Task 42 – ECS Requirements Volume 10 Specification

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ECS Requirements Volume 10 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 SDPS Requirements for the Toolkit for DAACs (TKD) and Toolkit for Science Teams (TKS) subsystems.

***Keywords**: SDPS, TKD, TKS*

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 TKD

These are the completed ECS requirements for the TKD subsystem (Toolkit for DAACS Subsystem). The SDP Toolkit is used by EOS instrument data providers who will deliver code to the ECS DAACs. TKD provides these tools for installation at the DAACs.

ID	Title	Status
ECS-L4-18803	S-TKD-01500 The SDP toolkit shall support the bi-directional transformation between coordinates in the following projections: a. Cartesian ellipsoid reference frame and the Space Oblique Mercator b. Universal Transverse Mercator c. Polar Stereographic d. Goodes Interrupted Homolosine e. Integerized Sinusoidal Grid f. Lambert Confromal Conic g. Polyconic h. Transverse Mercator i. Hotin Oblique Mercator.	Completed
ECS-L4-18804	S-TKD-00010 The interfaces provided by the SCF Toolkit functions to the science software shall either be identical to the interfaces provided by the SDP Toolkit functions to the science software, or they will be transparent emulations.	Completed
ECS-L4-18805	S-TKD-00020 Calling sequences of SCF Toolkit functions and SDP Toolkit functions shall be identical.	Completed
ECS-L4-18806	S-TKD-00040 Logical file paths referenced by SCF Toolkit functions and SDP Toolkit functions shall be identical, i.e., all file references shall be by logical file names.	Completed
ECS-L4-18807	S-TKD-00090 The SCF Toolkit shall contain error/status handling and reporting capabilities identical to those available in the SDP Toolkit.	Completed
ECS-L4-18808	S-TKD-00100 The SCF Toolkit shall contain versions that have been certified for each of the ECS approved computing platforms.	Completed
ECS-L4-18809	S-TKD-00101 The SCF Toolkit shall exhibit its portability and adaptability by producing the same results (to an agreed upon tolerance) on each of the approved computing platforms.	Completed
ECS-L4-18810	S-TKD-00110 The SDP Toolkit shall provide bindings to source code written in the FORTRAN 77 Programming Language.	Completed
ECS-L4-18811	S-TKD-00112 The SDP Toolkit shall provide bindings to source code written in the FORTRAN 90 Programming Language.	Completed
ECS-L4-18812	S-TKD-00114 The SDP Toolkit shall provide bindings to source code written in the C Programming Language.	Completed

ID	Title	Status
ECS-L4-18813	S-TKD-00116 The SDP Toolkit shall provide bindings to source code written in the C++ Programming Language.	Completed
ECS-L4-18814	S-TKD-00121 The SDP Toolkit shall provide bindings to ECS approved languages.	Completed
ECS-L4-18815	S-TKD-00122 The SDP Toolkit shall be supported under the following UNIX shells: Bourne, csh and the Perl language.	Completed
ECS-L4-18816	S-TKD-00140 The SCF Toolkit shall provide access to Level 0 data provided by science software developers and/or ESDIS.	Completed
ECS-L4-18817	S-TKD-00141 The SCF Toolkit shall provide access to simulated orbit data for at least 1 day and 1 night (15 consecutive orbits).	Completed
ECS-L4-18818	S-TKD-00160 The ECS contractor shall provide an Algorithm Integration Team at each DAAC, whose function shall be to answer questions about the SCF and SDP Toolkits, PDPS design and operations concept, and the science software integration and test process.	Completed
ECS-L4-18819	S-TKD-00170 A detailed user's guide for the SCF Toolkit shall be delivered, in both hardcopy and electronic versions, and shall include at a minimum detailed descriptions of the SDP Toolkit; all differences between the SCF and PDPS versions, both visible and invisible to Toolkit users, a set of sample production shell scripts; and sample makefiles.	Completed
ECS-L4-18820	S-TKD-00180 All SDP Toolkit functions shall return error/status codes that can be detected and reported using error/status reporting tools.	Completed
ECS-L4-18821	S-TKD-00190 The SDP Toolkit shall contain tools to open and close Science Data Processing Facility (SDPF), EOS Data and Operations System (EDOS)-generated Level 0 data sets or data sets from other sources as determined by the ESDIS Project.	Completed
ECS-L4-18822	S-TKD-00200 The SDP Toolkit shall contain tools to read Consultative Committee on Space Data Systems (CCSDS)-format packetized data from Level 0 data files. Data is assumed to be made available to the Toolkit in the native format of the computing platform the Toolkit is instantiated on.	Completed
ECS-L4-18823	S-TKD-00201 The SDP Toolkit shall contain tools to read Consultative Committee on Space Data Systems (CCSDS)-format packetized data for EOS PM-1 GIRD format packets from Level 0 data files. Data is assumed to be made available to the Toolkit in the native format of the computing platform the Toolkit is instantiated on.	Completed
ECS-L4-18824	S-TKD-00220 The SDP Toolkit shall include the capability to provide the first CCSDS packet after a given time.	Completed
ECS-L4-18825	S-TKD-00221 The SDP Toolkit shall include the capability to provide the first CCSDS packet after a given time for EOS PM-1 GIRD format packets.	Completed
ECS-L4-18826	S-TKD-00225 The SDP Toolkit shall return the number of Level 0 packets read to reach the Level 0 packet with the correct start time.	Completed
ECS-L4-18827	S-TKD-00226 The SDP Toolkit shall return the number of Level 0 packets read to reach the Level 0 packet with the correct start time for EOS PM-1 GIRD format packets	Completed
ECS-L4-18828	S-TKD-00230 The SDP Toolkit shall contain tools to access the metadata located within Level 0 data files , (e.g., SDPF- and EDOS-generated header, accounting and quality information).	Completed
ECS-L4-18829	S-TKD-00235 The SDP Toolkit shall contain tools to access the ECS-internal metadata that is associated with the Level 0 data files provided to a PGE.	Completed
ECS-L4-18830	S-TKD-00240 The SDP Toolkit shall provide tools to access SDPF-, EDOS-provided telemetry data, or access to data sets from other sources as determined by the ESDIS Project.	Completed

ID	Title	Status
ECS-L4-18831	S-TKD-00252 The SDP Toolkit shall contain tools for the definition of and access to point structures. These structures will be based on standard HDF structures and will also be known as HDF-EOS point structures.	Completed
ECS-L4-18832	S-TKD-00253 The SDP Toolkit shall contain tools which access point structures. These tools will create, open, close, attach, or detach to existing point structures.	Completed
ECS-L4-18833	S-TKD-00254 The SDP Toolkit shall contain tools to define the level within a point structure and to define the link between two levels within a point structure.	Completed
ECS-L4-18834	S-TKD-00255 The SDP Toolkit shall contain tools which read/write records and read/write attributes of point structures.	Completed
ECS-L4-18835	S-TKD-00256 The SDP Toolkit shall contain tools which perform inquiries to point structures. These tools will return information about: number of levels, number of records in a level, number of fields in a level, information about the defined spatial and temporal extent of point structures, and information about defined attributes of point structures.	Completed
ECS-L4-18836	S-TKD-00257 The SDP Toolkit shall contain tools which subset point structures. These tools will define a region or time period of interest within a point structures, and read the region or time period of interest.	Completed
ECS-L4-18837	S-TKD-00260 The SDP Toolkit shall contain tools for the definition of and access to swath structures. These structures will be based on standard HDF structures and will also be known as HDF-EOS swath structures.	Completed
ECS-L4-18838	S-TKD-00261 The SDP Toolkit shall contain tools which open an HDF file and create, read or write, attach or detach a swath structure within that file; and close the file.	Completed
ECS-L4-18839	S-TKD-00262 The SDP Toolkit shall contain tools which define: swath data and geolocation dimensions, the mapping between geolocation and data dimensions, a new geolocation field, a new swath structure, a field compression method; and writes field metadata to geolocation or data fields.	Completed
ECS-L4-18840	S-TKD-00263 The SDP Toolkit shall contain tools which read/write data fields, read/write attributes within a swath, and sets or retrieves fill values for a field.	Completed
ECS-L4-18841	S-TKD-00264 The SDP Toolkit shall contain tools which perform inquiries to swath structures. These tools will return information about: dimensions, geolocation relations, geolocation and data mappings, geolocation and data fields, number and name of attributes, and defined region and time period.	Completed
ECS-L4-18842	S-TKD-00265 The SDP Toolkit shall contain tools which subset swath structures. These tools will define, read, and extract a region of interest by latitude and longitude; and define, read and extract a time period of interest.	Completed
ECS-L4-18843	S-TKD-00270 The SDP Toolkit shall contain tools that select data items within an HDF file, and read the selected data item, and optionally rewrite the HDF file with changes made to the data item.	Completed
ECS-L4-18844	S-TKD-00271 The SDP Toolkit shall contain tools that list the contents of HDF files, and verify that the files are legal HDF files.	Completed
ECS-L4-18845	S-TKD-00272 The SDP Toolkit shall support tiling of SDSs within HDF-EOS files by setting up a data structure with an arbitrary number of internal tiles, reading and writing data tiles to that structure.	Completed
ECS-L4-18846	S-TKD-00280 The SDP Toolkit shall contain tools for the definition of and access to grid structures. These structures will be based on standard HDF structures and will also be known as HDF-EOS grid structures.	Completed

ID	Title	Status
ECS-L4-18847	S-TKD-00281 The SDP Toolkit shall contain tools which open an HDF file and create, read or write, attach or detach a grid structure within that file; and close the file.	Completed
ECS-L4-18848	S-TKD-00282 The SDP Toolkit shall contain tools which define: origin of a grid, projection of a grid, pixel registration within a grid cell, data field within a grid, and a field compression method.	Completed
ECS-L4-18849	S-TKD-00283 The SDP Toolkit shall contain tools which read/write data, read/write attributes within a swath, and set and retrieve fill values for a field.	Completed
ECS-L4-18850	S-TKD-00284 The SDP Toolkit shall contain tools which perform inquiries to grid structures. These tools will return information about: data fields, dimensions, attributes, projection, geolocation, grid origin, and defined region.	Completed
ECS-L4-18851	S-TKD-00285 The SDP Toolkit shall contain tools which subset grid structures. These tools will define and read a region of interest of a field or a vertical field, extract row/column for specified latitude/longitude pairs, extract field values for specified pixels, and perform bilinear interpolation for a grid field.	Completed
ECS-L4-18852	S-TKD-00286 The SDP Toolkit shall allow a user to perform nested subsetting on non-geolocation dimensions of an HDF-EOS grid data structure.	Completed
ECS-L4-18853	S-TKD-00288 The SDP Toolkit HDF-EOS Library shall accept and process scanline delimited Swath subsetting requests from the SDSRV HDF-EOS Server.	Completed
ECS-L4-18854	S-TKD-00290 The SDP toolkit shall contain tools that read from and write to metadata information contained in HDF files.	Completed
ECS-L4-18855	S-TKD-00321 The SDP toolkit shall contain tools to read from and write to HDF files.	Completed
ECS-L4-18856	S-TKD-00324 The SDP toolkit shall contain tools to convert a single instance of selected HDF datatypes into files in formats identified by the ESDIS project.	Completed
ECS-L4-18857	S-TKD-00360 The SDP Toolkit shall contain tools to open and close generic files, including text and binary files. These generic files will be limited to those produced by an ECS approved language.	Completed
ECS-L4-18858	S-TKD-00370 The SDP Toolkit shall support opening a metadata file.	Completed
ECS-L4-18859	S-TKD-00371 The SDP Toolkit shall support the use of more than one Metadata Control File concurrently.	Completed
ECS-L4-18860	S-TKD-00380 The SDP Toolkit shall be able to read information from and write information to a metadata file containing standard product and science-software-specific information. This software specific information will include program version number; institutional source; and other identifying information approved by the ECS Project.	Completed
ECS-L4-18861	S-TKD-00400 The SDP Toolkit shall be able to write a record of metadata in the metadata file using ECS standard structuring, and contain ECS standard, instrument specific and product specific attributes. The record will contain program variables and constants as well as values generated automatically (e.g., configuration information).	Completed
ECS-L4-18862	S-TKD-00410 The SDP Toolkit shall be able to overwrite a record in the temporary metadata store during PGE execution with a new record.	Completed
ECS-L4-18863	S-TKD-00430 The SDP Toolkit shall support closing a metadata file.	Completed
ECS-L4-18864	S-TKD-00450 The SDP Toolkit shall support writing the ECS standard, instrument specific and product specific attributes into an ECS standard product file.	Completed

ID	Title	Status
ECS-L4-18865	S-TKD-00510 The SDP Toolkit shall contain tools that support three types of Q/A data: (1) flags; (2) graphics files, which are output directly from science processes; and (3) data that is written in the same format as a standard product file.	Completed
ECS-L4-18866	S-TKD-00520 The SDP Toolkit shall contain a tool for marking temporary files for deletion, enabling reuse of the logical file ID within the science software.	Completed
ECS-L4-18867	S-TKD-00521 The SDP Toolkit shall contain a command tool for marking temporary files for deletion, enabling reuse of the logical file ID within the science software, while preserving the record of the defunct temporary file.	Completed
ECS-L4-18868	S-TKD-00530 The SDP Toolkit shall create temporary file names such that each name is unique for a given DAAC.	Completed
ECS-L4-18869	S-TKD-00531 SDP Toolkit shall contain a tool for creating "intermediate" files, whose longevity is determined by the user up to ECS defined limits, e.g., a temporary calibration file may be retained as an intermediate file from the last orbit's processing or a file kept for averaging purposes for several months.	Completed
ECS-L4-18870	S-TKD-00535 The SDP Toolkit shall contain command tools for creating and retrieving intermediate and temporary file reference names at the level of the PGE's script.	Completed
ECS-L4-18871	S-TKD-00580 The SDP Toolkit shall contain tools that can test for multi-level error/status conditions.	Completed
ECS-L4-18872	S-TKD-00581 The SDP Toolkit shall provide an ordering for the multi-level error/status conditions thus enabling them to be used in conditional expressions.	Completed
ECS-L4-18873	S-TKD-00582 The SDP Toolkit shall contain tools that allow the user to assert an error/status condition with a discrete severity level.	Completed
ECS-L4-18874	S-TKD-00590 The SDP Toolkit shall support the following levels for error/status conditions: fatal error, general error, warning error, notice status, user-defined status, informational message status and success status.	Completed
ECS-L4-18875	S-TKD-00591 The SDP Toolkit shall provide the means of associating an action message with one or more status conditions.	Completed
ECS-L4-18876	S-TKD-00600 The SDP Toolkit shall contain tools for recording user and Toolkit-defined error and status reports to log files.	Completed
ECS-L4-18877	S-TKD-00610 The SDP Toolkit shall contain tools to uniquely identify the software unit, science software program, product and production run in error and status messages.	Completed
ECS-L4-18878	S-TKD-00620 The SDP Toolkit shall contain tools to identify the associated instrument within the error message codes.	Completed
ECS-L4-18879	S-TKD-00630 The SDP Toolkit shall provide a tool for marking all user requested files and status logs for subsequent retrieval by the SCF.	Completed
ECS-L4-18880	S-TKD-00631 The SDP Toolkit shall support a tool for transferring all report and status logs to an intermediate location.	Completed
ECS-L4-18881	S-TKD-00632 The SDP Toolkit shall contain tools for integrating Commercial-off-the-Shelf (COTS) status messages into the Toolkit wherever the Toolkit uses that COTS software.	Completed
ECS-L4-18882	S-TKD-00650 The SDP Toolkit shall contain tools to associate with error messages at least the following: what routine noted the error, error-type, pertinent variable data, and action taken.	Completed

ID	Title	Status
ECS-L4-18883	S-TKD-00660 The SDP Toolkit shall contain tools to allow science algorithms to enable error trapping mechanisms for non-processing relating signals, and to issue the appropriate signal handling routines to respond to these events.	Completed
ECS-L4-18884	S-TKD-00661 The SDP Toolkit shall be capable of performing context-sensitive buffering of status message information in order to provide an optimal level of efficiency.	Completed
ECS-L4-18885	S-TKD-00662 The SDP Toolkit shall prevent the proliferation of duplicate status messages from being recorded in the status log files.	Completed
ECS-L4-18886	S-TKD-00663 The SDP Toolkit shall provide the tools to enable and disable status messaging for user-specified calls.	Completed
ECS-L4-18887	S-TKD-00664 The SDP Toolkit shall provide the tools to ensure that user status codes are unique across the entire ECS system.	Completed
ECS-L4-18888	S-TKD-00680 Input to all relevant SDP Toolkit planetary body and spacecraft position access functions shall include spacecraft identification.	Completed
ECS-L4-18889	S-TKD-00710 The SDP Toolkit shall use a single standard internal time in all ephemeris calculations.	Completed
ECS-L4-18890	S-TKD-00720 The SDP Toolkit shall provide tools to return spacecraft position, velocity, attitude, and quaternion defining the rotation from spacecraft to Earth Centered Inertial reference frame for any given time or for a range of times, including provision for interpolation between state vectors.	Completed
ECS-L4-18891	S-TKD-00740 SDP Toolkit shall have the capability to provide to the user quality information about position and attitude.	Completed
ECS-L4-18892	S-TKD-00745 The SDP Toolkit shall return the orbit number of a spacecraft for a given time.	Completed
ECS-L4-18893	S-TKD-00760 The SDP Toolkit shall contain tools that return local solar time for a given UTC time and position on the Earth's surface, as well as solar right ascension and declination.	Completed
ECS-L4-18894	S-TKD-00770 The SDP Toolkit shall contain tools that return Greenwich Hour Angle for a given time.	Completed
ECS-L4-18895	S-TKD-00780 The SDP Toolkit shall contain tools that return a flag for the presence of a celestial body in the field of view.	Completed
ECS-L4-18896	S-TKD-00800 The SDP Toolkit shall contain a tool that returns the Earth-Centered Inertial (ECI) vector from the Earth to the sun, moon, and planets at a given time.	Completed
ECS-L4-18897	S-TKD-00810 The SDP Toolkit shall contain a tool that returns the Satellite-Centered Inertial (SCI) vector from the Satellite to the sun, moon, and planets at a given time.	Completed
ECS-L4-18898	S-TKD-00840 The SDP Toolkit shall provide a means to retrieve requested physical and geophysical parameters at specified locations from a selected data set. Data sets shall be those required by the ESDIS Project but will include as a minimum a Digital Elevation Model (DEM) and a land-sea mask.	Completed
ECS-L4-18899	S-TKD-00850 The SDP Toolkit shall provide a means to retrieve regular grids or volumes of the required parameter defined by the upper left and bottom right vertices (x,y,z at each vertex).	Completed
ECS-L4-18900	S-TKD-00860 The SDP Toolkit shall contain a tool to determine if a given point on the earth's surface is in day or in night.	Completed
ECS-L4-18901	S-TKD-00870 The SDP Toolkit shall contain tools to access a land/sea classification database including coastal outlines.	Completed
ECS-L4-18902	S-TKD-00900 The toolkit shall provide access to Greenwich Mean and Greenwich Apparent Sidereal Time.	Completed

ID	Title	Status
ECS-L4-18903	S-TKD-00910 The SDP Toolkit shall provide a tool to transform a position and velocity vector between J2000 and true of date coordinate systems.	Completed
ECS-L4-18904	S-TKD-00912 The SDP Toolkit shall provide a tool to transform a position and velocity vector between J2000 and mean of date coordinate systems.	Completed
ECS-L4-18905	S-TKD-00914 The SDP Toolkit shall provide a tool to transform a position and velocity vector between mean of date and true of date coordinate systems.	Completed
ECS-L4-18906	S-TKD-00916 The SDP Toolkit shall provide a tool to provide the angles of nutation in longitude and obliquity and their respective rates at a given time.	Completed
ECS-L4-18907	S-TKD-00930 Geographic information access tools in the SDP Toolkit shall be capable of handling the north and south pole singularities, e.g., such a way that no failures, such as division by zero or erratic results in terms of positions will occur on approaching or passing over the poles.	Completed
ECS-L4-18908	S-TKD-00931 The Toolkit shall provide access to physical and geophysical datasets to retrieve single or multiple parameters and values from requested points, areas or volumes.This will include National Meteorological Center (NMC) six hour global model temperature, moisture and ozone profiles; NMC six hour global model surface parameters; and weekly Special Sensor for Microwave Imaging (SSM/I) snow and ice data from NESDIS.	Completed
ECS-L4-18909	S-TKD-00940 The SDP Toolkit shall support opening of a DEM dataset.	Completed
ECS-L4-18910	S-TKD-00941 The SDP Toolkit shall be able to verify whether a given pixel in a DEM dataset is valid data or a fill value.	Completed
ECS-L4-18911	S-TKD-00942 The SDP Toolkit shall be able to find and return the highest resolution which has complete valid data (no fill values) in a latitude-longitude rectangular region.	Completed
ECS-L4-18912	S-TKD-00943 The SDP Toolkit shall return the data value of a latitude and longitude defined point. If no data exists at this point, the Toolkit will interpolate.	Completed
ECS-L4-18913	S-TKD-00944 The SDP Toolkit shall return the DEM data contained in a latitude-longitude rectangular region. If any of the data are fill values, the values will be replaced with actual data from a lower resolution data set.	Completed
ECS-L4-18914	S-TKD-00945 The SDP Toolkit shall provide access to the metadata pertaining to a DEM data set.	Completed
ECS-L4-18915	S-TKD-00946 The Toolkit shall provide access to the quality assurance layer of a DEM data set.	Completed
ECS-L4-18916	S-TKD-00947 The SDP Toolkit shall return the size of a rectangular region defined by latitude and longitude.	Completed
ECS-L4-18917	S-TKD-00948 The SDP Toolkit shall support closing of a DEM dataset.	Completed
ECS-L4-18918	S-TKD-00980 The SDP Toolkit shall provide a means to retrieve elevation and terrain information from various terrain models at a specified latitude and longitude coordinate.	Completed
ECS-L4-18919	S-TKD-01000 The SDP Toolkit shall provide a means to receive from various terrain models a regular grid of elevation from a rectangular area defined by the maximum extent of the rectangle.	Completed
ECS-L4-18920	S-TKD-01030 The SDP Toolkit shall provide the functionality to retrieve elevation and related information from DEMs (e.g. error terms, variability of elevation) as available.	Completed

ID	Title	Status
ECS-L4-18921	S-TKD-01050 The SDP Toolkit shall provide the following lower level coordinate system bi-directional transformations: a. spacecraft reference to orbital reference b. Earth-Centered Inertial (ECI) to Earth-Centered Rotating (ECR) c. ECR to geodeticd. ECI to spacecraft reference e. ECI to orbital reference	Completed
ECS-L4-18922	S-TKD-01060 The SDP Toolkit shall provide the sub-satellite point and ground track velocity vector at any arbitrary time.	Completed
ECS-L4-18923	S-TKD-01072 The SDP Toolkit shall provide tools to access images, where an API already exists.	Completed
ECS-L4-18924	S-TKD-01080 The SDP Toolkit shall provide the latitude and longitude of the intersection of the earth reference ellipsoid with the instrument look vector in the spacecraft reference frame at an arbitrary time.	Completed
ECS-L4-18925	S-TKD-01083 The SDP Toolkit shall provide a tool to geolocate every pixel (with its own look angle).	Completed
ECS-L4-18926	S-TKD-01090 The SDP Toolkit shall provide a tool to determine a given point on earth is in an instrument field of view at any designated time. Parameters that determine instrument field-of-view relative to a platform are assumed to be supplied by instrument teams.	Completed
ECS-L4-18927	S-TKD-01091 The SDP Toolkit shall provide the capability of determining the terrestrial zenith angle and azimuth of the look vector, as well as the vectors to any celestial body, at any specified latitude, longitude and altitude.	Completed
ECS-L4-18928	S-TKD-01092 The SDP Toolkit shall provide the capability of determining the angle of refraction of the look vector, other vectors at the look point and the displacement of the ray at the look point due to refraction, under mean atmospheric conditions.	Completed
ECS-L4-18929	S-TKD-01160 The SDP Toolkit shall contain time system transformation tools that return UTC and TAI (International Atomic Time) times and Julian Dates that are of the same precision as the spacecraft clock.	Completed
ECS-L4-18930	S-TKD-01170 The SDP Toolkit shall provide tools to transform time among the six following systems: a. Coordinated Universal Time (UTC) (Date and ASCII formats) b. UT1 (binary and Julian Date formats) c. International Atomic Time (TAI) (binary and Julian Date formats) d. Julian Date (floating point format, in units of days) e. spacecraft clock f. Global Positioning System (GPS)	Completed
ECS-L4-18931	S-TKD-01171 The SDP Toolkit shall provide tools to transform time among the six following systems: a. Coordinated Universal Time (UTC) (Date and ASCII formats) b. UT1 (binary and Julian Date formats) c. International Atomic Time (TAI) (binary and Julian Date formats) d. Julian Date (floating point format, in units of days) e. spacecraft clock represented in the GIRD format f. Global Positioning System (GPS)	Completed
ECS-L4-18932	S-TKD-01180 Where applicable, the SDP Toolkit time system transformation tools shall return ASCII times that are in Consultative Committee for Space Data Systems (CCSDS) standard time code formats.	Completed
ECS-L4-18933	S-TKD-01190 The SDP Toolkit time system transformation tools shall have the capability of returning TAI time in seconds from the start of a specified epoch.	Completed
ECS-L4-18934	S-TKD-01210 The SDP Toolkit shall assure that leap seconds are accounted for in all time and date conversion tools for binary formats, and leap days/years for ASCII formats.	Completed
ECS-L4-18935	S-TKD-01215 The SDP Toolkit shall contain tools to convert UTC to UT1 and ephemeris times.	Completed

ID	Title	Status
ECS-L4-18936	S-TKD-01220 The SDP Toolkit shall contain provision to transform UTC and TAI to and from Julian Day formats, and to provide UT1 as a Julian Date, as well as a difference from UTC.	Completed
ECS-L4-18937	S-TKD-01240 The SDP Toolkit shall provide tools which (1) dynamically allocate process-private memory (perhaps with limits) and (2) explicitly free dynamic memory within a program when it is no longer needed.	Completed
ECS-L4-18938	S-TKD-01241 The SDP Toolkit shall provide tools which (1) allow a PGE to create a shared memory segment and (2) provide the means for applications within the PGE to access that shared memory segment for the duration of the PGE's execution.	Completed
ECS-L4-18939	S-TKD-01245 The SDP Toolkit shall provide tools to accomplish various mathematical and statistical tasks including, but not limited to: a. solution of linear algebraic equations, matrix manipulation, matrix inversion and Eigenvalue decomposition b. interpolation and extrapolation c. integration and evaluation of functions d. root finding e. determination of min/max of functions f. statistical description of data g. discrete Fourier Transforms and polynomial fits	Completed
ECS-L4-18940	S-TKD-01280 The SDP Toolkit shall provide tools to generate product identifiers that can be used by the script/PGE to label metadata with environment and PGE information in order to facilitate production tracking.	Completed
ECS-L4-18941	S-TKD-01290 The SDP Toolkit shall provide tools to deliver runtime parameter data to the PGE.	Completed
ECS-L4-18942	S-TKD-01291 The SDP Toolkit shall provide command tools to deliver runtime parameter data to the PGE's shell.	Completed
ECS-L4-18943	S-TKD-01310 The SDP Toolkit shall provide tools for retrieving file metadata (also known as file attributes) that is associated with files staged by the Data Processing Subsystem.	Completed
ECS-L4-18944	S-TKD-01311 The SDP Toolkit shall provide tools for performing PGE initialization and termination procedures to support PGE usage of the Toolkit.	Completed
ECS-L4-18945	S-TKD-01312 The SDP Toolkit shall provide a command tool to facilitate the execution of a PGE and its' initialization and termination.	Completed
ECS-L4-18946	S-TKD-01313 The SDP Toolkit shall provide a command tool to perform format checking on files containing Process Control information.	Completed
ECS-L4-18947	S-TKD-01314 The SDP Toolkit shall provide a command tool for retrieving file metadata that is associated with files staged by the Data Processing Subsystem.	Completed
ECS-L4-18948	S-TKD-01315 The SDP Toolkit shall provide a command tool to retrieve the number of physical file instances that are associated with a single logical file instance.	Completed
ECS-L4-18949	S-TKD-01316 The SDP Toolkit shall provide a function which returns the size of a file entered in the Process Control File.	Completed
ECS-L4-18950	S-TKD-01360 The SDP Toolkit shall provide access to ancillary data sets used by several instrument processing systems.	Completed
ECS-L4-18951	S-TKD-01362 The SDP toolkit shall provide interfaces to access, retrieve and selectively manipulate ancillary data sets as required by the ESDIS Project.	Completed
ECS-L4-18952	S-TKD-01365 The SDP toolkit shall provide an interface that accepts simple searches for parameter values on a PARAMETER=VALUE basis and returns parameter values.	Completed

ID	Title	Status
ECS-L4-18953	S-TKD-01370 The SDP Toolkit shall provide an interface to perform simple linear interpolation in tspace between ancillary parameter points in geographically gridded data sets such as those in the NMC set.	Completed
ECS-L4-18954	S-TKD-01410 The SDP Toolkit shall provide tools for producing graphics output from production software.	Completed
ECS-L4-18955	S-TKD-01415 The SDP Toolkit shall provide tools for image processing; for map projections; correlations and registration; filters; contrast enhancement.	Completed
ECS-L4-18956	S-TKD-01502 The SDP Toolkit geo-coordinate transformation tools shall support the transformation of multiple coordinate vectors in a single call.	Completed
ECS-L4-18957	S-TKD-01520 The SDP Toolkit shall provide a means of accessing commonly used mathematical and physical constants.	Completed
ECS-L4-18958	S-TKD-01521 The SDP Toolkit shall provide a means of accessing constant values related to an instrument.	Completed
ECS-L4-18959	S-TKD-01522 The values of the parameters in S-TKD-01520 and S-TKD-01521 shall be capable of adjustment without recompilation of a PGE.	Completed
ECS-L4-18960	S-TKD-01530 The SDP Toolkit shall provide a means to perform unit conversions and parameter translations.	Completed
ECS-L4-18961	S-TKD-01600 The SDP Toolkit shall provide tools that perform bit and byte manipulation directly from applications developed in Fortran77.	Completed
ECS-L4-18962	S-TKD-01700 The SDP Toolkit shall provide a thread-safe version which has functions that are callable from any thread in a multi-threaded application.	Completed
ECS-L4-18963	S-TKD-01705 The SDP Toolkit shall provide a thread-safe version which operates as specified in the SDP Toolkit Users Guide.	Completed
ECS-L4-18964	S-TKD-01710 The SDP Toolkit shall provide a thread-safe version and a non-thread-safe version of the SDP Toolkit.	Completed
ECS-L4-18965	S-TKD-01715 The SDP Toolkit shall provide a thread-safe version which complies with the POSIX standard, i.e. POSIX.1c threads (pthreads) will be supported.	Completed
ECS-L4-18966	S-TKD-01720 The SDP Toolkit shall provide a thread-safe version which locks and unlocks calls to non-thread-safe COTS libraries included with the Toolkit software.	Completed
ECS-L4-18967	S-TKD-01730 The SDP Toolkit shall provide a thread-safe version which is supported on the SGI platform.	Completed

2.2 TKS

These are the completed ECS requirements for the TKS subsystem (Toolkit for Science Teams Subsystem). The SDP Toolkit is used by EOS instrument data providers who will deliver code to the ECS DAACs. TKS provides a version of the toolkit that will be used by developers at their Science Computing Facilities (SCFs) to develop EOS data production software and to prepare that software for integration into distributed active archive centers (DAACs). This SCF version of the Toolkit contains provisions for error/status message, process control and file name handling by science software in lieu of an operational scheduling system.

ID	Title	Status
ECS-L4-18968	S-TKS-00122 The SDP Toolkit shall be supported under the following UNIX shells: Bourne, csh and the Perl language.	Completed

ID	Title	Status
ECS-L4-18969	S-TKS-00010 The interfaces provided by the SCF Toolkit functions to the science software shall either be identical to the interfaces provided by the SDP Toolkit functions to the science software, or they will be transparent emulations.	Completed
ECS-L4-18970	S-TKS-00020 Calling sequences of SCF Toolkit functions and SDP Toolkit functions shall be identical.	Completed
ECS-L4-18971	S-TKS-00040 Logical file paths referenced by SCF Toolkit functions and SDP Toolkit functions shall be identical, i.e., all file references shall be by logical file names.	Completed
ECS-L4-18972	S-TKS-00050 The SCF Toolkit shall provide the capability to run a production process in the SCF test environment.	Completed
ECS-L4-18973	S-TKS-00060 The SCF Environment shall provide the capability for science software developers to generate a production script, capable of linking multiple Product Generation Executive (formerly Product Generation Executable) (PGEs) into a single SCF command.	Completed
ECS-L4-18974	S-TKS-00080 The SCF Toolkit shall provide the capability to test all I/O transactions among PGEs that originate in the science software, in the same manner as the production environment.	Completed
ECS-L4-18975	S-TKS-00090 The SCF Toolkit shall contain error/status handling and reporting capabilities identical to those available in the SDP Toolkit.	Completed
ECS-L4-18976	S-TKS-00100 The SCF Toolkit shall contain versions that have been certified for each of the ECS approved computing platforms.	Completed
ECS-L4-18977	S-TKS-00101 The SCF Toolkit shall exhibit its portability and adaptability by producing the same results (to an agreed upon tolerance) on each of the approved computing platforms.	Completed
ECS-L4-18978	S-TKS-00110 The SDP Toolkit shall provide bindings to source code written in the FORTRAN 77 Programming Language.	Completed
ECS-L4-18979	S-TKS-00112 The SDP Toolkit shall provide bindings to source code written in the FORTRAN 90 Programming Language.	Completed
ECS-L4-18980	S-TKS-00114 The SDP Toolkit shall provide bindings to source code written in the C Programming Language.	Completed
ECS-L4-18981	S-TKS-00116 The SDP Toolkit shall provide bindings to source code written in the C++ Programming Language.	Completed
ECS-L4-18982	S-TKS-00120 The SCF version of the SDP Toolkit shall be POSIX compliant.	Completed
ECS-L4-18983	S-TKS-00121 The SDP Toolkit shall provide bindings to ECS approved languages.	Completed
ECS-L4-18984	S-TKS-00123 SCF Toolkit source code shall be delivered to the SCFs.	Completed
ECS-L4-18985	S-TKS-00140 The SCF Toolkit shall provide access to Level 0 data provided by science software developers and/or ESDIS.	Completed
ECS-L4-18986	S-TKS-00141 The SCF Toolkit shall provide access to simulated orbit data for at least 1 day and 1 night (15 consecutive orbits).	Completed
ECS-L4-18987	S-TKS-00170 A detailed user's guide for the SCF Toolkit shall be delivered, in both hardcopy and electronic versions, and shall include at a minimum detailed descriptions of the SDP Toolkit; all differences between the SCF and PDPS versions, both visible and invisible to Toolkit users, a set of sample production shell scripts; and sample makefiles.	Completed
ECS-L4-18988	S-TKS-00180 All SDP Toolkit functions shall return error/status codes that can be detected and reported using error/status reporting tools.	Completed
ECS-L4-18989	S-TKS-00190 The SDP Toolkit shall contain tools to open and close Science Data Processing Facility (SDPF), EOS Data and Operations System (EDOS)-generated Level 0 data sets or data sets from other sources as determined by the ESDIS Project.	Completed

ID	Title	Status
ECS-L4-18990	S-TKS-00200 The SDP Toolkit shall contain tools to read Consultative Committee on Space Data Systems (CCSDS)-format packetized data from Level 0 data files. Data is assumed to be made available to the Toolkit in the native format of the computing platform the Toolkit is instantiated on.	Completed
ECS-L4-18991	S-TKS-00201 The SDP Toolkit shall contain tools to read Consultative Committee on Space Data Systems (CCSDS)-format packetized data for EOS PM-1 GIRD format packets from Level 0 data files. Data is assumed to be made available to the Toolkit in the native format of the computing platform the Toolkit is instantiated on.	Completed
ECS-L4-18992	S-TKS-00220 The SDP Toolkit shall include the capability to provide the first CCSDS packet after a given time.	Completed
ECS-L4-18993	S-TKS-00221 The SDP Toolkit shall include the capability to provide the first CCSDS packet after a given time for EOS PM-1 GIRD format packets.	Completed
ECS-L4-18994	S-TKS-00225 The SDP Toolkit shall return the number of Level 0 packets read to reach the Level 0 packet with the correct start time.	Completed
ECS-L4-18995	S-TKS-00226 The SDP Toolkit shall return the number of Level 0 packets read to reach the Level 0 packet with the correct start time for EOS PM-1 GIRD format packets.	Completed
ECS-L4-18996	S-TKS-00230 The SDP Toolkit shall contain tools to access the metadata located within Level 0 data files , (e.g., SDPF- and EDOS-generated header, accounting and quality information).	Completed
ECS-L4-18997	S-TKS-00235 The SDP Toolkit shall contain tools to access the ECS-internal metadata that is associated with the Level 0 data files provided to a PGE.	Completed
ECS-L4-18998	S-TKS-00240 The SDP Toolkit shall provide tools to access SDPF-, EDOS-provided telemetry data, or access to data sets from other sources as determined by the ESDIS Project.	Completed
ECS-L4-18999	S-TKS-00253 The SDP Toolkit shall contain tools which access point structures. These tools will create, open, close, attach, or detach to existing point structures.	Completed
ECS-L4-19000	S-TKS-00254 The SDP Toolkit shall contain tools to define the level within a point structure and to define the link between two levels within a point structure.	Completed
ECS-L4-19001	S-TKS-00255 The SDP Toolkit shall contain tools which read/write records and read/write attributes of point structures.	Completed
ECS-L4-19002	S-TKS-00256 The SDP Toolkit shall contain tools which perform inquiries to point structures. These tools will return information about: number of levels, number of records in a level, number of fields in a level, information about the defined spatial and temporal extent of point structures, and information about defined attributes of point structures.	Completed
ECS-L4-19003	S-TKS-00257 The SDP Toolkit shall contain tools which subset point structures. These tools will define a region or time period of interest within a point structure, and read the region or time period of interest.	Completed
ECS-L4-19004	S-TKS-00260 The SDP Toolkit shall contain tools for the definition of and access to swath structures. These structures will be based on standard HDF structures and will also be known as HDF-EOS swath structures.	Completed
ECS-L4-19005	S-TKS-00261 The SDP Toolkit shall contain tools which open an HDF file and create, read or write, attach or detach a swath structure within that file; and close the file.	Completed

ID	Title	Status
ECS-L4-19006	S-TKS-00262 The SDP Toolkit shall contain tools which define: swath data and geolocation dimensions, the mapping between geolocation and data dimensions, a new geolocation field, a new swath structure, a field compression method; and writes field metadata to geolocation or data fields.	Completed
ECS-L4-19007	S-TKS-00263 The SDP Toolkit shall contain tools which read/write data fields, read/write attributes within a swath, and set or retrieve fill values for a field.	Completed
ECS-L4-19008	S-TKS-00264 The SDP Toolkit shall contain tools which perform inquiries to swath structures. These tools will return information about: dimensions, geolocation relations, geolocation and data mappings, geolocation and data fields, number and name of attributes, and defined region and time period.	Completed
ECS-L4-19009	S-TKS-00265 The SDP Toolkit shall contain tools which subset swath structures. These tools will define, read, and extract a region of interest by latitude and longitude and define, read and extract a time period of interest.	Completed
ECS-L4-19010	S-TKS-00270 The SDP Toolkit shall contain tools that select data items within an HDF file, and read the selected data item, and optionally rewrite the HDF file with changes made to the data item.	Completed
ECS-L4-19011	S-TKS-00271 The SDP Toolkit shall contain tools that list the contents of HDF files, and verify that the files are legal HDF files.	Completed
ECS-L4-19012	S-TKS-00272 The SDP Toolkit shall support tiling of SDSs within HDF-EOS files by setting up a data structure with an arbitrary number of internal tiles and reading and writing data tiles to that structure.	Completed
ECS-L4-19013	S-TKS-00280 The SDP Toolkit shall contain tools for the definition of and access to grid structures. These structures will be based on standard HDF structures and will also be known as HDF-EOS grid structures.	Completed
ECS-L4-19014	S-TKS-00281 The SDP Toolkit shall contain tools which open an HDF file and create, read or write, attach or detach a grid structure within that file, and close the file.	Completed
ECS-L4-19015	S-TKS-00282 The SDP Toolkit shall contain tools which define: origin of a grid, projection of a grid, pixel registration within a grid cell, data field within a grid, and a field compression method.	Completed
ECS-L4-19016	S-TKS-00283 The SDP Toolkit shall contain tools which read/write data, read/write attributes within a swath, and set and retrieve fill values for a field.	Completed
ECS-L4-19017	S-TKS-00284 The SDP Toolkit shall contain tools which perform inquiries to grid structures. These tools will return information about: data fields, dimensions, attributes, projection, geolocation, grid origin, and defined region.	Completed
ECS-L4-19018	S-TKS-00285 The SDP Toolkit shall contain tools which subset grid structures. These tools will define and read a region of interest of a field or a vertical field, extract row/column for specified latitude/longitude pairs, extract field values for specified pixels, and perform bilinear interpolation for a grid field.	Completed
ECS-L4-19019	S-TKS-00286 The SDP Toolkit shall allow a user to perform nested subsetting on non-geolocation dimensions of an HDF-EOS grid data structure.	Completed
ECS-L4-19020	S-TKS-00288 The SDP Toolkit HDF-EOS Library shall accept and process scanline delimited Swath subsetting requests from the SDSRV HDF-EOS Server.	Completed
ECS-L4-19021	S-TKS-00290 The SDP toolkit shall contain tools that read from and write to metadata information contained in HDF files.	Completed

ID	Title	Status
ECS-L4-19022	S-TKS-00321 The SDP toolkit shall contain tools to read from and write to HDF files.	Completed
ECS-L4-19023	S-TKS-00324 The SDP toolkit shall contain tools to convert a single instance of selected HDF datatypes into files in formats identified by the ESDIS project.	Completed
ECS-L4-19024	S-TKS-00360 The SDP Toolkit shall contain tools to open and close generic files, including text and binary files. These generic files will be limited to those produced by an ECS approved language.	Completed
ECS-L4-19025	S-TKS-00370 The SDP Toolkit shall support opening a metadata file.	Completed
ECS-L4-19026	S-TKS-00371 The SDP Toolkit shall support the use of more than one Metadata Control File concurrently.	Completed
ECS-L4-19027	S-TKS-00380 The SDP Toolkit shall be able to read information from and write information to a metadata file containing standard product and science-software-specific information. This software specific information will include program version number; institutional source; and other identifying information approved by the ECS Project.	Completed
ECS-L4-19028	S-TKS-00400 The SDP Toolkit shall be able to write a record of metadata in the metadata file using ECS standard structuring, and contain ECS standard, instrument specific and product specific attributes. The record will contain program variables and constants as well as values generated automatically (e.g., configuration information).	Completed
ECS-L4-19029	S-TKS-00410 The SDP Toolkit shall be able to overwrite a record in the temporary metadata store during PGE execution with a new record.	Completed
ECS-L4-19030	S-TKS-00430 The SDP Toolkit shall support closing a metadata file.	Completed
ECS-L4-19031	S-TKS-00450 The SDP Toolkit shall support writing the ECS standard, instrument specific and product specific attributes into an ECS standard product file.	Completed
ECS-L4-19032	S-TKS-00510 The SDP Toolkit shall contain tools that support three types of Q/A data: (1) flags; (2) graphics files, which are output directly from science processes; and (3) data that is written in the same format as a standard product file.	Completed
ECS-L4-19033	S-TKS-00520 The SDP Toolkit shall contain a tool for marking temporary files for deletion, enabling reuse of the logical file ID within the science software.	Completed
ECS-L4-19034	S-TKS-00521 The SDP Toolkit shall contain a command tool for marking temporary files for deletion, enabling reuse of the logical file ID within the science software, while preserving the record of the defunct temporary file.	Completed
ECS-L4-19035	S-TKS-00530 The SDP Toolkit shall create temporary file names such that each name is unique for a given DAAC.	Completed
ECS-L4-19036	S-TKS-00531 SDP Toolkit shall contain a tool for creating "intermediate" files, whose longevity is determined by the user up to ECS defined limits, e.g., a temporary calibration file may be retained as an intermediate file from the last orbit's processing or a file kept for averaging purposes for several months.	Completed
ECS-L4-19037	S-TKS-00535 The SDP Toolkit shall contain command tools for creating and retrieving intermediate and temporary file reference names at the level of the PGE's script.	Completed
ECS-L4-19038	S-TKS-00580 The SDP Toolkit shall contain tools that can test for multi-level error/status conditions.	Completed
ECS-L4-19039	S-TKS-00581 The SDP Toolkit shall provide an ordering for the multi-level error/status conditions thus enabling them to be used in conditional expressions.	Completed

ID	Title	Status
ECS-L4-19040	S-TKS-00582 The SDP Toolkit shall contain tools that allow the user to assert an error/status condition with a discrete severity level.	Completed
ECS-L4-19041	S-TKS-00590 The SDP Toolkit shall support the following levels for error/status conditions: fatal error, general error, warning error, notice status, user-defined status, informational message status and success status.	Completed
ECS-L4-19042	S-TKS-00591 The SDP Toolkit shall provide the means of associating an action message with one or more status conditions.	Completed
ECS-L4-19043	S-TKS-00600 The SDP Toolkit shall contain tools for recording user and Toolkit-defined error and status reports to log files.	Completed
ECS-L4-19044	S-TKS-00610 The SDP Toolkit shall contain tools to uniquely identify the software unit, science software program, product and production run in error and status messages.	Completed
ECS-L4-19045	S-TKS-00620 The SDP Toolkit shall contain tools to identify the associated instrument within the error message codes.	Completed
ECS-L4-19046	S-TKS-00630 The SDP Toolkit shall provide a tool for marking all user requested files and status logs for subsequent retrieval by the SCF.	Completed
ECS-L4-19047	S-TKS-00631 The SDP Toolkit shall support a tool for transferring all report and status logs to an intermediate location.	Completed
ECS-L4-19048	S-TKS-00632 The SDP Toolkit shall contain tools for integrating Commercial-off-the-Shelf (COTS) status messages into the Toolkit wherever the Toolkit uses that COTS software.	Completed
ECS-L4-19049	S-TKS-00650 The SDP Toolkit shall contain tools to associate with error messages at least the following: what routine noted the error, error-type, pertinent variable data, and action taken.	Completed
ECS-L4-19050	S-TKS-00660 The SDP Toolkit shall contain tools to allow science algorithms to enable error trapping mechanisms for non-processing relating signals, and to issue the appropriate signal handling routines to respond to these events.	Completed
ECS-L4-19051	S-TKS-00661 The SDP Toolkit shall be capable of performing context-sensitive buffering of status message information in order to provide an optimal level of efficiency.	Completed
ECS-L4-19052	S-TKS-00662 The SDP Toolkit shall prevent the proliferation of duplicate status messages from being recorded in the status log files.	Completed
ECS-L4-19053	S-TKS-00663 The SDP Toolkit shall provide the tools to enable and disable status messaging for user-specified calls.	Completed
ECS-L4-19054	S-TKS-00664 The SDP Toolkit shall provide the tools to ensure that user status codes are unique across the entire ECS system.	Completed
ECS-L4-19055	S-TKS-00680 Input to all relevant SDP Toolkit planetary body and spacecraft position access functions shall include spacecraft identification.	Completed
ECS-L4-19056	S-TKS-00710 The SDP Toolkit shall use a single standard internal time in all ephemeris calculations.	Completed
ECS-L4-19057	S-TKS-00720 The SDP Toolkit shall provide tools to return spacecraft position, velocity, attitude, and quaternion defining the rotation from spacecraft to Earth Centered Inertial reference frame for any given time or for a range of times, including provision for interpolation between state vectors.	Completed
ECS-L4-19058	S-TKS-00740 SDP Toolkit shall have the capability to provide to the user quality information about position and attitude.	Completed
ECS-L4-19059	S-TKS-00745 The SDP Toolkit shall return the orbit number of a spacecraft for a given time.	Completed

ID	Title	Status
ECS-L4-19060	S-TKS-00760 The SDP Toolkit shall contain tools that return local solar time for a given UTC time and position on the Earth's surface, as well as solar right ascension and declination.	Completed
ECS-L4-19061	S-TKS-00770 The SDP Toolkit shall contain tools that return Greenwich Hour Angle for a given time.	Completed
ECS-L4-19062	S-TKS-00780 The SDP Toolkit shall contain tools that return a flag for the presence of a celestial body in the field of view.	Completed
ECS-L4-19063	S-TKS-00800 The SDP Toolkit shall contain a tool that returns the Earth-Centered Inertial (ECI) vector from the Earth to the sun, moon, and planets at a given time.	Completed
ECS-L4-19064	S-TKS-00810 The SDP Toolkit shall contain a tool that returns the Satellite-Centered Inertial (SCI) vector from the Satellite to the sun, moon, and planets at a given time.	Completed
ECS-L4-19065	S-TKS-00840 The SDP Toolkit shall provide a means to retrieve requested physical and geophysical parameters at specified locations from a selected data set. Data sets shall be those required by the ESDIS Project but will include as a minimum a Digital Elevation Model (DEM) and a land-sea mask.	Completed
ECS-L4-19066	S-TKS-00850 The SDP Toolkit shall provide a means to retrieve regular grids or volumes of the required parameter defined by the upper left and bottom right vertices (x,y,z at each vertex).	Completed
ECS-L4-19067	S-TKS-00860 The SDP Toolkit shall contain a tool to determine if a given point on the earth's surface is in day or in night.	Completed
ECS-L4-19068	S-TKS-00870 The SDP Toolkit shall contain tools to access a land/sea classification database including coastal outlines.	Completed
ECS-L4-19069	S-TKS-00900 The toolkit shall provide access to Greenwich Mean and Greenwich Apparent Sidereal Time.	Completed
ECS-L4-19070	S-TKS-00910 The SDP Toolkit shall provide a tool to transform a position and velocity vector between J2000 and true of date coordinate systems.	Completed
ECS-L4-19071	S-TKS-00912 The SDP Toolkit shall provide a tool to transform a position and velocity vector between J2000 and mean of date coordinate systems.	Completed
ECS-L4-19072	S-TKS-00914 The SDP Toolkit shall provide a tool to transform a position and velocity vector between mean of date and true of date coordinate systems.	Completed
ECS-L4-19073	S-TKS-00916 The SDP Toolkit shall provide a tool to provide the angles of nutation in longitude and obliquity and their respective rates at a given time.	Completed
ECS-L4-19074	S-TKS-00930 Geographic information access tools in the SDP Toolkit shall be capable of handling the north and south pole singularities, e.g., such a way that no failures, such as division by zero or erratic results in terms of positions will occur on approaching or passing over the poles.	Completed
ECS-L4-19075	S-TKS-00931 The Toolkit shall provide access to physical and geophysical datasets to retrieve single or multiple parameters and values from requested points, areas or volumes.This will include National Meteorological Center (NMC) six hour global model temperature, moisture and ozone profiles; NMC six hour global model surface parameters; and weekly Special Sensor for Microwave Imaging (SSM/I) snow and ice data from NESDIS.	Completed
ECS-L4-19076	S-TKS-00940 The SDP Toolkit shall support opening of a DEM dataset.	Completed
ECS-L4-19077	S-TKS-00941 The SDP Toolkit shall be able to verify whether a given pixel in a DEM dataset is valid data or a fill value.	Completed

ID	Title	Status
ECS-L4-19078	S-TKS-00942 The SDP Toolkit shall be able to find and return the highest resolution which has complete valid data (no fill values) in a latitude-longitude rectangular region.	Completed
ECS-L4-19079	S-TKS-00943 The SDP Toolkit shall return the data value of a latitude and longitude defined point. If no data exists at this point, the Toolkit will interpolate.	Completed
ECS-L4-19080	S-TKS-00944 The SDP Toolkit shall return the DEM data contained in a latitude-longitude rectangular region. If any of the data are fill values, the values will be replaced with actual data from a lower resolution data set.	Completed
ECS-L4-19081	S-TKS-00945 The SDP Toolkit shall provide access to the metadata pertaining to a DEM data set.	Completed
ECS-L4-19082	S-TKS-00946 The SDP Toolkit shall provide access to the quality assurance layer of a DEM data set.	Completed
ECS-L4-19083	S-TKS-00947 The SDP Toolkit shall return the size of a rectangular region defined by latitude and longitude.	Completed
ECS-L4-19084	S-TKS-00948 The SDP Toolkit shall support closing of a DEM dataset.	Completed
ECS-L4-19085	S-TKS-00980 The SDP Toolkit shall provide a means to retrieve elevation and terrain information from various terrain models at a specified latitude and longitude coordinate.	Completed
ECS-L4-19086	S-TKS-01000 The SDP Toolkit shall provide a means to receive from various terrain models a regular grid of elevation from a rectangular area defined by the maximum extent of the rectangle.	Completed
ECS-L4-19087	S-TKS-01030 The SDP Toolkit shall provide the functionality to retrieve elevation and related information from DEMs (e.g. error terms, variability of elevation) as available.	Completed
ECS-L4-19088	S-TKS-01050 The SDP Toolkit shall provide the following lower level coordinate system bi-directional transformations: a. spacecraft reference to orbital reference b. Earth-Centered Inertial (ECI) to Earth-Centered Rotating (ECR) c. ECR to geodeticd. ECI to spacecraft reference e. ECI to orbital reference	Completed
ECS-L4-19089	S-TKS-01060 The SDP Toolkit shall provide the sub-satellite point and ground track velocity vector at any arbitrary time.	Completed
ECS-L4-19090	S-TKS-01072 The SDP Toolkit shall provide tools to access images, where an API already exists.	Completed
ECS-L4-19091	S-TKS-01080 The SDP Toolkit shall provide the latitude and longitude of the intersection of the earth reference ellipsoid with the instrument look vector in the spacecraft reference frame at an arbitrary time.	Completed
ECS-L4-19092	S-TKS-01083 The SDP Toolkit shall provide a tool to geolocate every pixel (with its own look angle).	Completed
ECS-L4-19093	S-TKS-01090 The SDP Toolkit shall provide a tool to determine a given point on earth is in an instrument field of view at any designated time. Parameters that determine instrument field-of-view relative to a platform are assumed to be supplied by instrument teams.	Completed
ECS-L4-19094	S-TKS-01091 The SDP Toolkit shall provide the capability of determining the terrestrial zenith angle and azimuth of the look vector, as well as the vectors to any celestial body, at any specified latitude, longitude and altitude.	Completed
ECS-L4-19095	S-TKS-01092 The SDP Toolkit shall provide the capability of determining the angle of refraction of the look vector, other vectors at the look point and the displacement of the ray at the look point due to refraction, under mean atmospheric conditions.	Completed

ID	Title	Status
ECS-L4-19096	S-TKS-01160 The SDP Toolkit shall contain time system transformation tools that return UTC and TAI (International Atomic Time) times and Julian Dates that are of the same precision as the spacecraft clock.	Completed
ECS-L4-19097	S-TKS-01170 The SDP Toolkit shall provide tools to transform time among the six following systems: a. Coordinated Universal Time (UTC) (Date and ASCII formats) b. UT1 (binary and Julian Date formats) c. International Atomic Time (TAI) (binary and Julian Date formats) d. Julian Date (floating point format, in units of days) e. spacecraft clock f. Global Positioning System (GPS)	Completed
ECS-L4-19098	S-TKS-01171 The SDP Toolkit shall provide tools to transform time among the six following systems: a. Coordinated Universal Time (UTC) (Date and ASCII formats) b. UT1 (binary and Julian Date formats) c. International Atomic Time (TAI) (binary and Julian Date formats) d. Julian Date (floating point format, in units of days) e. spacecraft clock represented in the GIRD format f. Global Positioning System (GPS)	Completed
ECS-L4-19099	S-TKS-01180 Where applicable, the SDP Toolkit time system transformation tools shall return ASCII times that are in Consultative Committee for Space Data Systems (CCSDS) standard time code formats.	Completed
ECS-L4-19100	S-TKS-01190 The SDP Toolkit time system transformation tools shall have the capability of returning TAI time in seconds from the start of a specified epoch.	Completed
ECS-L4-19101	S-TKS-01210 The SDP Toolkit shall assure that leap seconds are accounted for in all time and date conversion tools for binary formats, and leap days/years for ASCII formats.	Completed
ECS-L4-19102	S-TKS-01215 The SDP Toolkit shall contain tools to convert UTC to UT1 and ephemeris times.	Completed
ECS-L4-19103	S-TKS-01220 The SDP Toolkit shall contain provision to transform UTC and TAI to and from Julian Day formats, and to provide UT1 as a Julian Date, as well as a difference from UTC.	Completed
ECS-L4-19104	S-TKS-01240 The SDP Toolkit shall provide tools which (1) dynamically allocate process-private memory (perhaps with limits) and (2) explicitly free dynamic memory within a program when it is no longer needed.	Completed
ECS-L4-19105	S-TKS-01241 The SDP Toolkit shall provide tools which (1) allow a PGE to create a shared memory segment and (2) provide the means for applications within the PGE to access that shared memory segment for the duration of the PGE's execution.	Completed
ECS-L4-19106	S-TKS-01245 The SDP Toolkit shall provide tools to accomplish various mathematical and statistical tasks including, but not limited to: a. solution of linear algebraic equations, matrix manipulation, matrix inversion and Eigenvalue decomposition b. interpolation and extrapolation c. integration and evaluation of functions d. root finding e. determination of min/max of functions f. statistical description of data g. discrete Fourier Transforms and polynomial fits	Completed
ECS-L4-19107	S-TKS-01280 The SDP Toolkit shall provide tools to generate product identifiers that can be used by the script/PGE to label metadata with environment and PGE information in order to facilitate production tracking.	Completed
ECS-L4-19108	S-TKS-01290 The SDP Toolkit shall provide tools to deliver runtime parameter data to the PGE.	Completed
ECS-L4-19109	S-TKS-01291 The SDP Toolkit shall provide command tools to deliver runtime parameter data to the PGE's shell.	Completed

ID	Title	Status
ECS-L4-19110	S-TKS-01310 The SDP Toolkit shall provide tools for retrieving file metadata (also known as file attributes) that is associated with files staged by the Data Processing Subsystem.	Completed
ECS-L4-19111	S-TKS-01311 The SDP Toolkit shall provide tools for performing PGE initialization and termination procedures to support PGE usage of the Toolkit.	Completed
ECS-L4-19112	S-TKS-01312 The SDP Toolkit shall provide a command tool to facilitate the execution of a PGE and its' initialization and termination.	Completed
ECS-L4-19113	S-TKS-01313 The SDP Toolkit shall provide a command tool to perform format checking on files containing Process Control information.	Completed
ECS-L4-19114	S-TKS-01314 The SDP Toolkit shall provide a command tool for retrieving file metadata that is associated with files staged by the Data Processing Subsystem.	Completed
ECS-L4-19115	S-TKS-01315 The SDP Toolkit shall provide a command tool to retrieve the number of physical file instances that are associated with a single logical file instance.	Completed
ECS-L4-19116	S-TKS-01316 The SDP Toolkit shall provide a function which returns the size of a file entered in the Process Control File.	Completed
ECS-L4-19117	S-TKS-01360 The SDP Toolkit shall provide access to ancillary data sets used by several instrument processing systems.	Completed
ECS-L4-19118	S-TKS-01362 The SDP toolkit shall provide interfaces to access, retrieve and selectively manipulate ancillary data sets as required by the ESDIS Project.	Completed
ECS-L4-19119	S-TKS-01365 The SDP toolkit shall provide an interface that accepts simple searches for parameter values on a PARAMETER=VALUE basis and returns parameter values.	Completed
ECS-L4-19120	S-TKS-01370 The SDP Toolkit shall provide an interface to perform simple linear interpolation in tspace between ancillary parameter points in geographically gridded data sets such as those in the NMC set.	Completed
ECS-L4-19121	S-TKS-01410 The SDP Toolkit shall provide tools for producing graphics output from production software.	Completed
ECS-L4-19122	S-TKS-01415 The SDP Toolkit shall provide tools for image processing; for map projections; correlations and registration; filters; contrast enhancement.	Completed
ECS-L4-19123	S-TKS-01500 The SDP toolkit shall support the bi-directional transformation between coordinates in the following projections: a. Cartesian ellipsoid reference frame and the Space Oblique Mercator b. Universal Transverse Mercator c. Polar Stereographic d. Goodes Interrupted Homolosine e. Integerized Sinusoidal Grid f. Lambert Confromal Conic g. Polyconic h. Transverse Mercator i. Hotin Oblique Mercator.	Completed
ECS-L4-19124	S-TKS-01502 The SDP Toolkit geo-coordinate transformation tools shall support the transformation of multiple coordinate vectors in a single call.	Completed
ECS-L4-19125	S-TKS-01520 The SDP Toolkit shall provide a means of accessing commonly used mathematical and physical constants.	Completed
ECS-L4-19126	S-TKS-01521 The SDP Toolkit shall provide a means of accessing constant values related to an instrument.	Completed
ECS-L4-19127	S-TKS-01522 The values of the parameters in S-TKS-01520 and S-TKS-01521 shall be capable of adjustment without recompilation of a PGE.	Completed
ECS-L4-19128	S-TKS-01530 The SDP Toolkit shall provide a means to perform unit conversions and parameter translations.	Completed
ECS-L4-19129	S-TKS-01600 The SDP Toolkit shall provide tools that perform bit and byte manipulation directly from applications developed in Fortran77.	Completed

ID	Title	Status
ECS-L4-19130	S-TKS-01700 The SDP Toolkit shall provide a thread-safe version which has functions that are callable from any thread in a multi-threaded application.	Completed
ECS-L4-19131	S-TKS-01705 The SDP Toolkit shall provide a thread-safe version which operates as specified in the SDP Toolkit Users Guide.	Completed
ECS-L4-19132	S-TKS-01710 The SDP Toolkit shall provide the capability for a user to install a thread-safe version or the non-thread-safe version.	Completed
ECS-L4-19133	S-TKS-01715 The SDP Toolkit shall provide a thread-safe version which complies with the POSIX standard, i.e. POSIX.1c threads (pthreads) will be supported.	Completed
ECS-L4-19134	S-TKS-01720 The SDP Toolkit shall provide a thread-safe version which locks and unlocks calls to non-thread-safe COTS libraries included with the Toolkit software.	Completed
ECS-L4-19135	S-TKS-01725 The SDP Toolkit shall provide a thread-safe version which is supported on the SUN platform.	Completed
ECS-L4-19136	S-TKS-01730 The SDP Toolkit shall provide a thread-safe version which is supported on the SGI platform.	Completed
ECS-L4-19137	S-TKS-02000 The SDP toolkit shall provide the HDF Group hdiff tool for use in HDF file comparison.	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