

Polling with Delivery Record (PDR) Mechanism

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Change Explanation

None

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Abstract

This document establishes the Polling with Delivery Record (PDR) Mechanism as an ESDS standard interface mechanism. The Polling with Delivery Record (PDR) Mechanism is used for electronic transfer of data and related information. This RFC document provides a brief introduction, with the full PDR specification detailed in Section 4.5 of the *Interface Control Document between the EOSDIS Core System (ECS) and the Science Investigator-led Processing Systems (SIPS) Volume 0, Interface Mechanisms* [1].

1 Introduction

The Polling with Delivery Record (PDR) mechanism was originally defined in 1998 for electronic transfer of data products, metadata, browse imagery and other related information generated at Science Investigator-led Processing Systems (SIPS) to the EOSDIS Core System (ECS). Data transfers using this interface protocol are fully automated at the various SIPS and in the ECS Ingest system.

There are currently 15 SIPS [2] using the PDR mechanism to supply data to the 12 NASA DAACs [3]. In addition, several DAACs use this mechanism to acquire Sentinel data from the ESA International Data Hub via the NASA Sentinel Gateway [4].

Expanded use of the PDR mechanism will facilitate data transfers between a wider set of data providers and consumers within the ESDS community.

2 Overview of the PDR system

A Product Delivery Record (also PDR) file contains Parameter-Value Language (PVL) statements describing data and associated files available for transfer. It contains file names, file size, data types, data type versions, location, and linkage information. When data files are ready for delivery, they are placed with a PDR in a specified directory by the data provider. The data customer polls this directory, and when it detects a new PDR, it attempts to acquire the data and associated files described therein. The data customer responds with either a Product Delivery Record Discrepancy (PDRD) indicating a problem with the PDR itself, or a Product Acceptance

Notice (PAN) reporting either success or error found for each data file in the PDR. These responses are also encoded in PVL. This mechanism is shown in Figure 1.

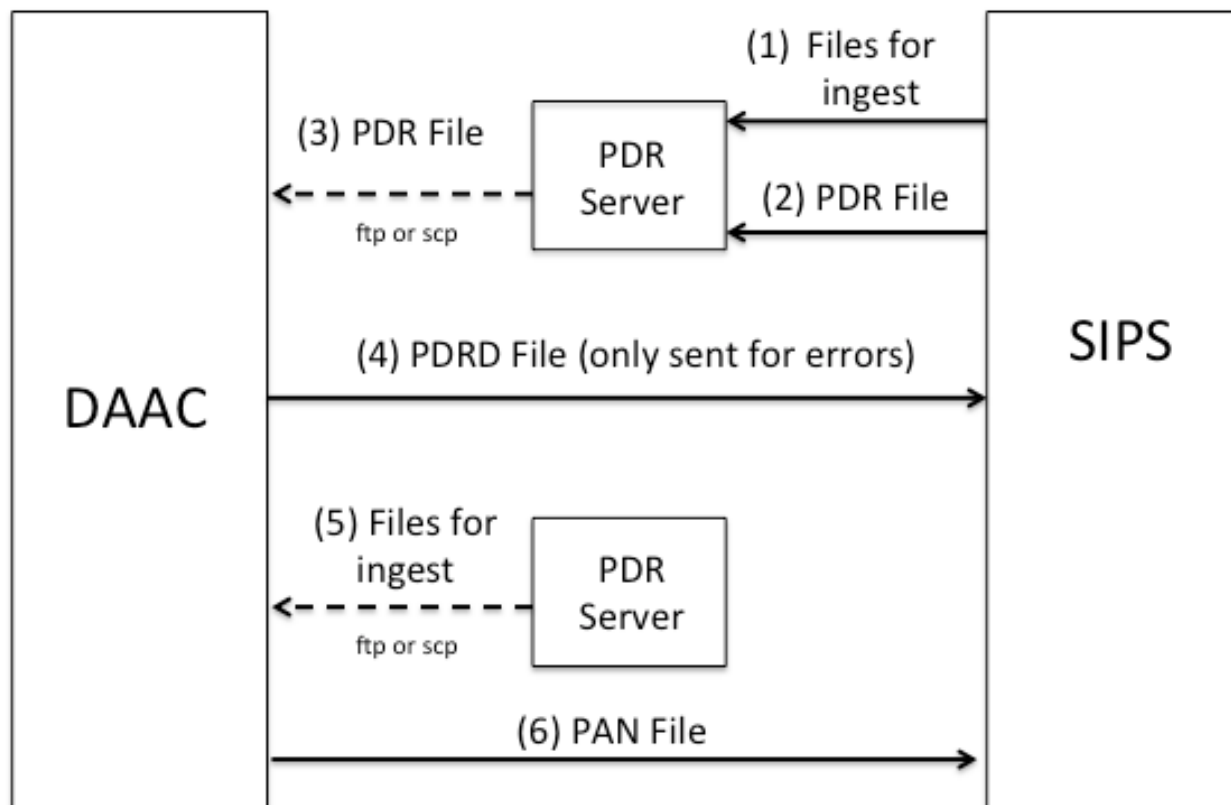


Figure 1. Polling with Delivery Record file transfer mechanism

The PDR mechanism, including PDR, PAN and PDRD messages, is specified in Section 4.5 of the *Interface Control Document between the EOSDIS Core System (ECS) and the Science Investigator-led Processing Systems (SIPS) Volume 0, Interface Mechanisms* [1]. A quick reference summary is provided in Appendix B of the same document. This document is managed in NASA’s COMET (Configuration Management EOSDIS Tool).

3 References

Normative References

- [1] NASA ESDIS Project, *Interface Control Document between the EOSDIS Core System (ECS) and the Science Investigator-led Processing Systems (SIPS) Volume 0, Interface Mechanisms*, NASA ESDIS document 423-41-57, Revision J, CH01, August 2013 (expires August 2018).

Informative References

- [2] Science Investigator-led Processing Systems (SIPS),
<https://earthdata.nasa.gov/about/science-investigator-led-processing-systems>
- [3] EOSDIS Distributed Active Archive Centers (DAACs),
<https://earthdata.nasa.gov/about/daacs>
- [4] Dawn Lowe, NASA Sentinel Gateway: Facilitating EOSDIS Mirroring of Sentinel Data, 29 September 2015. Accessed 2 March 2017.
http://ceos.org/document_management/Working_Groups/WGISS/Meetings/WGISS-40/20150929_Tuesday/09.29_13.30_NASA_Sentinel_Gateway_Status.ppt

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Appendix A

Glossary of acronyms

<u>Acronym</u>	<u>Description</u>
COMET:	Configuration Management EOSDIS Tool
DAAC:	Distributed Active Archive System
ECS:	EOSDIS Core System
EOSDIS:	Earth Observing System Data and Information System
ESDIS:	Earth Science Data and Information System
ESDS:	Earth Science Data Systems
PAN:	Product Acceptance Record
PDR:	Polling with Delivery Record; Product Delivery Record
PDRD:	Product Delivery Record Discrepancy
PVL:	Parameter-Value Language
SIPS:	Science Investigator-led Processing System

Appendix B. PDR Specification

Editor's Notes:

1. The following pages contain
 - a. A copy of Section 4.5 from *Interface Control Document between the EOSDIS Core System (ECS) and the Science Investigator-led Processing Systems (SIPS) Volume 0, Interface Mechanisms*, NASA ESDIS document 423-41-57, Revision J, CH01, August 2013 (expires August 2018) [1].
 - b. A copy of Appendix B from the same document.
2. References within this appendix refer to items in the included copy of the *Interface Control Document*, not to items in this RFC document. The reference on page 4-30 of the original (found on page 6 of this RFC document) to Appendix B refers to the appendix of the included copy of the *Interface Control Document* (found on page 30 of this RFC document).

Appendix B - Section 4.5 from Interface Control Document between the EOSDIS Core System (ECS) and the Science Investigator-led Processing Systems (SIPS) Volume 0, Interface Mechanisms, NASA ESDIS document 423-41-57, Revision J, CH01, August 2013 (expires August 2018)

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Each time a SIPS determines that a new ESDT is to be produced or that an existing ESDT is to be revised, the SIPS operator provides the required information to the ECS science engineering group at the ECS Development Facility (EDF) as specified in the Operations Agreement(s) between the DAAC and the SIPS. An EDF engineer develops the new ESDT descriptor and provides it and its associated MCF to the SIPS for review. The new ESDT is then merged into the ECS and delivered to the DAAC. The DAAC operator obtains the MCF using the ECS ESDT Maintenance GUI and forwards the final MCF to the SIPS, which uses it to produce the metadata for the new or updated data type.

4.5 Transfer of Higher-Level Products to ECS

The SIPS makes available products for ingest by the ECS. For each SIPS, these products are specified in a SIPS-unique volume. Data is transferred from the SIPS to the ECS by a Polling with Delivery Record (PDR) mechanism as defined in 305-EMD-200 document "Release 7.21 Segment/Design Specification for the EMD Project." This section (Section 4.5) of this ICD provides detailed specifications for this interface methodology.

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The PDR interface is used to transfer the SIPS's science data granule products, metadata, browse data, quality assessment data, production history, Failed PGE data to ECS Ingest. All products supplied for ingest by ECS must be compliant with EOSDIS format and standards and be accompanied by ECS conformant metadata in either ODL or (for science files only) XML format. The transfer protocol documented in this section must be used to ensure that ECS can link files to the correct granules during ingest.

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4.5.1 Overview of Polling Ingest Methodology

The purpose of the ECS-SIPS electronic interface is to support the delivery of data files from the SIPS to ECS. To accommodate the polling with delivery record interface, a single PDR server directory will be identified for each SIPS to ECS interface. The data files and the Product Delivery Records (PDRs) are placed on this server directory by the SIPS. At the end of the data exchange process, the SIPS removes the PDR, the PAN or PDRD file and where necessary the data from the server directory.

The SIPS makes the directory sub-tree available to ECS with the allowable privileges. The ECS uses either of two file transfer methods to retrieve the PDR and data from the SIPS server directory. The standard method is ftp. Secure transfer, using scp, is also available by prior agreement between the SIPS and the DAAC (see Section 4.7 for a description of available data exchange security options). ECS notifications to the SIPS (PDRD and PAN) are provided by email or ftp or both, unless the DAAC has configured the SIPS interface for scp transfers. In that case, ECS notifications to the SIPS are sent by email or scp or both.

Implementation of the Polling with Delivery Record Ingest consists of the following steps (Figure 4.5-1 shows the standard transfer method using ftp):

- (1) The SIPS places data files in specified locations on the PDR Server. Data files for ingest consist of Data, .met, .xml, Browse, PH, QA, Ancillary, Failed PGE.

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(2) The SIPS generates a PDR and places it on the PDR Server in a previously specified directory.

(3) ECS polls the PDR Server directory at operator-tunable intervals, detects a PDR, and acquires the PDR file via ftp (or scp).

(4) Once a PDR has been detected and acquired by ECS, the PDR is validated. In the event that the PDR is invalid, ECS automatically returns a Product Delivery Record Discrepancy (PDRD) to an operator-configurable address provided by the SIPS. If an error is detected in the PDR, processing is terminated and none of the specified files are transferred to the ECS server for processing until a corrected PDR is received and successfully processed. If the PDR is valid, ECS schedules to pull the files specified in the PDR using ftp (or scp) and in this case no PDRD is sent.

(5) ECS pulls the specified files from the PDR Server to be ingested or otherwise processed. The files are then archived.

(6) ECS sends a Production Acceptance Notification (PAN) to an operator-configurable address provided by the SIPS. The PAN reports either success or error found for each data type in the PDR.

(7) Upon determining that no further action can or should be taken with respect to the PDR, the SIPS deletes the PAN or PDRD, the PDR and if necessary the associated data from the PDR server.

Address information and operator tunable parameters for the transfer of the PDR, PDRD and PAN are documented for each individual SIPS in an Operations Agreement(s) between the DAAC(s) and the SIPS. Examples include the SIPS's unique identifier, PDR server address and directory, e-mail addresses, contact telephone numbers, and the time between ECS Ingest receiving a failure and sending a new PDRD/PAN. Associated procedures are included in the 611-EMD-200, Release 7.21 Mission Operations Procedures.

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The Polling Ingest with PDR transfer mechanism is fully automated. In the context of this transfer mechanism, the following sections address the PDR, PDRD and PAN. Error conditions and error handling/backup methods are then discussed.

Sections 4.5.2 through 4.5.5 give details of this interface methodology specific to the ECS-SIPS interface. A quick reference summary is provided in Appendix B.

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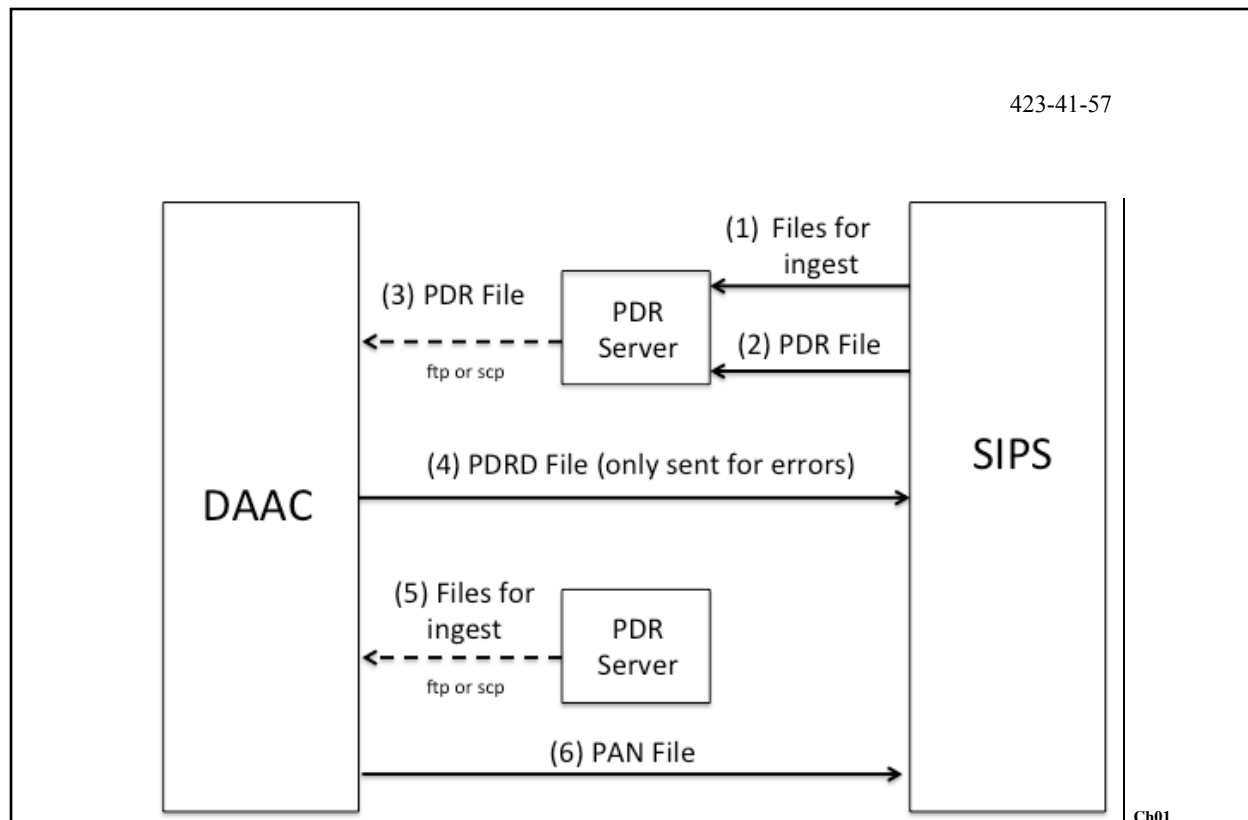


Figure 4.5-1. Polling with Delivery Record File Transfer Mechanism (standard method using ftp)

4.5.2 PDR File Naming Convention

The PDR file name must be unique within the PDR Server directory and have a ".PDR" file extension. The file name with path must be no longer than 255 characters. For the purpose of error tracking, ECS recommends that the file name contain the file creation date as part of the file name. PDRD and PAN messages returned by ECS will use the same name as the reference PDR except that the file name extension will be changed to ".PDRD" or ".PAN" respectively. An example PDR File Naming Convention is depicted in Figure 4.5-2. Note that the SIPS designation is free text that may consist of any identifier that has meaning to the SIPS operators. The ".PDR" as a filename extension is the only requirement for the ECS ingest processing (except that there must be some part of the file name preceding the extension).

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Table 4.5-1. Example File Naming Convention For SIPS Product Delivery Record

Field	Description	Format/ Type Max Size (Bytes)	Value
SIPS Designation	Identifier meaningful for the SIPS	ASCII String (21)	Free text
PDR Creation Date	Date when PDR was created (optional)	ASCII (15)	.yyyymmddhhmmss
Filename extension	Extension for PDR filename (required)	ASCII String (4)	'.PDR'

EXAMPLE ONLY

EXAMPLE ONLY

FILENAME = LATIS123.20010719123845.PDR

Figure 4.5-2. Example PDR File Naming Convention

4.5.3 Product Delivery Record (PDR)

a. SIPS PDR Server Directory

The purpose of the PDR is to announce the availability of data and associated files for transfer to ECS and to provide linkage information for the files. It contains file names, file size, data types, data type versions, location, and linkage information. The PDR is generated by the SIPS and placed in a pre-specified directory on the PDR Server after the files referenced in the PDR have been placed in their respective directories. The address of the SIPS's PDR Server and the directory name are operator-configurable items that are documented in an Operations Agreement(s) between the DAAC(s) and the SIPS. ECS regularly polls the PDR Server, detects/acquires/validates the PDR, and schedules to pull the data.

b. PDR Format

The PDR is comprised of Parameter-Value Language (PVL) Statements. The required PDR PVL parameters are depicted in Table 4.5-2. The PDR PVL statements are ASCII strings, having at most 256 characters, in the form: "Parameter = Value." Each statement ends with a semicolon. Comments can be included if preceded by /* and closed with */. The Value strings shown in Table 4.5-2 include pre-defined values shown by single quote marks and SIPS determined values which include ASCII strings, International Standards Organization (ISO) times, and integers to be filled in with appropriate values by the SIPS processor during PDR creation.

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An example PDR PVL file is provided in Figure 4.5-3. The maximum allowed file length for a PDR is 1 megabyte. PDRs are validated to check that all required fields contain valid values and that the format of the PDR is correct and consistent with the standards. PDRs that adhere to the defined message standards shown in Table 4.5-2 are accepted and processed. Additional information on PVL valid characters can be found in Parameter Value Language Specification (document referenced in Section 2.3.1).

c. Linkages

This section is a general description of how to use the PDR structure to furnish file relationships to the ECS. Please see Table 4.5-4 for details about types of files that can be provided via this interface, linkage relationships and actual values to be used in the PDR statements.

When associated files are ingested into the ECS, pointers have to be set to link them. There are two ways to provide the association information on the PDR. Tables 4.5-2 and 4.5-4 give the specification for each of two types of file groups, or FILE_GROUP objects, which provide these linkages.

(1) In the usual case, a FILE_GROUP contains:

- a single science data granule consisting of one or more files,
- the science data granule's mandatory metadata file,
- optionally, any of several types of associated files to which pointers may have to be set (browse, quality assessment, production history).
- optional metadata for some of the associated files (browse and quality assessment).

Failed PGE tar files are delivered in separate file groups like science granules, but the only associated file for each of these is its required metadata file.

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(2) If a browse, quality assessment or production history file is to be linked to multiple science granules, the link information must be specified using a "linkage file" transmitted with the file but after all associated science granules have been ingested. Although a linkage file must be used with multiple linkages, the linkage file may also be used to assign a one to one linkage between a browse, quality assessment or production history file and a single science granule previously ingested.

The browse, quality assessment or production history file and its associated linkage file must comprise one FILE_GROUP in a PDR. Each linkage FILE_GROUP may contain only one file type to be linked (BROWSE, QA or PRODHIST), an associated metadata file if needed, and one linkage file. The linkage file specifies a list of one or more science granules previously delivered and ingested with which to link the browse, quality assessment or production history file.

A PDR may have multiple Linkage FILE_GROUPS. The second file group in Table 4.5-2 is a linkage group and an example is given at the end of Figure 4.5-3.

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If one or more of the pointers in a Linkage file cannot be resolved, the ingest fails and an error message is returned to the SIPS (See section 4.5.5).

Table 4.5-3 defines the parameters for a Linkage file and Figure 4.5-4 is an example Linkage file. Table 4.5-4 provides guidelines for both types of file linkage.

d. Checksums

The SIPS may include a checksum for any science, HDF or HDF-EOS file in the PDR. Three checksum types are supported: Type CKSUM is a 32-bit unsigned value produced by the unix cksum command. Type ECS is a 64-bit signed value produced by the internal ECS checksum algorithm. Type MD5 is the 128-bit Message Digest output of the RFC 1321 algorithm, represented as a 32-character hexadecimal string (with alpha characters all lower case). (For details of the algorithm see RFC 1321 at <http://www.faqs.org/rfcs/rfc1321.html>.)

The DAAC can set provision of checksum in the PDR to mandatory for specific SIPS.

A standalone JAVA ECS checksum utility is available from the DAAC to enable the SIPS to compute the ECS type checksum.

The DAAC maintains a DAAC-configurable checksum verification percentage parameter for the SIPS, which determines for what percentage of the SIPS's data the ECS will verify checksums upon ingest. If a required checksum verification does not succeed, data ingest fails. Agreement on the checksum verification percentage for ingest should be recorded in the Operations Agreement between the SIPS and the DAAC.

If the SIPS does not provide checksums on the PDR, the ECS may compute and record checksums for the SIPS science files using the ECS algorithm. To safeguard system performance, the percentage of ingested files without checksums for which the ECS will compute checksums is DAAC-configurable.

Table 4.5-2. Product Delivery Record PVL Parameters (1 of 6)

Parameter	Description	Type	Format/ Max Size (Bytes)	Value
ORIGINATING_SYSTEM	Originator of Delivery Record. Identifier for the SIPS.	Variable String	ASCII (20 B)	Free text, e.g. LATIS123 (not an IP address)
TOTAL_FILE_COUNT	Total number of files to transfer	Integer	ASCII (4 B)	1-9999
EXPIRATION_TIME	SIPS designated ISO time for deletion of data from originating system. This parameter is specified in the Operations Agreement(s) between the DAAC(s) and the SIPS.	Fixed String	ASCII (20 B) ²	GMT in the format: yyyy-mm-ddThh:mm:ssZ, where T indicates the start of time information and Z indicates "Zulu" time.

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Table 4.5-2. Product Delivery Record PVL Parameters (2 of 6)

Parameter	Description	Type	Format/ Max Size (Bytes)	Value
OBJECT	Start of file group parameters (repeat for each DATA_TYPE/group of files) Note that associated browse granule, quality assessment, production history, and metadata (.met or .xml) files must be in the same FILE_GROUP as the data file(s) to ensure that they will be linked to the data when they are ingested into the ECS. If a Browse granule, quality assessment or production history file is sent separately from its associated science data, its FILE_GROUP must include a linkage file, illustrated by the last FILE_GROUP in this table.	Fixed String	ASCII (10 B)	'FILE_GROUP'
DATA_TYPE	ECS-implemented Earth Science Data Type (ESDT) for science data granule, or Failed PGE tar file. There can be only one DATA_TYPE in a FILE_GROUP.	Variable String	ASCII (8 B)	ESDT for science data granule or a generic data type (FAILPGE).
DATA_VERSION	ESDT version number (if this is omitted, system will default to the last version installed in ECS)	Integer	ASCII (3 B)	3-Digit version number
NODE_NAME	Name of network node on which the files in the file group are staged for pickup.	Variable String	ASCII (64 B)	Name or IP address

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Table 4.5-2. Product Delivery Record PVL Parameters (3 of 6)

Parameter	Description	Type	Format/ Max Size (Bytes)	Value
OBJECT	Start of file parameters for a Metadata file. There can be multiple metadata files in a FILE_GROUP in accordance with Table 4.5-4, but only one per FILE_SPEC. Repeat FILE_SPEC for each metadata file type needed in the file group. Note: ECS supports ingest of ODL (.met) and XML (.xml) metadata for science files. The DTD for science file metadata is M2XTGranuleMetadata.dtd at http://ecsinfo.gsfc.nasa.gov/ . ECS does not support ingest of XML metadata for non-science files.	Fixed String	ASCII (9 B)	'FILE_SPEC'
DIRECTORY_ID	File directory location (i.e., a path name)	Variable String	ASCII ¹	directory
FILE_ID	Metadata File name	Variable String	ASCII ¹	metadata file name (ends in .met or .xml)
FILE_TYPE	Metadata File Type. See Table 4.5-4.	Variable String	ASCII (20 B)	'METADATA' or 'BROWSE_METADATA' or 'QA_METADATA'
FILE_SIZE	Length of file in bytes	Unsigned 32 bit Integer	ASCII (10 B)	< 2 GB
END_OBJECT	End of file parameters for Metadata file	Fixed String	ASCII (9 B)	'FILE_SPEC'
OBJECT	Start of file parameters for science data file (repeat for all files in the granule) or Failed PGE	Fixed String	ASCII (9 B)	'FILE_SPEC'
DIRECTORY_ID	File directory location (i.e., a path name)	Variable String	ASCII ¹	directory
FILE_ID	File name of granule, as defined by SCF, used for distribution if no LocalGranuleID in the metadata	Variable String	ASCII ¹	science data file name

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Table 4.5-2. Product Delivery Record PVL Parameters (4 of 6)

Parameter	Description	Type	Format/ Max Size (Bytes)	Value
FILE_TYPE	File Type of the data. See Table 4.5-4.	Variable String	ASCII (20 B)	'HDF-EOS', or 'HDF' or 'SCIENCE'
FILE_SIZE	Length of file in bytes	Unsigned 32 bit Integer	ASCII (10 B)	< 2 GB
FILE_CKSUM_TYPE	Type of checksum, presently either 32-bit unsigned value (type CKSUM) or 64-bit signed value (type ECS). Optional and allowed only for science files (e.g. FILE_TYPE = SCIENCE, HDF, or HDF-EOS but not metadata, BROWSE or PRODHIST).	Variable String	ASCII (max 64 B)	'CKSUM', 'ECS' or 'MD5'
FILE_CKSUM_VALUE	Checksum value. Required if the optional FILE_CKSUM_TYPE parameter is present.	Variable String	ASCII (max 255 B)	'<signed or unsigned numeric string>' or, for MD5, '<32-character hexadecimal string>' (with alpha characters all lower case)
END_OBJECT	End of file parameters for data file	Fixed String	ASCII (9 B)	'FILE_SPEC'
OBJECT	Start of file parameters for browse data, quality assessment or production history file. Repeat as needed.	Fixed String	ASCII (9 B)	'FILE_SPEC'
DIRECTORY_ID	File directory location (i.e., a path name)	Variable String	ASCII ¹	Directory
FILE_ID	File name of browse data file, quality assessment or production history file as defined by SCF, used for distribution, if no LocalGranuleID in the metadata	Variable String	ASCII ¹	browse data, quality assessment or production history file name
FILE_TYPE	File Type for Browse, quality assessment or production history per Table 4.5-4.	Variable String	ASCII (20 B)	'BROWSE' or 'QA' or 'PRODHIST'
FILE_SIZE	Length of file in bytes	Unsigned 32 bit Integer	ASCII (10 B)	< 2 GB
END_OBJECT	End of file parameters for Browse, quality assessment or production history data file	Fixed String	ASCII (9 B)	'FILE_SPEC'

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Table 4.5-2. Product Delivery Record PVL Parameters (5 of 6)

Parameter	Description	Type	Format/ Max Size (Bytes)	Value
END_OBJECT	End of file group parameters (repeat for each DATA_TYPE/group of files)	Fixed String	ASCII (10 B)	'FILE_GROUP'
OBJECT	Start of file group parameters (repeat for each DATA_TYPE/DATA_VERSION group of files) for a Linkage file group. If a Browse, QA or production history file is sent separately from the related DATA_TYPE/DATA_VERSION granules, it must be sent after the data granules have been ingested and placed in a separate FILE_GROUP that includes a LINKAGE file. A linkage file must be used whenever multiple pointers to the linked file are needed.	Fixed String	ASCII (10 B)	'FILE_GROUP'
DATA_TYPE	For a linkage FILE_GROUP, use the generic data type Browse, QA or PH	Variable String	ASCII (12 B)	'Browse' or 'QA' or 'PH'
DATA_VERSION	ESDT version number. For a linkage FILE_GROUP, this currently defaults to 001.	Integer	ASCII (3 B)	3-Digit version number
NODE_NAME	Name of network node on which the files in the file group are staged.	Variable String	ASCII (64 B)	Name or IP address of network node where files are located
OBJECT	Start of file parameters for Browse, quality assessment or production history file	Fixed String	ASCII (9 B)	'FILE_SPEC'
DIRECTORY_ID	File directory location (i.e., a path name)	Variable String	ASCII ¹	directory
FILE_ID	File name of browse data, quality assessment or production history file, as defined by science processing system. Used by ECS for distribution if no Local Granule ID in the metadata.	Variable String	ASCII ¹	browse, QA or production history file name
FILE_TYPE	File Type. See Table 4.5-4.	Variable String	ASCII (20 B)	'BROWSE' or 'QA' or 'PRODHIST'
FILE_SIZE	Length of file in bytes	Unsigned 32 bit Integer	ASCII (10 B)	< 2 GB
END_OBJECT	End of file parameters for Browse, quality assessment or production history data file	Fixed String	ASCII (9 B)	'FILE_SPEC'
OBJECT	Start of file parameters for optional metadata file for Browse or quality assessment. There is no metadata option for production history.	Fixed String	ASCII (9 B)	'FILE_SPEC'

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Table 4.5-2. Product Delivery Record PVL Parameters (6 of 6)

Parameter	Description	Type	Format/ Max Size (Bytes)	Value
DIRECTORY_ID	File directory location (i.e., a path name)	Variable String	ASCII ¹	Directory
FILE_ID	File name of metadata file for browse data or quality assessment file, as defined by science processing system. Used by ECS for distribution if no Local Granule ID in the metadata.	Variable String	ASCII ¹	browse or QA metadata file name
FILE_TYPE	File Type for browse or QA metadata file. See Table 4.5-4.	Variable String	ASCII (20 B)	'BROWSE_METADATA' or 'QA_METADATA'
FILE_SIZE	Length of file in bytes	Unsigned 32-bit integer	ASCII (10 B)	< 2 GB
END_OBJECT	End of file parameters for Browse or QA metadata file	Fixed String	ASCII (9 B)	'FILE_SPEC'
OBJECT	Start of file parameters for Linkage file	Fixed String	ASCII (9 B)	'FILE_SPEC'
DIRECTORY_ID	File directory location (i.e., a path name)	Variable String	ASCII ¹	directory
FILE_ID	File name of Linkage file that identifies how to link browse, QA or production history file to associated data file(s)	Variable String	ASCII ¹	Linkage file name
FILE_TYPE	File Type for Linkage file. See Table 4.5-4.	Variable String	ASCII (20 B)	'LINKAGE'
FILE_SIZE	Length of file in bytes	Unsigned 32 bit Integer	ASCII (10 B)	< 2 GB
END_OBJECT	End of file parameters for Linkage file	Fixed String	ASCII (9 B)	'FILE_SPEC'
END_OBJECT	End of file group parameters for a Linkage group (repeat for each DATA_TYPE/group of files)	Fixed String	ASCII (10 B)	'FILE_GROUP'

¹Size does not exceed a total of 256 bytes when DIRECTORY_ID and FILE_ID are combined.

²Only used when PDR server is not under ECS control.

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EXAMPLE ONLY	EXAMPLE ONLY
<pre> ORIGINATING_SYSTEM = SIPS1234; /* SIPS Processor Identifier */ TOTAL_FILE_COUNT = 8; EXPIRATION_TIME = 1998-06-18T14:00:00Z; OBJECT = FILE_GROUP; /* Example for a Science Data Granule */ DATA_TYPE = SIPS_DATA; /* Valid ECS ESDT Shortname */ DATA_VERSION = 003; NODE_NAME = calibrsv.nasa.gov; OBJECT = FILE_SPEC; DIRECTORY_ID = SIPS1/CAL1; FILE_ID = 7SIPSCALP.01A; /* *Per SIPS file naming convention */ FILE_TYPE = SCIENCE; /* Allowed values pre-defined per Table 4.5-4 */ FILE_SIZE = 1000000; END_OBJECT = FILE_SPEC; OBJECT = FILE_SPEC; DIRECTORY_ID = SIPS1/CAL2; </pre>	

Figure 4.5-3. Example PDR PVL for Data Granule, Failed PGE and a Linkage Group (1 of 2)

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```

FILE_ID = 7SIPSCALP.02A.MET; /* Per SIPS file naming convention but must have .MET or .xml extension */
FILE_TYPE = METADATA; /* Required with Science file per Table 4.5-4 */
FILE_SIZE = 2000;
END_OBJECT = FILE_SPEC;
OBJECT = FILE_SPEC;
    DIRECTORY_ID = SIPS1/BROWSE;
    FILE_ID = 7SIPSCALP.01A.BROWSE; /* per SIPS naming convention */
    FILE_TYPE = BROWSE; /* a browse mapped one-to-one to the science granule, delivered with the science granule */
    FILE_SIZE = 1000000;
END_OBJECT = FILE_SPEC;
END_OBJECT = FILE_GROUP;
OBJECT = FILE_GROUP; /* Example for a Failed PGE file */
    DATA_TYPE = FAILPGE; /* Generic data type for Failed PGE */
    DATA_VERSION = 001; /* defaults to 1; presently no significance */
    NODE_NAME = calibsrv.nasa.gov;
    OBJECT = FILE_SPEC; /*Failed PGE file*/
    DIRECTORY_ID = SIPS1/FAILPGE;
    FILE_ID = 7SIPSCALP.01A.FAILPGE;
    FILE_TYPE = SCIENCE; /* per Table 4.5-4 */
    FILE_SIZE = 1929430;
END_OBJECT = FILE_SPEC;
OBJECT = FILE_SPEC; /* required metadata file for Failed PGE per Table 4.5-4 */
    DIRECTORY_ID = SIPS1/FAILPGE;
    FILE_ID = 7SIPSCALP.01A.FAILPGE.met;
    FILE_TYPE = METADATA; /* per Table 4.5-4 */
    FILE_SIZE = 2934;
END_OBJECT = FILE_SPEC;
END_OBJECT = FILE_GROUP;
/* An example of a Browse delivered after the associated science granule has been ingested */
OBJECT = FILE_GROUP;
    DATA_TYPE = Browse; /* Generic data type of file to be linked, Browse */
    DATA_VERSION = 001; /* defaults to 1; presently no significance */
    NODE_NAME = calibsrv.nasa.gov;
    OBJECT = FILE_SPEC;
    DIRECTORY_ID = SIPS1/BROWSE;
    FILE_ID = 7SIPSBRO.JANUARY1998; /* Per SIPS file naming convention */
    FILE_TYPE = BROWSE; /* Allowed values pre-defined per Table 4.5-4 */

```

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```

FILE_SIZE = 5040105;
END_OBJECT = FILE_SPEC;
OBJECT = FILE_SPEC; /* Optional metadata file for Browse */
    DIRECTORY_ID = SIPS1/BROWSE;
    FILE_ID = 7SIPSBROJANUARY1998.met;
    FILE_TYPE = BROWSE_METADATA;
    FILE_SIZE = 1798;
END_OBJECT = FILE_SPEC;
OBJECT = FILE_SPEC;
    DIRECTORY_ID = SIPS1/BROWSE/LINKS;
    FILE_ID = LINKFILE011998.PVL; /* per SIPS file naming convention */
    FILE_TYPE = LINKAGE; /* Allowed values pre-defined per Table 4.5-4 */
    FILE_SIZE = 2000;
END_OBJECT = FILE_SPEC;
END_OBJECT = FILE_GROUP
/*-----*/
/* Repeat FILE_GROUP objects for each different file group */
/*-----*/

```

**Figure 4.5-3. Example PDR PVL for Data Granule, Failed PGE and a Linkage Group
(2 of 2)**

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Table 4.5-3. Linkage File PVL Parameters

Parameter	Description	Type/Format (Length in Bytes)	Value
Suggested comment	Type of file and file name being linked (browse, QA or production history). (Note: ECS uses PDR to determine file but comment may be useful for visual checks.)		/*<string>*/
GROUP	Start of linkage file	Fixed String	'LINKAGE_POINTERS'
NUM_POINTERS	Number of Granules to be linked (number of GRANULE_POINTERS)	Integer	1-9999
GRANULE_POINTER_nnn	Pointer in LGID reference format (per Section 5.4). Repeat with suffix nnn=_001, _002, ... for each granule to be linked.	Variable String	LGID:ShortName:VersionID:Identifier
END_GROUP	End of Linkage File	Fixed String	'LINKAGE_POINTERS'
END	Required ODL END statement		

```

/*linkage for browse file <filename>*/
GROUP = LINKAGE_POINTERS
  NUM_POINTERS = 3
  GRANULE_POINTER_001 = "LGID:CERES01:001:ceres0110010119.122357001.dat"
  GRANULE_POINTER_002 = "LGID:CERES01:002:ceres0120010119.122357001.dat"
  GRANULE_POINTER_003 = "LGID:CERES01:003:ceres0130010119.122357001.dat"

END_GROUP = LINKAGE_POINTERS
END
    
```

Figure 4.5-4. Example Linkage File

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Table 4.5-4. FILE_TYPE Values and Linkages for PDR (1 of 2)

PDR FILE_TYPE Value	File Description	PDR Linkage Guidelines
BROWSE	Science Browse Data Granules	Supply in same FILE_GROUP as its data granule(s) or, if on separate PDR, in its own FILE_GROUP with Linkage file. May be accompanied by a BROWSE_METADATA file in the same FILE_GROUP. In a linkage FILE_GROUP for Browse data, use DATA_TYPE Browse.
BROWSE_METADATA	ECS-Compliant Metadata (.met) File for a Browse file	Supply in the same FILE_GROUP as its related Browse file. Optional (but must be used if the BrowseDescription attribute is to be associated with the browse granule)
DELETED	DELETED	DELETED
HDF	Science Data Granule in HDF	Must be accompanied by a METADATA file in same FILE_GROUP
HDF-EOS	Science Data Granule in HDF containing HDF_EOS objects.	Must be accompanied by a METADATA file in same FILE_GROUP
LINKAGE	PVL file providing browse, production history or QA pointer information to update science granule metadata already in the archive. Must be used whenever multiple pointers to a single Browse, production history or QA file are to be set.	Supply in FILE_GROUP with the FILE_TYPE to be linked. DATA_TYPE for the FILE_GROUP is that of the file to be linked (Browse, PH or QA).

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Table 4.5-4. FILE_TYPE Values and Linkages for PDR (2 of 2)

PDR FILE_TYPE Value	File Description	PDR Linkage Guidelines
METADATA	ECS-Compliant Metadata File. Use this FILE_TYPE to supply metadata for a granule of any DATA_TYPE for which a special metadata file type has not been specified (Browse and QA have special metadata types). Note: the METADATA file may be either .met or .xml but XML metadata is supported only for science data.	Supply in same FILE_GROUP as its data granule. Required.
PRODHIST	Production History Granule	Supply in same FILE_GROUP as its data granule or, if on separate PDR, in own FILE_GROUP with a Linkage file. Production History never has a metadata file of its own. In a linkage FILE_GROUP for production history file, the DATA_TYPE is PH.
QA	Quality Assessment Granule. These are essentially QA information files	Supply in same FILE_GROUP as its data granule or, if on a separate PDR from its data granule, in its own FILE_GROUP with a Linkage file. May be accompanied by a QA_METADATA file in the same FILE_GROUP. In a linkage FILE_GROUP for QA, the DATA_TYPE is QA.
QA_METADATA	ECS-Compliant Metadata (.met) File for a QA file	Supply in the same FILE_GROUP as its related QA file. Optional
SCIENCE	Science Data Granule in unspecified format. Includes QA Data and Failed PGE files.	Must be accompanied by a METADATA file in same FILE_GROUP.

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4.5.4 Product Delivery Record Discrepancy (PDRD)

The Product Delivery Record Discrepancy (PDRD) is sent by ECS to the SIPS via ftp and/or e-mail (or via scp and/or email), only in the event that the PDR cannot be successfully validated. The subject of the e-mail message is the PDRD file name. The e-mail address (or ftp address) is an operator-tunable parameter documented for each SIPS in an Operations Agreement(s) between the DAAC(s) and the SIPS. The PDRD identifies the error/success dispositions for file groups in the PDR resulting from ECS's attempt to validate the PDR. The same file-naming convention is used for the PDRD as for the PDR, except that the file name extension is '.PDRD' instead of the '.PDR'. There are two forms of PDRD, a short form (Table 4.5-5) and long form (Table 4.5-6). The short form is used when the first error encountered in each file group within the PDR is the same or the first error found applies to each group. The long form is used when one or more file groups in the PDR have invalid parameters; some file groups may be error-free. For each file group, if an error is encountered when the PDR is processed, ECS halts processing and reports the error that it just encountered for that file group. None of the remaining conditions in that file group are validated. ECS processing then continues on with the next file group in the PDR. The dispositions in the Long PDRD will be reported for all file groups in the order listed in the PDR. In the event that a PDRD is returned to the SIPS, none of the files are transferred to the ECS for processing, and the SIPS must correct the errors and resubmit the entire PDR for processing.

The PDRD consists of PVL Statements. Short and Long PDRD PVL examples are provided, respectively, in Figure 4.5-5 and Figure 4.5-6.

EXAMPLE ONLY	EXAMPLE ONLY
<pre>MESSAGE TYPE = SHORTPDRD; DISPOSITION = "DATABASE FAILURES";</pre>	

Figure 4.5-5. Example Short PDRD PVL

EXAMPLE ONLY	EXAMPLE ONLY
<pre>MESSAGE_TYPE = LONGPDRD; NO_FILE_GRP = 3; DATA_TYPE = SIPS_DATA1; DISPOSITION = "INVALID DATA TYPE"; DATA_TYPE = SIPS_DATA2; DISPOSITION = "INVALID FILE ID"; DATA_TYPE = SIPS_DATA3; DISPOSITION = "SUCCESSFUL";</pre>	

Figure 4.5-6. Example Long PDRD PVL

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Table 4.5-5. Short Product Delivery Record Discrepancy PVL Parameters

Parameter ²	Description	Type/Format (Length in Bytes)	Value ²	Explanation
MESSAGE_TYPE	Short Product Delivery Record Discrepancy	Fixed String/ASCII (9)	SHORTPDRD	
DISPOSITION	Disposition of Ingest Request ¹	Variable String/ASCII (64)	One of the following:	
			"INVALID FILE COUNT"	TOTAL_FILE_COUNT parameter is either missing or <= 0 - not retryable
			"ECS INTERNAL ERROR"	Memory allocation error, if doing a cross-mode/DAAC ingest and the version ID for the DDIST data type is not in the InCurrentDataTypesMap database table, if the PDR file name is null, if the PDR file can't be found or has a size of 0, or if the PDR can't be copied from the local to the remote Request directory - could be either retryable or not retryable ³ depending on why the error occurred
			"DATABASE FAILURES"	Error in accessing the Ingest database - could be either retryable or not retryable ³ depending on why the database access failed (execution of stored procedures already gets retried)
			"MISSING OR INVALID ORIGINATING_SYSTEM PARAMETER"	ORIGINATING_SYSTEM parameter is missing or empty - not retryable
			"DATA PROVIDER REQUEST THRESHOLD EXCEEDED"	This will not occur unless the data provider request threshold is lowered while Polling is in the middle of processing - retryable
			"DATA PROVIDER VOLUME THRESHOLD EXCEEDED"	If the size of a request will cause the data provider volume threshold to be exceeded - retryable
			"SYSTEM REQUEST THRESHOLD EXCEEDED"	This will not occur unless the data provider request threshold is less than the system request threshold - retryable
			"SYSTEM VOLUME THRESHOLD EXCEEDED"	If the size of a request will cause the system volume threshold to be exceeded - retryable

¹In any given instance, only one disposition value is provided. In cases where multiple errors may exist, the disposition value corresponding to the first error encountered will be provided.

²Each parameter/value is followed by an EOL mark.

³It is recommended that these errors not be retried without prior agreement with the DAAC.

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Table 4.5-6. Long Product Delivery Record Discrepancy PVL Parameters

Parameter ²	Description	Type/Format (Length in Bytes)	Value ²
MESSAGE_TYPE	Long Product Delivery Record Discrepancy	Fixed String/ASCII (8)	LONGPDRD
NO_FILE_GRP (to follow)	Number of File Groups in the PDR	Integer/ASCII (4)	Number of File Groups in the PDR

For each file group in the PDR

Parameter	Description	Type/Format (Length in Bytes)	Value ²	Explanation
DATA_TYPE	ECS Data Type	ASCII String (20)	DATA_TYPE in PDR	
DISPOSITION	Disposition of Ingest Request ¹	Variable String/ASCII (64)	One of the following:	
			“SUCCESSFUL”	No error
			“INVALID DATA TYPE” ³	The DATA_TYPE parameter is missing from the file group or the value along with its appropriate Version ID is not in the Ingest database - not retryable
			“INVALID DIRECTORY” ³	The DIRECTORY_ID parameter is missing or empty for a file - not retryable
			“INVALID FILE SIZE”	The FILE_SIZE parameter is missing, empty, greater than 2 GB or 0 for a file - not retryable
			“INVALID FILE ID” ³	The FILE_ID parameter is missing or empty for a file - not retryable
			“INVALID NODE NAME” ³	The NODE_NAME parameter is missing or empty for the file group - not retryable
			“INVALID FILE TYPE” ³	The FILE_TYPE parameter is missing or empty for a file or the value is not in the Ingest database for the given data type - not retryable
			“UNSUPPORTED CHECKSUM TYPE”	The checksum type given on the PDR is not supported by the ECS – not retryable
			“MISSING FILE_CKSUM_VALUE PARAMETER”	The FILE_CKSUM_TYPE parameter is present on the PDR but the FILE_CKSUM_VALUE is not – not retryable
			“MISSING FILE_CKSUM_TYPE PARAMETER”	The FILE_CKSUM_VALUE is present but FILE_CKSUM_TYPE is not – not retryable
			“INVALID FILE_CKSUM_VALUE”	The FILE_CKSUM_VALUE is present but syntactically incorrect – not retryable

¹For each file group, only one disposition value may be provided. In cases where multiple errors may exist, the disposition value corresponding to the first error encountered will be provided.

²Each parameter/value statement is followed by an EOL mark.

³Null string check only

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4.5.5 Production Acceptance Notification (PAN)

After ECS has attempted to ingest and archive the data, ECS automatically sends a “Production Acceptance Notification” (PAN) via e-mail or ftp (or via email or scp) to the SIPS. The PAN file announces the completion of data transfer and archival, and identifies any errors or problems that have been encountered. The e-mail, ftp or scp address and actions to be taken in case of data or archival failure are specified for each SIPS, in an Operations Agreement(s) between the DAAC(s) and the SIPS.

The naming convention for the PAN is the same as that used for the PDR, except that the file name extension is PAN instead of PDR. The subject of an e-mail PAN is the PAN file name. There are two forms of the PAN, a short (Table 4.5-7) and a long (Table 4.5-8) form. The short form of the PAN is sent to acknowledge that all files have been successfully transferred, or to report errors that are not specific to individual files but which have precluded processing of any and all files (e.g., ftp failure). If all files in a request do not have the same disposition, the long form of this message is employed. For each file in a file group, if an error is encountered, ECS halts processing and reports the error that it just encountered for that file. Remaining conditions in that file are not validated. ECS processing then continues on with the next file in the file group. If there are no more files to process in the file group, ECS processing then continues on with the next file group in the PDR.

The PAN consists of PVL Statements. Short and Long PAN PVL examples are provided, respectively, in Figure 4.5-7 and Figure 4.5-8.

If one or more of the pointers in a Linkage file cannot be resolved, the ingest fails and the PAN is sent with the disposition message “REFERENCED GRANULE NOT FOUND” or “REFERENCED GRANULE DUPLICATED”.

EXAMPLE ONLY	EXAMPLE ONLY
<pre>MESSAGE_TYPE = SHORTPAN; DISPOSITION = "POST-TRANSFER FILE SIZE CHECK FAILURE"; TIME_STAMP = ;</pre>	

Figure 4.5-7. Example Short PAN PVL

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EXAMPLE ONLY	EXAMPLE ONLY
MESSAGE_TYPE = LONGPAN;	
NO_OF_FILES = 3;	
FILE_DIRECTORY = /SIPS1/CAL1;	
FILE_NAME = 7SIPSCALP.01A;	
DISPOSITION = "UNABLE TO ESTABLISH FTP/KFTP CONNECTION";	
TIME_STAMP = ;	
FILE_DIRECTORY = /SIPS1/CAL2;	
FILE_NAME = 7SIPSCALP.02A;	
DISPOSITION = "ECS INTERNAL ERROR";	
TIME_STAMP = ;	
FILE_DIRECTORY = /SIPS1/CAL2;	
FILE_NAME = 7SIPSCALP.03A;	
DISPOSITION = "SUCCESSFUL";	
TIME_STAMP = 1996-04-28T23:59:59Z;	

Figure 4.5-8. Example Long PAN PVL

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Table 4.5-7. Short Production Acceptance Notification PVL Parameters (1 of 2)

Parameter ²	Description	Type/ Format (Length in Bytes)	Value ²	Explanation
MESSAGE_TYPE	Short Production Acceptance Notification Definition	Fixed String/ASCII (8)	SHORTPAN	
DISPOSITION	Disposition of Ingest Request ¹	Variable String/ASCII (64)	One of the following:	
			"SUCCESSFUL" ⁴	No error
			"NETWORK FAILURE" ^{5, 8}	Ftp service not available - retryable
			"UNABLE TO ESTABLISH FTP/KFTP CONNECTION" ⁸	Cannot open ftp/scp data connection - retryable
			"ALL FILE GROUPS/FILES NOT FOUND" ⁵	Data file not available when trying to ftp it or data file not found or has a size of 0 after it has been ftp'd - may or may not be retryable ⁹
			"FTP/KFTP FAILURE" ^{5, 8}	Other ftp errors - may or may not be retryable
			POST-TRANSFER FILE SIZE CHECK FAILURE" ⁵	Size of data file in the PDR is incorrect or the entire data file did not get ftp'd - first case is not retryable, the second case is retryable
			FTP/KFTP COMMAND FAILURE" ^{5, 7}	Ftp/scp command syntax error, ftp/scp command not implemented, bad ftp/scp command sequence, or ftp/scp command not implemented for a parameter - not retryable
			"DUPLICATE FILE NAME IN GRANULE" ⁵	Duplicate file name in granule - not retryable
			"METADATA PREPROCESSING ERROR" ⁴	Error in generating metadata file - may or may not be retryable ⁹
			"LINKAGE FILE PREPROCESSING ERROR" ⁴	Error in preprocessing linkage file - may or may not be retryable ⁹
			"RESOURCE ALLOCATION FAILURE" ⁵	Unable to create or extend the staging disk - may or may not be retryable ⁹
			"ECS INTERNAL ERROR" ⁶	Error in accessing the Ingest database, memory allocation error, invalid request volume, error in parsing the PDR file, error in warm starting a request, and any other errors not covered by the other error codes - may or may not be retryable ⁹
			"INCORRECT NUMBER OF METADATA FILES"	Number of input metadata files is not within the minimum and maximum limits - not retryable
			"INCORRECT NUMBER OF SCIENCE FILES" ⁴	Number of input science files is not within the minimum and maximum limits - not retryable
			"INCORRECT NUMBER OF FILES" ⁴	No input files or the number of input files of a particular type (i.e., Browse) is not within the minimum and maximum limits - not retryable

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Table 4.5-7. Short Production Acceptance Notification PVL Parameters (2 of 2)

Parameter ²	Description	Type/ Format (Length in Bytes)	Value ²	Explanation
			"DATA CONVERSION FAILURE" ⁴	Error in preprocessing science files, validating metadata or adding file to appropriate group in the insert command - not retryable
			"REQUEST CANCELLED" ⁶	Granule has been cancelled or failed by the operator – may or may not be retryable ⁹
			"INVALID OR MISSING FILE TYPE" ⁴	If the input file type has a null or invalid internal file type in the Ingest database - not retryable
			"FILE I/O ERROR" ⁴	Error when copying files which were generated by the Ingest preprocessing to the staging disk - may or may not be retryable ⁹
			"DATA ARCHIVE ERROR" ⁴	Archive error - may or may not be retryable ⁹
			"REFERENCED GRANULE NOT FOUND" ⁴	No granule UR found for granule referenced in a linkage file - may or may not be retryable ⁹
			"REFERENCED GRANULE DUPLICATED" ⁴	Multiple granules URs found for granule referenced in a linkage file - not retryable
			"CHECKSUM VERIFICATION FAILURE" ⁴	If checksum on ingest is required but the checksum in the PDR could not be verified when recomputed by ECS – not retryable
TIME_STAMP ³	ISO Time when the ECS completed transfer of the file. Does not necessarily indicate successful ingest.	ASCII (20)	GMT in the format: yyyy-mm-ddThh:mm:ssZ, where T indicates the start of time information and Z indicates "Zulu" time	

¹In any given instance, only one disposition value may be provided. In cases where multiple errors have occurred, the disposition value corresponding to the first error encountered will be provided.

²Each parameter/value statement is followed by an EOL mark.

³The time stamp is present only in certain circumstances. If the time stamp is null, the value will be 20 spaces (character 20 hex). See the footnotes on the values for "Disposition" to determine when the time stamp is null.

⁴Dispositions for which there will always be a time stamp.

⁵Dispositions for which the time stamp will always be null.

⁶Dispositions for which the time stamp is sometimes null, i.e., when the file has not been ftp'd.

⁷ftp is not supported; the reference is an artifact of an earlier design.

⁸It is recommended that these be automatically retried but retries should be limited to 10-minute intervals for 3 hours.

⁹It is recommended that these errors not be retried without prior agreement with the DAAC.

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Table 4.5-8. Long Production Acceptance Notification PVL Parameters

Parameter ²	Description	Type/Format (Length in Bytes)	Value ²
MESSAGE_TYPE	Long Production Acceptance Notification	Fixed String/ASCII (7)	LONGPAN
NO_OF_FILES	Number of Files in PDR	ASCII (4)	TOTAL_FILE_COUNT parameter in PDR

For each File in the PDR

FILE_DIRECTORY	ASCII string specifying file directory location	ASCII (<256) Equivalent to PDR length	DIRECTORY_ID parameter in PDR
FILE_NAME	File names on system creating PDR	ASCII (<256) Equivalent to PDR length	FILE_ID parameter in PDR
DISPOSITION ¹	Disposition of Ingest Request	Variable String/ASCII (64)	See Table 4.5-7 for List of Disposition messages with explanations.
TIME_STAMP ³	ISO Time when the ECS completed transfer of the file. Does not necessarily indicate successful ingest.	ASCII (20)	GMT in the format: yyyy-mm-ddThh:mm:ssZ, where T indicates the start of time information and Z indicates "Zulu" time.

¹In any given instance, only one disposition value may be provided. In cases where multiple errors have occurred, the disposition value corresponding to the first error encountered will be provided.

²Each parameter/value statement is followed by an EOL mark.

³The time stamp is present only in certain circumstances. If the time stamp is null, the value will be 20 spaces (character 20 hex). See the footnotes on the values for "Disposition" to determine when the time stamp is null.

4.5.6 SIPS-ECS Electronic Data Exchange Error Handling/Back-up Methods

During the course of data exchange via ftp, the following typical error conditions may arise:

- Failure to establish TCP/IP connection
- Erroneous ftp command
- File not found (listed in PDR, but not found on disk)
- File not readable due to permissions

Should a problem develop during an ftp file transfer due to any of the above error conditions, an operator-tunable number of attempts are made to pull the data. In the event that problems cannot be resolved within this operator-tunable number of attempts, the DAAC and SIPS operations personnel should coordinate recovery efforts.

4.6 Ordering Archived Data for Reprocessing (Deleted)

4.7 Data Exchange Security

The ECS implements EOSDIS security policy by supporting the following standard file transfer methods:

If the ECS is using ftp to poll the SIPS's disk, standard ftp login procedures including the use of a password for the purposes of security are used.

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Appendix B - Appendix B from Interface Control Document between the EOSDIS Core System (ECS) and the Science Investigator-led Processing Systems (SIPS) Volume 0, Interface Mechanisms, NASA ESDIS document 423-41-57, Revision J, CH01, August 2013 (expires August 2018)

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Appendix B. File Transfer Quick Reference Summary

1. **Granule.** There can be only *one* data granule (ESDT) in a FILE_GROUP on a PDR. The data granule may consist of multiple files, however.
2. **Metadata File.** Every data granule *must* be accompanied by a metadata (.met or .xml) file in the same FILE_GROUP (only one per file group).
3. **Browse, Production History, QA.** A data granule may also be accompanied by a browse file and/or a production history file and/or a quality assurance file in the same FILE_GROUP, *provided* that none of these files has multiple granule associations. Optional metadata files may accompany Browse and QA.
4. **Linkage.** Linkage files must be used whenever a new browse or production history or quality assurance file is to be linked to one or more granules already in the archive.
 - a. There can be only one linkage file per FILE_GROUP.
 - b. The pointers in the linkage file must conform to the format specified in Table 4.5-3 of the ECS-SIPS ICD Vol 0.
 - c. Linkage files cannot point to a granule(s) not already in the archive.
 - d. Linkage file ingest failures include PAN disposition messages “referenced granule not found” and “referenced granule duplicated” (if multiple URs are found for a linkage pointer).
5. **LocalGranuleID.**
 - a. Must be unique for each Granule in a given collection (ESDT).
 - b. Must be a valid filename for Unix or Windows-NT with a maximum length 80 characters.
 - c. ECS uses for constructing filename for the granule when it is distributed.
 - d. LocalGranuleId is a required metadata field for all products delivered from a SIPS.
6. **InputPointer.**
 - a. If the referenced input granule was obtained from ECS, the SIPS may use the ECS UR, extracted from the ECS distribution notice.
 - b. Otherwise the convention is, InputPointer is in the format LGID:ShortName:VersionID:Identifier, where Identifier is a LocalGranuleID and is unique within the given collection.
 - c. Non-standard InputPointer references will not affect Ingest or Insert by ECS, but may be confusing to end users and may not be compatible with any future services that might use the standard.