KAGUYA (SELENE)

Product Format Description

- Lunar Radar Sounder (LRS)-

Version 1.0

November 1, 2009

Index

1. Introduction

1.1 Purpose

This document describes the format*2 used for the catalog and product files for the Lunar Radar Sounder *1(LRS) that was board KAGUYA (SELENE). These files provided by Japan Aerospace Exploration Agency (JAXA).

*1 : Refer to the following "Project Homepage of KAGUYA" and "Image Gallery of KAGUYA" used for the LRS mission.

- ✓ Project Homepage for KAGUYA
  http://www.kaguya.jaxa.jp/en/equipment/lrs_e.htm
- ✓ Image Gallery for KAGUYA
  http://wms.selene.darts.isas.jaxa.jp/selene_viewer/en/observation_mission/lrs/

*2 : The data format used for SELENE is based on the PDS (Planetary Data System) by NASA. However, the data format is not fully compliant with the PDS format.

1.2 The composition of this format description

Table 1-1 shows the composition of this format description.

Table 1-1 the composition of this format description

No.	INDEX	Title	Description content
1	Section 1.3	Table 1-2 LRS Products List	The name of the product, the object form, and the composition of the product are described as a product list illustrated by this description.
		Table 1-3 Product Description	Concerning each product shown in the No1 product list, the content included in data and the description of the observation method are illustrated.
2	Chapter X	" Product Name"	Concerning the product shown in the No1 product list, rules used for file naming, label format, data object format and catalog information file format are described.
3	Section X.1	Rules used for File naming	Concerning the product shown in No2, the rules of file nomenclature is described.
4	Section X.2	Label Format	Concerning the product shown in No2, the label format is described.
5	Section X.3	Data Object Format	Concerning the product shown in No2, the data format of the data object is described. (The extension of the data file is unique in each product. Therefore, refer to the file nomenclature in No3.)
6	Section X.4	Catalog Information File Format	Concerning the product shown in No2, the format of the catalog information file (extension: .ctg) of the product is described.
7	Chapter X+1		
		Same as above	

1.3 Data Set

The Data Set refers to a set consisting of: Product, Catalog Information, and Thumbnail Image (JPEG format), which are tar-archived. This set is referred to as the "L2 Data Set". The file extension is "SL2". However, the thumbnail image may be omitted at the by composer's judgment.

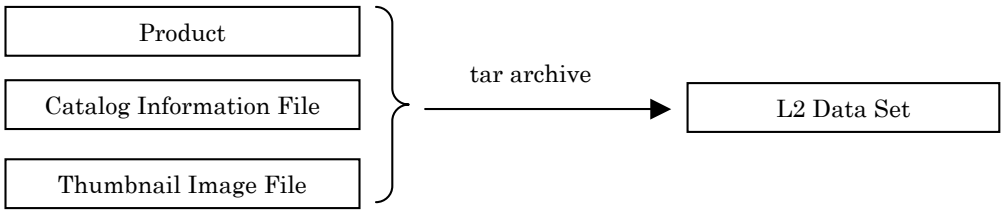

Figure 1-1 composition of the L2 Data Set

1.3.1 Product

For product composition, two possible options are available. Product Composition – Attached consists of label information and data information in a single data file. Product Composition – detached consists of separate files for the label file and data file.

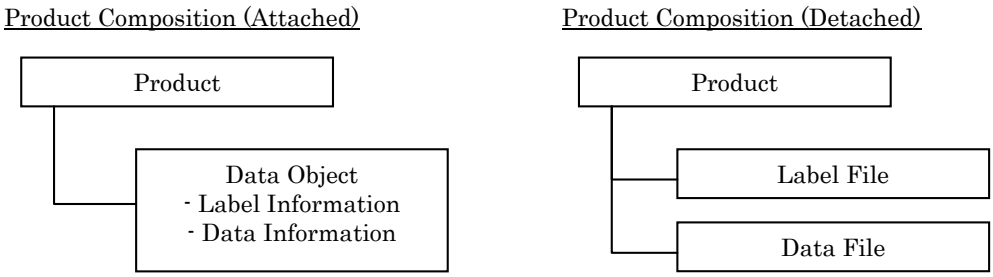

Figure 1-2 Product Composition : Attached and Detached

(1) Label File (Data Object (Label Information)

The Label File (Label Information) is storing as text format the information that identifies the Data File (Data Information).

(2) Data File (Data Object (Data Information))

The data File (Data Object (Data Information)) of the product are classified into the following four data types.

a) IMAGE : image data
An IMAGE is a two-dimensional array of values, all of the same type, each of which is referred to as a sample. IMAGE are normally processed with special display tools to produce a visual representation of the samples by assigning brightness levels or display colors to the values. An IMAGE consists of a series of lines, each containing the same number of samples.
*Refer to the PDS Standard Reference V3.8 Appendix A.20 "IMAGE".

b) TABLE : tabular form data
TABLEs are a natural storage format for collections of data from many instruments. The TABLE is a uniform collection of rows containing ASCII or binary values stored in columns.
*Refer to the PDS Standard Reference V3.8 Appendix A.29 "TABLE".

c) SERIES : time series data
The SERIES is a sub-class of the TABLE. It is used for storing a sequence of measurements organized in a specific way. The sampling parameter keywords in the SERIES represent the variation between the ROWS of data.
*Refer to the PDS Standard Reference V3.8 Appendix A.24 "SERIES"

d) TEXT : text data
The TEXT describes a file which contains plain text.
*Refer to the PDS Standard Reference V3.8 Appendix A.30 "TEXT".

1.3.2 Catalog Information File

Catalog Information File is the information file attached to explain the general of the product and is used to search for the product from L2DB subsystem.

1.3.3 Thumbnail Image File

Thumbnail Image File is the reduced image of the data object, and is the JPEG format image. However, the thumbnail image may be omitted at the by composer's judgment.

1.4 LRS Products

The list of GRS products, which this document describes, is shown in Table 1-2. In addition, the description for each product is shown in Table 1-3.

Table 1-2 LRS Products List

Level*1	Product Name	Product ID	Data Type	Product Format*2
Standard	Sounder low-resolution subsurface cross section	SDR_Bscan_low	IMAGE	A
Standard	Sounder high-resolution subsurface cross section	SDR_Bscan_high	IMAGE	A
Standard	High-frequency wave spectrum	NPW_spectrum	-*3	-*3
Standard	Low-frequency wave spectrum	WFC_spectrum	-*3	-*3
Higher Level	Subsurface geologic structure interpretation map	SDR_Geology	IMAGE	A

*1 : Data obtained by equipments is not clear as it is, therefore various processings and correction treatment are necessary by the ground system. According to the difference in the process of processing and correction treatment, they can be classified to the standard processing and higher-level processing. The higher-level processing refers to the standard processing data to which various processing and correction treatment are conducted according to the research purpose et cetra.

*2 : Product Format : A - Attached, D - Detached

*3 : CDF Format. This completely conforms to CDF Ver2.7.

Table 1-3 Product Description

Product Name	Product ID
Sounder low-resolution subsurface cross section	2 dimensional image data of 256 gray scale levels (1 byte) that exhibit reflected echo strength of a sounder observation along a satellite orbit. The horizontal axis represents satellite flight direction, while the vertical axis is the distance from the satellite, namely the depth in the lunar interior below the lunar surface. Large echo intensities indicate the lunar surface and discontinuities below the lunar surface. This data product corresponds to B-scan image, which can be produced by arranging A-scope images along a satellite orbit. An A-scope image can be generated by FFT processing of a received raw signal of Sounder operation. The spatial resolution along a satellite orbit is 750m (SDR_W and SDR_S modes) or 600m (SDR_A mode). In cases of SDR_W and SDR_S modes, 10 pulses are averaged to reduce the spatial resolution in the along-track direction. The spatial resolution in the range direction (depth direction) is originl 75m. One file is for a region of about 1000km (10 minutes observation) along a satellite orbit.
Sounder high-resolution subsurface cross section	2 dimensional image data of 256 gray scale levels (1 byte) that exhibit reflected echo strength of a sounder observation along a satellite orbit. The horizontal axis represents satellite flight direction, while the vertical axis is the distance from the satellite, namely the depth in the lunar interior below the lunar surface. Large echo intensities indicate the lunar surface and discontinuities below the lunar surface. This data product corresponds to B-scan image, which can be produced by arranging A-scope images along a satellite orbit. An A-scope image can be generated by FFT processing of a received raw signal of Sounder operation. The spatial resolution along a satellite orbit is 75m. The spatial resolution in the range direction (depth direction) is about 75m. One file is for a region of about 1000 km (10 minutes observation) along a satellite orbit.
High-frequency wave spectrum	E-field wave spectrum at 256 frequency points between 20kHz and 10MHz with time resolution of 8seconds.
Low-frequency wave spectrum	E-field wave spectrum at 351 frequency points between 100Hz and 1MHz with time resolution of 8seconds.
Subsurface geologic structure interpretation map	An interpretation map showing subsurface geologic structures derived from sounder low-resolution subsurface cross sections, also referring to data products to be provided by the other instruments. Subsurface discontinuities along with their displacements (if any) will be drawn. The lithology and formation age might be described for strata between discontinuities if known. This data product will be generated for only limited regions, because this data indicate interpretation of subsurface geologic structures

(1) Observation mode

There are 3 observation modes (SDR-W, SDR-A, SDR-S) used in the LRS Sounder. The Sounder subsurface cross section executes the following processes based on each type of observation mode.

- SDR-W : Raw waveform data. This observation mode refers to being converted into echo power by FFT processing.
- SDR-A : This mode is the averaged wave data, and similarly it is converted into echo power by FFT processing.
- SDR-S : Amongst the data of the 1024 points processed by the FFT on-board, 320 arbitrary points are down linked. This observation mode is converted from arbitrary data into IEEE 32 bit floating point data format.

(2) Sounder high-resolution subsurface cross section Ver1 and Ver2

For the Sounder high-resolution subsurface cross section, ver1 data, which is the IMAGE object data of the previously described 32 bit IEEE floating-point data type, and the ver.2 data that rotates the IMAGE object data array by 90 degrees, are generated. The data are also converted into 8 bit integer type, and in addition, corrections at delay time, corrections at flight direction data interval, and corrections of the satellite high altitude, are added.

(3) CDF

The High-frequency wave spectrum product and Low-frequency wave product are both generated in CDF *1(Common Data Format) format. The catalog information is included in the CDF File.

Therefore, as a L2 product, the data product file and the catalog information file, in the CDF format, are included. The label is not defined. This completely conforms to CDF Ver2.7.

*1 : http://cdf.gsfc.nasa.gov/

2. Sounder low-resolution subsurface cross section

2.1 Rules used for File naming

The nomenclature used for Label, Data Object and Catalog Information File the Sounder low-resolution subsurface cross section are described below. In addition, the file names are case-independent.

Table 2-1 Rules used for File naming

Item	Description
L2 Data Set (tar archive)	LRS_SWL_RV10_yyyymmddhhmmss.sl2 1 2 3 4 5 6 7
Data Product	LRS_SWL_RV10_yyyymmddhhmmss.img
Catalog Information File	LRS_SWL_RV10_yyyymmddhhmmss.ctg

1 : LRS	STATIC
2 : Data Class	S : Data of the Sounder Observation
3 : Observation Mode	A : SDR_A W : SDR_W S : SDR_S
4 : Mode	L : Bscan_Low
5 : Downlink Class	R : Real Data S : Stored Data
6 : Version Class	V10 : Ver 1 V20 : Ver 2
7 : Start date and time of the observation	yyyymmddhhmmss

2.2 Label Format

Figure 2-1 shows the Sounder low-resolution subsurface cross section product file layout.

Label	Basic information PDS fundamental label Data set information Object pointer etc
	Description of the IMAGE object The number of bands, lines, samples and data format etc.
Object	IMAGE Object Data

Figure 2-1 Product file layout

The label portion is adjusted to the length of the object record by adding a space(s) at the end of the final label record, so as to adjust the size to RECORD_TYPE = FIXED_LENGTH.

PDS_VERSION_ID = PDS3<CR+LF> RECORD_TYPE = FIXED_LENGTH<CR+LF> RECORD_BYTES =.....<CR+LF>FILE_RECORDS= .....END<SPACE> .....<SPACE>
Object record #1
: :
Object record #N

Figure 2-2 Record image

The label format of the Sounder low-resolution subsurface cross section product is shown in Table 2-2.

Table 2-2 Label Format for the Sounder low-resolution subsurface cross section

No	Items	Elements	Types	Values
Standard Item				
1	PDS version number	PDS_VERSION_ID = %s	char	PDS3 [STATIC]
2	Record format of the file	RECORD_TYPE = %s	char	FIXED_LENGTH [STATIC] Fixed length record
3	Byte count of the file records	RECORD_BYTES = %d	int	NNNN SDR-W/S mode：Observation time SDR-A mode：Variable based on the observation time and average wedge shape
4	Count of the file records	FILE_RECORDS = %d	int	NNNN The calculated number is from amount of data. The digit number is indeterminate.
5	Count of the label records	LABEL_RECORDS = %d	int	NNNN The calculated number is from the number of label records. The digit number is indeterminate.
6	Starting position of the image object	^IMAGE = %d	Int	NNNN
7	Data set name	DATA_SET_ID = %s	char	SDR_Bscan_low [STATIC]
8	Product name	PRODUCT_ID = %s	char	LRS_SWL_RV10_yyyymmddhhmmss The extension is removed from the file name. This conforms to the file name contract.
9	Product name	PRODUCT_SET_ID = %s	char	SDR_Bscan_low [STATIC]
10	Satellite name	INSTRUMENT_HOST_NAME = %s	char	SELENE-M [STATIC]
11	Name of the instrument (Full name)	INSTRUMENT_NAME = %s	char	Lunar Radar Sounder [STATIC]
12	Target name	TARGET_NAME = %s	char	MOON [STATIC]
13	Exposure start time	START_TIME = %s	char	YYYY-MM-DDThh:mm:ss Absolute start time of data
14	Exposure stop time	STOP_TIME = %s	char	YYYY-MM-DDThh:mm:ss Absolute stop time of data
15	Value of the TI count (start)	SPACECRAFT_CLOCK_START_COUNT = %d	int	NNNN TI of the start of data The digit number is indeterminate.
16	Value of the TI count (stop)	SPACECRAFT_CLOCK_STOP_COUNT = %d	int	NNNN TI of the stop of data The digit number is indeterminate.
17	Date and Time of product creation	PRODUCT_CREATION_TIME = %s	char	YYYY-MM-DDThh:mm:ss Sets the creation date and time for when the label was generated

18	Count of the frequency step	SPECTRUM_SAMPLES = %d	int	NNNN SDR_W/A = 1024 SDR_S = 320 The digit number is indeterminate.
19	Observation mode	INSTRUMENT_MODE_ID = %s	char	SDR-$ $: W, A or S
20	Longitude of ascending node	ASCENDING_NODE_LONGITUDE = %f	float	XXX.XX The digit number is indeterminate.
21	Latitude of the observation start	START_SUB_SPACECRAFT_LATITUDE = %f	float	YY.YYY Start of sub-satellite point latitude
22	Latitude of the observation end	STOP_SUB_SPACECRAFT_LATITUDE = %f	float	YY.YYY End of sub-satellite point latitude
23	Longitude of the observation start	START_SUB_SPACECRAFT_ LONGITUDE = %f	float	XXX.XXX Start of sub-satellite point longitude
24	Longitude of the observation end	STOP_SUB_SPACECRAFT_ LONGITUDE = %f	float	XXX.XXX End of sub-satellite point longitude
Definition part of the Data Object for sounder observation				
		OBJECT = IMAGE		
1	Band storage type	BAND_STORAGE_TYPE = %s	Char	BAND_SEQUENTIAL [STATIC] *Refer to the PDS Standard Reference V3.5 Appendix A.19 “IMAGE”.
2	Number of bands	BANDS = %d	small int	1 [STATIC]
3	Horizontal pixel count of image	LINE_SAMPLES = %d	int	NNNN SDR_W/S : Variable based on the observation time and average wedge shape SDR_A : Variable based on the average wedge shape
4	Vertical pixel count of image	LINES = %d	int	XXX Changeable based on the change in the delay time and the satellite altitude.
5	Pixel bit length	SAMPLE_BITS = %d	int	8 [STATIC]
6	Pixel type	SAMPLE_TYPE = %s	char	LSB_UNSIGNED_INTEGER [STATIC] * Refer to the PDS Standard Reference V3.5 Appendix C.4 for further information about “LSB_UNSIGNED_INTEGER”.
7	The unit of data	UNIT = %s	char	N/A [STATIC]
8	Description	NOTE = %s	char	Echo power<dBW/m^2> = (255 – DN) * (Pmax – Pmin) / 255+Pmin where Pmax = xxx.xxx, Pmin = xxx.xxx Conversion equation from the DN (brightness) value to the echo power.
		END_OBJECT = IMAGE		
END statement				
		END		

<Example of Label>

```
PDS_VERSION_ID = PDS3

RECORD_TYPE = FIXED_LENGTH
RECORD_BYTES = 1200
FILE_RECORDS = 1116
LABEL_RECORDS = 1

^IMAGE = 2

DATA_SET_ID = "SDR_Bscan_low"
PRODUCT_ID = "LRS_SWL_RV10_20080101195958"
PRODUCT_SET_ID = "SDR_Bscan_low"
INSTRUMENT_HOST_NAME = "SELENE-M"
INSTRUMENT_NAME = "Lunar Radar Sounder"
TARGET_NAME = MOON
START_TIME = 2008-01-01T19:59:58
STOP_TIME = 2008-01-01T20:09:58
SPACECRAFT_CLOCK_START_COUNT = 0883252797
SPACECRAFT_CLOCK_STOP_COUNT = 0883253395
PRODUCT_CREATION_TIME = 2009-06-29T08:57:54

SPECTRUM_SAMPLES = 1024
INSTRUMENT_MODE_ID = "SDR-W"
ASCENDING_NODE_LONGITUDE = 169.105
START_SUB_SPACECRAFT_LATITUDE = 50.489
STOP_SUB_SPACECRAFT_LATITUDE = 19.558
START_SUB_SPACECRAFT_LONGITUDE = 349.482
STOP_SUB_SPACECRAFT_LONGITUDE = 349.180

OBJECT = IMAGE
  BAND_STORAGE_TYPE = BAND_SEQUENTIAL
  BANDS = 1
  LINE_SAMPLES = 1200
  LINES = 1115
  SAMPLE_BITS = 8
  SAMPLE_TYPE = LSB_UNSIGNED_INTEGER
  UNIT = "N/A"
  NOTE = "
    Echo power <dBW/m^2> = (255-DN)*(Pmax-Pmin)/255+Pmin
    where Pmax = -73.600, Pmin = -195.000"
END_OBJECT = IMAGE
END
```

2.3 Data Object Format

Figure 2-3 shows the object format for the Sounder low-resolution subsurface cross section product. This is of fixed-length. This object refers to the 1/10-averaged IMAGE object of the Sounder high-resolution subsurface cross section for the flight direction.

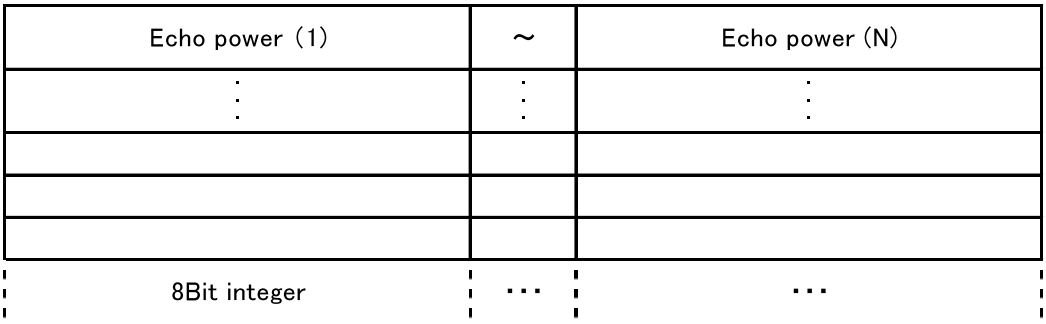

Figure 2-3 IMAGE Object Format

2.4 Catalog Information File Format

The Catalog Information File Format of the Sounder low-resolution subsurface cross section product is shown in Table 2-3.

Table 2-3 Catalog Information File Format

Item Name	Elements	Format of Value	Range of Value	Values
Name of the data file (*1)	DataFileName	AAAA….AAAA (Up to 31 digits)	alphanumeric characters	LRS_SWL_RV10_yyyymmddhhmmss.img dependent on the product (See Section 2.1 "Rules used for File naming")
Size of the data file	DataFileSize	NNNNNNNNNNNN (Up to 12 digits)	unit:<byte>	XXXX dependent on the product
File format of the data file	DataFileFormat	AAAA….AAAA (Up to 16 digits)	character strings	PDS [STATIC]
Name of the instrument	InstrumentName	AAAA….AAAA (Up to 16 digits)	character strings	LRS [STATIC]
Processing level	ProcessingLevel	AAAA….AAAA (Up to 16 digits)	character strings	Standard
Product ID	ProductID	AAAA….AAAA (Up to 30 digits)	character strings	SDR_Bscan_low
Version number of the product	ProductVersion	AAAA….AAAA (Up to 16 digits)	character strings	1.0
Access level	AccessLevel	N	values of 0-4	N/A
Start time	StartDateTime	yyyy-mm-ddT hh:mm:ssZ	DATE & TIME	yyyy-mm-ddThh:mm:ssZ
Stop time	EndDateTime	yyyy-mm-ddT hh:mm:ssZ	DATE & TIME	yyyy-mm-ddThh:mm:ssZ
Longitude of ascending node of the start data	StartAscendingLongitude	NNN.NNNNNN	0-360	XXX.XXX
Longitude of ascending node of the end data	EndAscendingLongitude	NNN.NNNNNN	0-360	XXX.XXX
Flag of the location	LocationFlag	A	A : ascending D : descending N : including the North Pole S : including the South Pole W : including the North Pole and the South Pole	X
Upper left latitude of the scene	UpperLeftLatitude	SNN.NNNNNN	-90-90	XXX.XXX [STATIC]
Upper left longitude of the scene	UpperLeftLongitude	NNN.NNNNNN	0-360	XXX.XXX [STATIC]
Upper right latitude of the scene	UpperRightLatitude	SNN.NNNNNN	-90-90	XXX.XXX [STATIC]
Upper right longitude of the scene	UpperRightLongitude	NNN.NNNNNN	0-360	XXX.XXX [STATIC]
Lower left latitude of the scene	LowerLeftLatitude	SNN.NNNNNN	-90-90	XXX.XXX [STATIC]
Lower left longitude of the scene	LowerLeftLongitude	NNN.NNNNNN	0-360	XXX.XXX [STATIC]

Lower right latitude of the scene	LowerRightLatitude	SNN.NNNNNN	-90-90	XXX.XXX [STATIC]
Lower right longitude of the scene	LowerRightLongitude	NNN.NNNNNN	0-360	XXX.XXX [STATIC]

(*1) "DataFileName" is the stored file name of the product. For the detached format, this is the stored file name.

<Example of Catalog Information File>

DataFileName = LRS_SWL_RV10_20080101195958.img
DataFileSize = 1339200
DataFileFormat = PDS
InstrumentName = LRS
ProcessingLevel = Standard
ProductID = SDR_Bscan_low
ProductVersion = 1.0
AccessLevel = 2
StartDateTime = 2008-01-01T19:59:58Z
EndDateTime = 2008-01-01T20:09:58Z
StartAscendingLongitude = 169.105
EndAscendingLongitude = 169.105
LocationFlag = D
UpperLeftLatitude = 50.489
UpperLeftLongitude = 348.982
UpperRightLatitude = 19.558
UpperRightLongitude = 348.680
LowerLeftLatitude = 50.489
LowerLeftLongitude = 349.982
LowerRightLatitude = 19.558
LowerRightLongitude = 349.680

3. Sounder high-resolution subsurface cross section

For the Sounder high-resolution subsurface cross section, ver1 data, which is the IMAGE object data of the previously described 32 bit IEEE floating-point data type, and the ver.2 data that rotates the IMAGE object data array by 90 degrees, are generated. The data are also converted into 8 bit integer type, and in addition, corrections at delay time, corrections at flight direction data interval, and corrections of the satellite high altitude, are added.

3.1 Rules used for File naming

The nomenclature used for Label, Data Object and Catalog Information File the Sounder high-resolution subsurface cross section are described below. In addition, the file names are case-independent.

Table 3-1 Rules used for File naming

Item	Description
L2 Data Set (tar archive)	LSR_SWH_RV10_yyyymmddhhmmss.sl2 1 2 3 4 5 6 7
Data Product	LSR_SWH_RV10_yyyymmddhhmmss.img
Catalog Information File	LSR_SWH_RV10_yyyymmddhhmmss.ctg

1 : LRS	STATIC
2 : Data Class	S : Data of the Sounder Observation
3 : Observation Mode	A : SDR_A W : SDR_W S : SDR_S
4 : Mode	L : Bscan_high
5 : Downlink Class	R : Real Data S : Stored Data
6 : Version Class	V10 : Ver 1 V20 : Ver 2
7 : Start date and time of the observation	yyyymmddhhmmss

3.2 Sounder high-resolution subsurface cross section ver.1

Figure 3-1 shows the Sounder high-resolution subsurface cross section ver.1 product file layout.

Label	Basic information PDS fundamental label Data set information Object pointer etc
	Description of the RECORD_HEADER_TABLE object Description of each column
	Description of the IMAGE object The number of bands, lines, samples and data format etc.
Object	Product data The record format with the prefix data refers to the IMAGE object. The prefix section is defined with the TABLE object.

Figure 3-1 Product file layout

The label portion is adjusted to the length of the object record by adding a space(s) at the end of the final label record, so as to adjust the size to RECORD_TYPE = FIXED_LENGTH.

* The label record is the same length as the object record.

PDS_VERSION_ID = PDS3<CR+LF> RECORD_TYPE= FIXED_LENGTH<CR+LF>RECORD_BYTES=4137<CR+ LF>FILE_RECORDS=.....END<SPACE> ....<SPACE>
Object record #1
:
Object record #N

Figure 3-2 Record image

The object portion defines both the TABLE object, which includes the dummy suffix data, as well as the IMAGE object, which includes the dummy prefix data, since the object record includes the record header. This enables the record header section to be read by the TABLE Viewer, and the data record to be read by the IMAGE Viewer, etc.

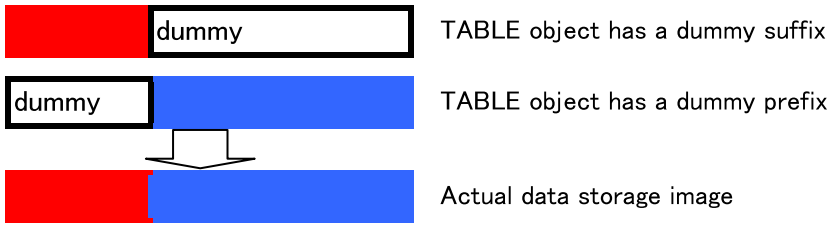

Figure 3-3 Definition of object with dummy suffix and dummy prefix

3.2.1 Label Format

The label format of the Sounder high-resolution subsurface cross section ver1 is shown in Table 3-2.

Table 3-2 Label Format

No	Items	Elements	Types	Values
Standard Item				
1	PDS version num	PDS_VERSION_ID = %s	char	PDS3 [STATIC]
2	Record format of the file	RECORD_TYPE = %s	char	FIXED_LENGTH [STATIC] Fixed length record
3	Byte count of the file records	RECORD_BYTES = %d	int	NNNN SDR-W/A mode：4137 SDR-S mode：1321
4	Count of the file records	FILE_RECORDS = %d	int	NNNN The calculated number is from amount of data. The digit number is indeterminate.
5	Count of the label records	LABEL_RECORDS = %d	int	NNNN The calculated number is from the number of label records. The digit number is indeterminate.
6	Starting position of the table object	^RECORD_HEADER_TABLE = %d	int	NNNN The record header is described with the TABLE object. This item is a pointer to the record header number for the records that are specified). 1 origin
7	Starting position of the image object	^IMAGE = %d	int	NNNN The same value as the ^RECORD_HEADER_TABLE is set.
8	Data set name	DATA_SET_ID = %s	char	SDR_Bscan_high [STATIC]
9	ID of the product	PRODUCT_ID = %s	char	LRS_SWH_RV10_yyyymmddhhmmss The extension is removed from the file name This conforms to the file name contract.
10	Product name	PRODUCT_SET_ID = %s	char	SDR_Bscan_high [STATIC]
11	Satellite name	INSTRUMENT_HOST_NAME = %s	char	SELENE-M [STATIC]
12	Name of the instrument (Full name)	INSTRUMENT_NAME = %s	char	Lunar Radar Sounder [STATIC]
13	Target name	TARGET_NAME = %s	char	MOON [STATIC]
14	Exposure start time	START_TIME = %s	char	YYYY-MM-DDThh:mm:ss Absolute start time of data
15	Exposure stop time	STOP_TIME = %s	char	YYYY-MM-DDThh:mm:ss Absolute stop time of data
16	Value of the TI count (start)	SPACECRAFT_CLOCK_START_COUNT = %d	int	NNNN TI of the start of data The digit number is indeterminate.
17	Value of the TI count (stop)	SPACECRAFT_CLOCK_STOP_COUNT = %d	int	NNNN TI of the stop of data The digit number is indeterminate.
18	Date and Time of product creation	PRODUCT_CREATION_TIME = %s	char	YYYY-MM-DDThh:mm:ss

				Sets the creation date and time for when the label was generated
19	Count of the frequency step	SPECTRUM_SAMPLES = %d	int	NNNN SDR_W/A = 1024 SDR_S = 320 The digit number is indeterminate.
20	Observation mode	INSTRUMENT_MODE_ID = %s	char	SDR-$ $: W, A or S
21	Longitude of ascending node	ASCENDING_NODE_LONGITUDE = %f	float	XXX.XX The digit number is indeterminate.
22	Latitude of the observation start	START_SUB_SPACECRAFT_LATITUDE = %f	float	YY.YYY Start of sub-satellite point latitude
23	Latitude of the observation end	STOP_SUB_SPACECRAFT_LATITUDE = %f	float	YY.YYY End of sub-satellite point latitude
24	Longitude of the observation start	START_SUB_SPACECRAFT_ LONGITUDE = %f	float	XXX.XXX Start of sub-satellite point longitude
25	Longitude of the observation end	STOP_SUB_SPACECRAFT_ LONGITUDE = %f	float	XXX.XXX End of sub-satellite point longitude
Definition part of the RECORD HEADER OBJECT				
	Start of the TABLE Object	OBJECT = RECORD_HEADER_TABLE		
1	Type of data	INTERCHANGE_FORMAT = %s	char	BINARY [STATIC]
2	Number of lines of data	ROWS = %d	int	XXX [STATIC]
3	Number of columns of data	COLUMNS = %d	int	6 [STATIC]
4	Byte count of data line	ROW_BYTES = %d	int	41 [STATIC]
5	Byte count of suffix record (row)	ROW_SUFFIX_BYTES = %d	int	NNNN SDR_W/A = 4096 SDR_S = 1280
Data format of the ROW 1		OBJECT = COLUMN		
1	Name of the item	NAME = %s	char	OBSERVATION_TIME [STATIC] Calculated from the FIF0 counter (for units of 50 msec) stored in the CCSDS packet and the TI value. Calculated by the unit of msec in the calculation referring to SPICE.
2	Type of the data	DATA_TYPE = %s	char	CHARACTER [STATIC]
3	Starting position of the data	START_BYTE = %d	int	1 [STATIC]
4	Byte count of the data	BYTES = %d	int	23 [STATIC]
		END_OBJECT = COLUMN		
Data format of the ROW 2		OBJECT = COLUMN		
1	Name of the item	NAME = %s	char	DELAY [STATIC] Calculated from the delay time (H) and delay time (L) that's stored in the CCSDS packet. SDR-W within the frame is of the same value. SDR-A and SDR-S are calculated for each measurement. SDR-A and SDR-s are not of the same value within the frame
2	Type of the data	DATA_TYPE = %s	char	IEEE_REAL [STATIC]
3	Starting position of	START_BYTES = %d	int	24 [STATIC]

	the data			
4	Byte count of the data	BYTE = %d	int	4 [STATIC]
5	Unit of the data	UNIT = %s	char	micro-sec [STATIC]
		END_OBJECT = COLUMN		
Data format of the ROW 3		OBJECT = COLUMN		
1	Name of the item	NAME = %s	char	START_STEP [STATIC] SDR-W and SDR-A are fixed at 0.SDR-R sets the CCSDS packet storage value.
2	Type of the data	DATA_TYPE = %s	char	MSB_UNSIGNED_INTEGER [STATIC] * Refer to the PDS Standard Reference V3.5 Appendix C.2 for further information about "MSB_UNSIGNED_INTEGER".
3	Starting position of the data	START_BYTES = %d	int	28 [STATIC]
4	Byte count of the data	BYTE = %d	int	2 [STATIC]
		END_OBJECT = COLUMN		
Data format of the ROW 4		OBJECT = COLUMN		
1	Name of the item	NAME = %s	char	SUB_SPACECRAFT_LATITUDE [STATIC] Sub-satellite point latitude for the above described observation time (absolute time) is calculated. Refer to the SPICE for the calculation. 0 to 360
2	Type of the data	DATA_TYPE = %s	char	IEEE_REAL [STATIC]
3	Starting position of the data	START_BYTES = %d	int	30 [STATIC]
4	Byte count of the data	BYTE = %d	int	4 [STATIC]
5	Unit of the data	UNIT = %s	char	degree [STATIC]
		END_OBJECT = COLUMN		
Data format of the ROW 5		OBJECT = COLUMN		
1	Name of the item	NAME = %s	char	SUB_SPACECRAFT_LONGITUDE [STATIC] Sub-satellite point longitude for the above described observation time (absolute time) is calculated. Refer to the SPICE for the calculation. -90 to 90
2	Type of the data	DATA_TYPE = %s	char	IEEE_REAL [STATIC]
3	Starting position of the data	START_BYTES = %d	int	34 [STATIC]
4	Byte count of the data	BYTE = %d	int	4 [STATIC]
5	Unit of the data	UNIT = %s	char	degree [STATIC]
		END_OBJECT = COLUMN		
Data format of the ROW 6		OBJECT = COLUMN		
1	Name of the item	NAME = %s	char	SPACECRAFT_ALTITUDE [STATIC] Satellite altitude (distance from the reference plane of the Moon) for the above mentioned observation time (absolute time) is calculated. Refer to the SPICE tor the calculation.

2	Type of the data	DATA_TYPE = %s	char	IEEE_REAL [STATIC]
3	Starting position of the data	START_BYTES = %d	int	38 [STATIC]
4	Byte count of the data	BYTE = %d	int	4 [STATIC]
5	Unit of the data	UNIT = %s	char	km [STATIC]
		END_OBJECT = COLUMN		
	End of the TABLE Object	END_OBJECT = RECORD_HEADER_TABLE		
Definition part of the Data Object for sounder observation				
	Start of the IMAGE Object	OBJECT = IMAGE		
1	Band storage type	BAND_STORAGE_TYPE = %s	char	BAND_SEQUENTIAL [STATIC]
2	Number of bands	BANDS = %d	smallint	1 [STATIC]
3	Horizontal pixel count of image	LINE_SAMPLES = %d	int	NNNN SDR_W/A = 1024 SDR_S = 320
4	Vertical pixel count of image	LINES = %d	int	XXX Variable based on the observation time
5	Pixel bit length	SAMPLE_BITS = %d	int	32 [STATIC]
6	Pixel type	SAMPLE_TYPE = %s	char	IEEE_REAL [STATIC]
7	Byte count of the prefix record	LINE_PREFIX_BYTES= %d	int	41 [STATIC]
8	Unit of the data	UNIT = %s	char	dBW/m^2 [STATIC]
	End of the IMAGE Object	END_OBJECT = IMAGE		
END statement				
		END		

<Example of Label>

```
PDS_VERSION_ID = PDS3

RECORD_TYPE = FIXED_LENGTH
RECORD_BYTES = 4137
FILE_RECORDS =    4251
LABEL_RECORDS = 1

^RECORD_HEADER_TABLE = 2
^IMAGE = 2

DATA_SET_ID = "SDR_Bscan_high"
PRODUCT_ID = "LRS_SWH_RV10_20071120073312"
PRODUCT_SET_ID = "SDR_Bscan_high"
INSTRUMENT_HOST_NAME = "SELENE-M"
INSTRUMENT_NAME = "Lunar Radar Sounder"
TARGET_NAME = MOON
START_TIME = 2007-11-20T07:33:12
STOP_TIME = 2007-11-20T07:39:28
SPACECRAFT_CLOCK_START_COUNT = 0879579190
SPACECRAFT_CLOCK_STOP_COUNT = 0879579566
PRODUCT_CREATION_TIME = 2009-06-24T10:16:29

SPECTRUM_SAMPLES = 1024
INSTRUMENT_MODE_ID = "SDR-W"
ASCENDING_NODE_LONGITUDE =     9.222
START_SUB_SPACECRAFT_LATITUDE =     -6.537
STOP_SUB_SPACECRAFT_LATITUDE =     12.568
START_SUB_SPACECRAFT_LONGITUDE =       9.279
STOP_SUB_SPACECRAFT_LONGITUDE =       9.111

OBJECT = RECORD_HEADER_TABLE
  INTERCHANGE_FORMAT = BINARY
  ROWS =    4250
  COLUMNS = 6
```

```
  ROW_BYTES = 41
  ROW_SUFFIX_BYTES = 4096
  OBJECT = COLUMN
    NAME = OBSERVATION_TIME
    DATA_TYPE = CHARACTER
    START_BYTE = 1
    BYTES = 23
  END_OBJECT = COLUMN
  OBJECT = COLUMN
    NAME = DELAY
    DATA_TYPE = IEEE_REAL
    START_BYTE = 24
    BYTES = 4
    UNIT = "micro-sec"
  END_OBJECT = COLUMN
  OBJECT = COLUMN
    NAME = START_STEP
    DATA_TYPE = MSB_UNSIGNED_INTEGER
    START_BYTE = 28
    BYTES = 2
  END_OBJECT = COLUMN
  OBJECT = COLUMN
    NAME = SUB_SPACECRAFT_LATITUDE
    DATA_TYPE = IEEE_REAL
    START_BYTE = 30
    BYTES = 4
    UNIT = "degree"
  END_OBJECT = COLUMN
  OBJECT = COLUMN
    NAME = SUB_SPACECRAFT_LONGITUDE
    DATA_TYPE = IEEE_REAL
    START_BYTE = 34
    BYTES = 4
    UNIT = "degree"
  END_OBJECT = COLUMN
  OBJECT = COLUMN
    NAME = SPACECRAFT_ALTITUDE
    DATA_TYPE = IEEE_REAL
    START_BYTE = 38
    BYTES = 4
    UNIT = "km"
  END_OBJECT = COLUMN
END_OBJECT = RECORD_HEADER_TABLE
OBJECT = IMAGE
  BAND_STORAGE_TYPE = BAND_SEQUENTIAL
  BANDS = 1
  LINE_SAMPLES = 1024
  LINES =    4250
  SAMPLE_BITS = 32
  SAMPLE_TYPE = IEEE_REAL
  LINE_PREFIX_BYTES = 41
  UNIT = "dBW/m^2"
END_OBJECT = IMAGE
END
```

3.2.2 Data Object Format

Figure 3-4 shows the Sounder high-resolution subsurface cross section product format. This is of fixed-length. The record header is defined with the TABLE object. The echo electric power data section is defined as the IMAGE target that contains the record header.

Absolute time	Measuring delay time	Start frequency number of steps	Observation sub-satellite point latitude	Observation sub-satellite point longitude	Observation sub-satellite point high altitude	echo power (1)	～	echo power SDR-A,W : (1024) SDR-S : (320)
:	:					:	:	:
184 Bit	32 Bit	16 Bit	32 Bit	32 Bit	32 Bit	32 Bit IEEE floating point	･･	･･･

Figure 3-4 Object Format

3.3 Sounder high-resolution subsurface cross section ver.2

Figure 3-5 shows the Sounder high-resolution subsurface cross section ver.2 product file layout.

Label	Basic information PDS fundamental label Data set information Object pointer etc
	Description of the CONTAINER object Fundamental label Description of each column
	Description of the IMAGE object The number of bands, lines, samples and data format etc.
Object	CONTAINER object data Record header
Object	IMAGE Object Data

Figure 3-5 L2 product (Sounder high-resolution subsurface cross section ver.2) file layout

The label portion is adjusted to the length of the object record by adding a space(s) at the end of the final label record, so as to adjust the size to RECORD_TYPE = FIXED_LENGTH.

PDS_VERSION_ID = PDS3<CR+LF> RECORD_TYPE = FIXED_LENGTH<CR+LF> RECORD_BYTES =.....<CR+LF>FILE_RECORDS=.....END<SPACE>.....<SPACE>
Object record #1
:
Object record #N

Figure 3-6 Record image

3.3.1 Label Format

The label format of the Sounder high-resolution subsurface cross section ver.2 product is shown in Table 3-3.

Table 3-3 Sounder high-resolution subsurface cross section ver.2 label format

No	Items	Elements	Types	Values
Standard Item				
1	PDS version number	PDS_VERSION_ID = %s	Char	PDS3 [STATIC]
2	Record format of the file	RECORD_TYPE = %s	Char	FIXED_LENGTH [STATIC] Fixed length record
3	Byte count of the file records	RECORD_BYTES = %d	int	NNNN SDR-W/S mode : Variable based on the observation time SDR-A mode : Variable based on the observation time and average wedge shape
4	Count of the file records	FILE_RECORDS = %d	int	NNNN The calculated number is from amount of data. The digit number is indeterminate.
5	Count of the label records	LABEL_RECORDS = %d	int	NNNN

				The calculated number is from the number of label records. The digit number is indeterminate.
6	Starting position of the container object	^CONTAINER = %d	int	NNNN The record header is described with the CONTAINER object. This item is a pointer to the record header number for the records that are specified. 1 origin
7	Starting position of the image object	^IMAGE = %d	int	NNNN The value of the ^CONTAINER+1 is set.
8	Data set name	DATA_SET_ID = %s	char	SDR_Bscan_high [STATIC]
9	ID of the product	PRODUCT_ID = %s	char	LRS_SWH_RV20_yyyymmddhhmmss
10	Product name	PRODUCT_SET_ID = %s	char	SDR_Bscan_high [STATIC]
11	Satellite name	INSTRUMENT_HOST_NAME = %s	char	SELENE-M [STATIC]
12	Name of the instrument (Full name)	INSTRUMENT_NAME = %s	char	Lunar Radar Sounder [STATIC]
13	Target name	TARGET_NAME = %s	char	MOON [STATIC]
14	Exposure start time	START_TIME = %s	char	YYYY-MM-DDThh:mm:ss Absolute start time of data
15	Exposure stop time	STOP_TIME = %s	char	YYYY-MM-DDThh:mm:ss Absolute stop time of data
16	Value of the TI count (start)	SPACECRAFT_CLOCK_START_COUNT = %d	int	NNNN TI of the start of data The digit number is indeterminate.
17	Value of the TI count (stop)	SPACECRAFT_CLOCK_STOP_COUNT = %d	int	NNNN TI of the stop of data The digit number is indeterminate.
18	Date and Time of product creation	PRODUCT_CREATION_TIME = %s	char	YYYY-MM-DDThh:mm:ss Sets the creation date and time for when the label was generated
19	Count of the frequency step	SPECTRUM_SAMPLES = %d	int	NNNN SDR_W/A = 1024 SDR_S = 320 The digit number is indeterminate.
20	Observation mode	INSTRUMENT_MODE_ID = %s	char	SDR-$ $: W, A orS
21	Longitude of ascending node	ASCENDING_NODE_LONGITUDE = %f	float	XXX.XX The digit number is indeterminate.
22	Latitude of the observation start	START_SUB_SPACECRAFT_LATITUDE = %f	float	YY.YYY Start of sub-satellite point latitude
23	Latitude of the observation end	STOP_SUB_SPACECRAFT_LATITUDE = %f	float	YY.YYY End of sub-satellite point latitude
24	Longitude of the observation start	START_SUB_SPACECRAFT_ LONGITUDE = %f	float	XXX.XXX Start of sub-satellite point longitude
25	Longitude of the observation end	STOP_SUB_SPACECRAFT_ LONGITUDE = %f	float	XXX.XXX End of sub-satellite point longitude

Definition part of the CONTAINER OBJECT				
	Start of the CONTAINER Object	OBJECT = CONTAINER		
1	Name	NAME = %s	char	HEADER [STATIC]
2	Type of data	INTERCHANGE_FORMAT = %s	char	BINARY [STATIC]
3	Starting position of the data	START_BYTE = %d	int	1 [STATIC]
4	Byte count of the data	BYTES = %d	int	41 [STATIC]
5	Number of columns of data	COLUMNS = %d	int	6 [STATIC]
6	Number of cycles	REPETITIONS = %d	int	XXX Corresponds to the LINE_SAMPLES
7	Description	DESCRIPTION = %s	char	"The HEADER container represents the format of XXX repeating groups of attributes in this data product." Number of cycles is entered for XXX. The content is TBD
Data format of the ROW 1		OBJECT = COLUMN		
1	Name of the item	NAME = %s	char	OBSERVATION_TIME [STATIC] Calculated from the FIF0 counter (for units of 50 msec) stored in the CCSDS packet and the TI value. Calculated by the unit of msec in the calculation referring to SPICE.
2	Type of the data	DATA_TYPE = %s	char	CHARACTER [STATIC]
3	Starting position of the data	START_BYTE = %d	int	1 [STATIC]
4	Byte count of the data	BYTES = %d	int	23 [STATIC]
		END_OBJECT = COLUMN		
Data format of the ROW 2		OBJECT = COLUMN		
1	Name of the item	NAME = %s	char	DELAY [STATIC] Calculated from the delay time (H) and delay time (L) that's stored in the CCSDS packet. SDR-W within the frame is of the same value. SDR-A and SDR-S are calculated for each measurement. SDR-A and SDR-s are not of the same value within the frame
2	Type of the data	DATA_TYPE = %s	char	IEEE_REAL [STATIC]
3	Starting position of the data	START_BYTES = %d	int	24 [STATIC]
4	Byte count of the data	BYTE = %d	int	4 [STATIC]
5	Unit of the data	UNIT = %s	char	micro-sec [STATIC]
		END_OBJECT = COLUMN		
Data format of the ROW 3		OBJECT = COLUMN		
1	Name of the item	NAME = %s	char	START_STEP [STATIC] SDR-W and SDR-A are fixed at 0.SDR-R sets the CCSDS packet storage value.
2	Type of the data	DATA_TYPE = %s	char	LSB_UNSIGEND_INTEGER [STATIC]
3	Starting position of the data	START_BYTES = %d	int	28 [STATIC]
4	Byte count of the data	BYTE = %d	int	2 [STATIC]
		END_OBJECT = COLUMN		

Data format of the ROW 4		OBJECT = COLUMN		
1	Name of the item	NAME = %s	char	SUB_SPACECRAFT_LATITUDE [STATIC] Sub-satellite point latitude for the above described observation time (absolute time) is calculated. Refer to the SPICE for the calculation. 0 to 360
2	Type of the data	DATA_TYPE = %s	char	IEEE_REAL [STATIC]
3	Starting position of the data	START_BYTES = %d	int	30 [STATIC]
4	Byte count of the data	BYTE = %d	int	4 [STATIC]
5	Unit of the data	UNIT = %s	char	degree [STATIC]
		END_OBJECT = COLUMN		
Data format of the ROW 5		OBJECT = COLUMN		
1	Name of the item	NAME = %s	char	SUB_SPACECRAFT_LONGITUDE [STATIC] Sub-satellite point longitude for the above described observation time (absolute time) is calculated. Refer to the SPICE for the calculation. -90 to 90
2	Type of the data	DATA_TYPE = %s	char	IEEE_REAL [STATIC]
3	Starting position of the data	START_BYTES = %d	int	34 [STATIC]
4	Byte count of the data	BYTE = %d	int	4 [STATIC]
5	Unit of the data	UNIT = %s	char	degree [STATIC]
		END_OBJECT = COLUMN		
Data format of the ROW 6		OBJECT = COLUMN		
1	Name of the item	NAME = %s	char	SPACECRAFT_ALTITUDE [STATIC] Satellite altitude (distance from the reference plane of the Moon) for the above mentioned observation time (absolute time) is calculated. Refer to the SPICE tor the calculation.
2	Type of the data	DATA_TYPE = %s	char	IEEE_REAL [STATIC]
3	Starting position of the data	START_BYTES = %d	int	38 [STATIC]
4	Byte count of the data	BYTE = %d	int	4 [STATIC]
5	Unit of the data	UNIT = %s	char	km [STATIC]
		END_OBJECT = COLUMN		
	End of the CONTAINER Object	END_OBJECT = CONTAINER		
Definition part of the Data Object for sounder observation				
	Start of the IMAGE Object	OBJECT = IMAGE		
1	Band storage type	BAND_STORAGE_TYPE = %s	char	BAND_SEQUENTIAL [STATIC]
2	Number of bands	BANDS = %d	int	1 [STATIC]
3	Horizontal pixel count of image	LINE_SAMPLES = %d	int	NNNN SDR_W/S : Variable based on the observation time SDR_A : Variable based on the observation time and average wedge shape
4	Vertical pixel count of image	LINES = %d	int	XXX Changeable based on the change in

				the delay time and the satellite altitude.
5	Pixel bit length	SAMPLE_BITS = %d	int	8 [STATIC]
6	Pixel type	SAMPLE_TYPE = %s	char	LSB_UNSIGEND_INTEGER [STATIC]
7	Unit of the data	UNIT = %s	char	N/A [STATIC]
8	Description	NOTE = %s	char	Echo power<dBW/m^2> = (255 – DN) * (Pmax – Pmin) / 255+Pmin where Pmax = xxx.xxx, Pmin = xxx.xxx Conversion equation from the DN (brightness) value to the echo power.
	End of the IMAGE Object	END_OBJECT = IMAGE		

<Example of Label>

```
PDS_VERSION_ID = PDS3

RECORD_TYPE = FIXED_LENGTH
RECORD_BYTES = 4
FILE_RECORDS = 1646
LABEL_RECORDS = 580

^CONTAINER = 581
^IMAGE = 623

DATA_SET_ID = "SDR_Bscan_high"
PRODUCT_ID = "LRS_SWH_RV20_20080215135645"
PRODUCT_SET_ID = "SDR_Bscan_high"
INSTRUMENT_HOST_NAME = "SELENE-M"
INSTRUMENT_NAME = "Lunar Radar Sounder"
TARGET_NAME = MOON
START_TIME = 2008-02-15T13:56:45
STOP_TIME = 2008-02-15T13:56:45
SPACECRAFT_CLOCK_START_COUNT = 0887119001
SPACECRAFT_CLOCK_STOP_COUNT = 0887119001
PRODUCT_CREATION_TIME = 2009-06-29T04:55:24

SPECTRUM_SAMPLES = 1024
INSTRUMENT_MODE_ID = "SDR-W"
ASCENDING_NODE_LONGITUDE = 299.318
START_SUB_SPACECRAFT_LATITUDE = 30.553
STOP_SUB_SPACECRAFT_LATITUDE = 30.546
START_SUB_SPACECRAFT_LONGITUDE = 119.201
STOP_SUB_SPACECRAFT_LONGITUDE = 119.201

OBJECT = CONTAINER
  NAME = HEADER
  INTERCHANGE_FORMAT = BINARY
  START_BYTE = 1
  BYTES = 41
  COLUMNS = 6
  REPETITIONS = 4
  DESCRIPTION = "
    The HEADER container represents the format of 4
    repeating groups of attributes in this data product."
  OBJECT = COLUMN
    NAME = OBSERVATION_TIME
    DATA_TYPE = CHARACTER
    START_BYTE = 1
    BYTES = 23
  END_OBJECT = COLUMN
  OBJECT = COLUMN
    NAME = DELAY
    DATA_TYPE = IEEE_REAL
    START_BYTE = 24
    BYTES = 4
    UNIT = "micro-sec"
  END_OBJECT = COLUMN
  OBJECT = COLUMN
    NAME = START_STEP
    DATA_TYPE = LSB_UNSIGNED_INTEGER
    START_BYTE = 28
    BYTES = 2
  END_OBJECT = COLUMN
  OBJECT = COLUMN
    NAME = SUB_SPACECRAFT_LATITUDE
    DATA_TYPE = IEEE_REAL
    START_BYTE = 30
    BYTES = 4
    UNIT = "degree"
  END_OBJECT = COLUMN
  OBJECT = COLUMN
    NAME = SUB_SPACECRAFT_LONGITUDE
    DATA_TYPE = IEEE_REAL
```

```
    START_BYTE = 34
    BYTES = 4
    UNIT = "degree"
  END_OBJECT = COLUMN
  OBJECT = COLUMN
    NAME = SPACECRAFT_ALTITUDE
    DATA_TYPE = IEEE_REAL
    START_BYTE = 38
    BYTES = 4
    UNIT = "km"
  END_OBJECT = COLUMN
END_OBJECT = CONTAINER
OBJECT = IMAGE
  BAND_STORAGE_TYPE = BAND_SEQUENTIAL
  BANDS = 1
  LINE_SAMPLES = 4
  LINES = 1024
  SAMPLE_BITS = 8
  SAMPLE_TYPE = LSB_UNSIGNED_INTEGER
  UNIT = "N/A"
  NOTE = "
    Echo power <dBW/m^2> = (255-DN)*(Pmax-Pmin)/255+Pmin
    where Pmax = -92.600, Pmin = -162.500"
END_OBJECT = IMAGE
END
```

3.3.2 Data Object Format

The object of the Sounder high-resolution subsurface cross section product ver.2 is comprised of: (a) CONTAINER object and (b) IMAGE object.

(a) CONTAINER object

Figure 3-7 shows the format for the CONTAINER object. The record header is of fixed-length.

Record header (1)						~	Record header Echo power (N)					
Absolute time	Measurement delay time	Start frequency number of steps	Observation sub-satellite point	Observation sub-satellite point	Observation sub-satellite point high		Absolute time	Measurement delay time	Start frequency number of steps	Observation sub-satellite point	Observation sub-satellite point	Observation sub-satellite point high
:	:	:	:	:	:	:	:	:	:	:	:	:
184 Bit	32 Bit	16 Bit	32 Bit	32 Bit	32 Bit		184 Bit	32 Bit	16 Bit	32 Bit	32 Bit	32 Bit

Figure 3-7 CONTAINER Object Format

(b) IMAGE Object

Figure 3-8 shows the format for the IMAGE object. The record header is of fixed-length.

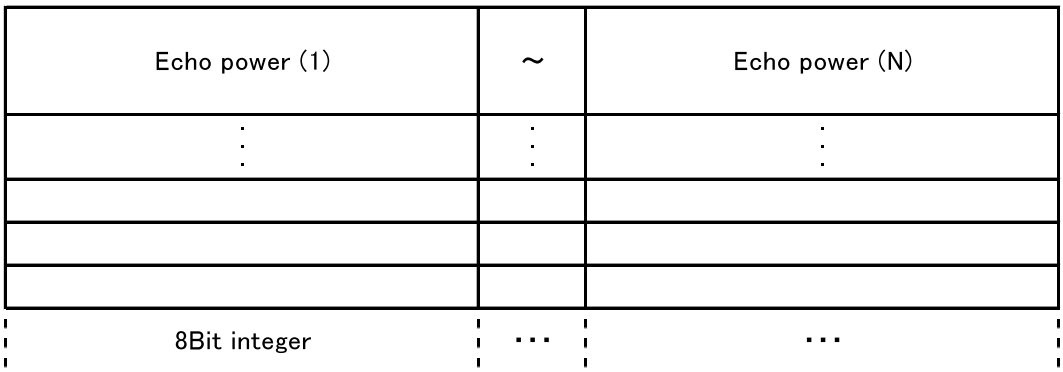

Figure 3-8 IMAGE Object Format

In the Sounder high-resolution subsurface cross section product ver.2, the delay time correction, satellite latitude correction and data interval correction for the flight direction are applied to the IMAGE object data. For example, for the observation of the flat surface of the Moon, Figure 3-9 and Figure 3-10 shows the data format when the delay time changes from T1 to T2 (T1 > T2) and the satellite altitude changes sequentially as R1, R2, R3, R4 (R1 > R2 > R3 > R4). The data interval for the flight direction is shown by using X.

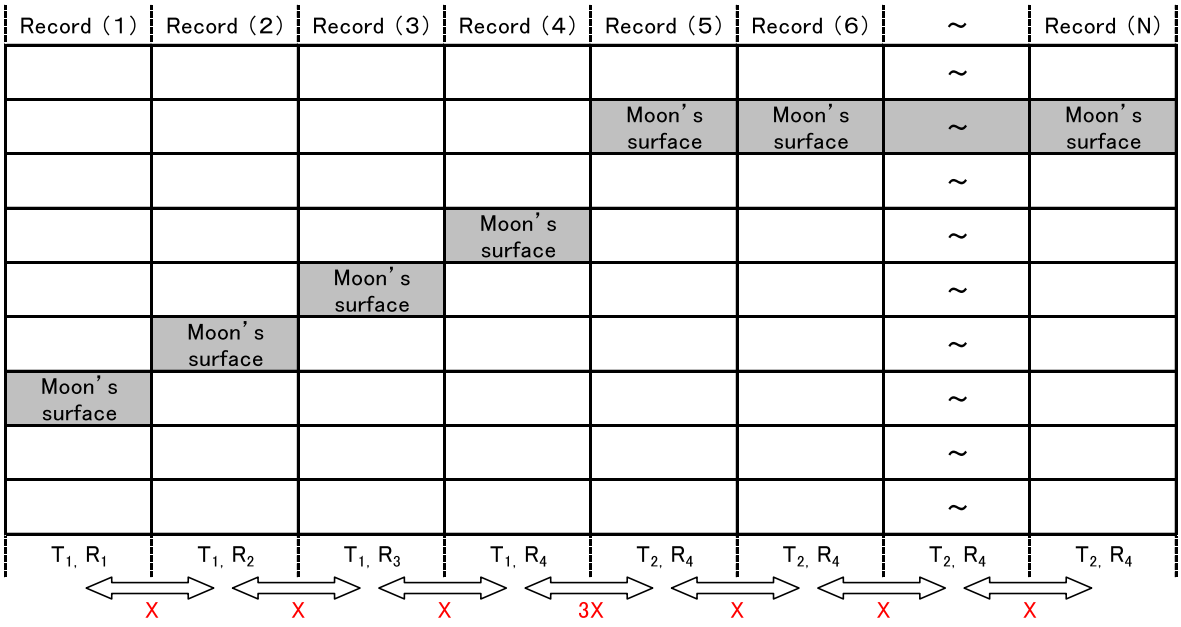

Figure 3-9 IMAGE object data before adding dummy data

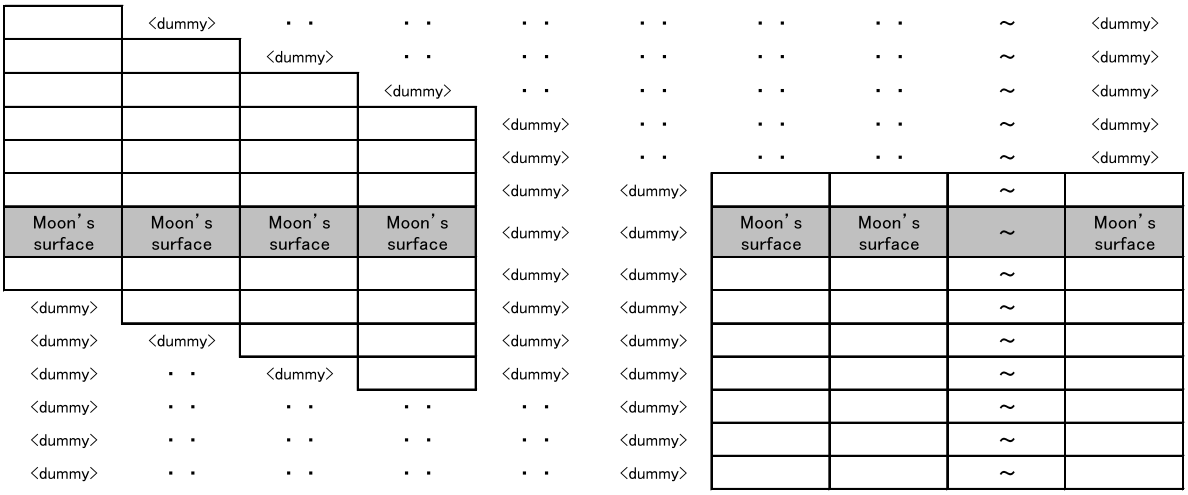

Figure 3-10 IMAGE object data after adding dummy data

To correlate the dummy data that was added to the IMAGE object data, SPACE(s) are added to the CONTAINER object data. Figure 3-11 shows the data format.

Record Header (1)	Record Header (2)	Record Header (3)	Record Header (4)	<SPACE>
<SPACE>	Record Header (5)	Record Header (6)	-	Record Header (N)

Figure 3-11 CONTAINER object data after adding SPACE(s)

3.4 Catalog Information File Format

The Catalog Information File Format for the IMAGE object used for the Sounder high-resolution subsurface cross section is shown in Table 3-4.

Table 3-4 Catalog Information File Format

Item Name	Elements	Format of Value	Range of Value	Values
Name of the data file (*1)	DataFileName	AAAA….AAAA (Up to 31 digits)	alphanumeric characters	LRS_SWH_RV10_yyyymmddhhmmss.img dependent on the product (See Section 3.1 "Rules used for File naming")
Size of the data file	DataFileSize	NNNNNNNNNNN N (Up to 12 digits)	unit:<byte>	XXXX
File format of the data file	DataFileFormat	AAAA….AAAA (Up to 16 digits)	character strings	PDS [STATIC]
Name of the instrument	InstrumentName	AAAA….AAAA (Up to 16 digits)	character strings	LRS [STATIC]
Processing level	ProcessingLevel	AAAA….AAAA (Up to 16 digits)	character strings	Standard
Product ID	ProductID	AAAA….AAAA (Up to 30 digits)	character strings	SDR_Bscan_high
Version number of the product	ProductVersion	AAAA….AAAA (Up to 16 digits) AAAA….AAAA (最大 16 桁)	character strings	1.0
Access level	AccessLevel	N	values of 0-4	N/A
Start time	StartDateTime	yyyy-mm-ddT hh:mm:ssZ	DATE & TIME	yyyy-mm-ddT hh:mm:ssZ
Stop time	EndDateTime	yyyy-mm-ddT hh:mm:ssZ	DATE & TIME	yyyy-mm-ddT hh:mm:ssZ
Longitude of ascending node of the start data	StartAscendingLongitude	NNN.NNNNNN	0-360	XXX.XXX
Longitude of ascending node of the end data	EndAscendingLongitude	NNN.NNNNNN	0-360	XXX.XXX
Flag of the location	LocationFlag	A	A：ascending D：descending N ： including the North Pole S ： including the South Pole W ： including the North Pole and the South Pole	X
Upper left latitude of the scene	UpperLeftLatitude	SNN.NNNNNN	-90-90	XXX.XXX
Upper left longitude of the scene	UpperLeftLongitude	NNN.NNNNNN	0-360	XXX.XXX
Upper right latitude of the scene	UpperRightLatitude	SNN.NNNNNN	-90-90	XXX.XXX
Upper right longitude of the scene	UpperRightLongitude	NNN.NNNNNN	0-360	XXX.XXX
Lower left latitude of the scene	LowerLeftLatitude	SNN.NNNNNN	-90-90	XXX.XXX
Lower left longitude of the scene	LowerLeftLongitude	NNN.NNNNNN	0-360	XXX.XXX

Lower right latitude of the scene	LowerRightLatitude	SNN.NNNNNN	-90-90	XXX.XXX
Lower right longitude of the scene	LowerRightLongitude	NNN.NNNNNN	0-360	XXX.XXX

(*1) "DataFileName" is the stored file name of the product. For the detached format, this is the stored file name.

<Example of Catalog Information File>

DataFileName = LRS_SWH_RV20_20080215135645.img
DataFileSize = 6584
DataFileFormat = PDS
InstrumentName = LRS
ProcessingLevel = Standard
ProductID = SDR_Bscan_high
ProductVersion = 2.0
AccessLevel = 2
StartDateTime = 2008-02-15T13:56:45Z
EndDateTime = 2008-02-15T13:56:45Z
StartAscendingLongitude = 299.318
EndAscendingLongitude = 299.318
LocationFlag = W
UpperLeftLatitude = 30.553
UpperLeftLongitude = 118.701
UpperRightLatitude = 30.546
UpperRightLongitude = 118.701
LowerLeftLatitude = 30.553
LowerLeftLongitude = 119.701
LowerRightLatitude = 30.546
LowerRightLongitude = 119.701

4. High-frequency wave spectrum

4.1 Rules used for File naming

The nomenclature used for Data Object and Catalog Information File the High-frequency wave spectrum are described below. In addition, the file names are case-independent.

Table 4-1 Rules used for File naming

Item	Description
L2 Data Set (tar archive)	LRS_NPW_V010_yyyymmdd.sl2 1 2 3 4
Data Product	LRS_NPW_V010_yyyymmdd.cdf
Catalog Information File	LRS_NPW_V010_yyyymmdd.ctg

1 : LRS	STATIC
2 : Data Class	NPW : High-frequency wave spectrum
3 : Version Class	V10
4 : Date of the observation	yyyymmdd

4.2 Label Format

The High-frequency wave spectrum is generated in CDF (Common Data Format) format. Therefore, as a L2 product, the data product file and the catalog information file, in the CDF format, are included. The label is not defined.

4.3 Data Object Format

The High-frequency wave spectrum is generated in CDF*1 (Common Data Format) format. This completely conforms to CDF Ver3.3.

The Global Attributes and the Variable Attributes defined in the data file are compliant with Space Physics Guidelines for CDF*2.

*1 : http://cdf.gsfc.nasa.gov/

*2 : http://spdf.gsfc.nasa.gov/sp_use_of_cdf.html

4.4 Catalog Information File Format

The Catalog Information File Format of the High-frequency wave spectrum is shown in Table 4-2.

Table 4-2 Catalog Information File Format

Item Name	Elements	Format of Value	Range of Value	Values
Name of the data file (*1)	DataFileName	AAAA….AAAA (Up to 31 digits)	alphanumeric characters	LRS_NPW_V010_yyyymmdd.cdf dependent on the product (See Section 4.1 "Rules used for File naming")
Size of the data file	DataFileSize	NNNNNNNNNNNN (Up to 12 digits)	unit:<byte>	XXXX
File format of the data file	DataFileFormat	AAAA….AAAA (Up to 16 digits)	character strings	CDF [STATIC]
Name of the instrument	InstrumentName	AAAA….AAAA (Up to 16 digits)	character strings	LRS [STATIC]
Processing level	ProcessingLevel	AAAA….AAAA (Up to 16 digits)	character strings	Standard
Product ID	ProductID	AAAA….AAAA (Up to 30 digits)	character strings	NPW_spectrum
Version number of the product	ProductVersion	AAAA….AAAA (Up to 16 digits)	character strings	1.0
Access level	AccessLevel	N	values of 0-4	N/A
Start time	StartDateTime	yyyy-mm-ddThh:mm:ssZ	DATE & TIME	yyyy-mm-ddThh:mm:ssZ
Stop time	EndDateTime	yyyy-mm-ddThh:mm:ssZ	DATE & TIME	yyyy-mm-ddThh:mm:ssZ
FreeKeyword	FreeKeyword			=CdfFileName,T,se_h1_npw_yyyymmdd_v01.cdf

(*1) "DataFileName" is the stored file name of the product. For the detached format, this is the stored file name.

<Example of Catalog Information File>

DataFileName = LRS_NPW_V010_20080910.cdf
DataFileSize = 7273757
DataFileFormat = CDF
InstrumentName = LRS
ProcessingLevel = Standard
ProductID = NPW_spectrum
ProductVersion = 1.0
AccessLevel = 2
StartDateTime = 2008-09-10T00:00:00Z
EndDateTime = 2008-09-10T23:59:59Z
FreeKeyword = CdfFileName,T,se_h1_npw_20080910_v01.cdf

5. Low-frequency wave spectrum

5.1 Rules used for File naming

The nomenclature used for Data Object and Catalog Information File the Low-frequency wave spectrum are described below. In addition, the file names are case-independent.

Table 5-1 Rules used for File naming

Item	Description
L2 Data Set (tar archive)	LRS_WFC_V010_yyyymmddhhmmss.sl2 1 2 3 4
Data Product	LRS_WFC_V010_yyyymmddhhmmss.cdf
Catalog Information File	LRS_WFC_V010_yyyymmddhhmmss.ctg

1 : LRS	STATIC
2 : Data Class	WFC : Low-frequency wave spectrum
3 : Version Class	V10
4 : End date of the observation	yyyymmddhhmmss

5.2 Label Format

The Low-frequency wave spectrum is generated in CDF (Common Data Format) format. Therefore, as a L2 product, the data product file and the catalog information file, in the CDF format, are included. The label is not defined.

5.3 Data Object Format

The Low-frequency wave spectrum is generated in CDF*1 (Common Data Format) format. This completely conforms to CDF Ver2.7.

The Global Attributes and the Variable Attributes defined in the data file are compliant with Space Physics Guidelines for CDF*2.

*1 : http://cdf.gsfc.nasa.gov/

*2 : http://spdf.gsfc.nasa.gov/sp_use_of_cdf.html

5.4 Catalog Information File Format

The Catalog Information File Format for the IMAGE object used for the Low-frequency wave spectrum is shown in Table 5-2.

Table 5-2 Catalog Information File Format

Item Name	Elements	Format of Value	Range of Value	Values
Name of the data file (*1)	DataFileName	AAAA….AAAA (Up to 31 digits)	alphanumeric characters	LRS_WFC_V010_yyyymmddhhmmss.cdf dependent on the product (See Section 5.1 "Rules used for File naming")
Size of the data file	DataFileSize	NNNNNNNNNNN (Up to 12 digits)	unit:<byte>	XXXX
File format of the data file	DataFileFormat	AAAA….AAAA (Up to 16 digits)	character strings	CDF [STATIC]
Name of the instrument	InstrumentName	AAAA….AAAA (Up to 16 digits)	character strings	LRS [STATIC]
Processing level	ProcessingLevel	AAAA….AAAA (Up to 16 digits)	character strings	Standard
Product ID	ProductID	AAAA….AAAA (Up to 30 digits)	character strings	WFC_spectrum
Version number of the product	ProductVersion	AAAA….AAAA (Up to 16 digits)	character strings	1.0
Access level	AccessLevel	N	values of 0-4	N/A
Start time	StartDateTime	yyyy-mm-ddthh:mm:ss.ssssssZ	DATE & TIME	yyyy-mm-ddthh:mm:ssZ
Stop time	EndDateTime	yyyy-mm-ddthh:mm:ss.ssssssZ	DATE & TIME	yyyy-mm-ddthh:mm:ssZ
FreeKeyword	FreeKeyword			CdfFileName,T,selene_h0_wfc_yyyymmddhh mmss_v01.cdf

(*1) "DataFileName" is the stored file name of the product. For the detached format, this is the stored file name.

<Example of Catalog Information File>

DataFileName = LRS_NPW_V010_20070214082343.cdf
DataFileSize = 525924
DataFileFormat = CDF
InstrumentName = LRS
ProcessingLevel = Standard
ProductID = NPW_spectrum
ProductVersion = 1.0
AccessLevel = 2
StartDateTime = 2007-02-14T08:23:43Z
EndDateTime = 2007-02-14T08:25:00Z
FreeKeyword = Cdf

6. Subsurface geologic structure interpretation map

6.1 Rules used for File naming

The nomenclature used for Label, Data Object and Catalog Information File the Subsurface geologic structure interpretation map are described below. In addition, the file names are case-independent.

Table 6-1 Rules used for File naming

Item	Description
L2 Data Set (tar archive)	LRS_GEO_V010_yyyymmddhhmmss.sl2 1 2 3 4
Data Product	LRS_GEO_V010_yyyymmddhhmmss.img
Catalog Information File	LRS_GEO_V010_yyyymmddhhmmss.ctg

1 : LRS	STATIC
2 : GEO	STATIC
3 : Version Class	V010
4 : Start date and time of the observation	yyyymmddhhmmss

6.2 Label Format

The label format of the Subsurface geologic structure interpretation map is shown in Table 6-2.

Table 6-2 Label Format

No	Items	Elements	Types	Values
Standard Item				
1	PDS version number	PDS_VERSION_ID = %s	char	PDS3 [STATIC]
2	Record format of the file	RECORD_TYPE = %s	char	FIXED_LENGTH [STATIC] Fixed length record
3	Byte count of the file records	RECORD_BYTES = %d	int	NNNN SDR_W/S : Variable based on the observation time SDR_A : Variable based on the observation time and average wedge shape
4	Count of the file records	FILE_RECORDS = %d	int	NNNN The calculated number is from amount of data. The digit number is indeterminate.
5	Count of the label records	LABEL_RECORDS = %d	int	NNNN The calculated number is from the number of label records. The digit number is indeterminate.
6	Starting position of the image object	^IMAGE = %d	int	NNNN
7	Data set name	DATA_SET_ID = %s	char	SDR_Geology [STATIC]

8	ID of the product	PRODUCT_ID = %s	char	LRS_GEO_V010_yyyymmddhhmmss [STATIC] The extension is removed from the file name.
9	Product name	PRODUCT_SET_ID = %s	char	SDR_Geology [STATIC]
10	Satellite name	INSTRUMENT_HOST_NAME = %s	char	SELENE-M [STATIC]
11	Name of the instrument (Full name)	INSTRUMENT_NAME = %s	char	Lunar Radar Sounder [STATIC]
12	Target name	TARGET_NAME = %s	char	MOON [STATIC]
13	Exposure start time	START_TIME = %s	char	YYYY-MM-DDThh:mm:ss Absolute start time of data
14	Exposure stop time	STOP_TIME = %s	char	YYYY-MM-DDThh:mm:ss Absolute stop time of data
15	Value of the TI count (start)	SPACECRAFT_CLOCK_START_COUNT = %d	int	NNNN TI of the start of data The digit number is indeterminate.
16	Value of the TI count (stop)	SPACECRAFT_CLOCK_STOP_COUNT = %d	int	NNNN TI of the stop of data The digit number is indeterminate.
17	Date and Time of product creation	PRODUCT_CREATION_TIME = %s	char	YYYY-MM-DDThh:mm:ss Sets the creation date and time for when the label was generated
18	Count of the frequency step	SPECTRUM_SAMPLES = %d	int	NNNN SDR_W/A = 1024 SDR_S = 320 The digit number is indeterminate.
19	Observation mode	INSTRUMENT_MODE_ID = %s	char	SDR-$ $: W, A or S
20	Longitude of ascending node	ASCENDING_NODE_LONGITUDE = %f	float	XXX.XX The digit number is indeterminate.
21	Latitude of the observation start	START_SUB_SPACECRAFT_LATITUDE = %f	float	YY.YYY Start of sub-satellite point latitude
22	Latitude of the observation end	STOP_SUB_SPACECRAFT_LATITUDE = %f	float	YY.YYY End of sub-satellite point latitude
23	Longitude of the observation start	START_SUB_SPACECRAFT_ LONGITUDE = %f	float	XXX.XXX Start of sub-satellite point longitude
24	Longitude of the observation end	STOP_SUB_SPACECRAFT_ LONGITUDE = %f	float	XXX.XXX End of sub-satellite point longitude
Definition part of the Data Object for sounder observation				
	Start of the IMAGE Object	OBJECT = IMAGE		
1	Band storage type	BAND_STORAGE_TYPE = %s	char	SAMPLE_INTERLEAVED [STATIC]
2	Number of bands	BANDS = %d	smallint	1 [STATIC]

3	Horizontal pixel count of image	LINE_SAMPLES = %d	int	NNNN SDR_W/S : Variable based on the observation time and average wedge shape SDR_A : Variable based on the average wedge shape
4	Vertical pixel count of image	LINES = %d	int	XXX Changeable based on the change in the delay time and the satellite altitude.
5	Pixel bit length	SAMPLE_BITS = %d	int	8 [STATIC]
6	Pixel type	SAMPLE_TYPE = %s	char	LSB_UNSIGNED_INTEGER [STATIC] * Refer to the PDS Standard Reference V3.5 Appendix C.4 for further information about "LSB_UNSIGNED_INTEGER".
7	Unit of the data	UNIT = %s	char	N/A [STATIC]
8	Description	NOTE = %s	char	XXXXXXXXXXXXXXXXXXX
	End of the IMAGE Object	END_OBJECT = IMAGE		

<Example of Label>

```
PDS_VERSION_ID = PDS3

RECORD_TYPE = FIXED_LENGTH
RECORD_BYTES = 1200
FILE_RECORDS =     1116
LABEL_RECORDS = 1

^IMAGE = 2

DATA_SET_ID = "SDR_Geology"
PRODUCT_ID = "LRS_GEO_V010_20080101195958"
PRODUCT_SET_ID = "SDR_Geology"
INSTRUMENT_HOST_NAME = "SELENE-M"
INSTRUMENT_NAME = "Lunar Radar Sounder"
TARGET_NAME = MOON
START_TIME = 2008-01-01T19:59:58
STOP_TIME = 2008-01-01T20:09:58
SPACECRAFT_CLOCK_START_COUNT = 0883252797
SPACECRAFT_CLOCK_STOP_COUNT = 0883253395
PRODUCT_CREATION_TIME = 2009-06-19T03:55:31

SPECTRUM_SAMPLES = 1024
INSTRUMENT_MODE_ID = "SDR-W"
ASCENDING_NODE_LONGITUDE = 169.105
START_SUB_SPACECRAFT_LATITUDE = 50.489
STOP_SUB_SPACECRAFT_LATITUDE = 19.558
START_SUB_SPACECRAFT_LONGITUDE = 349.482
STOP_SUB_SPACECRAFT_LONGITUDE = 349.180

OBJECT = IMAGE
  BAND_STORAGE_TYPE = SAMPLE_INTERLEAVED
  BANDS = 3
  LINE_SAMPLES = 1200
  LINES = 1115
  SAMPLE_BITS = 8
  SAMPLE_TYPE = LSB_UNSIGNED_INTEGER
  UNIT = "N/A"
  NOTE = "
    Lines are subsurface reflectors."
```

END_OBJECT = IMAGE
END

6.3 Data Object Format

Figure 6-1 shows the Subsurface geologic structure interpretation map product file layout.

Label	Basic information PDS fundamental label Data set information Object pointer etc.
	Description of the IMAGE object The number of bands, lines, samples, and data format etc
Object	IMAGE Object Data

Figure 6-1 L2 product (Subsurface geologic structure interpretation map) file layout

The label portion is adjusted to the length of the object record by adding a space(s) at the end of the final label record, so as to adjust the size to RECORD_TYPE = FIXED_LENGTH.

PDS_VERSION_ID = PDS3<CR+LF> RECORD_TYPE = FIXED_LENGTH<CR+LF> RECORD_BYTES =.....<CR+LF>FILE_RECORDS= .....END<SPACE>.....<SPACE>
Object Record #1
: :
Object Record #N

Figure 6-2 Record image

The background chart is sounder low-resolution subsurface cross section that become the origin of subsurface geologic structure. And the foreground chart is a magnification of the frame border shown in the background chart. The heavy line in the foreground chart shows detected subsurface discontinuities. Besides, the terrain etc. interpreted based on the comparison with another data are shown.

6.4 Catalog Information File Format

The Catalog Information File Format for the Subsurface geologic structure interpretation map is shown in Table 6-3.

Table 6-3 Catalog Information File Format

Item Name	Elements	Format of Value	Range of Value	Values
Name of the data file (*1)	DataFileName	AAAA….AAAA (Up to 31 digits)	alphanumeric characters	LRS_GEO_V010_yyyymmddhhmmss.img dependent on the product (See Section 2.1 “Rules used for File naming”)

Size of the data file	DataFileSize	NNNNNNNNNNN (Up to 12 digits)	unit:<byte>	XXXX
File format of the data file	DataFileFormat	AAAA….AAAA (Up to 16 digits)	character strings	PDS [STATIC]
Name of the instrument	InstrumentName	AAAA….AAAA (Up to 16 digits)	character strings	LRS [STATIC]
Processing level	ProcessingLevel	AAAA….AAAA (Up to 16 digits)	character strings	Higher Level
Product ID	ProductID	AAAA….AAAA (Up to 30 digits)	character strings	SDR_Geology
Version number of the product	ProductVersion	AAAA….AAAA (Up to 16 digits)	character strings	1.0
Access level	AccessLevel	N	values of 0-4	N/A
Start time	StartDateTime	yyyy-mm-ddT hh:mm:ssZ	DATE & TIME	yyyy-mm-ddThh:mm:ssZ
Stop time	EndDateTime	yyyy-mm-ddT hh:mm:ssZ	DATE & TIME	yyyy-mm-ddThh:mm:ssZ
Longitude of ascending node of the start data	StartAscendingLongitude	NNN.NNNNNN	0-360	XXX.XXX
Longitude of ascending node of the end data	EndAscendingLongitude	NNN.NNNNNN	0-360	XXX.XXX
Flag of the location	LocationFlag	A	A：ascending D：descending N ： including the North Pole S ： including the South Pole W ： including the North Pole and the South Pole	X
Upper left latitude of the scene	UpperLeftLatitude	SNN.NNNNNN	-90-90	XXX.XXX
Upper left longitude of the scene	UpperLeftLongitude	NNN.NNNNNN	0-360	XXX.XXX
Upper right latitude of the scene	UpperRightLatitude	SNN.NNNNNN	-90-90	XXX.XXX
Upper right longitude of the scene	UpperRightLongitude	NNN.NNNNNN	0-360	XXX.XXX
Lower left latitude of the scene	LowerLeftLatitude	SNN.NNNNNN	-90-90	XXX.XXX
Lower left longitude of the scene	LowerLeftLongitude	NNN.NNNNNN	0-360	XXX.XXX
Lower right latitude of the scene	LowerRightLatitude	SNN.NNNNNN	-90-90	XXX.XXX
Lower right longitude of the scene	LowerRightLongitude	NNN.NNNNNN	0-360	XXX.XXX

(*1) “DataFileName” is the stored file name of the product. For the detached format, this is the stored file name.

<Example of Catalog Information File>

DataFileName = LRS_GEO_V010_20080101195958.img
DataFileSize = 4015201
DataFileFormat = PDS
InstrumentName = LRS
ProcessingLevel = Higher Level
ProductID = SDR_Geology
ProductVersion = 1.0
AccessLevel = 2
StartDateTime = 2008-01-01T19:59:58Z
EndDateTime = 2008-01-01T20:09:58Z
StartAscendingLongitude = 169.105
EndAscendingLongitude = 169.105
LocationFlag = D
UpperLeftLatitude = 50.489

UpperLeftLongitude = 348.982
UpperRightLatitude = 19.558
UpperRightLongitude = 348.680
LowerLeftLatitude = 50.489
LowerLeftLongitude = 349.982
LowerRightLatitude = 19.558
LowerRightLongitude = 349.680