

Representative Task Order 1 (RTO1)

ECS/ECHO/URS Sustaining Engineering and Continuous Evolution

Background

This task provides for the evolutionary development and sustaining engineering of the software and hardware for the following subsystems: EOSDIS Core System (ECS) Science Data Processing System (SDPS), the ECS Maintenance Environment (EME), the Earth Observing System Clearinghouse (ECHO), the Reverb client, ECHO tools such as the Provider User Management Program (PUMP), and the EOSDIS User Registration System (URS). Hereafter the composite of these subsystems is referred to as the System. The System is a major component of NASA's premier Earth Observing System Data and Information System (EOSDIS).

This task also provides for program management, system engineering, science support, and operations support.

This task specifically includes continuing system evolution and technology upgrades.

Applicable and Reference Documents

Applicable Documents

The following applicable documents are those specification, standards, criteria, etc. used to define the requirements of this representative task order.

- 423-46-01, Functional and Performance Requirements Specification for the Earth Observing System Data and Information System (EOSDIS) Core System Science Data Processing System
- 423-45-01 ECHO System Requirements
- 531-EED-001 EOSDIS User Registration Systems (URS) Phase I Concept of Operations and Requirements
- 423-CDRD-tbd Contract Data Requirements Document for EED2
- NPR 2210.1C, External Release of NASA Software
- NPR 2810.1A Security of Information Technology
- NPR 7150.2A NASA Software Engineering Requirements
- NASA-STD-8719.13C, NASA Software Safety Standard
- NASA-STD-8739.8, Software Assurance Standard
- IEEE Standard 730, Software Quality Assurance Plans
- Property Lists – posted to the EED2 RFP Website
 - ASDC(IAGP) EED Property List
 - ECHO(IAGP) EED Property List
 - ECHO2(Riverdale) EED Property List

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- EDF(Riverdale) EED Property List
- LPDAAC EED Property List
- NSIDC EED Property List
- URS(IAGP) EED Property List
- 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.

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.

1. General Reference Documents

- NPR 4200.1G, NASA Equipment Management Procedural Requirements
- NPR 7120.5E, NASA Space Flight Program and Project Management Requirements

2. Reference Documents

The EED (EOSDIS Evolution and Development contract) contractor maintained and/or developed the following documents. The EED-2 contractor shall maintain these system documents as required.

- SV-EOSM-423-EDF – Subsystem Acceptance of Subordinate C&A Package and Implementation Variances for the EOSDIS Development Facility
- CP-SCM-423-EDF - Contingency Plan for the EOSDIS Development Facility
- CD-4238-423-EDF - Risk Assessment Report for the EOSDIS Development Facility (EDF)
- SV-EOSM-423-URS – Subsystem Acceptance of Subordinate C&A Package and Implementation Variances for the User Registration System
- CP-SCM-423-URS - Contingency Plan for the User Registration System
- CD-4238-423-URS - Risk Assessment Report for the User Registration System
- SV-EOSM-423-ECHO – Subsystem Acceptance of Subordinate C&A Package and Implementation Variances for EOS Clearinghouse
- CP-SCM-423-ECHO - Contingency Plan for the ECHO Project
- CD-4238-423-ECHO - Risk Assessment Report for the EOS Clearinghouse
- 305-EED-001, Rev 02, Release 8.2 Segment/Design Specifications for the EED Contract (9/13)
- 311-EED-001, Rev 02, Release 8.2 INGEST Database Design and Schema Specifications for the EED Contract (9/13)
- 333-EED-001, Rev 01, Release 8 SDP Toolkit Users Guide (1/12)

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- 609-EED-001, Rev02, Release 8.2 Operations Tools Manual for the EED Contract (9/13)
- 611-EED-001, Rev 02, Release 8.2 Mission Operation Procedures for the EED Contract (9/13)
- 625-EED-001, Rev 02, Release 8.2 Training Material for the EED Contract Volumes 1 through 5 (9/13)
- 814-EED-001, Rev 01, SCF Toolkit 5.2.18 (1/12)
- 573-EED-001 EED to EED-2 Transition Support Plan – (1/14)

3. ECS External Interface Control Documents and Interface Requirements

Reference Documents

The following ICDs were generated during the development of the ECS and are under the control of the ESDIS CCB. The EED contractor shall support the maintenance of these ICDs/IRDs by submitting and reviewing Configuration Change requests.

Doc Number	Doc Title	Version
428-ICD-EDOS/EGS	ICD between EDOS and EGS	Revision 6

Doc Number	Doc Title	Version
423-ICD-002	ICD between EOS Networks and EOSDIS Elements	Rev C
423-ICD-007	ICD between ICESat-2 SIPS and NSIDC DAAC	Original
423-41-45	ICD between ECS and NSIDC DAAC	Rev B
423-41-57	ICD between ECS and SIPS, Volume 0	Rev J, CH01
423-41-57-1	ICD between ECS and SIPS, Volume 1 ACRIM III	Rev B

Doc Number	Doc Title	Version
423-41-57-2	ICD between ECS and SIPS, Volume 2 SAGE III SCF Data Flows	Rev A
423-41-57-5	ICD between ECS and SIPS, Volume 5 MOPITT Data Flows	Rev B
423-41-57-6	ICD between ECS and SIPS, Volume 6 MODIS (MODAPS)	Rev C
423-41-57-7	ICD between ECS and SIPS, Volume 7 AMSR-E	Rev B
423-41-57-10	ICD between ECS and SIPS, Volume 10 TES	Rev C
423-41-57-11	ICD between ECS and SIPS, Volume 11 ICESat	Rev B

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423-41-57-16	ICD between ECS and SIPS, Volume 16 ISS SAGE III SCF Data Flows	Original
423-41-58	ICD between ECS and the LP DAAC	Rev C
423-41-60	DFCD for EMOS ICC Planning and Scheduling	Rev A, CH02
423-41-63	ICD between EMOS and SDPS	Rev E
423-47-01	ICD between EMS and the Data Providers	Rev B
423-45-02	ICD between ECS and ECHO for Metadata Inventory and Ordering	Rev C
423-45-03	ICD for EWOC and External Processing Co-located at the DAACs	Rev A

For informational purpose only, the above documents and ECS specific design documentation are available from a combination of the following Web sites including:

- a) ESDIS Project Home Page: <https://earthdata.nasa.gov/esdis>
- b) ECS Data Handling System: <http://edhs1.gsfc.nasa.gov/>
- c) ESDIS Library: http://esdisfmp.gsfc.nasa.gov/fmi/xsl/esdis_lib/default.xsl
- d) GSFC Directives Management System: <http://gdms.gsfc.nasa.gov/>
- e) ECHO Website: <https://earthdata.nasa.gov/echo>
- f) Reverb website: <http://reverb.echo.nasa.gov/reverb>
- g) URS Website: <https://earthdata.nasa.gov/urs/login>
- h) EED-2 RFP website:
<https://wiki.earthdata.nasa.gov/display/EED/EOSDIS+Evolution+and+Development+%28EED-2%29+Home>

Definitions

Preventive Maintenance – As used in this statement of work refers to hardware preemptive activities, such as cleaning filters and installing recommended engineering changes, to avoid future failures. Preventive maintenance activities will normally be included with a corrective maintenance task.

Corrective Engineering – Changes necessitated by actual errors (i.e. ‘bugs’), or design deficiencies. Corrective maintenance consists of activities normally considered to be error correction required to keep the system operational. By its nature, corrective maintenance is usually a reactive process. Corrective maintenance is related to the system not performing as originally intended. The four main causes of corrective maintenance are (1) design errors, (2) logic errors, (3) coding errors, and (4) hardware failures.

Adaptive Engineering – Changes initiated as a result of changes in the environment in which a system must operate. These environmental changes are normally beyond the

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control of the maintainer and consist primarily of changes to the: (1) rule, laws, and regulations that affect the system: (2) hardware configuration, e.g., new terminals, local printers, etc.: (3) data formats, file structures: and (4) system software, e.g., operating systems, compilers, utilities, etc.

Perfective Engineering – (Also known as enhancements and upgrades) All changes, insertions, deletions, modifications, extensions, and enhancements made to a system to meet the evolving and/or expanding needs of the user. It is generally performed as a result of new or changing requirements, or in an attempt to augment or fine-tune the existing software/ hardware operations/performance. Activities designed to make the code easier to understand and to work with, such as restructuring or documentation updates and optimization of code to make it run faster or use storage more efficiently are also included in the Perfective category.

ECHO Partners – ECHO Partners are a diverse group of organizations that are continuously growing. An ECHO Data Partner provides ECHO with metadata representing their Earth Science data holdings. These Data Partners retain complete control over what metadata is represented in ECHO including inserting new metadata, modifying existing metadata and removing old metadata. An ECHO Client Partner develops software applications that communicate with web services available through the ECHO API. The ECHO API allows for various client types including user-interactive, metadata harvesting and other batch processing for scientists and other clients.

URS Partners – URS Partners consist of groups which host applications that have been selected for migration into the URS scope, which implies that users of those components have access to the wider EOSDIS set of services. This facilitates metrics tracking and feedback, which gives the ESDIS Project insight into the quality, performance, and usage of the deployed systems.

Scope

In the performance of this task, the EED2 contractor is required to coordinate and integrate task related activities with the ESDIS Project, the Distributed Active Archive Centers (DAACs), the science investigator teams, the user community, ECHO data providers, ECHO client and services providers, and other EOS contractors. The contractor shall conduct an evolutionary development program to improve the reliability, availability, functionality, operability, and performance of the System within the EOSDIS while reducing operational and maintenance costs. The contractor shall:

- Provide corrective maintenance engineering of the custom and COTS software in a timely manner.
- Provide preventive and corrective maintenance engineering of EOSDIS hardware components consistent with the operational availability
- Provide hardware and software adaptive maintenance engineering
- Provide hardware and software perfective engineering to implement new requirements.

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- Provide corrective, adaptive, and perfective maintenance to lower the overall cost of maintenance and operations of EOSDIS and/or to support evolving system requirements
- Conduct a continuous evolution program to assess new technologies and user requirements.

Period of Performance

The period of performance of this representative task is to be 4/1/2015 through 3/31/2017.

Place of Performance

The place of performance is the GSFC, Greenbelt, MD and the contractor's facility (TBD). This hypothetical representative task order does not include operations support at the Distributed Active Archive Centers (DAACs). The contractor will interact with the DAACs and may need to travel to the DAACs for technical interchange meetings.

RTO1-1 System Evolution Engineering

RTO1-1.1 General

RTO1-1.1.1 The contractor's overall evolution and sustaining engineering program shall include a prioritized balance of corrective engineering actions, requests for routine minor enhancements (perfective), and technology refreshment. The contractor shall proactively coordinate with the user community and the ESDIS Project to establish consensus priorities while ensuring the operational availability and performance of the System. The contractor shall submit technology refresh technical and cost proposals to the government for authorization and commitment of funds prior to implementation. The contractor shall ensure the compatibility of interfaces between the System and other system components.

RTO1-1.1.2 The contractor shall replace, delete and/or upgrade custom software, COTS software, COTS hardware, and system media (e.g. archive media) based on favorable cost trades against the overall ESDIS maintenance and operations costs, or to improve system performance, scalability, maintainability, and/or reliability. Trade studies shall generally look forward 3 to 5 years, conducting 2 per year.

RTO1-1.1.3 The contractor is responsible for the total hardware and software maintenance process including, but not limited to, management, design, implementation, modification, configuration management, personnel training, operator training for baseline changes, integration, installation, user liaison, help desk, testing, quality assurance, and technical assistance.

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RTO1-1.1.4 The contractor shall plan, document, implement, and maintain the hardware and software maintenance process to be used throughout the life of the System maintenance engineering program. The contractor shall provide configuration control of System hardware, software, and documentation.

RTO1-1.1.5 The contractor shall ensure that hardware/software maintenance activities do not degrade, impair, delete, or otherwise reduce the functionality or performance of the current operational system. The current operational system is defined in the Functional and Performance Requirements Specification for the Earth Observing System Data and Information System (EOSDIS) Core System Science Data Processing System, 423-46-01, the ECHO System Requirements, 423-45-01, and the EOSDIS URS Phase 1 Concept of Operations and Requirements.

RTO1-1.1.6 The contractor shall respond to corrective, adaptive, and perfective modification requests. For the System, the contractor shall assume an average workload of resolving 30 corrective and/or adaptive non-conformance reports (NCRs) per month and an average 15 perfective NCRs per month. Resolution includes formal verification and closure. The contractor shall continuously analyze the System and development processes to identify implementation and architecture changes that may reduce the overall maintenance and operational cost to the ESDIS Project.

RTO1-1.1.7 The contractor shall support the management of the System requirements by recommending changes, and 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. The contractor shall control lower level requirements at the contractor's configuration control board.

RTO1-1.1.8 The contractor shall be responsible for the maintenance of the System documentation, including but not limited to design documentation, operations procedures, interfaces, and user's guides. Documentation shall reflect the implementation of the current operational releases and patches. In addition the contractor shall create and maintain all other documentation required to ensure System documentation is kept current throughout the contract. Documentation shall be delivered with each release.

RTO1-1.1.9 The contractor shall implement, maintain, and manage a software and hardware problem reporting system and shall report on the status of open/closed items within this system at regular weekly/monthly and technical interchange meetings with the ESDIS Project.

RTO1-1.1.10 The contractor shall be readily accessible to the operational DAACs on a 5-day per week, 8-hour per day basis to answer routine questions, provide status of corrective changes, support new patches and releases, and coordinate future deliveries. The contractor shall provide a 'help desk' function such that the operational DAAC sites have a means of contacting the EED2 contractor 24 hours a day, 7 days a week. The contractor shall provide system administration and database administration functions 24 hours a day, 7 days a week to provide immediate assistance for emergency operational problems with the hardware and software systems.

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RTO1-1.1.11 The contractor shall provide the necessary hardware and software environment to perform evolutionary development and maintenance engineering functions required by this statement of work. The environment may consist of the GFE environment and/or new components and tools. The environment shall be maintained throughout the task period of performance.

RTO1-1.1.12 The contractor shall perform database administration for the System, including but not limited to monitoring, maintenance, backups, and performance tuning.

RTO1-1.1.13 The contractor shall develop and maintain the System in compliance with Section 508 Standards, particularly, standard 1194.22 Web-based intranet and internet information and applications.

RTO1-1.1.14 The contractor shall provide and maintain an accessible version of the ECHO system for client partner testing (including ingest and ordering) that is independent from the operational ECHO system.

RTO1-1.1.15 The EOSDIS URS system serves as the central system for all EOSDIS user registration and authentication. The URS provides 24x7 availability using a series of redundant hardware servers and network paths. The contractor shall provide and maintain an accessible version of the URS system for development and testing that is independent from the operational URS system. The contractor shall provide and maintain a Contingency URS environment. The current contingency URS environment is in Building 13 at GSFC. The Contingency URS system will become operational during events when the production system in building 32 becomes unavailable. The Contingency URS will replicate the functionality and purpose of the production system.

RTO1-1.1.16 The contractor shall maintain the ECHO tools ensuring the tools are updated for each new version of ECHO and is in compliance with all NASA website requirements. The contractor shall perform usability testing and develop new content and layouts as needed to meet ECHO website goals.

RTO1-1.1.17 The contractor shall develop and deliver Use Cases for new ECHO versions. The contractor shall develop a design based on the Use Cases that is scalable to allow for additional datasets, providers, and queries while still meeting the ECHO system performance requirements. The Use Case and design materials, shall include any data model and interface changes, and will be reviewed by the ECHO Leadership Team and the ECHO Technical Committee at a design review. The materials shall be updated based on their feedback.

RTO1-1.1.18 The contractor shall provide systems engineering support for the ECHO, URS and SDPS systems. The contractor shall assist in coordinating, organizing, communicating, and documenting the activities and interactions between the various stakeholders, to include the multiple DAACs and ESDIS.

RTO1-1.1.19 The contractor shall provide maintenance of the ECS Data Handling System (EDHS) web site, which provides online access to ECS/EED2 documentation.

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RTO1-1.1.20 The contractor shall provide system administration and operational support to the ECHO/URS equipment at GSFC Building 32 and at the Contingency Environment in building 13 at Goddard Space Flight Center to act as a contingency plan in the event the production system in building 32 becomes unavailable. The backup system replicates the functionality and purpose of the production system according to the contingency plan.

RTO1-1.2 Testing

RTO1-1.2.1 All new functionality shall be thoroughly tested prior to its release. The acceptance criteria for new functionality shall be approved by the COR. Functional and performance testing shall be conducted in a high fidelity test environment that simulates the target environment. This may include the GFE test environment, and/or contractor-provided facilities. For each new release, the contractor shall address any deltas between the test environment and the target system and assess the impacts of those differences with the ESDIS Project.

RTO1-1.2.2 The contractor shall make the test plans (e.g. regression and installation) and results available to the COR upon request.

RTO1-1.2.3 A member of the ESDIS project or their appointed representative may witness the execution of all acceptance, regression, installation and performance tests.

RTO1-1.2.4 Although the ESDIS project is responsible for overall integration of the EOSDIS, the contractor shall support these integration activities as follows:

- By conducting pre-release interface tests at the development facility,
- By reviewing and submitting technical comments for EOSDIS integration test plans and specifications, and
- By providing problem analysis and recommendation of solutions

RTO1-1.3 Software

RTO1-1.3.1 The contractor shall be fully responsible for the software evolutionary development and maintenance engineering of the System. This responsibility includes, but is not limited to, System custom code and scripts, COTS software products, Earth Science Data Types (ESDTs), databases, configuration control, overall configuration management, documentation, testing, reviews, and support services.

RTO1-1.3.2 The contractor shall develop and maintain a Software Maintenance and Development Plan (SMDP) by a formal change control process. The SMDP shall address methodologies for corrective, adaptive, and perfective changes. The SMDP shall include, but not be limited to:

- Contractor's maintenance and development concept (including use of vendors)
- Organization and maintenance activities
- Resources
- Processes

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- Testing and verification
- Training requirements
- Maintenance/development records and reports
- Configuration management plans

RTO1-1.3.3 The contractor's interface to the DAACs shall include an Integrated Product Team (IPT) to convey and prioritize DAAC problems and for describing upcoming emergency patches. Pre-Ship Reviews (PSRs) shall be conducted for COTS changes (hardware and software) and patch deliveries.

RTO1-1.3.4 The contractor shall coordinate with the ECHO Partners to establish Trouble Ticket priorities. Significant issues shall be discussed weekly with Partners.

RTO1-1.3.5 Software metrics shall include, but shall not be limited to:

- Software size with emphasis on tracking reductions achieved through evolution
- Software staffing
- Software enhancement scheduling
- Discrepancy report open duration

RTO1-1.4 Hardware

RTO1-1.4.1 The contractor shall provide preventive and corrective engineering of the System computer equipment including, but not limited to, central processing units, workstations and servers, direct access storage devices, tape devices, archive media, peripherals, network and communications devices, and other associated equipment for the System. Equipment described in the Property Lists is located at the 3 DAAC sites, the GSFC, and the contractor's development facility. The Property Lists are located on the EED2 wiki website.

RTO1-1.4.2 The contractor shall maintain the hardware in accordance with OEM standards for maintenance, including installation of OEM recommended microcode and engineering changes. The contractor shall maintain the equipment in such a manner that it is certified to be acceptable by the OEM for maintenance.

RTO1-1.4.3 The contractor shall enhance System hardware, if required, to support software upgrades.

RTO1-1.4.4 The contractor shall develop and maintain the Hardware Maintenance and Development Plan (HMDP) by a formal change control process. The HMDP shall address methodologies for preventive, corrective, adaptive, and perfective changes. The HMDP shall include, but not be limited to:

- Contractor's maintenance and development concept (including use of vendors)
- Maintenance activity
- Resources
- Processes
- Testing and verification
- Training requirements

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- Maintenance/development records and reports

RTO1-1.4.5 The contractor shall perform preventive maintenance as necessary to ensure the System reliability and operational availability requirements are achieved.

RTO1-1.4.6 The contractor shall ensure that all failed hardware components and system media are restored to service in a time period consistent with the operational availability requirements of the System as specified in the functional and performance specifications and derived lower level derived requirements.

RTO1-1.4.7 Hardware maintenance shall be provided for equipment transitioned to the contractor, equipment upgrades, enhancements performed by the contractor, capacity upgrades, and for specific equipment provided by the government.

RTO1-1.4.8 The contractor shall be responsible for the timely repair of all hardware components regardless of the cause of failure (e.g., due to the negligence of the government or the operations staff, or catastrophic event).

RTO1-1.4.9 The contractor shall maintain records of equipment failures, repair statistics, engineering changes, time to restore, etc. Maintenance records shall be made available to the government upon request. Hardware maintenance shall include the maintenance of hardware component microcode.

RTO1-1.4.11 The following approximate square footage will be made available at the DAACs for spare parts and components, test equipment, and repair work:

DAAC	SQ. FT.
ASDC	400
LPDAAC	550
NSIDC	250

RTO1-2 Science Data System Management Support

RTO1-2.1 The contractor shall provide support to the science data producer community. The contractor shall support updates to Earth Science Data Types (ESDTs) and associated services to support evolving science products based on periodic inputs from the Instrument Teams (ITs). New ESDTs will be required at a rate of 200 per year and modified ESDTs will be required at a rate of 150 per year. For new products, the contractor shall define and develop new ESDTs. ESDT training shall be provided to ITs and DAACs including instruction on the EOSDIS data model, the ESDT definition process, and the metadata requirements and options. This training shall be ad hoc, but expected to occur twice per year. In coordination with the ITs and their associated Science Teams, evaluate and refine any proposed modifications or extensions to the ECS SDPS in support of the formal Modification Request process.

RTO1-3 System Operations Support

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RTO1-3.1 The contractor shall provide operations for the ECHO and URS Systems. This activity will include system administration, help desk functionality, planning and execution of periodic system upgrades, monitoring to support metrics collection, non-conformance reports and trouble ticket management, and support to patches and releases. The prioritization of fixes to these systems will be accomplished in conjunction with the ESDIS Project. The contractor shall communicate all aspects of ECHO and URS Systems operations and general project information and activities.

RTO1-3.2 The contractor shall identify processes, tools, and system enhancements that automate and/or improve the efficiency of the ECHO and URS Systems operations and simplify system usage for the partners. Specifically the contractor shall investigate enhancements that:

- Increase the number of ECHO and URS Systems clients and keep up with EOSDIS data growth by reducing cost of entry and improving ECHO ease of use.
- Reduce operations costs.
- Increase the scope of clients that the ECHO and URS Systems can support.

RTO1-3.3 The contractor shall provide operations training for all new product versions assuming there are, on average, 6 URS versions and 10 ECHO versions promoted to operations per year. The contractor shall maintain documentation required to capture and communicate operations processes, policies, and procedures.

RTO1-3.4 The contractor shall support at least 8 hour/5 day attended operations of ECHO and URS Systems operational servers, partner test servers, and web server except as noted below.

RTO1-3.5 The contractor shall define and execute a configuration control process through which operational changes are reviewed and approved on a schedule commensurate with the proposed technical approach. The contractor shall implement operational changes approved by the proposed configuration control process.

RTO1-3.6 The contractor shall manage ECHO ingest operations, including scheduling and monitoring ingest, update, and deletion of collection metadata, granule metadata, and browse; working with data providers to track, troubleshoot, and correct ingest problems; and supporting periodic metadata and browse reconciliations.

RTO1-3.7 The contractor shall collect and distribute metrics about the ECHO and URS systems. These metrics are quantitative information on ECHO and URS Systems holdings, availability, performance, and usage. The contractor shall provide operational support for the interfaces to the EOSDIS Metrics System (EMS).

RTO1-3.8 The contractor shall maintain lists of ECHO metadata valids and infrastructure necessary to establish metadata mapping between external partners metadata formats and the ECHO metadata format.

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RTO1-3.9 The contractor shall provide user support to the users of the ECHO and URS Systems and their supporting tools. Support for 4 new ECHO data partners (including ~400 new collections & ~25 million granules) per year and 6 new URS partners per year shall be provided. The contractor shall:

- Provide technical assistance and coordination to support the registration and acclimation of new partners, including development and maintenance of Operations Agreements with each data partner.
- Assist partners in using current and new versions of ECHO and URS Systems and related tools in both the operational and partner test system environments.
- Support end-to-end testing with partners.
- Provide user support for ECHO and URS Systems partners on weekdays between 8am and 7pm. Provide after hours support to ECHO and URS Systems partners as needed, on a pre-arranged schedule.
- Develop and maintain user documentation.

RTO1-3.10 The contractor shall perform external testing for new ECHO and URS Systems versions.

RTO1-4. Reporting, Reviews and Management Coordination

RTO1-4.1. 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.

RTO1-4.2 The contractor shall conduct a periodic evolution planning review to establish the evolutionary direction of the System. Reviews shall address emerging technologies and application to the System and User requirements. The reviews shall include trades that address technical and cost parameters.

RTO1-4.3 At a minimum, the contractor shall conduct a Pre-Ship Review (PSR), to be performed for all deliveries, including patches resulting from sustaining engineering activities and releases resulting from perfective engineering activities. The PSR shall be conducted for any software release or patch, including patches and upgrades to COTS software.

RTO1-4.4 In addition, for technical modifications that introduce changes in system behavior, the contractor shall conduct Requirements Reviews, which will include:

- Summary operations concept for each modified capability in the upcoming release,
- Description of all functional and performance requirements to be supported, including derived subsystem requirements for each capability in the upcoming release,
- Functional, performance and error handling verification criteria for each capability in the upcoming release,

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- Discussion of operations, including installation/transition and training, impact for each capability in the upcoming release.

RTO1-4.5 The contractor shall prepare, present, and maintain a way to apply periodic patches to the systems. The contract shall document, communication, describe and inform all stakeholders as to the process and schedule for implementing each patch to the system.