

Earth Science Data and Information System Project

Earth Observing System Data and Information System (EOSDIS) Evolution and Development 2 (EED2) for Providing Sustaining Engineering and Operations of the Sentinel Gateway

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Section 1. Introduction

1.1 Project Overview

The Earth Science Data and Information System (ESDIS) Project manages the science systems of the Earth Observing System Data and Information System (EOSDIS). EOSDIS provides science data to a wide community of users for NASA's Science Mission Directorate.

The ESDIS Project has been directed by NASA Headquarters to develop, implement and operate a system to gather and redistribute data from the European Commission's (EC) Copernicus Programme. The adoption of the Copernicus Data Policy, which promotes the access, use and sharing of information and data on a free, full and open basis is an exciting opportunity to maximize access and exploitation of data from Sentinel instruments by scientists. The U.S. Earth Science community is already anticipating the value of this data to their research. However, the variety, volume and velocity of data from Copernicus missions will present new challenges for delivering data to U.S. science users from European systems. Anticipating the demand for Sentinel data, the EC and European Space Agency (ESA) have developed the concept of International Agreements (IAs) that provide dedicated capabilities for mirroring Sentinel data to specific agencies and partners. NASA is one such partner.

1.2 Applicable and Reference Documents

1.2.1 Applicable Documents

Applicable documents are those specification, standards, criteria, etc. used to define the requirements of this Statement of Work (SOW). In the event of a conflict between an applicable document and this SOW this SOW takes precedence. Should a conflict occur among applicable documents, the contractor shall request resolution from the Contracting Officer.

- 423-CDRD-EED2 Contract Data Requirements Document for EED2
- NPR 2210.1, External Release of NASA Software
- NPD 2820.1, NASA Software Policies
- NPR 2810.1A Security of Information Technology
- NPR 7150.2 NASA Software Engineering Requirements
- NASA-STD-8719.13B, NASA Software Safety Standard
- NASA-STD-8739.8, Software Assurance Standard
- IEEE Standard 730, Software Quality Assurance Plans
- Section 508 Standards – see <http://www.section508.gov/index.cfm?FuseAction=Content&ID=12>, particularly Subpart B – Technical Standards 1194.22 Web-based intranet and internet information and applications.

1.2.2 Reference Documents

Reference documents are those documents included for information purposes; they provide insight into the operation, characteristics, and interfaces, as well as relevant background information. The contractor is bound by these documents to the extent specified in this specification or in its applicable documents.

1.2.2.1 General Reference Documents

- NPR 4200.1F, NASA Equipment Management Procedural Requirements
- NPR 7120.5D, NASA Space Flight Program and Project Management Requirements

1.3 Task Summary

The NASA Sentinel Gateway (NSG) performs data acquisition, temporary storage, and distribution of the Sentinel Data from the European Space Agency (ESA) to the Distributed Active Archive Centers (DAACs). The NSG includes sufficient network connectivity and performs all necessary data acquisition protocols and procedures for nominal data reception and for anomaly resolution according to appropriate interface documents. The NSG has no data processing capabilities. It is strictly a central system dedicated to storing and forwarding data to the DAACs. The NSG provides local storage for a configurable number of days, currently a maximum of 60 days, of acquired Sentinel products.

The work within this task provides for the operations and sustainment engineering of the NSG. The NSG is responsible for ensuring ingest of Sentinel data products from ESA's multiple data hubs and data distribution to multiple DAACS that span across multiple locations. The task will provide for continued operations of the system, ensuring all available products to be archived at the DAACs are ingested from ESA data hubs and verified. Any data anomalies/issues found are reconciled. The NSG is responsible for the operational data flow from five Sentinel missions: Sentinel-1A, Sentinel-1B, Sentinel-3A, Sentinel-3B, and Sentinel-5P. The distribution of Sentinel-1 data to the Alaska Satellite Facility (ASF) and the Soil Moisture Active Passive (SMAP) Science Data Segment (SDS); the distribution of Sentinel-3 products to Ocean Biology (OB.DAAC) and the Level-1 and Atmosphere Archive and Distribution System (LAADS); and Sentinel-5P to the Goddard Earth Sciences Data Information Services Center (GES DISC). In addition to routine enhancements and bug fixes as a part of the sustaining engineering effort, this task year includes a hardware and software technical refresh of the Isilons and application servers. The team will need to develop plans and schedules for the build, configuration, installation of the new hardware, file transfers to new storage, and regression testing to ensure minimal impact to operational data flow.

The EED2 contractor shall coordinate and integrate task related activities with the ESDIS Project Office Designee, ESA, and the DAACs. The task also provides for enhancements to the operator Graphical User Interface (GUI) and tools as well as enhance error handling, data search, query, prioritization, and acquisition capabilities; data download prioritization schemes; enhancing the process flow for continuous integration and code deployment, as needed; and supporting data distribution to other U.S. Agencies as requested by ESDIS.

Section 2 describes the work to be performed under this task.

1.4 Period of Performance

The period of performance of this task is 10/01/2019 through 08/31/2020.

1.5 Place of Performance

The place of performance is the GSFC, Greenbelt, MD and the contractor's facility in Riverdale Maryland.

Section 2. Work to be Performed

2.1 Program Management

The contractor shall ensure the successful performance of this task with program direction and oversight from the Government. The contractor shall maintain the EED2 Program Management Plan.

2.1.1 Program Control

The contractor shall provide an organization with the necessary capability and authority to ensure that, within the scope of the contract, task, technical, schedule, and cost requirements are met. The prime contractor shall be fully responsible for the performance of its subcontractors and vendors.

The contractor's primary government interface is with the Goddard Space Flight Center's (GSFC) ESDIS Project Office designee.

The contractor shall supply the necessary resources, materials, facilities, and support tools needed in addition to the government furnished property to support this task.

The contractor shall maintain a formal configuration management system for controlling all aspects of this task including but not limited to hardware, software, systems, procedures, standards, and documentation. The contractor shall maintain the Configuration Management Plan.

The contractor shall use a Continuous Risk Management System (CRSM) that provides for the identification, analysis, tracking, mitigation, and resolution of risks related to this task. The CRMS shall be implemented in accordance with the guidelines set forth by NPR 7120.5, NASA Program and Project Management Processes and Requirements. Risks shall be reviewed regularly with the ESDIS Project.

2.1.2 Program Planning, Reporting, and Reviews

Planning

The contractor shall be responsible for all planning necessary to support the work defined by this task.

The contractor shall identify, document, and deliver all management plans to the government for comment and where applicable, approval.

Reporting

The contractor shall formally report technical, schedule, and financial performance on a monthly basis. The contractor shall report to the ESDIS Project whenever the contractor's performance warrants communication of current status more often than monthly. The contractor shall submit written reports and orally present status at monthly and other progress reviews. Written reports shall include Program Monthly Reviews.

In addition to formal presentations, the contractor shall meet with ESDIS Project technical monitors on a weekly (or other mutually agreed to) basis to communicate status and priorities. The contractor shall meet with the users on a mutually agreed to schedule (nominally weekly) to discuss status and priorities.

The contractor shall provide 533M, 533Q, accrual, and variance reports (DID EED-533-11). The contractor shall track and report on NSG costs.

Technical Reviews

The contractor shall prepare and support, as needed, requirements, design, and operational readiness reviews to ensure that the system requirements are met, the task is within budget, schedules are being met, and the design is in line with ESDIS' vision/concept.

Participate in Planning Teleconferences and Meetings

The contractor shall support weekly status meetings and biweekly multi agency teleconferences between NASA and other partners. The contractor shall also provide weekly operational status to ESDIS.

2.1.3 Procurement Management

The contractor shall follow the Procurement Management Plan (DID EED-PM-17), which documents procedures to be used for the competitive selection and procurement of required products and services, as well as the management of vendors and subcontractors.

2.1.4 Performance Based Metrics

The contractor shall identify, implement, track, and analyze metrics over the period of the task. Metrics shall address significant performance aspects of this task including responsiveness to ESDIS, ESA, and DAAC priorities.

Task and system performance metrics shall be selected such that accomplishments, as measured by the metric, shall be completely within the control of the EED2 contractor.

Metrics will be used to monitor the contractor's progress and may be used for award fee purposes.

2.1.5 System Engineering

The contractor shall support the requirements analysis and definition, system design, and end-to-end testing of the NSG and its interfaces. The contractor shall evaluate and provide recommendations for the best architecture to meet the data processing and distribution requirements.

The contractor shall:

- Provide systems engineering for the Sentinel missions. Continue to ensure sufficient system resources are available for processing and for handling the data volumes for ingest of the operational data and distribution to multiple DAACs (e.g. ASF and SMAP SDS (for S1A/S1B), LAADS and OB.DAAC (for S3A/3B), and GES DISC (for S5P)). Keep networks informed of any changes needed to network bandwidth requirements.
- Provide support for testing and verification of bug fixes and enhancements to the system.
- Provide support and enhancements to the interface, as needed, to ensure successful data ingest and distribution of Sentinel products from multiple missions to multiple DAACs or U.S. government agencies, as designated by ESDIS.
- Provide schedules/milestones for sprint activities.
- Update the following documents for the operational system, as needed: Interface Control Documents (ICD), Operational Concepts, Requirements Document, Design Document, wiki pages, and Standard Operating Procedures for the NSG system. Documentation will be configuration controlled at the ESDIS Configuration Control Board (CCB). ESDIS formats for documentation will be applied.
- Continue to work with NSG external interfaces (e.g. multiple DAACs, ESA public/private hubs, and U.S. Government agencies, etc.) to ensure compatibility between the system components and that performance and functional requirements are met.

2.2 System Design, Development/Enhancements, and Operations

The contractor shall ensure that the NSG hardware and software continue to be able to handle data ingest from multiple Sentinel missions, store the data, and distribute the data to multiple DAACs. Operations shall monitor the health and status of the NSG system daily. Issues/bugs encountered shall be tracked, resolved, and reported.

2.2.1 Software

The contractor shall support sustainment, enhancement, and management of the system. This support includes, but is not limited to, system custom code and scripts, COTS software products, databases, configuration control, documentation, testing, reviews, and support services.

The contractor shall:

- Provide enhancements/fixes, as needed, to the system and tools to monitor data ingest and data distribution to better support inventory reconciliation between the NSG and the ESA data provider, as well as the NSG and the DAACs.
- Continue to provide software support (e.g. bug fixes, etc.) and enhancements for all operational Sentinel missions.

- Provide enhancements, as needed, to the data prioritization scheme and/or to search/query/ingest/download software of Sentinel products from ESA.
- Provide an interface for other US government agencies as designated by ESDIS, to retrieve data from the NSG rolling repository, if needed.
- Provide support to the process flow for continuous integration and code deployment.
- Provide support for ad-hoc query requests to ESA.
- Provide support to keep and maintain daily NSG metrics on-line.
- Support preventive and corrective maintenance of custom or COTS software components. Such maintenance shall be provided in a timely manner and consistent with the operational availability.
- Support the configuration control and maintenance of system software, and documentation.
- Continue to use the established software and hardware problem reporting system (e.g. JIRA).
- Ensure that the software and tools are in compliance with applicable NASA security requirements.

2.2.2 Hardware

The contractor shall support preventive and corrective engineering of the system computer equipment including, but not limited to, central processing units, workstations and servers, direct access storage devices, archive media, and other associated equipment for the system. The equipment is located at the GSFC.

The contractor shall:

- Provide recommendations for enhancements or fixes needed to the system hardware to support software upgrades, as needed.
- Support preventive and corrective maintenance of hardware components as necessary to ensure the system reliability and operational availability requirements are achieved.
- Support the configuration control and maintenance of system hardware and documentation.
- Keep maintenance records of equipment failures, repair statistics, Engineering Changes (ECs), time to restore, etc. Maintenance records shall be made available to the government upon request.

2.3 Systems Operations and Sustaining Engineering

2.3.1 Sustaining Engineering

The contractor's overall sustaining engineering program shall support a prioritized balance of corrective engineering actions, requests for routine minor enhancements (perfective), and technology refreshment for the operational system, as needed.

The contractor shall:

- Support the replacement, deletion and/or upgrade of custom software, COTS software, hardware, and system media (e.g. archive media), as needed.
- Support the configuration control of system hardware, software, and documentation.
- Support the management of the systems requirements by recommending changes, reviewing, analyzing, and impacting change requests. The requirements are configuration controlled at the ESDIS Configuration Control Board (CCB). The contractor shall participate in the government configuration control process.
- Support the maintenance of the system and its documentation, including but not limited to the design documentation, operations procedures, interfaces, and user's guides. Documentation shall reflect the implementation of the current operational releases and patches.
- Support the compatibility of interfaces between the system and other system components.
- Support the established software and hardware problem reporting system (e.g. JIRA).
- Support the existing hardware and software environment to perform operational and maintenance engineering functions required by this statement of work.
- Support the maintenance of tools and ensure that the tools are updated as needed.
- Support the testing activities between the data source and multiple DAAC destinations.
- Support maintenance and enhancements of all server environments (e.g. development, production, and UAT) to support internal and external testing activities.
- Continue to monitor and ensure sufficient resources, system performance, and ingest and distribution requirements are met.
- Support the daily operations and data reconciliation for each of the Sentinel Missions and its interface to the DAACs.
- Continue to provide sustaining engineering for all Sentinel Missions.

2.3.2 Systems Administration Support

The contractor shall provide systems administration support and maintenance for the operational Sentinel system as well as the installation/configuration, operation, and maintenance of any new systems hardware and software and related infrastructure. The contractor shall participate in technical research and development. The contractor shall ensure that the system hardware, software, operating systems, and related system components or procedures implement the security requirements described in Section 2.5. The contractor shall provide support for development of

security documentation (including, but not limited to SAIVs, POAMs, contingency plans, security plans, etc.), security assessment activities, and resolve issues found in the assessment to ensure the Sentinel Gateway system is ready for operations.

2.4 Operations Support

2.4.1 NSG Operations Support

The contractor shall operate and maintain the NSG to ensure that the Sentinel data is acquired from ESA and made available to the respective DAACs.

The contractor shall:

- Monitor the system's health and status daily, 8 hours/5 days support. This includes monitoring ingest, storage, distribution, and deletion of data products from the system.
- Determine and acquire missing products. Support data reconciliation activities.
- Track, troubleshoot, correct, and document any system issues found.
- Maintain documentation required to capture and communicate operations, processes, policies and procedures.
- Collect and distribute quantitative information on NSG system holdings, availability, performance, and usage.
- Maintain inbound and outbound staging areas.

2.5 Security

The contractor shall support and implement security requirements that are consistent with NPR 2810.1 Security of Information Technology.

2.6 Test Support

The contractor shall support end-to-end testing to ensure that the NSG interfaces are compatible with ESA and DAAC or US Agency interfaces.

The contractor shall track and resolve any issues encountered during any of the test events. Additionally, the contractor shall report to the ESDIS Project Office Designee results of the test and recommend solutions to any issues.

2.7 Project Deliverables

See TPR for task deliverables.