

**THERMAL and EVOLVED GAS ANALYZER EDR
(NASA LEVEL 0) and RDR (NASA LEVEL 1)
ARCHIVE VOLUME
SOFTWARE INTERFACE SPECIFICATION**

Version 2.3
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DOCUMENT CHANGE LOG

Change	Date	Affected Portions
Initial Draft	09/01/05	All
Added RDR	11/20/07	All
Updated from RDR review	03/19/08	All
Added list of Data set Cat files	04/21/08	2.8
Added TEGA_Tutorial information	04/21/08	2.6

TBD ITEMS

Section	Description
2.4 Data Directory Contents and Naming	TBD until naming convention is agreed upon – completed. Completed
2.9 Label Directory Contents	Data column .FMT Files not yet developed – completed. Completed
2.10 Software Directory Contents	Software files and descriptions not developed yet – completed. Completed
3.2.4 Software File Format	Software not developed - completed
3.2.6 Science Data File Formats	Not developed yet - completed
Table 1	TBD - completed

ACRONYMS AND ABBREVIATIONS

BCE	Bench Checkout Equipment
PEB	Payload Electronics Box
CODMAC	Committee on Data Management and Computation
CCSDS	Spacecraft Data Systems
CHDO	Compressed Header Data Object
DN	Digital Number
DSN	Deep Space Network
EDR	Experiment Data Record
EGA	Evolved Gas Analyzer
HTML	HyperText Markup Language
ICD	Interface Control Document
JPL	Jet Propulsion Laboratory
NSSDC	National Space Science Data Center
PAWG	Phoenix Archive Working Group
PDS	Planetary Data System
PECM	Power Emission Control Module
RDR	Reduced Data Record
SC	Scanning Calorimeter
SFDU	Standard Format Data Unit
SIS	Software Interface Specification
SOC	Science Operations Center
SOPC	Spacecraft Operations Processing Computer
TA	Thermal Analyzer
TBD	To Be Determined
TBW	To Be Written
TDS	Telemetry Data System
TEGA	Thermal and Evolved Gas Analyzer
UA	University of Arizona

GLOSSARY

Archive – An archive consists of one or more data sets along with all the documentation and ancillary information needed to understand and use the data. An archive is a logical construct independent of the medium on which it is stored.

Archive Volume, Archive Volume Set – A volume is a unit of media on which data products are stored; for example, one CD-ROM or DVD-ROM. An *archive volume* is a volume containing all or part of an archive; that is, data products plus documentation and ancillary files. When an archive spans multiple volumes, they are called an *archive volume set*. Usually the documentation and some ancillary files are repeated on each volume of the set, so that a single volume can be used alone.

Catalog Information – Descriptive information about a data set (e.g. mission description, spacecraft description, instrument description), expressed in Object Description Language (ODL) which is suitable for loading into a PDS catalog.

Data Product – A labeled grouping of data resulting from a scientific observation, usually stored in one file. A product label identifies, describes, and defines the structure of the data. An example of a data product is a planetary image, a spectrum table, or a time series table.

Data Set – An accumulation of data products. A data set together with supporting documentation and ancillary files is an archive.

Standard Data Product – A data product generated in a predefined way using well-understood procedures, processed in "pipeline" fashion. Data products that are generated in a nonstandard way are sometimes called *special data products*.

1. Introduction

1.1. Purpose and Scope

This Software Interface Specification is intended to be used by those who wish to understand the format and content of the Phoenix Project Thermal and Evolved Gas Analyzer (TEGA) EDR (NASA Level 0) and the TEGA RDR (NASA Level 1) Archives. Typically, these individuals would be software engineers, data analysts, or planetary scientists.

The specifications in this document apply to all TEGA EDR and RDR standard product archive volumes that are generated by the Phoenix Project.

1.2. Content Overview

Table 1-1 TEGA Standard Data Products

Product Type	NASA Level	Description	PDS Data Set ID
ENGEDR	0	Engineering data from instrument sensors as time series (engineering values from EGA and TA)	PHX-M-TEGA-2-ENGEDR-V1.0
SCEDR	0	SC oven heating time series of raw values of oven and shield power, current, voltage and pulse	PHX-M-TEGA-2-SCEDR-V1.0
EGAEDR	0	EGA detector currents (time series of counts), selected scanned peaks	PHX-M-TEGA-2-EGAEDR-V1.0
EGHEDR	0	EGA Mass hopping counts (time series of counts)	PHX-M-TEGA-2-EGHEDR - V1.0
LEDEDR	0	Oven fill data (time series of raw and integrated LED readings)	PHX-M-TEGA-2-LEDEDR-V1.0
MSGEDR	0	Instrument message log	PHX-M-TEGA-2-MSGEDR-V1.0
ENGRDR	1A	Engineering data converted to engineering units as time series	PHX-M-TEGA-3-ENGRDR-V1.0
SCRDR	1B	SC oven and shield duty cycle durations	PHX-M-TEGA-4-SCRDR-V1.0
EGSRDR	1B	EGA counts at each mass swept by the mass spectrometer.	PHX-M-TEGA-4-EGSRDR-V1.0
EGHRDR	1B	Times and counts at masses scanned in mass hopping mode.	PHX-M-TEGA-4-EGHRDR-V1.0

The EDR and RDR data products are generated by the TEGA Science Team at the University of Arizona (UA) and delivered to the Phoenix Science Operations Center (SOC) also at UA. The TEGA team plans to deliver both EDR and RDR products together in a single archive volume. The SOC will deliver the TEGA EDR and RDR archive to the PDS Geosciences Node at Washington University, St. Louis in accordance with the Phoenix Archive Plan.

This Software Interface Specification (SIS) describes the format, content, and generation of the TEGA EDR and RDR Archive. Section 2, Archive Volume Generation, describes the procedure

for transferring data products to archive media. Section 3, Archive Volume Contents, describes the structure of the archive volumes and the contents of each file. Section 4, Archive Volume Format, describes the file formats used on the archive volumes. Finally, Section 5, Support Staff and Cognizant Persons, lists the individuals responsible for generating the archive volumes.

1.3. Applicable Documents and Constraints

This Archive Volume SIS is intended to be consistent with the following documents:

1. Mars Exploration Program Data Management Plan, R. E. Arvidson et al., Rev. 3.0, March 20, 2002.
2. Phoenix Project Archive Generation, Validation and Transfer Plan, *Preliminary*, January 27, 2005, JPL D-29392.
3. Phoenix Project Thermal and Evolved Gas Analyzer Data Product EDR Software Interface Specification, Version 1.2, March 22, 2007, JPL D-33227.
4. *Planetary Data System Data Preparation Workbook*, February 17, 1995, Version 3.1, JPL D-7669, Part 1.
5. *Planetary Data System Standards Reference*, June 15, 2001, Version 3.4. JPL D-7669, Part 2.
6. ISO 9660-1988, Information Processing - Volume and File Structure of CD-ROM for Information Exchange, April 15, 1988.
7. Phoenix Project Thermal and Evolved Gas Analyzer Data Product RDR Software Interface Specification, Version 2.0, March 19, 2008.

1.4. Relationships with Other Interfaces

This Archive Volume SIS could be affected by changes to the design of the TEGA EDR standard data products (Applicable Document #3) or by changes to the design of the TEGA RDR standard data products (Applicable Document #7).

2. Archive Volume Contents

This section describes the contents of the TEGA EDR and RDR Archive volumes, including the file names, file contents, file types, and organization responsible for providing the files, either the PDS Geosciences Node or the TEGA Science Team.

2.1. Online and Physical Storage

The TEGA EDR and RDR archive will be made available through the Planetary Data System via online Internet access and via physical media such as DVDs. The PDS will store at least three copies of the TEGA EDR and RDR archive on physical media for long-term preservation.

The following description of the contents of the TEGA archive volume applies to both physical volumes and online storage. The online TEGA archive will be organized as one large volume.

2.2. Archive Volume Directories

TEGA EDR and RDR archive volumes will include the following directories.

<u>Directory</u>	<u>Contents</u>
Volume root directory	Introduction and errata text files
CATALOG	Descriptions of data set, instruments, spacecraft, and mission as found in the PDS Catalog
DOCUMENT	Documentation files
INDEX	Volume and cumulative index tables
LABEL	Descriptions of data file formats, referenced by PDS labels
SOFTWARE	Source code library to aid programmers in parsing the data files
Data directories	Data files and their detached PDS labels

The contents of these directories are described in detail in Sections 2.3 to 2.10.

2.3. Root Directory Contents

Files in the Root Directory include an overview of the archive, a description of the volume for the PDS Catalog, and a list of errata or comments about the archive. The following files are contained in the Root Directory.

<u>File Name</u>	<u>File Contents</u>	<u>File Provided By</u>
AAREADME.TXT	Volume content and format information	Geosciences
ERRATA.TXT	A cumulative listing of comments and updates concerning all archive volumes published to date	Geosciences
VOLDESC.CAT	A description of the contents of this volume in a PDS format readable by both humans and computers	Geosciences

2.4. Data Directory Contents and Naming

TEGA EDR and RDR data products are aggregated by Solar days since first full day on Mars. Landing day is Sol zero. Each product contains one Sol worth of data. Data for each Sol will be in a subdirectory named in the format SOL, indicating the Sol of the data acquisition period. For the EDR data, each SOL labeled subdirectory directory will contain six PDS labels and associated data files for the six product types listed in section 1.2. For the RDR data, each SOL labeled subdirectory will contain four PDS labels and associated data files for the four product types listed in section 1.2.

The following schematic shows an example of the nesting of directories for the EDR data acquired during Sol 2, this include all data taken from wake-up to shut down for Sol 2, where Sol is defines as the Mars day since landing with Sol 0 being landing day. TEGA had two activities that were run on Sol 2, as indicated by the two subdirectories under Sol 2.

<Volume Root>

```
| - 2008
|   | - label
|   |   | --
|   |   | --
|   | -- 002
|   |   | --1
|   |   |   | -- < ENGEDR data acquired on the second Sol>
|   |   |   | -- < SCEDR data acquired on the second Sol>
|   |   |   | -- < EGAEDR data acquired on the second Sol>
|   |   |   | -- < EGHEDR data acquired on the second Sol>
|   |   |   | -- < LEDEDR data acquired on the second Sol>
|   |   |   | -- < MSGEDR data acquired on the second Sol>
|   |   | --2
|   |   |   | -- < ENGEDR data acquired on the second Sol>
|   |   |   | -- < SCEDR data acquired on the second Sol>
|   |   |   | -- < EGAEDR data acquired on the second Sol>
|   |   |   | -- < EGHEDR data acquired on the second Sol>
|   |   |   | -- < LEDEDR data acquired on the second Sol>
|   |   |   | -- < MSGEDR data acquired on the second Sol>
|   |   |
```

The following schematic shows an example of the nesting of directories for the RDR data acquired beginning at midnight March 18, 2009 through March 19 2009.

<Volume Root>

```
| - 2008
|   | - label
|   |   | --
```

```

|      |      | --
|      |-- 002
|      |      |--1
|      |      |      |-- < ENGRDR data acquired on the second Sol>
|      |      |      |-- < SCRDR data acquired on the second Sol>
|      |      |      |-- < EGSRDR data acquired on the second Sol>
|      |      |      |-- < EGHRDR data acquired on the second Sol>
|      |      |--2
|      |      |      |-- < ENGRDR data acquired on the second Sol>
|      |      |      |-- < SCRDR data acquired on the second Sol>
|      |      |      |-- < EGSRDR data acquired on the second Sol>
|      |      |      |-- < EGHRDR data acquired on the second Sol>

```

The file naming rules are described in section 4.5.

2.5. Index Directory Contents

Files in the Index Directory are provided to help the user locate products on this archive volume and on previously released volumes in the archive. The following files are contained in the Index Directory of the EDR and RDR archive volumes.

File Name	File Contents	File Provided By
INDXINFO.TXT	A description of the contents of this directory	TEGA
INDEX.TAB	A table listing all data products on this volume	TEGA
INDEX.LBL	A PDS detached label that describes INDEX.TAB	TEGA

2.6. Document Directory Contents

The Document Directory contains documentation to help the user understand and use the archive data. The following files are contained in the Document Directory

File Name	File Contents	File Provided By
DOCINFO.TXT	A description of the contents of this directory	TEGA
TEGA_EDR_SIS.PDF	The EDR Data Product SIS as a PDF file	TEGA
TEGA_EDR_SIS.HTML	The EDR Data Product SIS as an HTML file	TGA
TEGA_EDR_SIS.LBL	A PDS detached label that describes both TEGA_EDR_SIS.HTML and TEGA_EDR_SIS.PDF	TEGA
TEGA_ARCHVOL_SIS.PDF	The Archive Volume SIS (this document) as a PDF file	TEGA

TEGA_ARCHVOL_SIS.HTML	The Archive Volume SIS (this document) as an HTML file	TEGA
TEGA_ARCHVOL_SIS.LBL	A PDS detached label that describes both TEGA_ARCHVOL_SIS.HTML and TEGA_ARCHVOL_SIS.PDF.	TEGA
TEGA_RDR_SIS.PDF	The RDR Data Product SIS as a PDF file	TEGA
TEGA_RDR_SIS.HTML	The RDR Data Product SIS as an HTML file	TEGA
TEGA_RDR_SIS.LBL	A PDS detached label that describes both TEGA_RDR_SIS.HTML and TEGA_RDR_SIS.PDF	TEGA
TEGA_Tutorial.PDF	A presentation on the operation of TEGA as a PDF file	TEGA
TEGA_Tutorial.HTML	A presentation on the operation of TEGA as an HTML file	TEGA

2.7. Calibration Directory Contents

The Calibration Directory contains calibration reports. This directory is the same for the EDR and RDR archive volumes.

File Name	File Contents	File Provided By
CALINFO.TXT	A description of the contents of this directory	TEGA
TEGA_CALIBRATION_REPORT.PDF	Describes instrument and data calibration performed by the TEGA team as a PDF file.	TEGA
TEGA_CALIBRATION_REPORT.HTML	Describes instrument and data calibration performed by the TEGA team as an HTML file.	TEGA
TEGA_CALIBRATION_REPORT.LBL	A PDS detached label that describes both TEGA_CALIBRATION_REPORT.HTML and TEGA_CALIBRATION_REPORT.PDF.	TEGA

2.8. Catalog Directory Contents

The files in the Catalog Directory provide a top-level understanding of the mission, spacecraft, instruments, and data sets. The files in this directory are coordinated with the PDS data engineer, who is responsible for loading them into the PDS catalog. The following files are found in the Catalog Directory of the EDR and RDR archive volumes.

File Name	File Contents	File Provided By
CATINFO.TXT	A description of the contents of this directory	TEGA
ENGEDR_DS.CAT	Engineering EDR Data set information for the PDS catalog	TEGA
EGHEDR_DS.CAT	EGA EDR Mass Scan Data set information for the PDS catalog	TEGA
EGAEDR_DS.CAT	EGA EDR Scan Data set information for the PDS catalog	TEGA
LEDEDR_DS.CAT	Sample Delivery EDR Data set information for the PDS catalog	TEGA
MSGEDR_DS.CAT	Messaging EDR Data set information for the PDS catalog	TEGA

SCEDR_DS.CAT	Scanning Calorimeter EDR Data set information for the PDS catalog	TEGA
ENGRDR_DS_CAT	Engineering RDR Data set information for the PDS catalog	TEGA
EGHRDR_DS_CAT	EGA RDR Mass Scan set information for the PDS catalog	TEGA
EGSRDR_DS_CAT	EGA RDR Scan set information for the PDS catalog	TEGA
SCRDR_DS_CAT	Scanning Calorimeter RDR set information for the PDS catalog	TEGA
INSTHOST.CAT	Instrument host (i.e., spacecraft) information for the PDS catalog	Geosciences
INST.CAT	Instrument information for the PDS catalog	TEGA
MISSION.CAT	Mission information for the PDS catalog	Geosciences
PERSON.CAT	Personnel information for the PDS catalog (Team and PDS personnel responsible for generating the archive)	TEGA
REF.CAT	References mentioned in other *.CAT files	TEGA

2.9. Label Directory Contents

The Label Directory contains files that describe data format and organization. These files are referred to in the PDS labels that accompany the data products. They are "include" files that are intended to be parsed as if they were part of the PDS labels that refer to them. The following files are contained in the Label Directory.

File Name	File Contents	File Provided By
LABINFO.TXT	A description of the contents of this directory	TEGA
TEGA_ENG.FMT	A description of the contents of the engineering data files	TEGA
TEGA_SC.FMT	A description of the contents of the scanning calorimetry data records	TEGA
SC_REC.FMT	A description of the contents of the scanning calorimetry data records	TEGA
TEGA_EGA.FMT	A description of the contents of the evolved gas analyzer mass sweep data records	TEGA
EGA_REC.FMT	A description of the contents of the evolved gas analyzer mass sweep data records	TEGA
TEGA_EGH.FMT	A description of the contents of the evolved gas analyzer mass hopping data records	TEGA
EGH_REC.FMT	A description of the contents of the evolved gas analyzer mass hopping data records	TEGA
TEGA_LED.FMT	A description of the contents of the LED reading data records	TEGA
LED_REC.FMT	A description of the contents of the LED reading data records	TEGA
TEGA_MSG.FMT	A description of the contents of the message data records	TEGA
TEGA_ENGRDR.FMT	A description of the reduced engineering data files	TEGA
TEGA_SCRDR.FMT	A description of the contents of the reduced scanning calorimetry data records	TEGA

TEGA_EGSRDR.FMT	A description of the contents of the reduced evolved gas analyzer mass sweep data records	TEGA
TEGA_EGSRDR_REC.FMT	A description of the contents of the reduced evolved gas analyzer mass sweep data records	TEGA
TEGA_EGHRDR.FMT	A description of the contents of the reduced evolved gas analyzer mass hopping data records	TEGA
TEGA_EGHRDR_REC.FMT	A description of the contents of the reduced evolved gas analyzer mass hopping data records	TEGA

2.10. Software Directory Contents (optional)

The Software Directory contains utilities or application programs to aid the user in viewing or extracting data from the data product files. The following files are contained in the Software Directory.

File Name	File Contents	File Provided By
SOFTINFO.TXT	A description of the contents of this directory	TEGA

At this point there is no software being delivered.

3. Archive Volume Format

This section describes the format of TEGA EDR and RDR Archive Volumes. Data that comprise the Archives will be formatted in accordance with Planetary Data System specifications [Applicable Documents 4 and 5].

3.1. Disk Format

The TEGA EDR and RDR Archive Volumes have a compact disk format that is compatible with the computer operating systems Windows, Macintosh, and SunOS. The volume format is in accordance with ISO 9660 level 2 Interchange Standard [Applicable Document 6].

3.2. File Formats

This section describes file formats for the kinds of files contained on the TEGA EDR and RDR Archive Volumes.

3.2.1. Document File Format

Document files with the .TXT suffix exist in the Root, Index, Software, Catalog, Document, Software and Label directories. They are ASCII files which may have embedded PDS labels. Lines in a .TXT file end with a carriage return character (ASCII 13) and a line feed character (ASCII 10). This allows the files to be readable under various operating systems.

Documents in the Document directory may contain formatting and figures that cannot be rendered as ASCII text. Therefore each document is given in two formats, hypertext and PDF. The hypertext file contains ASCII text plus hypertext markup language (HTML) commands that enable it to be viewed in a Web browser such as Netscape Navigator or Microsoft Internet

Explorer. The hypertext file may be accompanied by ancillary files such as images and style sheets that are incorporated into the document by the Web browser. The second format, PDF (Portable Document Format) is a proprietary format of Adobe Systems Incorporated that is frequently used for distributing documents. Adobe offers free software, Acrobat Reader, for viewing PDF files.

3.2.2. Tabular File Format

Tabular files (.TAB suffix) exist in the Index directory. Tabular files are ASCII files formatted for direct reading into many database management systems on various computers. All fields are separated by commas, and character fields are enclosed in double quotation marks ("). (Character fields are padded with spaces to keep quotation marks in the same columns of successive records.) Character fields are left justified, and numeric fields are right justified. The "start byte" and "bytes" values listed in the labels do not include the commas between fields or the quotation marks surrounding character fields. The records are of fixed length, and the last two bytes of each record contain the ASCII carriage return and line feed characters. This allows a table to be treated as a fixed length record file on computers that support this file type and as a text file with embedded line delimiters on those that don't.

All tabular files are described by PDS labels, either embedded at the beginning of the file or detached. If detached, the PDS label file has the same name as the data file it describes, with the extension .LBL; for example, the file INDEX.TAB is accompanied by the detached label file INDEX.LBL in the same directory.

3.2.3. PDS Label Format

All data files in the archive have PDS labels, either embedded at the beginning of the file or detached in a separate file. For examples of PDS labels for each type of data product, see the TEGA EDR Data Product SIS [Applicable Document 3] or the TEGA RDR Data Product SIS [Applicable Document 7].

A PDS label, whether embedded or detached from its associated file, provides descriptive information about the associated file. The PDS label is an object-oriented structure consisting of sets of 'keyword=value' declarations. The object to which the label refers (e.g. IMAGE, TABLE, etc.) is denoted by a statement of the form:

`^object = location`

in which the caret character (^, also called a pointer in this context) indicates where to find the object. In an embedded label, the location is an integer representing the starting record number of the object (the first record in the file is record 1). In a detached label, the location denotes the name of the file containing the object, along with the starting record or byte number, if there is more than one object in the file. For example:

`^HEADER = ("F01.IMG",1)`

`^IMAGE = ("F01.IMG",1025 <BYTES>)`

indicates that the IMAGE object begins at byte 1025 of the file F01.IMG, in the same directory as the detached label file

Lines of text in detached labels end with a carriage return character (ASCII 13) and a line feed character (ASCII 10). This allows the files to be readable under various operating systems.

3.2.4. Software File Format

None provided at this time.

3.2.5. Catalog File Format

Catalog files (suffix .CAT) exist in the Root and Catalog directories. They are text files containing descriptive information about the data set, instrument, spacecraft, and missions. These files are used as input to the PDS Catalog so that the information can be available to users who search the catalog. These files are formatted using 'keyword=value' statements similar to those in a PDS label, so that they can be read both by humans and by computers.

3.2.6. Science Data File Formats

TEGA EDR data files are in the form of binary time-series tables. The binary tables include columns of most-significant-byte-first (“big-endian”) unsigned integers. One file will contain one Sol’s data.

TEGA RDR data files are in the form of binary time-series tables. The binary tables include columns of most-significant-byte-first (“big-endian”) unsigned integers. One file will contain one Sol’s data.

For more information about the format and content of the EDR data products, see the EDR Data Product SIS [Applicable Document 3]. For more information about the format and content of the EDR data products, see the RDR Data Product SIS [Applicable Document 7].

4. Archive Volume Generation

4.1. Data Transfer and Validation Methods

TEGA EDR and RDR products are generated by the TEGA Science Team at the Lunar and Planetary Laboratory, University of Arizona. The products are delivered by Internet transfer to the Phoenix Project Science Operations Center (SOC). The TEGA team will assemble complete archive volumes including data products, documentation, and ancillary materials and deliver the archive volumes to the designated PDS Nodes (for TEGA products the Geosciences Node at Washington University in St. Louis).

The TEGA Science Team will validate the EDR and RDR products for science content as part of the product generation process. The Geosciences Node validates the EDR and RDR products and completes archive volumes for compliance with PDS standards and with the Data Product SIS and Archive Volume SIS documents.

EDR and RDR archive volumes are made available via Internet web access and FTP access at the Geosciences Nodes.

The Geosciences Node will generate DVD-R copies of archive volumes for delivery to PDS Central Node and the NSSDC. A copy of each volume will be kept at the Geosciences Node.

4.2. Data Product Sizes and Delivery Rates

Table 1 summarizes expected sizes and production rates for the TEGA EDR and RDR Standard Products.

Table 4-1 Standard Product Sizes and Delivery Rates

Product	Product Size (Bytes)	Production Rate	Expected Number of Products for Primary Mission (90 days)	Expected Total Data Volume for Primary Mission
ENGEDR	2,600,000	1 per sol	45	117,000,000
SCEDR	560,000	1 per sol	45	25,200,000
EGAEDR	46,000	1 per sol	45	2,070,000
EGHEDR	1,600,000	1 per sol	45	72,000,000
LEDEDR	16,000	1 per sol	45	720,000
MSGEDR	270,000	1 per sol	45	12,150,000
ENGRDR	4,460,000	1 per sol	45	200,700,000
SCRDR	2,000	1 per sol	45	90,000
EGSRDR	805,000	1 per sol	45	36,255,000
EGHRDR	23,000	1 per sol	45	1,035,000

The TEGA Science Team releases EDR and RDR data products to the SOC and subsequently the PDS according to the schedule outlined in the Phoenix Project Archive Generation, Validation, and Transfer Plan [Applicable Document 2]. The Phoenix Project Level 1 requirements state that Level 0 and Level 1 imaging data shall be archived with PDS within six months of the end of the

mission, and all other Level 0 and Level 1 data shall be archived within 12 months of the end of the mission [Applicable Document 2]. The actual delivery schedule will exceed these requirements: the Phoenix Project will make at least two deliveries to the PDS, the first one no later than six months after Sol 30 data are received on Earth, and the second one no later than six months after Sol 90 data are received on Earth. In the event of an extended mission, subsequent data releases will occur for every 90 sols; for example, Sol 180 plus six months, then Sol 270 plus six months, with the final delivery occurring no later than six months after the last data have been received on Earth.

4.3. Interface Media Characteristics

All volumes in the TEGA EDR and RDR Standard Product Archive conform to ISO 9660 standards [ISO 9660, 1988].

4.4. Backup and Duplicates

Backup copies of the TEGA EDR and RDR products will be stored at UA until the final versions of the products have been archived on physical media with the PDS.

Duplicate copies of the TEGA archive volumes on physical media will be stored at the PDS Geosciences Node, the PDS Central Node and the NSSDC.

4.5. Labeling and Identification

The file naming scheme defined for the Phoenix Lander instrument products adheres to, and is compliant with the PDS Level II 27.3 filename standards. The file naming convention described here divides the filename into two parts (none consecutive). The first part is instrument-independent, or generic, containing a minimal set of fields, which apply to all instruments aboard the Phoenix Lander. The second part is reserved for instrument-specific fields.

Each product name must be uniquely identifiable throughout the mission by incorporating a combination of relevant fields such as Spacecraft Clock count (SCLK), instrument identifier, data source, observation identifier, product token, etc.

The generic portion of the file name as described here, is not sufficient for uniqueness. The information saved in the instrument-specific portion, in conjunction with the generic portion, must guarantee uniqueness.

The file naming rules are as follows:

- I. Only letters A-Z, digits 0-9 and the underscore (“_”) may be used.
- II. All characters must be in upper case.
- III. The full length of product name must be 31 characters, 27 for the filename followed by a “.” and a three-character file extension.
- IV. All fields and sub-fields must be filled or padded with “_” (ASCII underscore) as needed to maintain proper length. For number fields, zeros should be used instead.
- V. The convention used for/by instrument must guarantee uniqueness throughout the whole mission.

A template for general filename is shown below, and the table that follows provides additional detail for individual fields.

Table 4-2 File Naming Template

1	2	3	4	5	6	7	8	9	0	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	3	3
Instrument	Source/Epic	Sol			Product Type			<i>Instrument Specific</i>																			Producer	Version		Extension		

The “Instrument Specific” portion is reserved for each instrument/team to use as needed, within the boundaries stated by the above rules.

Table 4-3 Detailed description of product name components

Position	Name	Description/value
1	Instrument	S SSI R RAC T TEGA A RA O MECA-OM P MECA-TECP F MECA-AFM W MECA-WCE X MECA-Misc M MET-P&T L MET-LIDAR D MARDI E ASE
2	Source/Epic	Spacecraft S Surface, flight model T Test-bed C Cruise, flight model
3-5	SOL	Solar days since first full day on Mars. Landing day is Sol zero. If Source/Epic is T, day of year should be used (ERT or SCET). For cruise phase, always set to " C ".

6-8	Product Type	<p>These 3-char identifiers are differentiated as either EDR (Level 0) or RDR (Level 1+) products. If the identifier begins with an "E", then the product is a type of EDR. Otherwise, it is a type of RDR.</p> <p><i>See applicable instrument SIS documents for detailed descriptions of all valid product types for each instrument.</i></p>
9-25	Reserved	<p>Reserved, and required, for instrument-specific fields. See applicable instrument EDR/RDR SIS documents for details.</p> <p>Unused positions are filled with " " (ASCII underscore)</p>
26	Producer (Reserved)	<p>Producer's id, although part of the reserved portion for instrument-specific field, this field to be used to identify the generating entity of the product.</p> <p>M MIPL T TEGA</p>
27	Version	Version number, 0-9,A-Z (36 total)
28	Period	Always set to "." (ASCII period)
29-31	File Extension	<p>PDS file extension, instrument specific.</p> <p>IMG Imaging/Camera data DAT Non-imaging instrument data QUB Multi-layer, cube products TAB Table/tabular data</p> <p><i>See table 10-1 in the PDS Standards Ref. for complete list of acceptable extensions</i></p>

Table 4-4 TEGA-specific EDR file names

Character Position	1-8	9-27	28-31
ENGEDR Product	TSnnnEDR (nnn = sol)	_aa_bbb_yyyymmdd_cv (aa_bbb derived from Table 4-2, yyyymmdd = date, c = U, v = version)	.DAT
ENGEDR Examples	TS020EDR TS020EDR TS020EDR	_TA_MAN_20080501_U1 _ME_OIL_20080501_U1 _EG_ESB_20080501_U1	.DAT .DAT .DAT
All other EDR products	TSnnnEDR (nnn = sol)	_aaa_yyyy_mm_dd_cv (aaa = EDR product type, yyyy_mm_dd = date, c = U, v = version)	.DAT

SCEDR Example	TS020EDR	__SC_2008_05_01__U1	.DAT
EGAEDR Example	TS020EDR	__EGA_2008_05_01__U1	.DAT
EGHEDR Example	TS020EDR	__EGH_2008_05_01__U1	.DAT
LEDEDR Example	TS020EDR	__LED_2008_05_01__U1	.DAT
MSGEDR Example	TS020EDR	__MSG_2008_05_01__U1	.DAT

Table 4-5 TEGA Specific RDR file names

Character Position	1-8	9-27	28-31
ENGRDR Product	TSnnnRDR (nnn = sol)	__aa_bbb_yyyymmdd_cv (aa_bbb derived from Table 4-2, yyymmdd = date, c = U, v = version)	.DAT
ENGRDR Examples	TS020RDR TS020RDR TS020RDR	__TA_MAN_20080501_U1 __ME_OIL_20080501_U1 __EG_ESB_20080501_U1	.DAT .DAT .DAT
All other RDR products	TSnnnRDR (nnn = sol)	__aaa_yyyy_mm_dd_cv (aaa = RDR product type, yyyy_mm_dd = date, c = U, v = version)	.DAT
SCRDR Example	TS020RDR	__SC_2008_05_01__U1	.DAT
EGHRDR Example	TS020RDR	__EGH_2008_05_01__U1	.DAT
EGSRDR Example	TS020RDR	__EGS_2008_05_01__U1	.DAT

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