PHOENIX MET/LIDAR EDR ARCHIVE VOLUME SOFTWARE INTERFACE SPECIFICATION

Version 1.1

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TABLES AND FIGURES

DOCUMENT CHANGE LOG

Change	Date	Affected Portions
Draft	5/18/07	
TBD ITems	4/11/08	

TBD ITEMS

Section	Description
4.2	Complete delivery schedule section.
4.5	Correct VOLUME_ID?

ACRONYMS AND ABBREVIATIONS

ASCII	American Standard Code for Information Interchange
ISO	International Standards Organization
JPL	Jet Propulsion Laboratory
NSSDC	National Space Science Data Center
PDS	Planetary Data System
SIS	Software Interface Specification
TBD	To Be Determined

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 Meteorology (MET or P&T) and LIDAR EDR Archive. Typically, these individuals would be software engineers, data analysts, or planetary scientists.

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

1.2. Content Overview

The MET/LIDAR archive includes products from both the Pressure & Temperature (P&T) meteorology experiment and the LIDAR experiment. The data products are generated by the MET/LIDAR team at York University and Dalhousie University and delivered to the PDS Atmospheres Node at New Mexico State University.

This Software Interface Specification (SIS) describes the format, content, and generation of the MET/LIDAR 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, JPL D-29392, Rev. 1.0, December 20, 2004.
3. MET Lidar EDR and RDRs Software Interface Specification.
4. *Planetary Data System Standards Reference*, March 20, 2006, Version 3.7. JPL D-7669, Part 2.
5. ISO 9660-1988, Information Processing - Volume and File Structure of CD-ROM for Information Exchange, April 15, 1988.

1.4. Relationships with Other Interfaces

This Archive Volume SIS could be affected by changes to the design of the MET/LIDAR standard data products (Applicable Document #3).

2. Archive Volume Contents

This section describes the contents of the MET/LIDAR Archive volumes, including the file names, file contents, file types, and organization responsible for providing the files.

2.1. 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.

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

2.2. Data Directory Contents and Naming

The Data Directory will be two archive volumes – one for each data set: PT and LIDAR These directories will contain subdirectories (if necessary) of the form X*annn* where X refers to the MET (M) /LIDAR (L) instruments, *a* will be a character indicating the "location" of the observation: S = Surface, T = Testbed, C = Cruise; and *nnn* will be a three-digit Mars day number (or day of year number for testbed or cruise). Within each of these subdirectories will reside the data files as indicated in the Data Product SISs.

2.3. 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.

File Name	File Contents	File Provided By
INDXINFO.TXT	A description of the contents of this directory	Atmospheres Node
INDEX.TAB	A table listing all data products on this volume	Atmospheres Node
INDEX.LBL	A PDS detached label that describes INDEX.TAB	Atmospheres Node
CUMINDEX.TAB	A cumulative listing of all data products on this volume and on previous volumes in this set	Atmospheres Node
CUMINDEX.LBL	A PDS detached label that describes CUMINDEX.TAB	Atmospheres Node

2.4. 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	Atmospheres Node
DPSIS.TXT or .HTM	The Data Product SIS as text or hypertext	Instrument Team
DPSIS.PDF	The Data Product SIS as a PDF file	Instrument Team
DPSIS.LBL	A PDS detached label that describes both DPSIS.TXT(HTM) and DPSIS.PDF	Instrument Team
ARCHSIS.TXT or .HTM	The Archive Volume SIS (this document) as text or hypertext	Atmospheres Node
ARCHSIS.PDF	The Archive Volume SIS (this document) as a PDF file	Atmospheres Node
ARCHSIS.LBL	A PDS detached label that describes both ARCHSIS.TXT(HTM) and ARCHSIS.PDF.	Atmospheres Node
other files	Other files as deemed necessary by either Instrument Team or Atmospheres Node - TBD	Instrument Team

2.5. 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.

File Name	File Contents	File Provided By
CATINFO.TXT	A description of the contents of this directory	Atmospheres Node
LIDARDS.CAT	LIDAR Data set information for the PDS catalog	Instrument Team
PTDS.CAT	PT Data set information for the PDS catalog	Instrument Team
INSTHOST.CAT	Instrument host (i.e., spacecraft) information for the PDS catalog	Phoenix Project
INST.CAT	Instrument information for the PDS catalog (one each for PT and for LIDAR)	Instrument Team
MISSION.CAT	Mission information for the PDS catalog	Phoenix Project
PERSON.CAT	Personnel information for the PDS catalog (Team and PDS personnel responsible for generating the archive. One each for PT and for LIDAR)	Instrument Team
REF.CAT	References mentioned in other *.CAT files catalog (one each for PT and for LIDAR)	Instrument Team

3. Archive Volume Format

This section describes the format of MET/LIDAR Archive Volumes. Data that comprise the Archive will be formatted in accordance with Planetary Data System specifications [Applicable Document 4].

3.1. Disk Format

Archive Volumes follow a compact disk format that is compatible with the computer operating systems MS-DOS, Macintosh, and SunOS. The volume format is in accordance with ISO 9660 level 2 Interchange Standard [Applicable Document 5]. Note however that delivery is expected to be electronic from the instrument team to PDS. PDS will assume the responsibility for actually writing the volumes onto hard media such as CDs or DVDs, if at all.

3.2. File Formats

This section describes file formats for the kinds of files contained on MET/LIDAR Archive Volumes.

3.2.1. Document File Format

Document files with the .TXT suffix exist in the Root, Index, Catalog, and Document 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, either hypertext or plain ASCII, 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 and Data directories. 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 Data Product SIS [Applicable Document 3].

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 carat 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. Below is a list of the possible formats for the ^object definition.

^object = n

^object = n<BYTES>

^object = "filename.ext"

^object = ("filename.ext",n)

^object = ("[dirlist]filename.ext",n)

^object = ("filename.ext",n<BYTES>)

^object = ("[dirlist]filename.ext",n<BYTES>)

where

n is the starting record or byte number of the object, counting from the beginning of the file (record 1, byte 1),

<BYTES> indicates that the number given is in units of bytes,

filename is the up to 8 character, alphanumeric upper-case file name,

ext is the 3 character upper-case file extension,

dirlist is a period-delimited path-list of parent directories, in upper case, that specifies the object file directory (used only when the object is not in the same directory as the label file). The list begins at the directory level below the root directory of the CD-ROM. '[dirlist]' may be omitted when the object being described is

> located either in the same directory as the detached label, or in a subdirectory named LABEL that is located in a higher level of the directory tree, typically the CD-ROM root itself.

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. Catalog File Format

Catalog files (suffix .CAT) exist in the Root and Catalog directories. They are text files formatted in an object-oriented structure consisting of sets of 'keyword=value' declarations.

3.2.5. Science Data File Formats

The MET/LIDAR data files are ASCII tables with comma-separated values. See the above section on Tabular File Format for a more complete description. For more information about the format and content of the data products, see the Data Product SISs [Applicable Document 3].

4. Archive Volume Generation

4.1. Data Transfer and Validation Methods

MET/LIDAR products are generated by the instrument team at York University and/or at Dalhousie University. The products will be delivered electronically (FTP or other means) to the PDS Atmospheres Node at New Mexico State University according to the Phoenix Project delivery schedule. Assembly of the volumes will be done by the instrument team.

The MET/LIDAR team validates the data products for science content as part of the product generation process. The Atmospheres Node validates the data products and ancillary files for compliance with PDS standards and with the SISs.

The volumes will then be made available via Internet and FTP access at the Atmospheres Node.

The Atmospheres Node is responsible for delivering copies of the volumes to the NSSDC and to the PDS Engineering Node (as the backup site for the Atmospheres Node).

4.2. Data Product Sizes and Delivery Rates

Table 1 summarizes expected sizes and production rates for the MET/LIDAR Standard Products.

Table 1 – Standard Product Sizes and Delivery Rates

Product	Product Size	Production Rate	Expected Number of Products for Primary Mission (TBD days)	Expected Total Data Volume for Primary Mission
TBD				

Schedule for release of data products as described in the Project Archive Plan should be included here. TBD.

4.3. Interface Media Characteristics

All volumes in the MET/LIDAR Standard Product Archive conform to ISO 9660 standards [Applicable Document 5].

4.4. Backup and Duplicates

Backup copies of MET/LIDAR products are the responsibility of the instrument team until the volumes have been validated by the Atmospheres Node. Duplicate copies of MET/LIDAR archive volumes will be housed at the PDS Engineering Node and at NSSDC.

4.5. Labeling and Identification

Each MET/LIDAR archive volume will be identified by a unique volume ID formed according to the scheme PH##_xxxx (TBD), where:

PH represents the Phoenix mission,

represents the MET (MT) or LIDAR (LD) instrument, and

Xxxx is a volume sequence number starting with 0001.

5. Support Staff and Cognizant Persons

Jim Whiteway, MET/LIDAR Principal Investigator, York University

Cameron Dickinson, MET/LIDAR Collaborator, York University

Allan Carswell, MET/LIDAR Collaborator, York University

Peter Taylor, MET Collaborator, York University

Carlos Lange, MET Collaborator, University of Alberta

Tom Duck, MET?LIDAR Collaborator, Dalhousie University

David Fisher, MET Collaborator,

Lyle Huber, PDS Atmospheres Node, New Mexico State University

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Questions and comments regarding the MET/LIDAR Archive Volume may be directed to the PDS Atmospheres Node, lhuber <at> nmsu.edu, 505-646-1862.