Revision 2

Earth Science Data Information Systems (ESDIS), Code 423

Common Metadata Repository (CMR) Life Cycle Document

National Aeronautics and Space Administration

Goddard Space Flight Center
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Common Metadata Repository (CMR)
Life-Cycle Document
Signature/Approval Page

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Preface

Approval of this Life Cycle document by the CMR Project Manager ratifies the process, roles, and responsibilities for modifying CMR requirements. With the approval of the CMR Project Manager, the CMR System Engineering Manager will make revisions as needed to the CMR Life Cycle Document in order to improve the management and operations of the CMR. The latest version of this document can be found online at [URL]. Distribution is unlimited.

Change Record Page

ISSUE	RELEASE DATE	PAGES AFFECTED	DESCRIPTION
Revision 2	Nov 2017	ALL	Updated document

To Be Determined

TBD #	Location	Description
1	4.4	Publically accessible location to post CMR release notes is yet to be determined.

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1 Introduction and Scope

The Common Metadata Repository (CMR) is a continuously evolving metadata system that merges all existing capabilities and metadata from the legacy EOS (Earth Observing System) Clearing House (ECHO) and the Global Change Master Directory (GCMD) systems. The CMR elements include all system components, which consist of: CMR itself (formerly ECHO), GCMD (to include the International Directory Network (IDN) and Keyword Management System (KMS)), Earth Science Data and Information System (ESDIS) Metrics System (EMS), all related tools (internal and external), the GCMD Keywords Controlled Vocabulary, and all metadata including the Unified Metadata Model (UMM) concepts.

The CMR is designed to allow continuous evolution of all system components to maintain the highest quality system for data providers and consumers. This document describes the CMR life cycle process and specifies how all CMR element requirements are managed, updated, modified, reviewed, and approved for implementation through open and transparent processes involving all stakeholders.

This document addresses the various methods and processes involved with making changes to the CMR elements and/or corresponding CMR element documentation. Changes made to NASA-managed and CMR-supported formats (e.g. DIF9, DIF10, ECHO10) and/or preferred or recommended usages of supported formats are captured in the UMM documents.

2 Roles and Responsibilities

The following organizations, groups, and individuals are key players in the CMR Lifecycle Process:

- Stakeholders consist of the EOSDIS Distributed Active Archive Centers (DAACs) and user communities, as well as inter-agency (US), non-agency (US), and international metadata providers to the CMR. They may make suggestions for improvement to the CMR, and may be asked to provide input into the review of any proposed changes.

- The CMR System Engineering Team (SET) provides both science expertise and technical system implementation expertise. The SET is responsible for managing all CMR requirements, maintaining CMR documentation, documenting all proposed changes to CMR, performing impact assessment for these proposed changes and recommending disposition of the proposed change to the CMR Project Manager.

- The CMR Team is composed of the GCMD Team, the CMR Development Team, the CMR Systems Engineering team, and the CMR Operations teams. The CMR

Team is responsible for tracking and making accepted proposed changes, assisting the CMR SET with Impact Assessments, trouble ticket generation, documentation revision, and notifying the original change submitter of the outcome. The CMR Team may also act as Stakeholders by submitting and/or reviewing proposed changes.

- ESDIS Standards Office (ESO) is responsible for facilitating stakeholder review of proposed changes and recommending disposition of the proposed change to SET based on stakeholder input.

- CMR Project Manager is responsible for deciding whether and when to implement the proposed change based on documented recommendations from the SET.

3 Abstract: CMR Life Cycle Process Overview

The CMR Life Cycle Process begins with proposed recommendations for changes, additions, deprecations, or deletions to any element of the CMR. Once submitted, change requests are entered into a tracking system where they are evaluated in terms of benefits and cost, and impact assessments are documented. The proposed changes that are determined to be beneficial to the user community or improve the CMR system are then implemented and the approval status of the request is communicated to the requestor and all stakeholders. In cases of significant, non-routine changes where an ESO review is required, request and approval status will be posted on the ESO-CMR Reviews webpage (https://earthdata.nasa.gov/about/esdis-project/esdis-standards-office-eso/eso-cmr-reviews) and is also likely to be documented on the Wiki.

3.1 Types of Change Requests

Submitted requests can be generally classified as:

- **New** - Requests for something new to be added in a CMR element
- **Modify** - Requests for modifying something existing in a CMR element
- **Deprecate** - Requests to have something existing in a CMR element deprecated
- **Delete** - Requests to have something existing or deprecated in a CMR element removed

3.2 Change Request Process Time Frame

While every effort will be made to acknowledge and evaluate all submitted change requests in a timely manner, it should be noted that evaluation and

review of complex changes or those with significant impact (e.g. a new UMM concept) may require lengthier evaluations and reviews. Major changes will be implemented several times a year and minor ones within a shorter time frame; every change will be identified with a new major or minor release number along with release notes detailing the changes that have been made.

Requests for the addition of some GCMD Keywords (e.g. instrument, platform, organization) are considered routine and will undergo a streamlined process with quick turn-around and limited review (as documented in the Keyword Governance and Community Guide document, https://cdn.earthdata.nasa.gov/conduit/upload/5182/KeywordsCommunityGuide_Baseline_v1_SIGNED_FINAL.pdf). Urgency will be determined based on the impact assessment of the proposed change.

3.3 Levels of Control

Different types of CMR system documentation require different levels of configuration management. These documents can be categorized as follows:

- **HIGH** – Requirements or documents about stakeholders or interfaces (e.g. ADURD, OA) are controlled in the ESDIS COMET system and require the ESDIS Configuration Change Request (CCR) process to be followed, as per ESDIS CM Procedures (423-PG-1410.2.1)

- **MEDIUM** – Schemas, APIs, code, and other documentation that is not controlled in COMET but needs strict Configuration Management (CM) is handled by the CMR subcontractor (e.g. by utilizing a CM tool such as Jama). Current processes are governed by contractor configuration management.

- **LOW** – Best practices, guides, and descriptive documentation that drives no impacts to the system or stakeholders is kept in the Earthdata website, Wiki, or Developer Portal (as appropriate) and does not have any additional change management process governing updates

3.4 Applicability

The life-cycle defined in this document applies to all elements of the CMR. Below are some examples of major elements that undergo periodic review and revision and the levels of control at which they are managed:

Expected Elements	***Level of Control***
Unified Metadata Models (for Collections, Granules, Common Parameters, Variables, Services)	*High*
Requirements and Interface documentation	*High*
Best Practices/Guidance (e.g. Metadata QA/Curation	*Low*

Guide, etc.)	
GCMD Keywords	Medium
CMR system components/code (e.g. MMT, CMR API, IDN, etc.)	Medium

4 CMR Life Cycle Process Detail

This section provides additional details of the various stages in the CMR life-cycle. Figure 4-1 below is a high level flow chart that depicts this process:

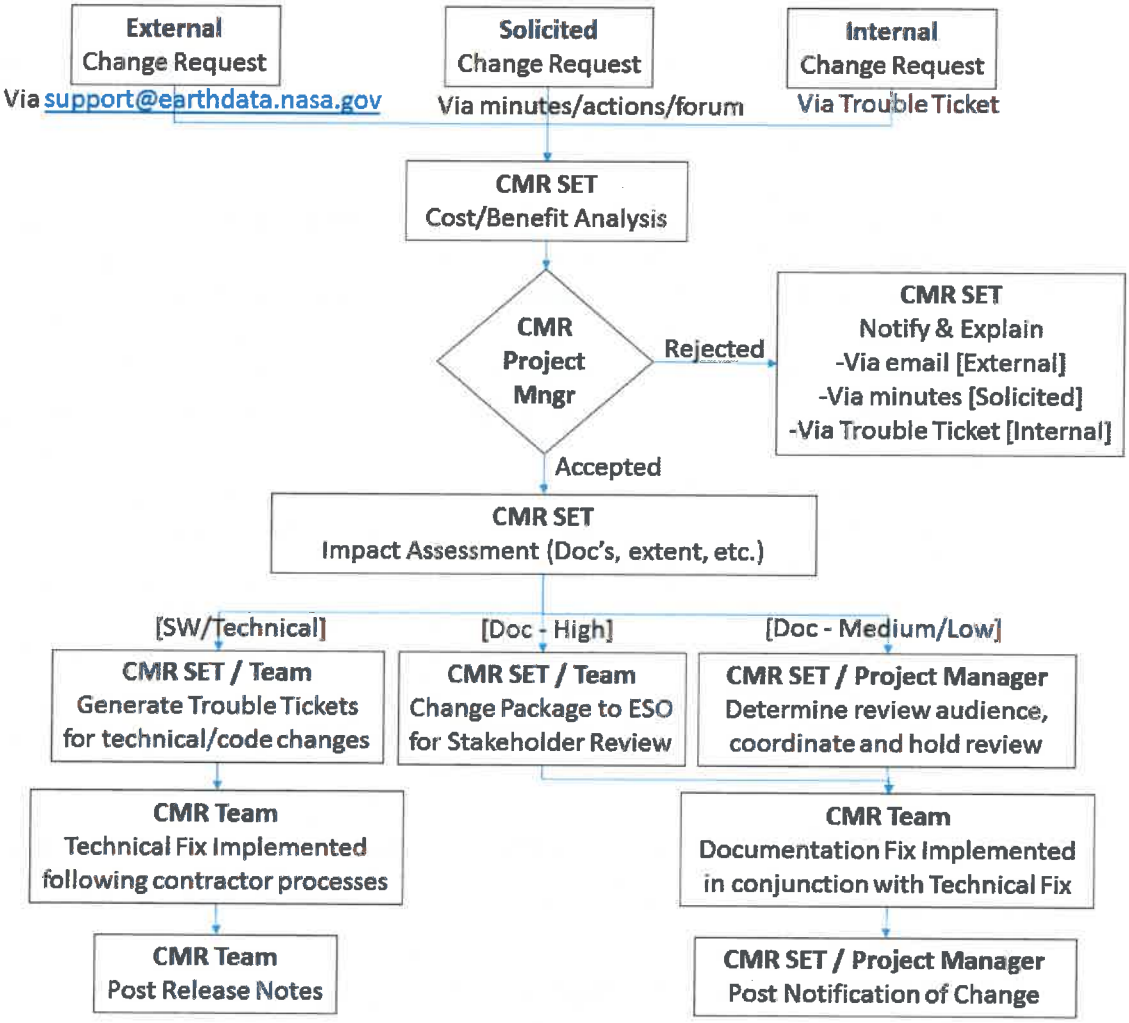

Figure 4.1 CMR Life Cycle Process

4.1 Submission, Initial Assessment, and Pre-vetting

Proposed changes to the CMR system can come from the stakeholder community, from meetings and gatherings, and/or from the CMR team. All accepted suggestions and recommended changes to High-level-controlled

documentation are tracked by the CMR team and decisions are documented and distributed.

There are three main methods for acquiring proposed changes:

- External: Changes proposed to the CMR team from external stakeholders/sources are typically submitted by email via support@earthdata.nasa.gov.
- Solicited: Changes proposed via solicited feedback, such as from forums or workshops or Technical Interchange Meetings (TIMs), are typically accrued as actions or in spreadsheets or forum pages and communicated to the attending community via meeting minutes and/or page updates.
- Internal: Changes proposed from internal sources are typically done by directly submitting trouble tickets as part of the trouble ticked adjudication process.

Once acquired, these proposed changes are delivered to the CMR SET who, with the assistance of the CMR Team, performs a cost-benefit analysis of the proposed change. After completion of the assessment of the benefits and costs and extents of the proposed change, a formal recommendation is provided to the CMR Project Manager concerning whether to pursue the proposed change or reject the request. This may be done via a preliminary impact assessment.

If the CMR Project Manager rejects the proposed change, the CMR SET will:

- For external requests: notify the original submitter and provide an explanation for the rejection via email
- For solicited requests: notify the original submitter via updates to a forum page action tracker spreadsheet or TIM actions/meeting minutes depending on how it was solicited
- For internal requests: notify the original submitter via updates to the trouble ticket directly

If the CMR Project Manager accepts the request for further analysis, then the proposed change proceeds to the Impact Statement steps described in section 4.2

4.2 Impact Assessment for the Proposed Change

An impact assessment is essential to understanding how the proposed change will affect the current system implementation, identifying what and who will be impacted, and determining the full extent of documentation and system changes required to fully, and properly, make and describe the proposed change. The CMR SET, with the help of the CMR Team, prepares the Impact Assessment. The impact assessment will:

- Address whether the proposed change is a new or a revised concept/element and evaluate how it will be incorporated into the existing system.
- Determine if a similar change request already exists and, if so, whether the existing request should be modified/clarified or if a new request is still needed
- Briefly describe the impact the proposed change will have on existing data, data systems, metadata providers, and users.
- Clearly assert and communicate cases where the proposed change will not maintain compatibility with existing data or data systems.
- Identify the extent of documentation, wiki pages, best practices, etc. that will need to be updated to reflect the proposed change.
- Identify the technical changes needed for code, APIs, SW, etc.

The CMR SET and/or the CMR Team will generate corresponding trouble tickets for any technical/code changes that may be required.

4.3 Review Process for the Proposed Change

If changes are needed to documentation controlled at a high-level, the CMR SET, with the help of the CMR Team, will revise the appropriate CMR documentation to incorporate the proposed change and submit a formal documentation package to the ESO, which will conduct a stakeholder review. The time frame allotted to complete the process is expected to vary on a case by case basis but will, nominally, be a month.

- The ESO will conduct a public review of the proposed change; Signatory stakeholders are determined by the impact statement, but the wider community will also be made aware of the proposed changes via an ESO review email distribution list. Visit the ESO-CMR Reviews webpage (https://earthdata.nasa.gov/about/esdis-project/esdis-standards-office-eso/eso-cmr-reviews) for further guidance on participation.
- The ESO will provide a written recommendation for approval, rejection or modifications to the proposed change to the CMR Project Manager.
- Following ESO review, the CMR team may make further changes based on ESO comments and recommendations.
- The CMR Project Manager will render a decision as to whether the change should or should not be implemented and the CMR team will subsequently notify the original submitter of the proposed change of the outcome.

If changes are not needed to documentation controlled at a high-level, then the CMR SET, with the help of the CMR Project Manager, will determine the appropriate review audience (to minimally include ESDIS and the CMR Team, but also any other affected ESDIS teams or stakeholders). Reviews may be coordinated via the CMR Project wiki (https://wiki.earthdata.nasa.gov/x/CgJ7Ag).

4.4 Implementation of the Proposed Change

Once the reviews are completed and proposed changes are agreed upon, implementation proceeds. If there are related proposed changes that are managed at different levels of control, efforts will be made to align the implementation of related changes.

Technical work is scheduled and performed by the CMR Development and Sustaining Engineering Team, in coordination with the other CMR teams, following contractor processes (i.e. the change is racked and stacked against other queued improvements to determine an implementation time) and Release Notes are posted at [TBD #1].

Updated CMR documentation and other associated artifacts will typically be published and announced to the user community in appropriate forums/locations after the corresponding technical changes are implemented:

- High: Documentation or element changes in need of an ESO Stakeholder Review will be posted here: https://earthdata.nasa.gov/about/esdis-project/esdis-standards-office-eso/eso-cmr-reviews
- Medium: Documentation that is controlled at the contractor level will be updated in the contractor CM tool
    - GCMD Keyword release information is posted here: https://wiki.earthdata.nasa.gov/x/MAjVB
    - Code or other technical changes are addressed in the Release Notes
- Low: Documentation that resides in the wiki will be updated in-place; interested parties can opt to Watch a wiki page and thereby be notified when it is updated.

4.5 Additional Information About the Change Processes

earthdata.nasa.gov/about/gcmd: The GCMD team page that contains information about GCMD products and processes.

https://wiki.earthdata.nasa.gov/x/d4A9B: The GCMD Keywords Community Forum, where keyword users and metadata providers can discuss topics related to the GCMD Keywords.

5 Periodic Internal Reviews

The CMR SET will periodically perform reviews of all CMR concepts and documents to ensure that the CMR concepts are still relevant, applicable and useful to the user community. Proposed changes resulting from an internal review will follow the

same procedure described above, and in all cases the SET decides whether a documentation effort and public review will be initiated for the proposed change.

6 References

6.1 Document References

Document Title	Spec # / Version / Release Date	Link to resource
Unified Metadata Model for Collections (UMM-C)	*19 December 2016*	*https://wiki.earthdata.nasa.gov/x/1YXyAg*
Unified Metadata Model for Granules (UMM-G)	*June 2016*	
Unified Metadata Model for Common Parameters (UMM-Common)	*19 December 2016*	
Unified Metadata Model for Variables (UMM-Var)	*TBD December 2017*	
Unified Metadata Model for Services (UMM-S)	*TBD December 2017*	
ESDIS CM Procedures	*423-PG-1410.2.1*	*https://ops1-cm.ems.eosdis.nasa.gov/cm2/flow/search?execution=e4s1#*
Archiving, Distribution and User Services in EOSDIS (ADURD)	*432-10-69, Revision B, March 2017*	*https://earthdata.nasa.gov/about/esdis-project/esdis-policy/adurd*
Global Change Master Directory (GCMD) Keyword Governance and Community Guide Document	*Version 1.0, 4 August 2016*	*https://cdn.earthdata.nasa.gov/conduit/upload/5182/KeywordsCommunityGuide_Baseline_v1_SIGNED_FINAL.pdf*
Metadata Quality Review Life Cycle Doc	*12 January 2015 ---Internal DRAFT---*	*https://wiki.earthdata.nasa.gov/download/attachments/38994452/Metadata%20Quality%20Review%20Life%20Cycle%20Doc%20-%2012%20Jan%202015.docx?version=1&modificationDate=1421091220406&api=v2*

6.2 Contacts

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6.3 Glossary of Acronyms

ADURD	Archiving, Distribution and User services in EOSDIS Requirements Document
API	Application Programming Interface
DIF	Directory Interchange Format
CCR	Configuration Change Request
CM	Configuration Management
CMR	Common Metadata Repository
COMET	COnfiguration Management EOSDIS Tool
ECHO	EOS Clearing HOuse
EMS	ESDIS Metrics System
EOS	Earth Observing System
EOSDIS	Earth Observing System Data and Information System
ESDIS	Earth Science Data and Information System
ESEC	EED Systems Engineering Council
ESO	ESDIS Standards Office
GCMD	Global Change Master Directory
IDN	International Directory Network
KMS	Keyword Management System
MMT	Metadata Management Tool
OA	Operational Agreement
SET	System Engineering Team
SW	Software
TIM	Technical Interchange Meeting
UMM	Unified Metadata Model
UMM-C	Unified Metadata Model for Collections
UMM-Common	Unified Metadata Model for Common Parameters
UMM-G	Unified Metadata Model for Granules
UMM-S	Unified Metadata Model for Services
UMM-Var	Unified Metadata Model for Variables