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ERRATA NOTICE

EOS Core System (ECS) Project Contract No. NAS5-60000

January 22, 1998

Document No.: 814-RD-009-002

Title: HDF-EOS 2.00 VDD for the ECS Project - Version 1.00

Certain pages in the subject document have been revised. They have been replaced in this file as follows:

Removed

vii through x

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vii through x

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ADDENDUM NOTICE

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Inserted

6-1 and 6-2

If you have any questions, please contact our Data Management Office at (301) 925-0510.

814-RD-009-002

EOSDIS Core System Project

HDF-EOS 2.1 Version Description Document (VDD) for the ECS Project

Version 1.00

October 1997

Hughes Information Technology Systems
Upper Marlboro, Maryland

HDF-EOS 2.1 Version Description Document (VDD) for the ECS Project

Version 1.00

October 1997

Prepared Under Contract NAS5-60000

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Hughes Information Technology Systems
Upper Marlboro, Maryland

814-RD-009-002

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Preface

This document accompanies the delivery of HDF-EOS 2.1 (Hierarchical Data Format - Earth Observing System) software for the ECS project. It is not a formal deliverable and does not require Government approval; however, it has been placed under configuration control by the EOSDIS Core System (ECS) Science Data Processing Segment. Changes to this document shall be made by document change notice (DCN) or by complete revision.

This HDF-EOS version is directed at Earth Observing System (EOS) instrument data providers who will deliver code to the ECS Release A Distributed Active Archive Centers (DAACs). It describes the HDF-EOS library tools. It will also be used by EOS data consumers. HDF files consist of a directory and a collection of data objects. Every data object has a directory entry, containing a pointer to the data object location, and information defining the datatype. Additions to traditional HDF are required to fully support these datatypes.

This document describes three new EOS specific datatypes – *point*, *swath*, and *grid*. Each of these new datatypes is constructed using conventions for combining standard HDF datatypes and is supported by a special application programming interface (API) which aids the data product user or producer in the application of the conventions. The APIs allow data products to be created and manipulated in ways appropriate to each datatype, without regard to the actual HDF objects and conventions underlying them. The sum of these new APIs comprise the HDF-EOS library.

Any questions regarding distribution should be addressed to:

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Abstract

This document describes the delivery contents of HDF-EOS 2.1 software. HDF refers to the scientific data format standard selected by NASA as the baseline standard for EOS and HDF-EOS refers to EOS conventions for using HDF. The three interfaces described include – Point, Swath, and Grid.

It briefly describes the capabilities of the product, provides an inventory of the delivery, lists unresolved problems, and addresses issues such as special operating instructions, system limitations, and disclaimer notices for public domain software used in the product.

Keywords: API, HDF-EOS, standard, data, product, disk, format, point, grid, swath

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1. Introduction

1.1 Identification of Document

This document is a Version Description Document (VDD) prepared using NASA-STD-2100-91 as a guide. It is submitted as required for the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), contract number NAS5-60000.

1.2 Scope of Document

This VDD specifies the delivery contents of the HDF-EOS 2.1 software and accompanying documentation.

1.3 Purpose and Objectives of Document

The purpose of this VDD is to describe the contents of the delivery of HDF-EOS 2.1 software. The document briefly describes all tools that incorporate the delivery, provides an inventory of the delivery, lists unresolved problems, and addresses special issues such as special operating instructions, system limitations, and disclaimer notices for public domain software used in the library.

1.4 Document Status and Schedule

This Version Description Document for HDF-EOS 2.1 is submitted as a final document. Any changes to HDF-EOS 2.1 that require a subsequent version to be released will be described in a new Version Description Document.

1.5 Document Organization

The format and contents of this document comply with NASA-DID-P500 and NASA-DID-999 as defined in NASA-STD-2100-91.

- Introduction — Introduces the VDD scope, purpose, objectives, status, schedule and document organization.
- Related Documentation — Provides a bibliography of reference documents for the VDD organized by parent and binding subsections.
- Product Description — Describes the general capabilities and product contents.
- Inventory — Lists tar file listings for HDF-EOS and test drivers, documentation, and archive tape.
- Non-conformance Status — Discusses known problems with HDF-EOS Version 2.00 and lists Non-conformance Reports with open status.
- Appendices — Contain supplemental information such as: Build/installation instructions, user feedback procedures, and the test baseline configuration.

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2. Related Documentation

2.1 Parent Documents

The following document is the parent from which this document's scope and content derive:

423-42-01 EOSDIS Core System Statement of Work-CN10

2.2 Applicable Documents

The following documents are directly applicable to this plan to the extent referenced herein. In the event of conflict between any of these documents and this plan, the plan shall take precedence.

170-TP-005-004 HDF-EOS Library Users Guide for the ECS Project, Volume 1:
Overview and Examples

170-TP-006-003 HDF-EOS Library Users Guide for the ECS Project Volume 2:
Function Reference Guide

175-WP-001-001 HDF-EOS Primer for Version 1 EOSDIS

333-CD-004-002 Release B.0 SCF Toolkit Users Guide for the ECS Project

814-RD-08-002 Release B.0 Toolkit 5.2 Version Description Document (VDD) for the
ECS Project

NASA-STD-2100-91 NASA Software Documentation Standard, Software Engineering
Program

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3. Product Description

This section describes the general capabilities of HDF-EOS 2.1 and the tools and test drivers provided.

3.1 Product Description and General Capabilities

HDF-EOS is an extension of NCSA (National Center for Supercomputing Applications) HDF and uses HDF library calls as an underlying basis. Version 4.1r1 of HDF is used. The library tools are written in the C language and a FORTRAN interface is provided. The current version contains software for creating, accessing and manipulating grid, point and swath structures. Also included are overviews of the interfaces, function-by-function calling sequences, explanations, and code examples. Included also are tools for subsetting and data projection. EOSView, our viewing tool has been revised to accommodate the current version of the libraries.

HDF is the scientific data format standard selected by NASA as the baseline standard for EOS. These libraries are aimed at EOS data producers and consumers, who will develop their data into increasingly higher order products. These products range from calibrated Level 1 to Level 4 model data. The primary use of HDF-EOS libraries will be to create structures for associating geolocation data with their associated science data. This association is specified by producers through use of the supplied libraries. Most EOS data products identified, fall into categories of grid, point, or swath structures. These structures are implemented in the current version of the libraries. Services based on geolocation information will be built on HDF-EOS structures. Producers of products not covered by these structures (for example, non-geolocated data) can use standard HDF libraries.

In the ECS (EOS Core System) production system, the HDF-EOS libraries will be used in conjunction with SDP (Science Data Processing) Toolkit software. The primary tools used in conjunction to HDF-EOS libraries will be those for metadata handling, process control, and status message handling. Metadata tools will be used to write ECS inventory and granule specific metadata into HDF-EOS files, while the process control tools will be used to access physical file handles used by the HDF tools.

3.2 HDF-EOS Version 2.1 Routine Listing

The HDF-EOS library is comprised of three new APIs:

- Point (PT) interface – designed to support data that has associated geolocation information, but is not organized in any well defined spatial or temporal way
- Swath (SW) interface – tailored to support time-ordered data such as satellite swaths (which consist of a time-ordered series of scanlines), or profilers (which consist of a time-ordered series of profiles)
- Grid (GD) interface – designed to support data that has been stored in a rectilinear array based on a well defined and explicitly supported projection

The HDF library is accessible from both C and FORTRAN programs because it contains a set of “wrapper” functions that make the underlying C code callable from FORTRAN. HDF provides two names for each function; one for use in C programming and a shorter version for use in FORTRAN programming. The following HDF-EOS Routine listings provide a description of the tools.

3.2.1 PT API Routines

All C routine names in the point data interface have the prefix “PT” and the equivalent FORTRAN routine names are prefixed by “pt.” The PT routines are grouped into categories which are described in the HDF-EOS User’s Guide. The PT function calls are listed in the following table.

| Routine Name | | Description |
|-----------------|---------------|--|
| C | FORTRAN | |
| PTopen | ptopen | creates a new file or opens an existing one |
| PTcreate | ptcreate | creates a new point data set and returns a handle |
| PTattach | ptattach | attaches to an existing point data set |
| PTdetach | ptdetach | releases a point data set and frees memory |
| PTclose | ptclose | closes the HDF-EOS file and deactivates the point interface |
| PTdeflevel | ptdeflev | defines a level within the point data set |
| PTdeflinkage | ptdeflink | defines link field to use between two levels |
| PTwritelevel | ptwrlev | writes (appends) full records to a level |
| PTreadlevel | ptrdlev | reads data from the specified fields and records of a level |
| PTupdatelevel | ptuplev | updates the specified fields and records of a level |
| PTwriteattr | ptwrattr | creates or updates an attribute of the point data set |
| PTreadattr | ptrdatr | reads existing attribute of point data set |
| PTnlevels | ptnlevs | returns the number of levels in a point data set |
| PTnrecs | ptnrecs | returns the number of records in a level |
| PTnfields | ptnfls | returns number of fields defined in a level |
| PTlevelinfo | ptnlevinfo | returns information about a given level |
| PTlevelindx | ptlevidx | returns index number for a named level |
| PTbcklinkinfo | ptbcklinkinfo | returns link field to previous level |
| PTfwdlinkinfo | ptflinkinfo | returns link field to following level |
| PTgetlevelname | ptgetlevname | returns level name given level number |
| PTsizeof | ptsizeof | returns size in bytes for specified fields in a point |
| PTattrinfo | ptattrinfo | returns information about point attributes |
| PTinqattrs | ptinqattrs | retrieves number and names of attributes defined |
| PTinqpoint | ptinqpoint | retrieves number and names of points in file |
| PTgetrecnums | ptgetrecnums | returns corresponding record numbers in a related level |
| PTdefboxregion | ptdefboxreg | define region of interest by latitude/longitude |
| PTregioninfo | ptreginfo | returns information about defined region |
| PTregionrecs | ptregrecs | returns # of records and record #s within region |
| PTextractregion | ptextreg | read a region of interest from a set of fields in a single level |
| PTdeftimeperiod | ptdeftmper | define time period of interest |
| PTperiodinfo | ptperinfo | returns information about defined time period |

| Routine Name | | Description (cont.) |
|------------------|-----------|---|
| C | FORTRAN | |
| PTperiodrecs | ptperrecs | returns # of records and record #s within time period |
| PTexttractperiod | ptextper | read a time period from a set of fields in a single level |

3.2.2 SW API Routines

The SW interface consists of routines for storing, retrieving, and manipulating data in swath data sets. All C routine names in the swath data interface have the prefix “SW” and the equivalent FORTRAN routine names are prefixed by “sw.” The SW routines are grouped into categories which are described in the HDF-EOS User’s Guide. The SW function calls are listed in the following table.

| Routine Name | | Description |
|-----------------|------------|---|
| C | FORTRAN | |
| SWopen | swopen | opens or creates HDF file in order to create, read, or write a swath |
| SWcreate | swcreate | creates a swath within the file |
| SWattach | swattach | attaches to an existing swath within the file |
| SWdetach | swdetach | detaches from swath interface |
| SWclose | swclose | closes file |
| SWdefdim | swdefdim | defines a new dimension within the swath |
| SWdefdimmap | swdefmap | defines the mapping between the geolocation and data dimensions |
| SWdefidxmap | swdefimap | defines a non-regular mapping between the geolocation and data dimension |
| SWdefgeofield | swdefgfld | defines a new geolocation field within the swath |
| SWdefdatafield | swdefdfld | defines a new data field within the swath |
| SWdefcomp | swdefcomp | defines a field compression scheme |
| SWwritegeometa | swwrgmeta | writes field metadata for an existing swath geolocation field |
| SWwritedatameta | swwrmeta | writes field metadata for an existing swath data field |
| SWwritefield | swwrfld | writes data to a swath field |
| SWreadfield | swrdfld | reads data from a swath field. |
| SWwriteattr | swwrattr | writes/updates attribute in a swath |
| SWreadattr | swrdattr | reads attribute from a swath |
| SWsetfillvalue | swsetfill | sets fill value for the specified field |
| SWgetfillvalue | swgetfill | retrieves fill value for the specified field |
| SWinqdims | swinqdims | retrieves information about dimensions defined in swath |
| SWinqmaps | swinqmaps | retrieves information about the geolocation relations defined |
| SWinqidxmaps | swinqimaps | retrieves information about the indexed geolocation/data mappings defined |

| Routine Name | | Description (cont.) |
|-----------------|--------------|---|
| C | FORTRAN | |
| SWinqgeofields | swinqgflds | retrieves information about the geolocation fields defined |
| SWinqdatafields | swinqdflds | retrieves information about the data fields defined |
| SWinqattrs | swinqattrs | retrieves number and names of attributes defined |
| SWnentries | swnentries | returns number of entries and descriptive string buffer size for a specified entity |
| SWdiminfo | swdiminfo | retrieve size of specified dimension |
| SWmapinfo | swmapinfo | retrieve offset and increment of specified geolocation mapping |
| SWidxmapinfo | swidxmapinfo | retrieve offset and increment of specified geolocation mapping |
| SWattrinfo | swattrinfo | returns information about swath attributes |
| SWfieldinfo | swfldinfo | retrieve information about a specific geolocation or data field |
| SWcompinfo | swcompinfo | retrieve compression information about a field |
| SWingswath | swingswath | retrieves number and names of swaths in file |

3.2.3 GD API Routines

The table below provides the routines available for storing and retrieving HDF-EOS *Grid Data*. All C routine names in the grid data interface have the prefix “GD” and the equivalent FORTRAN routine names are prefixed by “gd.” The GD routines are grouped into categories which are described in the HDF-EOS User’s Guide.

| Routine Name | | Description |
|------------------|-------------|---|
| C | FORTRAN | |
| GDopen | gdopen | creates a new file or opens an existing one |
| GDcreate | gdcreate | creates a new grid in the file |
| GDattach | gdattach | attaches to a grid |
| GDdetach | gddetach | detaches from grid interface |
| GDclose | gdclose | closes file |
| GDdeforigin | gddeforigin | defines origin of grid |
| GDdefdim | gddefdim | defines dimensions for a grid |
| GDdefproj | gddefproj | defines projection of grid |
| GDdefpixreg | gddefpixreg | defines pixel registration within grid cell |
| GDdeffield | gddeffld | defines data fields to be stored in a grid |
| GDdefcomp | gddefcomp | defines a field compression scheme |
| GDwritefieldmeta | gdwrmeta | writes metadata for field already existing in file |
| GDwritefield | gdwrfld | writes data to a grid field. |
| GDreadfield | gdrfld | reads data from a grid field |
| GDwriteattr | gdwrattr | writes/updates attribute in a grid. |
| GDreadattr | gdrdattr | reads attribute from a grid |
| GDsetfillvalue | gdsetfill | sets fill value for the specified field |
| GDgetfillvalue | gdgetfill | retrieves fill value for the specified field |
| GDinqdims | gdinqdims | retrieves information about dimensions defined in grid |
| GDinqfields | gdinqflds | retrieves information about the data fields defined in grid |

| Routine Name | | Description (cont.) |
|-----------------|---------------|---|
| C | FORTRAN | |
| GDinqattrs | gdinqattrs | retrieves number and names of attributes defined |
| GDnentries | gdnentries | returns number of entries and descriptive string buffer size for a specified entity |
| GDgridinfo | gdgridinfo | returns dimensions of grid and X-Y coordinates of corners |
| GDprojinfo | gdprojinfo | returns all GCTP projection information |
| GDdiminfo | gddiminfo | retrieves size of specified dimension. |
| GDcompinfo | gdcompinfo | retrieve compression information about a field |
| GDfieldinfo | gdfieldinfo | retrieves information about a specific geolocation or data field in the grid |
| GDinqgrid | gdinqgrid | retrieves number and names of grids in file |
| GDattrinfo | gdattrinfo | returns information about grid attributes |
| GDorigininfo | gdorginfo | return information about grid origin |
| GDpixreginfo | gdpreinfo | return pixel registration information for given grid |
| GDdefboxregion | gddefboxreg | define region of interest by latitude/longitude |
| GDregioninfo | gdreginfo | returns information about a defined region |
| GDextractregion | gdextrreg | read a region of interest from a field |
| GDdeftimeperiod | gddeftmeper | define a time period of interest |
| GDdefvrtregion | gddefvrtreg | define a region of interest by vertical field |
| GDgetpixels | gdgetpix | get row/columns for lon/lat pairs |
| GDgetpixvalues | gdgetpixval | get field values for specified pixels |
| GDinterpolate | gdinterpolate | perform bilinear interpolation on a grid field |
| GDdupregion | gdDupreg | duplicate a region or time period |
| GDdeftile | gddeftle | define a tiling scheme |
| GDtileinfo | gdtleinfo | returns information about tiling for a field |
| GDsettilecache | gdsettleche | set tiling cache parameters |
| GDreadtile | gdrdtle | read data from a single tile |
| GDwritetile | gdwrtile | write data to a single tile |

3.3 HDF-EOS 2.1 Test Tools and Drivers

Included in the software delivery of HDF-EOS 2.1 is a tar file containing test driver programs. These test programs are provided to aid the user in the development of software using the HDF-EOS libraries. The user may run the same test cases as included in this file to verify that the software is functioning correctly. These programs were written to support the internal testing and are not an official part of the delivery. Users make use of them at their own risk. No support will be provided to the user of these programs. The tar file contains source code for a driver in C and FORTRAN for each tool, sample output files, and input files and/or shell scripts, where applicable.

The following UNIX command will create a directory called testdrivers beneath the current directory containing all these test files.

```
zcat HDF-EOS2.1v1.00_TestDrivers.tar.Z | tar xvf -
```

3.4 HDF-EOS 2.1 Hierarchical Data Format

HDF refers to the scientific data format standard selected by NASA as the baseline standard for EOS and HDF-EOS refers to EOS conventions for using HDF. This document provides information on the use of the three interfaces included in HDF-EOS – Point, Swath, and Grid.

The Hierarchical Data Format (HDF) has been selected by the EOSDIS Project as the format of choice for standard product distribution. HDF is a *disk format* and *subroutine library* for storage of most kinds of scientific data. As a *disk format*, HDF files consist of a directory and an unordered set of binary data objects. Each directory entry describes the location, the type, and the size of these binary objects.

The *HDF subroutine library* is designed to be easy for C and FORTRAN programmers to use. The HDF library consists of callable routines, each of which belongs to a particular *interface*. Each interface within these layers address a particular HDF function or a particular HDF data structure, such as arrays, tables, and annotations.

3.5 HDF-EOS Users Guide

The purpose of the *HDF-EOS Library Users Guide for the ECS Project, Volume 1: Overview and Examples* (170-TP-005-004) is to provide EOS instrument data processing software developers and scientists with knowledge of HDF-EOS 2.1 functionality and to provide a listing of routine calling sequences, detailed descriptions, and examples of usage.

The *HDF-EOS Library Users Guide for the ECS Project Volume 2: Function Reference Guide* (170-TP-006-003) is intended for use by anyone who wishes to use the HDF-EOS library to create or read EOS data products. Users of this document will include EOS instrument team science software developers and data product designers, DAAC personnel, and end users of EOS data products such as scientists and researchers.

4. Product Inventory

4.1 HDF-EOS 2.1 Tar File Listing

A listing of the tar file “HDF-EOS2.1v1.00.tar.Z” follows:

```
./hdfEOS/  
./hdfEOS/lost+found/  
./hdfEOS/lib/  
./hdfEOS/lib/dec/  
./hdfEOS/lib/hp/  
./hdfEOS/lib/ibm/  
./hdfEOS/lib/sgi/  
./hdfEOS/lib/sgi32/  
./hdfEOS/lib/sgi64/  
./hdfEOS/lib/sun4/  
./hdfEOS/lib/sun5/  
./hdfEOS/lib/tmp/  
./hdfEOS/lib/tmp/geolibDEC.a  
./hdfEOS/lib/tmp/geolibHP.a  
./hdfEOS/lib/tmp/geolibIBM.a  
./hdfEOS/lib/tmp/geolibIRIX53.a  
./hdfEOS/lib/tmp/geolibIRIX62-32.a  
./hdfEOS/lib/tmp/geolibIRIX62-64.a  
./hdfEOS/lib/tmp/geolibSOL24.a  
./hdfEOS/lib/tmp/geolibSUN4.a  
./hdfEOS/lib/tmp/geolibIRIX62-n32.a  
./hdfEOS/lib/tmp/geolibIRIX62-64mips3.a  
./hdfEOS/make/  
./hdfEOS/make/CLInstall.sh  
./hdfEOS/make/Makefile.instr  
./hdfEOS/make/Makefile.template  
./hdfEOS/make/make.options  
./hdfEOS/make/make.targets  
./hdfEOS/make/makeidl.include  
./hdfEOS/make/makeidlxx.include  
./hdfEOS/make/makerec.include  
./hdfEOS/make/makerec.template  
./hdfEOS/obj/  
./hdfEOS/obj/dec/  
./hdfEOS/obj/hp/  
./hdfEOS/obj/ibm/  
./hdfEOS/obj/sgi/  
./hdfEOS/obj/sgi32/  
./hdfEOS/obj/sgi64/  
./hdfEOS/obj/sun4/  
./hdfEOS/obj/sun5/  
./hdfEOS/src/  
./hdfEOS/src/EHapi.c  
./hdfEOS/src/GDapi.c  
./hdfEOS/src/PTapi.c  
./hdfEOS/src/SWapi.c  
./hdfEOS/src/make_IT/
```

./hdfeos/src/make_IT/makeDEC4.0r1
./hdfeos/src/make_IT/makeHP4.0r1
./hdfeos/src/make_IT/makeIBM4.0r1
./hdfeos/src/make_IT/makeSGI4.0r1
./hdfeos/src/make_IT/makeSUN4.0r1
./hdfeos/src/make_IT/makeinc
./hdfeos/src/Makefile_CM
./hdfeos/src/Makefile
./hdfeos/src/Makefile_alt
./hdfeos/samples/
./hdfeos/samples/AppendField.c
./hdfeos/samples/DefineFields.c
./hdfeos/samples/DefineGDflds.c
./hdfeos/samples/DefineLevels.c
./hdfeos/samples/InquireGrid.c
./hdfeos/samples/InquireSwath.c
./hdfeos/samples/ReadFields.c
./hdfeos/samples/ReadGDflds.c
./hdfeos/samples/ReadLevels.c
./hdfeos/samples/SetupGrid.c
./hdfeos/samples/SetupPoint.c
./hdfeos/samples/SetupSwath.c
./hdfeos/samples/SubsetGrid.c
./hdfeos/samples/SubsetPoint.c
./hdfeos/samples/SubsetSwath.c
./hdfeos/samples/UpdateLevels.c
./hdfeos/samples/WriteFields.c
./hdfeos/samples/WriteGDflds.c
./hdfeos/samples/WriteLevels.c
./hdfeos/samples/appendfield.f
./hdfeos/samples/definefields.f
./hdfeos/samples/definegdflds.f
./hdfeos/samples/definelevels.f
./hdfeos/samples/inquiregrid.f
./hdfeos/samples/inquireswath.f
./hdfeos/samples/readfields.f
./hdfeos/samples/readgdflds.f
./hdfeos/samples/readlevels.f
./hdfeos/samples/setupgrid.f
./hdfeos/samples/setuppoint.f
./hdfeos/samples/setupswath.f
./hdfeos/samples/subsetgrid.f
./hdfeos/samples/subsetpoint.f
./hdfeos/samples/subsetswath.f
./hdfeos/samples/updatelevels.f
./hdfeos/samples/writefields.f
./hdfeos/samples/writegdflds.f
./hdfeos/samples/writelevels.f
./hdfeos/samples/fixdBuoy0.txt
./hdfeos/samples/fixdBuoy1.txt
./hdfeos/samples/fixdBuoy1s.txt
./hdfeos/samples/floatBuoy0.txt
./hdfeos/samples/floatBuoy1.txt
./hdfeos/samples/simple.txt
./hdfeos/samples/README
./hdfeos/bin/
./hdfeos/bin/dec/
./hdfeos/bin/hp/

```
./hdfEOS/bin/ibm/  
./hdfEOS/bin/sgi/  
./hdfEOS/bin/sgi32/  
./hdfEOS/bin/sgi64/  
./hdfEOS/bin/sun4/  
./hdfEOS/bin/sun5/  
./hdfEOS/bin/tmp/  
./hdfEOS/bin/tmp/hdfEOS_env.csh.tmp  
./hdfEOS/bin/tmp/hdfEOS_env.ksh.tmp  
./hdfEOS/bin/INSTALL-HDFEOS  
./hdfEOS/include/  
./hdfEOS/include/HdfEosDef.h  
./hdfEOS/include/cfortHdf.h  
./hdfEOS/include/cproj.h  
./hdfEOS/include/proj.h  
./hdfEOS/include/isin.h  
./hdfEOS/doc/  
./hdfEOS/doc/HDFEOS-DEFINITION.TXT  
./hdfEOS/doc/README
```

4.2 HDF-EOS 2.1 Test Tools Tar File Listing

A listing of the tar file “HDF-EOS2.1v1.00_TestDrivers.tar.Z” follows:

```
./hdfEOS/testdrivers/  
./hdfEOS/testdrivers/README  
./hdfEOS/testdrivers/swath/  
./hdfEOS/testdrivers/swath/testswath.c  
./hdfEOS/testdrivers/swath/testswath.f  
./hdfEOS/testdrivers/swath/tutils.h  
./hdfEOS/testdrivers/swath/testswathf90-32.f  
./hdfEOS/testdrivers/grid/  
./hdfEOS/testdrivers/grid/testgrid.c  
./hdfEOS/testdrivers/grid/testgrid.f  
./hdfEOS/testdrivers/grid/tutils.h  
./hdfEOS/testdrivers/grid/testgridf90-32.f  
./hdfEOS/testdrivers/point/  
./hdfEOS/testdrivers/point/fixdBuoy0.txt  
./hdfEOS/testdrivers/point/fixdBuoy1.txt  
./hdfEOS/testdrivers/point/fixdBuoy1s.txt  
./hdfEOS/testdrivers/point/floatBuoy0.txt  
./hdfEOS/testdrivers/point/floatBuoy1.txt  
./hdfEOS/testdrivers/point/simple.txt  
./hdfEOS/testdrivers/point/testpoint.c  
./hdfEOS/testdrivers/point/testpoint.f  
./hdfEOS/testdrivers/point/tutils.h  
./hdfEOS/testdrivers/point/testpointf90-32.f
```

4.3 Documentation

The documents provided with this release are:

Document Number: 170-TP-005-004
Title: HDF-EOS Library Users Guide for the ECS Project-Volume 1: Overview and Examples
Delivery Source: Hardcopy, WEB

Document Number: 170-TP-006-003
Title: HDF-EOS Library Users Guide for the ECS Project-Volume 2: Function Reference Guide
Delivery Source: Hardcopy, WEB

4.4 Archive Tape

The following magnetic tape is used to archive the delivered baseline configuration of the developed software.

904-PR-037-002

Tape label: ECS HDF-EOS 2.1v1.00
Distribution Date: Oct 29, 1997
>>> 3.0gbyte format (low density) <<<
Filenames: HDF-EOS2.1v1.00.README
 HDF-EOS2.1v1.00.tar.Z
 HDF-EOS2.1v1.00_TestDrivers.tar.Z

5. Non-Conformance Status

5.1 Known Problems with HDF-EOS 2.1

This section contains the list of problems closed (section 5.2) and known problems (section 5.3) as of 10/28/97 in the HDF-EOS 2.1 delivery. These problems were found and recorded during unit and integration and captured in the formal problem tracking system, Distributed Defect Tracking System (DDTS). The DDTS system generated the attached list of “closed” NCRs. This list has been reviewed by HITC management and HDF-EOS is considered to be acceptable for delivery at this time. The list includes the NCR ID, Title, Description, and Status. DDTS Problem Severity Definitions, on a 1-5 scale, are defined as follows:

- 1 Catastrophic and unrecoverable!
Example: system crash or lost user data.
- 2 Severely broken and no workaround.
Example: can't use major product function.
- 3 A defect that needs to be fixed but there is a workaround.
Example: user data must be modified to work.
- 4 A defect that causes small impact. Easy to recover or workaround.
Example: error messages aren't very clear.
- 5 Trivial defect or enhancement request.
Example: bad layout or misuse of grammar in manual.

5.1.1 Installed Changes

This VDD addresses the new functionality and a new feature added in the HDF-EOS 2.1 software.

- Additional functionality for Landsat data has been added
 - Retrieve indexed array of specified geolocation mapping for specified region
 - Retrieve the type of dimension mapping for a dimension
- Addition of vertical subsetting for the point data set

The status of the NCRs corrected for this release is included in section 5.2. This NCR report reflects the information obtained from DDTS on October 28, 1997. To obtain a detailed description of the NCRs, the DDTS system can be accessed from the following WEB page:

<http://newsroom.gsfc.nasa.gov/ddts/>

5.2 HDF-EOS 2.1 Non-Conformance Reports (Close Status)

The following HDF-EOS open problems, listed in numerical order by severity, were closed with the HDF-EOS 2.1 Release:

NCR ID: ECSed08074

Title: Landsat7 overlapping scene problem

Severity: 1

Description: The present index mapping subsetting code can not perform subsetting properly if the adjacent scenes overlap each other with multiple scan lines.

Resolution: Incorporated code sent by Joel Gales in SWregioninfo and SWextractregion functions.

NCR ID: ECSed08071

Title: The index mapping update in define index mapping API is not updated

Severity: 2

Description: The index map array is not being updated after the index map subsetting is performed.

Resolution: A temporary fix is done which gives the complete index mapping. Code was added in define index mapping function so that it takes complete index map array and writes it to the output hdfs file. This temporary fix is done for August demo.

NCR ID: ECSed08186

Title: Function SWupdateidxmap added to SWapi.c

Severity: 2

Description: The function SWupdateidxmap gets the full index map for a swath and returns the updated index for a region.

Resolution: Created new function SWupdateidxmap and added it to SWapi.c

NCR ID: ECSed09306

Title: HDF-EOS Patch For SOM Projections

Severity: 2

Description: Projection parameters are concatenated into one string with a limit of 80 characters. MISR parameters exceed the 80 character limit. Request that the Subroutine gd_projinfo be edited so that string utl_estr length is increased from 80 char to 512 char. LaRC TT: LD0000000000288

Resolution: Duplicate of ECSed08870

NCR ID: ECSed09562

Title: Swath core dumping on SUN Platform
Severity: 2
Description: Swath is core dumping (segmentation fault) on the SUN platform. The core dump occurs only when the fortran drivers are run.

NCR ID: ECSed06598

Title: Vertical subsetting needed for Point data.
Severity: 3
Description: A use case has been discovered for subsetting of point data by altitude (SAGE). HDF-EOS currently provides the capability for Grid and Swath and a similar ability for Point is needed as well. (DefVertRegion)
Resolution: PTdefvrtregion functions (to PTapi.c) was added to source code

NCR ID: ECSed08070

Title: Time subsetting regioninfo returning wrong return value
Severity: 3
Description: While performing the time subsetting the status from fieldinfo function is supposed to return zero, but it is returning a -1.
Resolution: I changed the return status of fieldinfo from tstatus to status.

NCR ID: ECSed08152

Title: SWWritefield returns failure when appending 1-d fields
Severity: 3
Description: Fix done. Test case being written at release time.

NCR ID: ECSed08154

Title: HDFEOS 2.0 Incorrect Prototype
Severity: 3
Description: This is to document a problem found by Alexander Murray at ASTER. The prototype of GDfieldinfo has it returning int32, and it should have it returning intn (the doc says intn, and SWfieldinfo returns intn). Please fix this, it causes warnings.
Resolution: Prototype of GDfieldinfo now returns intn. Changed in include/HdfEosDef.h

NCR ID: ECSed08281

Title: Test for subsetted region only checks lower limits
Severity: 3
Description: The test for a subsetted region only checks the lower limits of the boundary
Resolution: I added the upper limits to the test.

NCR ID: ECSed08282

Title: Time cannot have different dimensions than lat/lon in swath API
Severity: 3
Description: SWregioninfo and SWextractregion don't allow for the field "Time" to have dimensions different from the Latitude and Longitude fields. This is not correct.
Resolution: I modified the SWapi to allow the "Time" field to have different dimensions.

NCR ID: ECSed08827

Title: PTdefvrtregion returns incorrect records values
Severity: 3
Description: The bug that the incorrect size of a defined region of interest from a set of fields in a single level is generated for Point data when calling the subsetting function PTdefvrtregion.
Resolution: Changed the flag index from bckRecs[k] to Flag[k] in function PTrecnum called by function PTregioninfo in order the number of records can be returned back correctly

NCR ID: ECSed09410

Title: INSTALL-HDFEOS script does not properly install HDFEOS on SUN5 platform
Severity: 3
Description: In the INSTALL-HDFEOS script HDFSYS is set to SUN. It should be set to SUN5. This prevents HDFEOS from being properly installed on SUN5 platforms
Resolution: Modification of Installation script

NCR ID: ECSed09426

Title: Point is returning incorrect values
Severity: 3
Description: There is a problem with the point interface which is causing the point drivers to return differences
Resolution: Output array in testdriver was not large enough to handle all of the data. Increased size of output array to handle output data.

NCR ID: ECSed09431

Title: INSTALL-HDFEOS does not properly install on Power Challenge
Severity: 3
Description: The INSTALL-HDFEOS script does not properly install HDFEOS on the SGI. The INSTALL-HDFEOS script should set the mips2 and mips3 flag when compiling sgi (old 32bit) and sgi32 (new32bit), respectively.

Resolution: The HDF-EOS install script and Makefile were out of sync and out of date. The install script (INSTALL-HDFEOS) and the source code makefile have been rewritten.

NCR ID: ECSed09432

Title: Wrong version of libGctp.a for relbsgi (mips4 and not mips3)

Severity: 3

Description: The wrong version of the libGctp.a file is being copied for relbsgi (a R4400 machine and NOT a R10000 machine). The library is being built with "mips4" flags when it should be built with "mips3" flags for this type of machine.

Resolution: Modification of INSTALL-HDFEOS script to use correct gctp library.

NCR ID: ECSed08870

Title: Insufficient buffer size in GDprojinfo for 64bit platform

Severity: 4

Description: On 64 bit platform, the size of the buffer used to store projection parameters in GDprojinfo is insufficient. When 13 projection parameters combined string length exceeds 80 bytes there is memory leak and error occurs at some other part of the program.

Resolution: The utlstr buffer size in GDprojinfo has been increased from 80 bytes to 512 bytes(same number of bytes used when projection parameter is written to metadata).

NCR ID: ECSed08893

Title: EHbisect prototype incorrect.

Severity: 4

Description: EHbisect prototype in HdfEosDef.h is incorrect.

Resolution: The following lines in HdfEosDef.h:

```
#if (defined(SUN5) || defined(SUN4))
    intn EHbisect(float64 (float64 []), float64 [], int32, float64, float64, float64,
float64 *);
#else
    intn EHbisect(float64 (), float64 [], int32, float64, float64, float64, float64 *);
#endif
```

changed to:

```
/* 9/3/97 Abe changed the first argument from float64 (float64 []) to float64 (*)
#if (defined(SUN5) || defined(SUN4))
    intn EHbisect(float64 (*) (float64 []), float64 [], int32, float64, float64, float64,
float64 *);
```

```

#else
/* 9/3/97 Abe changed the first argument from float64 () (float64 []) to float64
(*) (float64 []) */
intn EHbisect(float64 (*) (float64 []), float64 [], int32, float64, float64, float64,
float64 *);
#endif

```

NCR ID: ECSed08901

Title: Users need to open about 200 swath files simultaneously.

Severity: 4

Description: The HDF limit MAX_FILE does not let users to open more than 32 files simultaneously in read mode.

Resolution: Changed NEOSHDF to 200 in EHapi.c

NCR ID: ECSed08945

Title: SWextratctregin

Severity: 4

Description: SWextratctregin

Resolution: Modification of the subsetting routines in the SWapi.c code

NCR ID: ECSed08946

Title: SWextractregion in SWapi.c has problem with indexed mapping when scenes overlap

Severity: 4

Description: The function SWextractregion in SWapi.c does not extract right region for a swath with indexed mapping when scenes overlap.

Resolution: Modification of SWapi.c.

NCR ID: ECSed08961

Title: SWextractregion in SWapi.c does not extract correct region for indexed ma

Severity: 4

Description: SWextractregion in SWapi.c does not extract correct region for indexed mapping when overlapping scenes are involved. It needs a fixture as the one done for SWregioninfo function.

Resolution: Modification of SWapi.c

NCR ID: ECSed08898

Title: A function SWgeomapinfo was added to SWapi.c

Severity: 5
Description: A function needed to return dimension mapping info for mapping between Geodim and Datadim for indexed mapping in a swath.
Resolution: The function SWgeomapinfo written to return dimension mapping info for mapping between Geodim and Datadim for indexed mapping in a swath.

NCR ID: ECSed08900

Title: Function SWregioninfo was modified in SWapi.c file.
Severity: 5
Description: The function SWregioninfo did not return correct info for indexed mapping when scenes overlap.
Resolution: on line 7049 a few lines added to set flag idxMapElem = 0 for indexed mapping. After line 7180 a few lines added to get nXtrk for indexed mapping.

NCR ID: ECSed09357

Title: HDFEOS Point test driver core dumps on all platforms
Severity: 5
Description: The point test driver is core dumping on all platforms.
Resolution: Modification of PTapi.c source code.

5.3 HDF-EOS 2.1 Non-Conformance Reports (Open Status)

The following NCR is a lien against the HDF-EOS 2.1 delivery:

NCR ID: ECSed06150

Title: HDF4.1r1 bug on DEC, reading tiled and compressed datasets.
Severity: 3
Description: There is a problem reading data from a tiled and compressed SDS object (written with HDF4.1r1 on a sun5). This problem ONLY occurs on the DEC. The function SDreaddata returns an error of FAIL. NCSA has been notified of this problem. Has been deferred.

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6. Non-Conformance Status

6.1 Patch Releases for HDF-EOS 2.1

6.1.1 Installed Changes

Addendum A addresses the modifications to problems found in the HDF-EOS 2.1 software. The patches delivered are part of Version 2 Drop 3. The files updated are provided below:

Drop 3

/ecs/hdfeos/include/HdfEosDef.h

/ecs/hdfeos/src/EHapi.c

/ecs/hdfeos/src/SWapi.c

Section 6.2 provides a summary of NCRs which have been fixed and released as a patch or several patches. To obtain a detailed description of the NCRs, the DDTs system can be accessed from the following WEB page:

<http://newsroom.gsfc.nasa.gov/ddts/>

6.2 Non-Conformance Reports

The following HDF-EOS NCRs have been fixed and are available to the Science Community. They are listed in numerical order by severity.

6.2.1 Affected Version 2: Drop 3

NCR ID: ECSed10635
Title: HDF_EOS Libraries are receiving core dump messages.
Severity: 1
Problem: HDF_EOS Server test drivers and purify as a result purify identified a memory buffer overlap. Seem to crashing in the file. c line 3942 funtion name: SWINQFIELDS. In addition, array bounds write error is occurring while running HDF_EOS in function SWXREGIONDEX in line 6469 in file SWAP.C
Resolution: In the Swath interface, there are several sections of code that deal with data sets with indexed geolocation, specifically Landsat.

One section was using a loop counter twice, causing a infinite loop once started. I added a new loop counter to eliminate this problem.

NCR ID: ECSed10331
Title: Additional Function required to support Landsat data products
Severity: 4
Problem: The new function was added to the Swath library to support the Landsat data products
Resolution: The function SWregionindex was added to the Swath interface of the HDF-EOS library

NCR ID: ECSed10406
Title: SWwritefield returns incorrect value when appending to existing field

Severity: 4
Problem: Swwritefield returns incorrect values when appending to an existing field.

There is an apparent bug in the SWapi.c routine SWwrrdfield with Toolkit 5.2.1. When I call swwrrfld (the Fortran version), I can sometimes, erroneously get back an error code of 1. Several toolkits ago, there was a line status=0 in the code which was removed. We reported this as well as the correction to line 5031 to pgstkkit. The correction to 5031 was put into Toolkit 5.2.1, but the status=0 line was not added. We feel that it should be. In the Toolkit 5.2.1 version of SWapi.c, the line should be added right after line 5086. We think that the block should be:

```
    free(buf);  
    VSdetach(vdataID);  
    status=0;  
}
```

If you need more information (such as a test code which illustrates the error), please let me know. Also, let us know if this fix is indeed a proper one. Thanks.

Resolution: Modify SWapi.c when appending to fields and the append is successful, to return the correct value.

NCR ID: ECSed10568

Title : Version number for HDF-EOS not updated
Severity: 4
Problem: Version number for HDF-EOS not updates for October 1997 release.

I just downloaded HDF-EOS 2.1 v1.00 from your ftp server and installed it on our system. In the EHapi.c source file line 28, there is a symbol definition:

```
#define HDFEOSVERSION 2.0
```

Shouldn't this be set to 2.1? I found this when looking at the "HDFEOSVersion" field in Swath files built using HDF-EOS 2.1.

```
System: SGI Challenge L  
OS : IRIX 6.2  
Compiler: IRIX cc -32 -ansi
```

Resolution: Change the variable HDFEOSVERSION in EHapi.c from 2.0 to 2.1.

Appendix A. Build/Installation Instructions

Build/installation instructions for HDF-EOS are located in Appendix A of the HDF-EOS Users Guide (170-TP-005-004) and in the README file available with the HDF-EOS delivery.

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Appendix B. User Feedback Procedures

The mechanism for handling user feedback, documentation and software discrepancies, and bug reports follows:

- a. Accounts at the ECS Landover facility have been set up for user response:
pgstlkit@eos.hitc.com or
hdfeos@eos.hitc.com
- b. Users will e-mail problem reports and comments to the above account. A receipt will be returned to the sender. A workoff plan for the discrepancy will be developed and status report issued once a month. Responses will be prioritized based on the severity of the problem and the available resources. Simple bug fixes will be turned around sooner, while requested functional enhancements to the Toolkit will be placed in a recommended requirements data base (RRDB) and handled more formally.

- c. In order to help expedite responses, we request the following information be supplied with problem reports:

Name:

Date:

EOS Affiliation (DAAC, Instrument, ESDIS, etc.):

Phone No.:

Development Environment:

Computing Platform:

Operating System:

Compiler and Compiler Flags:

Tool Name:

Problem Description:

(Please include exact inputs to and outputs from the toolkit call, including error code returned by the function, plus exact error message returned where applicable.)

Suggested Resolution (include code fixes or workarounds if applicable):

- d. In addition to the e-mail response mechanism, a phone answering machine is also provided. The telephone number is: 301-925-0781. Calls will be returned as soon as possible. Note, however, that e-mail is the preferred method of responding to users.

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Appendix C. Test Baseline Configuration

The HDF-EOS library was built and tested in a multi-platform environment using the following platforms, operating systems, and compilers:

Table C-1. HDF-EOS Development Configuration

| Platform | OS | Version | C Compiler | FORTRAN |
|---------------------|--------------|----------------|-------------------|-------------------|
| Sun Sparc | Solaris | 2.5.1(5.5.1) | Sun C 4.0 | Sun FORTRAN 4.0 |
| HP 9000/770 | HP-UX | A.10.01 | HP C 10.24 | HP FORTRAN 10.24 |
| DEC Alpha | Digital Unix | 4.0 | DEC C 5.2 | DEC FORTRAN 5.2 |
| IBM RS-6000 | AIX | 4.2 | IBM C 3.1.4.0 | IBM FORTRAN 3.2.5 |
| SGI Power Challenge | IRIX | 6.2 | SGI C 7.1 | SGI FORTRAN 7.1 |

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Abbreviations and Acronyms

| | |
|-------|--|
| A.A. | Astronomical Almanac |
| AA | Ancillary Data Access |
| AIRS | Atmospheric Infrared Sounder |
| API | Application Program Interface |
| APID | Application Process Identifier |
| ASTER | Advanced Spaceborne Thermal Emission and Reflection Radiometer |
| BNF | Bachus-Nauer Form |
| CBP | Celestial Body Position |
| CCR | Configuration Change Request |
| CCSDS | Consultative Committee on Space Data Systems |
| CDRL | Contract Deliverable Requirements List |
| CERES | Clouds and Earth Radiant Energy System |
| COTS | Commercial off-the-shelf Software |
| CSMS | Communications and Systems Management Segment (ECS) |
| CRC | Cyclic Redundancy Code |
| CSC | Coordinate System Conversion |
| CUC | Constant and Unit Conversions |
| DAAC | Distributed Active Archive Center |
| DCE | Distributed Computing Environment |
| DCN | Document Change Notice |
| DCW | Digital Chart World |
| DDF | Data Distribution Facility |
| DEM | Digital Elevation Model |
| DDTs | Distributed Defect Tracking system |
| DPFT | Data Processing Focus Team |
| DTM | Digital Terrain Model |
| ECI | Earth Centered Inertial |

| | |
|---------|---|
| ECR | Earth Centered Rotating |
| ECS | EOSDIS Core System |
| EDHS | ECS Data Handling System |
| EDOS | EOS Data and Operations System |
| EOS | Earth Observing System |
| EOSAM | EOS AM Project (morning spacecraft series) |
| EOSDIS | EOS Data and Information System |
| EOSPM | EOS PM Project (afternoon spacecraft series) |
| EPH | Ephemeris Data Access |
| ESDIS | Earth Science Data and Information System |
| ET | Ephemeris Tool |
| FDF | Flight Dynamics Facility |
| FOV | Field-of-View |
| ftp | file transfer protocol |
| GAST | Greenwich Apparent Sidereal Time |
| GCT | Geo-Coordinate Transformation |
| GMST | Greenwich Mean Sidereal Time |
| GPS | Global Positioning System |
| GSFC | Goddard Space Flight Center |
| HAIS | Hughes Applied Information Systems |
| HDF | Hierarchical Data Format |
| HDF-EOS | Hierarchical Data Format - Earth Observing System |
| HITC | Hughes Information Technology Company |
| http | hypertext transport protocol |
| I&T | Integration & Test |
| I/O | input/output |
| IEEE | Institute of Electrical and Electronic Engineers |
| IMS | Information Management System (ECS) |
| IWG | Investigator Working Group |

| | |
|--------|---|
| JPL | Jet Propulsion Laboratory |
| LaRC | Langley Research Center |
| MOO | Maintain and Operation |
| MCF | Metada Configuration File |
| MDUE | Missing Data Unit Entry |
| MEM | Memory Management |
| MET | Metadata |
| MODIS | Moderate-Resolution Imaging Spectroradiometer |
| MSFC | Marshall Space Flight Center |
| NASA | National Aeronautics and Space Administration |
| NCR | Nonconformance Report |
| NCSA | National Center for Supercomputer Applications |
| netCDF | network Common Data Format |
| NMC | National Meteorological Center |
| PACOR | Packet Processor |
| PC | Process Control |
| PGE | Product Generation Executive |
| PCF | Process Control File |
| PDS | Production Data Set |
| PDPS | Planning & Data Production System |
| PCF | Process Control File |
| PDR | Preliminary Design Review |
| PGE | Product Generation Executive (formerly Product Generation Executable) |
| PGS | Product Generation System (ECS) |
| PGSTK | Product Generation System Toolkit |
| POSIX | Portable Operating System Interface for Computer Environments |
| QA | Quality Assurance |
| QAC | Quality and Accounting Capsule |
| RDBMS | Relation Data Base Management System |

| | |
|-------|---|
| RPC | Remote Procedure Calls |
| RRDB | Recommended Requirements Database |
| SCF | Science Computing Facility |
| SDP | Science Data Production |
| SES | Scheduling and Execution Subsystem |
| SDPS | Science Data Processing Segment |
| SDPF | Science Data Processing Facility |
| SGI | Silicon Graphics International |
| smf | Collection of utilities and library routines used for generating SMFs and manipulating SMF-defined status values and messages |
| SMF | Status Message File |
| SPSO | Science Processing Support Office |
| SSM/I | Special Sensor for Microwave Imaging |
| TAI | International Atomic Time |
| TBD | To Be Determined |
| TD | Time Date Conversion |
| TDB | Barycentric Dynamical Time |
| TDRSS | Tracking and Data Relay Satellite System |
| TDT | Terrestrial Dynamical Time |
| TLCF | Team Leader Computing Facility |
| TRMM | Tropical Rainfall Measuring Mission (joint US - Japan) |
| TSS | (TDRSS) Service Session |
| UARS | Upper Atmosphere Research Satellite |
| URL | Universal Research Locator |
| US | United States |
| USNO | U.S. Naval Observatory |
| UT | Universal Time |

| | |
|------|-----------------------------------|
| UTC | Universal Coordinated Time |
| UTCf | Universal Time Correlation Factor |
| UTM | Universal Transverse Mercator |
| VCDU | Virtual Channel Data Unit |
| VDD | Version Description Document |
| VPF | Vector Product Format |
| WWW | World Wide Web |

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