

## Process for Earth Science Data Systems Standards and References

### Status of this document

This document provides information to the NASA Earth Science community. Distribution is unlimited.

### Change Explanation

V 1.2 – Added section on criteria for standards approval, including those proposed standards of commercial origin.

V 1.1 – Updated terms in section 2 to match wording on earthdata.nasa.gov site.

V 1.0 - This document replaces all versions of ESDS-RFC-002 and SPG-RFC-002.

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### Abstract

This document describes the process of endorsement of standards and references by the ESDIS Standards Office. It describes the process of developing the initial Request For Comment (RFC) and then describes the process by which it can become an ESDS standard or reference document.

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## 1 Introduction

The primary goal of the ESDIS standards process is to facilitate interoperability among components of the NASA Earth Science network of data systems. Establishment of appropriate standards, guidelines and other reference documents enables flexibility as future data and service providers will have well-defined access points to join the NASA Earth Science network of data systems. This flexibility is central to supporting the evolving strategies of NASA's Earth Science activities. In order to accomplish these goals, the standards process needs to focus on recommending standards that are relevant to the NASA Earth Science network of data systems and that have mature implementations and demonstrable operational readiness. The standards process is also designed to encourage community participation in order to leverage community expertise, ideas, and capabilities.

A primary concern is to foster a recommended set of "working edge" standards. That is, in order to recommend a proposal as an ESDS standard, there must be evidence both of successful domain implementation and demonstrable operational readiness. Community input is sought to ensure broad review and garner broad support.

Additionally, the ESDIS project also needs to support developing and emerging standards to fulfill current and future needs of NASA Earth science data systems. The process for supporting developing and emerging standards is under development.

In structure, the standards process consists of gathering input, publishing the proposed documents, gathering public comment, and deciding whether the process should move ahead or not. The completion of the process results in a recommended set of well-specified standards or other technical notes.

## 2 Categorization of Requests For Comment (RFCs)

Documents submitted for consideration under the Standards Process are called Request for Comment (RFC) documents. Broadly, these submitted RFCs can fall into one of five categories:

- **Standard** - specification approved by a recognized standards body such as OGC, ISO, IETF
- **Convention** - specification in common use among some members of the NASA ESDS community
  - *In practice, Standard and Convention are often used interchangeably.*

- **Suggested Practice** - guidance on how to apply a particular standard or convention within the NASA ESDS community
- **Lessons Learned** - document describing the use of software, protocols or processes that may be helpful to others
- **Administrative Document** – used to manage the standards process

Topics covered in the documents can include:

- **Software** - library or toolkit available for use
- **Specification** - document describing a format or protocol in sufficient detail that it can be independently implemented in software
- **Process** - steps that can be followed to reach a desired result
- **Technical Note** - other technical document of interest to the community

Each submitted document is assigned a unique number that is listed in the header to identify each RFC. This is the RFC number and takes the form ESDS-RFC-*nnn*. In addition, the header contains the RFC category, the RFC status (see below), the author's name, the submission date, and a title.

Documents are tagged with a status indicating where the document is in the review process. Upon completing the review process, documents are considered “Final” and are tagged with a recommendation.

Status tags:

- **Legacy** - formal review has been bypassed for a legacy standard in common usage
- **Monitoring** - up and coming technology to watch, not yet described in an RFC
- **In development** – document is being written
- **Submitted** – the document has been submitted for evaluation
- **In review** – community comment and ESO evaluation in progress
- **Final** – published document

Note that the first three status tags pertain to documents that have not been reviewed but are considered significant and worth including in the list of recommended Standards and References.

Recommendation tags:

- **Approved** – recommended for use in NASA Earth science data systems
- **Emerging** – promising technology, not rigorously reviewed or widely adopted yet
- **Limited / Restricted** – approved for use only in certain circumstances
- **Deprecated** – don't choose for new projects
- **Obsoleted** – no longer in use
- **Proposed / In Process** – placeholder until recommendation is made

It is possible for an RFC to receive more than one recommendation tag (e.g. Approved and Emerging, meaning that it is approved for use even though it may not be widely adopted yet).

Additional tags may be used to indicate technology area (e.g., data formats, metadata), parent standards body (e.g., OGC, ISO) for those standards being adopted from other organizations, and other relevant information.

### 3 Criteria for Standards Approval

Before it can be approved, a proposed standard must meet the following criteria:

- (1) The format specification must be sufficiently well-documented to be technically implementable;
- (2) There must be at least two representative implementations; and
- (3) There must be evidence of significant operational experience.

Proposed standards of commercial origin must meet these additional criteria:

- (1) The format specifications should be published in open literature and freely available
- (2) There should be no patent, copyright or other intellectual property encumbrances on the format or its specification
- (3) Besides the commercial entity that developed and/or maintains the format, there should be:
  - a. at least two (2) independent implementations that read the format
  - b. at least one (1) independent implementation that writes the format

### 4 ESDIS Standards Process

The ESDIS standards process can be separated into three major phases: document submission, initial screening, and community review. Each phase is meant to be carried out as a partnership between the document submitters and the ESO.

There are no specific time limits for each phase. However, with a willing, eager team of authors and a motivated set of community reviewers, the entire process could take as little as 2-3 months.

#### 4.1 Phase 1 – Document Submission

The idea for drafting and submitting a document into the standards process can originate with the authors who would like to promote the use of a standard, convention, or process, or who might wish to publish information of value to the Earth science community in the form of lessons learned (typically about the particulars of implementing something, e.g. deploying standards compliant software at a data center). Or the idea can originate from the ESO in the course of observing how a particular community or data center is benefiting from the use of a new standard, process, etc. In the latter case, the ESO will solicit the submission of an RFC covering that topic.

Potential authors should contact the ESO prior to drafting an unsolicited RFC document. This is to ensure the topic is relevant to the needs of ESDIS and is not already being worked on by other authors.

The document should conform to a simple template described in the Instructions to Authors document. A completed draft can be submitted to the ESO for consideration in the standards process.

It is also very important to identify as many implementations of the standard, specification, or process as possible and to list these in a document known as Evidence of Use. The list should include contact information for specific individuals who can later be asked to help review the RFC. Evidence of use is required for Standards and Conventions, highly recommended for Suggested Practice and not required (but welcome) for Lessons Learned RFCs.

#### 4.2 Phase 2 – Initial Screening

A completed draft RFC is reviewed by ESO staff to ensure that it conforms to the needs of ESDIS and the requirements set forth in the Instructions to Authors. Necessary revisions are made by the authors.

The ESO then recruits a 3-4 member Technical Working Group (TWG), including an ESO staff person, that will carry out the rest of the process. Members of the TWG should be knowledgeable in the technology area covered by the RFC. Members are recruited from the Earth science data systems community at large. The leader of the TWG is usually assigned the role of RFC Editor and acts as the liaison between the TWG and the authors.

The TWG reviews the RFC for completeness and to ensure the RFC is ready to be reviewed more broadly. This review could lead to more revisions that must be carried out by the authors.

If Evidence of Use is required, it must be submitted before the process continues.

The TWG then tries to identify a pool of potential reviewers, including the people listed in the Evidence of Use.

Once the RFC is considered ready and there is sufficient Evidence of Use the process moves to the next phase.

#### 4.3 Phase 3 – Community Review

During phase 3, the TWG develops a review strategy. This includes making decisions on what the Community Review needs to cover. Reviews can cover one or both of the following areas; technical content and operational readiness. Technical content reviews are required only for specifications that were developed outside of a standards organization. These reviews are meant to address whether the specification is well-documented and is technically implementable. Operational readiness reviews address whether the standard or convention is suitable for operational use and how organizations that have already implemented it have benefited from it.

Based on the review strategy the TWG develops a set of questions meant to discover the strengths, weaknesses, applicability and limitations of the contents of the RFC for each of the areas as needed.

The review questions are sent to the potential reviewers, who are asked to provide timely answers.

Once the reviewers have provided answers to the survey questions, the TWG analyzes the results and makes a recommendation to ESDIS whether to approve the RFC.

During the third phase, comments received are shared with the RFC authors who are then given the opportunity make clarifications and correct any errors found. It can be very useful if the authors help identify more potential reviewers and if they help encourage reviewers to provide responses. Reviewers are not paid to provide reviews so it helps if they understand the nature and value of their contributions to the process.

If the recommendation of the TWG to ESDIS is positive, and if ESDIS concurs, then the RFC is considered “final” and is tagged with one or more recommendation tags (see above).

#### 4.4 Document Maintenance

After an RFC is approved, further editorial changes may be required in order to correct errors or provide clarification. In such cases, the approved RFC may be modified, with internal review by the ESO. Substantive technical changes, however, may not be made to an existing RFC, but should be submitted for review in a new RFC.

In order to guard against releasing several new versions in quick succession, editorial changes may be captured in a separate Errata document. At the discretion of the RFC Editor (not necessarily original editor, but the responsible person appointed by ESO), a new version of the RFC may be issued, incorporating any existing errata and/or new changes.

#### 5 References

ESDS-RFC-003 - Instructions to RFC Authors

#### 6 Contact

Email: [eso-staff@lists.nasa.gov](mailto:eso-staff@lists.nasa.gov)

Web: <https://earthdata.nasa.gov/esdis/esdis-standards-office-eso>

#### 7 Glossary of Acronyms

<b>Acronym</b>	<b>Description</b>
ESDIS	Earth Science Data and Information Systems
ESDS	Earth Science Data Systems
ESO	ESDIS Standards Office
NASA	National Aeronautics and Space Administration
RFC	Request For Comment
TWG	Technical Working Group: See Section 2.5 of this document.