

TASK STATEMENT OF REQUIREMENTS (SOR)

Task Number: ARC019.10.00

Date: June 2, 2016

Task Title: Special Projects

Requester: [REDACTED]

Period of Performance: August 1, 2016 through July 31, 2017

I Description of Work

The NASA Advanced Supercomputing (NAS) Facility supports the scientific and modeling requirements of the entire agency. With the development and implementation of first Columbia and now Pleiades, the NAS division is recognized as the lead within the agency for Supercomputing. This task will support Special Projects outside the funding of the NASA Advanced Supercomputing Facility. The NAS provides both technical work in support of networking, computation, visualization, application porting and application scaling. This Task will support the Division and associated projects in these areas:

- Subtask A: Code Enhancements to Support External Customers
- Subtask B: Mars Orbiter Missions
- Subtask C: Not Used
- Subtask D: ERA & HEOMD Support
- Subtask E: Not used
- Subtask F: Non-TN Systems Support
- Subtask G: Not Used
- Subtask H: Cloud and Data Analytics
- Subtask I: Enhanced Collaborations and Visiting Scholars Program
- Subtask J: Completed
- Subtask K: Exploratory Research Support
- Subtask L: Non-TN HPC Systems Support

The Contractor shall provide a task plan to that will carry out the above mission. This task plan should address the following sub-system elements:

Subtask A: Code Enhancements to Support External Customers

Government Point of Contact: [REDACTED]

This subtask focuses on additional work on code enhancements outside core (HECC - see Task ARC013) funding. Work will be specified by the Division, and will include performance enhancement and optimization for specific codes. The milestones and deliverables will be decided based on the requirements for each code.

Subtask B: Mars Orbiter Missions

Government Point of Contact: [REDACTED]

This task shall provide support for the Mars missions such as the Mars Reconnaissance Orbiter (MRO) mission. This sub-subtask shall provide periodic maintenance support and requested upgrades for the HiWeb HiRISE image suggestion tool. Work would include:

- **HiWeb, the HiRISE Image Suggestion Tool**
 - Perform maintenance updates as requested by HiRISE Science Team and operations staff.
 - Implement roll angles in image suggestion interface.
 - Implement database-centric user base management.

Subtask C: **Not Used**

Subtask D: **ERA & HEOMD Support**

Government Point of Contact: [REDACTED]

This subtask provides a combination of technical writing, project coordination, and risk analysis support to tasks funded under the Engineering Risk Assessment (ERA) Team and the Human Exploration and Operations Mission Directorate (HEOMD). Efforts to be supported by this subtask include (but are not limited to) the development of the Space Launch System (SLS), the Commercial Crew Program (CCP), and Asteroid Threat Assessment (ATAP) projects. Technical writing and project coordination tasks include: producing monthly reports, technical highlights, and presentations; editing and formatting technical papers and deliverable reports; providing meeting support, task coordination, and scheduling; and maintaining digital archives of project deliverables and materials. Risk analysis support work includes helping to develop the ERA PD physics-based impact risk model, running risk simulations, and post-processing and analyzing results. This subtask may also provide technical writing support for the NASA Advanced Supercomputing (NAS) Publications and Media Team and NASA's booth at the annual Supercomputing Conference, if possible alongside primary duties. The staff will work with the Government POC to perform and prioritize the task work needed to support these efforts.

Subtask E: **Not Used**

Subtask F: **Non-TN Systems Support**

Government Point of Contact: [REDACTED]

The goal of this task is to provide support and maintenance for non-TN systems that are operating within the NAS domain.

- The contractor shall:
 - Provide LSA (Lead System Administrator) system and user support for Macintosh OS X and Linux desktop systems, and Linux servers for non-TN customers residing on the NASLAN. This includes new system deployments, regular OS and security patching, OS upgrades, backups, general application support and hardware maintenance.

- Provide support for 12 non-TN user systems and 54 non-TN servers. 34 servers are supported 24x7 and 31 servers are VMs.
 - MAS systems: 51 Linux servers (including 31 VMs and 34 24x7 servers)
 - AA systems: 13 total - 1 Linux server, 8 user Macs, 4 user Linux systems
 - SS systems: 2 Linux servers
- Provide support for additional servers and desktops as identified.
- Provide information for the applicable IT security plan and ensure the systems are operated in accordance with the applicable IT security plan.
- Appendix A identifies the current systems to be supported.

Subtask G: Not Used

Subtask H: Cloud and Data Analytics

Government Point of Contact: [REDACTED]

The goal of this task is to assess the feasibility of utilizing cloud environments for NASA S&E (Science and Engineering) analyses including Data Analytics of NASA's big data sets. In support of the areas of this task, the contractor shall:

- **Area 1: Facilitate NASA's adoption of the commercial cloud computing model as part of the OCIO Enterprise Managed Cloud Computing project. Customers who have relied on traditional server-based deployment approaches frequently need assistance by a skilled cloud system architect to conduct prototyping and piloting, so this position will support prospective customers early in efforts to understand if their application or workload is suitable for operation in a cloud environment. Additionally, since cloud computing is still relatively new, its use requires the implementation of additional capabilities and integration with existing NASA IT services to be considered enterprise-grade. The contractor shall**
 - Support users wishing to prototype and pilot the operation of applications and workloads in NASA cloud environments.
 - Assist with the planned enhancement of Agency cloud computing capabilities.
 - Deliver a brief monthly report listing each customer cloud prototyping/piloting effort supported and associated progress or accomplishments.
- **Area 2: Advance NAS support to Science Data Analysis and Analytics (SDA)**
 - Develop and maintain a NAS SDA Roadmap that identifies needed capabilities and their priority; work with appropriate NAS groups to define implementation plans for capabilities and to perform related analysis of NAS hardware and software
 - Perform implementation projects and execute work pursuant to funded proposal efforts, as identified in periodic updates to the NAS SDA Roadmap.
 - Continue ongoing survey/interviews of Analytics projects that use or could use NASA data.

- Continue to develop and quantify use cases for NAS SDA support based on information gained from interviews and other research
- Develop and maintain a description of the current and future NAS environment (hardware and software) to support SDA
- Coordinate SDA efforts with other NAS groups and projects, including HECC efforts and NEX
- Support NAS in developing proposals for funding of work to advance NAS SDA Roadmap goals
- Participate in NASA Big Data Working Group and other similar agency or center initiatives
- Support NAS outreach efforts related to SDA, including support for conferences and publications as well as incorporating SDA into appropriate NAS websites; Identify outreach opportunities; conduct outreach to related SDA efforts throughout NASA and other government agencies.

Subtask I: Enhanced Collaborations and Visiting Scholars Program

Government Point of Contact: [REDACTED]

This subtask supports mission-focused collaborations and visits by subject matter experts to leverage and enrich NAS advanced computing activities in science and engineering modeling and simulation, data analysis and interpretation, as well as, NAS Division's other areas of expertise.

NAS shall continue and enhance its dialog with other NASA organizations, academia and the industry and seek opportunities for outreach to discover new users and create awareness of the division's capabilities to support advanced computing.

In the path to achieve this goal, the contractor shall support and organize workshops, lectures, seminars and collaborations resulting from visits by subject matter experts in the areas of interest to the NAS Division. The enhanced collaborations and interactions with visiting subject matter experts would augment NAS Division's expertise in emerging areas of advanced computing to demonstrate the use of these technologies to solve NASA's mission critical problems.

Requirements: The contractor shall:

- Collaborate as appropriate with all other technical areas to both leverage and drive their capabilities, and to demonstrate the power of NAS' comprehensive advanced computing services model.
- Provide support for enhanced collaborations with other entities that leverage and enrich NAS advanced computing, science and engineering modelling and simulation, and data analysis and interpretation capabilities.
- Provide demonstrations and presentations of NASA advances and results and impacts for NAS management and for important visitors to NAS, as requested.
- Design, implement and support a NAS Visiting Scholar Program that can provide logistics and organizational support for visits by subject matter experts for various durations.

- Provide logistics, organizational, and procurement support for ongoing and periodic NASA sponsored workshops, forums, seminars, lectures, conferences, and presentations.

Subtask J: Completed

Subtask K: Exploratory Research Support

Government Point of Contact: [REDACTED]

This subtask focuses on exploratory research not covered by other subtasks as specified by the Division. The milestones and deliverables will be decided based on the requirements for each effort.

Subtask L: Non-TN HPC Systems Support

Government Point of Contact: [REDACTED]

The goal of this task is to provide support and maintenance for High Performance Computing system requirements for non-TN projects that are operating or supported by the TN division.

The contractor shall:

- Provide support for systems and users on non-TN Linux systems and related subsystems residing within the HECC enclave. This includes system architecture design, new system deployment, regular OS and security patching, OS upgrades, backups, application support and hardware maintenance.
- Provide disaster recovery support for non-TN systems. This includes working with non-TN staff to optimize data transfers, tuning archive system for the increased workload and may include day-to-day data transfers and monitoring. Hardware procurements to support disaster recovery will be billed to the requesting projects.
- Provide data storage service for non-TN projects as requested by the TN division. This includes working with non-TN staff to develop requirements and plans for transferring, storing, optimizing and retrieving backup data from the HECC backup server. Hardware procurements to support disaster recovery will be billed to the requesting projects.
- Provide support for non-TN projects that require High Performance Computing expertise for projects on HECC resources as identified.
- Provide support for additional servers or services as identified.

II Deliverables/Milestones

Tracking #	Milestone	Metrics	Deliverables	Date
CE1	TBD	TBD	TBD	TBD

Table A: Code Enhancements to Support External Customers in Support of HECC Milestones

Tracking #	Milestone	Metrics	Deliverables	Date
19B-01	Perform maintenance updates	Respond to maintenance requests from HiRISE operations staff and science team as needed.	Update HiWeb to keep pace with OS and Java version updates, for bug fixes, and general maintenance.	On-going
19B-02	Implement roll angles in image suggestion interface	HiWeb users are able to enter requested roll angles when entering image suggestions	Roll angles added to photometric angle panel of suggestion GUI.	On-going effort
19B-03	Implement database-centric userbase management	Science theme lead (STL) responsibilities in HiCAT database used in HiWeb to determine user editing privileges	HiWeb modified to read HiCAT to determine STL editing privileges for suggestions.	On-going effort

Table B: Mars Orbiter Missions Milestones**Table C: Not Used**

Tracking #	Milestone	Metrics	Deliverables	Date
19D-01	Monthly reports for SLS, Commercial Crew and other customers for Engineering Risk Assessment Office	Performance data from all performance organizations, collected and compiled into a well designed report in a timely fashion	Separate powerpoint/pdf documents to be sent to individual customers	Ongoing on a monthly basis
19D-02	Asteroid fragment cloud model	Timely production, testing, and documentation of fragment cloud model in support of ATAP.	Help develop, test, and document stand alone model for ERA team.	May 2017
19D-03	Physics-based Impact Risk model development	Timely production, testing, and documentation of impact risk assessment model in support of ATAP's delivery to NASA HQ.	Help develop, update, test, and document stand alone model for ERA team.	Sept 2017

Tracking #	Milestone	Metrics	Deliverables	Date
19D-04	Risk assessment support	Exercise risk assessment models as part of the ERA Team. Develop inputs, execute models, synthesize results, document and disseminate findings at conferences and in publications, as appropriate. ATAP management and the PDCO, at HQ, have emphasized the need for additional publications from the ERA Team.	Submit abstracts to key ATAP-related meetings and publications. Present work and submit papers for accepted opportunities. -Present at Asteroid Generated Tsunami Workshop, Aug. 2016 -Submit abstract to PDC2017, May2017. -Submit abstract to one peer-reviewed journal of choice, as determined with the ERA/ATAP Teams.	As needed

Table D: ERA and HEOMD Support Milestones

Table E: Not Used

Tracking #	Milestone	Metrics	Deliverables	Date
19F-SS01	Security Patching and System Updates	Install IT Security updates as needed on supported OS's and apply OS and applications updates	Summary of updates applied	Ongoing Report Monthly
19F-SS02	Offsite MAS Server Support	Support failover of MAS services to an offsite location	Support of failover systems	Ongoing Report Monthly
19F-SS03	After-hours MAS support	Support 34 MAS servers 24x7	24x7 support	Ongoing Report Monthly
19F-SS04	Security Plan updates	Provide any necessary updates to the NAS SSP for the non-TN systems	Ensure systems are operating in accordance with the updated IT security plan	Ongoing Report Monthly

Table F: Non-TN Systems Support Milestones

Table G: Not Used

Tracking #	Milestone	Metrics	Deliverables	Date
19H-01	Provide assistance to users establishing their cloud-based prototype	At least two cloud-based prototype projects	Cloud environment along with images, scripts etc to ease S&E use	Continuous effort throughout this performance period.
19H-02	Enhance OCIO Enterprise Managed Cloud Computing project capabilities based on user requirements	Enhancements utilized by ongoing projects	Enhanced cloud environment	Continuous effort throughout this performance period.
19H-03	NAS Roadmap for SDA	Roadmap updates prepared and reviewed with SDA planning team	NAS Roadmap for SDA	Update quarterly
19H-03	SDA Interviews	Interviewees identified, interviews conducted and notes delivered	Notes on each interview	At least one per quarter
19H-04	Use Case Definitions	Use case definitions updated based on information gained from interviews and other research	Use case descriptions, including quantification	Update quarterly
19H-05	NAS SDA Environment Description	NAS SDA environment description includes NAS platforms and their capabilities, including hardware and software	NAS SDA Environment Description Document	Update as needed based on changes to environment
19H-06	Outreach initiatives	Identify/support at least one outreach opportunity per quarter	Description of opportunity; materials to support opportunity when directed	At least one per quarter
19H-07	Implementation/funded proposal projects	Milestones as documented in project plans	As documented in project plans	Monthly report of progress on projects

Table H: Cloud and Data Analytics Milestones

Tracking #	Milestone	Metrics	Deliverables	Date
19I-01	TBD	TBD	TBD	TBD

Table I: Enhanced Collaborations and Visiting Scholars Program

Table J: Not Used

Tracking #	Milestone	Metrics	Deliverables	Date
19K-01	TBD	TBD	TBD	TBD

Table K: Exploratory Research Support Milestones

Tracking #	Milestone	Metrics	Deliverables	Date
19L-01	Provide HPC engineering support to non-TN projects and agency mission activities	Provide agreed upon level of support to meet project/mission timelines	Report status of activities	Ongoing, weekly
19L-02	Provide HPC data archive support to non-TN projects	Perform backups in accordance to agreed upon schedule	Report completion of backup activity	Ongoing, monthly

Table L: Non-TN HPC Systems Support

Metrics

The metrics for this task are listed in the table under Deliverables/Milestones.

III Documentation and Reporting Requirements

The contractor shall:

- Discuss the monthly progress with the Task Requester.
- Schedule and conduct periodic task reviews after coordinating with the Task Requester, COTR and CO.
- Support in-depth presentations as scheduled by the Task Requester.
- Provide an electronic copy of the NF 533 for this task.
- Provide an electronic copy of the Monthly Technical Progress Report detailing the activity associated with this task, a summary of accomplishments, any problem areas and proposed action plans, and any issues by the 5th working day of the month.

IV Travel Requirements

The contractor is expected to travel as required as necessary to perform this task. Travel will include:

- Attend training and conferences as needed to support this task.
- Travel to other Centers as required.
- Attend technical meetings as required.

The Contractor shall provide to the Task Requester and Contract Management a Trip Report for both domestic and foreign travel that includes:

- Name of Traveller

- Trip Itinerary
- Task Name and Number
- Purpose of Trip
- Contact(s) and Summary of Discussion(s)
- Summary of Presentation(s) / Talk(s)

The following information shall be included in all Trip Reports for foreign travel:

- Statement of and Date of Threat Vulnerability Briefing
- Statement of and Date of Threat Vulnerability Debriefing (including the date the debriefing questionnaire was mailed to the Threat Vulnerability office. If no formal debriefing was required, so state)
- Statement of and Date of Export Compliance Briefing (if not applicable, so state and provide date of approval for 1676 package)

V Government Property

The Government will furnish equipment (workstations, offices) as required for the successful completion of the task's requirements. All requests for new equipment will go through the appropriate POC.

VI Ames Management System Requirements

Work on this task shall comply with NASA Management System Policy - NPD1280.1, NASA Policies & Procedures - NODIS, Ames Management System Directives (APR1280.1), AMS Core Processes: APR7100.1, APR8060.1, APR8800.7; AMS Elements APR1220.1, APR1410.1, APR1440.1, APR8700.3, APR8700.2, and CDMS (see <http://ams.arc.nasa.gov>).

In addition, this work should comply with Ames Management Objectives (MO), for Code TN, specifically:

a. Center Level MO 1

Promote and maintain an organizational culture in which safety is paramount.

b. Center Level MO 2

Deliver key technical contributions to Agency-critical programs and projects, meeting all cost and schedule commitments.

c. Center Level MO 3

Produce outstanding research.

d. Center Level MO 4

Continually improve Ames Research Center processes.

e. Center Level MO 5

Develop and maintain a highly skilled workforce.

f. Continuous Improvement

Use the Center's Continuous Improvement Actions system.

VII Security Requirements

Work on this task shall comply with the NAS Security Model and applicable U.S. Federal Government and NASA Policies and Regulations. In particular, work on this task shall comply with NPG 2810.1A and OMB Circular A-130.

VIII IT Purchasing Requirements

Acquisition of IT products and services required for this task shall comply with applicable NASA IT procurement policies including the ARC CIO's IT purchase approval process (when required), Internet Protocol version 6 (IPv6) compliance policy and other requirements stipulated in NASA Form NF 1707.

IX Other Requirements

Evaluation of Contractor's Response to SOR - Evaluation criteria of task proposal will be based on sound innovative technical approach, completeness of analysis, review and designs, proposed expertise and skill mix, and cost/price.

Award Fee Evaluation - Performance evaluation will be measured based on cost containment, quality of technical and status reports, adherence to metrics, and accomplishment of milestones/deliverables.

Task requires contractor access to Government database(s)? NO

X Section 508 Requirements

Certain subsystem elements are expected to result in spreadsheets or databases that contain a substantial amount of information. This information and its presentation mechanism are subject to Section 508 of the Rehabilitation Act, Electronic and Information Technology (EIT) Accessibility. Complete information on EIT accessibility and Section 508, is available via Internet at <http://www.section508.gov>.

Specifically, the Contractor must propose EIT products and/or services that meet the applicable accessibility standards identified below:

- 36 CFR 1194.41 - Information, documentation and support

XI Quality Assurance Standards

The contractor shall be in compliance with all applicable NASA and Center-level Quality Assurance Standards and safety practices and guidelines.