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ROSETTA

Archive Conventions

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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 2007	2	5		Col opt/required added in table 1 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 3.1	
8 May	5	1		Update of Table 4, mission phase	

Date	Iss.	Rev.	pp.	Description / Authority	CR No.
2009				names with dates. VOLUME_SET_ID Section 3.5.1 Payload checkout Table added for OBSERVATION_TYPE values. Section 3.2	
17 Sep 2009	5	3		Thermal characterisation added in section 3.2.	
12 Nov 2009	5	4		VOLUME values definition clarified. Section 2.3.	
4 Feb 2010	5	5		Calendar dates added (CR4B and 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.	
14 Aug 2013	6	0	19	VOLUME values for SREM VOLUME values for ROMAP	
21 Oct 2013	7	0		MISSION_PHASE_NAME table updates. One chapter added about delivery schedule.	
11 Dec 2013	7	1	7 8 24	Delivery Schedule (after SWT decision). Mandatory and strongly recommended keyword (pipeline version) Coordinate systems	
7 Feb 2014	7	2	14	SOLAR WIND target: “N/A” is the correct TARGET_TYPE	
11 Feb 2014	7	3	22	Values for RPC MIP	
21 Mar 2014	7	4,5, 6		MISSION_PHASE_NAME table	
23 Jan 2015	7	7		TARGET_NAME correction for 67P	
27 Jan 2015	7	8		MISSION PHASE and Sub Phases	
6 Apr 2015	7	9		MISSION_PHASE_NAME: REBOUNDS and RBD added for Lander archive.	
20 Apr 2015	8	0		Mission Manager changed. NOTE keyword in 4.2.5 section updated with Cheops Reference Frame and S/c Altitude.	
23 Apr 2015	8	1		VOLUME_SET_ID for GIADA	
6 Aug 2015	8	2		APXS VOLUME values. Dates for PHC, PDCS, SDL, RBD, FSS	
19 Aug 2015	8	3		ESC1 and PRELANDING dates	
20 Oct 2015	9	0		Date for mission extension added	

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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. RO-EST-MN-0811_1_1_Minutes_of_the_Lander_SD2_Telecon_2004Dec15.doc
AD4. 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. Delivery Schedule

The delivery schedule is defined by [AD1].

3. Mandatory and strongly recommended keywords and standard values

3.1 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.

3.2 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. After November 2013 SWT, the ROSETTA:PIPELINE_VERSION_ID keyword has been added to the list to follow the team pipeline and easy data set validation.

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),

Keyword	**Req. or opt. for PDS**	Max. length	Standard value(s)
			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 3.2.1
DATA_SET_NAME	opt.	60	formation rule see section 3.2.2
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 8
INSTRUMENT_NAME	req.	60	see Table 8
INSTRUMENT_TYPE	opt.	30	
INSTRUMENT_MODE_ID	opt.	20	
INSTRUMENT_MODE_DESC	opt.	N/A	
TARGET_NAME	req.	120	see Table 9
TARGET_TYPE	opt.	20	see Table 9
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 4.1
SC_TARGET_POSITION_VECTOR	N/A	See section 4.1
SC_TARGET_VELOCITY_VECTOR	N/A	See section 4.1
SPACECRAFT_ALTITUDE	N/A	See section 4.1
SUB_SPACECRAFT_LATITUDE	N/A	See section 4.1
SUB_SPACECRAFT_LONGITUDE	N/A	See section 4.1
ROSETTA:PIPELINE_VERSION_ID	N/A	N/A

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	Abb^n	Start date	End date
“GROUND”	GRND	***	2004-03-02
“LAUNCH”	LEOP	2004-03-03	2004-03-04
“COMMISSIONING 1”	CVP1	2004-03-05	2004-06-06
"CRUISE 1"	CR1	2004-06-07	2004-09-05
“COMMISSIONING 2”	CVP2	2004-09-06	2004-10-16
“EARTH SWING-BY 1”	EAR1	2004-10-17	2005-04-04
"CRUISE 2"	CR2	2005-04-05	2006-07-28
“MARS SWING-BY “	MARS	2006-07-29	2007-05-28
"CRUISE 3"	CR3	2007-05-29	2007-09-12
“EARTH SWING-BY 2”	EAR2	2007-09-13	2008-01-27
"CRUISE 4-1"	CR4A	2008-01-28	2008-08-03
"STEINS FLY-BY"	AST1	2008-08-04	2008-10-05
"CRUISE 4-2"	CR4B	2008-10-06	2009-09-13
"EARTH SWING-BY 3"	EAR3	2009-09-14	2009-12-13
“CRUISE 5”	CR5	2009-12-14	2010-05-16
“LUTETIA FLY-BY”	AST2	2010-05-17	2010-09-03
“RENDEZVOUS MANOEUVRE 1”	RVM1	2010-09-04	2011-06-07
“CRUISE 6”	CR6	2011-06-08	2014-01-20
“PRELANDING”	PRL	2014-01-21	2014-11-18
“COMET ESCORT 1”	ESC1	2014-11-19	2015-03-10
“COMET ESCORT 2”	ESC2	2015-03-11	2015-06-30
“COMET ESCORT 3”	ESC3	2015-07-01	2015-10-20
“COMET ESCORT 4”	ESC4	2015-10-21	2016-01-12

Simple MISSION_PHASE_NAME	Abb^n	Start date	End date
ROSETTA EXTENSION 1	EXT1	2016-01-13	2016-04-05
ROSETTA EXTENSION 2	EXT2	2016-04-06	2016-06-28
ROSETTA EXTENSION 3	EXT3	2016-06-29	2016-09-30 (TBC)

The “COMET ESCORT <N>” are defined after LTP (Long Term Planning) dates, and the dates have been put with the current knowledge but are likely to be adjusted.

Table 4(b): Accumulative mission phases.

Accumulative MISSION_PHASE_NAME	Abb^n	Corresponding simple mission phases	
“COMMISSIONING”	CVP	CVP1 and CVP2	
“CRUISE”	CRU	CR1, CR2, CR3, CR4A, CR4B, CR5, CR6 See special agreement with SD2 in [AD3,AD4].	
“PRELANDING”	PRL	2014-01-21	2014-11-20

Table 5 Mission sub-phases after wake up (from January up to LTP4).

“RENDEZVOUS MANOEUVRE 2”	RVM2	2014-01-21	2014-09-09
“NEAR COMET DRIFT”	NCD	2014-03-17	2014-07-01
“FAR APPROACH TRAJECTORY”	FAT	2014-07-02	2014-08-01
“COMET CHARACTERISATION”	CC	2014-08-02	2014-09-02
“GLOBAL MAPPING, CLOSE OBS”	GMP/COP	2014-09-03	2014-10-24
“LANDING AND FSS”	LD/FSS	2014-10-25	2014-11-20

For the Orbiter instruments, a SWT agreement states that delivery from wake-up to LTP4 (20/11/2014) will be done in one data set. There will not be data sets for each of the mission phases (NCD, FAT…). Nevertheless, teams may use a way to indicate the sub-mission phase (NCD…) using the keywords and dates listed in Table 5. There are two exceptions for the Lander instruments and for NAVCAM. The mission phase names for the Lander can be found in

“POST HIBERNATION COMMISSIONING”	PHC	2014-04-09T08:15:25	2014-04-23T15:45:13
“PRE DELIVERY CALIB SCIENCE”	PDCS	2014-07-13T14:42:56	2014-10-17T20:31:20
“SEPARATION DESCENT LANDING”	SDL	2014-11-12T08:35:02	2014-11-12T15:34:04
“REBOUNDS”	RBD	2014-11-12T15:34:05	2014-11-12T17:30:20
“FIRST SCIENCE SEQUENCE”	FSS	2014-11-12T17:30:21	2014-11-15T01:00:00

Table 6 MISSION_PHASE_NAME for the Lander after wake up (2014-01-21).

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 7.
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 7 Payload checkouts and corresponding OBSERVATION_TYPE values (Values must be in quotes).

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 8: 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”

INSTRUMENT_ID	INSTRUMENT_NAME
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"
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 9: Standard values related to targets.

TARGET_NAME	TARGET_TYPE	<target name> in DATA_SET_NAME	<target id> in DATA_SET_ID see 3.2.1
“67P/CHURYUMOV-GERASIMENKO 1 (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”	“N/A”	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

3.2.1 DATA_SET_ID Formation

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

Table 10 DATA_SET_ID fields description.

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

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-A-CAL-ALICE-2-AST1-V1.0"
DATA_SET_ID = "RO/RL-A-CONSERT-2-AST2-V1.0"

3.2.2 DATA_SET_NAME Formation

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

Table 11 DATA_SET_NAME fields description.

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

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 EARTH MIRO 2 EAR2 EARTH2 V1.0"
DATA_SET_NAME = "ROSETTA-ORBITER/ROSETTA-LANDER LUTETIA CONSERT 2 AST2 V1.0"

3.2.3 Multiple Mission Phases in One Data Set

AND is indicated by /.

DATA_SET_ID = "RO-A-NAVCAM-2-AST1/AST2-V1.0"
DATA_SET_NAME = "ROSETTA-ORBITER-STEINS/LUTETIA-NAVCAM-2-AST1/AST2-V1.0"

A range is indicated by TO.

DATA_SET_ID = "RO-C-VIRTIS-2-EAR1-TO-EAR2-V1.0"

DATA_SET_NAME = "ROSETTA-ORBITER 67P VIRTIS 2 EAR1-TO-EAR2 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-CR1-TO-FAT -V1.0"
DATA_SET_NAME = "ROSETTA-O/L 67P CONSERT 2 CR1-TO-FAT V1.0"

3.3 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.

3.3.1 VOLDESC.CAT template

```
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.

3.3.2 VOLUME object: required keywords

Table 12: 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 3.2.1
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 18
VOLUME_NAME	60	See Table 17
VOLUME_SERIES_NAME	60	"ROSETTA SCIENCE ARCHIVE"
VOLUME_SET_NAME	60	See Table 13 and Table 14
VOLUME_SET_ID	40	See Table 16
VOLUME_VERSION_ID	12	"VERSION 1"
VOLUMES	N/A	1

Table 12: Mandatory keywords and standard values for the VOLUME object.

3.3.3 VOLUME_SET_NAME

The volume set will group all the volumes from one instrument. Table 13 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
SREM	ROSETTA SREM DATA
VIRTIS	ROSETTA VIRTIS DATA

Table 13: VOLUME_SET_NAME values for the Orbiter

INSTRUMENT	VOLUME_SET_NAME
3.4 PXS	3.5 ROSETTA APXS DATA
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 14: VOLUME_SET_NAME values for the Lander

3.5.1 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	IAPS	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
SREM	GR	NOA	ISARS	ROSRE	10XX
VIRTIS	IT	INAF	IASF	ROVIR	1001 or 100X or 10XX
PHILAE					
APXS	DE	UMZ	IAAC	RLAPX	10XX
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	DE	TUBS	IGEP	RLSPM	10XX
SD2	IT	POLIMI	AERO	RLSD2	100X
SESAME					

Table 15: 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_IAPS_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_????
SREM	GRE_NOA_ISARS_ROSRE_10XX
VIRTIS	IT_INAF_IASF_ROVIR_????
PHILAE	
APXS	DE_UMZ_IAAC_RLAPX_10XX
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 16: VOLUME_SET_ID values per instrument.

3.5.2 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_V 1.0
SREM	RO-X-SREM-5-CVP1-V1.0	SREM RAW AND DERIVED DATA FOR CVP1
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 17: VOLUME_NAME keyword values (one example per instrument).

3.5.3 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 18 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
SREM	RO-X-SREM-5-CVP1-V1.0	ROSRE_1001
VIRTIS	RO-CAL-VIRTIS-2-CVP-V1.0	ROVIR_1001
PHILAE		
APXS	RL-C-APXS-1-PHC-V1.0	RLAPX_1001
CIVA	RL-M-CIVA-2-MARS-V1.0	RLCIV2_1001
CONSERT	RO/RL-CAL-CONSERT-2-CR4A-V1.0	ROLCN2_1001
COSAC	RL-CAL-COSAC-2-CVP-V1.0	RLCOS_1013
PTOLEMY	RL-CAL-PTOLEMY-2-CR4A-V1.0	RLPTO1_1019
ROLIS	RL-M-ROLIS-2-MARS-V1.0	RLROL1_1020
ROMAP MAG	RL-M-ROMAP-2-MARS-MAG-V1.0	RLMAG2_1001
ROMAP SPM	RL-M-ROMAP-3-MARS-SPM-V1.0	RLSPM2_10??
SD2	RL-CAL-SD2-3-CVP-V1.0	RLSD23_1001

Table 18: VOLUME_ID keyword values for the orbiter (one example per instrument).

3.5.4 REQUIRED OBJECTS

Two objects are required on the VOLUME object:

- CATALOG
- DATA_PRODUCER

3.5.4.1 CATALOG

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

- DATA_SET

- INSTRUMENT
- INSTRUMENT_HOST
- MISSION

3.5.4.2 DATA_PRODUCER

The following keywords are required:

- INSTITUTION_NAME
- FACILITY_NAME
- FULL_NAME
- ADDRESS_TEXT

3.5.4.3 INSTITUTION_NAME

INSTR	INSTITUTION_NAME
ALICE	SOUTHWEST RESEARCH INSTITUTE
COSIMA	FINNISH METEOROLOGICAL INSTITUTE
GIADA	INAF – INSTITUTO DI ASTROFISICA E PLANETOLOGIA SPAZIALI
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	CENTRE NATIONAL D'ETUDES SPATIALES
RSI	INSTITUT FUER GEOPHYSIK UND METEOROLOGIE
VIRTIS	INAF – INSTITUTO DI ASTROFISICA SPAZIALE E FISICA COSMICA
APXS	

Table 19: INSTITUTION_NAME values per instrument.

3.5.4.4 FACILITY_NAME

INSTR	FACILITY_NAME
ALICE	DEPARTMENT OF SPACE STUDIES
COSIMA	SPACE RESEARCH
GIADA	LABORATORIO DI FISICA COSMICA E PLANETOLOGIA
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	SCIENCE OPERATIONS AND NAVIGATION CENTER
RSI	N/A
VIRTIS	N/A

Table 20: FACILITY_NAME values per instrument.

3.5.4.5 FULL_NAME

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

4. Geometry Information

4.1 Geometry Keywords in Data Product Labels

4.1.1 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

4.1.2 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 4.2);
- the DATASET.CAT;
- the EAICD.

4.2 Reference frame and Coordinate System

In this section, we will present the coordinate system and reference frame used within the mission.
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.

4.2.1 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 4.2.6.
The name of the reference frame used is documented in:
- the label using the NOTE keyword;
- the DATASET.CAT – see 4.2.7;
- the EAICD – see 4.2.8.

The SPACECRAFT_ALTITUDE is the distance in km measured from the center of mass of the target.
The units used are documented in the label using the NOTE keyword.

4.2.2 Coordinate system: Body fixed system (cometocentric)

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.

Rosetta teams intend to use a common Body fixed system: The Cheops Reference frame. The coordinate system is completely right handed, with -90° ≤ latitude ≤ +90° and 0° ≤ longitude ≤ 360°. These coordinates should always be provided with observations for which they are meaningful, and particularly for all observations of the nuclear surface.

4.2.3 Coordinate system: Coma system

The mission may use a Coma System, which definition is:

- Right handed
- Z toward sun
- X in orbit plane with sense of orbital motion
- Y orthogonal.
- This is a reference frame that rotates with the comet's orbital motion so that one axis always points at the sun. It can be conveniently expressed either as rectangular coordinates or as spherical or cylindrical coordinates as long as everything is in the same frame. These coordinates should be provided only where they are meaningful.

4.2.4 Coordinate system: Solar Equator System

The Coma System is important for most orbiter instruments but others, like RPC MAG, use a system based on solar equator (CSEQ). RPC MAG data are given in these coordinates, which definition is: The body-Centered Solar EQuatorial (CSEQ) frames for the Rosetta primary target comet 67P/Churyumov-Gerasimenko and secondary target asteroid 21/LUTETIA are named '67P/C-G_CSEQ' and '21/LUTETIA_CSEQ'. These frames are defined as a two-vector style dynamic frames as follows:

- +X axis is the position of the Sun relative to the body; it's the primary vector and points from the body to the Sun;
- +Z axis is the component of the Sun's north pole of date orthogonal to the +X axis;
- +Y axis completes the right-handed reference frame;
- The origin of this frame is the body's center of mass.

All the vectors are geometric: no aberration corrections are used.

4.2.5 SPACECRAFT_ALTITUDE

The SPACECRAFT_ALTITUDE keyword definition in the PDS dictionary states: "The spacecraft_altitude element provides the distance from the spacecraft to a reference surface of the target body measured normal to that surface."
However, some instruments, because of the complexity of the comet surface, preferred to give the information with respect to the centre of mass. In this case, the NOTE keyword must mention that the SPACECRAFT_ALTITUDE is computed from the centre of mass and not from the comet surface. The information should be also explained in the EAICD.

4.2.6 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, SC_TARGET_VELOCITY_VECTOR are related to the equatorial J2000 inertial frame.
The values of SUB_SPACECRAFT_LATITUDE and SUB_SPACECRAFT_LONGITUDE refer to the Cheops reference frame.
{***The SPACECRAFT_ALTITUDE gives the distance to the spacecraft from the target center of mass***.}
All values are computed for the time t=START_TIME. Distances are given in <km>, velocities in <m/s>, and angles in <deg>."

In this text, the part in between { }, in bold & italics, must only be used in the case that the spacecraft altitude is computed from the center of mass. If it is used, then remove the { }, and change the text inside to normal font.

4.2.7 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 Cheops reference frame.
{**The SPACECRAFT_ALTITUDE gives the distance to the spacecraft from the target center of mass**.}
These parameters are computed at time t=START_TIME.
Distances are given in km, angles in degrees.”

In this text, the part in between { } in bold & italics, must only be used in the case that the spacecraft altitude is computed from the center of mass. If it is used then remove the { }, and change the text inside to normal font.

4.2.8 EAICD

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

*only relevant if distance is linked to centre of mass