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ROSETTA

Archive Conventions

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Distribution List

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Change Record Sheet

Date	Iss.	Rev.	pp.	Description / Authority	CR No.
10 Jan 2006	1	–		First issue. This document previously constituted appendix F of the Archive Plan (AD1). It was moved to a separate document in order to facilitate frequent updating. Made a few corrections, mainly affecting the values of INSTRUMENT_ID/NAME for some experiments. Added a table of the corresponding values for PROCESSING_LEVEL_ID and PRODUCT_TYPE. Added chapter “Geometry Information”.	
24 Jan 2006	1	1		Modified INSTRUMENT_ID/NAME for Lander teams (SESAME, ROLIS, MUPUS, ROMAP)	
31 Jan 2006	1	2		Modified INSTRUMENT_NAME for PTOLEMY	
06 March	1	3		TARGET_NAME = JUPITER added	
13 March 2007	2	0		Reference frame Geometry keywords in the labels	
14 March2007	2	1		Time of computation for geometry parameters in the label	
29 March 2007	2	2		Adding in the chapter 3. Typo. Authors.	
9 April 2007	2	3		3.1 GEO indexes	
10 April 2007	2	4		LABEL_RECORDS is not a required keywords for detached label.	
26 April	2	5		Col opt/required added in table 1	

Date	Iss.	Rev.	pp.	Description / Authority	CR No.
2007				Ref for special agreement with SD2 on CRU in table 3(b).	
11 May 2007	3	0		Definition of the values inside the VOLDESC.CAT	
1 June 2007	3	1		MOON added as a target in Table5	
7 June	3	2		VOLUME object values updated.	
8 June	3	3		VOLUME object updated for RPC MAG COSIMA	
18 June 2007	3	4		Update volume tables (See …) RAW -> CALIBRATED for MIRO. GER instead of DE for RSI in Volume. ROSETTA SCIENCE ARCHIVE in template of VOLDESC.CAT instead of TBD.	
18 Sep 2007	3	5		Make clear section on Mandatory keywords 2. Geometry keywords strongly recommended.	
11Feb 2008	3	6		VOLUME_SET_ID	
23 Feb 2009	4	0		Upper case notification. Section 2.1	
8 May 2009	5	1		Update of Table 4, mission phase names with dates. VOLUME_SET_ID Section 2.3.4 Payload checkout Table added for OBSERVATION_TYPE values. Section 2.2	
17 Sep 2009	5	3		Thermal characterisation added in section 2.2.	
12 Nov 2009	5	4		VOLUME values definition clarified. Section 2.3.	
4 Feb	5	5		Calendar dates added (CR4B and	

Date	Iss.	Rev.	pp.	Description / Authority	CR No.
2010				EAR3) Table 4	
26 Jul 2010	5	7		VOLUME_SET_NAME for the Lander and OBSERVATION_TYPE updates.	
8 Jun 2011	5	9	11	MISSION_PHASE_NAME TABLE updates with dates.	

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1. Introduction, Reference and Applicable documents

1.1 Introduction

This document defines the conventions that apply to the Rosetta Science Data Archive. The conventions are agreements and rules in addition to the PDS Standards AD2. Adoption of these conventions in all data sets will improve the consistency and aid the comprehension of the Rosetta archive.
The archiving process, responsibilities, schedule and top-level structure of the data sets are described in the Archive Plan AD1.

1.2 Applicable Documents

AD1. Rosetta Archive Generation, Validation and Transfer Plan, RO-EST-PL-5011, Issue 2, Revision 3, 10 Jan 2006.
AD2. Planetary Data System Standards Reference, JPL D-7669, Part 2, Version 3.6, 1 Aug 2003.
AD3. Planetary Science Data Dictionary Document, JPL D-7116, Revision E, 28 Aug 2002.
AD4. Planetary Science Data Archive Technical Note Geometry and Position Information, SOP-RSSD-TN-010, to be updated.
AD5. Report or the IAU/IAG working group on cartographic coordinates and rotational elements of the planets and satellites: 2000.
AD6. RO-EST-MN-0811_1_1_Minutes_of_the_Lander_SD2_Telecon_2004Dec15.doc
AD7. RO-SGS-MN-009_1_1_Minutes_of_PHILAE_Meeting_2007Apr23.doc

1.3 Reference Documents

Rosetta Mission Calendar, RO-ESC-TN-5026, Issue 2.1, Oct 2003.

2. Mandatory and strongly recommended keywords and standard values

2.1 File and directory naming

In chapter 10, PDS recommends that archive products adhere to the ISO 9660 Level 2 specification. Part of this specification is the restrictive use of the upper case alphanumeric characters (A-Z, 0-9) and the underscore. For the ROSETTA mission, however, PDS and PSA have agreed that only the upper case alphanumeric characters (A-Z, 0-9) and the underscore may be used in file and directory names.

2.2 Data Product Labels

Table 1 lists the **keywords that are mandatory** for all data product labels of the Rosetta mission. Note that not all of these keywords are required by the PDS standards, the second column of this table provides the information on the PDS requirements. “N/A” (“Not Applicable”) may be used for data elements of

any type (i.e. text, date, numeric etc.) if needed.
The date/time expression YYYY-MM-DDThh:mm:ss[.fff] (without "Z") represents Universal Time Coordinated (UTC). This is erroneous in chapter 7 of the PDS Standards Reference Version 3.6 AD2, although the Change Log indicates that the "Z" was removed from the examples (according to a telecon with PDS-SBN on 4 November 2003).
Table 2 lists the strongly recommended keywords.

Table 1: Mandatory keywords and standard values for data product labels.

Keyword	**Req. or opt. for PDS**	Max. length	Standard value(s)
PDS_VERSION_ID	req.	6	PDS3
LABEL_REVISION_NOTE (only for catalogue files)	opt.; in catalog labels: req.	N/A	"Vn.m"
RECORD_TYPE	req.	20	FIXED_LENGTH (recommended), VARIABLE_LENGTH, STREAM, UNDEFINED
RECORD_BYTES	see section 5.3.2 of AD2	N/A	
FILE_RECORDS	see section 5.3.2 of AD2	N/A	
LABEL_RECORDS	see section 5.3.2 of AD2	N/A	Only for attached label.
DATA_SET_ID	req.	40	formation rule see section 2.2.1
DATA_SET_NAME	opt.	60	formation rule see section 2.2.2
PRODUCT_ID	req.	40	"<filename without extension>"
PRODUCT_CREATION_TIME	req.	24	YYYY-MM-DDThh:mm:ss[.fff]
PRODUCT_TYPE	opt.	30	see Table 3
PROCESSING_LEVEL_ID	opt.	1	CODMAC level 1, 2, 3, …, 8, N, see Table 3
MISSION_ID	opt.	N/A	ROSETTA
MISSION_NAME	opt.	60	"INTERNATIONAL ROSETTA MISSION"
MISSION_PHASE_NAME	opt.	30	see Table 4
INSTRUMENT_HOST_ID	opt.	6	RO, RL
INSTRUMENT_HOST_NAME	req.	60	"ROSETTA-ORBITER", "ROSETTA-LANDER"
INSTRUMENT_ID	opt.	12	see Table 6
INSTRUMENT_NAME	req.	60	see Table 6

Keyword	**Req. or opt. for PDS**	Max. length	Standard value(s)
INSTRUMENT_TYPE	opt.	30	
INSTRUMENT_MODE_ID	opt.	20	
INSTRUMENT_MODE_DESC	opt.	N/A	
TARGET_NAME	req.	120	see Table 7
TARGET_TYPE	opt.	20	see Table 7
START_TIME	req.	24	YYYY-MM-DDThh:mm:ss[.fff]
STOP_TIME	req.	24	YYYY-MM-DDThh:mm:ss[.fff]
SPACECRAFT_CLOCK_START_COUNT	req.	30	e.g. “1/21983325.39258”
SPACECRAFT_CLOCK_STOP_COUNT	req.	30	e.g. “1/21983325.39258”
PRODUCER_ID	opt.	20	
PRODUCER_FULL_NAME	opt.	60	
PRODUCER_INSTITUTION_NAME	opt.	60	
DATA_QUALITY_ID	opt.	3	-1, 0, 1, 2, 3, 4
DATA_QUALITY_DESC	opt.	N/A	

Table 2: List of strongly recommended keywords

Keyword	Max. length	Standard value(s)
SC_SUN_POSITION_VECTOR	N/A	See section 3.2
SC_TARGET_POSITION_VECTOR	N/A	See section 3.2
SC_TARGET_VELOCITY_VECTOR	N/A	See section 3.2
SPACECRAFT_ALTITUDE	N/A	See section 3.2
SUB_SPACECRAFT_LATITUDE	N/A	See section 3.2
SUB_SPACECRAFT_LONGITUDE	N/A	See section 3.2

Table 3: Standard values for PROCESSING_LEVEL_ID and PRODUCT_TYPE.

PROCESSING_LEVEL_ID value = CODMAC level	PSA level	NASA level	PRODUCT_TYPE value	Description
1	1a		UDR	Unprocessed Data Record
2	1b	0	EDR	Experiment Data Record
3	2	1A	RDR	Reduced Data Record
4		1B	REFDR	Reformatted Data Record
5	3	2-5	DDR	Derived Data Record
6			ANCDR	Ancillary Data Record

Table 4: Standard values for MISSION_PHASE_NAME and abbreviations.

Table 4(a): Simple mission phases with dates.

Simple MISSION_PHASE_NAME	Abbreviation	Start date	End date
“GROUND”	GRND	***	02/03/2004
“LAUNCH”	LEOP	3/03/2004	4/03/2004
“COMMISSIONING 1”	CVP1	05/03/2004	06/06/2004
"CRUISE 1"	CR1	07/06/2004	05/09/2004
“COMMISSIONING 2”	CVP2	06/09/2004	16/10/2004
“EARTH SWING-BY 1”	EAR1	17/10/2004	04/04/2005
"CRUISE 2"	CR2	05/04/2005	28/07/2006
“MARS SWING-BY “	MARS	29/07/2006	28/05/2007
"CRUISE 3"	CR3	29/05/2007	12/09/2007
“EARTH SWING-BY 2”	EAR2	13/09/2007	27/01/2008
"CRUISE 4-1"	CR4A	28/01/2008	03/08/2008
"STEINS FLY-BY"	AST1	04/08/2008	05/10/2008
"CRUISE 4-2"	CR4B	06/10/2008	13/09/2009
"EARTH SWING-BY 3"	EAR3	14/09/2009	13/12/2009
CRUISE 5	CR5	14/12/2009	16/05/2010
LUTETIA FLY-BY	AST2	17/05/2010	03/09/2010
“RENDEZVOUS MANOEUVRE 1”	RVM1	04/09/2010	13/07/2011
CRUISE 6	CR6	14/07/2011	?

Simple MISSION_PHASE_NAME	Abbreviation	Start date	End date
"RENDEZVOUS MANOEUVRE 2"	RVM2	?	?

Table 4(b): Accumulative mission phases.

Accumulative MISSION_PHASE_NAME	Abbreviation	Corresponding simple mission phases
"COMMISSIONING"	CVP	CVP1 and CVP2
"CRUISE"	CRU	CR1, CR2, CR3, CR4A, CR4B, CR5, CR6 See special agreement with SD2 in [AD6,AD7].
"COMET"	COM	FAT to PERI, i.e. APPR, SSP and ESCO

Payload Checkouts (PCs) may be planned during some of the mission phases. It could be of interest giving the information inside the label of the data product. If the instrument team wishes to provide this information, they must use OBSERVATION_TYPE keyword, with the values given in Table 5.

The table gives also the starting and ending dates of the PCs and the corresponding mission phase, which it belongs to. The other possible values are "EARTH SWINGBY 1", "DEEP IMPACT", "MARS", "EARTH SWINGBY 2", "STEINS FLYBY", "EARTH SWINGBY 3", "LUTETIA FLYBY", "HONDA" and can be listed by the command 'pvv help OBSERVATION_TYPE'.

Table 5 Payload checkouts and corresponding OBSERVATION_TYPE values.

OBSERVATION_TYPE value	MISSION_PHASE	Starting date	Ending date
PASSIVE CHECKOUT 0	EARTH SWING BY 1	27/03/05	31/03/05
PASSIVE CHECKOUT 1	CRUISE 2	30/09/05	05/10/05
PASSIVE CHECKOUT 2	CRUISE 2	03/03/06	08/03/06
PASSIVE CHECKOUT 3	MARS SWING BY	25/08/06	30/08/06
ACTIVE CHECKOUT 4	MARS SWING BY	23/11/06	22/12/06
PASSIVE CHECKOUT 5	MARS SWING BY	18/05/07	22/05/07
ACTIVE CHECKOUT 6	EARTH SWING BY 2	13/09/07	29/09/07
PASSIVE CHECKOUT 7	EARTH SWING BY 2	04/01/08	08/01/08
ACTIVE CHECKOUT 8	CRUISE 4-1	07/07/08	31/07/08
PASSIVE CHECKOUT 9	CRUISE 4-2	28/01/09	01/02/09
THERMAL CHARACTERIZATION	CRUISE 4-2	16/02/09	19/02/09

ACTIVE CHECKOUT 10	EARTH SWING BY 3	18/09/09	08/10/10
ACTIVE CHECKOUT 12	CRUISE 5	22/04/10	15/05/10
LANDER PANEL TEST	CRUISE 5	24/02/10	24/02/10
LUTETIA REHEARSAL	CRUISE 5	14/03/10	15/03/10
PASSIVE CHECKOUT 13	RENDEZVOUS MANOEUVRE 1	01/12/10	08/12/10

Table 6: Standard values for INSTRUMENT_ID and INSTRUMENT_NAME.

INSTRUMENT_ID	INSTRUMENT_NAME
OSINAC	“OSIRIS – NARROW ANGLE CAMERA”
OSIWAC	“OSIRIS – WIDE ANGLE CAMERA”
VIRTIS	“VISIBLE AND INFRARED THERMAL IMAGING SPECTROMETER”
ALICE	“ALICE”
MIRO	“MICROWAVE INSTRUMENT FOR THE ROSETTA ORBITER”
ROSINA	“ROSETTA ORBITER SPECTROMETER FOR ION AND NEUTRAL ANALYSIS”
COSIMA	“COMETARY SECONDARY ION MASS ANALYZER”
MIDAS	“MICRO-IMAGING DUST ANALYSIS SYSTEM”
GIADA	“GRAIN IMPACT ANALYSER AND DUST ACCUMULATOR”
CONSERT	“COMET NUCLEUS SOUNDING EXPERIMENT BY RADIOWAVE TRANSMISSION”
RSI	“ROSETTA RADIO SCIENCE INVESTIGATION”
RPCICA	“ ROSETTA PLASMA CONSORTIUM – ION COMPOSITION ANALYSER ”
RPCIES	“ROSETTA PLASMA CONSORTIUM – ION AND ELECTRON SENSOR”
RPCLAP	“ ROSETTA PLASMA CONSORTIUM – LANGMUIR PROBE ”
RPCMAG	“ROSETTA PLASMA CONSORTIUM – FLUXGATE MAGNETOMETER”
RPCMIP	“ROSETTA PLASMA CONSORTIUM – MUTUAL IMPEDANCE PROBE”
RPCPIU	“ROSETTA PLASMA CONSORTIUM – PLASMA INTERFACE UNIT”
SREM	“STANDARD RADIATION ENVIRONMENT MONITOR”
NAVCAM	“NAVIGATION CAMERA”
ROLIS	“ROSETTA LANDER IMAGING SYSTEM – DESCENT AND CLOSEUP IMAGER”
CIVA	“CIVA – COMETARY INFRARED AND VISIBLE ANALYSER”
SD2	“SAMPLING, DRILLING AND DISTRIBUTION SUBSYSTEM”
COSAC	“COMETARY SAMPLING AND COMPOSITION EXPERIMENT”

INSTRUMENT_ID	INSTRUMENT_NAME
PTOLEMY	"PTOLEMY – GAS CHROMATOGRAPH ISOTOPE RATIO MASS SPECTROMETER"
APXS	"ALPHA PARTICLE X-RAY SPECTROMETER"
MUPUS	"MULTI-PURPOSE SENSORS FOR SURFACE AND SUBSURFACE SCIENCE"
SESAME	"SURFACE ELECTRIC SOUNDING AND ACOUSTIC MONITORING EXPERIMENT"
ROMAP	"ROSETTA LANDER MAGNETOMETER AND PLASMA MONITOR"

Table 7: Standard values related to targets.

TARGET_NAME	TARGET_TYPE	<target name> in DATA_SET_NAME	<target id> in DATA_SET_ID see 2.2.1
"67P/CHURYUMOV-GERASIMENKO (1969 R1)"	"COMET"	67P	C
"2867 STEINS"	"ASTEROID"	STEINS	A
"21 LUTETIA"	"ASTEROID"	LUTETIA	A
"EARTH"	"PLANET"	EARTH	E
"MARS"	"PLANET"	MARS	M
"CALIBRATION"	"CALIBRATION"	CAL	CAL
"CHECKOUT"	"N/A"	CHECK	X
"INTERPLANETARY DUST"	"DUST"	DUST	D
"INTERSTELLAR DUST"	"DUST"	DUST	D
"METEOROID STREAM"	"DUST"	DUST	D
"SOLAR WIND"	"SOLAR SYSTEM"	SW	SS
"9P/TEMPEL 1 (1867 G1)"	"COMET"	9P	C
"C/LINEAR (2002 T7)"	"COMET"	2002T7	C
"JUPITER"	"PLANET"	JUPITER	J
"MOON"	"SATELLITE"	N/A	N/A

2.2.1 DATA_SET_ID Formation

DATA_SET_ID = "<INSTRUMENT_HOST_ID>-<target id>-<INSTRUMENT_ID>-<data processing level number>-<mission phase abbreviation>-<description>-<version>"

<INSTRUMENT_HOST_ID>	RO, RL	required
<target id>	see Table 7	required
<INSTRUMENT_ID>	`INSTRUMENT_ID` from Table 6, GIADA uses `GIA`	required
<data processing level number>	CODMAC level 1, 2, 3, ..., 8, N	required
<mission phase abbreviation>	mission phase abbreviation from Table 4	optional
<description>	free character string containing only `A-Z, 0-9`	optional
<version>	e.g. `V1.0`	required

The maximum length of the DATA_SET_ID values is of 40 characters.
Multiple instrument hosts, targets and instruments are referenced by concatenation of the values with a "/", which is interpreted as "and". This is not allowed for the data processing level number.
Examples: DATA_SET_ID = "RO-C-COSIMA-2-PERI-JET-V1.0"
DATA_SET_ID = "RO/RL-CAL-CONSERT-2-GRND-PINGPONG-V1.0"

2.2.2 DATA_SET_NAME Formation

DATA_SET_NAME = "<INSTRUMENT_HOST_NAME> <target name> <INSTRUMENT_ID> <data processing level number> <mission phase abbreviation> <description> <version>"

<INSTRUMENT_HOST_NAME>	ROSETTA-ORBITER, ROSETTA-LANDER	required
<target name>	see Table 7	required
<INSTRUMENT_ID>	`INSTRUMENT_ID` from Table 6	required
<data processing level number>	CODMAC level 1, 2, 3, ..., 8, N	required
<mission phase abbreviation>	mission phase abbreviation from Table 4	optional
<description>	free character string containing only `A-Z, 0-9, -`	optional
<version>	e.g. `V1.0`	required

The maximum length of the DATA_SET_NAME values is of 60 characters.
Multiple instrument hosts, targets and instruments are referenced by concatenation of the values with a "/", which is interpreted as "and". This is not allowed for the data processing level number.
Examples: DATA_SET_NAME = "ROSETTA-ORBITER CAL RPCMAG 2 GRND TEST3 V1.0"
DATA_SET_NAME = "ROSETTA-ORBITER/ROSETTA-LANDER 67P CONSERT 2 SSP ORBIT1 V1.0"

2.2.3 Multiple Mission Phases in One Data Set

AND is indicated by /.

DATA_SET_ID = "RO-C-MIDAS-2-SINC/PERI-TAIL-V1.0"
DATA_SET_NAME = "ROSETTA-ORBITER 67P MIDAS 2 SINC/PERI TAIL V1.0"

A range is indicated by TO.

DATA_SET_ID = "RO-C-VIRTIS-2-CAT-TO-COP-MAPPING-V1.0"
DATA_SET_NAME = "ROSETTA-ORBITER 67P VIRTIS 2 CAT-TO-COP MAPPING V1.0"

If max. length is exceeded, abbreviate. <mission phase abbreviation> and <description> fields may be dropped.

DATA_SET_ID = "RO/RL-C-CN-2-SSP-TO-MINC/HIGH/PERI-V1.0"
DATA_SET_NAME = "ROSETTA-O/L 67P CONSERT 2 SSP-TO-MINC/HIGH/PERI DESC V1.0"

2.3 VOLUME Object

The VOLDESC.CAT is one of the required files at the root level. It contains the VOLUME object, which gives a high-level description of the contents of the volume. A volume was one unit of a physical medium such as a CD, a DVD or a magnetic tape on which data used to be distributed. In the past 10 years, the physical volume has changed from being a physical distribution package to being the package used for deep archiving and PDS still requires the VOLUME object values to be filled in. Volumes are grouped into volume sets. Although the standards allow multiple data sets to be stored on a single volume, this possibility implies a complex volume organization (see Fig 19.3a of PDS standards [AD2], sharing of all directories). We discourage to choose storing several data sets in one volume. On PDS side, data sets are sent to the NSSDC (the National Space Science Data Center) for deep archiving. In order to be able to track and retrieve a single data set, it is needed to stick to one data set ID per volume to avoid confusion and also to deal with the physical storage device limitations in the deep archive (currently about 300TB).
As a conclusion, we highly recommend the ROSETTA teams to store one data set per volume.

In the following, you will find a template of the VOLDESC.CAT and the values in the VOLUME object.

2.3.1 VOLDESC.CAT template

```
PDS_VERSION_ID                = PDS3
OBJECT                         = VOLUME
  DATA_SET_ID                  = …
  DESCRIPTION                  = "This volume contains ..."
  MEDIUM_TYPE                 =  "ELECTRONIC"
  PUBLICATION_DATE             = 2006-10-31
  VOLUME_FORMAT                = "ISO-9660"
```

```
 VOLUME_ID                          =
VOLUME_NAME                        = " "
 VOLUME_SERIES_NAME                = “ROSETTA SCIENCE ARCHIVE”
  VOLUME_SET_NAME                   = " "
  VOLUME_SET_ID                     =
  VOLUME_VERSION_ID                 = “VERSION 1”
  VOLUMES                           = 1
OBJECT                             = CATALOG
   ^DATA_SET_CATALOG                 = "DATASET.CAT"
   ^INSTRUMENT_CATALOG               = "INST.CAT"
   ^INSTRUMENT_HOST_CATALOG          = "INSTHOST.CAT"
   ^MISSION_CATALOG                  = "MISSION.CAT"
…
END_OBJECT                         = CATALOG
FACILITY_NAME                      =
   FULL_NAME                         = " "
   ADDRESS_TEXT                      = " "
  END_OBJECT                         = DATA_PRODUCER
END_OBJECT                         = VOLUME
END
```

Figure 1 VOLDESC.CAT template

2.3.2 VOLUME object: required keywords

Table 8: lists the keywords mandatory for the VOLUME object of the Rosetta mission. Max stands for the “maximum length of the keyword value”.

Keyword	Max.	Standard value(s)
DATA_SET_ID	40	see section 2.2.1
DESCRIPTION	N/A	"This volume contains …"
MEDIUM_TYPE	30	"ELECTRONIC"
PUBLICATION_DATE	10	YYYY-MM-DD
VOLUME_FORMAT	20	"ISO-9660"
VOLUME_ID	11	See Table 14
VOLUME_NAME	60	See Table 13
VOLUME_SERIES_NAME	60	"ROSETTA SCIENCE ARCHIVE"
VOLUME_SET_NAME	60	See Table 9 and Table 10
VOLUME_SET_ID	40	See Table 12
VOLUME_VERSION_ID	12	"VERSION 1"
VOLUMES	N/A	1

Table 8: Mandatory keywords and standard values for the VOLUME object.

2.3.3 VOLUME_SET_NAME

The volume set will group all the volumes from one instrument. Table 9 lists all the possible values per instrument. As the value is common to all data sets, only one value is given per instrument.

INSTRUMENT	**VOLUME_SET_NAME**
ALICE	ROSETTA ALICE DATA
COSIMA	ROSETTA COSIMA DATA
GIADA	ROSETTA GIADA DATA
MIDAS	ROSETTA MIDAS DATA
MIRO	ROSETTA: MIRO DATA
OSIRIS	ROSETTA OSIRIS DATA
ROSINA	ROSETTA ROSINA DATA
RPC ICA	ROSETTA RPC ICA DATA
RPC IES	ROSETTA RPC IES DATA
RPC LAP	ROSETTA RPC LAP DATA
RPC MAG	ROSETTA RPC MAG DATA
RPC MIP	ROSETTA RPC MIP DATA

RSI	RO: RADIO SCIENCE COMMISSIONING
VIRTIS	ROSETTA VIRTIS DATA

Table 9: VOLUME_SET_NAME values for the Orbiter

INSTRUMENT	**VOLUME_SET_NAME**
CIVA	ROSETTA CIVA DATA
CONSERT	ROSETTA CONSERT DATA
COSAC	ROSETTA COSAC DATA
PTOLEMY	ROSETTA PTOLEMY DATA
ROMAP	ROSETTA ROMAP MAG DATA ROSETTA ROMAP SPM DATA
ROLIS	ROSETTA ROLIS DATA
SD2	ROSETTA SD2 DATA

Table 10: VOLUME_SET_NAME values for the Lander

2.3.4 VOLUME_SET_ID

This keyword consists of five fields separated by "_". The five fields are, in this order:

- country abbreviation
- government branch
- discipline
- mission/spacecraft and instrument information: it shall not exceed 6 characters altogether.
- A 4-digit sequence identifier: The first digit(s) represent the volume set; the remaining digits contain "X", representing the range of volumes in the set.

If there is only one volume in the volume set, the VOLUME_SET_ID must end with the entire VOLUME_ID.
Example:
VOLUME_ID = "ROROS_1001"
VOLUME_SET_ID = "CH_UNIBE_SRPS_ROROS_1001"

If there are several volumes in the set, the VOLUME_SET_ID must end with X(s).
Example:
With 2 to 9 volumes in the set:
VOLUME_ID = "ROROS_1001", … "ROROS_1009",
VOLUME_SET_ID = "CH_UNIBE_SRPS_ROROS_100X"
With up to 99 volumes in the set: (no more than 99 volumes is allowed)
VOLUME_ID = "ROROS_1001", … "ROROS_1099",

VOLUME_SET_ID = "CH_UNIBE_SRPS_ROROS_10XX"

INSTR	CY	GOV	DISC	MIS/INST	4-DIGIT
ALICE	USA	NASA	JPL	ROALI	1001 or 100X or 10XX
COSIMA	FI	FMI	SPACE	ROCOS	1001 or 100X or 10XX
GIADA	IT	INAF	OAC	ROGIA	1001 or 100X or 10XX
MIDAS	AT	OEAW	IWF	ROMID	1001 or 100X or 10XX
MIRO	USA	NASA	JPL	ROMIR	1001 or 100X or 10XX
OSIRIS	DE	MPG	MPS	ROOSI	1001 or 100X or 10XX
ROSINA	CH	UNIBE	SRPS	ROROS	1001 or 100X or 10XX
RPC ICA	SE	IRF	IRF	ROICA	1001 or 100X or 10XX
RPC IES	USA	SWRI	SSE	ROIES	1001 or 100X or 10XX
RPC LAP	SE	IRF	IRF	ROLAP	1001 or 100X or 10XX
RPC MAG	DE	TUBS	IGEP	ROMAG	1001 or 100X or 10XX
RPC MIP	FR	CNRS	LPCE	ROMIP	1001 or 100X or 10XX
RSI	GER	UNI	IGM or RIU	RORSI	1001 or 100X or 10XX
VIRTIS	IT	INAF	IASF	ROVIR	1001 or 100X or 10XX
PHILAE					
APXS					
CIVA	FR	CNRS	IAS	ROCIV	10XX
CONSERT	FR	CNRSUG	IPAG	RORLCN	10XX
COSAC	DE	MPG	MPS	RLCOS	10XX
MUPUS					
PTOLEMY	UK	OU	PSSRI	RLPTO	10XX
ROLIS	DE	DLR	PF	RLROL	10XX
ROMAP MAG	DE	TUBS	IGEP	RLMAG	10XX
ROMAP SPM	HU	KFKI	AEKI	RLSPM	10XX
SD2	IT	POLIMI	AERO	RLSD2	100X
SESAME					

Table 11: Items values to form the VOLUME_SET_ID keyword value (TBC).

INSTR	VOLUME_SET_ID
ALICE	USA_NASA_JPL_ROALI_????
COSIMA	FI_FMI_SPACE_ROCOS_????
GIADA	IT_INAF_OAC_ROGIA_100X or _10XX
MIDAS	AT_OEAW_IWF_ROMID_????
MIRO	USA_NASA_JPL_ROMIR_????
OSIRIS	DE_MPG_MPS_ROOSI_????
ROSINA	CH_UNIBE_SRPS_ROROS_????
RPC ICA	SE_IRF_IRF_ROICA_????
RPC IES	USA_SWRI_SSE_ROIES_????
RPC LAP	SE_IRF_IRF_ROLAP_????
RPC MAG	DE_TUBS_IGEP_ROMAG_????
RPC MIP	FR_CNRS_LPCE_ROMIP_????
RSI	GER_UNI_IGM_RORSI_???? GER_UNI_RIU_RORSI_????
VIRTIS	IT_INAF_IASF_ROVIR_????
PHILAE	
APXS	
CIVA	FR_CNRS_IAS_ROCIV_10XX
CONSERT	FR_CNRSUG_IPAG_RORLCN_10XX
COSAC	DE_MPG_MPS_RLCOS_10XX
MUPUS	
PTOLEMY	UK_OU_PSSRI_RLPTO_10XX
ROLIS	DE_DLR_PF_RLROL_10XX
ROMAP MAG	DE_TUBS_IGEP_RLMAG_10XX
ROMAP SPM	HU_KFKI_AEKI_RLSPM_10XX
SD2	IT_POLIMI_AERO_RLSD2_100X
SESAME	

Table 12: VOLUME_SET_ID values per instrument.

2.3.5 VOLUME_NAME

The VOLUME groups similar data sets from one instrument. The VOLUME_NAME element contains the name of a data volume. In most cases, the volume_name is more specific than the VOLUME_SET_NAME. For example, the VOLUME_NAME for the first volume in the VOYAGER IMAGES OF URANUS volume set is: “Volume 1: Compressed Images 24476.54 – 26439.58”. As there is one data set per volume the VOLUME_ID must be incremented per data sets.

INSTR	DATASET_ID	VOLUME_NAME
ALICE	RO-C/CAL/X-ALICE-2-CVP1-V1.0	ROSETTA ALICE COMMISSIONING 1 PHASE, EXPERIMENT DATA
COSIMA	RO-CAL-COSIMA-2-V1.0	ROSETTA COSIMA CALIBRATION DATA UPTO COMET PHASE
GIADA	RO-X-GIA-2-CVP-FIRSTCOMM-V1.1	
MIDAS	RO-X-MIDAS-3-EAR1-PC0-V1.0	ROMID_1002
MIRO	RO-CAL-MIRO-2-GRND-THERMALVAC-V1.0	RAW MIRO DATA FOR THE GROUND PHASE
OSIRIS	RO-X-OSIRIS-2-CVP-COMMISSIONING-V1.2	
ROSINA	RO-X-ROSINA-2-ENG-V1.0	
RPC ICA	RO-X-RPCICA-2-CVP-RAW-V1.0	
RPC IES	RO-CAL-RPCIES-2-GRND-V1.0	
RPC LAP	RO-X-RPCLAP-2-CVP-EDITED-V1.0	
RPC MAG	RO-X-RPCMAG-2-CVP-RAW-V1.0	RPCMAG RAW DATA FOR THE COMMISIONNING PHASE
RPC MIP	RO-CAL-RPCMIP-3-CVP-V1.0	
RSI	RO-X-RSI-1/2/3-CVP1-0001-V1.0	RORSI_0001_2004_086_V1.0
VIRTIS	RO-CAL-VIRTIS-2-CVP-V1.0	
PHILAE		
APXS		
CIVA	RL-M-CIVA-2-MARS-V1.0	CIVA RAW DATA FOR THE MARS SWING BY PHASE
CONSERT	RO/RL-CAL-CONSERT-2-CR4A-V1.0	CONSERT RAW DATA FOR THE CR4A PHASE
COSAC	RL-CAL-COSAC-2-CVP-V1.0	COSAC RAW DATA FOR THE

		COMMISSIONING PHASE
PTOLEMY	RL-CAL-PTOLEMY-2-CR4A-V1.0	PTOLEMY RAW DATA FOR THE CR4A PHASE
ROLIS	RL-M-ROLIS-2-MARS-V1.0	ROLIS RAW DATA FOR THE MARS SWING BY PHASE
ROMAP MAG	RL-M-ROMAP-2-MARS-MAG-V1.0	ROMAP MAG RAW DATA FOR THE MARS SWING-BY
ROMAP SPM	RL-M-ROMAP-3-MARS-SPM-V1.0	ROMAP SPM CALIBRATED DATA FOR THE MARS SWING-BY
SD2	RL-CAL-SD2-3-CVP-V1.0	SD2 CALIBRATED DATA FOR THE COMMISSIONING PHASE

Table 13: VOLUME_NAME keyword values (one example per instrument).

2.3.6 VOLUME_ID

Following PDS standards: “it is formed using

- a mission, spacecraft, or campaign identifier, followed by
- an optional instrument or data type identifier (total of 6 characters), followed by
- an underscore character and 4 digit sequence number.”

The VOLUME_ID keyword consists of the last two components of the VOLUME_SET_ID. It should not exceed 11 characters.
The digits at the end increment for each volume (i.e. 1001, 1002,…).
Table 14 lists the values for the VOLUME_ID keyword per data set.

INSTR	**DATASET_ID**	**VOLUME_ID**
ALICE	RO-C/CAL/X-ALICE-2-CVP1-V1.0	ROAL2_0001
COSIMA	RO-CAL-COSIMA-2-V1.0	ROCOS_1001
GIADA	RO-X-GIA-2-CVP-FIRSTCOMM-V1.1	ROGIA_1001
MIDAS	RO-CAL-MIDAS-3-CVP-FULL-V1.0	ROMID_1001
MIRO	RO-CAL-MIRO-2-GRND-THERMALVAC-V1.0	ROMIR_1001
OSIRIS	RO-X-OSIRIS-2-CVP-COMMISSIONING-V1.2	ROOSI_1001
ROSINA	RO-X-ROSINA-2-ENG-V1.0	ROROS_1001
RPC ICA	RO-X-RPCICA-2-CVP-RAW-V1.0	ROICA_1001

RPC IES	RO-CAL-RPCIES-2-GRND-V1.0	ROIES_1001
RPC LAP	RO-X-RPCLAP-2-CVP-EDITED-V1.0	ROLAP_1001
RPC MAG	RO-X-RPCMAG-2-CVP-RAW-V1.0	ROMAG_1001
RPC MIP	RO-CAL-RPCMIP-3-CVP-V1.0	ROMIP_1001
RSI	RO-X-RSI-1/2/3-CVP1-0001-V1.0	RORSI_1001
VIRTIS	RO-CAL-VIRTIS-2-CVP-V1.0	ROVIR_1001
PHILAE		
CIVA	RL-M-CIVA-2-MARS-V1.0	RLCIV2_1010
CONSERT	RO/RL-CAL-CONSERT-2-CR4A-V1.0	RLCOS2_1007(TBC)
COSAC	RL-CAL-COSAC-2-CVP-V1.0	RLCOS2_1013
PTOLEMY	RL-CAL-PTOLEMY-2-CR4A-V1.0	RLPTO2_1019
ROLIS	RL-M-ROLIS-2-MARS-V1.0	RLROL1_1020
ROMAP MAG	RL-M-ROMAP-2-MARS-MAG-V1.0	RLMAG2_1023
ROMAP SPM	RL-M-ROMAP-3-MARS-SPM-V1.0	RLSPM2_10??
SD2	RL-CAL-SD2-3-CVP-V1.0	RLSD23_1002

Table 14: VOLUME_ID keyword values for the orbiter (one example per instrument).

2.3.7 REQUIRED OBJECTS

Two objects are required on the VOLUME object:

- CATALOG
- DATA_PRODUCER

2.3.7.1 CATALOG

It lists the content of the CATALOG directory using pointers to the documents.
CATALOG object shall contain:

- DATA_SET
- INSTRUMENT

- INSTRUMENT_HOST
- MISSION

See

Figure 1, for the presentation of this object inside the VOLUME object.

2.3.7.2 DATA_PRODUCER

The following keywords are required:

- INSTITUTION_NAME
- FACILITY_NAME
- FULL_NAME
- ADDRESS_TEXT

2.3.7.3 INSTITUTION_NAME

INSTR	INSTITUTION_NAME
ALICE	SOUTHWEST RESEARCH INSTITUTE
COSIMA	FINNISH METEOROLOGICAL INSTITUTE
GIADA	INAF – OSSERVATORIO ASTRONOMICO DI CAPODIMONTE
MIDAS	AUSTRIAN ACADEMY OF SCIENCES
MIRO	JET PROPULSION LABORATORY
OSIRIS	MAX PLANCK INSTITUTE FOR SOLAR SYSTEM RESEARCH
ROSINA	UNIVERSITY OF BERN
RPC ICA	SWEDISH INSTITUTE OF SPACE PHYSICS
RPC IES	SOUTHWEST RESEARCH INSTITUTE
RPC LAP	SWEDISH INSTITUTE OF SPACE PHYSICS
RPC MAG	IGEP-TU-BRAUNSCHWEIG
RPC MIP	?
RSI	INSTITUT FUER GEOPHYSIK UND METEOROLOGIE
VIRTIS	INAF - INSTITUTO DI ASTROFISICA SPAZIALE E FISICA COSMICA

Table 15: INSTITUTION_NAME values per instrument.

2.3.7.4 FACILITY_NAME

INSTR	FACILITY_NAME
ALICE	DEPARTMENT OF SPACE STUDIES
COSIMA	SPACE RESEARCH
GIADA	LABORATORIO DI FISICA COSMICA, PLANETOLOGIA E ASTROBIOLOGIA
MIDAS	SPACE RESEARCH INSTITUTE
MIRO	MIRO DATA PROCESSING TEAM
OSIRIS	MPS
ROSINA	N/A
RPC ICA	INSTITUTET FOER RYMDFYSIK
RPC IES	SPACE SCIENCE AND ENGINEERING DIVISION
RPC LAP	INSTITUTET FOER RYMDFYSIK
RPC MAG	IGEP
RPC MIP	?
RSI	N/A
VIRTIS	N/A

Table 16: FACILITY_NAME values per instrument.

2.3.7.5 FULL_NAME

Unless you may propose something else in agreement with the PI, we suggest using the PI name.

3. Geometry Information

3.1 Geometry Index Table

A geometry index table is required in all data sets. Details are described in AD4. The indexes are provided by PSA. At the time being, PSA will provide GEO_EARTH and GEO_MARS indexes corresponding to the first Earth and Mars fly-by. The index, as generated by PSA, does not have instrument related information. Every line of the index table indicates the spacecraft position and geometry related information at a given epoch. The epochs are taken less spaced as long as the spacecraft approaches the body.

For the GEO_EARTH table, information is provided from 4 weeks before closest approach to 4 weeks after and the sampling time is the following:

- from 4 weeks to 1 week: 1 hour
- from 1 week to 18 hours: 10 minutes
- from 18 to closest: 60 seconds.

Then, it is symmetric up to 4 weeks after closest approach.

3.2 Geometry Keywords in Data Product Labels

3.2.1 List of strongly recommended keywords

Several keywords shall be added to each data product in order to allow future users of the data quick access to geometrical information. Some of these are applicable to all instruments and are strongly recommended in all data product labels. Others are just optional and should be considered for use depending upon the type of instrument data being archived.

The six strongly recommended keywords in the label of the data products are:
SC_SUN_POSITION_VECTOR
SC_TARGET_POSITION_VECTOR
SC_TARGET_VELOCITY_VECTOR
SPACECRAFT_ALTITUDE
SUB_SPACECRAFT_LATITUDE
SUB_SPACECRAFT_LONGITUDE

The optional list of geometry keywords is:
SOLAR_LONGITUDE
SUB_SOLAR_LATITUDE
SUB_SOLAR_LONGITUDE
SC_SUN_VELOCITY_VECTOR
SPACECRAFT_SOLAR_DISTANCE
LOCAL_TRUE_SOLAR_TIME
CENTER_LATITUDE
CENTER_LONGITUDE
PHASE_ANGLE
INCIDENCE_ANGLE
EMISSION_ANGLE
SLANT_DISTANCE

NORTH_AZIMUTH
SUB_SPACECRAFT_AZIMUTH
SUB_SOLAR_AZIMUTH
HORIZONTAL_PIXEL_SCALE
VERTICAL_PIXEL_SCALE
SOLAR_ELONGATION
TARGET_CENTER_DISTANCE
RIGHT_ASCENSION
DECLINATION
FOOTPRINT_POINT_LATITUDE
FOOTPRINT_POINT_LONGITUDE
QUATERNION
QUATERNION_DESC
SPICE_FILE_NAME

3.2.2 Time of computation for the geometry keywords

The recommended time of computation for the geometry keywords is the start time of the observation, the same that is given as a value for the START_TIME keyword.
In cases where the computation time of the geometry parameters is not equivalent to the value of the START_TIME keyword, an explanation must be provided in the EAICD.
The time of computation for the geometry parameters is defined in:

- the label using the NOTE keyword (see 3.3);
- the DATASET.CAT;
- the EAICD.

3.3 Reference frame and Coordinate System

A reference frame is an ordered set of three mutually orthogonal (possibly time dependent) unit-length direction vectors, coupled with a location called the frame's "center" or "origin." In this sense, a reference frame is the perspective from which a system or body is observed. It provides a set of axes relative to which an observer can measure the position and motion of all points in a system, as well as the orientation of objects in it. There are two types of reference frames: inertial and non-inertial.
A frame's center is an ephemeris object whose location is coincident with the origin (0,0,0) of a reference frame.
The Earth Mean Equator J2000 is a reference frame. See the PDS Standard Reference, Chapter 2: "The Earth Mean Equator and Equinox of Julian Date 2451545.0 (referred to as the J2000 system) is the standard inertial reference frame."

A coordinate system is a system for assigning a finite sequence of components to each point in an n-dimensional space.
The most common coordinate systems are the following:
The Cartesian coordinate system (also called the “rectangular coordinate system”), which, for three dimensional flat space, uses three numbers representing distances to the origin.
The polar coordinate systems:
Cylindrical coordinate system represents a point in space by an angle, a distance from the origin and a height.
Spherical coordinate system represents a point in space with two angles and a distance from the origin.
Body-Fixed Rotating Coordinate systems are coordinate systems aligned with the spin axis of the body. The equator defines the fundamental plane of the system.
The Planetocentric system is a spherical body-fixed rotating coordinate systems: it has an origin at the center of mass of the body. Planetocentric latitude is the angle between the equatorial plane and a vector connecting the point of interest and the origin of the coordinate system. Latitudes are defined as positive in the northern hemisphere of the body. Longitudes increase eastward. The radius is measured from the center of the body.

3.3.1 Reference frame: J2000

The J2000 reference system is the inertial reference frame Earth Mean Equator and Equinox of Julian Date 2451545.0.

For the following keywords the reference frame used is clearly defined as the J2000 in the PDS dictionary:
SC_SUN_POSITION_VECTOR: J2000 corrected for light time and stellar aberration, evaluated at epoch at which the observation was made.
SC_TARGET_POSITION_VECTOR: J2000 corrected for light time, evaluated at epoch at which the observation was made.
SC_TARGET_VELOCITY_VECTOR: J2000 corrected for light time, evaluated at epoch at which the observation was made.
Although the inertial reference frame is given in the PDS definition of the keyword, it is of importance to have the information in the label. This information is provided in the label using the NOTE keyword – see 3.3.3.
If you use a different reference frame, specify its name in the label using the NOTE keyword and explain the reason of the deviation in the EAICD.
The name of the reference frame used is documented in:

- the label using the NOTE keyword;
- the DATASET.CAT – see 3.3.4;
- the EAICD – see 3.3.5.

The SPACECRAFT_ALTITUDE is the distance in km measured normal to the surface.
The units used are documented in the label using the NOTE keyword.

3.3.2 Coordinate system: Planetocentric

The chosen coordinate system to compute geometry parameters containing latitude and longitude information is documented in the label using the NOTE keyword. This is the case for the two following keywords:
SUB_SPACECRAFT_LATITUDE

SUB_SPACECRAFT_LONGITUDE.

PSA recommends the use of the PLANETOCENTRIC reference frame. For more information on this coordinate system, refer to chapter 3 of the IAU report AD5.
The reason of the choice of another coordinate system is explained in the EAICD.

The name of the used coordinate system is specified in every of the three following items:
- the label of the data product using the NOTE keyword;
- the DATASET.CAT;
- the EAICD.

3.3.3 Label NOTE

Instead of the keyword COORDINATE_SYSTEM_NAME, which is too ambiguous in its definition and does not allow the specification of both the inertial reference frame and the coordinate system in a body fixed frame, the NOTE keyword is used to define all the necessary information on geometry parameters.
The following text is included in the label of the data products:
NOTE ="
The values of the keywords SC_SUN_POSITION_VECTOR SC_TARGET_POSITION_VECTOR and SC_TARGET_VELOCITY_VECTOR are related to the <*inertial*> reference frame.
The values of SUB_SPACECRAFT_LATITUDE and SUB_SPACECRAFT_LONGITUDE are northern latitude and eastern longitude in the standard planetocentric IAU_<TARGET_NAME> frame.
All values are computed for the time t= START_TIME.
Distances are given in <km> velocities in <km/s>, Angles in <deg>. "

<inertial> is replaced by Earth Mean Equator J2000 or any other inertial reference frame. The name of the coordinate system is adapted to the actual use.

3.3.4 DATASET.CAT

Include the information on the computation of the geometry parameters in the DATASET.CAT: reference frame, coordinate system, time of computation, units.

The following text is included in the DATASET.CAT:

“Coordinate System
==========
The geometry items SC_SUN_POSITION_VECTOR, SC_TARGET_POSITION_VECTOR and SC_TARGET_VELOCITY_VECTOR provided in the label of the data product are relative to the Earth Mean Equator and Equinox reference frame of J2000.

SUB_SPACECRAFT_LATITUDE, SUB_SPACECRAFT_LONGITUDE are given in the PLANETOCENTRIC coordinate system.
These parameters are computed at time t=START_TIME.
Distances are given in km, angles in degrees."

3.3.5 EAICD

Include the information on the computation of the geometry parameters in the EAICD: reference frame, coordinate system, time of computation, units.