Task 42 – ECS Requirements Volume 4 Specification

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ECS Requirements Volume 4 Specification
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Preface

This document is under ESDIS Project configuration control. Once this document is approved, ESDIS approved changes are handled in accordance with Class I and Class II change control requirements described in the ESDIS Configuration Management Procedures, and changes to this document shall be made by change bars or by complete revision.

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Abstract

This document provides the completed Level 4 Science Data Processing System (SDPS) Requirements for the Defect Tracking (DTS) and HDF-EOS-To-Geotiff Conversion Tool (HEG) subsystems.

***Keywords**: SDPS, DTS, HEG*

Change History Log

Revision	Effective Date	Description of Changes (Reference the CCR & CCB Approval Date)
		CCR 423-ESDIS-XXX; CCB Approved mm/dd/yyyy Pages:

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1 INTRODUCTION

The EOSDIS Core System (ECS) performs information management and data archiving and distribution for Earthdata mission datasets at NASA Distributed Active Archive Center (DAAC) locations. Each DAAC performs these functions using a combination of standard capabilities provided by ESDIS, and hardware and software specific to the DAAC. The ECS was developed using special hardware and software to support the high ingest rates of EOS instruments. ECS currently resides and operates at three DAACs: Atmospheric Science Data Center (ASDC), Land Processing (LP) DAAC and National Snow and Ice Data Center (NSIDC) DAAC.

Data products are created by NASA's Science Investigator-led Processing Systems (SIPS) or, in a few cases, by systems interfacing with the ECS at the DAACs. The ECS at the DAACs ingests the data from the processing systems and archives them. ECS has interfaces with the Common Metadata Repository (CMR) to provide metadata to support search and access through CMR clients, for example, Earthdata Search. ECS also provides software toolkits to assist instrument teams in their development of product generation software at their Science Computing Facilities (SCFs) to facilitate ingest of the resulting products into ECS or into other DAAC-specific archiving and distribution systems.

ECS is structured as two segments: the Communications and Systems Management Segment (CSMS) and the Science Data Processing Segment (SDPS).

- The Communications and Systems Management Segment (CSMS) provides the communications infrastructure for the ECS and systems management for all of the ECS hardware and software components. The CSMS provides the interconnection between users and service providers within the ECS, transfer of information between subsystems, computer software configuration items (CSCIs), computer software components (CSCs), and processes of the ECS.
- The Science Data Processing System (SDPS) provides science data ingest and production, search and access functions, data archive, and system management capabilities.

The ECS includes the following subsystems:

Subsystem	**Segment**	**Subsystem Description**
AIM	SDPS	Archive Inventory Management Subsystem
BMGT	SDPS	Bulk Metadata Generation Tool
CSS	CSMS	Communications Subsystem
Data Access	SDPS	Data Access Subsystem
DMS	SDPS	Data Management Subsystem
DPL	SDPS	Data Pool Subsystem
DPL-Ingest	SDPS	Data Pool Ingest Subsystem
DSS	SDPS	Data Server Subsystem
DTS	SDPS	Defect Tracking Subsystem

Subsystem	Segment	Subsystem Description
EMS	SDPS	EOSDIS Metrics Subsystem
HEG	SDPS	HDF-EOS to Geotiff Converter Subsystem
INS	SDPS	Ingest Subsystem
ISS	CSMS	Internetworking Subsystem
MGS	SDPS	Map Generation Service
MSS	SDPS	System Management Subsystem
OMS	SDPS	Order Manager Subsystem
SSS	SDPS	Spatial Subscription Server Subsystem
TKD	SDPS	Toolkit Subsystem for DAACs
TKS	SDPS	Toolkit Subsystem for Science Teams

1.1 Purpose

The purpose of the ECS Requirements Document Set is to present the system requirements that have been implemented for ECS. This document is one volume of the set.

1.2 Scope

Because the number of requirements is large, this Requirements documentation set has been divided in to a series of Volumes, partitioned by subsystem. This is one volume in the set.

Volume	Subsystems	Requirements
1	AIM, BMGT	462
2	CSS, DMS, Data Access	249
3	DPL	1,670
4	DTS, HEG	125
5	DSS	1,245
6	INS, DPL Ingest	180
7	ISS, MGS, MSS, EMS	374
8	OMS	817
9	SSS	160
10	TKD, TKS	335
	total	5,617

1.3 Related Documentation

The latest versions of all documents below should be used. The latest Earth Science Data and Information System (ESDIS) Project documents can be obtained from Uniform Resource Locator (URL): https://ops1-cm.ems.eosdis.nasa.gov. ESDIS documents have a document number starting with either 423 or 505. Other documents are available for reference in the ESDIS project library website at: http://esdisfmp01.gsfc.nasa.gov/esdis_lib/default.php unless indicated otherwise.

1.3.1 Applicable Documents

The following document contains policies or other directive matters that are binding upon the content of this document.

Document Number	Document Title
423-46-01	Functional and Performance Requirements Specification for the ECS Science Data Processing System

1.3.2 Reference Documents

The following documents are not binding on the content but referenced herein and amplify or clarify the information presented in this document.

Document Number	Document Title
NPR 2810.1A	Security of Information Technology document
170-TP-013-001	HDF-EOS Data Format Converter User's Guide', (170-TP-013-001), January 2002
170-TP-600	HDF-EOS Library Users Guide Volume 1 (170-TP-600)
n/a	BMGTCollectionMetadata.dtd https://earthdata.nasa.gov/esdis/eso/standards-and-references/echo-metadata-standard
n/a	BMGTGranuleMetadata.dtd https://earthdata.nasa.gov/esdis/eso/standards-and-references/echo-metadata-standard
n/a	BMGTBrowseMetadata.dtd https://earthdata.nasa.gov/esdis/eso/standards-and-references/echo-metadata-standard
n/a	ECHO PackageManifest.xsd https://earthdata.nasa.gov/esdis/eso/standards-and-references/echo-metadata-standard
170-WP-023	Bulk Metadata and Browse Export Capability for the ECS Project' (170-WP-023-011, 9/27/00)
209-CD-036	Interface Control Document for ECS Interfaces That Support External Subsetters Located at DAACs', ECS Project document number 209-CD-036-001

Document Number	Document Title
304-CD-002	Science and Data Processing Segment (SDPS) Requirements Specification for the ECS Project (March 1995)
311-EMD-xxx	Archive Management Inventory (AIM) Database Design Schema Specifications for the EMD Project
423-41-57	Interface Control Document between the EOSDIS Core System (ECS) and the Science Investigator-led Processing Systems (SIPS), Volume 0
423-41-58	ICD between ECS and the LP DAAC
423-41-63	ICD between EMOS and the SDPS
423-45-02	Interface Control Document between EOSDIS Core System (ECS) and EOS Clearinghouse (ECHO) for Metadata Inventory and Ordering
423-45-03	Interface Control Document for ECS ECHO WSDL Order Component (EWOC) and External Processing Systems Co-located at the DAACs
423-ICD-EDOS/EGS	Interface Control Document Between the Earth Observing System (EOS) Data and Operations System (EDOS) and the EOS Ground System (EGS) Elements, renumbered as 428-ICD-EDOS/EGS
505-41-17	Interface Requirements Document between EOSDIS Core System (ECS) and the NASA Science Internet (NSI), 505-41-17
505-41-30	Interface Control Document Between EOSDIS Core Systems (ECS) and the Version 0 System for Interoperability', ESDIS document number 505-41-30
910-TDA-042	EMD Browsers Baseline
CK_70_01	ECS Ticket: End-To-End Checksum Capability
DP_72_02	ECS Ticket: Ingest of Level 0 Data from EDOS into the Data Pool
DP_72_03	ECS Ticket: Ingest of ASTER L1A and Browse into Data Pool
DP_72_04	ECS Ticket: Data Pool Ingest of Data at the ASDC DAAC
DP_72_05	ECS Ticket: Support for MISR Browse Linkages in Release 7.20
DP_S3_01	ECS Ticket: Populate Data Pool from ECS Archive
DP_S3_02	ECS Ticket: Accommodate Non ECS Data in Data Pool
DP_S4_07	ECS Ticket: Support Compression on Data Pool Insert
DP_S6_01	ECS Ticket: SIPS Ingest Into Data Pool
DP_SY_01	ECS Ticket: Data Pool FTP Service
DP_SY_03	ECS Ticket: Data Pool Cleanup
DP_SY_04	ECS Ticket: Data Pool Insert
DP_SY_06	ECS Ticket: Update Granule Expiration in Data Pool
DP_SY_08	ECS Ticket: Compile & Examine Data Pool Access Statistics
DS_7E_01	ECS Ticket: Removal of Science Data Server
ES_SY_01	ECS Ticket: External Subsetter Support
OD_S3_01	ECS Ticket: Order Manager

Document Number	Document Title
OD_S4_01	ECS Ticket: Improve Distribution to End Users through Data Pool
OD_S5_02	ECS Ticket: Managing HEG Orders
OD_S5_06	ECS Ticket: Hiding Order-Only Granules In The Data Pool
OG_S5_01	ECS Ticket: HEG Extensions for OWS
OM_80_01	ECS Ticket: Operational Updates to OMS
OP_S4_06	ECS Ticket: Support Multiple Data Pool File Systems
WD_S3_01	ECS Ticket: HDF-EOS Format Converter Integration with Data Pool
WD_S4_02	ECS Ticket: HEG Integration Enhancements
WL_S4_01	ECS Ticket: Synergy IV 24-Hour Workload Performance

2 REQUIREMENTS

2.1 DTS

These are the completed ECS requirements for the DTS subsystem. The DTS provides trouble ticket management and status tracking through the life-cycle sates of issue resolution.

ID	Title	Status
ECS-L4-15849	C-DTS-00010 The system shall be able to document the life cycles of reported software defects.	Completed
ECS-L4-15850	C-DTS-00020 The system shall be able to store at least the following information about each defect: unique ID, status, description, affected hardware or software, problem solution, originator, and affected baseline.	Completed
ECS-L4-15851	C-DTS-00030 The system shall provide a Linux, Windows, or Web-based graphical user interface for submitting, browsing, editing, and printing defect reports and enhancement requests	Completed
ECS-L4-15852	C-DTS-00040 The system shall permit access by users outside the local network on which it resides.	Completed
ECS-L4-15853	C-DTS-00050 The system shall be capable of assigning life cycle states to each defect report or enhancement request.	Completed
ECS-L4-15854	C-DTS-00060 The system shall be capable of categorizing defect reports and enhancement requests at least by type, class, project, urgency and priority.	Completed
ECS-L4-15855	C-DTS-00070 The system shall be capable of reassigning defects from one project and class to another.	Completed
ECS-L4-15856	C-DTS-00080 The system shall allow administrators to configure defect report or enhancement request data fields such that data entry is required.	Completed
ECS-L4-15857	C-DTS-00090 The system shall be capable of presenting lists of valid values to users while they create or edit defect reports and enhancement requests.	Completed
ECS-L4-15858	C-DTS-00100 The system shall have a state transition tracking mechanism that administrators can configure to enforce work flow through a defect resolution process tailored to ECS.	Completed
ECS-L4-15859	C-DTS-00110 The system shall allow tailoring of workflows according to defect type and project.	Completed

ID	Title	Status
ECS-L4-15860	C-DTS-00120 The system shall be customizable, allowing administrators to alter and define additional life cycle states, defect report and enhancement request attributes, data entry screens, pick lists, and event-driven actions.	Completed
ECS-L4-15861	C-DTS-00130 The system shall allow entry of a defect report by any registered user of the system [as well as non-registered users].	Completed
ECS-L4-15862	C-DTS-00140 The system shall regulate access to screens and fields according to permissions configurable by an administrator.	Completed
ECS-L4-15863	C-DTS-00170 The system shall be capable of creating defect reports and enhancement requests from data it receives via e-mail.	Completed
ECS-L4-15864	C-DTS-00150 The system shall be capable of automatically sending, to the defect report's originator and others as may be subscribed, an e-mail message that confirms submission of a defect report and enhancement request.	Completed
ECS-L4-15865	C-DTS-00180 The system shall be capable of importing defect reports and enhancement requests from formatted data files	Completed
ECS-L4-15866	C-DTS-00160 The system shall be capable of sending, to the defect report's originator and others as may be subscribed, an e-mail message that documents each change made to a defect report and enhancement request.	Completed
ECS-L4-15867	C-DTS-00190 The system shall be capable of exporting user-selected defect reports and enhancement requests and fields as formatted data for use with other applications such as text editors and spreadsheets.	Completed
ECS-L4-15868	C-DTS-00200 The system shall provide a capability to search for historical and current defect reports by various criteria including keyword, user identity, and defect ID.	Completed
ECS-L4-15869	C-DTS-00210 The system shall allow users to run ad hoc and pre-defined queries to retrieve user-selected defect report and enhancement request data.	Completed
ECS-L4-15870	C-DTS-00220 The system shall be capable of searching for defects relating to the same resource (e.g., equipment).	Completed
ECS-L4-15871	C-DTS-00230 The system shall be capable of producing ad hoc and pre-defined reports containing user-selected defect report and enhancement request data.	Completed
ECS-L4-15872	C-DTS-00240 The system shall produce reports, for users system-wide, which list the identity and disposition of defects against ECS baselines	Completed
ECS-L4-15873	C-DTS-00250 The system shall make available, for users system-wide, the assignments, schedules, and status of tasks for correcting ECS defects.	Completed
ECS-L4-15874	C-DTS-00260 The system shall allow users to direct output of queries and reports to screen, file, or printer.	Completed
ECS-L4-15875	C-DTS-00270 The system shall maintain a historical record of each change made to a defect report and enhancement request, identifying the author, date/time, and description (or field name) of the change.	Completed
ECS-L4-15876	C-DTS-00280 The system shall be accompanied by documentation, to include user and administrator guides and installation instructions.	Completed
ECS-L4-15877	C-DTS-00290 The system shall be capable of forwarding defect reports from one collection to another to facilitate problem escalation.	Completed
ECS-L4-15878	C-DTS-00300 The system shall provide an API that supports entry of defect reports and enhancement requests by other applications.	Completed
ECS-L4-15879	C-DTS-00310 The system shall allow sites to specify notification and escalation rules.	Completed

2.2 HEG

These are the completed ECS requirements for the HEG subsystem. HEG is a tool developed to allow a user to reformat, re-project and perform stitching/mosaicing and subsetting operations on HDF-EOS objects.

ID	Title	Status
ECS-L4-15880	S-HEG-30100 [DESIRABLE - Design decision to be made] The HEG front-end shall limit the number of executing data conversion processes based upon the expected memory and disk usage for a processing request and the operator allowed limits for memory and disk consumption allocated to this processing.	Completed
ECS-L4-15881	S-HEG-00010 The HDF-EOS Format Conversion Tool shall be operable on a Sun Solaris 2.5.1 operating system.	Completed
ECS-L4-15882	S-HEG-00020 The HDF-EOS Format Conversion Tool shall be operable on an SGI IRIX 6.5 operating system.	Completed
ECS-L4-15883	S-HEG-00040 The HDF-EOS Format Conversion Tool shall allow HDF-EOS grid data to be converted to GeoTiff format, in accordance with the format definition in the GeoTIFF Revision 1.0 Specification (see www.remotesensing.org/geotiff/geotiff.html).	Completed
ECS-L4-15884	S-HEG-00060 The HDF-EOS Format Conversion Tool shall allow HDF-EOS grid data to be converted to generic binary format, with an ASCII header, in accordance with the binary format defined in Appendix of the HDF-EOS Format Conversion Tool User's Guide.	Completed
ECS-L4-15885	S-HEG-00065 When scaling factors are present in the HDF-EOS files, the HDF-EOS Format Conversion Tool shall include them in the output ASCII header file associated with generic binary output.	Completed
ECS-L4-15886	S-HEG-00070 The HDF-EOS Format Conversion Tool shall allow an HDF-EOS swath object to be converted to HDF-EOS grid format in the HDF-EOS Geographic projection, as defined in 'HDF-EOS Library Users Guide Volume 1 (170-TP-600)'.	Completed
ECS-L4-15887	S-HEG-00080 The HDF-EOS Format Conversion Tool shall allow HDF-EOS grid objects to be reprojected to the Universal Transverse Mercator (UTM) projection. (as described in U.S. Geological Survey Professional Paper 1395, 'Map Projections--A Working Manual',Snyder, John P.)	Completed
ECS-L4-15888	S-HEG-00090 The HDF-EOS Format Conversion Tool shall allow HDF-EOS grid objects to be reprojected to the HDF-EOS Geographic projection, as defined in 'HDF-EOS Library Users Guide Volume 1 (170-TP-600)'.	Completed
ECS-L4-15889	S-HEG-00100 The HDF-EOS Format Conversion Tool shall allow HDF-EOS grid objects to be reprojected to the Space Oblique Mercator (SOM) projection. (as described in U.S. Geological Survey Professional Paper 1395, 'Map Projections--A Working Manual',Snyder, John P.)	Completed
ECS-L4-15890	S-HEG-00110 The HDF-EOS Format Conversion Tool shall allow HDF-EOS grid objects to be reprojected to a Polar Stereographic projection. (as described in U.S. Geological Survey Professional Paper 1395, 'Map Projections--A Working Manual',Snyder, John P.)	Completed
ECS-L4-15891	S-HEG-00235 The HDF-EOS Format Conversion Tool GUI shall allow the user to configure the name of a default local file system.	Completed
ECS-L4-15892	S-HEG-00120 The HDF-EOS Format Conversion Tool shall allow output data to be back-projected into its original projection to facilitate pixel by pixel error analysis and statistical summaries	Completed

ID	Title	Status
ECS-L4-15893	S-HEG-00240 The HDF-EOS Format Conversion Tool GUI shall allow the user to list and view all objects (metadata in text attributes, local attributes, palettes, data tables and arrays, etc.) within HDF-EOS granules.	Completed
ECS-L4-15894	S-HEG-00130 The HDF-EOS Format Conversion Tool shall allow a user to subset an HDF-EOS swath object spatially, by specifying one of the following criteria: a. LLBOX	Completed
ECS-L4-15895	S-HEG-00250 When converting an HDF-EOS swath object to an HDF-EOS grid object, the HDF-EOS Format Conversion Tool shall preserve the original ECS core attributes from the HDF-EOS input file in the output file, and amend the values of the attributes as appropriate to reflect output file content.	Completed
ECS-L4-15896	S-HEG-00260 When reprojecting HDF-EOS grid objects, the HDF-EOS Format Conversion Tool shall allow a user to specify the resolution (i.e., grid dimensions) of the output file.	Completed
ECS-L4-15897	S-HEG-00280 The HDF-EOS Format Conversion Tool shall allow the user to compare two input files and write pixel by pixel differences to a user-specifiedoutput file.	Completed
ECS-L4-15898	S-HEG-00140 The HDF-EOS Format Conversion Tool shall allow a user to subset an HDF-EOS grid object spatially, by specifying one of the following criteria: a. LLBOX	Completed
ECS-L4-15899	S-HEG-00145 When spatially subsetting an HDF-EOS swath or grid object, the HDF-EOS Format Conversion Tool shall preserve the original ECS core attributes from the HDF-EOS input file in the output file, and amend the values of the attributes as appropriate to reflect output file content.	Completed
ECS-L4-15900	S-HEG-00150 It is desirable that the HDF-EOS Format Conversion Tool allow a user to stitch together two or more HDF-EOS swathobjects, by track parameter (e.g., latitude).	Completed
ECS-L4-15901	S-HEG-00160 It is desirable that the HDF-EOS Format Conversion Tool allow a user to stitch together two or more ASTER or MODIS HDF-EOS grid objects.	Completed
ECS-L4-15902	S-HEG-20010 The HEG Tool shall provide the capability to produce the following types of multiple band output files from a format conversion operation on a single object of an HDF-EOS file: (a) Multi-band GeoTIFF (b) Band interleaved (BIL) - DESIRABLE (c) Band sequential format (BSQ) - DESIRABLE	Completed
ECS-L4-15903	S-HEG-20015 The HEG Tool shall provide the capability to produce the following types of multiple band output files from a format conversion operation on multiple objects of an HDF-EOS file: (a) Multi-band GeoTIFF (b) Band interleaved (BIL) - DESIRABLE (c) Band sequential format (BSQ) - DESIRABLE	Completed
ECS-L4-15904	S-HEG-20020 The HEG Tool shall perform conversion, reprojection, and subsetting operations on 4-dimensional data structures.	Completed
ECS-L4-15905	S-HEG-00165 It is desirable that the HDF-EOS Format Conversion Tool allow a user to spatially subset an output file containing stitched HDF-EOS objects.	Completed
ECS-L4-15906	S-HEG-00170 The HDF-EOS Format Conversion Tool shall be able to be invoked from a command line interface.	Completed
ECS-L4-15907	S-HEG-20030 The HEG Tool shall check that the bounding area requested for a spatial subset for a product is contained within the spatial boundaries of the data product selected for subsetting.	Completed

ID	Title	Status
ECS-L4-15908	S-HEG-00180 The HDF-EOS Format Conversion Tool command line interface shall allow the user to specify: a.the name of the HDF-EOS input file or files b.the name of the object in the HDF-EOS input file on which to operate c.the name of the output file d.the location of the output file e.the output file data format (GeoTiff, binary, HDF-EOS grid) f.the output file data projection (if applicable) g.the spatial subsetting parameters for the input file (if applicable) h.the stitching specifications for the input files (if applicable)	Completed
ECS-L4-15909	S-HEG-20040 The HEG tool shall delete the intermediate TIFF file upon completion of a conversion operation.	Completed
ECS-L4-15910	S-HEG-00190 The HDF-EOS Format Conversion Tool shall be downloadable to a user's workstation via ftp.	Completed
ECS-L4-15911	S-HEG-20060 The HEG tool shall delete the intermediate reprojected files upon completion of a subsetting or stitching operation.	Completed
ECS-L4-15912	S-HEG-00200 The HDF-EOS Format Conversion Tool shall be able to be run via a web-based GUI.	Completed
ECS-L4-15913	S-HEG-20080 The HEG tool shall provide the capability to cancel an operation in progress.	Completed
ECS-L4-15914	S-HEG-00210 The HDF-EOS Format Conversion Tool web-based GUI shall provide a Help capability which allows a user to understand how to use the tool without reference to other documentation.	Completed
ECS-L4-15915	S-HEG-20090 The HEG tool shall run on IRIX 6.5	Completed
ECS-L4-15916	S-HEG-00220 The HDF-EOS Format Conversion Tool GUI shall allow the user to enter or choose: a. the name of the HDF-EOS input file or files b. the name of the object in the HDF-EOS input file on which to operate c. the name of the output file d. the location of the output file e. the output file data format (GeoTiff, binary, HDF-EOS grid) f. the output file data projection (if applicable) g. the spatial subsetting parameters for the input file (if applicable) h. the stitching specifications for the input files (if applicable)a.	Completed
ECS-L4-15917	S-HEG-20092 The HEG tool shall run on Windows 98.	Completed
ECS-L4-15918	S-HEG-00230 The HDF-EOS Format Conversion Tool GUI shall allow the user to browse a local file system and select input files from that file system.	Completed
ECS-L4-15919	S-HEG-20095 The HEG tool shall run on Linux (Red Hat Version 7.2)	Completed
ECS-L4-15920	S-HEG-20100 The HEG tool shall apply file name extensions to the resulting converted files, which are consistent with the requested output format.	Completed
ECS-L4-15921	S-HEG-20110 The HEG tool shall support requests for spatial sub-sampling of data products.	Completed
ECS-L4-15922	S-HEG-20120 The HEG Tool shall ensure that the output HDF-EOS file reflects the results of a spatial sub-sampling operation in its metadata.	Completed
ECS-L4-15923	S-HEG-20130 The HEG tool shall reproject to the following map projections: (a) Transverse Mercator (b) Lambert Azimuthal - DESIRABLE (c) Lambert Conformal Conic - DESIRABLE (d) State Plane - DESIRABLE	Completed
ECS-L4-15925	S-HEG-20140 The HEG tool shall provide the capability to correct geometric distortion resulting from a stitching operation of multiple MODIS swath objects. - DESIRABLE	Completed
ECS-L4-15926	S-HEG-20150 The HEG tool shall provide the capability to produce subsampled stack HDFEOS grid products, providing subsampling intervals between every pixel and line and every fifth pixel and line. - DESIRABLE	Completed

ID	Title	Status
ECS-L4-15927	S-HEG-20310 The HEG Converters shall provide support for the following MODIS Aqua HDF-EOS data types: a. MYD09A1.004; b. MYD11A1.004; c. MYD13A1.004; d.MYD13A2.004; e. MYD13Q1.004. Support for these data types must include the ability to: convert from HDF-EOS to GeoTiff format reproject to supported HEG projections subset spatially by bounding box	Completed
ECS-L4-15928	S-HEG-20325 The HEG Converters shall support the option to produce only a client-selected subset of all possible output files.	Completed
ECS-L4-15929	S-HEG-20330 The HEG Converters shall support the subsetting of fields of three or more dimensions within an HDFEOS object into two dimensional fields within a single HDFEOS object. This support shall be provided for both grid and swath input data sets.	Completed
ECS-L4-15930	S-HEG-20335 The HEG Converters shall allow the production of external metadata files associated with GeoTiff converter output to be optional.	Completed
ECS-L4-15931	S-HEG-20350 The standard HEG interface shall be callable from java and C++ applications.	Completed
ECS-L4-15932	S-HEG-20340 The HEG CI shall provide a standard synchronous interface for all HEG conversion requests.	Completed
ECS-L4-15933	S-HEG-20360 The standard HEG interface shall accept the following input parameters from its clients for a HEG conversion request: a. Requestor / client name (e.g., OMS, W*S, DOWS Converter) b. A unique identifier for the request (optional, unless client indicates it will attempt to reconnect if interrupted by a fault; see (p) below.) c. Input file path and file name (DESIRABLE: multiple input file names to support stitching) d. Whether the input file is compressed e. Decompression algorithm for input file (if applicable) f. Output file format g. Output file projection h. Output file projection parameters (if they were supplied by end user) (Note: if projection parameters are not supplied by the end user, the HEG converter executables will supply defaults) i. Output file subset type (optional)- e.g., spatial, band, field j. Output file subsetting parameters (optional) – e.g., bounding rectangle corner coordinates, object names, field names, band names, band values, 4th dimension names, 4th dimension values k. Output file name(s) (optional) l. Output file directory name m. Whether metadata files (e.g., .tif.met, .hdf.met) should be produced with the converter output n. Whether a request summary file (i.e., ConverterSynopsis.txt) should be produced for the request o. Whether all output GeoTiffs produced by the HEG converters should be combined in a single multi-band GeoTiff p. That the client will not reconnect to a pre-submitted HEG service request if the request is interrupted by a fault (NOTE: this does not imply that the standard HEG interface will or can recover a request interrupted by a fault and allow a client to reconnect to it).	Completed
ECS-L4-15934	S-HEG-20365 The standard HEG interface shall be able to run in debug mode. When running in debug mode, the HEG interface shall instruct the HEG converters not to remove temporary files created during the conversion process; when not running in debug mode, the HEG interface shall instruct the HEG converters to remove temporary files at the completion of the conversion process.	Completed

ID	Title	Status
ECS-L4-15935	S-HEG-20370 The standard HEG interface shall accept and carry out requests to cancel a HEG service request (i.e., an execution of a HEG converter executable.) When the request is cancelled, no permanent or temporary output files shall remain. (NOTE: For Synergy V, only the C++ client will require this service).	Completed
ECS-L4-15936	S-HEG-20375 The standard HEG interface shall produce a request summary file (ConverterSynopsis.txt) and place it in the client-specified output directory, if requested to do so by the client. (Note: This file is currently produced by the HEG Front End/WebAccess packager).	Completed
ECS-L4-15937	S-HEG-20380 The standard HEG interface shall return a completion status code to its clients. (the set of valid completion codes is TBD by design).	Completed
ECS-L4-15938	S-HEG-20390 The standard HEG interface shall return to its clients the process id of the HEG converter process that was started on behalf of the client's HEG service request. (NOTE: For Synergy V, only the C++ client will require this service).	Completed
ECS-L4-15939	S-HEG-20400 The standard HEG interface shall return to its clients the names of all output files produced by the HEG converters.	Completed
ECS-L4-15940	S-HEG-20410 The standard HEG interface shall decompress compressed-format input files before making them available to the HEG converters for conversion, using the decompression algorithm provided by the client. If no decompression algorithm is provided, the standard HEG interface shall use a standard decompression algorithm which corresponds to the compressed-format suffix of the input file, if possible. Ref: Ticket DP_S4_07: Support Compression on Data Pool Insert, requirement S-DPL-75135: The HEG Front End shall decompress files which were compressed at insert time before converting them, using the decompression algorithm provided by the DAAC. If no decompression algorithm is provided, the HEG Front End shall assume that decompression is not necessary.	Completed
ECS-L4-15941	S-HEG-20420 The standard HEG interface shall gracefully handle termination of the client-side connection.	Completed
ECS-L4-15942	S-HEG-20430 The standard HEG interface shall be able to gracefully handle resubmission of a request by its client; i.e., resubmission of a request by a client shall not result in file creation errors nor failure to return a completion status to the client.	Completed
ECS-L4-15943	S-HEG-20440 The standard HEG interface shall successfully handle a configurable number of concurrent requests from multiple clients.	Completed
ECS-L4-15944	S-HEG-20450 Different instances of the standard HEG interface shall be able to execute in different EMD operation modes concurrently and independently.	Completed
ECS-L4-15945	S-HEG-20460 The standard HEG interface shall be able to log the following information and/or events at the applicable debug levels (TBD by detailed design which information and/or events should be logged at which debug levels): start up mode of operation (if applicable) c. receipt of data conversion request input parameters received from client submission of request to converter process id of converter request command line content for converter request submission content of parameter file sent to converter completion of converter request results of converter request error conditions (input file not found, client no longer communicating, resubmission of request) shut down All log entries shall be date/time stamped to the nearest millisecond.	Completed

ID	Title	Status
ECS-L4-15946	S-HEG-20470 The standard HEG interface shall create the appropriate parameter file and call the appropriate HEG converter executable (i.e, gdtif, swtif, resample, etc.) based on the HDFEOS objects within the input data set and on the requested output conversion options.	Completed
ECS-L4-15947	S-HEG-30010 The HEG front-end shall receive data conversion requests from the Data Pool web application service.	Completed
ECS-L4-15948	S-HEG-30020 The HEG front-end shall retrieve data conversion requests from the queue for each granule for which conversion processing is requested.	Completed
ECS-L4-15949	S-HEG-30030 The HEG front-end shall process data conversion request information for each granule conversion into a data conversion request file in the format required for input to the HEG Converter.	Completed
ECS-L4-15950	S-HEG-30050 The HEG front-end shall include a data conversion order ID & request ID in the data conversion request file.	Completed
ECS-L4-15951	S-HEG-30060 The HEG front-end shall provide the capability to initiate a HEG data conversion process, providing as input to the processing request the data conversion request file.	Completed
ECS-L4-15952	S-HEG-30070 The HEG front-end shall make available granules required for data conversion to a location that is accessible by the HEG Converter.	Completed
ECS-L4-15953	S-HEG-30080 The HEG front-end shall limit the number of executing data conversion processes by not initiating new data conversion processes if the number of executing processes exceeds an operator configurable value.	Completed
ECS-L4-15954	S-HEG-30090 The HEG front-end shall provide the capability to queue a configurable number of processing requests to be dispatched to the HEG converter for processing.	Completed
ECS-L4-15955	S-HEG-30110 The HEG front-end shall receive data conversion processing results information from a data conversion process when the process terminates.	Completed
ECS-L4-15956	S-HEG-30120 The HEG front-end shall make available converted files for distribution to the user, via anonymous FTP.	Completed
ECS-L4-15957	S-HEG-30150 The HEG front-end shall provide a log file that records the following events and associated information: a. Receipt of data conversion request: date/time stamp, granule ID b. Data conversion request to HEG converter: date/time stamp, data conversion request ID c. Data conversion processing results information received: date/time stamp, data conversion request ID, request processing status. d. User notification email sent: date/time stamp, data conversion request ID	Completed
ECS-L4-15958	S-HEG-30160 The HEG front-end shall provide a capability for operations to: a.) start processing entries from the processing request queue b.) stop processing queue entries, c.) shutdown the HEG front-end without loss of saved queue entries	Completed
ECS-L4-15959	S-HEG-30180 The HEG front-end shall, upon receiving a start request, begin processing queued processing requests through the HEG converter, which are ready to be processed.	Completed
ECS-L4-15960	S-HEG-30170 The HEG front-end shall provide the capability to display the entries contained in the processing request queue, including orderID and requestID associated with the entries.	Completed
ECS-L4-15961	S-HEG-30190 The HEG front-end shall provide as an option, the ability to be started or initialized in a stopped processing queue condition.	Completed
ECS-L4-15962	S-HEG-30200 The HEG front-end shall provide the capability for operators to change the state of individual entries in the processing queue.	Completed

ID	Title	Status
ECS-L4-15963	S-HEG-30210 The HEG front-end shall, when a shutdown request is received, kill all processing being performed by the HEG converter and exit.	Completed
ECS-L4-15964	S-HEG-30220 The HEG front-end shall, when a stop queue processing request is received, cease to submit processing requests for HEG converter processing.	Completed
ECS-L4-15965	S-HEG-30230 The HEG front-end shall, when a processing request is determined to have failed during HEG converter processing, change the status of the associated processing request to 'Failed'.	Completed
ECS-L4-15966	S-HEG-30240 The HEG front-end shall be able to run in any mode.	Completed
ECS-L4-15967	S-HEG-30250 The HEG front-end shall be able to run concurrently in different modes.	Completed
ECS-L4-15970	S-HEG-30280 The HEG front-end shall provide the capability to monitor and record the status of each conversion process thread including: a.) Data Conversion order ID & request ID b.) The granule ID for the conversion request c.) The conversion actions requested by the user d.) the results of the conversion processing (success or failure) e.) reason for failure (if applicable) f.) the filename for the converted data granule (one for each file of the granule)	Completed
ECS-L4-15971	S-HEG-30285 The HEG front-end shall, provide all appropriate processing status updates to the DPL database.	Completed
ECS-L4-15972	S-HEG-30290 The HEG converter shall return processing result information to the HEG front-end so that the results may be sent independent of the availability of the HEG front-end.	Completed
ECS-L4-15973	S-HEG-30300 The HEG converter shall remove all temporary files used during the data conversion processing at the end of that processing.	Completed
ECS-L4-15974	S-HEG-30310 The HEG converter shall be able to run in any mode.	Completed
ECS-L4-15975	S-HEG-30330 The Data Pool Maintenance and Monitor GUI shall provide the ability to display if a collection is enabled for HEG processing for each collection that is configured for the Data Pool.	Completed
ECS-L4-15976	S-HEG-30320 The HEG converter shall be able to run concurrently in different modes.	Completed

Appendix A Abbreviations and Acronyms

These are the abbreviations and acronyms used in the SDPS requirements Volumes 1-10. This section is replicated in all volumes.

ACL	access control list
ACVU	AIM checksum verification utility
ADC	Affiliated Data Center
ADEOS	Advanced Earth Observing Satellite
AIM	Archive Inventory Management
AIRS	Atmospheric Infrared Sounder
AMFS	Archival Management and Storage System File System
AMSR	Advanced Microwave Scanning Radiometer
ANSI	American National Standards Institute
API	Application Program Interface
APIDs	Application Process Identifiers
APIs	Application Program Interfaces?
ARP	Address Resolution Protocol
ASDC	Atmospheric Science Data Center
ASF	Alaska Satellite Facility
ASTER	Advanced Spaceborne Thermal Emission and Reflection Radiometer
AST_L1A, AST_L1B	ASTER Level 1 A and Level 1 B data types
AVG	average
AVN	National Center for Environmental Prediction (NCEP) Aviation model, later renamed to Global Forecast System (GFS)
BGT	Bulk Metadata Generation Tool, also known as BMGT
BIL	Band Interleaved
BMGT	Bulk Metadata Generation Tool
BPI	Bits per inch
BRF	Browse Reference File
BRWS	Browse
BUFR	Binary Universal Form for the Representation of meteorological data
CCB	Configuration Control Board
CCR	Configuration Change Request
CCSDS	Consultative Committee for Space Data Systems
CD	Compact Disc

CFG	Configuration
CI	Configuration Item
CKSUM	refers to a particular algorithm or program to calculate a file checksum
CLS	Client Subsystem
CM	Configuration Management
CMO	Configuration Management Office
CMR	Common Metadata Repository
COTS	Commercial Off-The Shelf (hardware or software)
CPU	Central Processing Unit
CRON	A linux system utility to perform time scheduled executions
CS	Client Server
CSC	Computer Software Component
CSCI	Computer Software Configuration Item
CSDT	Computer Scient Data Type
CSH	C-Shell
CSMS	Communication and Systems Management Segment
CSS	Communications Subsystem
DAAC	Distributed Active Archive Center
DADS	Data Archive and Distribution System
DAR_ID	Data Acquisition Request Identifier
DB	Database
DBID	Database Identifer
DB	Database
DCLI	DDIST (Data Distribution) Command Line Interface
DD	Data Dictionary
DDIST	Data Distribution CSCI
DDR	Detailed Design Review
DEM	Digital Elevation Model
DESKT	Desktop (Computer Software Configuration Item)
DFA	Delete From Archive
DHWM	Data High Water Mark
DIF	Directory Interchange Format
DIPHW	Distribution and Ingest Peripheral HWCI
DMS	Data Management Subsystem
DN	Delivery Notification
DORRAN	Distributed Ordering, Researching, Reporting, and Accounting Network (at EDC)

DPAD	Data Pool Action Driver
DPCV	Data Pool Checksum Verification Utility
DPIU	Data Pool Insert Utility
DPL	Data Pool
DPLINGST	Data Pool Ingest
DPLINSERT	Data Pool Insert
DPM	Data Pool Maintenance
DRPHW	Data Repository HWCI
DSS	Data Server Subsystem
DTD	Document Type Definition (XML)
DTF	Sony Digital Tape Format Tape cartridge system
DTS	Defect Tracking Subsystem
EBNET	EOSDIS Backbone Network
ECHO	EOS Clearing House
ECI, ECR	Earth Centered Inertial, Earth Centered Rotating
ECNBDB	Spatial Subscription Server database
ECS	Earth Observing System Data and Information Core System
EDC	Earth Resource Observation System Data Center
EDOS	Earth Observing System (EOS) Data and Operations System
EDR	Expedited Data Set Request
EDS	Expedited Data Set
EED	EOSDIS Evolution and Development Project
EGS	EOSDIS Ground System
EMD	EOSDIS Maintenance and Development Project
EMOS	EOS Mission Operations System
EMS	ESDIS Metrics System
EOC	Earth Observation Center (Japan), EOS Operations Center
EOS	Earth Observing System
EOSDIS	Earth Observing System Data and Information System
EPD	External Processor Dispatcher
EPSG	European Petroleum Survey Group
ESDIS	Earth Science Data and Information System
ESDT	Earth Science Data Type
ESG	Earth Science Gateway
ESI	EOSDIS Service Interface
ETE	End to End
EWOC	ECHO WSDL Order Component

FCAPS	Fault, Configuration, Accountability, Performance, and Security
F&PRS	Functional and Performance Requirements Specification
FDDI	Fiber Distributed Data Interface
FDF	Flight Dynamics Facility
FOS	Flight Operations Segment
FSMS	File and Storage Management System
FTP	File Transfer Protocol
FTPD	File Transfer Protocol Daemon
GB	Gigabyte or Gigabit
GBYTE	Gigabyte
GCMD	Global Change Master Directory
GDS	Ground Data System
GEOTIFF	Georeferenced Tagged Image File Format
GFE	Government Furnished Equipment
GIS	Geographical Information System
GLAS	Geoscience Laser Altimeter System
GPS	Global Positioning System
GRIB	Grid in Binary
GSFC	Goddard Space Flight Center
GUI	Graphical User Interface
GZIP	GNU zip
HDF	Hierarchical Data Format
HDF-EOS	an EOS proposed standard for a specialized HDF data format
HEG	HDF-EOS-To-Geotiff Conversion Tool
HIPPI	High Performance Parallel Interface
HIRDLS	High-Resolution Dynamics Limb Sounder
HTML	Hypertext Markup Language
HTTP	Hypertext Transfer Protocol
HTTPD	Hypertext Transfer Protocol Daemon
HWCI	Hardware Configuration Item
I/O	Input/Output
I&T	Integration and Test
IAS	Image Assessment System
ICD	Interface Control Document
ICLHW	Ingest Client HWCI
ICMP	Internet Control Message Protocol

IDL	Interactive Data Language
ID	Identifier
IEEE	Institute of Electrical and Electronics Engineering
IGS	International Ground Station
IIU	Inventory Insert Utility
IMS	Information Management System
INCI	Internetworking Hardware HWCI
INHCI	Ingest Hardware (Configuration Item)
INHW	Ingest Hardware (Configuration Item)
INS	Ingest Subsystem
IP	Internet Protocol
IR-1	Initial Release 1
IRD	Interface Requirements Document
IRIX	Silicon Graphics version of Unix
ISS	Internetworking Subsystem
IV&V	Independent Verification and Validation
JDT	Java DAR (Data Acquisition Request) Tool
JPEG	Joint Photographic Experts Group image file format
JPG	JPEG file extension
JPL	Jet Propulsion Laboratory
KFTP	Kerberized File Transfer Protocol
LAN	Local Area Network
LARC	Langley Research Center
LAT/LON	Latitude and Longitude
LGID	Local Granule Identifier
LLBOX	Latitude/Longitude Box
LP-DAAC	Land Processes Distributed Active Archive Center
LPS	Landsat 7 Processing System
LSM	Local System Management (network)
LUNs	Logical Unit Numbers
M&O	Maintenance and Operations
MAN	Metropolitan Area Network
MAX	Maximum
MB	Megabyte (10^6)
MB/sec	Megabytes per second
MBITS/SEC	Megabits per second
MBPS	Megabytes per second

MCF	Metadata Configuration File
MD5	Message Digest checksum algorithm number 5
MDT	Maximum Down Time
METC	refers to file containing Collection Metadata
MGS	Map Generation Subsystem
MGU	Map Generation Utility
MISBR	MISR Browse
MISR	Multi-Imaging SpectroRadiometer
MLCI	Management Logistics Configuration Item
MM	Millimeter
MM/DD/YYYY	date code representation for month, day, year
MODAPS	MODIS Adaptive Processing System
MODIS	Moderate Resolution Imaging SpectroRadiometer
MRTG	Multi Router Traffic Grapher
MSEC	Millisecond
MSM	Media Storage Manager (part of Stornext)
MSS	System Management Subsystem
MTMGW	Machine to Machine Gateway
MUTEX	Mutually Exclusive
N/A	Not Applicable/Not Available
NARA	National Archives and Records Administration
NASA	National Aeronautics and Space Administration
NBSRV	Spatial Subscription Server
NCEP	National Centers for Environmental Prediction
NCR	Non-conformance report
NESDIS	National Environmental Satellite, Data, and Information Service (NOAA)
NFS	Network File System
NIST	National Institute of Standards and Technology
NM	Name Server Subsystem
NMC	National Meteorological Center (NOAA)
NMF	Network Management Facility
NOAA	National Oceanic and Atmospheric Administration
NSBRV	Spatial Subscription Server
NSI	NASA Science Internet
NSIDC	National Snow and Ice Data Center
NTP	Network Transport Protocol

OBU	OWS Binding Utility
ODC	Other Data Center
ODL	Object Description Language
OGC	Open GIS Consortium
OLA	On-line Archive
OMS	Order Manager Subsystem
OPS	Operations
ORNL	Oak Ridge National Laboratory
OSI	Open Systems Interconnection
OSS	Operational Support Software
OWS	OGC Web Services Subsystem
PANs	Production Acceptance Notifications
PB	Petabyte (10^15)
PC	Personal Computer
PDF	Portable Document Format
PDPS	Planning and Data Processing Subsystems
PDR	Product Delivery Record
PDRD	Product Delivery Record Discrepancy
PDSIS	Product Distribution System Information Server
PF	Process Framework
PGE	Product Generation Executable
PGEEXE	PGE executable tar file ESDT
PH	Production History
PID	Process Identifier
PO.DAAC	Physical Oceanography Distributed Active Archive Center
POSIX	Portable Operating System Interface
PREPROCERR	Preprocessing Error
PSA	Product-Specific Attribute
PTHREADS	Portable Operating System Interface (POSIX) threads
PUBERR	Publication Error
PVC	Performance Verification Center
PVL	Parameter Value Language
Q/A, QA	Quality Assurance
QAMUT	Quality Assurance Metadata Update Tool
QC	Quality Control
RARP	Reverse Address Resolution Protocol
RDBMS	Relational Database Management System

RFC	Request for Comments
RHWM	Request High Water Mark
RLWM	Request Low Water Mark
ROM	Read Only Memory
RPC	Remote Procedure Call
RPCID	Remote Procedure Call Identifier
RTR	Requirements Technical Review
SBSRV	Subscription Server
SCF	Science Computing Facility
SCI	science
SCP	Secure Copy
SDP	Science Data Processing
SDPF	Science Data Processing Facility
SDPS	Science Data Processing Segment
SDRSV	misspelled SDSRV
SDS	Scientific Dataset(HDF-EOS term), Science Data System
SDSRV, SDSVR	Science Data Server
SIPS	Science Investigator-led Processing System
SMAP	Soil Moisture Active Passive
SNAC	StorNext Archive Cache
SNFS	StorNext File System
SNMP	Simple Network Management Protocol
SOM	Space Oblique Mercator
SORCE	Solar Radiation and Climate Experiment
SQL	Structured Query Language
SRF	Server Request Framework
SS	two digit seconds field in a time string
SSH	Secure Shell (protocol)
SSI&T	Science System Integration and Test
SSM/I	Special Sensor for Microwave/Imager
SSS	Spatial Subscription Server Subsystem
STGMT	Storage Management Subsystem
TB	Terabyte
TBD	To Be Determined/To Be Defined
TBR	To Be Resolved
TCP	Transmission Control Protocol
TCP/IP	Transmission Control Protocol/Internet Protocol

TES	Trophospheric Emission Spectrometer
TKD	Toolkit for DAAC
TKS	Toolkit for Scientists
TOMS	Total Ozone Mapping Spectrometer
TSDIS	TRMM Science Data and Information System
TSM	Tertiary Storage Manager, component of StorNext
TTPro	TestTrack Pro
UDF	Universal Disk Format
UDP	User Datagram Protocol
UPS	Uninterruptible Power Supply
URL	Uniform Resource Locator
UR	Universal Reference, granule UR
UTC	Universal Time Coordinated/Universal Time Code
UTM	Universal Transverse Mercator
V0	Version 0, Refers to the Archive System and Protocols used in the predecessor to the ECS
VPN	Virtual Private Network
VS	versus (abbr)
W*S	refers to any member of the family of Open Geospatial Consortium (OGC) web services: WCS, WMS, WFS, WPS
WAN	Wide Area Network
WCS	Web Coverage Service
WGS84	World Geodetic System 1984
WKBCHCI	Workbench Configuration Item
WKSHW	Working Storage Hardware Configuration Item
WMS	Web Map Service
WRS	Worldwide Reference System, used by Landsat
WSDL	Web Service Definition Language
WU-FTP	Washington University File Transfer Protocol program
WWW	World Wide Web
XFR	Transfer (abbr)
XML	Extensible Markup Language
XSD	XML Schema Definition
XVU	XML Validation Utility