/2010.
*2b. The contractor shall obtain C-22 approval for the S4 User's Guide and release the S4 software through the NASA GRC Software Repository. Due by 3/31/2010.

NOTE: Revisions for this statement-of-work are preceded by an asterisk (*)

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	35
Schedule	35
Cost	30

Desired Personnel Skill Sets

Highly skilled in development and implementation (including real-time) of control methods and propulsion system simulations. Advanced programming in Fortran, C/C++, Matlab/Simulink.

Government Furnished Property

Hardware and software testbeds. Matlab/Simulink software – License No's 254274, 18747, 220189, & 321084.

Safety and Assurance Plans

None Selected.

Technical Representative: Wernet, Mark

Task Number: NNC07E211T - 10

Task Title: Optical Diagnostics Integration Engineer

Task Details

Period of Performance
2/6/2009 - 8/31/2011

Background
Why the project is being pursued

The NASA Glenn Research conducts research in advanced propulsion systems to develop revolutionary new propulsion concepts and also to improve the efficiency and performance of more traditional propulsion systems under the Aeronautics Research Mission Directorate. In addition, NASA Glenn supports testing of entry vehicles for inter-planetary science missions under the Science Mission Directorate. Nonintrusive measurements of flow field velocities within and around these advanced propulsion systems and/or re-entry vehicles are required in order to gain insight into the fundamental flow physics and also for validation of Computational Fluid Dynamics (CFD) models of the flow field. Nonintrusive techniques are preferable over intrusive probes which may disturb the flow and also may not survive the harsh environments encountered in these advanced propulsion systems. Test facilities supported include aeroacoustic research facilities, turbomachinery facilities, Propulsion Systems Lab and the 8x6, 9x15 and 10x10 research wind tunnels at GRC. Within the genre of nonintrusive velocimetry techniques, planar techniques such as Particle Image Velocimetry (PIV) and Doppler Global Velocimetry (DGV) are more desirable than traditional point based techniques such as Laser Doppler Velocimetry (LDV). PIV and DGV provide instantaneous planar measurements of the flow velocity that can be used to compute first and second order flow statistics for validation of CFD predictions and verification of prototype propulsion system performance.

Task Order Description
Description of Services to be procured

Develop the hardware and software to support the implementation and application of minimally intrusive, laser-based velocity measurement systems in turbomachinery, Pulse Detonation Engine systems, and aeroacoustic ground based propulsion research. These optical diagnostics systems may also be applied in subsonic and supersonic wind tunnel facilities. Specific work objectives will be to interact with facility engineers to develop the necessary hardware and software for implementation of optical diagnostics. The hardware requirements are defined as the infrastructure required to support laser and camera systems in wind tunnels. Integration of the optical diagnostic systems is performed through the use of 3-D CAD visualization software. The software requirements are defined as developing data acquisition and data reduction systems for the different optical diagnostics being applied. An in depth understanding of image processing and mathematical theory are required. Work requires substantial initiative and problem solving abilities; broad objectives will be given but specific implementation methods are to be determined by the contract engineer.

General Scope of Work

SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

SOW Summary Should define respective responsibilities of Government and Contractor and specific task to be performed
******Government's Estimated Period of Performance: April 1, 2009 to August 11, 2011 - Completion of GESS-2 Contract. Base plus 3 Options******

The contractor shall:

1. Work with the optical diagnostics engineers to understand planned programs utilizing optical diagnostic systems. Interact with facility engineers to determine any hardware design or fabrication required in order to obtain optical access or support the installation of the optical diagnostics hardware into the facility.

2. Design and oversee fabrication of mechanical components for optical diagnostic techniques for application to both in-house and customer research rigs and components.

3. Consult with researchers on new diagnostic techniques and systems, in order to understand the unique measurement requirements for the specific diagnostics. Stay abreast of current measurement technologies and improvements in laser and detector technology with regard to their application and enhancement of nonintrusive measurement systems development.

4. Develop software required for improved data acquisition, processing and display of research data. Process acquired research data and provide researchers with flow measurement velocity data in physical units. Develop techniques for integration of flow measurement data with CFD predictions.

5. Write reports and present conference papers.

6. Assist in the preparation of research proposals to support continuation of optical diagnostics technology development and application.

7. Travel in accord with requirements for attendance of technical and/or technology transfer meetings, presentation of research papers, and in acquiring training or course work useful for enhancing capabilities in performing the task. Travel may also be required for support of research tests at other NASA Centers or customer facilities.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

1. Monthly progress reports, which shall include:
A.Technical developments, progress and analysis, and evaluation of all task specific projects.
B.Technical achievements or issues.

2. Software/hardware, testing equipment/materials, and optics shall be procurred as needed to meet task requirements.

Task reviews will be conducted bi-anually for the purpose of evaluating task performance according to predetermined measurables. Revisions, if required, will be tracked via monthly reports and modifications will be jointly agreed upon by the Task Manager and the TR as they relate to the performance rating of this task.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	20
Schedule	50
Cost	30

Desired Personnel Skill Sets

Experience with optical system design/layout concepts and optical diagnostic techniques is highly desirable. Experience with computer aided design software packages is beneficial. Familiarity with image processing and a strong foundation in mathematics is required for developing data reduction software. Experience with surface measurement probes and knowledge of instrumentation electronics is desirable. Programming experience in C, C++ and Fortran are required and proof of competency must be presented. Familiarity with digital image file formats is required. Candidate will be expected to learn the theory and operation of laser systems and on the job training will be provided. The ability to work effectively in multidisciplinary teams and/or independently is required. Good time management skills, oral and written communication skills are required.

Government Furnished Property

None

Safety and Assurance Plans

None Selected.

Technical Representative: Speier, Henry

Task Number: NNC07E219T - 9

Task Title: SPF 3-D Modeling and Thermal Vacuum Design

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

To 3-D model the Plum Brook Station Space Power Facility. To 3-D model the existing cryogenic coldwalls in a new CEV configuration.

Task Order Description
Description of Services to be procured

The Contractor shall provide the necessary personnel and materials required to further mature the Pro-E 3-D model of SPF and support the design associated with the GSE equipment related to the CEV Integrated Environmental Test CONOPS and Thermal Vacuum testing. The engineering effort shall integrate the structural analysis with the design task.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

The GESS Team shall perform the following:

Task Management: Manage resources on a day-to-day basis; execute the task: resolve problems and keep the NASA technical representative informed of all issues as they arise. The Contractor shall prepare and forward to the NASA technical representative monthly progress reports defining each month's technical progress and the future month's planned activities.

Design:

Expand the fidelity of the existing Pro-E 3-D model of the SPF to support CEV Integrated Environmental Test CONOPS and Thermal Vacuum Testing operations.
Develop structural designs for GSE handling equipment and structural hardware interfacing between the facility and Lockheed Martin.
Further mature structural models of thermal vacuum cryoshroud and heat flux cage.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

Design Activities:
1. Complete facility penetrations modeling in vibroacoustic highbay and test chamber and enclosure.

2. Complete cable route model (4 positions).
3. Partial model of South Gallery, West end.
4. Develop cryofloor CEV adapter model.
5. Cryowall quadrant handling fixture preliminary design sufficient for hand calc analysis.
6. Cryowall mast preliminary design model changes based on stress mods.
7. Develop heat flux system array model.
8. Develop heat flux system array attachment to cryofloor CEV adapter model.
9. Develop solid model for ANSYS analysis of the aluminum test chamber loading analysis. Mike Henry, Code H, will provide the detail information on what is needed for the analysis.
10. Cryoceiling conceptual design model.
11. Cryowall quadrants and ceiling assembly highbay storage beam structure preliminary design.
12. Update existing cryogenic pipe layout (chamber only) model.

Engineering Activities:
1. Cryofloor CEV adapter w/heat flux system connection stress analysis.
2. Cryowall quadrant handling fixture stress analysis.
3. Cryowall mast stress analysis update.
4. Cryofloor stress analysis with CEV adapter and loads.
5. Cryowall quadrants and ceiling assembly highbay storage beam structure preliminary stress analysis.
6. Piping flexibility analysis for cryogenic piping in chamber.
7. Aluminum chamber stress analysis

Reporting Activities
1) Monthly Progress Reports
2) Engineering Analysis Reports

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	50
Schedule	25
Cost	25

Desired Personnel Skill Sets

Pro Engineer detail modeling.
Autocad drawing.
Structural Design Analysis Capabilities
ANSYS Structure Model Design Capabilities

Government Furnished Property

Pro Engineer
Autocad
ANSYS

Safety and Assurance Plans

None Selected.

Technical Representative: Tofil, Todd

Task Number: NNC07E224T - 16

Task Title: Communications, Navigation&Networking Configurable Test-bed (CoNNeCT)- Engineering Support

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

Critical CLV/CEV task review not required, 4/5/2007 Cestaro.

The GRC Space Communication Division is supporting the development of Software Defined Radio (SDR) technology through the Space Communication and Navigation Office at Headquarters. As part of the TRL progression of this technology, a spaceflight demonstration is desired. With the recently identified manifest opportunity on ECL3, GRC is actively proceeding in developing a preliminary flight design.

Task Order Description
Description of Services to be procured

Support the GRC engineering team to develop a plan, schedule, preliminary design and begin critical design following the PDR for an ISS payload spaceflight demonstration test bed in support of Software Defined Radio (SDR) technology. The currently identified manifest opportunity is on HTV2 in 2011. This task defines specific deliverables required to prepare and execute the preliminary design phase of the CoNNeCT Project.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

TECHNICAL APPROACH:

The GESS II Team shall perform the following:

The contractor shall work closely with the GRC Communications, Navigation and Networking reConfigurable Testbed (CoNNeCT) Systems Engineering team to provide project support and engineering services. The team will work with the Lead Systems Engineer to develop a Flight and Ground System concept and to develop data products for the Preliminary Design Review. The results of all activities will be reported to the Lead Systems Engineer and distributed to individuals as defined by the Lead Systems Engineer.

Work Elements:
Provide general Systems Engineering Support to Project Management and the Lead Systems Engineer including:

Preliminary Design Review preparation and execution.
Assist in developing the Flight and Ground Systems concept.
Provide systems engineering content for the Baseline Systems Description (BSD).
Provide input into the Risk Assessment and Mitigations.
Provide support to the Lead Systems Engineer and the Systems Engineering Team.
Provide updates to PDR Documentation.
Support CDR, which is expected in 2/2010.

This task will be divided into sub-tasks as follows:

Sub Task 1 - ISS/ELC/Launch Vehicle Interface

Define the Launch Vehicle Interface and requirements. Define the Express Logistics Carrier (ELC) engineering requirements. Define the CoNNeCT interfaces with the Launch Vehicle and with the ISS. Develop the ISS Integration concept. Develop documentation and reports as required. Define CoNNeCT interfaces with the carrier. Review Project documentation as requested.

Sub-Task 2 Test, Verification and Validation Support
Support Test, Verification and Validation planning for the CoNNeCT Flight System. Support test planning and verification, as needed, for the breadboard and engineering units. Support Test, Verification and Validation planning of the CoNNeCT Ground System. Support development of the Test, Verification and Validation Plan, including defining verification methods. Work with applicable discipline engineers to confirm verification methods. Assist lead V&V lead in identifying and defining the analyses and inspections that are required.

Sub-Task 3 Requirements Development
Work closely with the Lead Systems Engineer to support the CoNNECT engineering team and to ensure technical integration across and within the CoNNeCT elements. Develop a Ground Systems Requirements Document. Lead or participate in Ground Architecture meetings weekly. Assist in the definition, clarification and interpretation of experiment requirements. Decompose the Concept of operations Document and the Mission operations Document into SRD requirements as appropriate. Support updates to PDR documents; including the System Requirements Document and Flight Systems Requirements Document. Review project documents as requested.

Sub-Task 4 Requirements Management Support
Supply a requirements manager to use DOORS to control the CoNNeCT Systems Requirements Document (SRD), Flight Systems Requirements Document (FSRD), Ground Systems Requirement Document (GSRD) and the requirements flow down and the verification definition. Perform initial input of level 4 documents into DOORs.

Sub-Task 5 Configuration Management
Provide a short term (through approximately mid October) Configuration Management Analyst to define, develop, and implement the CoNNeCT CM and DM plans for both hardware and software. Plans shall be applicable to each phase of the project and will work toward predictable, repeatable, consistent, and measurable processes leading to robust quality management of documents, hardware and software. Provide content for the Documentation Tree.

Subtask 6 ICDs
Manage the development, maintenance and configuration control of the Interface Control Documents for the payload subsystem to subsystem interfaces. The ICDs include the RF ICD, JPL radio ICD, GD ICD, Harris ICD. Skills required include knowledge of systems engineering, space flight development and communications theory. This tasks

continues through FY09.

Subtask 7 Comm engineering
This function requires an end to end knowledge of space communication networks, RF components, microwave theory, satellite communication and link budgets. The main task is to verify that proper decomposition of STRD, SRD and FSRD requirements has occurred and trace to the three radio specifications and the RF specification; and if not, decompose the requirements into engineering requirements and flow them into lower level documents.

Subtask 8
Compile a compliance matrix to the level 1 requirements document,the Systems Requirements Document, the Flight System Requirements document and work with the level IV book managers to compile compliances for the level IV documents. The compliance to the FSRD, SRD and Level 1's will be largely by rolling up the level 4 compliances defined by the level 4 book managers. Provide weekly schedule updates and a monthly report.

Subtask 9 Ground Integration
Provide weekly schedule updates and a monthly report. Develop the approach for ground processing at KSC and Tanegashima.
Work with appropriate personnel at KSC to coordinate KSC activities.
Work with launch site personnel to coordinate launch site activities.
develop flow of activities at KSC and Tanegashima.

Subtask 10 Assembly, Integration and Test
Work with the project payload team to define and develop the assembly and integrations plans. Communicate with appropriate facility managers to prepare cost estimates and to prepare for testing. Work with Manufacturing to prepare for hardware assembly Provide weekly schedule updates and a monthly report.

Subtask 11
Project Title: CoNNeCT Standing Review Board (SRB)/Software Member

Provide an individual with expert knowledge and experience in the development of space flight and associated ground software. This individual will also have strong experience and knowledge in the development of space flight software and associated ground software. The person will serve as a member of the Standing Review Board for the CoNNeCT Project. This individual will assess and address technical concerns regarding the project, specifically the software portion of the project. The following activities will be required to conduct the Software Review task:
1. The person will need three weeks (120 hours) to prepare for, participate in, and document the results of the review. This time will be used to attend the Software Architecture Review on June 12, work with the lead software engineer to close SWRR RFAs, review PDR documentation, attend the board on June 22nd, conduct interviews with project personnel and prepare the board report.
2. The review is scheduled to kickoff June 12, 2009 with a table top review of the payload software architecture and should conclude around June 24th with the project PDR board.
3. A review summary report shall be generated that describes any major issues found during the review and requests for actions to address these issues. It is expected that the preparation and production of this report, along with an associated summary presentation to project and engineering management, can be accomplished in 3 working days.

In addition, as a member of the SRB, the following activities will be required to conduct this task:

4. The person will need to prepare for, participate in, and document the results of various reviews.
5. The person will need to actively participate in the reviews and support the Board Chair.
6. When assigned to specific topics by the Board Chair, the person will need to review, summarize and provide a detailed report as a subject matter expert to the Board Chair.

Subtask 12
Project Title: CoNNeCT Standing Review Board

Provide an individual with expert knowledge and experience in the development of space flight hardware. This individual will also have strong experience and knowledge in the development of system engineering approaches associated with space flight hardware. The person will serve as a member of the Standing Review Board for the CoNNeCT Project. This individual will assess and address technical concerns regarding the project on an as requested basis. The following activities will be required to conduct this task:
1. The person will need to prepare for, participate in, and document the results of various reviews.
2. The person will need to actively participate in the reviews and support the Board Chair.
3. When assigned to specific topics by the Board Chair, the person will need to review, summarize and provide a detailed report as a subject matter expert to the Board Chair.

Desktop office computing hardware, software and support will be charged to task as a distributed cost.

This SOW is limited to the request for technical labor in support of project planning scope definition and flight design. As the project milestones and deliverables are better defined, it is expected that this task order will be amended to adjust work requirements and staffing levels.

Contractor shall plan on travel costs for up to 12 one person, two night trips to Goddard, JSC or JPL for support engineering functions during this period.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

Deliverables for Sub-Task 1:
1. Coordinate within CoNNeCT and JSC the development of the CoNNeCT to HTV Interface Control Document. CDR draft by 1 month before CDR.
2. Coordinate with CoNNeCT, JSC and JAXA the CoNNeCT to HTV Interface Control Document by January 2010
3. Coordinate the development of the CoNNeCT to ELC Interface Control Document. CDR draft by 1 month before CDR
5. PDR Presentation material for CDR 2 weeks before the review.
6. Documentation and documentation review as defined by Lead Systems Engineer
7. Update the Payload Integration Agreement (PIA)
8 Submit exceptions to the ISS as required.

Deliverbles for Sub-task 2 V&V
1. CDR baseline of the Verification and Validation Plan.
2. CDR version of the Verification and Validation Matrix, including methods, success criteria, responsible engineer and
3. CDR Presentation material due 2 weeks before the CDR.

Deliverables for Sub-Task 3 Requirements Development
1. Baseline Ground Segment Systems Requirements Document complete by Oct 20.
2. CDR draft Revisions to the SRD and FSRD Documents, incorporate the responses to RIDs\RFAs and internal comments.

Deliverables for Sub-Task 4 Requirements Management Support
1. Input the revision of SRD and FSRD into DOORS.
2. Input Ground SRD in DOORS
3. Put allocation matrix in DOORS.
4. CDR Presentation material.
5 Put level 4 specs into DOORs.

Deliverables for Sub-Task 5 Configuration Management (through approximately mid Oct)
1. Maintain and update Project Office Action Log Database
2. Maintain control over CoNNeCT Documentation, Data Product, Analyses, Drawing numbers.

Deliverables for Sub-Task 6 (ICDs)
1. JPL Radio ICD Management, GD Radio ICD Management, Harris Radio ICD Management and RF Subsystem ICD management. Oversee baselining of these documents.
2. CDR Presentation inputs.

Deliverables for Sub-Task 7 Comm Engineering:
1. Decomposition of RF and Comm requirements into the FSRD.

Deliverables for Sub-Task 8:
Compliance matrices for the Level 1 requirements, SRD, FSRD and GSRD by CDR.

Deliverables for Sub-Task 9: Ground Integration
1. Update Ground Integration Plan by CDR.
2. Develop ground handling tasks, flow and durations.
3. Develop ground handling/shipping methodology by CDR.

Deliverables for Sub-Task 10: Assembly Integration and Test
1. Develop pre/post ship check-out testing by CDR
2. Develop resource requirements (supplies, GSE, facilities, personnel, budget)
3. Identify safety hooks and requirements by facility (preliminary content)
4. Write the Assembly, Integration and Test Plan.
5. Write the STA test plan and procedure; the Vibration test plan and Procedure, the EMI test plan and procedure; and the Thermsal Vac Test Plan and Procedure.

Deliverables for Sub-Task 11
Generate RIDs and RFAs as appropriate for the milestone reviews.

Deliverable for Sub-Task 12:
Generate RIDs and RFAs as appropriate for the milestone reviews.

General Deliverables:
1. Reporting
a. Monthly Progress Reports

General deliverable
1. Monthly Report

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	Weights
Performance	40
Schedule	40
Cost	20

Desired Personnel Skill Sets

Appropriatew to the Scope of Work for each sub task. Skills for Subtasks 11 and 12 include knowledge of requirements devlopment and management. The individuals need to work well with others and need to be highly motivated.

Government Furnished Property

Pro/ENGINEER
E-Room Access
Windchill Access
Thermal Desktop™ or Patran

Safety and Assurance Plans

None Selected.

Technical Representative: Liu, Nan-Suey

Task Number: NNC07E230T - 5

Task Title: CFD Modeling of LOX/Methane Injectors and the Service Model Radiator

Task Details

Period of Performance
2/5/2009 - 8/31/2011

Background
Why the project is being pursued

The task will provide insight into the operation of the Service Module (SM) radiator for the CEV as well as into the feasibility of designing LOX/CH4 Injectors for the lunar surface ascent engine.

Task Order Description
Description of Services to be procured

CFD analysis to include grid generation for supplied geometries, running specified cases, and modifying codes as required.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

********Government's Estimated Period of Performance: October 1, 2009 to August 31, 2011 (Completion of GESS-2 Contract)********

The tasks effort will be divides aproximately 50/50 between the SM radiator modeling subtask and the injector modeling subtask.

A CFD model of the CEV SM radiator and related syatems will be developed. The modeling will be performed with Fluent. A workststion and access to the Fluent software will be provided by the government. The modeler will interact on a regular basis with the SM Thermal team to design a lab experiment to validate the CFD model. The model will be developed in stages. Appropriate operating conditions will be supplied by the SM Thermal team to the modeler. A Final Report documenting each stage of model development and results will be submitted to the SM thermal team at the conclusion of the task. Some travel will be required.

The National Combustion Code (NCC a GRC developed and owned code) will be utilized to develop models of candidate LSAM injectors. The modeler will consult with GRC RP branch personnel to ensure that the combustion and thermal phenomena affecting injector performance are adequately modeled. The modeler will generate computational grids suitable for use with NCC from supplied injector geometries. The modeler will perfom computations with the developed model at operating conditions of interest to the GRC RP branch. The modeler with perform/cordinate any improvements to NCC to enhance its accuracy or efficeincy required for the igniter modeling task. The work will be documented by reports.

Deliverables and Milestones to be met

Examples include: reports, analysis, and audits

********New for AFP7********

Task I – Orion Purge Analysis
1. Service Module, Spacecraft Adapter, and IU: Hydrogen Leak Simulation
Milestone 1 : Documentation Report (1/20/10)
2. Orion Purge System Thermal Simulation
Milestone 2 : Documentation Report (5/21/10)
3. Orion SM Radiator Fluid Flow Simulaion
Milestone 3: Documentation Report (9/30/10)

Task 2 - CFD Work for Analysis of Aerojet Ascent Main Engine (AME) at NASA GRC

1. Study the following parametrics:
a.Effect of film-cooling flow-rate on injector performance
b.Effect of (reduced) chemical-kinetics model on performance
c.Effect of spray-models (e.g. atomization) on system performance
2. Post-process CFD results and present to NASA/Aerojet team

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	50
Schedule	30
Cost	20

Desired Personnel Skill Sets

Familiar with CFD modeling and codes for combusting and thermally driven systems. Familiarity with running highly parallelized codes on a supercomputer. Ability to excercise sound engineering judgement.

Government Furnished Property

Computer workstation and access to Fluent software.

Safety and Assurance Plans

None Selected.

Technical Representative: Bulzan, Dan

Task Number: NNC07E232T - 8

Task Title: CE-13C Combustor Rig Facility Conversion

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

The test cell CE-13C is being converted from a laboratory for fuel reforming research to a laboratory for fundamental combustor and alternative fuel research. The purpose of this task is to look at the overall facility design and integration.

Task Order Description
Description of Services to be procured

1. Compare existing hardware capability with the requirements for the new combustor rig. This includes both mechanical engineering and electrical engineering support.
2. Design equipment, facility instrumentation, control, piping, and utility tie-ins to meet the new research requirements.
3. Ensure that facility meets all applicable NASA safety regulations and all applicable design codes.
4. Purchase or make any required hardware.
5. Support NASA in facility permits, including safety permit.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

1. Contractor shall be responsible for the work described in task order description above (facility analysis and design, procurement/fabrication of required hardware.)
2. Government will be responsible for providing facility requirements and design guidelines, facility build-up, check out, development of operating procedures, and the data acquisition and facility control system (Labview).
3. Government will provide the required quench cooler.
4. Contractor shall support the government in obtaining a safety permit.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

*Design documents
-overall summary
-equipment design
-data sheets
-PID's

-parts list
-instrument list
-equipment layout drawing
-piping isometric
-vendor documentation, including operating instructions
-instrument calibration sheets
-electrical area classification

*All required hardware, including equipment (e.g., heater), piping and fittings, pressure relief valves, and instrumentation and control valves.

Monthly Progress Reports.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	50
Schedule	40
Cost	10

Desired Personnel Skill Sets

Electrical engineering
Mechanical engineering
Drafting

Government Furnished Property

None

Safety and Assurance Plans

None Selected.

Technical Representative: Downey, Joseph

Task Number: NNC07E234T - 5

Task Title: Space Telecommunications Radio System (STRS) Research Support

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

The long-range vision of this project is to develop integrated communications systems that improve current service capabilities and enable new services to NASA missions, and reduce NASA's costs.

This work area addresses the long-range vision of enabling improved/new services to NASA missions. This includes developing re-configurable transceiver architectures and technology advancements, and development of an integration and system-level performance evaluation capability to demonstrate system performance in a relevant system environment.

Task Order Description
Description of Services to be procured

The purpose of this task to develop a re-configurable transceiver open architectures including the development or study of SDR systems, software/computer engineering, and digital signal processing. Software and firmware will be developed and used on the CONNECT flight experiment, scheduled for launch in 2011.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

The GESS Team shall perform the following:

1) CONNECT Support
Participate in the advocacy, design, development, and implementation of the Space Communications and Navigation Communication, Navigation, and Networking Tesbed (CONNECT). Serve as a point of contact for one or more of the CONNECT SDR platforms or waveforms. Support the payload build-up and integration testing.

Develop specification and budget development of the equipment needed for the SDR lab for CONNECT (i.e. EDS).

2) STRS Architecture Design and Reference Implementation
Update the STRS Architecture description and standards as required and participate in STRS compliant reference implementation(s) definition. Contribute to the presentations on the details of the reference implementation architecture to other NASA centers, SDR Forum Space Working Group, and project briefings. Present architecture definition and

advancements in appropriate forums.

3) SDR Forum Collaboration
Support the SDR Forum's space related activities, especially the Space Working Group. Keep abreast of the lasted technologies and trends for SDRs as they apply to NASA missions and the STRS Architecture.

4) FPGA Firmware Developers Interface (FDI)

Recommend firmware rules for abstraction of the STRS waveform implemented in the Signal Processing Module. Standard FPGA wrapper interfaces or firmware APIs could be a part of these rules. Consider standards already employed in FPGA IP cores. Utilize the SDR Forum's resources as appropriate. Collaborate with the JTRS's Network Enterprise Domain Test & Evaluation group (SPAWAR, Charleston) and their Waveform Portability Guidelines, as appropriate.

5) CONNECT Baseline TDRSS Waveform
Lead development of an STRS-compliant Data Group 2 TDRSS waveform for CONNECT. Coordinating the collaboration with GSFC waveform developers is an important part of this work element. Development of the waveform will initially be done on a ground-based SDR-3000, and then ported to NASA JPL's CONNECT SDR (breadboard, flight, and engineering models). Maintain close coordination with JPL's STRS Operating Environment activity. Model-based design development should be utilized with the Matlab/Simulink/Synplicity or other appropriate toolset.

6) SDR/STRS Technology Validation Lab
Support the operation of the GRC SDR/STRS laboratory development and operations. Key tasks include developing system diagrams, manage and control the laboratory configuration, execute appropriate test plans, and document results. Maintain and configure reconfigurable hardware platform(s) to support architecture, waveforms, and technology demonstrations. Platform(s) will support different architectures including different versions of the JTRS SCA and NASA's STRS. Conduct demonstrations of reconfigurable systems in the GRC SDR Technology Laboratory. Maintain laboratory equipment, calibration, and document and software configuration control.

Note: NDA's with companies providing support and information to NASA may be necessary to fully accomplish the task objectives.

Deliverables and Milestones to be met

Examples include: reports, analysis, and audits

Milestone /Deliverable
The following deliverables are required to support the project schedule. Specific dates can be updated during the period and task may be amended to adjust deliverables if required.

1) December, 2009 - Report detailing the status and results of the verification of the GRC/GSFC waveform against requirements using the JPL breadboard.
2) December, 2009 – Provide input to the draft verification plan of the CONNECT S-band system for CDR.
3) December, 2009 – Provide input to the draft verification plan of the CONNECT Ka-band system for CDR
4) December, 2009 – Complete compliance testing of the JPL breadboard system and provide results report.
5) January, 2010 - Complete compliance testing of the GD breadboard system and

provide results report.
6) January, 2010 – Report detailing the EDS assembly status and remaining issues.
7) March, 2010 – Report describing results of the JPL pre-ship review.
8) March, 2010 – Report detailing design and plan for implementation of the method to automatically control and collect analysis results on TVL laboratory equipment and to collect test data for future analysis.
9) March, 2010 – Complete compliance testing of the JPL Engineering Model system and provide results report.
10) March, 2010 – Port CoNNeCT Waveform to JPL Flight SDR.

• Monthly progress reports.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	Weights
Performance	40
Schedule	35
Cost	25

Desired Personnel Skill Sets

This task will require personnel with the previous knowledge of the Space Telecommunciations Radio System architecture. It also requires the knowledge of the developments leading to the Communications, Navigation, and Networking (CONNECT) Testbed. Knowledge in digital communications, firmware development, software development, and communication systems.

Government Furnished Property

GOVERNMENT FURNISHED PROPERTY:
The existing hardware and software furnished to the previous contractor should be made available.

Safety and Assurance Plans

None Selected.

Technical Representative: Krantz, Timothy

Task Number: NNC07E242T - 8

Task Title: Spur Gear Fatigue Rig Upgrade

Task Details

Period of Performance
2/17/2009 - 3/31/2010

Background
Why the project is being pursued

Why the project is being pursued
No-Bid by D received on 06/26/2007, ldk
Entered as WISE Task 20070618 on 06/20/2007, ljm
GRC has conducted spur gear fatigue test research for more than 30 years. The testing has proved valuable, and GRC continues to see this need for future aeronautics work. As time has passed and gear technology improved, required testing times has increased. Even though GRC has a set of 6 such rigs, the rigs that were designed many years ago is now only marginally capable of today's highest-quality testing gears in reasonable time because of torque limitations of the current rig. GRC has also learned that the rig dynamics are not optimal.
The NASA Fundamental Aeronautics Program, Subsonic Rotary Wing project has decided to invest in a new rig design, fabrication, and commissioning. The desire is to have a set of three rigs.
To maintain some history of the task, the main accomplishments during periods prior to AFP6 were as follows:
- completed a conceptual design trade study and produced ROM cost estimates for various design solution strategies
- assessed strategy to complete design via vendor supplying a full “turn-key” solution vs. purchasing components with NASA and GESS contractor acting as the integrator; decided on a turn-key solution
- completed the process of detailed SOW, accepting bids and proposals, proposal review,, and selection of “Superior Controls” as the vendor
- managed the procurement and delivery of two rigs to NASA GRC in spring of 2009

Task Order Description
Description of Services to be procured

Engineering support is needed to complete the task of delivering to NASA test machines fo rspur gears that meet NASA's specifications. The work includes defining the appropriate procurement method (as was accomplished in AFP5) and then managing the procurement, delivery of rigs and engineering design packages to GRC, and verification that the machines meet the government's specifications and the vendor's guarantee.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

General Scope of Work

SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed
Gov't estimated Period of Performance April 1 2009 - March 31, 2010
*************Edit of SOW for AFP7 – Aug 17, 2009 *******
On Aug 17, 2009 the SOW and milestones were edited slightly to best reflect the chaninging funding situation and technical needs of NASA as follows:
- All milestones referencing to a third test machine have been eliminated; although there is a technical need, it has become apparent the desired and required funding is unlikely to become available in FY10; if this situation changes and if NASA still requires contractor support for a third machine a new task will be initiated
- A new numbered item was added to the SOW listing (#9 below) requesting engineering analysis and procurement actions for spare parts for the new test machines
*************End of Edit of SOW for AFP7 – Aug 17, 2009 *******

Engineering support is needed as follows
The contractor shall continue to manage the procurement contract with Superior Control that was started in AFP5. In the following statements the word "vendor" refers to the Superior Controls company. Some of the main responsibilities of the contractor are as follows:
1. The contractor shall review any proposed design changes or augmentations to the Test System as might be proposed by the vendor. The contractor shall assist NASA to determine any impacts on the proposed change relative to the test rig performance specification, cost, and schedule. NASA will be responsible for accepting or declining any change that would negatively impact cost, schedule, or performance. The contractor shall have the option of making decisions on design or fabrication details if the available choices meet cost, schedule, and performance.

2. The contractor shall monitor the vendor's progress during the fabrication phase and guide and influence the vendor as possible within the constraints of the contract between the contractor and the vendor to meet delivery schedule.

3. The contractor shall keep an awareness of the facility preparation being done by NASA. While the contractor is not responsible for execution of the facility preparation, the contractor shall keep coordinated with NASA's preparation and shall notify the task Technical Representative if NASA's preparations in terms of capability or schedule are not consistent with the vendor's solution and schedule.

4. The contractor's procurement with the vendor calls for delivery of 2 machines while NASA's requirement is for 3 test machines. Once the vendor delivers the final engineering design package to the vendor, the contractor shall request a bid from the vendor for a third test machine. The contractor shall also assess if a third machine could be built by another vendor (or vendors) at lower cost using the final engineering and fabrication drawing for the 2 test machines. The total task value shall be estimated for 3 test machines even though NASA has not yet identified total funds for the third machine.

5. The contractor shall arrange for a visit to the vendor's site (per the vendor's contract) to observe the operation of the test machine and verify performance. The contractor shall suggest to NASA a set of operations that can be used to verify performance during the visit to the vendor's site. The contractor shall attend the site visit and shall assist the NASA TR to determine that the test machines are ready for delivery to GRC.

6. The contractor shall arrange for delivery of the test machines to GRC and coordinate the logistics to transport the test machines to the test cell CE-1 in Bldg 5.

7. The contractor shall review the final engineering package to be delivered with the test machines for completeness and conformance to the vendor's contract. The reviewed

package shall be delivered to the NASA TR.

8. The contractor shall observe the performance of the test machines during early operations at GRC making sure that the test machines meet specifications. If deficiencies are found and are determined to be covered by the vendor's guarantee, then the contractor shall take action to correct deficiencies via the guarantee. If the deficiencies are due to an improper specification by NASA, the contractor may choose to offer a solution to the NASA TR. At that time the NASA TR will determine if the solution is appropriate and if necessary would then provide an amended Task Request.

*************Edit of SOW for AFP7 – Aug 17, 2009 *******
9. The contractor shall complete a technical analysis of the final delivered rig design and recommend a set of spare parts that should be procured assuming operation of the rigs for a five year timeframe. Provide a procurement strategy consistent with available funding and obtain feedback from NASA TR. Place orders for spare parts as needed, but orders are not to exceed approved, obligated budget.
*************End of Edit of SOW for AFP7 – Aug 17, 2009 *******

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

June 15 – March 30, 2010 Verify the performance of the test rigs in operation at GRC, identify any deficiencies and suggest solution via vendor guarantee or via task augmentation as appropriate

***** New milestone as of Aug 17, 2009 *******
Sept 30, 2009 Place order for spare parts intending to cover five years of operations of the rigs.

Deliverables:
Deliver two test rigs, final set of fabrication drawings, recommended set of spare parts, and delivery of spare parts.

Monthly Progress Reports.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	Weights
Performance	30
Schedule	40
Cost	30

Desired Personnel Skill Sets

Execution requires knowledge and capability for
- mechanical system analysis

- refine general descriptions of experimental capability into detailed, quantified requirments
- skills to manage the project schedule and communicate key information to NASA for the major project decisions
- skills to verify machine performance

Government Furnished Property

AutoCad

Safety and Assurance Plans

None Selected.

Technical Representative: Frankenfield, Bruce

Task Number: NNC07E243T - 5

Task Title: Ares Upper Stage Compartment Purge & Haz Gas CFD Analysis

Task Details

Period of Performance
3/9/2009 - 8/31/2011

Background
Why the project is being pursued

No-Bid by D received on 06/25/2007, ljm

Entered as WISE Task 20070620 on 06/20/2007, ljm

The Ares I launch vehicle is being developed to support the NASA Constellation Program. The Ares I vehicle design includes vented compartments, which are located between 1) CEV and Upper Stage and 2) Upper Stage and First Stage. The Purge and Haz Gas Systems design must verify the following requirements for these compartments: 1) prevent hazardous gas accumulation and 2) provide hazardous gas detection.

The NASA GRC is designing the purge ducting for the Ares I launch vehicle. The Purge System ducting is made out of composites and are located in the Instrument Unit, Aft Skirt and Interstage.

Task Order Description
Description of Services to be procured

Provide CFD flow analysis of the Instrument Unit/Service Module (IU/SM) compartment volume and the Aft Skirt/Interstage/First Stage Frustum compartment volume.

Provide stress/structural engineering and composite materials support for the Purge and Haz Gas Detection Systems.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

Government's Estimated Period of Performance is April 1, 2009 to September 3, 2010***

The Contractor shall:

1) Use CFD to investigate if the GN2 purge gas circulation within each compartment.
2) Use CFD to investigate if a hydrogen and/or oxygen maximum spec leak rate would cause high hazardous gas concentrations within the compartments.
3) Use CFD to correlate the gas concentrations at the compartment vent exits compared to gas concentrations within other areas of the compartments.

4) Use CFD to investigate if GN2 purge gas circulation maintains an acceptable safe environment within the integrated IU & Orion shared volume compartment.
5) Provide testing and CFD analysis support for PHG testing at Plum Brook CCL and at MSFC TD04/05.
6) Provide a venting analysis during the ground purge flow at the launch pad.

7) Provide Stress/Structural Enginnering for the Purge & Haz Gas Systems (PHG) in the following areas:
a) Determine the laminated composite properties for use in the finite element analysis(FEA) of the purge system. Composite properties will be calculated and DEA results will verify the structural performance of the purge ducts design.
b) A FEA will be conducted on all individual components of the purge duct system using static and dynamic loads. The components include composite ducts and manifolds. A system analysis includes assembled dudts/manifolds and reinforced hoses. The FEA is use to further optimize the purge duct design. Maintain regular contact with MSFC Loads Team.
c) Provide recommendations on the purge duct design to maintain structural integrity. Recommendations shall be based on NASA standards and procedures, FEA, and other applicable considerations.
d) Written Reports shall be provided to NASA with each significant analysis.
e) Attend weekly team meetings.
f) Provide inputs to update the P&HG Structural Verification Plan (Doc #005)for composite purge duct materials.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

Provide CFD analysis results for the Purge and Haz Gas Systems CLOR on 6/2010.
Provide final CFD analysis to support Purge and Haz Gas Compartment Dev Testing TD04/05 scheduled for the summer of 2010.

Provide structural analysis report for the Purge and Haz Gas Systems CLOR on 6/2010.

Monthly Progress Reports.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	70
Schedule	15
Cost	15

Desired Personnel Skill Sets

Capability to model, run and analyze a CFD code that is capable to run multiple species gas flow environments.

Government Furnished Property

None

Safety and Assurance Plans

None Selected.

Technical Representative: Shalkhauser, Kurt

Task Number: NNC07E246T - 8

Task Title: EMC Verification Support for the Project Orion Crew Exploration Vehicle

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

Glenn Research Center (GRC) has the responsibility for qualification testing of the integrated Orion Crew Exploration Vehicle. The CEV, which includes the Crew Module, Service Module, and Launch Abort System, is a focal point of NASA's Constellation Program, which will carry human beings on missions to the International Space Station, the moon, and Mars. In order to accomplish these missions safely, the CEV will be subjected to a series of environmental qualification verifications at the Space Power Facility (SPF) at Plum Brook Station near Sandusky, Ohio. Electromagnetic Compatibility (EMC) characterization will be performed on the assembled vehicle as the first part of an extensive test campaign, which also includes vibration and thermal/vacuum characterization at the same facility.

Task Order Description
Description of Services to be procured

The contractor shall provide expert technical support and consultation to assist GRC in the planning, preparation, and execution of electromagnetic compatibility (EMC) verification of the Project Orion Crew Exploration Vehicle (CEV) under the GRC Space Environments Testing (SET) Project.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

GRC requires expertise to support the following activities:

Work Element 1.0 - EMC Support
1.1 EMC Requirements Definition: The Contractor shall review and analyze EMC requirements currently emerging from the NASA Constellation Program, the Orion Project Office, and the SET Project. The contractor shall assist in validating that the requirements are reasonable and verifiable as they relate to the integrated flight vehicle. The contractor shall participate in the development and review of EMC requirements/specifications by participation in NASA and Lockheed Martin formal and informal reviews, and by review of EMC-related documents such as the CxP70080: Constellation Program Electromagnetic Environmental Effects (E3) Requirements Document and the CxP70141: Constellation Program Electromagnetic Environmental Effects (E3) Control Plan.

1.2 EMC Verification Planning: The Contractor shall participate and assist in planning and definition of the EMC verification concept, developing the EMC facility requirements, determining test equipment needs, and defining measurement schemes. Planning will specifically involve design of specialized EMC equipment to be used within the vacuum/EMC chamber at Plum Brook Station. The Contractor shall collect data necessary for characterizing the EMC chamber and refining the design of the EMC verification system.

1.3 Verification Approach Consultation: The Contractor shall provide consultation and advice pertaining to the test procedures and operations, and advising NASA on compliance to EMC standards and standard practices. The Contractor shall participate in EMC working groups as needed, will support NASA and NASA/LM teleconferences, as well as representing GRC at meetings of the EMC Control Board (TBD). The Contractor shall provide consultation on EMC chamber certification.

1.4 Verification Services: The Contractor shall provide EMC engineering and technical support to collect data for verification of the Orion spacecraft. This work will involve multiple setups, reconfigurations, and extended operation of EMC equipment, including radiofrequency signal generators, amplifiers, transmitting and receiving antennas, and signal receivers/analyzers.

1.5 Data Analysis: The Contractor shall assist NASA in the on-going acquisition, review, and analysis of the acquired EMC data throughout the full term of the CEV effort, which includes the characterization and certification of the empty chamber, and extends through to the full-scale CEV integrated qualification.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

The milestones and deliverables for this period shall include:

1. Provide review and comments on CEV EMC-related documentation, including CxP70808: Constellation Program Electromagnetic Environmental Effects (E3) Requirements, and CxP70141; Constellation Program Electromagnetic Environmental Effects (E3) Control Plan.

2. Participation in meetings and teleconferences relating to EMC planning and requirements validation. (On-going)

3. Plan and perform a preliminary GRC-based radiofrequency (RF) characterization and RF leakage analysis of the SPF facility vacuum chamber. (Est.: October 2008 – November 2009)

4. Provide written input for maintenance of CxP 72205 CEV SET Test Facilities Requirements Document describing preparation of the Space Power Facility for EMC testing. (On-going)

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	20
Schedule	60

Cost	20

Desired Personnel Skill Sets

The lead support position shall be a NARTE-certified EMC engineer with experience in EMC verification, EMC data acquisition, and EMC analysis at the system and vehicle level. Others supporting this task shall be under the oversight of the NARTE-certified engineer/manager.

Government Furnished Property

None

Safety and Assurance Plans

None Selected.

Technical Representative: Hall, Nancy

Task Number: NNC07E248T - 8

Task Title: ELS Flight Experiments

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

To provide support to ELS with testing components/subsystems in a relevant environment, ie reduced gravity aircraft or drop tower.

Task Order Description
Description of Services to be procured

Engineering support for reduced gravity aircraft experiments or drop tower testing.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

Contractor shall:

SUBTASK ONE:
Provide engineering support to complete modification to the VPCAR C9 rig to fly it in FY10, if its selected during the Water Distillation Downselect process. Responsibilities include:
1) Evaluate and complete all mechanical open items that haven't been completed
2) Evaluate and calibrate all optical systems for optimum data analysis and collection
3) Evaluate and complete all open issues from functional testing
3) Support ground base testing at GRC including system checkout, updating procedures and input to test matrix
4) Support reduced gravity testing on plane at Ellington Field, Houston, TX

SUBTASK TWO:
If selected, provide support to the Systems Engineering Educational Discovery (SEED) proposal(s) submitted by GRC. Responsibilities include:
1) Provide mentor support to the university team selected via telecon or videcon. (Note: Student teams will be building up hardware, TEDP, etc support is mainly through email/phone)
2) Support reduced gravity testing on plane at Ellington Field, Houston, TX with university team

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

Provide input to TEDP (Test Equipment Data Package)
Completed buildup rigs, diagnostics and facilities as outlined in scope of work.

Monthly Progress Reports

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	Weights
Performance	60
Schedule	30
Cost	10

Desired Personnel Skill Sets

Reduced gravity flight qualified engineers

Government Furnished Property

This task will involve the use of the reduced gravity aircraft, laboratories in Bldg 77 and 110 and the small drop tower.

Safety and Assurance Plans

None Selected.

Technical Representative: Thomas, John

Task Number: NNC07E250T - 5

Task Title: Upper Stage Development Flight Instrumentation (DFI) Electrical Support

Task Details

Period of Performance
2/13/2009 - 8/31/2011

Background
Why the project is being pursued

DFI will characterize the CLV during the first 5 flights.

No Changes

Task Order Description
Description of Services to be procured

No Changes in Task Order Description.

Assisting in the development of the US DFI Requirements Document for the DFI system.

Providing electrical support in evaluating potential vendors and vendor bids.

Preparing laboratory space and equipment for Engineering Development Unit (EDU) checkout

Preparing documents in support of the major Ares, Upper Stage, Upper Stage Avionics reviews.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

Government's Estimated Period of Performance is September 1, 2009 to April 30, 2010.

There are no changes in the General Scope of Work.

NASA has the responsibility to design and procure hardware to characterize the CVL by acquiring sensor data. Contractor End Item Specifications need to be written to procure the hardware. The contractor shall assist the DFI lead in the development of contract end item specifications for the master and remote data acquisition units (DAU) for the DFI system. Additionally, the contractor shall provide electrical support in evaluating potential vendors and vendor bids, preparing a laboratory space for Engineering Development Unit (EDU) checkout, and in preparing documents in support of the major avionics reviews. The contractor shall function as a member of the DFI team, and shall work with the DFI technical lead and project manager to assure that all DAU-related work elements are completed.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

The milestones and deliverables for this period shall include item 1 below, the other items are included here for schedule purposes only:

1. Complete the US DFI Lab Build Up, with EDU Harnessing (12/15/10)

2. US DFI EDU Testing Without Telemetry System (4/30/10)

3. US DFI EDU Testing with Telemetry System (12/28/11)

4. DFI EDU's Available for integrated testing at SIL (if required) (3/15/11)

5. Avionics & Upper Stage CDR Document inputs (7/15/10)

6. ARES I-Y DFI flight hardware delivered to Michoud Assembly Facility (10/22/12)

7. ORION-1 DFI flight hardware delivered to Michoud Assembly Facility (11/23/11)

8. ORION-2 DFI flight hardware delivered to Michoud Assembly Facility (4/25/12)

9. ORION-3 DFI flight hardware delivered to Michoud Assembly Facility (9/17/12)

10. ORION-4 DFI flight hardware delivered to Michoud Assembly Facility (7/12/13)

Monthly reporting required for overall task status with any technical, financial or programmatic issues which need resolving.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	40
Schedule	40
Cost	20

Desired Personnel Skill Sets

Knowledge in electrical engineering.

Flight hardware development experience.

Procuring engineering, Qual and flight hardware, also lab hardware.

Testing EDU, Qual and FLight hardware.

Government Furnished Property

None

Safety and Assurance Plans

None Selected.

Technical Representative: Arida, Wade

Task Number: NNC07E254T - 6

Task Title: Evaluate Existing New Design of Windowed Test Sections for CE-5B

Task Details

Period of Performance
10/1/2009 - 9/30/2010

Background
Why the project is being pursued

****************** New as of AFP7 08/20/2009, wta ********************
Changes to deliverable dates and statement of work's estimated period of performance (wta, 08/20/2009)
****
There was an ADF design and partial report generated for a new windowed test section for test cell CE-5B located in ERB a few years back. There is a future need for an improved windowed test section design for testing in CE-5B.

Task Order Description
Description of Services to be procured

Please review the existing design and design report to verify test section design is and will be fabricated to all applicable codes.

Changes to the design should include the following
Design to higher pressures (500psig)
Focus on the four window design vs. the three window design.
Focus on test stand 2 design and not test stand 1
Verify design and fabrication will comply with all applicable codes
Try to eliminate GN2 film cooling or use air cooling instead.
Keep the window as close to the combustion environment as possible (work with research customers on this issue)
Verify existing subsystems will comply with the new design.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

Provide necessary ANSYS and or Caesar analysis
Assist with any design and safety reviews
Assist with the buildup and fabrication of the test section and window hardware

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

****************** New as of AFP7 08/20/2009, wta ********************

Final design completed by Nov. 2009
Hardware delivery and final design report by March 2009
****
Monthly Progress Reports.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	10
Schedule	50
Cost	40

Desired Personnel Skill Sets

Ansys and FEA analysis
Procurement assistance

Government Furnished Property

None

Safety and Assurance Plans

None Selected.

Technical Representative: Freeman, Carmela

Task Number: NNC07E256T - 4

Task Title: Facilities Project Drawing Set Updates

Task Details

Period of Performance
3/5/2009 - 8/31/2011

Background
Why the project is being pursued

This effort was being performed under task 98 and was split out to allow funding to be tracked seperately from configuration related efforts on task 98. No increase in support was required.

Task Order Description
Description of Services to be procured

Civil, Architectural, Plumbing, Building Electrical, HVAC, Piping, Energy Mgmt, Fire Protection, High Voltage Electrical, etc. drafting services to convert Facilities Project Drawings into As-Built Record Drawings and to enter them into the Facilities Engineering Drawing Mgmt System.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

Contractor shall update the Project drawings delivered at the end of construction and pick up the red-line changes. It will also involve uploading manual versions to autocad for older projects that make up the current backlog. Little or no field work involved.
Contractor shall work with the Facilities Division Project Manager to pick up all required changes and route drawings for signoff.
Government's Estimated Period of Performance is April 1, 2009 to the end of the contract, August 31, 2011

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

Quarterly report listing the project sets updated during the quarter, any new projects received and pending work.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation **Weights**

Performance	50
Schedule	25
Cost	25

Desired Personnel Skill Sets

Experience with A/E drafting methods and standards.

Government Furnished Property

Facilities Project drawing sets.

Safety and Assurance Plans

None Selected.

Technical Representative: Petrarca, David

Task Number: NNC07E258T - 19

Task Title: ARES I X Drafting Support

Task Details

Period of Performance
10/1/2009 - 10/31/2009

Background
Why the project is being pursued

The work is in support of the ARES I X project.

Task Order Description
Description of Services to be procured

The contractor shall supply designer services to support the design of segments SA, SM, IS-1 and work in support of design and detailing on all segments of ARES. Provide drafting support for ECS, weldment drawings, assembly drawings, IRD interface drawings, and possible detailing over the entire upper stage.

Contractor shall support the development of the integration drawings.

Contractor shall supply designer services to finalize intgrated drawings and address drafting issues that surfcae as a result of turnover. This task is not definite. Work may be completed by end of March.
****Added August 2009
Provide for last minute assessments to support launch.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

The contractor shall supply designer services to address finalizing designs and developing details for SA, SM, IS-1, and work in detailing on all ARES segments. Provide drafting support for ECS, weldment drawings, assembly drawings, IRD interface drawings, and possible detailing over the entire upper stage.

The contractor shall provide darfting services to develop the integration drawings as part of the ARES I-X team.

Provide drafting services to support completion of integrated drawings for KSC and address potential drafting issues that surface as a result of hardware turnover.

*********revised task August 2009
Provide drafting services to assess general task in support of launch.**************

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

Milestones
*******Completion of assessments to support flight through October 2009)******

The contractor shall:
• Release all drawings and models into the ARES database.
• The contractor shall support the ARES I-X drafting schedule milestones.
• Provide Monthly Progress Reports.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Models and drawings for the integrated drawings and any models/drawings that were revised after turnover.
*******Deliverables
Completion of assessments to support flight.(October 2009)******

Criteria to Be Used for Evaluation	**Weights**
Performance	40
Schedule	40
Cost	20

Desired Personnel Skill Sets

Designer capable of doing both conceptual work and detailing and very good Pro/E skills.

Government Furnished Property

n/a

Safety and Assurance Plans

None Selected.

Technical Representative: Weiland, Karen

Task Number: NNC07E259T - 7

Task Title: Thrust Vector Control Project Configuration/Data Management

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

No-Bid by D received on 08/20/2007, ljm

No-Bid by R received on 08/17/2007, ljm

No-Bid by F received on 08/17/2007, ljm

Entered as WISE Task 20070831 on 08/17/2007, ljm

The Launch Systems Project Office (LSPO) requires configuration management and records management to achieve its goals and objectives. This task order provides that support to the TVC project. The TVC project requires the establishment of configuration, documentation, and records management to achieve objectives in an effective time frame.

Task Order Description
Description of Services to be procured

The Contractor shall provide the necessary personnel and materials to provide configuration management (CM) support for the Thrust Vector Control (TVC) Project. The CM personnel shall ensure that the TVC project collects and properly dispositions all documentary materials, regardless of physical form or characteristics, made or received by the project as evidence of the project's functions, policies, decisions, procedures, operations, or other activities.

The Contractor shall provide the necessary personnel and materials required to support the conduct of TVC project reviews held at GRC.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

*******Government's Estimated Period of Performance: October 1, 2009 to Completion of GESS-2 Contract Base plus 3 Options*******
*******Updated for AFP7 October 1, 2009*******
The GESS Team shall perform the following:

For the TVC project at GRC, conduct configuration/documentation/data identification, configuration/documentation/data control, configuration/documentation/data status accounting, configuration/documentation/data verification, and records control in accordance with program/project requirements.

The Configuration Management Specialist's support for the Thrust Vector Control project focuses on configuration and data management, hardware and software process improvement.

The Configuration Management Specialist works toward predictable, repeatable, consistent, and measurable processes leading to robust quality management of documents, drawings, hardware, software, and data.

During AFP7, the support will add a focus on defining and implementing the drawing release process.

Specific Work Elements:

1. Become knowledgeable of modifications and new features of the WindChill CM software.
2. Become knowledgeable of the DDMS system which is intended to replace Windchill for the Upper Stage CM system.
3. Implement the requirements of the Ares I and Upper Stage Configuration Management Plans and flowing the requirements down to the Thrust Vector Control Project.
4. Implement and maintain all aspects of configuration identification (including the numbering scheme for hardware, software, and documentation, and labeling of baselines), control (including the release process for hardware, software, and documentation), and status accounting in accordance with the TVC Configuration Management Plan.
5. Coordinate and provide materials support for Technical reviews as required by project schedule.
6. Update and maintain CM requirements in the TVC CM Plan.
7. Implement CM Plan and Processes.
8. Update and maintain CM processes.
9. Implement records control.
10. Attend TVC Engineering Review Board, Project Control Board, Risk Review Panel, and other meetings.
11. Coordinate, track and maintain contractor data deliverables.
12. Configuration manage design review documents.
13. Define design review tool (for example eRoom) user interface requirements.
14. Store, maintain, and distribute project data according to NPR 1441.1 and NPR 7120.5.
15. Define and implement a drawing release process.

Travel, as needed, to Upper Stage Production Contractor or their subcontractor sites, Advanced Development Contractor sites, MSFC, KSC, MAF and SSC or other locations to work configuration/document management issues with the NASA centers and contractors.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

Updated TVC Configuration Data Management Plan within 1 month of release of either updated Ares I or Upper Stage Configuration Management Plans.

Records of receipt, review, and disposition of Data Requirement Documents from the advanced development contracts that support GRC engineering.

Records of configuration items/documentation/requirements numbered according to CM Plan.

Record of minutes and action items from TVC Engineering Review Board and Project Control Board within 1 week of the meetings.

Records of design review documents.

Documentation changes pertinent to TVC change orders implemented within 2 working days of approved change.

Document status accounting reports as new baselines are established and upon request. Document status accounting database accurate within 2 working days of changes.

Minutes for major project reviews, as needed, within 1 week of review board meeting.

Records collected, controlled, and dispositioned within the TVC project according to NPR 1441.1 and NPR 7120.5.

Baselines and releases of TVC Products for builds, incremental releases, and full releases (as required).

Monthly Progress Reports.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	50
Schedule	30
Cost	20

Desired Personnel Skill Sets

CM Specialists

Government Furnished Property

None

Safety and Assurance Plans

None Selected.

Technical Representative: Otten, Kim

Task Number: NNC07E265T - 9

Task Title: CEV SET Vibroacoustics

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

The CEV SET program has engineering design, analytical, and testing needs that requires supplemental expertise above current resources in the vibroacoustic technical field.

Task Order Description
Description of Services to be procured

Perform design, analytical, and test tasks, and provide consulting expertise, as described in General Scope of Work section below. This work is necessary to support the verification of the vibroacoustics facilities at Plum Brook.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

Provide high-level engineering support to NASA GRC Engineering (DEV) in the insight and verification of the Mechanical Vibration Facility (MVF) at NASA Plum Brook Station's Space Power Facility (SPF), Sandusky, OH. Ability to meet critical aggressive schedule is of prime importance.

Vibration Tasks (MVF):

1) Provide updated dynamic FEM (NASTRAN) models of MVF design including exciter, shaker table, seismic mass, head expander and other equipment. Transfer modeling information and models to NASA. Model should characterize the system boundary conditions, along with the complete shaker's system and dynamic characteristics.

a. Using CEV models provided by NASA/LM, perform performance analysis including the clipping associated with limitations of the hydraulic shakers force limitations, spherical coupling force limits, and available hydraulic fluid limits. Also make assessments of MVF with using both rigid and dynamic CEV model. Assess the capability to react CEV's overturning moment.

b. Perform analysis of MVF's ability to control test articles (e.g., CEV, VTA, etc). Characterize sensitivity to changes in the CEV test article dynamic properties (i.e. shifts in frequencies, etc.)

c. Review, evaluate, and provide recommendations with Benham's design and analysis including reports, presentations, etc.

2) Provide consulting on assessment of MVF design and operational capability from October 1, 2009 through September 2010.

3) Support the MVF validation including VTA design, analysis, and manufacturing drawings.

4) Support development of a test-verified model of MVF including reaction mass, pedistals, etc, and control system.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

Vibration Tasks (MVF) Deliverables:
1. Provide updated shaker component (vibration table, head expander, etc.) modeling and analyses (as required)
2. Control system modeling and analyses (as required)
3. Monthly activity reports (monthly)
4. Engineering reports (as required)
5. Model inputs, scripts, codes, etc.
6. VTA manufacturing drawings (as required)

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	40
Schedule	40
Cost	20

Desired Personnel Skill Sets

Experienced, high level vibroacoustic engineer(s) with proven experience with spaceflight hardware who can confidently perform the above stated tasks within the tight schedule constraints required.

Government Furnished Property

None

Safety and Assurance Plans

None Selected.

Technical Representative: Reed, Brian

Task Number: NNC08E272T - 9

Task Title: Ascent Abort -1 (AA-1) Reaction Control System (RCS) Support

Task Details

Period of Performance
7/22/2009 - 8/31/2011

Background
Why the project is being pursued

Requirement is not going into WISE. The TR is from Code D.

No-Bid by D received on 10/22/2008, ldk

Entered as WISE Task 20081007 on 10/16/2008, kcm

No-Bid by F received on 10/24/2007, ldk

No-Bid by D received on 10/23/2007, ljm

Entered as WISE Task 20071022 on 10/23/2007, ljm

NASA Glenn Research Center is responsible for providing engineering support to various programs requiring space propulsion expertise. This particular effort is in support of the AA-1 RCS, a cold gas propulsion system that will be used in the second test flight of the Orion launch abort system.

Task Order Description
Description of Services to be procured

This task provides engineering support for the development of the AA-1 RCS. The engineering support shall include sizing of the system; overall responsibility of the fluid system and electrical designs; structural dynamics support to plan for, analyze, test, and document compliance with environmental requirements; and documentation of the system design.

***************Added April 8, 2009************
Support shall be provided for developing a manufacturing plan for the RCS subassemblies. Plans for assembly and integration of the RCS will shall also be developed. This support will requires trips to the AA-1 integration site (NASA-Dryden Flight Research Center) and launch site (White Sands Missile Range).

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

The contractor shall provide engineering support of the sizing and modeling of the AA-1 RCS design. The contractor shall maintain and update as necessary, the RCS model provided to the AA-1 Flight Test Article CAD Model Configuration team. The contractor shall generate design drawings from the RCS model, necessary for the manufacture and assembly of the RCS.

The contractor shall provide a fluid system design that meets the AA-1 RCS requirements and applicable standards. The fluid system design shall include a detailed piping flexibility analysis of the piping system for the combined pressure, thermal, and launch loads. The contractor shall have overall responsibility for the analysis, qualification, and acceptance testing of the AA-1 RCS fluid sub-assemblies. The contractor shall represent the fluid system design at the appropriate technical interchange meetings, design reviews, and interdisciplinary design tiger team meetings, being responsible for addressing all related action items. The contractor shall provide documentation of the fluid system design.

The contractor shall provide an electrical design that meets the AA-1 RCS requirements and applicable standards. The design shall insure that the solenoid-operated valves, pressure transducers, and thermocouples are compliant with all applicable standards and processes of the AA-1 project. The electrical design includes the flight electrical harnesses, selection of flight connectors, coordination of these choices and corresponding connector pin-outs with the AA-1 Avionics Working Group. The contractor shall provide support to specify, design, build, document, and operate all electrical ground support equipment (EGSE). The EGSE must provide sufficient functionality to simulate the control authority of the AA-1 flight avionics as well as provide a telemetry capability of equivalent or better fidelity than the AA-1 avionics telemetry capability. The contractor shall represent the electrical design at the appropriate technical interchange meetings, design reviews, and interdisciplinary design tiger team meetings, being responsible for addressing all related action items. The contractor shall provide documentation of the electrical design.
****
(April 8, 2009)Support shall be provided for developing a manufacturing plan for the RCS subassemblies. Plans for assembly and integration of the RCS will shall also be developed. This support will require trips to the AA-1 integration site (NASA-Dryden Flight Research Center) and launch site (White Sands Missile Range).******

The contractor shall analyze the AA-1 RCS design in light of the structural dynamics environmental requirements listed in FTO-AFT-FTA-023. The contractor shall support the design team lead engineer in developing a design solution that complies with all environmental requirements. This includes identifying and analyzing design solution trades that specifically comply with the combination of dynamic and
static loads environments. The contractor shall document the final design analysis, including any appropriate test results, in an engineering memorandum for review by the structural systems dynamics Designated Lead Engineer. This material shall be developed in time for the Critical Design Review. All work is to be performed in conjunction with the project office, chief engineer, lead design team engineer and other team members.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

1) Manufacturing plan & schedule for AA-1 RCS assemblies (October 09)
2) Test and verification plan for fluid, electrical, and structural dynamic requirements (October 09)
3) Fluid system design analysis documentation (December 09)
4) Electrical system design analysis documentation (December 09)
5) Structural dynamic design analysis documentation (December 09)

6) Summary slides for critical design review (December 09)
7) Drawing package derived from ProE model of AA-1 RCS (January 10)

Monthly Progress Reports.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	20
Schedule	60
Cost	20

Desired Personnel Skill Sets

Mechanical designer(s) familiar with ProE and manufacturing drawings.

Engineer(s) proficient with the design of fluid systems for space-flight applications, including mounting and fastening of the components to the flight structure.

Engineer(s) proficient with the design of electrical systems for space-flight applications and electrical ground support equipment.

Engineer(s) with an understanding of structural systems dynamics engineering principles and flight requirements compliance. Test and analysis experience with structural dynamics and fluid systems is desired.

Government Furnished Property

1) A high fidelity transient analysis of the AA-1 RCS system will be provided by NASA (Thermal System Branch).

2) Integrated propulsion system and thruster sub-assembly to be led by NASA (Space Propulsion Branch)

Safety and Assurance Plans

None Selected.

Technical Representative: Meyer, Michael

Task Number: NNC08E285T - 9

Task Title: Chemical Propulsion Research and Advanced Technology Development

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

NASA's Exploration Program includes the use of cryogenic propellant propulsion systems (liquid oxygen/liquid hydrogen and liquid oxygen/liquid methane) to maximize performance, however, cryogenic propulsion has only been used for "in-space" vehicles under very limited conditions. In addition, the Lunar Lander descent stage main engine requires extreme throttleability. These new applications result in technical risk for future propulsion system development that will be mitigated through research and technology efforts. The Propulsion and Propellants Branch (RPP) has responsibility for conducting research and developing new technologies for chemical propulsion rocket engines. This technology development is part of the risk mitigation strategy and includes conducting experiments and analyses for components and subsystems. Our current primary project customer is the Propulsion and Cryogenic Advanced Development Project.

Task Order Description
Description of Services to be procured

The individuals responsible shall provide research and technology engineering in the Propulsion and Propellants Branch. Research responsibilities shall include theoretical analyses, definition of experimental requirements, conceptual design and analysis of experiment hardware, reduction and analysis of data, and support to define and advance technologies advocated by the Propulsion and Propellants Branch. Over a one year period, the task will principally address two areas: investigation of the fundamental physics controlling the performance and stability of combustion in a rocket engine and the testing of LOX/methane 100 lbf and 5500 lbf thrust rocket engines.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

The individuals responsible shall provide research and technology engineering in the Propulsion and Propellants Branch.

Research responsibilities shall include theoretical analyses, definition of experimental requirements, design of experiment hardware, reduction and analysis of data, and program support to define and advance technologies advocated by the Propulsion and Propellants Branch.

Specific Work Elements
*****Updated as of 8/25/09************

A. Rocket Engine Modeling Effort. Contractor shall:
1. Perform steady state performance modeling of various injector and chamber configurations
2. Support modeling of high frequency instabilities in liquid/liquid rocket engine thrusters
3. Support modeling of damping devices for high frequency instabilities in rocket engine thrusters
4. Support project reviews as appropriate.
5. Report findings and propose options for mitigation and experimental investigation of this problem.
****

B. 100 lbf Thruster Investigation. Contractor shall:
1. Coordinate with GRC and JSC to define a test plan that reconciles the testing goals for both sea level and altitude testing with the PCAD goals and GRC facility capabilities.
2. Write at Test Requirements Document with approval from GRC and JSC to clearly articulate the test needs to the facilities staff at the Rocket Lab. This will be needed to drive out long-lead procurement items as well as any required facility modifications. Sea level and altitude testing.
3. Develop a data reduction plan for the post-processing of the test data.
4. Support test cell preparation activities through clarification of requirements.
5. Lead sea level testing of 100 lbf thruster in cell 32.
6. Compile both raw and reduced data for reporting.
7. Upon completion of testing, conduct data analysis and write a report documenting the test activities and results.
8. Support project reviews as appropriate.
9. Keep GRC personnel (Propulsion and Propellants Branch management and GRC PCAD technical lead) apprised of work being performed.

*****Updated as of 8/25/09************
C. Guide sub-critical methane heat transfer investigation. Contractor shall:
1. Work with GRC PCAD technical lead to coordinate a test plan for sub-critical methane heat transfer investigation
2. Develop a data reduction plan for the post-processing of the test data.
3. Guide methane heat transfer heated tube testing.
4. Compile both raw and reduced data for reporting.
5. Upon completion of testing, support data analysis and write a report documenting the test activities and results.
6. Support project reviews as appropriate.
7. Keep GRC personnel (Propulsion and Propellants Branch management and GRC PCAD technical lead) apprised of work being performed.

D. Contractor shall provide expert consultation on the physics, modeling and testing of liquid rocket engines for combustion instability characterization and understanding.

*****Updated as of 8/25/09************
E. Support altitude testing of Aerojet 5500 lb¬f thruster a White Sands Test Facility
1. Support preparations including instrumentation requirements for WSTF 5500 lb¬¬f thruster
altitude testing.
2. Lead test matrix design for WSTF 5500 lbf thruster altitude testing.
3. Support data reduction as necessary for 5500 lbf thruster altitude testing.
****

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

******Updated as of August 26, 2009 *******

Milestones:
1. Initiate altitude testing of 100 lbf LOX/LCH4 thruster at ACS (12/15/09)
2. Complete Phase I altitude performance testing of 100 lbf LOX/LCH4 RCS thruster (2/30/10)
3. Initiate Heated Tube Facility Phase I methane testing (11/15/09)

Deliverables:
1. Report on flow instability modeling results (12/1/09)
2. Presentation/data review from propellant conditioning system checkout testing (10/1/09)
3. Present results of sea level performance tests of 100 lbf thruster and preliminary altitude performance tests of 100 lbf LOX/LCH4 RCS thruster in ACS for Altair TIM (12/15/09)

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.)

Criteria to Be Used for Evaluation	**Weights**
Performance	60
Schedule	20
Cost	20

Desired Personnel Skill Sets

The desired skills include senior research engineering experience in chemical rocket propulsion test and analysis including thrust chamber cooling physics, operation of the GRC heated tube facility, and internationally recognized expertise in rocket combustion instability.

Government Furnished Property

None

Safety and Assurance Plans

None Selected.

Technical Representative: Meyer, Michael

Task Number: NNC08E292T - 7

Task Title: Advanced Cryogenic Propellant Engine System Testing and Modeling

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

Advanced chemical propulsion concepts could significantly enhance cargo delivery and even crewed missions to the moon or Mars. The reduction in the masses of on-board propulsion for landing or ascent vehicles or for reaction control systems could significantly impact later missions in the return to the Moon and mission to Mars. In particular, NASA's Propulsion and Cryogenics Advanced Development (PCAD) project is investigating reliable high-performance liquid oxygen (LOX)/liquid methane propulsion systems for the lunar lander ascent stage, and LOX/liquid hydrogen for several stages of the lunar exploration architecture.

Experimental testing is planned at Aerojet Sacramento and the White Sands Test Facility (WSTF) for Reaction Control System (RCS) and main engine thrust class engines operating with high area ratio (HAR) nozzles. The goal of this testing is to collect data on nozzle performance in order to develop a realistic expectation of the kinetic losses associated with HAR nozzles when used with an oxygen/methane propellant combination. Additional RCS testing with this propellant combination is planned at GRC. The modeling capability in this task is intended to be complimentary to the experimental efforts. Predictions should be made prior to the start of testing and the model should be anchored/reconciled upon completion of the testing. Further, support of RCS thruster and Advanced Main Engine (AME) testing will be required.

Task Order Description
Description of Services to be procured

The individual(s) responsible shall provide research and technology engineering in the Propulsion and Propellants Branch. Research responsibilities shall include theoretical analyses, definition of experimental requirements, conceptual design and analysis of experiment hardware, reduction and analysis of data, and support to define and advance technologies advocated by the Propulsion and Propellants Branch. The objective of this research task is to advance chemical rocket engine capabilities through testing and modeling, specifically advanced, cryogenic propellant rockets for exploration and science mission applications. In particular, the task will:

1) develop a modeling capability to provide predictions of nozzle performance for oxygen/methane engines. RCS and AME thrust class engines with High Area Ratio (HAR) nozzles are of particular interest.

2) support testing and pre- and post-test analysis of LOX/LCH4 RCS thrusters at the Glenn Research Center and the White Sands Test Facility (WSTF).

3) Support AME task with analysis and hardware coordination.

4) Support testing and pre- and post- test analysis of AME at Aerojet and WSTF.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

The individual(s) responsible shall provide research and technology engineering in the Propulsion and Propellants Branch. Research responsibilities shall include theoretical analyses, definition of experimental requirements, conceptual design and analysis of experiment hardware, reduction and analysis of data, and support to define and advance technologies advocated by the Propulsion and Propellants Branch. This will include rocket combustion and nozzle performance modeling with the Two-Dimensional Kinetics (TDK) code, and support of research testing by
a. Developing a thorough understanding of past work on this subject, both experimental and theoretical for LOX/LCH4.
b. Beginning with a known problem, anchor to existing test data (of any propellant combination).
c. Predicting nozzle losses and performance over a range of engine conditions.

Rocket Combustion and Nozzle Performance Modeling

1. Conduct a literature review of theoretical and experimental work for the LOX/CH4 propellant combination relative to combustion and nozzle performance.
2. Perform TDK runs against known data set (anchor models).
a. Include parametric investigation of various code options for TDK and develop recommended best approach.
3. Perform TDK runs for RCS class engines, vary Pc, O/F, and area ratio. Identify the magnitude of the nozzle losses relative to theoretical values.
4. Perform TDK runs for LOX/LCH4 Ascent Main Engine class engines
a. Investigate parametric trends based on options within TDK and options for the propulsion architecture (model options, propellant inlet conditions, engine operating conditions).
5. Support weekly GRC PCAD technical team meetings.

GRC RCS thruster test support

1. Perform TDK runs for GRC thruster hardware
a. Simulate sea-level RCS tests to anchor model
b. Predict altitude performance for the test matrix
c. Compare predictions to those of Aerojet and the GRC test data
2. Provide recommendation for instrumentation
3. Provide recommendations for test matrix
4. Support testing and post-test data analysis

White Sands Test Facility (WSTF) AME Testing Support and Analysis

1. Serve as the lead of the WSTF interface group.
2. Perform TDK runs for the WSTF test hardware
a. Provide preliminary performance assessments
b. Provide recommendation for instrumentation (suggestions on experimental measurements required to properly anchor model predictions (types of measurements, locations of sensors, quantity sensors, accuracies required, et cetera))

3. Support atmospheric testing of AME
a. Assess preliminary performance
b. Travel to Aerojet for 2 separate weeks of testing
c. Anchor performance model and reassess altitude performance prediction for AME
4. Travel to WSTF for three separate weeks of test support
5. Perform post-test TDK runs for the WSTF test hardware
a. Re-anchor TDK to the WSTF test data

*****New 8/26/09*******
Support assessment of technology opportunities for Mars Ascent Propulsion

1. Conduct literature review of past MAV propulsion studies.
2. Discuss potential options with aerospace propulsion contractors.
3. Support feasibility assessment of RPP competing for MAV propulsion technology development.

****

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

Milestones:
1. Complete data comparison and analysis for Aerojet RCS tests (2/13/09)
2. Complete instrumentation and test matrix inputs for GRC RCS testing (3/15/09)
3. Complete preliminary post-test analysis of AME sea-level (Aerojet) tests (9/15/09)
4. Complete preparations (TRR) for WSTF AME altitude tests (11/15/09)
5. Preliminary correlation post-test analysis of GRC thruster tests (2/15/10)
6. Complete post-test analysis of GRC Phase I thruster tests (4/30/10)
7. Preliminary correlation post-test analysis of WSTF AME data (3/31/10)
8. Complete post-test analysis of WSTF AME data (5/30/10)

Deliverables:
1. Presentation on post-test analysis of GRC RCS thruster test (2/15/10)
2. Recommendation document on AME nozzle instrumentation for WSTF testing (9/15/09)
3. Presentation on predicted WSTF AME performance including post-test analysis of atmospheric data for Altair review. (12/15/09)

Note Milestones (6) & (8) are included for information only and are not due in Award Fee period 07.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	60
Schedule	20
Cost	20

Desired Personnel Skill Sets

The desired skills include senior propulsion research engineering experience, both analytical and experimental. Experience in chemical rocket propulsion and analysis including the TDK code.

Government Furnished Property

None

Safety and Assurance Plans

None Selected.

Technical Representative: Yuko, James

Task Number: NNC08E295T - 5

Task Title: ORION Service Module Thermal/Fluids Support

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

The ORION Service Module (SM) thermal/fluids IV&V effort requires additional support to address areas identified by SM Thermal as being required work to be done. These areas include (Task 1) Thermal Requirements Document Consolidation and Review, and (Task 2) Thermal Modeling Support

Task Order Description
Description of Services to be procured

Task 1: SM Thermal Requirements Document Consolidation and Review

Description:

The Thermal Requirements Consolidation task will continue to update the Constellation (CxP) CRADLE based consolidated thermal requirements database that was developed for the Orion Preliminary Design Review. This includes CxP level requirements, Orion requirements, and Integration Requirements and Control Documents to the Orion Vehicle. The task will verify that the ORION prime contractor, Lockheed Martin (LM), and their subcontractors are meeting the thermal requirements for the SM in the ORION program. The task product will be used to support the upcoming the Critical Design Review (CDR) of the ORION vehicle in February 2011.

The consolidated requirements document will support the IV&V of LM and their subcontractors work performed in order to meet the Orion Program requirements. In addition to consolidating the thermal requirements of the NASA kept CRADLE requirements database, the task will continue to try and track the differences with the Lockheed maintained CRADLE requirements database. The LM maintained requirements databook, “Big Blue”, will be updated 10/2009 and during the CDR analysis cycle. The task support will include attending technical reviews and design reviews.

TASK 2: SM Thermal Model Support

Description:

The SM Thermal Modeling Support task will provide support for performing IV&V of the

Orion power production/management/storage system in the Service Module. The task will include running the LM Integrated Thermal Model (ITM) to assess its construction and modeling accuracy and use the ITM as a base model for running simulations not being analyzed by LM. In addition, the model will be used as a baseline to run simulations in support of the needs of the GRC Service Module Power group. Also included will be support for any power testing and evaluation performed by NASA or LM and their subcontractors.

The GRC SM Thermal Analysis Team is part of an overall NASA Thermal Analysis Team which is comprised of members from GRC, JSC, and LaRC. Thermal modeling support for other Service Module teams and the NASA Thermal analysis team will be defined on an as needed basis. This will include, but not limited to the running of existing thermal models developed by LM, ATK and other contractors to provide model Verification, Validation and Accreditation. Some of the work may be defined by NASA as being direct, in-line work in support of the design analysis cycles.

Additional support for the task will include reviewing analyses and supporting documents by LM and their contractors in support of design reviews and the CDR in February 2010 to verify and validate that program requirements are being met. Analyses will be performed in support of the Design Analysis Cycle 4 and Design Analysis Cycle 5 (DAC-4, DAC-5) for the Critical Design Review (CDR).

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

The Government will provide information necessary for the completion of the Tasks. This includes getting access to WINDCHILL databases, requirements documents, and Lockheed Martin Thermal/Fluids analysis documents. The Government will also provide access to a license for the Thermal Desktop analysis software which is required for the ORION project.

The Contractor will provide reviews of ORION requirements documents. This will continue to be done in an Excel based format and presented to the Government. The requirements consolidation will also track the differences between the Orion kept requirements, government, and the LM kept requirements.

The Contractor will provide reviews of LM Design Reference Documents and LM analysis reports. The reviews should include evaluation of the validity and correctness of the analysis document the findings. The modeling task will also provide the Government an assessment of the LM/LM Contractor thermal analysis models. Independent thermal models may be necessary to be created in order to provide an assessment. The Task will include participation on weekly SM thermal modeling meetings and supporting related reviews and technical interchange meetings. A written monthly status report will be provided to the government.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

The following are the milestones and deliverables for this task:

Task 1: SM Thermal Document and Requirements Review
The requirement review portion of the task will continually monitor and update as necessary the thermal requirements for the SM thermal control system as the TBDs and TBRs become values. (Monitored monthly at the beginning of each month.)

The document of consolidated requirements will continue to evolve through the Fiscal Year (FY10) to incorporate updates and modifications to make the document more integrated with CRADLE. (Updated as needed.)

TASK 2: SM Thermal Model Support
The task will complete the NASA lead Integrated Timeline Analysis prior to the DAC-4 point of departure. (10/1/09)

The task will evaluate the completed Thermal Desktop models of the power system and avionics boxes of the Service Module. (1/1/10)

Analyses with the integrated model will be performed to assess the impact of the ascent/abort conditions on the power equipment components using the latest aeroheating data available, (11/30/09)

An assessment of the LM power system thermal analysis will be provided prio to the CDR Subsystem Design Reviews. (9/1/2010)

The task will support the development of an interface between the Thermal Desktop model and a Level II power model to integrate the thermal/power model. (4/30/10)

The task will continually assess the LM ITM models as they become available throughout the CDR design cycle. (on-going through FY10)

The task will incorporate the completed Thermal Desktop models of the power system and avionics boxes into a system level model of the Service Module. (5/1/09)

The task will provide review of the power generation, storage and distribution system during the CDR design review process. (9/1/10 – 2/1/11)

Monthly Progress Reports.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	60
Schedule	20
Cost	20

Desired Personnel Skill Sets

Thermal and Fluids Engineering background

Government Furnished Property

Access to Government Thermal Desktop License Files for Analysis.

Safety and Assurance Plans

None Selected.

Technical Representative: Wiedenmannott, Ulrich

Task Number: NNC08E324T - 5

Task Title: Systems Engineering - Orion Space Environmental Testing (SET) Program

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

IET has been replaced with SET

SET will continue through FY13. Near term effort required to satisfy needs of upcoming reviews.
****

The Orion Space Environmental Testing (SET) program is developing the capability for qualification tests of the Crew Exploration Vehicle (CEV) hardware in the Space Power Facility (SPF) at the NASA Plum Brook Station.

To assist in accomplishing these goals a Vibration Test Capability (VTC) is being built within the SPF. This includes a sinusoidal vibration system, a random vibration system and an acoustic test facility. Also, a High Speed Data Acquisition System (HSDAS) is being developed. An Electromagnetic Environmental Effects (E3) test and Thermal Vacuum (T/V) heat flux test are also being planned. Significant coordination is required for efficient and organized construction and commissioning of the facilities and test plan development.

Task Order Description
Description of Services to be procured

Provide system engineering support that includes space flight hardware verification, test facilities, space vehicle testing, and facility development.

Develop requirements for Thermal-Vacuum Capability and EMI/EMC Environmental Capability.
****
updated 08-13-09 Rick Wiedenmannott
Develop requirements for VTC, HSDAS, FO and VTA to meet needs of project as defined by NASA LSE(RW).
****

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

1. Develop and manage the requirements for the TV and E3 capabilities for SET.
2. Coordinate with lead engineers to determine requirements.
3. Provide input to requirements documents by developing the TV and E3 SRD.

4. Provide input to the Systems Engineering Management Plan as required for the TV and E3 capabilities.
5. Provide input to ICDs, commissioning plans, verification plans, and validation plans.
6. Support LSE effort to develop products for Design Review 4 (VTC CDR).
7. Organize document structure (tree) for requirements at all levels of the IET program for the E3 and T/V.
8. Review requirements for SPF, E3 and T/V
to determine intersystem compatibility, and identify interfaces by performing functional analysis. Including review of upper level documents for consistency of requirements and flow down of changes.
9. Support project reviews and design reviews.
****
August 13, 2009 Rick Wiedenmannott
- above items also apply to VTC, HSDAS, FO and VTA
- Develop the SET Verification plan and verification data sheets.
- coordinate with NASA leads to insure verification of all requirements are completed per NPR 7123.1A
- Design review 4 has been replaced by numerous ERBs, Control Panel Reviews and other system level reviews that must be supported.
****

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

Specific milestones and deliverables include the following.
1. Misc reports and documents (as required)
2. Monthly progress reports (monthly)
3. Systems requirements document for TV and E3.
4. Verification Plan and Verification Requirements Definition Sheets by end of FY'09

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	Weights
Performance	40
Schedule	30
Cost	30

Desired Personnel Skill Sets

A senior systems engineer is required having a minimum of fifteen years experience in the following areas: extensive knowledge and proficiency of Systems Engineering (SE) principles, space flight hardware verification, test facilities, space vehicle testing, and knowledge of facility development.

Government Furnished Property

None

Safety and Assurance Plans

None Selected.

Technical Representative: Elliott, Frederick

Task Number: NNC08E327T - 5

Task Title: Space Environmental Test (SET) Business Support

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

************AFP7 Update*******
This project was previously entitled Integrated Environmental Test (IET). Throughout this task all reference to IET is now Space Environmental Test (SET).
****

The GRC Orion Project Office (MX) requires 1) Resources Management support and 2) Scheduling support for the Space Environmental Test (SET) Project.

Task Order Description
Description of Services to be procured

Provide 1) Resources Management support and 2) Scheduling support to the Orion Space Environmental Test (SET) Project. Primary responsibilities are schedule development and resource management, including resource planning, monitoring, and evaluation of project status from a business management point of view, including Earned Value Management (EVM). Multi-personnel team shall be proactive in working with the SET Project team members, Civil Servant and Contractors, to develop the required information/products. Unique knowledge in business management tools such as Microsoft Project, Primavera, NASA financial systems and the capability to provide custom financial reports to the Orion Project is required.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

The GESS-2 Team shall perform the following for the SET Project:

1) Resources Management support
a) Assist SET Project Management and Scheduler in developing SET Project Budget and preparing SET Project Program Planning and Budget Execution (PPBE) inputs to Orion Project Office
b) Prepare Government Fiscal Year Full Cost Phasing Plans of project Commitments, Obligations, and Costs by WBS and Project Roll Up for GRC and Orion Project Office submissions – FY start and mid-year updates
c) Track Project Commitments, Obligations, and Costs and prepare monthly reports of Full Cost Plans versus Actuals, including variance explanations, for reporting to GRC and Orion Project Office Management
d)Prepare project End of year Estimates

e) Support the review of Vibro-acoustic Test Capability (VTC) Prime Contractor monthly financial reports (533s and EVM Cost Performance Reports) and provide analysis inputs to SET Project Management
f) Track status of project Purchase Requests (PRs), including approving project PRs initiated in the NASA SAP system upon receipt of approval from SET Project Management.
g) Assist Project Management by preparing other project financial reports as required.
h) Support project earned value management process development and reporting.

2) Schedule support
a) Develop and maintain project Resource Loaded Schedule (RLS) for in-house activities
b) Support the evaluation of the VTC Prime Contractor schedule
c) Develop and maintain project Integrated Master Schedule (IMS) from the in-house RLS and VTC Prime Contractor Schedule
d) Assist SET Project Management and Resources Manager in developing SET Project Budget and preparing SET Project Program Planning and Budget Execution (PPBE) inputs to Orion Project Office utilizing the RLS.
e) Prepare project summary schedules for reporting to GRC and Orion Project Office Management.
f) Support the review of Vibro-acoustic Test Capability (VTC) Prime Contractor schedule monthly EVM reports (Cost Performance Reports) and provide analysis inputs to SET Project Management.
g) Coordinate a bi-weekly SET Project Schedule Status meeting
h) Coordinate with VTC Prime Contractor Business Management personnel as required.

Anticipated Travel: One trip to Houston (JSC) every other month; one trip to Oklahoma City each quarter.

Training: The contractor may seek training within reasonable cost as long as there is added value to the government.

If training and/or additional travel is proposed under this task, the cost will be identified and budgeted into the accompanying cost plan, or an amendment must be issued to cover the additional task requirements.

Desktop office computing hardware, software and support will be charged to task as a distributed cost.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

The milestones and deliverables for this period shall include the following:
1. Financial report(s), schedule analysis, and RLS/IMS updates to support SET decisions, GRC reporting and JSC reporting. (Orion Technical, Cost, & Schedule Reviews and GRC Code M Reviews) - Monthly
2. Phasing Plans - a) Government Fiscal Year (GFY) start and b) Mid-GFY update
3. Full Cost (procurement & labor) tracking reports - Monthly
4. Development and monthly update of SET RLS / IMS.
5. VTC Schedule evaluation inputs - monthly
6. Schedule and resources inputs for SET Integrated Project Review with Orion Project Office (JSC) - December 2009
7. SET Project Program Planning and Budget Execution (PPBE) inputs - January/February 2010
8. As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements)

including any mitigation.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	35
Schedule	35
Cost	30

Desired Personnel Skill Sets

Budget Analysis, Schedule Development and analysis, Earned Value Management. Unique knowledge in business management tools such as Microsoft Project, Primavera, NASA financial systems and the capability to provide custom financial reports to the Orion Project is required.

Government Furnished Property

Any unique property resources required for this task deliverables will be provided by NASA

Safety and Assurance Plans

None Selected.

Technical Representative: Schubert, Kathleen

Task Number: NNC08E329T - 4

Task Title: Orion Service Module Program Planning & Control Support

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

Due to the formation of the Service Module Project Office/Code MX this task consolidates the Program Planning, Control, and Data Management functions into one task and creates the task order description to more accurately reflect the scope of the work to be performed.

Task Order Description
Description of Services to be procured

The Glenn Service Module Project Office requires Program Planning and Control, Integrated Product Team, and Service Module Panel process support. This work is being split from the existing Task 144 for cost traceability purposes. Primary responsibilities are resource management, schedule management, data management, including resource planning, monitoring, and evaluation of project status from a business management point of view, including EVM. Also includes coordinating the logistics required to conduct or participate in the following panels in accordance with program/project configuration and data management requirements:
CEV Project Control Panel (CPCB)
SM IPT Meetings (SMIPT)
SM Control Panel (SMCP)
SM Engineering Panel (SMEP)
SM Technical Cost Schedule Reviews (ITCSR)

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

The task consolidates all of the Program Planning and Control and Data Management functions required to support the Service Module Office. Primary responsibilities are data management, resource management, including resource planning, monitoring, and evaluation of project status for both Service Module Non-Prime and Prime efforts from a business management point of view, including EVM. Also includes coordinating the logistics required to conduct or participate in the following panels in accordance with program/project configuration and data management requirements:
CEV Project Control Panel (CPCB)
SM Team Meetings
SM IPT Meetings (SMIPT)
SM Control Panel (SMCP)
SM Technical Cost Schedule Reviews (iTCSR

SM Engineering Panel (SMEP)

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

The milestones and deliverables for this period shall include the following:
For the SMPO, coordinate the logistics required to conduct or participate in the following panels and in accordance with program/project requirements:

CEV Project Control Panel (CPCB)
SM IPT Meetings (SMIPT)
SM Control Panel (SMCP)
SM Engineering Panel (SMEP)
SM Technical Cost Schedule Reviews (ITCSR)

For the CEV Project Control Board, assure that the agenda's are distributed to the SM IPT leads and coordinate SM's participation in required topics that impact Service Module.

For the SM IPT and SM Team Meetings, participate in the meeting discussions to highlight upcoming activities such as requests for document review, control board agendas, or calendar items. Keep track of project actions, status and closure.

For the SM Control Panel and SM Engineering Panel, coordinate and schedule meetings, agenda topics, minutes, and records resulting from meetings.

Provide point of contact for coordinating the review of and response to all Service Module review of all Change Requests and DRD reviews.

Monthly financial and schedule report(s) to each of the work-package managers and office management. Coordinate the internal SM Technical Cost Schedule Reviews monthly including compilation of the leads inputs for Project Manager's use at other SM project reviews (Code M CMC and Orion TCSRs).

Generate automated database reports for PR's and other monthly charts on financial and workforce data as needed.

Coding of financial and schedule data in order to populate EVM reports.

Financial analyst support required for annual Operating Plan submit, Phasing Plans, and coordination of day to day changes to the plan.

Provide financial and schedule inputs required for Technical, Cost, Schedule Reviews for the monthly activities that include the PMR, CMC-1, CMC-2, TSCR, and Code M Service Module reviews.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	35

Schedule	35
Cost	30

Desired Personnel Skill Sets

Budget Analysis, Schedule Analysis, Configuration/Data Management Support

Government Furnished Property

Any unique property resources required for this task deliverables will be provided by NASA

Safety and Assurance Plans

None Selected.

Technical Representative: Petters, Dean

Task Number: NNC08E332T - 4

Task Title: Service Module Dynamic Interaction Simulation Test Support

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

This task is being initiated to extract facility buildup support for the SM DIST from task 112 to provide better technical oversight and to get better financial insight. This is an existing effort that is already staffed.

Task Order Description
Description of Services to be procured

The Orion Service Module (SM) Propulsion team has identified the need to conduct a test to investigate the steady state and transient characteristics of the SM Propulsion subsystem. The Space Propulsion Branch (DEP) will lead the effort for the test. The test will be used to improve the models that will be used to independently verify the Orion SM Propulsion subsystem. This task will provide the following facility and test article build-up support.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

The contractor shall support completion of the the design and build-up of the SM Propulsion Dynamic Interaction Simulation Test (DIST) Phase 1 test article.

The contractor shall support the design, procure and assemble the data acquisition system for the DIST Phase 1 test article

The contractor shall support the series of tests using the DIST Phase 1 test article

The contractor shall support the design of the Phase 2 test article

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

• Ensure the data acquisition and hardware control software is completed in support of the Phase 1 test (December 2009)

• Identify and procure remaining hardware and instrumentation for Phase 1 (November 2009)

• Identify test needs for phases 2 & 3 (February 2010)

2010
• Design Phase 2 test rig, identifying the instrumentation, wiring, tubing, and electrical needs of the test rig (March 2010)

Monthly Progress Report

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	10
Schedule	45
Cost	45

Desired Personnel Skill Sets

Demonstrated expertise in data acquisition and controls

Demonstrated expertise in test design and support, including the following areas of expertice: electrical systems, test safety, and fluid system design.

Government Furnished Property

None

Safety and Assurance Plans

None Selected.

Technical Representative: Clapper, Carolyn

Task Number: NNC08E334T - 3

Task Title: Space Communications and Data Systems – CoNNeCT

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

CoNNeCT is an Agency-wide level Project being managed at GRC and will support future Space Communication research/projects/missions. This task will support CoNNeCT.

Task Order Description
Description of Services to be procured

The GRC is responsible for the Agency level Project Management of the CoNNeCT Project, which is part of the Space Communications and Navigation Technology Program. The contractor shall provide Management of Electronic Data Resources; Database design, development and programming; Microsoft Project/Primavera Scheduler support; and provide resource analyst support to CoNNeCT. *****No changes*****

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

The contractor shall provide Management of Electronic Data Resources; Database design, development and programming; Technical assistance for web publication of the weekly/monthly resources reports; Microsoft Project/Primavera Scheduler support; and provide resource analyst support to CoNNeCT.

The work to be performed will require personnel as follows:

It is expected that several individuals will perform the task. One or more must have a background in Budget Analysis. It is also expected that one or more of the individuals will have the appropriate background with computers, networking, and computer security to provide adequate support on the ADP portion of this task.

The GESS Team shall perform the following:

Management of Electronic Resources

-- Assist with the CoNNeCT electronic database and file server.
-- Develop and edit content for the CoNNeCT electronic database.

Database Development

-- Provide services for the design, development and maintenance of an internal, web-based financial information systems database. This database will contain all elements of Full Cost, by providing plan vs. actual data, workforce and travel reports, broken down to the WBS level, as well as roll-up reporting.
-- Provide highly experienced database programming effort with knowledge of NASA financial and budgeting practices, strong knowledge of mainframe to PC electronic data transfer, and strong knowledge of PC and MAC environments. In addition, knowledge of the Internet is required to provide programming and posting to Internal Web pages.
-- Work to be performed includes strong knowledge of spreadsheets, databases, and multi-media presentation software.
-- Programming will include the development and maintenance of programs and reports in Microsoft Access, which uses electronic data from official lab systems including SAP, the official Labor file, and the travel system.
-- Ad-hoc queries from the financial information systems database will be developed upon request from the NASA TR.

Tasks to be Performed: The contractor shall perform tasks in the following major areas: Contract management and administration, PC financial database programming, monthly report generation, and Resource Analyst support. Each of these major areas is described below.

-- Contract Management and Administration: The contractor shall provide the necessary program management and coordination to accomplish the tasks in this Statement of Work. The contractor shall develop and deliver documents to the NASA TR on a monthly basis, which describe the work accomplished on this contract. The contractor shall provide the staff necessary to accomplish the contract tasks. Deliverables for this element are listed in the deliverables section.

-- PC Financial Database Applications and Programming: The contractor shall provide services in the design, development and maintenance of an integration financial information systems database. This database will contain actual commitment, obligation, and cost data, budget data, and workforce data broken down by the various projects with the Programs. Programming will include monthly maintenance of programs and reports that need adjustment, year-end processing which involves closing all records for the year and ensuring a proper financial start to the new year, and any new development requested by the NASA TR in regard to financial data gathering and reporting from the financial information systems database. Also, as required, programming shall be done to place the monthly financial data on the Internet.

-- Monthly Report Generation: On a monthly basis, the contractor shall perform financial close-out activities, verify accuracy of budget and actual financial data and make any needed corrections, and distribute reports electronically via the Internet. The contractor shall provide logging, tracking, and coordination of financial data and workforce data as it relates to the CoNNeCT. This includes providing electronic information to several different personnel levels: Agency Level Resource Manager, WBS Leads, Project Managers and Resource Analysts.

-- The contractor shall provide resource analyst support services for the CoNNeCT Project Agency-level Project and in their work with other customers.

Scheduler

-- Provide services for the development and documentation of Space Flight Schedules for CoNNeCT. *****No changes*****

The Contractor shall provide general clerical and administrative services for the CoNNeCT

Project Office. General clerical services shall include word processing, computer applications, office organization, and record keeping. General administrative services shall include the management of logistics, information, and documents associated with various project control boards and key project life-cycle reviews. Clerical and administrative services typically may be structured to meet one-time or ongoing organizational requirements.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

Database Programming

1. The NASA TR will receive a monthly technical progress report by the 10th working day of the contractor's accounting month.
2. Contractor TM will provide any information on potential risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Monthly Report Generation

1. Monthly programming to support month end closing of financial and workforce records will be performed so reports can be delivered.
2. Requests for new reports, additions to on-line reporting system, and other new work will be reviewed and delivered by stated date for each individual request.
3. Year-end programming and close-out work will be performed on the financial database to ensure that year-end financial and workforce reports are distributed. This involves file close-out, updating authority numbers, carry-in calculations, project/task additions and deletions, and other year end procedures. This will add 14-21 additional business days to the normal distribution.
4. By the 7th business day of each month, provide the TR: cumulative purchase requests by current fiscal year, sorted by type; cumulative purchase requests for the current fiscal year sorted by subtask; labor report down to the WBS level; prior year uncosted report; travel report; other reports as warranted.
5. By the 10th business day of each month, provide the TR: Plans vs. actuals by elements of full cost at the UPN level; Grant and SDB. Report; Graphs measuring performance of plans vs. actuals, by element of full cost, as well as at the total full cost level.
6. Provide assessments of programmatic Fiscal Year dollar and labor requirements, assist PA Analyst in developing operating plan, assist in implementing the operating plan, assess new and/or changing requirements and recommend changes, and support Program Review.

Microsoft Project/Primavera Scheduler support will be provided for the various projects within the CoNNeCT.

In addition, The contractor shall provide minimal support in the area of technical writing and MS PowerPoint presentation assistance as needed.

It is understood that the above deliverable dates for monthly reporting will not be possible at year-end close of financial books. A delay at year-end of 7-14 business days is possible.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	Weights
Performance	25
Schedule	50
Cost	25

Desired Personnel Skill Sets

Extensive Experience with Microsoft Project, Resource Loaded Schedules, Fast Track, and Primavera
Extensive Experience with Microsoft Access, SAP, BW

Government Furnished Property

Any unique property resources required for this task deliverables will be provided by NASA.

Safety and Assurance Plans

None Selected.

Technical Representative: Santosuosso, George

Task Number: NNC09E347T - 4

Task Title: CoNNeCT WBS 5.0 Payload Development

Task Details

Period of Performance
10/1/2009 - 4/15/2010

Background
Why the project is being pursued

Work previously performed under task 224T.

CoNNeCT is a Communications payload set to launch on JAXA's HTV-3 launch vehicle and installed on the ISS/ELC (Express Logistics Carrier). The Flight System and Ground System will serve as a testbed to conduct communications and network relay experiments under the STRS (Space Telecommunications Radio Standard) architecture as well as advance the TRL level of software defined radios.

Task Order Description
Description of Services to be procured

Engineering support is required in the following disciplines to support the flight payload develoment activities: Electrical engineering, electrical drafting, Mechanical Design, Mechanical Drafting, Structural Analysis, Structural Dynamics, and Thermal Engineering. See below for specifics in each discipline.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

Electrical Engineering/Electrical Drafting:

The Electrical Engineering and Drafting task supports the development of the CoNNeCT Avionics Enclosure along with data, power, and communications interfaces, interconnects and cabling design and development.

Specific Tasks

1. Develop the avionics enclosure to house all flight avionics
2. Procure and/or develop avionics cards for payload command and control, data processing, power distribution, health and status monitoring, experiment control and radio control
3. Develop detailed part and assembly designs for all GRC developed hardware.
4. Drafting: develop and manage the electrical drawing tree, schematics, wiring diagrams and drawings.
5. Support radio integration and interfacing through TIMs and telecons
6. Develop documentation identified for major reviews such as PDR and CDR
7. Design and develop electrical GSE such as software development systems, simulators

and other support equipment
8. Integrate all procured and custom-built components into the avionics enclosure
9. Conduct functional and performance testing on individual components as well as the integrated avionics enclosure
10. Support environmental testing of components and the integrated package, including radiation, thermal, and vibration testing
11. Procure Hardware for the build of both CoNNeCT Flight and Flight Spare Avionics, cables and harnessing and Electrical Ground Support Equipment (including Ground Integration Unit). Procurements to be made total approximately 500k and are outlined in the Flight System Avionics Schedule.

Mechanical Design/Drafting:

The Mechanical Design and Drafting task supports the overall development of the GRC hardware and assembly of all subsystems developed by all partners and contractors. This work will be performed in Pro/Engineer.

Specific Tasks
11. Develop detailed part and assembly designs for all GRC developed hardware.
12. Serve as integrator for developing the overall assembly model of the hardware and drawing. Establish how integration of the various partners CAD geometry will be done and how CAD information will be stored in GRC's Windchill.
13. Develop detail and assembly drawings for GRC responsible hardware. Including checking and backdrafting for detail drawings. Also serve as focal point for the official release of the drawings.
14. Drafting management tasks: develop and manage the drawing tree, setup and manage the models and drawings in GRC's Windchill and make provisions to provide PDFs of drawings to other databases, such as E-room, and develop a schedule for drawing development (schedule should be integrated with project schedule and disconnects resolved).
15. Provide services to revise drawings per ECOs that are generated, including those generated against GRC's partners hardware
16. Provide support to develop CAD "pictures" to support project reviews. Provide support to team meetings.

Structural Analysis
The Structural Engineer will support the structural concept development and perform all the required structural analyses of the payload structures, the attachments, and connections/interfaces. Hardware designed needs to be able to withstand all the loading conditions which include: launch, thermal temperatures, random vibration, etc. Tasks shall be completed in meeting the project's milestone schedule as well as meeting its performance spec's with respect to structural, thermal, and power/electrical requirements.

Specific Tasks:
1. Perform finite element analyses (FEM) of the CoNNect Assembly and all of its hardware components.
2. Finite element analysis includes: Modal analysis (frequency and mode shape), stress analysis for launch loads and thermal loads.
3. Perform fastener analysis per NSTS 08307B
4. Perform brackets and lugs analysis for the attachments.
5. Develop Fracture Control Plan and Fracture Summary Report
6. Support PDR and CDR, and other as needed reviews.
7. Resolve PDR & CDR concerns and close out RFAs.

Deliverables:
1. Safety Critical Data Package and Stress Report
2. Fracture Control Plan
3. Fracture Control Summary Report

Structural Dynamics
Task Description - Develop and assess loads environment expected during launch. Apply these loads, according to applicable NASA standards, to components and sub-components as specified. Ensure that all loads requirements are met. Provide report of all analyses. Perform a vibroacoustics assessment of components and sub-components as specified to evaluate if decision to not perform vibroacoustic testing is valid. Provide report of assessment. Review and assess gimbal contractor vibration testing compliance with vibration testing requirements. Provide gimbal vibration testing verification report.

Specific Tasks
1. Develop Launch Loads (Quasi-static and Random)
2. Vibroacoustic assessment
3. Verification of Vibration Testing Requirements for Gimbal

Deliverables
1. Launch Loads report
2. Vibroacoustic Assessment report
3. Gimbal Vibration Testing Verification Report

Thermal Engineering

This covers the resources to analyze, design, develop, and test the CoNNeCT Passive Thermal Control System (PTCS). Thermal analyses for individual components of subsystems within CoNNeCT will also be conducted as necessary to insure on-orbit temperature limits are not violated.

Specific Tasks:
1. Design trades will be conducted to determine which thermal control technique best satisfies the needs of the CoNNeCT system. Due to power source requirements, redundant heater/controller systems have been baselined for operational and keep-alive thermal control systems. The thermal capacities (heaters and MLI) and temperature limits are determined by analysis during the concept and design phases of the project followed by procurement of the designated components and assembly of the flight hardware.
2. The thermal design of the CoNNeCT flight hardware requires that new and existing on-orbit thermal models be combined to predict on-orbit temperatures of the CoNNeCT hardware.
3. Development of thermal models of the ISS, ELC and CoNNeCT payload will be combined to define the thermal operating environment.
4. A parametric analysis accounting for environmental, ISS and CoNNeCT operations variables will be used to define the thermal configuration and operating constraints of the CoNNeCT flight system. This analysis will be used to show compliance with ISS and ELC interface requirements and the temperature limits of the CoNNeCT payload.
5. Analysis of CoNNeCT in the HTV environment(s) and during transfer to the ELC will be performed to define heater placement and power requirements necessary to maintain acceptable temperatures using different passive thermal control techniques. These techniques may include a variety of thermal control finishes, insulation, heat pipes, louvers, or phase change materials, the selection of which requires a system perspective as weight, reliability, operations, and cost all contribute to the selection process.
6. Analysis results necessary to baseline the thermal design will be completed to support PDR.

7. Reduced thermal models (GMM and TMM) will be submitted to ISS integration support.
8. The thermal models of CoNNeCT will be used to close safety and QA verifications.
9. Analysis will also support the design and setup of thermal balance and thermal cycle tests to simulate the on-orbit thermal environment. The purpose of these tests is to validate thermal model predictions and provide environmental screening of the CoNNeCT hardware.

Deliverables include:
1. Baseline Thermal Analysis Report,
2. Presentation materials to support PDR and CDR and response to RID's
3. Thermal verifications, test plans, and reports.

4) Document Deliverables
Document deliverables held in SE&I Provided Plan to PDR and Plan to CDR.
5) Government Furnished Equipment
a) 3x Software Development Systems
b) 1x Ground Integration Unit
c) 1x Flight Releasable Attachment Mechanism
d) APL Radio
e) JPL Radio
f) GD Radio
g) Integrated Gimbal Assembly

6) Government Furnished Facilities
a) Software Development Lab, B.333
b) Flight Hardware Build Area, B.333

7) Government Contacts

a) CoNNeCT Project Manager
b) CoNNeCT Lead Systems Engineer
c) CoNNeCT Principal Investigator
d) CoNNeCT Payload Manager
e) CoNNeCT Comm Instrument Manager
f) CoNNeCT Payload Manager
g) CoNNeCT Payload Mechanical System Lead

8) Period of Performance

The period of performance for the delivery order is through 6/30/10.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

2) Milestones and Reviews

The contractor shall meet the following milestones and participate in the following meetings, as needed.
a) Engineering Review Boards
b) Dry run presentations in preparation for major reviews
c) Weekly Payload Team Meetings
d) Weekly Discipline Team Meetings
e) Monthly Project Team Meetings

f) Technical integration meetings and telecons
g) Weekly reporting that will include:
i. Top level technical performance/accomplishments
ii. Near term activities
iii. WBS Comments (Problems/Issues/Risks and Mitigation Strategies
iv. Schedules (to include a Critical Path Schedule)

h) The contractor shall support the major CoNNeCT Design Reviews to include:
i. PDR (Completed - September 2009)
ii. CDR
iii. VRR
iv. PSR
v. Software Requirements Review
vi. Software PDR
vii. Software CDR
viii. Phase 0/1 Flight Safety Review
ix. Phase 2 Flight Safety Review

Deliverables
• Document Deliverables - Document deliverables held in SE&I Provided Plan to PDR and Plan to CDR.
• Presentation materials to support PDR and CDR and response to RID's
• Safety Critical Data Package and Stress Report including launch loads and vibroacoustic assessment
• Fracture Control Plan
• Fracture Control Summary Report
• Baseline Thermal Analysis Report
• Thermal verifications, test plans, and reports.
• Preliminary Design models and drawings

Monthly Progress Reports

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	45
Schedule	45
Cost	10

Desired Personnel Skill Sets

Flight hardware development, test, and analysis experience is required in all discipline areas

Government Furnished Property

Safety and Assurance Plans

None Selected.

Technical Representative: Varga, Denise

Task Number: NNC09E348T - 4

Task Title: Communications, Navigation & Networking Configurable Testbed (CoNNeCT) - Software Engineering

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

Work previously performed under task 224T.

The GRC Space Communication Division is supporting the development of Software Defined Radio (SDR) technology through the Space Communication and Navigation Office at Headquarters. As part of the TRL progression of this technology, a spaceflight demonstration is desired. In response, GRC has formed the CoNNeCT (Communications, Navigation, and Networking reConfigurable Testbed) project to fly on ISS in 2011. This task is in support of this space flight project.

Task Order Description
Description of Services to be procured

Develop the Payload Avionics software system for CoNNeCT. The currently identified manifest opportunity is on HTV3 in 2011.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

TECHNICAL APPROACH:

The GESS II Team shall perform the following:

The contractor shall work closely with the GRC Communications, Navigation and Networking reConfigurable Testbed (CoNNeCT) team to provide project support and engineering services. The team will work with the Software Lead Engineer, the Payload Lead Engineer, and the CoNNeCT Control Center Lead to develop a Flight Software System to be delivered to flight hardware for testing and eventual shipment to the launch facility. Some support may be required throughout hardware and system testing and prior to launch at the launch site. The GESS II Team shall provide a Flight Software Lead Engineer to direct the flight team and provide an interface to the project.

Specific Work Elements:

• Develop the payload avionics software per the requirements in the CoNNeCT Software Requirements Specification
• Outfit and maintain the software development lab, which is located in Building 333,

Room 302A
• Support the Software Design Review, Physical Configuration Audit/Functional Configuration Audit and Preship Review for CoNNeCT
• Conduct peer reviews and inspections on work products
• Create detailed schedules and plans for work and supply to Integrated Master Schedule
• Manage work to the plans
• Develop required documentation per NPR 7150.2 Class C software
• Comply with NPR 7150.2 requirements for Class C software by utilizing GLPR 7150.1 for software development
• Demonstrate compliance via Compliance Matrix (available at software.grc.nasa.gov)
• Support project reviews per Integrated Master Schedule, such as the Critical Design Review, Test Readiness Review, Pre-Ship Review, etc. The required support may vary from attendance at review meetings to supply presentation material to presenting at a review.
• Support Verification & Validation, both at the software and systems level
• Provide test plans and test reports
• Report monthly to Discipline Lead Engineer for Software and Software Lead Engineer
• Provide monthly metrics reports to Software Lead Engineer and DLE for Software
• Perform ongoing Risk Management per the project Risk Management Plan
• Follow configuration management procedures per the Software Configuration Management Plan
• Install and maintain the software configuration management tool and the bug tracking tool on a server in the software lab
• Purchase and maintain the VxWorks operating system and tools and maintain in the software lab
• Develop the IT Security Plan for the software lab
• Maintain the Software Development systems in the software development lab. Keep a log for each system and record the hardware and software configuration throughout the life of the project.
• Assist in the build-up of the Ground Integration Unit by supplying software to the unit and participating in testing as hardware is integrated
• [NEW 8/21/09] Perform build-up of SDS#4 and Hardware simulator with parts procured during the previous performance period
• Travel to partner sites, JSC, KSC, or launch site to work interfaces, perform testing, and participate in Technical Interchange Meetings when necessary
• Develop a training plan including required skills and available classes to teach these skills
• Provide training to team members, as necessary, to obtain necessary skills
• Maintain training records for team members
• Respond to requests for information for safety reviews, hazard analyses, and safety packages
• Provide technical budget and schedule inputs
• Specific to the General Dynamics breadboard:
Review the applicable software documents form General Dynamics regarding the operation and software for the GD breadboard Software defined radio (SDR). Develop an application for commanding and receiving telemetry with the GD breadboard using the 1553B interface. Use the commands described by the GD software Interface Control Description. Develop a similar application for sending and receiving over the data interface using Spacewire with the ECSS-E-50-12A specification. Demonstrate the functionality of the breadboard using the command set, including startup,

Staffing:

Provide personnel, per previously submitted staffing plans under WBS 6.0 (Software), specifically under 6.2 (Flight Software) and 6.3 (Test Software), who have experience and knowledge directly related to the development of embedded software for avionics systems. Experience in the development of embedded flight software is preferred. The personnel should have experience developing software which runs under a real-time operating system as well as experience in software engineering processes such as requirements management, configuration management, verification and validation. These people will be required to support requirements development, concept definition, design, coding, verification, validation and acceptance of software that will support the CoNNeCT payload during operation aboard the ISS. The work will be conducted per the requirements indicated in NPR 7150.2.

Desktop office computing hardware, software and support will be charged to task as a distributed cost.

[NEW 8/21/09] Contractor shall plan on travel costs for up to 4 one person trips to JSC (2), SpaceDev in Louisville, CO (1), and JPL (1) for requirements exchange and engineering technical discussions during this period. One trip to Japan should be planned for up to 4 weeks in the 1st quarter FY2011 timeframe. Other travel for required training should also be costed.

Deliverables and Milestones to be met

Examples include: reports, analysis, and audits

Software Design Review 11/2009 - 12/2009
Project Critical Design Review 12/2009 - 1/2010
Functional Configuration Audit/Physical Configuration Audit, Ongoing
Preship Review, Ongoing

Deliverables:
Updates to Software Development Schedule, Due Weekly
Payload Avionics Software Design Document, Due 10/31/2009
Payload Avionics Software Test Plan, Due 10/31/2009
Payload Avionics Software Test Procedures, Due 11/31/2009
CDR Inputs, Due 11/30/2009
SWDR Inputs, Due 10/31/2009
Payload Avionics Software Test Report, Ongoing
FCA/PCA Inputs, Due 6/30/2010
Flight Software Delivery to Flight Hardware, Ongoing per Integration & Test schedule
Monthly Progress Reports in the form of the Monthly Metrics Spreadsheet (format to be supplied)

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	45
Schedule	45
Cost	10

Desired Personnel Skill Sets

VxWorks or other real-time operating system experience
Embedded programming experience

4+ years C++ programming experience
Microsoft Visual Studio experience
Experience with software configuration management tools
Requirements development
Software Architecture and Design
Experience with the following is a plus:
XML
Networking
Apache Server
Subversion installation and maintenance
Bugzilla installation and maintenance

Government Furnished Property

VxWorks operating system and tools
Software development systems (3 minimum)
E-Room Access
Windchill Access
Server for software repository and toolsets
Software Development Lab (B333, Room 302A)

Safety and Assurance Plans:
CoNNeCT Software Assurance Plan, GRC-CONN-PLAN-0085

Safety and Assurance Plans

None Selected.

Technical Representative: McKissock, David

Task Number: NNC09E352T - 2

Task Title: Service Module Systems Interfaces and Vehicle Integration

Task Details

Period of Performance
2/13/2009 - 8/31/2011

Background
Why the project is being pursued

No-Bid by D received on 11/05/2008, ldk

Entered as WISE Task 20081102 on 11/03/2008, ldk

The technical oversight of the development of the Orion Service Module is being performed by the GRC. Key roles in this activity is oversight of the service module interfaces and vehicle integration as part of the SE&I effort.

Task Order Description
Description of Services to be procured

Provide interface oversight and vehicle integration functions for the development of the Service Module per NPR 7123. This includes oversight of subsystem interface development throughout *NEW*ODAC-4 and ODAC-5 (Orion Design Analysis Cycle). Critical milestones will include the Orion PDR RID closeouts, DRD updates,Document resubmittals, and DAC 4/5 closeout ERBs *NEW AF7*

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

*NEW AF7***Government's Estimated Period of Performance is October 1, 2010 to August 31, 2011.***
NEW AF7*
Specific products include but are not limited to:
Requirements Allocation
Subsystem interface definition
Integration planning
Element planning
Subsytem integration
Integration enabling products.
Trade studies.
Special Studies and trades.
*********** New as of AFP6 - April 1, 2009 ***********
The contractor shall provide oversight, systems engineering, and vehicle integration functions for the GN&C, C&T subsystems, and EMI/EMC issues.

This oversight shall include coverage of GN&C and C&T Service Module activities, including regular meetings, mass tracking, risks and overall service module subsystem impacts resulting from changes to GN&C or C&T systems. The contractor shall provide weekly status of these subsystems and participate in weekly SE&I Team meetings.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

The Milestones and deliverables shall consist of the following:

1) Products mentioned above are to be reviewed for completeness and accuracy to support the Orion system reviews and design processes.
2) Weekly update reports on project status.

As part of the reporting requirements of this task order, the contractor shall included any open risks associated with this task, including cost, schedule, or technical requirements, including mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	35
Schedule	35
Cost	30

Desired Personnel Skill Sets

Systems engineer with manned space flight experience and proven communication skills.

Government Furnished Property

None

Safety and Assurance Plans

None Selected.

Technical Representative: Zernic, Michael

Task Number: NNC09E355T - 3

Task Title: Space Network Ground Segment Sustainment System Architecture Development Support

Task Details

Period of Performance
10/1/2009 - 8/31/2011

Background
Why the project is being pursued

The Space Network (SN) Ground Segment Sustainment (SGSS) project is developing a modernized and enhanced architecture for the SN ground stations at White Sands and Guam to replace the aging legacy systems used for monitoring, control, scheduling, user data processing, recording, and other critical functions and an associated set of engineering specifications.

Task Order Description
Description of Services to be procured

The SGSS project is led by Goddard Space Flight Center (GSFC), with Glenn Research Center (GRC) providing support in the role of architecture development and production of high-quality architecture description products including Department of Defense Architecture Framework (DoDAF) diagrams and contributions from model-based systems engineering. GRC is to assist in the development of context materials that establish: project scope, functional decompositions describing the reference system architecture being used to develop the requirements specifications, and accompanying Concept of Operations products to enhance understanding of the intended system behavior within its environment

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

To achieve the objectives the GRC SGSS Architecture Team requires a management and technical liaison to be located at GSFC to serve as the Point of Contact (POC) between the SGSS and the Architecture Team. This POC liaison shall attend all meetings at GSFC pertaining to the SGSS project. The POC liaison shall obtain and disseminate the design and technical information to the Architecture Team and provide review input. The POC liaison shall provide coordination of activities on the SGSS project between GRC and GSFC, including:
• Acting as liaison between SGSS and the Architecture Team for DoDAF drawing production,
• Facilitating and inspecting conversion of SGSS provided drawings into DoDAF formats (architecture and ConOps drawings tied to architecture) and CORE/Cradle exchanges,
• Providing oversight and participation in architecture/ConOps/requirements synchronization efforts,
• Providing oversight and participation in the linkage activities for the reference

architecture, ConOps, and requirements in Cradle database,
• Attending WebEx meetings with Architecture Team
• Conducting multiple system reviews through documentation and system review inputs.
• Performing system engineering tasks as required.

Travel to GRC or other locations as required is expected, not to exceed 6 trips.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

Deliverables:
1. Generate necessary graphical representations of architecture and ConOps for SRR presentation for delivery: March, 2010
2. Provide weekly activity reports in the format provided by SGSS Management until September 30, 2010
3. Presentation packages through September 30,2010

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	Weights
Performance	10
Schedule	45
Cost	45

Desired Personnel Skill Sets

None

Government Furnished Property

None

Safety and Assurance Plans

None Selected.

Technical Representative: Main, Leslie

Task Number: NNC09E372T - 1

Task Title: Central Process Systems Engineering in Support of Facilities Division

Task Details

Period of Performance
5/20/2009 - 8/31/2011

Background
Why the project is being pursued

No-Bid by D received on 05/22/2009, kcm

Entered as WISE Task 20090519 on 05/20/2009, kcm

To provide engineering services to support Facilities Division in the management Central Process Systems (CPS) at GRC. The CPS provide specialized utilities to the major test facilities including the various wind tunnels and test cells at Lewis Field. These utilities include combustion air, refrigerated air, altitude exhaust, cooling tower water, high voltage and variable frequency electrical power services.

Task Order Description
Description of Services to be procured

The contractor shall provide Controls, Electrical, and Mechanical Engineering services to support System and Project Management of the CPS and collateral equipment critical to the operation of the CPS. These engineering services emphasize safe, reliable, and timely systems support of the research (aeronautical and space) missions of GRC.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

The contractor shall provide all personnel, equipment, tools, supervision, and other items necessary to perform the management and engineering for systems and project engineering for modifications to and trouble shooting for the CPS at Lewis Field.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

Project designs with drawings, specifications, and preliminary cost estimates.
Computer programming of standard and proprietary computer programs that support the CPS.

Monthly Progress Reports

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	Weights
Performance	45
Schedule	40
Cost	15

Desired Personnel Skill Sets

Mechanical, Controls, and Electrical Engineering with AutoCad capabilities. Computer programming and troubleshooting education and experience for CPS controls. Engineering staff able to work in the office and in the field (investigation and troubleshooting of problems at the various CPS facilities at Lewis Field).

Government Furnished Property

Office space, office furniture or office cubicles, and telephone/internet services at Lewis Field.

Safety and Assurance Plans

Quality Assurance Plan
System Safety Plan

Technical Representative: Shook, Tony

Task Number: NNC09E378T - 2

Task Title: Linear Microphone Array Hardware Development

Task Details

Period of Performance
6/25/2009 - 8/31/2010

Background
Why the project is being pursued

No-Bid by D received on 06/29/2009, kcm

Entered as WISE Task 20090632 on 06/25/2009, kcm

This effort was originally initiated under GESS-2 task 0067 as part of the ORPR hardware development. There is now the need to build upon the current concept, finalize the design and analyses and provide test hardware to support the program. Tony Shook has been the TR for initial ORPR done under T067.

Task Order Description
Description of Services to be procured

Provide engineering, design and fabrication procurement services to develop a linear microphone array to be utilized in the 9x15 SWT in support of the Open Rotor Propeller Testing

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

The team shall perform the following:

Work closely with the researchers in the acoustic branch to develop the current concept assuring it will meet all the requirements and objectives of the test. Current plan is for 48 microphones @ 16 axial locations in the 9x15 SWT. GRC will provide controls and technician support for assembly in the tunnel.

********************Added 8/27/09 ************************

- Contractor shall procure microphone hardware and electronics as defined by the GRC researcher to support test hardware.
- Contractor shall design and fabricate test panels, microphone cover and transportation and handling cart based on requirements provided by GRC research team.

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Specific Work Elements:

1) Task Management
a) Manage resources on a day-to-day basis; execute the task; resolve problems and keep the technical representative informed of all issues. The contractor shall prepare and forward to the technical representative a monthly progress report defining the month's technical progress and the future month's planned activities.

2) Linear Microphone Array Design and Hardware Development
a) Provide engineering and design support to finalize current concept
b) Provide analyses and engineering support to assure design meets all research and safety requirements defined by the GRC research team
c) Provide 3D solid modeling and drawing support to fully document the design intent and allow for hardware fabrication

******Added 8/27/2009******

d) Provide a linear array test panels for testing at B&K labs
e) Provide a transportation and handling cart to move it around
f) Provide a removable cover for the face plate to protect the microphones.

****

Fabrication and material cost estimates identified in the associated cost plan have been determined based on the currently defined task requirements in this SOW, historical data and contractors' past experience for budgetary purposes. Once designs are finalized and approved by the TR, competitive bids will be obtained as required by the FAR prior to award.

Desktop office computing hardware, software and support will be charged to task as a distributed cost.

If travel and/or training is required, the cost has either been budgeted into the accompanying cost plan, or an amendment will be issued to cover the additional task requirements.

Government's Estimated Period of Performance is June 29, 2009 to December 30, 2009

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

Milestones:
• Provide test hardware in accordance with project schedule as defined by the GRC research team

Deliverables:
• Fabrication cost estimates and procured hardware related to task objectives
• 3D solid models and drawings submitted into the required Windchill database to support identified milestones.
• Linear Microphone fabricated hardware

************Added 8/27/09 *****************

• Transportation and handling cart
• Test Panels

****

• Monthly Progress Report- to include any open risks associated with this task (cost, schedule, technical requirements), along with any mitigation activities.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	Weights
Performance	50
Schedule	25
Cost	25

Desired Personnel Skill Sets

Personnel knowledgeable with the 9x15 SWT and previous microphone concept development work to aid in achieving aggressive milestones

Government Furnished Property

Pro/ENGINEER
Windchill

Safety and Assurance Plans

None Selected.

Technical Representative: Arida, Wade

Task Number: NNC10E379T - 0

Task Title: Recovery Act, Advanced Subsonic Combustion Rig Plenum Redesign and Fabrication

Task Details

Period of Performance
2/25/2010 - 2/24/2011

Background
Why the project is being pursued

NASA Glenn Research Center has committed support for specific efforts under the American Recovery and Reinvestment Act of 2009. Recovery act funds for NASA's Fundamental Aero Program (FAP) are being utilized to help design and fabricate combustor rig improvements to enable testing of advanced low nitrogen oxide (NOX) injector designs.

The combustor section on a jet engine is housed between the compressor and turbine section. The combustor houses a fuel injector that injects fuel into the airstream to increase the air's temperature and speed. A combustor rig is used to test only the combustion section of an aircraft's jet engine. A combustor rig test cell is designed to simulate the inlet conditions on a combustor by creating the same pressures and temperatures at the exit of a jet engine's compressor section. Consequently, the exit of the combustor rig is designed to simulate the same pressures and higher temperatures at the combustors exit to the inlet of a jet engine's turbine section. Combustor rigs can test various combustor concepts to determine their value long before it would be designed to fit into an aircraft's jet engine. America's air transportation industry is projected to double in size over the next 20 years. The production of greenhouse gas emissions generated by aircraft engine exhaust, emissions such as carbon dioxide (CO2), nitrogen oxide (NOX) and water vapor, will increase in proportion with the air transportation industry. As a result, NASA's Fundamental Aeronautics Program which is part of the Aeronautics Research Mission Directorate (ARMD) has established goals to reduce fuel burn in future aircraft, reduced fuel burn correlates to reduced CO2 and NOX emissions.

The Subsonic Fixed Wing Project (SFW), which is an element of the FAP, is working toward developing a complete new suite of integrated multidisciplinary analysis tools to predict noise, NOX, both takeoff and landing performance and cruise performance for subsonic aircraft which includes America's transportation industry. Improved performance requires more efficient operation at lower and higher aircraft speeds along with improved aircraft emissions at those speeds.

The Advanced Subsonic Combustion Rig (ASCR) located at NASA's John Glenn Research Center is a high-pressure, high-temperature combustion rig that simulates combustor inlet test conditions. The ASCR is equipped to measure both gas emissions and perform non intrusive laser diagnostic emission testing in a high pressure high temperature environment that mimics the conditions of high pressure ratio jet engine combustor section. This unique combustion test rig allows researchers and engine companies to test sector combustors that will be used in future aircraft engines. Engine companies with higher pressure ratio jet engines require testing at higher temperature and pressure conditions (1300°F @ 900-psig). The goal of this task is (1) to take existing “ASCR Sector Rig Modifications” redesign dated 2003, (2) bring up to current ASME Boiler and Pressure Vessel Code standards, and (3) fabricate and build new hardware per the verified design.

Task Order Description

Description of Services to be procured

Engineering services are being procured to coordinate the redesign and fabrication for the upgrade of the existing Advanced Subsonic Combustion Rig test section plenum hardware and its supporting water-cooling subsystems. These efforts will ensure the Advanced Subsonic Combustion Rig is compliant with current applicable codes (e.g. ASME Boiler and Pressure Vessel code (BPV) and ASME Piping Code ASME B31.3). The Advanced Subsonic Combustion Rig currently advertises temperature capabilities up to 1300°F at a pressure of 900-psig. Current hardware configuration is limiting operating temperatures to 1100°F at a pressure of 600-psig. The re-design will increase the Advanced Subsonic Combustion Rig’s testing capabilities to its advertised conditions of temperatures up to 1300°F non-vitiated (no combustibles) at flow rates ranging from 5 to 50-lb/s and pressures ranging from 30 to 900-psig, which will help research customers with the development of prediction and analysis tools for reduced uncertainty in the combustor test article design process. Table 1 displays snapshots of the test rig’s current configuration and the upgraded configuration.

EXISTING AND REVISED CONFIGURATIONS

-Existing ASCR Sector Rig Assembly 28470M43A000
Inlet Temperature @ Pressure: 1100°F @ 600-psig
Flow Conditions: 5 to 50 pound per second
Operating Pressure: 30 to 900-psig
Maximum Allowable Working Pressure: 1100-psig
Combustion Flow Temperature: 3400°F
Exhaust Flow Temperature: 500°F

-Revised ASCR Sector Rig Assembly Concept
Inlet Temperature @ Pressure: 1300°F @ 900-psig
Flow Conditions: 5 to 50 pounds per second
Operating Pressure: 30 to 900psig
Maximum Allowable Working Pressure: 1100-psig
Combustion Flow Temperature: 3400°F
Exhaust Flow Temperature: 500°F

TABLE 1. EXISTING VS. REVISED.

The revised configuration will allow the Advanced Subsonic Combustion Rig to operate at higher inlet temperature and pressure. The revised configuration also incorporates a separate laser section that will enhance test configuration set up and alignments.

General Scope of Work

SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

The contractor shall:

1. The contractor shall review the existing redesign and make necessary changes to the redesign to ensure it complies with all applicable codes within NASA Standard 8719.17

Rev. A entitled “NASA Requirements for Ground-Based Pressure Vessels and Pressurized Systems (PVS)” for the redesign and documentation.

2. The contractor shall review the existing redesign report located within the Government furnished CD (see Figure 1) and make the necessary changes to alleviate any open issues.

3. The contractor shall report to NASA any changes made to the existing redesign implemented per the direction of items #1 and #2.

4. The contractor shall take inventory of existing hardware configuration peripherals (e.g. fasteners, gaskets and instrumentation) and supply NASA with all extra peripherals needed to make the redesign a turnkey product

5. The contractor shall review water system upgrades within the existing redesign, verify compliance with NASA Standard 8719.17 Rev. A, make changes as needed and supply NASA with all extra components.

6. The contractor shall ensure fabrication of new hardware per the verified redesign is ASME Code Stamped. The contractor shall submit a NASA Form DD 250 “Material Inspection and Receiving Report” (the DD 250 is a multipurpose report utilized by Government agencies to provide evidence of contract quality assurance, to provide evidence of Government acceptance, and to provide supporting documentation for processing payment of contractor invoices). The contractor shall prepare the DD Form 250 in accordance with NASA FAR Supplement 1846.6. An approved DD Form 250, signed by the NASA Technical Representative, shall serve as an acceptance document of the task completion.

7. The contractor shall provide a hazard analysis for the revised Sector Rig assembly.

The Government will:

1. The Government will provide the contractor with the existing redesign for a replacement plenum test section for the Advanced Subsonic Combustion Rig’s sector rig test stand. The redesign was documented and completed in 2003 before funding ran out, no hardware was fabricated. The redesign complies with ASME code requirements for 2003 and may not comply with ASME 2009 code requirements. The existing redesign is documented on a CD titled “ASCR Sector Rig Modifications EDD Task# 75137, Drawings and Engineering Reports, February 13, 2003, T. Cressman”. Included on the disk are 14 drawings that encompass assembly and detailed component drawings for the task. Along with drawings are word documents and a PowerPoint document that records existing redesign issues and thermal printouts of the original redesign’s heat and stress analysis.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

These milestone(s) mark significant components of successful task completion. See Task Deliverables below for further details on deliverables associated with this task.

Ref. A
Milestone Description: Completion of Critical Design Review (CDR)
Due Date: 5 months after task award
Completion Criteria: All CDR actions successfully addressed and accepted by Government. See Deliverable 4.

Ref. B
Milestone Description: Delivery of Final Design Package
Due Date: 6 months after task award
Completion Criteria: Final Design Report, all drawings, schedule and list of needed procurements from final design package.

Ref. C
Milestone Description: Submission of inventory Report
Due Date: 3 months after task award
Completion Criteria: Compliance with the Commercial Parts List associated with drawing number 75137M77A000 “ASCR Split Plenum Sector Rig Assembly”. See Deliverable 3.

Ref. D
Milestone Description: Final delivery of fabricated vessels, additional peripheral hardware and water subsystem hardware needed
Due Date: 12 months after task award
Completion Criteria: Verification to design and compliance with NASA Standard 8719.17 Rev. A entitled “NASA Requirements for Ground-Based Pressure Vessels and Pressurized Systems (PVS)”. Approved NASA Form DD 250. See Deliverable 5 & 6.

Task Deliverables
NOTE: The government acknowledges that timely performance may be reliant on Government Furnished Equipment (GFE) and/or government furnished data.

Ref. 1
Deliverable Description: The Government will provide the contractor with the existing redesign for a replacement plenum test section for the Advanced Subsonic Combustion Rig’s sector rig test stand. The existing redesign is documented on a CD titled “ASCR Sector Rig Modifications EDD Task# 75137, Drawings and Engineering Reports, February 13, 2003, T. Cressman”.
Due Date: Task Order award
Acceptance Criteria: N/A
Responsible Party: GOVERNMENT

Ref. 2
Deliverable Description: Submit a report detailing any necessary changes to the redesign and/or changes alleviating any open issues.
Due Date: 3 months after Task Order award
Acceptance Criteria: Current compliance with NASA Standard 8719.17 Rev. A entitled “NASA Requirements for Ground-Based Pressure Vessels and Pressurized Systems (PVS)”
Responsible Party: CONTRACTOR

Ref. 3
Deliverable Description: Submit an inventory report of existing hardware configuration peripherals (e.g. fasteners, gaskets and instrumentation) and supply NASA with a list of all extra peripherals needed to make the redesign a turnkey product
Due Date: 3 months after Task Order award
Acceptance Criteria: Compliance with the Commercial Parts List associated with drawing number 75137M77A000 “ASCR Split Plenum Sector Rig Assembly” within supplied CD/Deliverable 1
Responsible Party: CONTRACTOR

Ref. 4
Deliverable Description: A complete final design package
Due Date: 30 days after CDR completion
Acceptance Criteria: All CDR findings and actions must be addressed for Government acceptance.

Package must include final design report, schematics and hazard analysis.
Responsible Party: CONTRACTOR

Ref. 5
Deliverable Description: Deliver fabricated vessels and all extra peripherals needed to make the redesign a turnkey product.
Due Date: 12 months after Task Order award
Acceptance Criteria: Current compliance with NASA Standard 8719.17 Rev. A entitled "NASA Requirements for Ground-Based Pressure Vessels and Pressurized Systems (PVS)" and signed DD 250.
Responsible Party: CONTRACTOR

Ref. 6
Deliverable Description: Submit all extra components required for water subsystem upgrades
Due Date: 12 months after Task Order award
Acceptance Criteria: Signed DD 250
Responsible Party: CONTRACTOR

Ref. 7
Deliverable Description: Submit Monthly Progress Reports
Due Date: Monthly delivered on the 5th business day of each month for the previous month
Acceptance Criteria: At a minimum, the contractor shall identify:
a) Technical task status (including design)
b) Percent complete of each deliverable
c) Progress towards meeting delivery dates
d) Task deliverable risks or variances (cost, schedule, technical requirements), and mitigation activities
Responsible Party: CONTRACTOR

Criteria to Be Used for Evaluation	Weights
Performance	40
Schedule	40
Cost	20

Desired Personnel Skill Sets

Design Mechanical Engineers and Draftsmen with working knowledge and/or experience of pressure vessel and piping codes and finite element and heat transfer analysis.

Government Furnished Property

See Task Deliverable Section

Safety and Assurance Plans

None Selected.

Technical Representative: Hughes, Christopher

Task Number: NNC10E415T - 0

Task Title: Recovery Act - Ultra High Bypass Turbine-Powered Simulator Fan Model

Task Details

Period of Performance
3/4/2010 - 3/31/2011

Background
Why the project is being pursued

NASA Glenn Research Center has committed support for specific efforts under the American Recovery and Reinvestment Act of 2009 (ARRA). Recovery act funds for NASA's Fundamental Aeronautics Program (FAP) are being utilized to design, develop and test aircraft-engine Ultra High Bypass (UHB) component technology hardware to support the Subsonic Fixed Wing (SFW) Project research into aircraft and propulsion integration. The goals of the SFW Project are to reduce the amount of fuel burned by aircraft today by 33% and reduce the hazardous exhaust gas Nitrogen Oxide, which is responsible for hurting the Earth's Ozone Layer, by 70%. Less fuel burned also means much less Carbon Dioxide, one of the gases responsible for Global Warming, put into the atmosphere by aircraft engines.

NASA has the capability to test scale models that can simulate an aircraft engine by itself or while installed on a model aircraft wing in NASA wind tunnel facilities. Some of these scale models are concepts of the next generation of today's aircraft engines, called turbofans. The wind tunnel testing is performed to determine the performance of new turbofan engine designs and their effect on the aircraft aerodynamic performance. A special test rig is used to power these model turbofans called a Turbine Powered Simulator, or TPS. The TPS provides power to a model of a turbofan engine during testing through a shaft that connects the fan part of the model to the air motor in the back of the TPS unit. Hot, high pressure air is sent to the air motor part of the TPS to spin it and the model turbofan through a shaft connecting them both together. The air is supplied through pipes that come through the model aircraft wing and engine pylon that the TPS is mounted to. To make sure the TPS is healthy and running smoothly and safely, there are special temperature sensors, pressure sensors and vibration sensors connected to the rotating parts inside the TPS. How well the model turbofan is performing is also measured using pressure and temperature sensors located inside the turbofan model.

To enable future propulsion-airframe integration testing of advanced UHB turbofans, design and fabrication of a representative UHB fan and stators for testing on a TPS will be performed. And, because of the severe operating conditions the TPS unit endures during testing, the TPS and support systems require inspection and rebuilding after every test campaign or before its use in the next test campaign. This means the TPS unit must be taken apart, the parts looked at with special equipment and techniques, the worn out parts replaced or rebuilt, instrumentation repaired or replaced, and the TPS put back together. The lubrication system must have seals, hoses and any broken sensors replaced. The TPS unit control system must also be inspected and defective parts replaced. It also requires software upgrades to be able to control the unit correctly for the next test campaign for any special operating test points to be explored. This work requires specially trained people and special equipment to do all the tasks needed to make the TPS drive unit operate as it was originally designed by its manufacturer, Tech Development Inc. (TDI).

Task Order Description
Description of Services to be procured

Engineering services are being procured in two separate subtasks. In the first subtask, the Contractor is being asked to complete the aerodynamic and mechanical design and fabrication of a new fan and set of stators to fit an existing NASA Turbine Powered Simulator (TPS) air motor, Model Number 2601 (2601). This fan model will be used to conduct research on the next generation of Ultra High Bypass Wing Integration Technology in future wind tunnel tests. The second subtask will focus on the refurbishment and upgrade of the TPS 2601 and its system components in order to insure the TPS unit can be operated safely during testing. This effort will involve the inspection and rebuilding of the parts of the TPS 2601 itself and the oil Lubrication Cart. The TPS Control Console will have NASA-defined software enhancements installed to enhance TPS control during testing.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

Subtask 1. Design and Fabrication of New TPS Fan Model

1 (a). Model Design

The Contractor shall:

1. Complete both a Preliminary Design and a Critical Design of the aerodynamic, mechanical and structural design of a new fan and outlet stators, including any model flow lines required to complete a calibration of the fan and stators (such as internal inner and outer flowpath contours and fan exit nozzles). The fan model will be used for testing with the existing NASA TPS 2601. The fan model will be designed to meet the aerodynamic, mechanical and structural performance requirements provided by NASA in Appendix A at the end of this Statement of Work.

2. Perform an assessment as part of the Preliminary Design to determine the material required for the fan to enable it to meet the mechanical and structural design requirements provided by NASA. A fan blade containment feature will not be required for this fan design.

3. Include an analysis as part of the Preliminary Design to match the new fan performance requirements to the existing TPS 2601 capability. If previous TPS experimental data is insufficient to perform the analysis, the Contractor shall be predict the existing TPS turbine performance with existing turbine design computational methods. In particular, the turbine drive air pressure and heat required to operate the proposed fan/stator system at its design condition shall be determined. The results of this analysis will be used to guide the detailed aerodynamic design of the fan/stator system.

4. Conduct a limited evaluation of the existing TPS mechanical analyses provided in the document TDI TR94-108 entitled “Design Analysis Report of the VHBR Simulator Model 2601 TPS and the BPR 9 Cowl Assembly,” produced under NASA Contract NAS1-4509, Task 053 with Langley Research Center, and a copy of which will be supplied by NASA,

to ensure that the increased temperature will not structurally compromise the TPS hardware at operating speed.

5. Design an internal flowpath contour for the new fan and stators to allow the fan model to perform as required. The outer flowpath shall include a bellmouth inlet adapter, fan case, fan duct, and several fan exit nozzles. The inner flowpath shall include the spinner, hub, inner fan duct, and inner nozzle. The flowpath hardware shall be designed to enable a calibration of the fan and stators using the TPS 2601 system. The Contractor shall utilize as much of the existing TPS flowpath contours and fan model hardware as possible.

6. Design the new stators to operate upstream of the existing TPS 2601 air supply/mounting pylon and fan duct bifurcator pylon (located 180 degrees circumferentially away from the mounting pylon) to minimize the flow distortion produced by the two pylons. The stators shall be designed to direct the fan air flow around the pylons and minimize their impact on the fan/stator system performance. The Contractor shall establish and document the tradeoffs between aerodynamic performance and structural safety factors in the stator design process required to incorporate this minimal flow distortion design feature.

7. Design five fan exit nozzles to investigate the fan performance map. The fan design points for the additional fan nozzles will be specified by NASA in the design requirements, given in Appendix A. The Contractor shall be responsible to provide the flowpath coordinates required for each nozzle as part of the fan model design process to allow the fan to reach the specific design points. The mechanical design of the new flowpath component hardware for mounting the hardware to the TPS unit shall meet exiting TPS 2601 interface requirements as defined by the TPS 2601 manufacturing and design drawings provided by NASA (See Task Deliverables, Item 1).

8. Design a new fan duct instrumentation rake(s) to measure total pressure and total temperature behind the stators during testing. The rake shall be dimensioned to fit within the fan duct at the axial location specified by NASA after the final design of the other model components has been completed. Up to six rakes shall be required, and NASA will define the number of rakes prior to CDR. The sensor specifications for the new rake(s) will be provided in the design requirements document supplied by NASA in Appendix A.

9. Include in the Final Design detailed analysis results that demonstrate the new fan and stators meet the design requirements defined by NASA, and complete manufacturing drawings and CAD models for all new model hardware. NASA will have final approval of all final fan model designs, manufacturing drawings and CAD models.

The Government will:

1. Provide a copy of the document TDI TR94-108.

2. Provide a copy of the manufacturing drawings for TPS 2601 unit.

3. Acquire the necessary design software package licenses and deliver to the Contractor.

1 (b). Model Manufacture

The Contractor shall:

1. Manufacture the fan and stators per the manufacturing drawings and CAD models generated as part of the Final Design.

2. Manufacture the bellmouth adapter, spinner, inner and outer fan ducts downstream of the stators, fan exit nozzles, and instrumentation rakes.

3. Provide material certifications and certified results of non-destructive inspection/testing for all material used to fabricate all model hardware.

4. Statically balance the model rotating assembly, which includes the hub, spinner and fan.

5. Assemble all model hardware and instrumentation onto the TPS 2601 to insure proper fit and assembly.

Subtask 2. Upgrade of Existing NASA-owned TDI 2601 TPS Unit and System Components

2 (a). Refurbish TPS 2601 Unit

The Contractor shall:

1. Disassemble and inspect the existing TPS 2601, replace existing bearings and seals, and reassemble the unit. All TPS components shall be inspected for cracks and stress anomalies using standard NDE test techniques.

2. Hydrostatically test the turbine inlet plenum (TDI drawing # 25201) exposed to the high pressure, high temperature air supplied to the TPS drive turbine to the limits defined by NASA in the design requirements document. If during the fan design process it is determined that the new predicted maximum operating pressure will be different than defined by NASA in the design requirements document, the Contractor shall request NASA to change the hydrostatic test limit be based on the new fan final design performance result.

The Government will:

1. Deliver the NASA-owned TPS 2601 turbine unit to the Contractor.

2 (b). Refurbish Lubrication Cart

The Contractor shall:

1. Inspect the oil Lubrication Cart for the TPS 2601 and repair and replace as necessary components of the cart to attain the original manufacturer defined operating configuration and performance specifications.

2. Review the Lubrication Cart operating history document provided by NASA and investigate and resolve the problems and issues listed.

The Government will:

1. Provide the Contractor with documentation of the operating history of the Lubrication Cart and its known operating problems and issues (See Appendix B).

2. Deliver the NASA-owned TPS Lubrication Cart to the Contractor

2 (c). Upgrade TPS Electronic Control Console

The Contractor shall:

1. Review the TPS Control Console upgrade requirements document provided by NASA and design and implement changes to the Control Console to achieve those requirements. The enhancements will provide increased safety monitoring and improved control shutdown functions. The Contractor shall be required to demonstrate the enhanced functionality of the TPS Control Console during the operational verification testing outlined in section 2(a) above.

The Government will:

1. Provide the Contractor with documentation of the operating history of the Control Console and its known operating problems and issues (See Appendix C).

2. Provide the Contractor with documentation of Control Console upgrade requirements and specifications (See Appendix C).
3.
4. Deliver the NASA-owned TPS Control Console to the Contractor

2 (d). Demonstrate Fan Model Operating Characteristics

The Contractor shall:

1. Demonstrate the operational characteristics of the new fan model and refurbished TPS 2601 and support systems at the Contractor's facility to verify the fan model and TPS unit performance and safety of operation. The Contractor shall provide all required resources and test equipment to operate the TPS unit and fan model during testing.

2. Operate the fan model and TPS unit to the limit specified in the design requirements document provided by NASA in Appendix A.

3. Acquire and provide to NASA all test data measured from all instrumentation during verification testing of the TPS unit and new fan model.

2 (e). Update TPS System Operating Manual

The Contractor shall:

1. Prepare an updated manual for the TPS unit and its support systems. The updated manual shall include operating and maintenance information on the updated TPS unit, TPS Control Console, and Lubrication Cart.

The Government will:

1. Provide the Contractor with a copy of the existing TPS 2601 operating manual.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

These milestone(s) mark significant components of successful task completion. See Task Deliverables below for further details on deliverables associated with this task.

Ref: A
Milestone Description : Complete Preliminary Design Review (PDR)
Due Date: Five (5) months after Task Award
Completion Criteria: All PDR actions successfully addressed and accepted by the Government. See Deliverables Item 2

Ref: B
Milestone Description : Complete Critical Design Review (CDR)
Due Date: Eight (8) months after Task Award
Completion Criteria: All CDR actions successfully addressed and accepted by Government. See Deliverable Item 3.

Ref: C
Milestone Description : Complete fabrication of Fan Model components
Due Date: Eleven (11) months after Task Award
Completion Criteria: Fan Model components meet drawing specifications approved by Government. See Deliverable Item 4.

Ref: D
Milestone Description : Complete acceptance testing of Fan Model, and TPS unit and support system components
Due Date: Twelve (12) months after Task Award
Completion Criteria: Fan Model and TPS system performance meets Government design requirements. See Deliverable Item 1.

Ref: E
Milestone Description : Complete Final Design Package
Due Date: Thirteen (13) months after Task Award
Completion Criteria: Final Design Report including all predicted results, and all final drawings and computer models. See Deliverable 6.

Task Deliverables

NOTE: The government acknowledges that timely performance may be reliant on Government Furnished Equipment (GFE) and/or Government furnished data.

Ref: 1
Deliverable Description:
a) Documentation defining the aerodynamic, mechanical and structural design requirements for the new fan model components and design requirements for TPS Control Console Upgrade

b) Manufacturing and design drawings, computer design models, TDI design report TR94-108, and Operating Manual for NASA-owned TPS Model 2601, and for BPR9 fan model previously tested in 2008 with same TPS unit

c) Government-owned TPS Model 2601, Lubrication Cart, and Control Console to Contractor facility

Due Date: Within thirty (30) days of Task Award
Acceptance Criteria: N/A
Responsible Party: GOVERNMENT

Ref: 2
Deliverable Description: Preliminary Design Review package including design, analysis and material trade-off results, turbine power capabilities and fan design tradeoff results,

preliminary layout drawings, and estimates of hardware pricing and delivery schedule.
Due Date: Four (4) months after Task award
Acceptance Criteria: Government able to schedule Preliminary Design Review (PDR), 10% completion of project
Responsible Party: CONTRACTOR

Ref: 3
Deliverable Description: Critical Design Review package including all PDR findings, final aerodynamic, mechanical and structural design parameters of the fan and stators, analysis and predicted fan and stator performance results, final geometry of the fan model components including flowpath contour definitions, final layout drawings, and final hardware pricing and delivery schedule.
Due Date: Seven (7) months after Task Award
Acceptance Criteria: Government able to schedule Critical Design Review, 90% design completion
Responsible Party: CONTRACTOR

Ref: 4
Deliverable Description: Final to Government for approval manufacturing drawings of Fan Model components
Due Date: Nine (9) months after Task Award
Acceptance Criteria: Drawings meet design requirements specified by Government
Responsible Party: CONTRACTOR

Ref: 5
Deliverable Description: Delivery of Fan Model components, TPS unit Model 2601, support system components, updated operating manual, and assembled fan model hardware to Government.
Due Date: Two (2) weeks after completion of acceptance testing
Acceptance Criteria: Government Form DD250 (Material Inspection and Receiving Report). The DD 250 is a multipurpose report utilized by Government agencies to provide evidence of contract quality assurance, to provide evidence of Government acceptance, and to provide supporting documentation for processing payment of contractor invoices. The Contractor shall prepare the DD Form 250 in accordance with NASA FAR Supplement 1846.6. An approved DD Form 250, signed by the NASA Technical Representative, shall serve as an acceptance document
Responsible Party: CONTRACTOR

Ref: 6
Deliverable Description: Final Design Report submitted for Government approval.
Due Date: Twelve (12) months after Task award
Acceptance Criteria: Final Design Report shall include all PDR and CDR findings and actions taken, all design, analysis and tradeoff study results, all fan predicted performance results, and detailed final manufacturing drawings and computer models of all Fan Model component hardware.
Responsible Party: CONTRACTOR

Ref: 7
Deliverable Description: Submit Monthly Progress Reports
Due Date: Delivered on the 5th business day of each month for the previous month
Acceptance Criteria:
a) Monthly Financial Management Report – The Contractor shall report monthly financial data using NASA Form 533M and shall ensure the task order's financial data is segregated in a separate line item category with the 533 report. Any additional ARRA financial documents or reports shall be provided according to the ARRA financial reporting clauses.
b) Technical task status (including design)

c) Fabrication status
d) Percent complete of each deliverable
e) Progress towards meeting delivery dates
f) Task deliverable risks or variances (cost, schedule or technical requirements), and mitigation activities
Responsible Party: CONTRACTOR

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	**Weights**
Performance	40
Schedule	40
Cost	20

Desired Personnel Skill Sets

Personnel knowledgeable with the TDI M2601 Turbine Powered Simulator unit and support systems, as well as wind tunnel facilities and testing, to aid in achieving aggressive milestones. Personnel should also be familiar with the following engineering programs/applications: Pro/Engineer, AutoCAD, NASTRAN, ANSYS and Windchill.

Government Furnished Property

ProEngineer, AutoCAD, NASTRAN, ANSYS and Windchill design software licenses. See also section Task Deliverables and Item 1 in corresponding table.

APPENDIX A

TPS Fan Model Design Requirements

The fan and stators and flowpath hardware designs shall meet the following aerodynamic, mechanical and structural requirements:

1. Fan outside diameter of 10.75"
2. 18 fan blades, 44 stator blades
3. Fan hub to tip ratio at fan leading edge of 0.31 (Fan hub diameter compatible with existing TDI 2601 TPS unit)
4. Stator hub to tip ratio at stator trailing edge of 0.45 – 0.47, but current value of 0.50 is acceptable if smaller dimension cannot be achieved (Stator hub diameter compatible with existing TDI 2601 TPS unit. There may be a constraint on this because of the pylon attachment stirrup that circles the air motor case at this location)
5. Fan face to core nozzle exit/fan diameter of 1.5
6. Design point freestream conditions of Mach 0.78 and inlet stagnation pressure of 1.5 atmospheres (with NASA approval, the pressure value may be reduced to 1.0 atmosphere if design process reveals a fan design cannot be defined with satisfactory performance for operating at 1.5 atmospheres).
7. Design fan rotational tip speed of 950 - 1000 feet per second
8. Design fan pressure ratio of 1.3
9. Design fan weight flow of 23.6 pounds per second
10. Structural safety factor of 2.0 on yield strength for rotating components (fan blades, hub, and spinner)

11. 20% speed margin on shaft-critical speed for existing TDI M2601 drive unit
12. Margin of safety to 105% of the fan design speed for the fan mechanical design
13. Hydrostatic testing limits shall be 1.5 times the lesser of either the highest turbine drive pressure operating pressures observed during the previous testing campaign or on the predicted operating pressures required for the new fan design. The TPS unit was designed to run in a wind tunnel facility with a stagnation pressure of 2.18 atmospheres in the last test campaign, requiring an 1816 psia TPS drive air supply pressure. If during the design process it is determined that the new predicted maximum operating pressure for the new fan design is less than the value defined above, then the final value for the testing limit shall be based on the fan model preliminary design results with concurrence from NASA.

APPENDIX B

TPS Unit 2601 Lubrication Cart Operating History

1. Intermittent very high oil pressures (over 250 psi) have been observed, suggesting that there is an obstruction in the oil supply line. Repeated checks confirm no restrictions in the facility oil supply lines. One possible cause is debris lodged in a small passage in the TPS drive unit itself, or in the oil lubrication cart.

2. The original oil flow rate sensor in the unit failed under previous testing and was replaced using nonstandard fittings and was not calibrated. The Contractor shall remount the sensor using standard fittings and calibrate the sensor as part of the lubrication cart refurbishment.

APPENDIX C

TPS Unit 2601 Control Console and Control System Upgrade Requirements

1. The Contractor shall design and implement a “watchdog” timer circuit in TPS Control System for integration with Ames 11 foot wind tunnel data system. The watchdog circuit is a redundant safety feature which monitors the TPS Control System for activity. If there is no activity from the Control System after a predetermined time interval (perhaps due to a computer lockup or a loss in power), the watchdog circuit actives and sends a signal to the facility to shut off the air supply to the TPS unit. The new watchdog circuit shall replace the existing circuit in the Control System. The circuit shall be normally closed and fail open (i.e. the circuit opens with loss of power). Technical Point of Contact for the new TPS Control Console watchdog circuit will be Jon Bader at NASA Ames Research Center (650-604-1401, Jon.B.Bader@nasa.gov)

2. The existing configuration of the TPS Control Console has the ability to perform data acquisition, drive air supply regulation, safety monitoring and to control shutdown functions, for a single TPS unit. The Contractor shall install and make operational LabView VI to support ‘safety monitoring’ and ‘control shutdown functions’ for conducting two additional modes of TPS unit operation (note: TPS unit drive air supply will be independently supplied and regulated. The regulation of drive supply air is not required for these two additional modes of operation): 1), control a single TPS unit while monitoring both the primary and secondary health monitoring instrumentation from the TPS drive unit; or 2), control two TPS units independently and simultaneously using only the primary health monitoring instrumentation from each unit. The Contractor shall preserve the existing capability to monitor and control a single TPS unit when implementing the modifications needed meet the control requirements for two TPS units

outlined above.

Safety and Assurance Plans

None Selected.

Technical Representative: Main, Leslie

Task Number: NNC10E423T - 0

Task Title: Central Process Systems (CPS) Operations Engineering

Task Details

Period of Performance
1/4/2010 - 8/31/2011

Background
Why the project is being pursued

The Central Process Systems (CPS), High Voltage Distribution, Altitude Exhaust, Combustion Air Systems, Cooling Towers, High Pressure Natural Gas, Refrigeration System, Service Air, Variable Frequency Electrical Distribution System and others, require engineering support to maintain system reliability, on "on-time" start capabilities, and system operational safety.

Task Order Description
Description of Services to be procured

Provide system software engineering, controls hardware engineering, and day to day field engineering support of the Central Process Systems operations and controls maintenance.

General Scope of Work
SOW Summary should define respective responsibilities of Government and Contractor and specific tasks to be performed

Provide software and systems engineering in support of the Central Process Systems operations at Glenn Research Center, Lewis Field. The engineering staff will support the mission in office space provided by NASA in Building 143.

Deliverables and Milestones to be met
Examples include: reports, analysis, and audits

Daily software engineering support and troubleshooting.

Reports as required on problems encountered, routine software upgrades, controls systems engineering and documentation.

Reports as required on field problems, problem resolution, and recommendations for upgrading the Central Process Systems operations.

Monthly Progress Reports.

As part of the reporting requirements of this Task Order, the contractor shall include any open risks associated with this task (cost, schedule, technical requirements) including any mitigation activities.

Criteria to Be Used for Evaluation	Weights
Performance	60
Schedule	35
Cost	5

Desired Personnel Skill Sets

Computer programming skills, computer troubleshooting skills, Mechanical and Electrical engineering experience with fluid (compressible and non-compressible) distribution systems, and controls systems maintenance experience.

Government Furnished Property

Office space in Building 143.

Safety and Assurance Plans

None Selected.