

# **Earth Science Data and Information System Project**

## **Earth Observing System Data and Information System (EOSDIS) Evolution and Development 2**

### **(EED2) Statement of Work for Cumulus Development and Operations (Task 54)**

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National Aeronautics and  
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# Section 1. Introduction

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## 1.1 Task Summary

This task will build on work done under other contracts and focus on several specific areas:

- Continued work on development, test, documentation and deployment strategies for Cumulus: a cloud-based ingest, archive, data management and distribution system in concordance with the needs of the Physical Oceanography Distributed Active Archive Center (PO.DAAC) working towards the launch of the Surface Water and Ocean Topography (SWOT) mission in September 2021. This work will also include the design and implementation of a cloud-based metrics solution that can be used to track ingest, archive, and distribution of EOSDIS holdings.

It is expected that Cumulus development, test, documentation and deployment work during this period of performance shall be October 1, 2019 through August 31, 2020

This task also provides for program management, system engineering, operations support and studies/prototyping support.

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

## 1.2 Applicable and Reference Documents

### 1.2.1 Applicable Documents

Applicable documents are those specifications, 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.

- 423-10-69, Revision B, Requirements for Archiving, Distribution and User Services in EOS Data and Information System (“the ADURD”)

### **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.

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

### **1.3 Period of Performance**

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

### **1.4 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**

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### **2.1 Scope of Work**

#### **2.1.1 Assumptions and Definitions**

##### *Collaborating with External Entities*

Both elements of this work involve coordination with various external entities: JPL, University of Alabama Huntsville, Development Seed, SES II, DAACs etc. It is assumed that the EED-2 contractor is responsible for the work outlined below and is supportive of (but not responsible for) efforts of these external entities as stated.

##### *Working within the Scaled Agile Framework (SAFe)*

All work to be executed during this period of performance will be done via the SAFe process, involving periodic Program Increment Planning meetings that will help keep expectations and roadmaps aligned amongst coordinating entities.

##### *NGAP Compliance*

Unless otherwise stated, the term “NGAP-compliant” intends that the deployment is in the latest version of the NGAP environment at the conclusion of the period of performance (e.g. NGAP 2.0).

#### **2.1.2 Program Control and Communication**

The contractor shall provide a management organization with the necessary capability and authority to ensure that task, technical, schedule, and cost requirements are met.

The contractor’s primary government interface is with the Goddard Space Flight Center’s ESDIS Project. Contract/task direction and modification can be provided only by the government Contracting Officer (CO).

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

##### *Planning, Reporting, and Reviews*

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

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 EED2-533-11). The contractor shall track and report separately on Cumulus and GITC costs.

The contractor will provide technical reviews at the request of the task monitor or COR. The reviews shall include trades that address technical and cost parameters if required.

### **2.1.3 Cumulus System Evolution and Operation**

The contractor shall be responsible for advising the government and guiding overall Cumulus system architecture and operations: ensuring system quality, functionality, compatibility, applicability, availability and performance for all evolutionary development and operational deployments.

The contractor shall participate in and support development activities to operationalize and evolve the Cumulus system, working jointly with other development teams.

The contractor shall continue to support PO.DAAC and working towards SWOT mission data operational in Cumulus.

The contractor shall support ASF and working towards NISAR mission data operational in Cumulus as directed by the task monitor.

The contractor shall continue to support, but not be responsible for, NGAP 2.0 compliant deployments of the Cumulus system for the following data providers:

- GHRC
- GITC
- PO.DAAC
- ASF
- GES DISC (tentative assuming ESDIS approval)
- ORNL (tentative assuming ESDIS approval)
- LP DAAC (tentative assuming ESDIS approval)

Each of these above deployments shall include NGAP-compliant Sandbox, SIT, and UAT environments to allow for DAAC development, testing, and integration that is independent from the production system. Data providers are responsible for deploying and maintaining those instances of Cumulus with support from the contractor.

The contractor shall participate in and support any performance testing of the Cumulus system for direct data download in concert with other external entities.

The contractor shall participate in and support the continued implementation and maintenance of automated integration tests for the Cumulus system.

The contractor shall support the development, test, and deployment of a backup, recovery and failure implementation for the Cumulus system. This is to include, but is not limited to, workflow, inventory, and data recovery.

The contractor shall provide support and knowledge transfer to data providers looking to integrate and extend Cumulus as directed by ESDIS in accordance with any code security and governance policies adopted by the project.

The contractor shall document and communicate usage of an image and container registry for EOSDIS participants that is NGAP-compliant.

The contractor shall communicate status, outcomes, lessons learned with regards to the Cumulus system as requested by ESDIS.

The contractor shall support research, prototyping and documentation of a Cumulus (or Cumulus-like) system capable of running in a non-AWS environment. This should consider cloud-agnostic technologies.

The contractor shall continue to participate in the DAAC Migrations Sub-Team of the Development Project Management Board, continuing to collect, analyze, prototype and envision potential transition patterns for EOSDIS data holdings.

All new functionality shall be thoroughly tested prior to its release. The acceptance criteria for new functionality shall be approved by the COR. 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.

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

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

The contractor shall work with external entities to provide documentation of all Cumulus system requirements as requested by ESDIS.

The contractor shall track and report on risks.

The contractor shall present as required at technical meetings (e.g. Systems Engineering Technical Interchange Meeting).

The contractor shall continue to provide detailed cost models for development requirements for the Cumulus core system including labor, compute, storage estimates as directed by the task monitor.

#### 2.1.3.1 Cloud Based Metrics Design and Implementation

The contractor shall continue to work with ESDIS and other entities as directed to elicit, develop, and refine requirements for a cloud-based metrics system.

The contractor shall develop, test, and deploy a cloud-based metrics system based on requirements delivered in Task 44. The deployed system shall be tested and deemed acceptable to various data providers operating a Cumulus instance as directed by the task monitor. The deployed metrics system is presumed to be a single cloud-based metrics system covering all Cumulus enabled data providers.

The contractor shall continue to provide detailed cost models for operational rollout of the metrics system including labor, compute, COTS, storage estimates.

The contractor shall provide cost estimates for NGAP account to be used in development for both compute and storage for the metrics system.

The contractor shall continue work with ESDIS NetOps and Security teams to ensure minimal duplication of cloud-based log storage and efforts.

## 2.2 Project Deliverables

Deliverable	Due Date
Presentation at AGU Fall Meeting (assuming abstract acceptance)	12/13/19
Updated Cumulus Cost Model through 2025	NLT 02/07/20
Updated Metrics Cost Model through 2025	NLT 02/07/20
Documentation of Cumulus and Metrics System Backup and Recovery Plans	NLT 03/31/20
Documentation of findings and prototyping of a Cumulus (or Cumulus-like) system capable of running in a non-AWS environment	NLT 05/01/20
Release of Cumulus version for SWOT Ops Quals	NLT 04/15/20
Updated Cumulus Cost Phasing Plan for FY2021	NLT 07/30/20
Updated Metrics Cost Phasing Plan for FY2021	NLT 07/30/20
Presentation Cumulus and Metrics Activities at SE TIM	08/31/20
Updated Cumulus Systems Requirements	08/31/20
Final Report of Findings and Activities	08/31/20
Monthly Status and Risk Report	Ongoing