

TASK STATEMENT OF REQUIREMENTS (SOR)

Task Number: ARC023-10-00

Date: June 2, 2016

Task Title: NASA Earth Exchange (NEX) Project

Requester: 

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

I Description of Work

The purpose and goal of the NASA Earth Exchange (NEX) is to support global research by supporting more effective exploitation of NASA data holdings through collaborative activity among the science community. The system put into place by this project will allow users to share models, software and analysis results, to produce white papers and other proposals that promote the analysis toward higher level computing environments as appropriate. In this way, NEX will perform as a center for development of science data analysis concepts and mechanisms, in much the same way NASA's project design centers are used to rapidly develop mission concepts.

The NEX system will bring together data sets for initial and ongoing analysis using NASA computing resources associated with the High End Computing Capability Project. The system will manage the data used for analysis by various science community users; help to manage the contacts and interactive protocols among users; and assist in providing consistency and applicability of analysis results across multiple data studies by multiple researchers.

In previous contract years, the Infrastructure Project Plan and the Infrastructure Requirements were developed in conjunction with NEX Science team. Since the initial documents were written, a NEX Infrastructure Roadmap/Requirements spreadsheet has been maintained and updated quarterly. These documents provide the background and roadmap of the work to be done under this task. As documented in the NEX Infrastructure Project Plan, this task will provide four fundamental capabilities to its users:

- A collaborative environment hosted in a web portal. This environment will include social networking and publication tools as well as an interface to the data management environment and data repository.
- A data management environment providing tools for seamless data movement, caching and archiving across all NEX components that efficiently manages storage resources to provide a "common view" of the data holdings to users as well as to a domain specific data platform developed by the NEX Science Team. This environment will also integrate tools that will support the streamlined discovery of and access to key datasets.
- A "sandbox" computing environment with access to a subset cache of the NEX dataset repository, where codes can be developed and evaluated. The sandbox will also provide access to a suite of both commercial and open-source analysis tools that scientists can apply to datasets in the cache. In addition, the sandbox will support mechanisms/tools to capture, archive and instantiate user work environments to facilitate reproducibility.
- A set of tools and management processes to move codes from the NEX sandbox to the NAS supercomputing environment to allow larger scale model and analysis runs and computational experiments, as well as to export resulting datasets back into the NEX repository.

This work consists of primarily operation and management of the NASA Earth Exchange (NEX) Infrastructure for its users including developing software enhancement to the environment to support the Science User Requirements. Additionally, acquisitions will be made to augment the NEX Infrastructure, and are considered as a separate sub-task of this work.

- Subtask A: Not Used
- Subtask B: System Operations and Enhancement
- Subtask C: Acquisitions

Subtask A: Not Used

Subtask B: System Operations and Enhancement

The contractor shall provide ongoing operational management and maintenance of the NEX Project Infrastructure, as appropriate within the context of the NASA research environment. This is defined as: administering and supporting the current and future NEX servers and filesystems within the NAS environment; operating and maintaining the NEX web portal; and by providing ongoing user support as indicated in the project plan. The contractor shall also develop new capabilities where required to meet the Science User requirements. The potential effort in this subtask includes:

1. Assure that NEX Infrastructure hardware and software are operational and connected to networks as planned and available to users during normal business hours (5x8).
 - a. Fix hardware and software problems
 - b. Diagnose connectivity problems.
 - c. Install operating system and other software and upgrades, including security patches.
 - d. Provide information for the applicable IT security plan and assure the system is operated in accordance with the applicable IT security plan.
2. Provide Tier 1 support to users of NEX Infrastructure, including a mechanism for tracking tickets generated by NEX users and managing NEX user accounts on HECC assets. Capture and record user recommendations obtained through support contacts.
3. Implement and maintain a capability to monitor and track usage of resources by NEX users and provide usage reports. Enhance this capability as needed.
4. Maintain a data management policy for the core and user generated datasets, updating it as needed.
5. Facilitate the process for ongoing elicitation of requirements and user needs for NEX Infrastructure.
6. Propose, analyze and implement significant enhancements to the NEX Infrastructure, as identified during operation and through ongoing interaction with the NEX Science Team. Potential areas to be addressed in Contract Year 10 will be according to top-level guidance developed by NEX Project Management in discussion with the NEX Steering Committee, as follows:
 - a. Support the existing diverse NEX user community. Improve ease of use and ease of access.
 - b. Pursue the OpenNEX concept, which includes NEX resources outside the enclave – i.e., the Sandbox and the OpenNEX instantiation on the Amazon Cloud. Take OpenNEX to larger scale and attract users.

- c. Enhance the ability to interoperate across platforms, including 1) moving work between the Sandbox and the Amazon cloud and 2) moving work between the Sandbox and Pleiades.
 - d. Continue to support the Portal with the current functionality, but enhancements are not as high priority as the previous three areas. Exceptions are the area of providing users with enhanced search functionality via the Portal and limited additional collaboration capability.
 - e. Additional areas as may be defined from time to time by NEX Program Management and the NEX Steering Committee.
7. Support two meetings per year of the NEX Steering Committee and the NEX User Working Group
 8. Seek opportunities to leverage NASA and NAS technology initiatives in Big Data, collaboration, security and other technology areas to support NEX goals; provide NEX lessons learned and technology developments to those initiatives.

The current NEX systems (as of April 2015) include:

- Inxsrv151 – Primary Sandbox Server
- Inxsrv105 – NDC Sandbox Server
- Inxsrv120 – NEX Web Portal Server
- Inxsrv121 – NEX Web Portal Database Server
- Inxsrv119 – NEX Development Hypervisor (hosting VMs that support development for the NEX Web Portal and Sandbox)
- NEX NFS Filesystem
- NEX designated resource on Pleiades

Additional servers and other hardware and software will be procured and added to the current configuration as required to meet new requirements and to refresh older servers.

Subtask C: Acquisitions

This subtask provides acquisition support for the NEX Project. It involves working with the NEX Project Lead to provide acquisition support for NEX procurements to include but not limited to software, hardware, training, and professional services. The contractor shall work with the NEX Project Lead and the providers to facilitate NEX procurements.

II Milestones/Metrics/Deliverables

Deliverables and milestones for the subtasks include:

Subtask B Deliverables

| No. | Milestone | Metrics | Deliverables | Date Requested |
|--------|--------------------------------------|---|----------------------------------|--------------------------|
| NEX-B1 | 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 |
| NEX-B2 | Usage monitoring | On-time delivery of complete and accurate usage reports | Report of usage of NEX resources | Monthly |

| No. | Milestone | Metrics | Deliverables | Date Requested |
|--------|---|--|---|--|
| NEX-B3 | NEX Data Management Policy | NEX Data Management Policy reviewed periodically and updated as needed | Updates to NEX Data Management Policy | Review twice yearly, before the NEX Steering Committee / User Working Group meetings |
| NEX-B4 | Plan for NEX enhancements | Requirements spreadsheet, discussion notes and implementation plan updated quarterly. | Updated documentation of requirements discussion and NEX Infrastructure implementation plan | Updated quarterly |
| NEX-B5 | Implement NEX enhancements | Enhancements implemented, tested and put into operation as defined in the implementation plan. | Enhancements as defined in the implementation plan. | Monthly report of performance against detailed milestones in the implementation plan. |
| NEX-B6 | Support to NEX Steering Committee and User Working Group meetings | Timely input of draft slides for meetings; timely delivery of summary of impacts to NEX infrastructure roadmap | Input to slides for meetings; summary of impacts to NEX infrastructure roadmap | Draft slides provided according to planning schedule for each meeting; summary of impacts to roadmap delivered within two weeks of meeting |

Other deliverables and milestones may be attached to the tasks; and these may be subject to modification, as more complete understanding of the task directions is made possible by the prototyping and research required.

III Documentation and Reporting Requirements

Documentation and reporting requirements for this task include the following:

- Provide Monthly Status Report to the Task Requestor.
- Provide Weekly Status Report to the Task Requestor.
- Provide all reports listed in Deliverables/Milestones to the Task Requestor.

IV Travel and Training

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 NASA centers and relevant computing installations 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 4

Continually improve Ames Research Center processes.

d. Continuous Improvement

Use the Center's Continuous Improvement Actions system.

VII Security Requirements

Work on this task shall comply with 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 technical approach, thoroughness of approach to 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)? Yes

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.