

ROSETTA-RPC-MAG

To Planetary Science Archive Interface Control Document

EAICD

RO-IGEP-TR0009

Issue 2.9 5 September 2007

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Approved by: PI





Change Log

Date	Sections Changed	Reasons for Change	
7.3.2005	EAICD V1.5 release		
26.9.2005	EAICD V1.7 release	PDS LABEL changes, SOFTWARE deleted	
4.10.2005	RPCMAG_SW.CAT changed to RPCMAG_SOFTWARE.CAT	RPC Conventions	
13.10.200 5	Data Structure adapted to RPC conventions	RPC Conventions	
26.10.200 5	1.8, 2.4.3, 2.44, 3.11, 3.13, 3.14, 3.2.2, 3.42, 3.4.3.1,3.4.3.3, 4.3.1.6	Changes due to comments listed in RO- EST-LI-3331_1.0	
18.01.200 6	4.3.x	Geoindex information in DATA LBL files updated	
28.09.200 6	Sections mentioned in RO-EST-LI-3362	Comments on the Internal ESA Review	
18.10.200 6	TOC,1.5,1.9,2,22,3.1,4.2,4.3	Implementation of CLK,CLL data and Quality flags	
20.4.2007	1.5.1, 1.5.2, 1.6, 1.8, 2.2.2, 2.2.6, 3.2.3, 3.42, 4.3.1.3,4.3.1.6	RID related changes, Editorial	
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		Chapter added for description of GEOMETRY Information	
	4.3.2 – 4.3.15	Changes of *LBL files due to new ESA Requirements after DAWG meeting	
6.8.2007		Additional changes according to RID 45	
5.9.2007	2.2.2	Exact explanation of time stamps	



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IGEP TU Braunschweig

RPC-MAG EAICD

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1 Introduction

1.1 Purpose and Scope

The purpose of this EAICD (Experimenter to (Science) Archive Interface Control Document) is two fold. First it provides users of the RPC-MAG with detailed description of the product and a description of how it was generated, including data sources and destinations. Secondly, it is the official interface between your instrument team and your archiving authority.

1.2 Archiving Authorities

The Planetary Data System Standard is used as archiving standard by

- NASA for U.S. planetary missions, implemented by PDS
- ESA for European planetary missions, implemented by the Research and Scientific Support Department (RSSD) of ESA

ESA implements an online science archive, the PSA,

- to support and ease data ingestion
- to offer additional services to the scientific user community and science operations teams as e.g.
 - \circ $\,$ search queries that allow searches across instruments, missions and scientific disciplines $\,$
 - several data delivery options as
 - direct download of data products, linked files and data sets
 - ftp download of data products, linked files and data sets

The PSA aims for online ingestion of logical archive volumes and will offer the creation of physical archive volumes on request.

1.3 Contents

This document describes the data flow of the RPC-MAG instrument on ROSETTA from the s/c until the insertion into the PSA for ESA. It includes information on how data were processed, formatted, labeled and uniquely identified. The document discusses general naming schemes for data volumes, data sets, data and label files. Standards used to generate the product are explained. Software that may be used to access the product is explained further on.

The design of the data set structure and the data product is given. Examples of these are given in the appendix.

1.4 Intended Readership

The staff of the archiving authority (Planetary Science Archive, ESA, RSSD, design team) and any potential user of the RPC-MAG data.



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1.5 Scientific Objectives

1.5.1 Overview

The ROSETTA orbiter magnetometer is part of the ROSETTA Plasma Consortium set of scientific instruments. The purpose of the magnetometer is the measurement of the interplanetary magnetic field close to different targets visited by the ROSETTA spacecraft.

Special points of interest are:

- Measurements of the interplanetary magnetic field during the flybys at planet Mars & Earth, the asteroids and in the environment of comet p/Churyumov Gerasimenko.
- Study of the structure and dynamics of the cometary-solar wind interaction region.
- Study of the generation and evolution of the cometary magnetic Cavity.
- Study of cometary tail evolution and structure.

1.5.2 The Cometary Magnetic Field - A historical perspective

In 1951 the German Astronomer Ludwig Biermann used the fact that cometary tails are always pointing away from the Sun to postulate the solar wind.

It was Hannes Alfvén who suggested in 1957 that cometary tails are due to the draping of the interplanetary magnetic field around the cometary nucleus.

To explain this draping effect C.S. Wu and R.C. Davidson in 1972 studied the pick-up of cometary ions and the associated mass loading of the solar wind.

Associated strong plasma wave turbulence due to this mass loading was first detected by B.T. Tsurutani and E.J. Smith in 1986.

The magnetic field draping itself was first measured by F. M. Neubauer and co-workers using magnetic field measurements made onboard the GIOTTO spacecraft.



1.5.3 The Cometary Magnetic field



1.6 Applicable Documents

Planetary Data System Data Preparation Workbook, February 1, 1995, Version 3.1, JPL, D-7669, Part1

Planetary Data System Standards Reference, August 1, 2003, Version 3.6, JPL, D-7669, Part 2 ROSETTA, Archive Generation, Validation and Transfer Plan, January 10, 2006, RO-EST-PL-5011 RPC-MAG Knowledge Management, Power-Point Presentation and Video (RO-3DSE-MAG) RO-RPC-UM, Rosetta Plasma Consortium: User's Manual

RO-IGM-TR-0002, Fluxgate Magnetometer Calibration for Rosetta: Report on the FM and FS Calibration

RO-IGM-TR-0003, Fluxgate Magnetometer Calibration for Rosetta: Analysis of the FM Calibration RO-IWF-TR-0001, Calibration Report, Sample Rate and Frequency Response - Analysis of ROSETTA RPCMAG

RO-IGEP-TR-0007, DDS2PDS User Manual

RO-IGEP-TR-0016, RPC Archiving Guidelines



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1.7 **Relationships to Other Interfaces**

This EAICD describes the overall RPC-MAG archiving details. If there will be changes in the DDS2PDS Sotftware, this EAICD and the DDS2PDS User manual, RO-IGM-TR0007, will be affected. Changes of the EAICD will not have any feedback to other documents, as the EAICD is changed at the end of the chain, taking into account any other document update made before

1.8 Acronyms and Abbreviations

DPU	Digital Processing Unit		
FGM	Fluxgate Magnetometer		
FM	Flight Model		
FS	Flight Spare Unit		
НК	Housekeeping		
IB	Inboard sensor		
I/F	Interface		
IGEP	Institute for Geophysics and extraterrestrial Physics, TU Braunschweig		
OB	Outboard sensor		
PIU	RPC Power Interface Unit		
PSA	Planetary Science Archive		
ROKSY	ROSETTA Knowledge Management System		
ТМ	Telemetry		
DDS	Data Distribution System		
PDS	Planetary Data System		
For a detailed list of Acronyms refer to the Appendix of the RPC User Manual RO-RPC-UM.			
For a detailed list of Actonyms refer to the Appendix of the RPC User Manual RO-RPC-UM.			



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1.9 Contact Names and Addresses

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2 Overview of Instrument Design, Data Handling Process and Product Generation

The ROSETTA orbiter magnetometer is part of the ROSETTA Plasma Consortium set of scientific instruments. The purpose of the magnetometer is the measurement of the interplanetary magnetic field close to different targets visited by the ROSETTA spacecraft.

To measure the magnetic field a system of two ultra light triaxial fluxgate magnetometers (about 36 g each) is used, with the outboard (OB) sensor mounted close to the tip of the about 1.5 m long spacecraft boom pointing away from the comet nucleus and with the inboard (IB) sensor on the same boom about 15 cm closer to the spacecraft body. Two magnetometer sensors are required to minimise the influence of the rather complex spacecraft field on the actual measurements, and for redundancy purposes.

In order to meet the scientific requirements as discussed above the spacecraft magnetic DC-field requirement is about 25 nT at the outboard MAG sensor. To achieve this goal a magnetic cleanliness programme was planned, conducted by the experimenter team, supported by the ROSETTA project.

To further eliminate spacecraft fields and zero-offsets the so called multi-magnetometer technique will be applied in conjunction with statistical in-flight techniques. To increase time resolution 6 A/D converters (one for each of the six sensor channels) will be used synchronously. The A/D converters have a resolution of 20 bits each. MAG will be operated with a high temporal resolution of about 20 vectors/sec outboard and inboard. Transmission of number of vectors/sec respectively burst mode memory operation will be adopted to available data rate by averaging of vector rate inside the PIU-DPU.

The Orbiter Magnetometer RPCMAG can be characterized by the following features:

- Fluxgate-Magnetometer with a resolution of +/- 31 pT
- Measurement Range ; +/- 16384 nT
- 2 Sensors OB/IB
- 20 Bit ADC
- Measuring B-Field in 3 components with a maximum vector rate of 20 Hz.
- The Flux-Gate Magnetometer RPC-MAG performance parameters are in full accordance with the EID-B design goals



- The Outboard/ Inboard sampling rate can be inverted by command either for higher Inboard time resolution or in case of outboard failure.
- The sensors are fully calibrated also versus a wide temperature range.
- The temperature at Outboard and Inboard sensor is monitored in MAG housekeeping data.
- The instrument delivers time series of the 3 dimensional magnetic field vector.



Block diagram of the RPCMAG Intrument



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2.1 Data Handling Process

The RPC-MAG data are provided by IGEP using the DDS2PDS S/W package.

Data Processing from DDS 2 PDS

Details can be found in the DDS2PDS User Manual RO-IGEP-TR0007.

- The overall data processing can be done mainly by the IDL S/W package DDS2PDS. This consists
 of several routines for different purposes:
 - Copying TM raw data from our ftp-server to the local analysis PC
 - Converting /Decoding these binary data to ASCII data. This is done by calling the MATLAB S/W RAW2ASCII from the IDL program.
 - Reading Attitude and Orbit file (*:ROS) from the ftp server
 - Calling the OASWLIB S/W to generate desired attitude and orbit vectors
 - Generating PDS Files from these ASCII raw data (Routine: GEN_CAL_DATA)
 - Generating Plots
 - Elimination of Reaction wheel influence
 - Considering Lander heater current disturbance
 - o Setting Quality flags to CALIBRATED, RESAMPLED, and DERIVED data
 - Copying the produced Datasets to our local ftp server
 - o Generating log files



• Binary TM data can be just read and converted to ASCII by RAW2ASCII

Program Details:

- developed in MATLAB under Windows by Hans Eichelberger, IWF, GRAZ
- his S/W acts as I/F between the binary raw data transmitted by the DDS/EGSE/IC-FTP server and the scientific usable data.
- The program converts binary raw data into ASCII data and adds the necessary time information (UTC) for the subsequent scientific analysis. Bad vectors are marked. All written ASCII files get a header starting with #
- It reads Magnetic field raw data in all modes (SID1 - SID6) Temperature data (IB/OB) HK data
- The program can be executed via a batch job to guarantee a more or less automatic data generation/conversion process.
- The converted ASCII data will be merged with auxiliary data and processed with GEN_CAL_DATA to
 obtain scientific usable data in PDS format. This IDL routine acts as I/F between the ASCII raw data
 converted by RAW2ASCII and the PDS System.
 - GEN_CAL_DATA reads (files can be read from a list for automatic data generation)

Magnetic field ASCII raw data: RPCMAGyymmddThhmm_RAW_<sensor>_<MODE>.ASS

Auxiliary data - Attitude: Auxiliary data - Position: Housekeeping data: Calibration files: Boom alignment file: ATyyyymmdd.ROS POSyymmdd.ROS RPCMAGyymmddThhmm_RAW_HK.ASC RPCMAG_GND_CALIB_FSDPU_FM<sensor>.TXT, RPCMAG_SC_ALIGN.TXT

- Functions of GEN_CAL_DATA:
 - apply temperature dependent ground calibration results to get B-field in unit coordinates.
 apply actual "inflight" temperature model to get rid of temperature influence. This model has to be created with assistance of the IDL S/W CALIB ROS TEMP xxxx before.
 - 2) turn B-field from instrument to s/c coordinates
 - 3) apply attitude data to get B-field in EME2000 frame (or a similar one)
 - 4) apply filters, spike detectors,.... data processing routines to get ``scientific
 - usable magnetic field data" in ASCII time series.
- GEN_CAL_DATA writes

PDS compliant calibrated data files and labels on different stages (*.tab, *.lbl).



After generating all the dataset and checking them with PVV the data are copy (via SCP) to the Imperial college SFTP server. From here all RPC data will be sent (sftp'ed) to the PSA. This last step is under responsibility of our overall RPC archive engineer (currently Charlotte Dunford, IC)



2.2 Overview of Data Products

RPCMAG will only deliver Flight data to the PSA. Data of the Ground calibration and the system tests cannot be converted to PDS compliant format and will be stored directly at IGEP. Relevant documentation will also be saved in the ROSETTA Knowledge Management System (ROKSY).

No software will be archived at the PSA.

2.2.1 Instrument Calibrations

The calibration for RPC-MAG has been performed completely. This means every electronics unit (DPU:FS,DPU:FM) has been calibrated connected with each sensor (Outboard sensor FS & FM, Inboard sensor FS & FM). Thus the results of all calibrations and cross calibrations will be archived.

Only the results are archived in PDS. These are

- Temperature dependent Sensitivity-Matrices
- Temperature dependent Alignment-Matrices
- Temperature dependent Offsets-Matrices
- Frequency behavior

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During the calibration and integration of the instrument it turned out, that there were slight differences between the Flight model (FM) and Flight spare unit (FS) of the instruments. We choose the best one for the real flying units. These are:

• DPU:	FS
 IB-Sensor: 	FM
OB-Sensor:	FM

2.2.2 In-Flight Data Products

Sensor temperatures of the MAG inboard and outboard sensors are delivered in the raw data files.

From the DDS we get raw data in instrument coordinates. These will be rotated into s/c-coordinates, the ground calibration parameters will be applied, and a temperature correction will be performed. The result of this procedure will be calibrated data.

On a higher level we will rotate these data in a convenient celestial body frame (e.g. EME2000, ECLIPJ2000, CSO, ..) and average these data to a convenient rate (e.g. 1s mean). A degapping and despiking filter can be applied.

The principal structure of the data products is the same for all mission phases. We will deliver ASCII tables containing at least 3 component magnetic field data and the related times in UTC and OBT. The raw data files will contain the sensor temperatures as well, as these are needed to calculate the real magnetic field.

The term "Calibrated data" means that the results of the Ground calibration will be applied to the raw data. The spacecraft generated offsets and the structures arising from the s/c noise are NOT removed in these data.

The elimination of these effects is under development and will lead to derived data products (TBD).

A major success in improving the data quality has been achieved by creating a Reaction Wheel frequency elimination algorithm. The rotation frequencies of ROSETTA's 4 reaction wheels can be identified as disturbance spectral lines in the dynamic spectra of the MAG data. Therefore, a frequency elimination filter (dynamic sharp notch filter) had to be developed to get rid of the reaction wheel impact. The filter works satisfactory, especially for the burst data.

During the Earth Fly by it turned out that the Lander heater currents disturb the RPCMAG data. The disturbance is in the order of a nanotesla. The elimination of this disturbance is done with semi manually but the generation of the archive files can be done automatically using DDS2PDS.

All higher level data products (CALIBRATED, RESAMPLED, DERIVED) contain quality flags for each magnetic field vector.

During the analysis of the EAR1 data and the comparison of the measured data with the Earth Magnetic Field model data (POMME model from GFZ, Potsdam) it turned out that the time stamp of the measured and filtered data has to be shifted slightly due to the filter algorithm used in the PIU software. If the time stamp is uncorrected, as it is for all the data products for the phases CVP, EAR1, and CR2 level V1.0, the time of the data is a little bit to early. This means that a certain dt (s. tables) has to be added to the time stamp to

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get the right times. This additional time offset is mode dependent and also dependent on the actual primary / secondary sensor.

For the data of the PRIMARY sensor, which is usually the OB sensor, the following table shows the times to be added to the time stamp of the vector to get the real physical event time:

SID	Mode Name	Packet Length [s]	Time to add to PRIMARY data timestamp [s]
SID1	Minimum	1024	223.7
SID2	Normal	32	8.2 ¹
SID3	Burst	16	0
SID4	Medium	32	1.35
SID5	Low	128	27.7
SID6	Test	16	0

For the SECONDARY vectors the situation is different as these vectors are not filtered but just picked out of the data stream. The following table applies for the time shift of the SECONDARY vectors.

SID	Mode Name	Packet Length [s]	Time to add to SECONDARY data timestamp [s]
SID1	Minimum	1024	1023.95
SID2	Normal	32	31.95
SID3	Burst	16	15.95
SID4	Medium	32	31.95
SID5	Low	128	127.95

For the later data products, starting with MARS or delivery level higher than V1.0 these corrections will be taken into account automatically by the Archive generation software. The correction is done only for the CALIBRATED, RESAMPLED and DERIVED science data, neither for EDITED data nor for HOUSEKEEPING data. Only the UTC time stamps are changed, the OBT is kept in the originally state.

¹ The analysis of the Earth Fly-by data resulted in a time shift of 8.3s. The stated 8.2 s is a theoretical value derived from the digital filter design.



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Data products:

EDITED RAW DATA: Data in ADC Counts

- Housekeeping Data UTC, OBT, T_OB, T_IB, STAGE_ID_A, STAGE_ID_B, FILTER_CFG, MAG_REF_VOLT, MAG NEG VOLT, MAG POS VOLT, BX OB, BY OB, BZ OB
- IB & OB Data • UTC, OBT, BX, BY, BZ, T, QUALITY

CALIBRATED DATA: DATA in Physical units, bad vectors removed, Quality flagged

LEVEL A Data:

- Housekeeping Data UTC, OBT, T_OB, T_IB, STAGE_ID_A, STAGE_ID_B, FILTER_CFG, MAG_REF_VOLT, MAG NEG VOLT, MAG POS VOLT, BX OB, BY OB, BZ OB
- IB & OB Data in Instrument coordinates UTC, OBT, BX, BY, BZ, T, QUALITY
- LEVEL B Data:
 - o IB & OB Data in s/c coordinates UTC, OBT, BX, BY, BZ, T, QUALITY
- LEVEL C Data:
 - IB & OB Data in Celestial body coordinate system, e.g. ECLIPJ2000 UTC, OBT, POS_X, POS_Y, POS_Z, BX, BY, BZ, QUALITY

RESAMPLED DATA : DATA in Physical units, bad vectors removed, Quality flagged

- LEVEL_K Data:
 - IB & OB Data in s/c coordinates, Lander Heater influence eliminated Source is corrected LEVEL B data
 - UTC, OBT, BX, BY, BZ, T, QUALITY
- LEVEL L Data:
 - IB & OB Data in Celestial body coordinate system, e.g. ECLIPJ2000 Source is corrected LEVEL C data UTC, OBT, POS X, POS Y, POS Z, BX, BY, BZ, QUALITY

LEVEL E Data:

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 $\circ~$ IB & OB Data in Instrument coordinates, derived from LEVEL_A data, data resampled to specified average interval,e.g. 1s, or 1 min

UTC, OBT, BX, BY, BZ,T, QUALITY



LEVEL_F Data:

 IB & OB Data in s/c - coordinates, derived from LEVEL_B or LEVEL_K data, data resampled to specified average interval, e.g. 1s, or 1 min

UTC, OBT, BX, BY, BZ, T, QUALITY

LEVEL_G Data:

 IB & OB Data in Celestial body coordinate system, e.g. ECLIPJ2000, derived from LEVEL_C or LEVEL_L data, data resampled to specified average interval, e.g. 1s, or 1 min UTC, OBT, POS X, POS Y, POS Z, BX, BY, BZ, QUALITY

LEVEL_H Data: Reaction Wheel Corrected Data

 IB & OB Data in Celestial body coordinate system, e.g. ECLIPJ2000, derived from LEVEL_C or LEVEL_L data, reaction wheel influence eliminated by filtering in frequency domain.

UTC, OBT, POS_X, POS_Y, POS_Z, BX, BY, BZ, QUALITY

LEVEL_I Data: Reaction Wheel Corrected Data, Averaged

 IB & OB Data in Celestial body coordinate system, e.g. ECLIPJ2000, derived from LEVEL_H data, reaction wheel influence eliminated by filtering in frequency domain, data resampled to specified average interval,e.g. 1s, or 1 min

UTC, OBT, POS_X, POS_Y, POS_Z, BX, BY, BZ, QUALITY

DERIVED DATA (occasionally): DATA in Physical units, bad vectors removed

LEVEL_J Data: PCA processed data

 IB & OB Data derived from LEVEL_G, LEVEL_H or LEVEL_J data, a principal component analysis (PCA) has been applied, output is

One file for correlated data (_C), and

Two files (IB, OB) containing uncorrelated data (_U)

UTC, OBT, POS_X, POS_Y, POS_Z, BX, BY, BZ, QUALITY

Normally EDITED RAW DATA, CLA, CLB, CLC, CLF and CLG data will be produced, in case of heater problems additionally CLK and CLL data will be available. In case of Reaction wheel problems also CLH data will be generated.

The following figure shows an overview about the relation of all produced data types:

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DATA PRODUCT OVERVIEW

2.2.3 Software

We do not intend to deliver any software.

2.2.3.1 Calibration Software

The ground calibration s/w is a complex package of different routines which has been used since many years for many missions (e.g. CLUSTER, DS-1, CASSINI, ...). The s/w is stored at the IGEP.

A single binary calibration file (*.CCD, Complete Calibration Data) produced by the calibration facility contains all information needed to perform a specific calibration task like offset determination or calculation of sensitivity and alignment. The calibration analysis s/w extracts the needed frames like applied magnetic field of the coil facility, measured fields of the FGM under test, and the actual temperatures. Then an appropriate sensor model will be applied to the data (e.g. linear model or models of higher order) to calculate the temperature dependent sensor parameters like offset, alignment and sensitivity. The frequency behavior will be investigated as well.

At the end of the process a report is written containing all results needed to use the magnetometer. All necessary parameters are written to the result files which are read by the DDS2PDS S/W.

DDS2PDS will apply the ground calibration results and additionally inflight calibration parameter to the data to generate proper archive data. In case of disturbance by ROSETTA's reaction wheels special filters in the frequency domain can be applied to get rid of the reaction wheel frequencies in the magnetic field data. This can be done automatically if needed. This elimination requires the knowledge of the reaction wheel frequencies which have to be retrieved from the DDS prior to the analysis.

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Also the Lander heater currents have an influence to the magnetic field data. This impact can be eliminated semi manually by comparing Lander HK data, ROMAP signatures and the RPCMAG data. The used s/w is not part of the DDS2PDS package.

It is a known fact that the magnetic field sensors are very temperature sensitive. This behaviour has been calibrated at the ground calibration down to -60° C. In flight, however, lower temperatures are seen. It turned out that the extrapolation of the ground calibration results (only the temperature dependent offset shift) did not lead to really convincing results. Therefore inflight data were taken to create a new temperature model of the offset behavior. For the early mission phases a common model, based on CVP & EAR1 data was used – the so called model 002. During the Mars swing by it turned out that the usage of a model based on daily changes yields to even better results. Especially due to hysteretic effects (in terms of temperature influence) of the magnetic field sensor it showed up that a more sophisticated temperature model was needed

Therefore the CALIB_ROS_TEMP_XXXX and the GEN_CAL_DATA S/W (IDL) were improved/extended to handle this more complex task, leading to model 006. Also the method was changed. The model 002 was achieved by calculating a best fit 3rd order polynomial of the sensor temperatures to the magnetic field (one polynomial for each of the 6 sensor components).

For the calculation of the new model 006 a different approach based on the following items, has been chosen:

- The correlation of the OB magnetic field readings and the OB temperature has to be minimal.
- The correlation of the IB magnetic field readings and the IB temperature has to be minimal.
- The correlation of the IB magnetic field readings and the OB magnetic field readings has to be maximal.
- The influence of the temperature can be eliminated (minimized) by subtracting suitable polynomials P(T) from the magnetic field readings.
- The coefficients of these 6 polynomials are calculated from the optimization of the 9 above mentioned correlation coefficients.

Mathematically this is done by a POWELL minimization routine.

It showed up that the best result is achieved if this calculation is done day by day in order to really take the right temperature behavior into account. The former temperature model showed significantly worse results especially at lower temperatures and faster temperature changes. The calculated polynomials can be of 5th order, but the analysis yielded that linear ones with only very little quadratic and cubic contribution are the best ones. All the MARS data and future data will be calibrated using this new model.

2.2.3.2 Pipeline processing Software

The pipeline processing s/w is named DDS2PDS. A coarse overview has been given already in chapter 2.2. DDS2PDS can be used with a command file in batch mode. Thus, data of many days can be processed automatically. The output of DDS2PDS are PDS files sorted by modes and times and calibration levels. Usually there will be one file per day and mode and level. CLH, CLK, and CLL file are generated only if disturbances occur and if they can be eliminated.

The format and the content of all PDS *: TAB files is stated in chapter 2.4.5.



2.2.3.3 Scientific analysis Software

The DDS2PDS software has also the capability to generate different kinds of plots. Thus time series can be plotted for every calibrated data level. Additionally spectra plots can be generated as well as plots of the differences of the OB & IB sensor.

Higher Level analysis software is currently under development.

2.2.4 Documentation

The features of the DDS2PDS s/w package will be described in the

DDS2PDS User Manual, RO-IGEP-TR0007.

This manual is part of the documentation package. The S/W itself, however, will not be delivered to the archive.

2.2.5 Derived and other Data Products

Actually it is not planned to deliver other derived data products than the described ones in section 2.4.5.

2.2.6 Ancillary Data Usage

For calculation of the magnetic field in a celestial reference coordinate system it is essential to have information about the attitude of the s/c and the position of the s/c. These data have to be available on the DDS.

Without these ancillary data (ATNR, ORER, ORHR,...) the generation of LEVEL_C (or higher level) data is not possible. The files can be retrieved from the AUXILIARY data section of the ROSETTA DDS. The format and content of these files is described in the ROSETTA DDID RO-ESC-IF-5003.

information The Attitude is extracted from the actual ATNR file. Currently this is ATNR FDLRMA DAP040302093352 0053.ROS. This ASCII file is provided by ESOC/TOS-GFI and contains ROSETTA'S state attitude guaternions. The actual attitude can be evaluated using the OASW S/W provided by ESOC.

FILE	COORDINATE SYSTEM CENTER
ORHR	SUN
ORER, ORFR, ORGR	EARTH
ORMR	MARS

The positions of the s/c are retrieved from the ORxx files. All positions are given here in the EME2000 frame. The coordinate systems centers, however, are different:

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These ASCII file are provided by ESOC/TOS-GFI as well and contain ROSETTA'S state vectors (positions & velocities for given times). The position for a specific time can be evaluated using the OASW S/W provided by ESOC.

In the future we will also use SPICE kernels generated by the JPL NAIF group. The input to the ROSETTA trajectory and attitude kernels is provided by the ESOC Flight dynamic team.



3 Archive Format and Content

3.1 Format and Conventions

3.1.1 Deliveries and Archive Volume Format

PDS compliant data will be delivered to ESA on DATA SET Level. One Data Set corresponds to one Volume.

Data of different Processing Levels will be archived in different Data Sets.

The complete RPCMAG Data Set will be delivered to the Imperial College server. From here all RPC data will be delivered to ESA by the RPC Archive Manager.

3.1.2 Data Set ID Formation

Example: DATA_SET_ID = "RO-X-RPCMAG-3-CVP-RAW-V1.0"

The Data Set Id has the following structure

- RO: Rosetta Orbiter as instrument host
- <target_ld> :
 - E: Earth,
 - A: Asteroid
 - M:Mars
 - C:Comet
 - X: Checkout
 - CAL:Calibration
 - SS:SOLAR WIND
 - D: Dust
- RPCMAG: Magnetometer Instrument
- <data_Processing_level> : Codmac Level 1...8,N .

According to PDS Standard Reference, Chapter 6.5

- <Mission Phase abbreviation>:
 - CVP: Commissioning
 - EAR1,EAR2,EAR3 : Earth Swing-By
 - CR1...CRn : Cruise Phases
 - MARS
 - AST1,AST2 : Asteroid Fly-by



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- RVM1,RVM2 : Rendezvous Maneuvre .
- NCD : Near comet Drift
- FAT / CAT: Far / Close Approach Trajectory
- TGM : Transition to Global mapping
- GMP: Global mapping Phase
- **COP** : Close Observation Phase
- SSP : Lander delivery
- LOW / HIGH :Comet Activity low/ high
- MINC: Comet Activity moderate increase
- SINC: Comet Activity sharp increase
- **PERI** : Near Perihelion
- **EXT: Extended Mission**

Accumulated Phases:

- APPR : Approach FAT to COP
- ESCO : Escort LOW to PERI
- COM : Comet FAT to PERI

Designators according to RO-EST-PL-5011, Table 2

- Description: processing level... •
- V1.0 version number



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3.1.3 Data Directory Naming Convention





This directory shows the complete internal data structure, which gives an detailed overview of all processed data. When the data will be delivered to the PSA, the transmitted structure will be adapted in that way, that only the data of a single processing level (EDITED, CALIBRATED, RESAMPLED,...) will go into the designated data set. There are no empty folders . Data of different processing levels will go to different data sets.

For every activated mode there will be one single file for each day where data have been measured. This means that there can be data gaps in the file if e.g. there were some measurements in the morning and some others in the evening.



3.1.4 Filenaming Convention

Magnetic Field data filename convention for EDITED and CALIBRATED data:

<inst></inst>	<begin observation="" of="">_</begin>	<level></level>	<sensor></sensor>	<inst mode=""></inst>	. <ext></ext>
RPCMAG	yymmddThhmm	RAW	IB	M1M6	LBL
		CLA	OB		TAB
		CLB			
		CLC			

Example: RPCMAG040528T1230_CLC_OB_M3.LBL RPCMAG040528T1230_CLC_OB_M3.TAB

Magnetic Field data filename convention for RESAMPLED averaged data (CLE,CLF,CLG,CLI):

<inst> <begin observation="" of=""></begin></inst>	<level></level>	<senso< th=""><th>r>_A<averag< th=""><th>e>.<ext></ext></th></averag<></th></senso<>	r>_A <averag< th=""><th>e>.<ext></ext></th></averag<>	e>. <ext></ext>
RPCMAG yymmdd	CLE	- IB	A60	LBL
	CLF	OB		TAB
	CLG			
	CLI			

Example: RPCMAG040528_CLG_OB_A20.LBL RPCMAG040528_CLG_OB_A20.TAB

Average denotes the time interval for one average period in seconds.

Magnetic Field data filename convention for RESAMPLED Heater or Reaction Wheel influenced data (CLK, CLL, CLH):

<inst></inst>	<begin observation="" of=""></begin>	<level></level>	<sensor></sensor>	_ <inst mode<="" th=""><th>>.<ext></ext></th></inst>	>. <ext></ext>
RPCMAG	yymmddThhmm	CLK	IB	M1M6	LBL
		CLL	OB		TAB
		CLI			

Example: RPCMAG040528T1230_CLK_OB_M3.LBL



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RPCMAG040528T1230 CLK OB M3.TAB

Magnetic Field data filename convention for PCA corrected data:

Correlated data:

<inst></inst>	<begin observation="" of=""></begin>	<level></level>	A <average></average>	C. <ext></ext>
RPCMAG	yymmdd	CLJ	A60	LBL
				TAB

Example: RPCMAG040528_CLJ_A20_C.LBL RPCMAG040528_CLJ_A20_C.TAB

Average denotes the time interval for one average period in seconds.

Uncorrelated data:

<inst></inst>	<begin observation="" of="">_</begin>	<level></level>	<sensor></sensor>	A <average></average>	U. <ext></ext>
RPCMAG	yymmdd	CLJ	ΙB	A60	LBL
		CLJ	OB		TAB

Example: RPCMAG040528_CLJ_OB_A20_U.LBL RPCMAG040528_CLJ_OB_A20_U.TAB RPCMAG040528_CLJ_IB_A20_U.LBL RPCMAG040528_CLJ_IB_A20_U.TAB

Average denotes the time interval for one average period in seconds.

Housekeeping data Convention:

	<begin observation="" of=""></begin>	_ <datatype></datatype>	>. <ext></ext>
RPCMAG	yymmddThhmm	HK	LBL
		TAB	
•	PCMAG040528T1230_	-	

RPCMAG040528T1230_HK.TAB



3.2 Standards Used in Data Product Generation

3.2.1 PDS Standards

MAG complies to PDS version 3, and we use version 3.6 of the PDS standard reference.

3.2.2 Time Standards

The Time Standard used for RPC-MAG obey the definitions stated in **Rosetta Time Handling, RO-EST-TN-3165, sect. 4.2**

UTC Time Format :

Time(UTC) in LBL files: yyyy-mm-ddThh:mm:ss.sss Time(UTC) in TAB files: yyyy-mm-ddThh:mm:ss.ssssss

ss.sss means: "seconds . decimal fractional seconds"

OBT Time Format:

The PDS keywords SPACECRAFT_CLOCK_START_COUNT and SPACECRAFT_CLOCK_STOP_COUNT refer to OBT.

The header of the experiment telemetry source packets contains the data acquisition start time in OBT as 32 bit of unit seconds followed by 16 bit of fractional seconds. OBT = 0 is at 2003-01-01-T00:00:00 UTC. The time resolution is $2^{(-16)} = 1.53E-5$ seconds. The OBT is represented in the following format:

SPACECRAFT_CLOCK_START/STOP_COUNT = "<reset number>/<unit seconds>.<fractional seconds>"

The unit seconds and the fractional seconds are separated by the full stop character ("."). Note that this is not a decimal point. The fractional seconds are expressed as multiples of $2^{(-16)} = 1.53E-5$ seconds and count from 0 to $2^{16} - 1 = 65535$.

E.g. in SPACECRAFT_CLOCK_START_COUNT = "1/21983325.392" the 392 fractional seconds correspond to $392 * 2^{(-16)} = 0.00598$ decimal seconds.

The spacecraft clock could be reset during the mission (although this is not planned). This would imply a change of the zero point. The zero point of the OBT will be indicated by pre-pending the reset number (integer starting at 1) and a slash to the unit seconds, i.e. "1/" means OBT = 0 at 2003-01-01T00:00:00 UTC.

Spacecraft Clock (OBT) in LBL files: "r/nnnnnnnnnnnn"

Spacecraft Clock (OBT) in TAB files: nnnnnnnnnnnnn

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Here r means the reset number starting at 1. As the OBT is in the TAB files is supposed to be just an addon information only the value of the clock without the reset number is stored. Probably nobody will use the OBT inside the TAB files as UTC is available for a comparison with other data.

System Name	Definition
Instrument coordinates	RPC-MAG unit reference systems for the Inboard (IB) and Outboard (OB) sensor. Systems are defined relative to the S/C coordinate sytem using matrices for the stowed and deployed boom orientations.
	Orientation: ref. to RPC USER MANUAL
S/C coordinates	Orientation: x: pointing from the LANDER to the s/c center, perpendicular to solar array axes; y:parallel to solar array axis; pointing to the left, when standing in front of the Lander, z: pointing up
EME2000	Earth Mean Equator inertial reference frame related to Equinox of Epoch J2000.
	Orientation: X: Pointing from SUN to Vernal Equinoxe, Y: perpendicular to X in Earth Equatorial plane, Z: Perpendicular to Earth Equatorial plane, pointing up
ECLIPJ2000	Ecliptic Coordinates related to Equinox of Epoch J2000.
	Orientation: X: Pointing from SUN to Vernal Equinoxe, Y: perpendicular to X in Eclipitic Plane, Z: Perpendicular to Ecliptic plane, pointing up
CSO	Comet Centric Solar Orbital System.
	Orientation: X: Pointing from COMET to SUN,
	Y: The inertially referenced velocity of the sun relative to the comet is the secondary vector: the Y axis is the component of this velocity vector orthogonal to the X axis.
	Z: Perpendicular to X and Y, completing system to be right handed
GSE	GEO Centric Solar Ecliptic System.
	Orientation: X: Pointing from EARTH to SUN, Y:

3.2.3 Reference Systems



	perpendicular to X in Ecliptic plane, Z: Perpendicular to Ecliptic plane, pointing up
MSO	Mars Centric Solar Orbital System.
	Orientation: X: Pointing from MARS to SUN, Y: perpendicular to X against planetary motion, Z: Perpendicular to X & Y, completing system to be right handed

3.2.4 Other Applicable Standards

N/A

3.3 Data Validation

For the validation of the data, data of the OB and IB sensor will be compared. They should show similar structures, originated in the solar wind. Due to the distortions of the s/c, however, there will be uncorrelated structures as well. The temperatures of both sensors should be nearly identical. A comparison of the MAG data with the data of the Lander magnetometer ROMAP will reveal precious information.

For a more quantitative assessment quality flags have been implemented to each magnetic field vector stored in TAB file. The quality flag is a string of 8 digits. The definition of this flag system is given in the following table

#	FLAG-ST	RING FLAG DESCRIPTION
#	87654321	
#	·····	1 IMPACT OF REACTION WHEELS
#		x = impact not assessed
#		0 = no disturbance
#		1 = disturbance eliminated during data analysis
#		2 = disturbance elimination failed
#		3 = data disturbed
		2 IMPACT OF LANDER HEATER CURRENTS:
		0 = no disturbance
		1 = disturbance eliminated during data analysis
		2 = disturbance elimination failed
		3 = data disturbed
		3 BOOM DEPLOYMENT:
		2 = boom deployment ongoing. Data only valid in instrument coordinates
		3 = pyros fired for boom release
		4 OFFSET RELATED EFFECTS:
#		x = offset issues not assessed



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#	::::	0 = no offset problems
#		1 = offset behavior not clear
#	::::	2 = offset drifts, sensor not in thermal equilibrium thus temperature model N/A
#	::::	3 = offset drifts, reason unknown
#	::::	4 = offset jump detected, reason unknown
#	::::	
#	::::	5 CORRELATION BETWEEN IB AND OB SENSOR
#	:::	x = correlation not assessed
		0 = perfect correlation
#	:::	1 = good correlation
#	:::	2 = poor correlation
#	:::	3 = IB and OB show different long term behavior
#	:::	
#	:::	
#	:::	6 OTHER IMPACTS DECREASING THE QUALITY
#	::	x = no assessment
#	::	0 = no other problems detected
	::	
#	::	2 =
#	::	3 =
	::	
#	::	5 = data disturbed by AC signal originated in s/c
		6 = data noisy due to power on failure
#	::	7 = data not calculatable due to thermistor failure
#	::	8 = sensor saturated due to huge external field
#	::	9 = sensor saturated, instrument power on sequence failed
#	::	
#	::	· 7 TBD
#	:	x = no assessment
#	:	8 TBD
#		x = no assessment
#		

With this complex quality assessment system it is possible to quantify the quality of each single vector in a detailed way. It is flexible enough to be adapted to widely spread future needs.

At a first step the flags have to be determined and written to an overall time oriented index file. Each time a flag changes a new entry has to be generated. This step has to be done manually day by day. Once this index file has been generated the S/W BATCH_SET_QUALITY will read this file and pad each vector in every related TAB file with the right quality flag

Flag evaluation Process:

Flag 1: Impact of Reaction wheels

This influence is checked by comparison of the dynamic frequency spectra of the magnetic field vectors and the spectra of the reaction wheels obtained from the DDS TM files. After calculation of the spectra the flags can easily be determined manually day by day (Optical comparison of plots: do disturbing spectral lines exist or not)

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Flag 2: Impact of Lander Heater Currents

These heater currents were up to now only disturbing during EAR1. The overall switch on/off times of this disturbance can be retrieved from Lander HK data.

Flag 3: Boom Deployment

The boom as been deployed on March 19, 2004. Exact times are known.

Flag 4, 5: Offset related Effects & Correlation between IB and OB Sensor

The offset is temperature dependent. Although a 3rd order model of the offset's temperature dependence exists the offset can not be determined exactly at any time. Especially immediately after powering on the instrument (up to a few hours later) the thermal equilibrium is not reached and therefore the thermal model cannot be applied. This leads to arbitrary offset values.

The S/W QUALITY_CHECK performs an automatic analysis of the IB and OB sensor temperatures. It will mark the quality as bad if the magnitude of the 1st derivative of the difference of these temperatures exceeds a certain threshold.

Furthermore various kinds of magnetic field difference plots (IBi-Obi vs .Time, IBi vs.OBi) are generated to get an idea of the offset jumps. The flags will be set according to the inspection.

Flag 6: Other Impacts

Manual inspection of HK data and taking into account all known problems

- Flag 7 TBD
- Flag 8 TBD.

The Quality assessment is done by the data producer.



3.4 Content

3.4.1 Volume Set

According to Planetary Data System Standard Reference, Version 3.6, Chapter 19, Figure 19.1.

3.4.2 Data Set

Our naming convention for the DATA_SET_NAME will follow the same principles as the DATA_SET_ID in chapter 3.1.3.

```
DATA_SET_NAME="ROSETTA-ORBITER <target_name> RPCMAG <level> <Mission phase abbreviation> <Description> <version number>"
```

<target_name> =

- 67P
- <asteroid short name>
- EARTH
- MARS
- CHECK
- CAL
- DUST
- SW

Target names according to RO-EST-PL-5011, table 4

<level> = Codmac Level 1...8,N . According to PDS Standard Reference, Chapter 6.5



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<Mission Phase abbreviation> =

- CVP : Commissioning
- EAR1, EAR2, EAR3 : Earth Swing-By •
- CR1...CRn : Cruise Phases •
- MARS •
- AST1,AST2 : Asteroid Fly-by •
- RVM1,RVM2 : Rendezvous Maneuvre •
- NCD : Near comet Drift •
- FAT / CAT: Far / Close Approach Trajectory
- TGM : Transition to Global mapping •
- GMP: Global mapping Phase •
- **COP** : Close Observation Phase •
- SSP : Lander delivery •
- LOW / HIGH :Comet Activity low/ high •
- MINC: Comet Activity moderate increase •
- SINC: Comet Activity sharp increase •
- PERI : Near Perihelion •
- **EXT: Extended Mission** .

Accumulated Phases:

- APPR : Approach FAT to COP •
- ESCO : Escort LOW to PERI •
- COM : Comet FAT to PERI •

Designators according to RO-EST-PL-5011, Table 2

<description> = This</description>	contains	the	processing	level	in	text	form:
------------------------------------	----------	-----	------------	-------	----	------	-------

- EDITED
- CALIBRATED
- RESAMPLED •
- DERIVED.

<Version Number>= Contains the Dataset version, e.g. V1.0

One data set will be used for each processing level. Multiple targets will be used for each data set and within each data set TARGET_NAME and TARGET_TYPE will be used to identify the current target (Thus they will


not stay the same within one data set, but data set id will). The data set name fits in the full length thus 60 characters.

3.4.3 Directories

3.4.3.1 Root Directory

The root directory for the RPCMAG data is named with the DATA_SET_ID. It will only contain the **AAREADME.TXT**, the **VOLDESC.CAT** and the PDSVOLUME.XML info file.

3.4.3.2 Calibration Directory

Contains the files:

CALINFO.TXT	; Info File
RPCMAG_SC_ALIGN.TXT	;Results of the sensor to S/C coordinates alignment After the S/C integration an optical measurement of the sensor and boom orientation has been carried out by ASTRIUM people at ESTEC. Mirrors were attached to the sensors and the exact alignment wrt. Spacecraft has been determined. The resulting angles are listed in this file for a stowed an a deployed boom.

RPCMAG_GND_CALIB_FSDPU_FMIB.TXT; GND Calibration results of FS DPU & FM IB sensor **RPCMAG_GND_CALIB_FSDPU_FMOB.TXT**; GND Calibration results of FS DPU & FM OB sensor

These two files contain the results of the ground calibration for each SENSOR/DPU combination. All temperature dependent sensitivity, misalignment and offset coefficients (refer to RO-IGM-TR0003, Analysis of the FMG Calibration, Chapters 7 & 8 & 9) are listed here to be read by the data calibration software.

During flight it turned out that the temperature model had to be extended to lower temperatures. Therefore, a new model with additional coefficients has been created. These coefficients are stored in inflight calibration files.

RPCMAG_002_CALIB_IB.TXT; Inflight Calibration results for the IB sensor **RPCMAG_002_CALIB_OB.TXT**; Inflight Calibration results for the OB sensor

These files were used for the early mission phases CVP - EAR1 - CR2. If there should be any need for future changes/improvements of these models/coefficients the file Counter (currently 002) will be incremented and the new values are stored to new files. The calibration software has the feature to distinguish between the calibration file versions. E.g. for the MARS fly by there are inflight calibration file on daily based data:

RPCMAG_070223_006_CALIB_IB.TXT; Inflight Calib. for the IB sensor, February 23, 2007 **RPCMAG_070223_006_CALIB_OB.TXT**; Inflight Calib. for the OB sensor, February 23, 2007

RPCMAG_070227_006_CALIB_IB.TXT; Inflight Calib. for the IB sensor, February 27, 2007 **RPCMAG_070227_006_CALIB_0B.TXT**; Inflight Calib. for the OB sensor, February 27, 2007

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Temperature models will be created dependent on the data behavior and s/c operations. If there are lots of attitude changes during an observation, the sensor temperature will change accordingly and the usage of daily based calibration files will make sense. In stable phases, however, a single model for a long interval is sufficient.

In the case of using many calibration files for a single observation period, the different offsets between the models have to be adapted. This is done by the files

CLA_OFFSETS_IB.TXT	;	Model Offset Correction file for the IB sensor
CLA_OFFSETS_OB.TXT	;	Model Offset Correction file for the OB sensor

In these files the first and last magnetic field values of the regarded TAB file are stored. For every entry line there are 3 GND calibration based values and 3 inflight calibration based values per sensor (data are stored in Instrument coordinates). From the last value of the previous data file and the first value of the actual data file the original data jumps (GND calibration based) can be calculated. This jump height is used to set the jump height for the inflight calibration data to the same value to get rid of any artificial field jumps. The calculated offset correction (3 components per sensor) for the actual used model is written also to these files.

Т

File format:

TIME Bx_GND By_GND Bz_GND Bx_IFL By_IFL Bz_IFL OFF_X OFF_Y OFF_Z

Time in UTC, Magnetic field values in nanoTesla, Temperatures in Kelvin.

3.4.3.3 Catalog Directory

Contains the files:

FILENAME	DESCRIPTION		
CATINFO.TXT	This file contains a list of all catalog files located in		
	the CATALOG directory. A brief description of these		
	files is given		
DATASET.CAT	This files describes the MAGNETOMETER dataset		
	in the actual mission phase		
ROSETTA_INSTHOST.CAT	This file describes the ROSETTA s/c acting as		
	instrument host for all the experiments. This file was		
	provided by ESA.		
ROSETTA_MISSION.CAT	This file describes the ROSETTA mission to Comet		
	67P/Churyumov-Gerasimenko. The file was		
	provided by ESA.		
RPCMAG_INST.CAT	This files contains a complete instrument description		
	of the orbiter magnetometer RPC-MAG.		
	In the file all people responsible for the RPC-MAG		
RPCMAG_PERS.CAT	data archiving are listed. Contact information is		
	added.		
RPCMAG_REF.CAT	The file contains publication references of all		
	publications mentioned in the CATALOG files.		
	Addionally all references to ESA documents are		
	listed here. These references were provided by ESA.		
RPCMAG_SOFTWARE.CAT	The files is empty, as no S/W will be provided.		



3.4.3.4 Index Directory

This directory contains the index files generated by the ESA S/W PVV. Additionally the GEOINDEX.LBL and GEOINDEX.TAB files will be located here

3.4.3.5 Browse Directory and Browse Files

N/A

3.4.3.6 Geometry Directory

The needed geometry information will be taken from the ancillary files provided by RSOC via the DDS. These files are not PDS compliant. RSOC is responsible for archiving them. Thus, there will not be any GEOMETRY directory.

3.4.3.7 Software Directory

It is not planned to deliver any software.

3.4.3.8 Document Directory

Directory Structure:



Details about the content of this directory can be found in the DOCINFO.TXT file.

The ARCHIVING folder will contain this EAICD and the DDS2PDS Manual of the used IDL processing software (RO-IGEP-TR0007). The CALIBRATION directory will contain the calibration protocols and analysis reports.

The documents will be saved in the original version as TeX or WORD or PDF files. HTML-file conversion is under consideration.

3.4.3.9 Data Directory

Refer to 3.1.3



4 **Detailed Interface Specifications**

Structure and Organization Overview 4.1

The principle data directory strucure sorted by data types was presented in chapter 3.1.3. The sortation with respect to the time is displayed in the following tree.



Each "Month" directory contains the different Level and sensor directories as described in Chapter 3.1.3. For the CALIBRATED data we have

LEVEL_A	; instrument coordinates
HK	; Housekeeping data t,
IB	; Inboard sensor: t,B,T,QUAL
OB	; Outboard sensor: t,B,T,QUAL
LEVEL_B	; s/c coordinates
LB	; Inboard sensor: t,B,T,QUAL
OB	; Outboard sensor: t,B,T,QUAL
LEVEL_C	; B in celestial coords. & positions
LIB	; Inboard sensor: t,r,B,QUAL
OB	; Outboard sensor: t,r,B,QUAL

For the EDITED Data there are only the sensor and housekeeping subdirectories.

-нк	;	Housekeeping data	a
-IB	;	Inboard sensor:	t,B,T
L_ _{OB}	;	Outboard sensor:	t,B,T

For the RESAMPLED data there are LEVEL_N $n=\{E;F;G;H;I\}$ data, which represent s second averaged data merged from all available mode files of the given day.



For the DERIVED data there are LEVEL_J data, which represent s second averaged data which are the output of a PCA analysis.

LEVEL J		Level
CORRELATED	;	PCA correlated part
		PCA uncorrellated part
		Inboard sensor: t,r,B,QUAL
	;	Outboard sensor: t,r,B,QUAL

4.2 Data Sets, Definition and Content

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 $G \in F$

We distinguish between four levels: EDITED, CALIBRATED, RESAMPLED, and DERIVED data.

The EDITED data just contain the decommutated TM data in units of ADC counts. Quality flags assign the data quality.

All calibrated data contain data in physical units like Nanotesla and Kelvin...This means, that the results of the ground calibration or inflight calibration have been applied to the data.

The CALIBRATED directory is divided in various sublevels:

LEVEL A data are data in instrument coordinates including also sensor temperatures. •

S/C generated noise and residual fields are not taken into account.

• LEVEL B data are magnetic field data in s/c coordinates including temperatures as well.

S/C generated noise and residual field are not taken into account.

LEVEL C data are data in celestial coordinates. Nominal s/c position and attitude have been . considered during the evaluation. s/c generated noise and residual fields are not taken into account. Data contain s/c positions as well.

The RESAMPLED data are derived from the CALIBRATED data by averaging to a specified average period, e.g. 1second or 1 minute or correcting specific disturbance sources by application of special filters. This leads to

LEVEL_K data. •

> These are calibrated, Lander heater influence corrected data in s/c- coordinates. Input were Lander corrected LEVEL B tables. The elimination of the heater influence has been done by a different s/w in a semi-manual way.

> S/C generated noise and residual fields are not taken into account. Different modes are taken into account if necessary. Data are not averaged but resampled due to filter algorithm.

Data of this calibration level will only be produced, if a heater influence occurred.

LEVEL L data. •

> These are calibrated, Lander heater influence corrected data celestial coordinates. Input were Lander corrected LEVEL_C data. The elimination of the heater influence has been done by a different s/w in a semi-manual way.

> S/C generated noise and residual fields are not taken into account. Different modes are taken into account if necessary. Data are not averaged but resampled due to filter algorithm.

Data of this calibration level will only be produced, if a heater influence occurred.

LEVEL_E data. •

These are calibrated data in instrument coordinates. Input were LEVEL A data.

S/C generated noise and residual fields are not taken into account. Data averaged. Different modes are taken into account if necessary. Used for internal use only.

LEVEL F data. •

These are calibrated data in s/c-coordinates. Input were LEVEL_B or LEVEL_K data.



S/C generated noise and residual fields are not taken into account. Data averaged. Different modes are taken into account if necessary.

• LEVEL_G data.

These are calibrated data in celestial coordinates. S/C position and attitude have been considered during the evaluation. S/C generated noise and residual fields are not taken into account. Data contain s/c positions as well. Data averaged. Different modes are taken into account if necessary.

Input were LEVEL_C or LEVEL_L data.

• LEVEL_H data.

These data are derived from LEVEL_C or LEVEL_L data. A filter algorithm has been applied to get rid of the noise produced by ROSETTA's reaction wheels. Nominal S/C position and attitude have been considered during the evaluation. Residual fields are not taken into account. Data contain s/c positions as well. Data are not averaged but resampled due to filter algorithm in frequency domain.

• LEVEL_I data.

These are averaged LEVEL_H data in celestial coordinates. S/C position and attitude have been considered during the evaluation. Residual fields are not taken into account. Data contain s/c positions as well. Data are averaged. Different modes are taken into account if necessary.

The DERIVED data are derived from the CALIBRATED data. Currently there are only

LEVEL_J data.

These data have been processed using a principal component analysis (PCA). As input LEVEL_G or LEVEL_I data can act.

As output two sets of files will be produced: correlated and uncorrelated data. The correlated data are the data which are supposed to represent the solar wind magnetic field. The uncorrelated (IB,OB) data represent the spacecraft noise.

Residual fields are not taken into account. Data averaged. The DC level of these magnetic field data is - per definition of a PCA – set to zero.

LEVEL_J data are currently used for internal purpose only. Therefore delivery is still TBD.

All data are stored in *.TAB files. All timeseries contain UTC and OBT spacecraft clock as time stamps. Data Sets will be created for each mission phase and delivered at convenient time afterwards. The data set will contain the data decribed in this document. It is not possible to state any exact data delivery date or data volume size as this is strongly dependent on the course of the mission.



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4.3 Data Product Design

4.3.1 General OVERVIEW

We have three types of data:

- Housekeeping data (HK),
- Outboard sensor magnetic field data (OB) and
- Inboard sensor magnetic filed data (IB).

The format of the HK data is different to the OB and the IB data. The latter have, however, the same format inside a given level. Magnetic field data exist for every level, whereas HK data only exist for EDITED and CALIBRATED LEVEL_A data.

A complete set of EDITED Data consists of HK, OB & IB data. A complete set of LEVEL_A Data consists of HK, OB & IB data. Higher level data only contain OB & IB data.

RAW data will be delivered as EDITED DATA in one DATA_SET.

LEVEL_A, LEVEL_B and LEVEL_C data will be delivered as CALIBRATED DATA in one DATA_SET.

LEVEL_K, LEVEL_L, LEVEL_E, LEVEL_F, LEVEL_G, LEVEL_H and LEVEL_I data will be delivered as RESAMPLED DATA in one DATA_SET.

LEVEL_J data will be delivered as DERIVED DATA in one DATA_SET (still TBD).

To reduce the data volume the standard delivery includes only EDITED DATA, CLA, CLB, CLC, CLF and CLG data. CLK, CLL, and CLH data will be produced if disturbances occur. CLE and CLJ data are normally only used for internal purpose and are not part of the standard data sets.

4.3.1.1 File Characteristics Data Elements

The *.LBL file will be identified by the FILE_NAME

4.3.1.2 Data Object Pointers Identification Data Elements

The only pointer which is used is the pointer from the *.LBL file to the *.TAB file.

4.3.1.3 Instrument and Detector Descriptive Data Elements

• INSTRUMENT_MODE_ID = "SID<n>"

The instrument can operate in six modes SID1 ... SID6 (n=1..6). Meaning:

- o SID1: Minimum Mode
- SID2: Normal Mode
- SID3: Burst Mode



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- SID4: Medium Mode
- SID5: Low Mode
- SID6: Test Mode

Mode	Sample	Packet	Packet	Bit Rate	Vector Rate	Name
	Rate	Period	Length			
SID 1	1/32 Hz	1024 s	32 OB vec	2 bits/s	0.03125 vec/s	Minimum
			1 IB vec	0.0625 bits/s	0.000976 vec/s	Mode
SID 2	1 Hz	32 s	32 OB vec	64 bits/s	1 vec/s	Normal
			1 IB vec	2 bits/s	0.03125 vec/s	Mode
SID 3	20 Hz	16 s	320 OB vec	1280 bits/s	20 vec/s	Burst Mode
			16 IB vec	64 bits/s	1 vec/s	
SID 4	5 Hz	32 s	160 OB vec	320 bits/s	5 vec/s	Medium
			1 IB vec	2 bits/s	0.03125 vec/s	Mode
SID 5	¼ Hz	128 s	32 OB vec	16 bits/s	0.25 vec/s	Low Mode
			1 IB vec	0.5 bits/s	0.007812 vec/s	
SID 6	20 Hz	16 s	320 OB vec	1280 bits/s	20 vec/s	Test Mode
			1 IB vec	4 bits/s	0.0625 vec/s	
НК	1280 Hz Internal	32 s	8 words	4 bits/s		House Keeping

For every activated mode and calibration level there will be one single file for each day where data have been measured. This means that there can be data gaps in the file if e.g. there were some measurements in the morning and some others in the evening. Data for heater or reaction wheel corrected data will only be available if any disturbance occurred.

Mode SID6 is normally switched on only for a few minutes after powering the instrument. This is just a test mode and therefore, SID 6 data are not included in the datasets.



• INSTRUMENT_MODE_DESC = "<name> MODE: PRIMARY & <s> SECONDARY VECTORS PER <q> SECONDS"

The mode description explains exactly how many primary vectors (usually OB) and how many <s> secondary vectors (usually IB) are generated Per <q> seconds and how this mode <name> is named.

• FLIGHT SOFTWARE VERSION ID = "FIL:V1.0"

The coefficients of the digital filter in the MAG flight software can be changed during flight. The Flight software ID will take these features into account.

• PLATFORM OR MOUNTING DESC = "MAGNETOMETER BOOM: DEPLOYED"

The lower magnetometer boom has three positions: STOWED, moving during deployment, and DEPLOYED. For the launch it was stowed, and after the commissioning it will be deployed for the rest of the mission. The knowledge of the boom status is important for the right evaluation of the coordinate system.

4.3.1.4 Structure Definition of Instrument Parameter Objects

N/A

4.3.1.5 Data Object Definition

All data are stored in *.TAB files. Their structure is defined in the OBJECT Table definition within the *.LBL Files. Each data definition block has as DESCRIPTION which explains the meaning of the assigned data column exactly.

4.3.1.6 Description of Instrument

The detailed description of the instrument is done in the RPCMAG knowledge management video and in a brief overview in the RPCMAG_INST.CAT file. The video (RO_3DSE_MAG) is stored and administrated by ESA on the ROKSY server. It contains all available information about our instrument. Therefore, the access is limited to our instrument team.

Furthermore a detailed instrument description and first scientific results obtained during the first Earth Flyby in March 2005 can be found in our Instrument paper

RPC-MAG:The Fluxgate Magnetometer in the ROSETTA Plasma Consortium, Glassmeier, Richter, et al., Space Science Reviews, 2006"

A copy of this paper is delivered in the DOCUMENT folder of each DATASET.

4.3.1.7 Parameters Index File Definition

N/A

4.3.1.8 Mission Specific Keyword

None



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4.3.1.9 Geometry Information

ESA asked for GEOMETRY information in the *.LBL files. The RPCMAG team provides this in the following way:

SC SUN POSITION VECTOR = . . . SC TARGET POSITION VECTOR = . . . SC TARGET VELOCITY VECTOR = SPACECRAFT ALTITUDE = . . . SUB_SPACECRAFT_LATITUDE = . . . SUB_SPACECRAFT_LONGITUDE = . . NOTE _" The values of the keywords SC_SUN_POSITION_VECTOR, SC_TARGET_POSITION_VECTOR and SC_TARGET_VELOCITY_VECTOR, are related to the ECLIPJ2000 reference frame. 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>"

This means that 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 related to the Ecliptic-J2000 frame. The SUB_SPACECRAFT_LATITUDE and SUB_SPACECRAFT_LONGITUDE, however, are related to the actual Planetocentric coordinate system. All the values are valid only for one particular time, the time given by the START_TIME value. All the distances are computed in Kilometers and all angles are given in degrees.

4.3.2 Data Product "EDITED Magnetic field data" Design

PDS VERSION ID =	PDS3
LABEL REVISION NOTE =	"V1.0"
RELEASE ID =	0001
REVISION ID =	0000
RECORD TYPE =	FIXED LENGTH
RECORD BYTES =	79 —
FILE RECORDS =	749276
DATA SET ID =	"RO-X-RPCMAG-2-CVP-RAW-V1.0"
DATA SET NAME = "ROSETTA-ORBITER	CHECK RPCMAG 2 CVP RAW V1.0"
PRODUCT_ID =	"RPCMAG040907T0000_RAW_OB_M3"
PRODUCT_CREATION_TIME =	2007-04-04T10:54:00
PRODUCT_TYPE =	"EDR"
MISSION_ID =	"ROSETTA"
MISSION_NAME =	"INTERNATIONAL ROSETTA MISSION"
MISSION_PHASE_NAME =	"COMMISSIONING"
INSTRUMENT_HOST_ID =	"RO"
INSTRUMENT HOST NAME =	"ROSETTA-ORBITER"
INSTRUMENT_ID =	"RPCMAG"
INSTRUMENT NAME = "ROSETTA PLASM	A CONSORTIUM - FLUXGATE MAGNETOMETER"
INSTRUMENT TYPE =	"MAGNETOMETER"
INSTRUMENT_MODE_ID =	"SID3"
INSTRUMENT MODE DESC =	II
BURST MODE: 320 PRIMARY & 16 SE	CONDARY VECTORS PER 16 SECONDS"

IGEP TU Braunschweig	nd ische RPC-MAG EAICI	Document No. : RO Issue/Rev. No. : 2.9 Date : 5.9 Page : 47) September 2007
TARGET_NAME TARGET_TYPE NOTE = "	= "CHECKOUT" = "N/A"		
START_TIME STOP_TIME	SYSTEM : INSTRUMENTCOOR = 2004-09-07T = 2004-09-07T COUNT = "1/53135983 COUNT = "1/53222383	00:00:00.004 23:59:59.958 .28694"	
START_JULIAN_DATE_VALU STOP_JULIAN_DATE_VALU SC_SUN_POSITION_VECTOD SC_TARGET_POSITION_VEC SC_TARGET_VELOCITY_VEC SPACECRAFT_ALTITUDE SUB_SPACECRAFT_LATITUDE SUB_SPACECRAFT_LONGITU NOTE	E = 2453256.499 R = (-151292139 CTOR = "N/A" CTOR = "N/A" = "N/A" DE = 999.999		542764.26)
The values of the SC_TARGET_POSITION are related to the SUB_SPACECRAFT_LAT are northern Lati	keywords SC_SUN_POSITI V_VECTOR and SC_TARGET ECLIPJ2000 reference TITUDE and SUB_SPACECRA tude and eastern Longit V <target name=""> frame.</target>	VELOCITY_VECTOR, frame. FT_LONGITUDE ude in the standard	uted
for the time t= S' Distances are give SPICE_FILE_NAME SPICE_FILE_NAME SPICE_FILE_NAME SPICE_FILE_NAME SPICE_FILE_NAME SPICE_FILE_NAME SPICE_FILE_NAME SPICE_FILE_NAME SPICE_FILE_NAME SPICE_FILE_NAME SPICE_FILE_NAME SPICE_FILE_NAME SPICE_FILE_NAME SPICE_FILE_NAME	TART_TIME. en in <km> velocities i: = "ATNR_P0403 = "ROS_LBOOM_Y = "ROS_V11.TF = "EARTH_TOPO = "EARTHFIXED = "EARTHFIXED = "ROS_RPC_V1 = "NAIF0008.T; = "DE403-MASS; = "DE403-MASS; = "DE405.BSP" = "ORER = "ORER = "ORHR</km>	n <km s="">, Angles in 02093352_00053.BC" V0.B" " 050714.TF" IAU.TF" ITRF93.TF" 1.TI" LS" PC" ES.TPC" 01_060918_060627.BPG 00031.BSP" 00052.BSP"</km>	<deg>"</deg>
CODE: 0= GOOD DATA; BIT0:X, BIT1:Y,BIT2:	= "RPC_MAG_TE. = "INGO RICHT: NAME = "IGEP-TU-BR. = "N/A" = " CODED FOR EACH VECTOR IN L= BAD DATA EACH SENS Z, BIT3=0:0B, BIT3=1 IB = 2	N THE LAST COLUMN O. SOR HAS ITS OWN QUA	
MAGNETOMETER ABOARD SENSOR. ALL VALUES AN FIELD IS GIVEN IN INS NOTE	= " BEEN GENERATED BY S/W: (TEMPERATURE OF THE	OUTBOARD



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PLATFORM OR MOUNTING DESC = "MAGNETOMETER BOOM: DEPLOYED"

^TABLE = "RPCMAG040907T0000 RAW OB M3.TAB" OBJECT = TABLE = "RPCMAG-OB-SID3-RAW" NAME INTERCHANGE FORMAT = ASCII = 749276 ROWS = 7 COLUMNS ROW BYTES = 79 OBJECT = COLUMN = "TIME UTC" NAME DATA TYPE = TIME START_BYTE = 1 = 26 BYTES = "UTC TIME OF OBSERVATION: YYYY-MM-DDTHH:MM:SS.FFFFFF" DESCRIPTION END OBJECT = COLUMN OBJECT = COLUMN = "TIME OBT" NAME = ASCII_REAL DATA TYPE START BYTE = 28 BYTES = 15 = "S/C CLOCK AT OBSERVATION TIME, SECONDS SINCE 00:00 DESCRIPTION AT 1.1.2003: SSSSSSSSS.FFFFF" END OBJECT = COLUMN = COLUMN OBJECT = "BX OB" NAME DATA TYPE = ASCII INTEGER START BYTE = 44 BYTES = 7 = "N/A" UNIT = " DESCRIPTION MAGNETIC FIELD X COMPONENT, UNCALIBRATED RAW DATA, INSTRUMENT COORDINATES, OB SENSOR. VALUE IS GIVEN IN ADC COUNTS" END OBJECT = COLUMN OBJECT = COLUMN = "BY OB" NAME = ASCII_INTEGER DATA TYPE START BYTE = 52 BYTES = 7 = "N/A" UNIT = "MAGNETIC FIELD Y COMPONENT, UNCALIBRATED RAW DATA, DESCRIPTION INSTRUMENT COORDINATES, OB SENSOR. VALUE IS GIVEN IN ADC COUNTS" = COLUMN END OBJECT OBJECT = COLUMN = "BZ OB" NAME DATA TYPE = ASCII INTEGER START BYTE = 60 BYTES = 7 UNIT = "N/A" = "MAGNETIC FIELD Z COMPONENT, UNCALIBRATED RAW DATA, DESCRIPTION INSTRUMENT COORDINATES, OB SENSOR. VALUE IS GIVEN IN ADC COUNTS"

	Institut für Geophysik und extraterrestrische Physik	RPC-MAG	EAICD	Document No. Issue/Rev. No. Date Page	: RO-IGEP-TR0009 : 2.9 : 5 September 2007 : 49
END_OBJECT	= COLUN	ΊN			
OBJECT NAME DATA_TYPE START_BYTE BYTES UNIT DESCRIPTION VALUE IS GIVE END_OBJECT	= 68 = 7 = "N/A" = "RAW	3" [_INTEGER ' TEMPERATURE DUNTS"	OF RPCMA	G OB SENSOR.	
OBJECT NAME DATA_TYPE START_BYTE BYTES DESCRIPTION END_OBJECT	= 76 = 2	LITY" [_INTEGER ER TO DATA_Q	UALITY_DE	SC. VALUE REP	RESENTS A FLAG"
END_OBJECT END	= TABLE	Ξ			

4.3.3 Data Product "EDITED Housekeeping data" Design

LABEL_REVISION_NOTE =	PDS3 "V1.0"
_	0001
REVISION_ID =	
_	FIXED_LENGTH
RECORD_BYTES =	
FILE_RECORDS =	
	"RO-E-RPCMAG-2-EAR1-RAW-V1.0"
DATA_SET_NAME = "ROSETTA-ORBITER	EARTH RPCMAG 2 EARI RAW VI.0"
PRODUCT_ID =	"RPCMAG050301T0002_RAW_HK"
PRODUCT_ID = PRODUCT_CREATION_TIME = PRODUCT_TYPE =	2007-04-17T15:24:38
PRODUCT_TYPE =	"EDR"
MISSION_ID =	"ROSETTA"
MISSION_NAME =	"INTERNATIONAL ROSETTA MISSION"
	"EARTH SWING-BY 1"
INSTRUMENT_HOST_ID =	"RO"
INSTRUMENT_HOST_NAME =	"ROSETTA-ORBITER"
INSTRUMENT_ID =	"RPCMAG"
INSTRUMENT_NAME = "ROSETTA PLASMA	A CONSORTIUM - FLUXGATE MAGNETOMETER"
	"MAGNETOMETER"
INSTRUMENT MODE ID =	"HK"
INSTRUMENT MODE DESC =	"HOUSEKEEPING MODE: 8 WORDS PER 32 SECONDS" "EARTH"
TARGET NAME =	"EARTH"
TARGET TYPE =	"PLANET"
NOTE = "	
MAGNETIC COORDINATE SYSTEM : INS	TRUMENTCOORDS"
	2005-03-01T00:02:05.359

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STOP_TIME SPACECRAFT_CLOCK_START_COUNT SPACECRAFT_CLOCK_STOP_COUNT	= 2005-03-01T23 = "1/68256106.0 = "1/68342378.0		
START_JULIAN_DATE_VALUE STOP_JULIAN_DATE_VALUE SC_SUN_POSITION_VECTOR SC_TARGET_POSITION_VECTOR SC_TARGET_VELOCITY_VECTOR SPACECRAFT_ALTITUDE SUB_SPACECRAFT_LATITUDE SUB_SPACECRAFT_LONGITUDE NOTE	= (-3.8 = 1394740.8 = 999.999 = 999.999 ="	596184 54, -49973623.8 55, -322852.7 55, 0.8 501	
The values of the keywords SC_TARGET_POSITION_VECTOR a are related to the ECLIPJ20 SUB_SPACECRAFT_LATITUDE and are northern Latitude and e planetocentric IAU_ <target for the time t= START TIME.</target 	and SC_TARGET_VE 000 reference fr d SUB_SPACECRAFT eastern Longitud _NAME> frame. Al	LOCITY_VECTOR, came. LONGITUDE le in the stand	lard
Distances are given in <km> SPICE_FILE_NAME SPICE_FILE_NAME SPICE_FILE_NAME SPICE_FILE_NAME</km>	<pre>> velocities in = "ATNR_P040302 = "ROS_LBOOM_V0 = "ROS_V11.TF" = "EARTH_TOPO_0</pre>	2093352_00053.e 9.B" 950714.TF"	
SPICE_FILE_NAME SPICE_FILE_NAME SPICE_FILE_NAME SPICE_FILE_NAME SPICE_FILE_NAME SPICE_FILE_NAME	<pre>= "EARTHFIXEDIA = "EARTHFIXEDIT = "ROS_RPC_V11. = "NAIF0008.TLS = "PCK00008.TPC = "DE403-MASSES</pre>	RF93.TF" TI" ;"	
SPICE_FILE_NAME SPICE_FILE_NAME SPICE_FILE_NAME SPICE_FILE_NAME SPICE_FILE_NAME	= "EARTH_000101 = "ROS_070312_S = "DE405.BSP" = "ORER = "ORHR	. 060918 060627	3SP"
PRODUCER_ID PRODUCER_FULL_NAME PRODUCER_INSTITUTION_NAME DATA_QUALITY_ID DATA_QUALITY_DESC PROCESSING_LEVEL_ID	<pre>= "RPC_MAG_TEAM = "INGO RICHTER = "IGEP-TU-BRAU = "N/A" = "N/A"</pre>		
THIS FILE CONTAINS HOUSEKEEPIN MAGNETOMETER ABOARD THE ROSETT NOTE	TA S/C. ALL VALU = "	VES ARE 20 BIT	ADC COUNTS."
LBL & TAB FILE HAVE BEEN GENER FLIGHT_SOFTWARE_VERSION_ID PLATFORM_OR_MOUNTING_DESC	<pre>KATED BY S/W: GE = "FIL:V1.0" = "MAGNETOMETER</pre>	R_BOOM: DEPLOYE	ERSION V20070330"
^TABLE = "RPCMAG050)301T0002_RAW_HK	.TAB"	
OBJECT= TABLENAME= "RPCMAG-HHINTERCHANGE_FORMAT= ASCIIROWS= 2697COLUMNS= 13ROW_BYTES= 106	K-RAW"		



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OBJECT NAME DATA_TYPE START_BYTE BYTES DESCRIPTION END_OBJECT	<pre>= COLUMN = "TIME_UTC" = TIME = 1 = 26 = "UTC TIME OF OBSERVATION: YYYY-MM-DDTHH:MM:SS.FFFFFF" = COLUMN</pre>
OBJECT NAME DATA_TYPE START_BYTE BYTES DESCRIPTION AT 1.1.2003: SSSS END_OBJECT	<pre>= COLUMN = "TIME_OBT" = ASCII_REAL = 28 = 15 = "S/C CLOCK AT OBSERVATION TIME, SECONDS SINCE 00:00 SSSSSS.FFFFF" = COLUMN</pre>
OBJECT NAME DATA_TYPE START_BYTE BYTES UNIT DESCRIPTION TEMPERATURE OF T VALUE IS GIVEN D END_OBJECT	IN ADC COUNTS"
OBJECT NAME DATA_TYPE START_BYTE BYTES UNIT DESCRIPTION TEMPERATURE OF T VALUE IS GIVEN I END_OBJECT	THE RECMAG INBOARD SENSOR. IN ADC_COUNTS"
DATA_TYPE START_BYTE BYTES DESCRIPTION END_OBJECT	<pre>= COLUMN = "STAGE_A_ID" = ASCII_INTEGER = 60 = 1 = "FILTER TYPE IDENTIFICATION FLAG A" = COLUMN</pre>
NAME DATA_TYPE START_BYTE BYTES	= 1 = "FILTER TYPE IDENTIFICATION FLAG B"
OBJECT NAME DATA_TYPE START_BYTE	<pre>= COLUMN = "FILTER_CFG" = ASCII_INTEGER = 64</pre>

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BYTES	= 1
DESCRIPTION	= "FILTER CONFIGURATION FLAG"
END_OBJECT	= COLUMN
OBJECT	= COLUMN
NAME	
DATA TYPE	= "MAG_REF_VOLTAGE" = ASCII_INTEGER = 66
DATA_TYPE START_BYTE	= 66
BYTES	= 7
	= '/ = "N/A"
UNIT	
	R REFERENCE VOLTAGE: 2.5 V.
VALUE IS GIV END OBJECT	VEN IN ADC_COUNTS" = COLUMN
_	
OBJECT	= COLUMN = "MAG_NEG_VOLTAGE" = ASCII_INTEGER
NAME	= "MAG_NEG_VOLTAGE"
DATA_TYPE	= ASCII_INTEGER
START_BYTE	= /4
BYTES	= 3
UNIT	= "N/A"
DESCRIPTION	= "
	R NEGATIVE SUPPLY VOLTAGE:-5V.
VALUE IS GIV	/EN IN ADC_COUNTS"
END_OBJECT	= COLUMN
OBJECT	= COLUMN
NAME	= "MAG_POS_VOLTAGE"
ρατά τύρε	= "MAG_POS_VOLTAGE" = ASCII_INTEGER
START BYTE	= 78
BYTES	= 3
UNIT	= "N/A"
DESCRIPTION	= "
	R POSITIVE SUPPLY VOLTAGE:+5V.
	VEN IN ADC COUNTS"
END_OBJECT	= COLUMN
OBJECT	= COLUMN
NAME	= "BX_OB" = ASCII_INTEGER = 82 = 7
DATA TYPE	= ASCII INTEGER
START BYTE	= 82
BYTES	= 7
UNIT	= "N/A"
DESCRIPTION	
MAGNETIC FIE	ELD X COMPONENT, UNCALIBRATED RAW DATA, COORDINATES, OB-SENSOR.
	/EN IN ADC COUNTS"
END OBJECT	
OBJECT	= COLUMN = "BY_OB" = ASCII_INTEGER = 90 = 7 = "N/A" = "
NAME	= "BY OB"
התאש שעטב הואשאו	
UAIA_IIFE	- 00 - VOCIT_INIEGEV
DAUL DITE	- 30 - 7
DIILO	— / — ЦЛТ / Л Ц
UNIT	= "N/A"
DESCRIPTION	
MAGNETIC FIE	LLD Y COMPONENT, UNCALIBRATED RAW DATA,
	COORDINATES, OB-SENSOR.
	VEN IN ADC_COUNTS"



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OBJECT	= COLUMN
NAME	= "BZ OB"
DATA TYPE	= ASCII INTEGER
START BYTE	= 98
BYTES	= 7
UNIT	= "N/A"
DESCRIPTION	= "
	COMPONENT, UNCALIBRATED RAW DATA, INATES, OB-SENSOR. N ADC COUNTS"
END OBJECT	= COLUMN
—	



4.3.4 Data Product "CALIBRATED LEVEL_A Housekeeping data" Design

= PDS3 PDS VERSION ID LABEL REVISION NOTE = "V1.0" RELEASE ID = 0001 REVISION ID = 0000 RECORD $T\overline{Y}PE$ = FIXED LENGTH RECORD BYTES = 114 FILE RECORDS = 2696 = "RO-E-RPCMAG-3-EAR1-CALIBRATED-V1.0" DATA_SET_ID = "RO-E-RPCMAG-3-EAR1-CALIBRATED-V1.0" DATA_SET_NAME = "ROSETTA-ORBITER EARTH RPCMAG 3 EAR1 CALIBRATED V1.0" PRODUCT ID = "RPCMAG050301T0002 CLA HK" PRODUCT CREATION TIME = 2007 - 04 - 17T15:24:39PRODUCT TYPE = "RDR" MISSION ID = "ROSETTA" MISSION NAME = "INTERNATIONAL ROSETTA MISSION" = "EARTH SWING-BY 1" MISSION PHASE NAME = "RO" INSTRUMENT HOST ID = "ROSETTA-ORBITER" INSTRUMENT_HOST_NAME = "RPCMAG" INSTRUMENT_ID INSTRUMENT_NAME = "ROSETTA PLASMA CONSORTIUM - FLUXGATE MAGNETOMETER"
INSTRUMENT_TYPE = "MAGNETOMETER"
INSTRUMENT_MODE_ID = "HK" INSTRUMENT MODE DESC = "HOUSEKEEPING MODE: 8 WORDS PER 32 SECONDS" = "EARTH" TARGET NAME = "PLANET" TARGET TYPE NOTE = " MAGNETIC COORDINATE SYSTEM : INSTRUMENTCOORDS" START TIME = 2005-03-01T00:02:37.359 = 2005-03-01T23:59:57.375 STOP TIME SPACECRAFT_CLOCK_START_COUNT = "1/68256106.02522" SPACECRAFT CLOCK STOP COUNT = "1/68342378.02522" START_JULIAN DATE VALUE = 2453430.5018212851 STOP JULIAN DATE VALUE = 2453431.4999696184 SC SUN POSITION VECTOR = (141024292.44, -49972695.05, = (1361318.21, -322825.32, 73845.31) SC TARGET POSITION VECTOR 73326.05) = (-3.85, = 1394614.468 SC TARGET VELOCITY VECTOR 0.86, -0.22)SPACECRAFT ALTITUDE = 999.999 SUB SPACECRAFT LATITUDE SUB SPACECRAFT LONGITUDE = 999.999 _" NOTE The values of the keywords SC_SUN_POSITION_VECTOR, SC_TARGET_POSITION_VECTOR and SC_TARGET_VELOCITY_VECTOR, are related to the ECLIPJ2000 reference frame. 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>" = "ATNR P040302093352 00053.BC" SPICE FILE NAME SPICE_FILE_NAME = "ROS LBOOM_V0.B" SPICE_FILE_NAME = "ROS V11.TF" = "EARTH TOPO 050714.TF" SPICE_FILE_NAME = "EARTHFIXEDIAU.TF" SPICE_FILE_NAME = "EARTHFIXEDITRF93.TF" SPICE_FILE_NAME SPICE_FILE_NAME = "ROS RPC V11.TI" SPICE_FILE_NAME = "NAIF0008.TLS"

Document No. : RO-IGEP-TR0009 Institut für IGEP Geophysik und extraterrestrische Physik Issue/Rev. No. : 2.9 RPC-MAG EAICD Date : 5 September 2007 TU Braunschweig Page : 55 = "PCK00008.TPC" SPICE FILE NAME = "DE403-MASSES.TPC" SPICE FILE NAME SPICE_FILE_NAME = "EARTH_000101_060918_060627.BPC" = "ROS_070312_STEP.TSC" = "DE405.BSP" SPICE_FILE_NAME SPICE FILE NAME = "ORER SPICE FILE NAME 00031.BSP" ____00052.BSP" = "ORHR_ SPICE_FILE_NAME PRODUCER ID = "RPC MAG TEAM" PRODUCER FULL NAME = "INGO RICHTER" = "IGEP-TU-BRAUNSCHWEIG" PRODUCER INSTITUTION NAME = "N/A" DATA QUALITY ID = "N/A" DATA QUALITY DESC PROCESSING LEVEL ID = 3 = " DESCRIPTION THIS FILE CONTAINS HOUSEKEEPING RAW DATA OBTAINED BY THE FLUXGATE MAGNETOMETER ABOARD THE ROSETTA S/C. ENTITIES ARE CONVERTED TO PHYSICAL UNITS. MAGNETIC FIELD IN INSTRUMENT COORDINATES. NO ALIGNMENT, SENSITIVITY OR TEMPERATURE CORRECTIONS." = " NOTE LBL & TAB FILE HAVE BEEN GENERATED BY S/W: GEN CAL DATA, VERSION V20070330" FLIGHT SOFTWARE VERSION ID = "FIL:V1.0" = "MAGNETOMETER_BOOM: DEPLOYED" PLATFORM OR MOUNTING DESC ^TABLE = "RPCMAG050301T0002 CLA HK.TAB" OBJECT = TABLE = "RPCMAG-HK-RAW" NAME INTERCHANGE FORMAT = ASCII = 2696 ROWS COLUMNS = 13 ROW BYTES = 114 OBJECT = COLUMN = "TIME UTC" NAME DATA TYPE = TIME START BYTE = 1 BYTES = 26 = "UTC TIME OF OBSERVATION: YYYY-MM-DDTHH:MM:SS.FFFFFF" DESCRIPTION = COLUMN END OBJECT = COLUMN OBJECT = "TIME OBT" NAME DATA TYPE = ASCII REAL START BYTE = 28 = 15 BYTES DESCRIPTION = "S/C CLOCK AT OBSERVATION TIME, SECONDS SINCE 00:00 AT 1.1.2003: SSSSSSSSS.FFFFF" END OBJECT = COLUMN OBJECT = COLUMN = "T OB" NAME DATA TYPE = ASCII REAL START BYTE = 44 BYTES = 6 UNIT = "KELVIN" = "TEMPERATURE OF THE RPCMAG OUTBOARD SENSOR" DESCRIPTION = COLUMN END OBJECT

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OBJECT NAME DATA_TYPE START_BYTE BYTES UNIT DESCRIPTION END_OBJECT	<pre>= COLUMN = "T_IB" = ASCII_REAL = 51 = 6 = "KELVIN" = "TEMPERATURE OF THE RPCMAG INBOARD SENSOR" = COLUMN</pre>
OBJECT NAME DATA_TYPE START_BYTE BYTES DESCRIPTION END_OBJECT	<pre>= COLUMN = "STAGE A_ID" = ASCII_INTEGER = 58 = 1 = "FILTER TYPE IDENTIFICATION FLAG A" = COLUMN</pre>
OBJECT NAME DATA_TYPE START_BYTE BYTES DESCRIPTION END_OBJECT	<pre>= COLUMN = "STAGE_B_ID" = ASCII_INTEGER = 60 = 1 = "FILTER TYPE IDENTIFICATION FLAG B" = COLUMN</pre>
OBJECT NAME DATA_TYPE START_BYTE BYTES DESCRIPTION END_OBJECT	<pre>= COLUMN = "FILTER_CFG" = ASCII_INTEGER = 62 = 1 = "FILTER CONFIGURATION FLAG" = COLUMN</pre>
OBJECT NAME DATA_TYPE START_BYTE BYTES UNIT DESCRIPTION END_OBJECT	
OBJECT NAME DATA_TYPE START_BYTE BYTES UNIT DESCRIPTION END_OBJECT	= 6 = "VOLT" = "MAGNETOMETER NEGATIVE SUPPLY VOLTAGE:-5V"
OBJECT NAME DATA_TYPE START_BYTE BYTES UNIT DESCRIPTION END_OBJECT	<pre>= COLUMN = "MAG_POS_VOLTAGE" = ASCII_REAL = 80 = 6 = "VOLT" = "MAGNETOMETER POSITIVE SUPPLY VOLTAGE:+5V" = COLUMN</pre>

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		," FIELD X COMPON	ENT, CONVERTED	RAW DATA,
	= COLUMN = "BY_OB" = ASCII_REAL = 96 = 8 = "NANOTESLA = "MAGNETIC DRDINATES, OB-SEN = COLUMN	." FIELD Y COMPON	ENT, CONVERTED	RAW DATA,
OBJECT NAME DATA_TYPE START_BYTE BYTES UNIT DESCRIPTION INSTRUMENT COO END_OBJECT END_OBJECT END_OBJECT	= 105 = 8 = "NANOTESLA = "MAGNETIC DRDINATES, OB-SEN = COLUMN	." FIELD Z COMPON	ENT, CONVERTED	RAW DATA,



4.3.5 Data Product "CALIBRATED LEVEL_A Magnetic Field data" Design

PDS_VERSION_ID	= PDS3
LABEL REVISION NOTE	= "V1.0"
RELEASE ID	= 0.001
REVISION ID	= 0000
PDS_VERSION_ID LABEL_REVISION_NOTE RELEASE_ID REVISION_ID RECORD_TYPE	= PDS3 = "V1.0" = 0001 = 0000 = FIXED_LENGTH = 90 = 86298
RECORD BYTES	
RECORD_BITES	- 90
FILE_RECORDS	= 86298 = "RO-E-RPCMAG-3-EAR1-CALIBRATED-V1.0"
DATA_SET_ID	= "RO-E-RPCMAG-3-EARI-CALIBRATED-VI.U"
DATA SET NAME = "ROSETTA-ORBITE.	R EARTH RPCMAG 3 EAR1 CALIBRATED V1.0"
PRODUCT_ID PRODUCT_CREATION_TIME	= "RPCMAG050302T0000_CLA_OB_M2"
PRODUCT_CREATION_TIME	= 2007-04-17T15:25:51
PRODUCT_TYPE	= "RDR"
MISSION_ID	= "ROSETTA"
MISSION_NAME	= "INTERNATIONAL ROSETTA MISSION"
MISSION PHASE NAME	= "EARTH SWING-BY 1"
INSTRUMENT HOST ID	= "RO"
INSTRUMENT HOST NAME	= "ROSETTA-ORBITER"
INSTRUMENT ID	<pre>= "RDR" = "ROSETTA" = "INTERNATIONAL ROSETTA MISSION" = "EARTH SWING-BY 1" = "RO" = "ROSETTA-ORBITER" = "RPCMAG"</pre>
INSTRUMENT NAME = "ROSETTA PLAS	MA CONSORTIUM - FLUXGATE MAGNETOMETER"
INSTRUMENT TYPE	= "MAGNETOMETER"
INSTRUMENT_TYPE INSTRUMENT_MODE_ID INSTRUMENT_MODE_DESC	= "SID2"
INSTRUMENT MODE DESC	= "
NORMAL MODE: 32 PRIMARY & 1 SE	CONDARY VECTORS PER 32 SECONDS"
TARGET NAME	= "FARTH"
TARGET_NAME TARGET_TYPE	= "PLANET"
NOTE = "	
ΜΛΟΝΕΨΤΟ ΟΟΟΡΟΤΝΛΨΕ ΟΥΟΨΕΜ • Τ	
CONDUCTION CONDUCTICO CONDUCTICO CONDUCTICO CONDUCTUAL	$-2005-03-02\pi00.00.00$ / 499
	-2005-03-02100.00.00.499
SDACEODAET CLOCK STADT COUNT	- 2005-05-02125.59.59.204 - "1/60242201 00000"
START_TIME STOP_TIME SPACECRAFT_CLOCK_START_COUNT SPACECRAFT_CLOCK_STOP_COUNT	- 1/00342301.03000 - 11/60420770 500071
SPACECRAFI_CLOCK_SIOF_COUNT	- 1/00420779.30097
SUPART TIILIAN DAME VALUE	= 2453431 5000057761
START_JULIAN_DATE_VALUE STOP_JULIAN_DATE_VALUE	-2453431.0000037701 -2453432.4000014821
STOL_OUDIAN_DATE_VALUE	- (1/1572625 12 - /7/610/5 62 5/00/ 07)
SC_SUN_POSITION_VECTOR	= (1413/3033.12, -4/401943.03, 54004.97) $= (1020011, 00, 240007, 27, 54402, 20)$
SC_IARGEI_POSITION_VECTOR	-(1020011.00, -240907.27, 54405.30)
SC_TARGET_VELOCITY_VECTOR	= (-3.87, 0.80, -0.22)
SPACECRAFT_ALTITUDE	= 1053531.465
SUB_SPACECRAFT_LATITUDE	= (141573635.12, -47461945.63, 54804.97) $= (1028811.88, -248987.27, 54403.38)$ $= (-3.87, 0.86, -0.22)$ $= 1053531.465$ $= 999.999$
	= 999.999
NOID	="
The values of the keywords	
	nd SC_TARGET_VELOCITY_VECTOR,
are related to the ECLIPJ20	
SUB_SPACECRAFT_LATITUDE and	
	astern Longitude in the standard
	NAME> frame. All values are computed
for the time t= START_TIME.	
	velocities in <km s="">, Angles in <deg>"</deg></km>
	= "ATNR_P040302093352_00053.BC"
	= "ROS LBOOM VO.B"
SPICE FILE NAME	= "ROS V11.TF"
	= "EARTH TOPO 050714.TF"

Document No. : RO-IGEP-TR0009 Institut für IGEP Geophysik und extraterrestrische Physik Issue/Rev. No. : 2.9 RPC-MAG EAICD Date : 5 September 2007 TU Braunschweig Page : 59 = "EARTHFIXEDIAU.TF" SPICE FILE NAME SPICE FILE NAME = "EARTHFIXEDITRF93.TF" SPICE_FILE_NAME = "ROS RPC V11.TI" SPICE_FILE_NAME = "NAIF0008.TLS" = "PCK00008.TPC" SPICE FILE NAME = "DE403-MASSES.TPC" SPICE FILE NAME = "EARTH 000101 060918_060627.BPC" SPICE FILE NAME SPICE FILE NAME = "ROS 070312 STEP.TSC" = "DE405.BSP" SPICE FILE NAME = "ORER SPICE FILE NAME 00031.BSP" = "ORHR SPICE FILE NAME 00052.BSP" = "RPC MAG_TEAM" PRODUCER ID PRODUCER_FULL NAME = "INGO RICHTER" = "IGEP-TU-BRAUNSCHWEIG" PRODUCER_INSTITUTION_NAME DATA_QUALITY_ID = "N/A" DATA_QUALITY_DESC = " ONLY 'GOOD' RAW DATA HAVE BEEN PROCESSED AND STORED" PROCESSING LEVEL ID = 3 = " DESCRIPTION THIS FILE CONTAINS CALIBRATED MAGNETIC FIELD VECTOR DATA OBTAINED BY THE OUTBOARD MAGNETOMETER ABOARD THE ROSETTA S/C AND THE TEMPERATURE OF THE OUTBOARD SENSOR. GROUND CALIBRATION RESULTS HAVE BEEN APPLIED TO THE RAW DATA. FIELD IS GIVEN IN INSTRUMENT-COORDINATES" NOTE = " LBL & TAB FILE HAVE BEEN GENERATED BY S/W: GEN CAL DATA, VERSION V20070330" NOTE _ " GROUND CALIBRATION FILE: RPCMAG GND CALIB FSDPU FMOB.TXT" NOTE _ INFLIGHT CALIBRATION FILE: RPCMAG 002 CALIB OB.TXT" FLIGHT SOFTWARE VERSION ID = "FIL:V1.0" PLATFORM OR MOUNTING DESC = "MAGNETOMETER BOOM: DEPLOYED" ^TABLE = "RPCMAG050302T0000 CLA OB M2.TAB" OBJECT = TABLE NAME = "RPCMAG-OB-SID2-CLA" INTERCHANGE FORMAT = ASCII ROWS = 86298 = 7 COLUMNS ROW BYTES = 90 OBJECT = COLUMN = "TIME UTC" NAME = TIME DATA TYPE START BYTE = 1 BYTES = 26 DESCRIPTION = "UTC TIME OF OBSERVATION: YYYY-MM-DDTHH:MM:SS.FFFFFF" END OBJECT = COLUMN OBJECT = COLUMN = "TIME OBT" NAME DATA TYPE = ASCII REAL START BYTE = 28 BYTES = 15 = "S/C CLOCK AT OBSERVATION TIME, SECONDS SINCE 00:00 DESCRIPTION AT 1.1.2003: SSSSSSSSS.FFFFF" END OBJECT = COLUMN

	nstitut für eophysik und traterrestrische RPC-MAG nysik	EAICD	Issue/Rev. No.	RO-IGEP-TR0009 2.9 5 September 2007 60
	<pre>= COLUMN = "BX_OB" = ASCII_REAL = 44 = 9 = "NANOTESLA" = "nT" = "MAGNETIC FIELD INSTRUMENT-COORDINAT = COLUMN</pre>			, TEMPERATURE
	<pre>= COLUMN = "BY_OB" = ASCII_REAL = 54 = 9 = "NANOTESLA" = "nT" = "MAGNETIC FIELD INSTRUMENT-COORDINAT = COLUMN</pre>			, TEMPERATURE
OBJECT NAME DATA_TYPE START_BYTE BYTES UNIT UNIT_ID DESCRIPTION CORRECTED DATA, END_OBJECT	<pre>= COLUMN = "BZ_OB" = ASCII_REAL = 64 = 9 = "NANOTESLA" = "nT" = "MAGNETIC FIELD INSTRUMENT-COORDINAT = COLUMN</pre>	Z COMPONE 'ES, OB SE	NT, CALIBRATED NSOR"	, TEMPERATURE
OBJECT NAME DATA_TYPE START_BYTE BYTES UNIT UNIT_ID DESCRIPTION END_OBJECT	<pre>= COLUMN = "T_OB" = ASCII_REAL = 74 = 6 = "KELVIN" = "K" = "TEMPERATURE OF = COLUMN</pre>	RPCMAG OB	SENSOR"	
The quality is the following v VALUE: MEAN x prop 0 no d	<pre>= 81 = 8 = " cribe the quality of coded in a 8 byte str alues:</pre>	ring. Each ng is stil .ity	character can l unknown	
	the specific flags:	,		
FLAG-STRING FLA	G DESCRIPTION			

Document No. : RO-IGEP-TR0009 Institut für Geophysik und extraterrestrische Physik IGEP Issue/Rev. No. : 2.9 RPC-MAG EAICD : 5 September 2007 Date TU Braunschweig Page : 61 87654321 ::::::: 1 IMPACT OF REACTION WHEELS x = impact not assessed ::::::: ::::::: 0 = no disturbance :::::: 1 = disturbance eliminated during data analysis :::::: 2 = disturbance elimination failed 3 = data disturbed :::::: :::::: ::::::: CURRENTS: :::::: x = impact not assessed ::::: 0 = no disturbance :::::: 1 = disturbance eliminated during data analysis 2 = disturbance elimination failed ::::: 3 = data disturbed ::::: ::::: :::::: BOOM DEPLOYMENT: 0 = boom deployed::::: 1 = boom stowed::::: 2 = boom deployment ongoing. Data only valid in ::::: ::::: instrument coordinates ::::: 3 = pyros fired for boom release ::::: :::::---- 4 OFFSET RELATED EFFECTS: x = offset issues not assessed :::: 0 = no offset problems :::: 1 = offset behavior not clear :::: :::: 2 = offset drifts, sensor not in thermal :::: equilibrium thus temperature model N/A 3 = offset drifts, reason unknown :::: 4 = ofset jump detected, reason unknown :::: :::: ::::---- 5 CORRELATION BETWEEN IB AND OB SENSOR x = correlation not assessed ::: 0 = perfect correlation ::: ::: 1 = good correlation 2 = poor correlation::: 3 = IB and OB show different long term behavior ::: ::: ::: :::---- 6 OTHER IMPACTS DECREASING THE QUALITY :: x = no assessment 0 = no other problems detected :: 1 = TBD:: 2 = TBD:: 3 = TBD:: 4 = TBD:: 5 = data disturbed by AC signal originated in s/c:: 6 = data noisy due to power on failure :: :: 7 = data not calculatable due to thermistor failure :: 8 = sensor saturated due to huge external field 9 = sensor saturated, instrument power on sequence failed :: :: ::---- 7 TBD x = no assessment : :---- 8 TBD : x = no assessment : ... END OBJECT = COLUMN



```
END_OBJECT
END
```

= TABLE

4.3.6 Data Product "CALIBRATED LEVEL_B Magnetic Field data" Design

RELEASE_ID REVISION ID	=	PDS3 "V1.0" 0001 0000
RECORD_TYPE RECORD_BYTES	=	FIXED_LENGTH 90 85435
FILE_RECORDS	=	85435
DATA_SET_ID DATA_SET_NAME = "BOSETTA-OBBIT		"RO-E-RPCMAG-3-EAR1-CALIBRATED-V1.0" EARTH RPCMAG 3 EAR1 CALIBRATED V1.0"
PRODUCT_ID	=	"RPCMAG050301T0014_CLB_OB_M2"
PRODUCT_CREATION_TIME	=	"RPCMAG050301T0014_CLB_OB_M2" 2007-04-17T15:24:57 "RDR"
MISSION_NAME	=	"INTERNATIONAL ROSETTA MISSION"
MISSION_PHASE_NAME	=	"INTERNATIONAL ROSETTA MISSION" "EARTH SWING-BY 1" "RO"
INSTRUMENT_HOST_ID INSTRUMENT_HOST_NAME	=	"RO" "ROSETTA-ORBITER"
MISSION_ID MISSION_NAME MISSION_PHASE_NAME INSTRUMENT_HOST_ID INSTRUMENT_HOST_NAME INSTRUMENT_ID	=	"RPCMAG"
INSTRUMENT NAME = "ROSETTA PLA	ASMA	A CONSORTIUM – FLUXGATE MAGNETOMETER"
INSTRUMENT_TYPE INSTRUMENT_MODE_ID INSTRUMENT_MODE_DESC	=	"MAGNETOMETER" "SID2"
INSTRUMENT MODE DESC	=	"
NORMAL MODE: 32 PRIMARY & 1 S	SECC	NDARY VECTORS PER 32 SECONDS"
TARGET_NAME TARGET_TYPE		"EARTH" "PLANET"
NOTE = "		
MAGNETIC_COORDINATE_SYSTEM :		
START_TIME STOP_TIME	=	2005-03-01T00:14:40.654 2005-03-01T23:59:59 498
SPACECRAFT CLOCK START COUNT	=	"1/68256861.20971"
START_TIME STOP_TIME SPACECRAFT_CLOCK_START_COUNT SPACECRAFT_CLOCK_STOP_COUNT	=	"1/68342380.09737"
START_JULIAN_DATE_VALUE		
		0 4 5 0 4 0 1 4 0 0 0 4 1 0 0 4
SC_SUN_POSITION_VECTOR	=	(141029080.44, -49951/00.29, /3686.10) (1358534.84 -322205.99 73167.86)
SC TARGET VELOCITY VECTOR	=	(-3.85, 0.86, -0.22)
SPACECRAFT_ALTITUDE	=	2453431.4999941904 (141029080.44, -49951700.29, 73686.10) (1358534.84, -322205.99, 73167.86) (-3.85, 0.86, -0.22) 1391758.931 999.999 999.999
SUB_SPACECRAFT_LATITUDE SUB_SPACECRAFT_LONGITUDE	=	999.999
NOTE	=	
The values of the keywords		C_SUN_POSITION_VECTOR, A SC TARGET VELOCITY VECTOR,
are related to the ECLIPJ2		
SUB_SPACECRAFT_LATITUDE an		
		stern Longitude in the standard AME> frame. All values are computed
for the time t= START_TIME		III. III. MINO MIC COMPUCCA
		velocities in <km s="">, Angles in <deg>"</deg></km>
SPICE_FILE_NAME SPICE FILE NAME		"ATNR_P040302093352_00053.BC" "ROS_LBOOM_V0.B"
SPICE_FILE_NAME		"ROS_V11.TF"

```
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                                = "EARTH TOPO 050714.TF"
SPICE FILE NAME
                                = "EARTHFIXEDIAU.TF"
SPICE FILE NAME
SPICE_FILE_NAME
                                = "EARTHFIXEDITRF93.TF"
SPICE_FILE_NAME
                                = "ROS_RPC_V11.TI"
                                = "NAI\overline{F}000\overline{8}.TLS"
SPICE FILE NAME
                                = "PCK00008.TPC"
SPICE FILE NAME
                                = "DE403-MASSES.TPC"
SPICE FILE NAME
SPICE FILE NAME
                               = "EARTH 000101 060918 060627.BPC"
                                = "ROS_070312_STEP.TSC"
SPICE FILE NAME
                                = "DE405.BSP"
SPICE FILE NAME
                                = "ORER
SPICE FILE NAME
                                                        00031.BSP"
                                = "ORHR
SPICE FILE NAME
                                                       00052.BSP"
                                = "RPC MAG TEAM"
PRODUCER ID
PRODUCER_FULL_NAME
                                = "INGO RICHTER"
                                = "IGEP-TU-BRAUNSCHWEIG"
PRODUCER_INSTITUTION_NAME
                                = "N/A"
DATA_QUALITY ID
                                = "
DATA_QUALITY_DESC = "
ONLY 'GOOD' RAW DATA HAVE BEEN PROCESSED AND STORED"
PROCESSING LEVEL ID
                                = 3
                                 = "
DESCRIPTION
 THIS FILE CONTAINS CALIBRATED MAGNETIC FIELD VECTOR DATA OBTAINED BY THE
 OUTBOARD MAGNETOMETER ABOARD THE ROSETTA S/C AND THE TEMPERATURE OF THE
 OUTBOARD SENSOR. GROUND CALIBRATION RESULTS HAVE BEEN APPLIED TO THE RAW
 DATA. FIELD IS GIVEN IN S/C-COORDINATES"
NOTE
                                 = "
 LBL & TAB FILE HAVE BEEN GENERATED BY S/W: GEN CAL DATA, VERSION V20070330"
                                 = "
NOTE
GROUND CALIBRATION FILE: RPCMAG_GND_CALIB_FSDPU_FMOB.TXT"
                                = ""
NOTE
INFLIGHT CALIBRATION FILE: RPCMAG 002 CALIB OB.TXT"
FLIGHT SOFTWARE VERSION ID = "\overline{F}IL:\overline{V}1.0"
PLATFORM OR MOUNTING DESC
                                = "MAGNETOMETER BOOM: DEPLOYED"
^TABLE
                    = "RPCMAG050301T0014 CLB OB M2.TAB"
OBJECT
                    = TABLE
                    = "RPCMAG-OB-SID2-CLB"
NAME
INTERCHANGE FORMAT = ASCII
                  = 85435
ROWS
                   = 7
COLUMNS
ROW BYTES
                   = 90
OBJECT
                   = COLUMN
                   = "TIME UTC"
NAME
                   = TIME
DATA TYPE
START BYTE
                    = 1
BYTES
                    = 26
                    = "UTC TIME OF OBSERVATION: YYYY-MM-DDTHH:MM:SS.FFFFFF"
DESCRIPTION
END OBJECT
                    = COLUMN
                   = COLUMN
OBJECT
                   = "TIME OBT"
NAME
DATA TYPE
                   = ASCII REAL
START BYTE
                   = 28
BYTES
                   = 15
                 = "S/C CLOCK AT OBSERVATION TIME, SECONDS SINCE 00:00
DESCRIPTION
AT 1.1.2003: SSSSSSSSS.FFFFF"
END OBJECT
                  = COLUMN
```



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```
= COLUMN
OBJECT
                  = "BX OB"
NAME
DATA_TYPE
                  = ASCII REAL
START BYTE
                  = 44
                  = 9
BYTES
                  = "NANOTESLA"
UNIT
                 = "nT"
UNIT ID
                 = "MAGNETIC FIELD X COMPONENT, CALIBRATED, TEMPERATURE
DESCRIPTION
CORRECTED DATA, S/C-COORDINATES, OB SENSOR"
END OBJECT
                  = COLUMN
OBJECT
                  = COLUMN
                  = "BY OB"
NAME
DATA_TYPE
                  = ASCII REAL
                  = 54
START_BYTE
                  = 9
BYTES
                  = "NANOTESLA"
UNIT
                  = "nT"
UNIT ID
DESCRIPTION = "MAGNETIC FIELD Y COMPONENT, CALIBRATED, TEMPERATURE
CORRECTED DATA, S/C-COORDINATES, OB SENSOR"
                  = COLUMN
END OBJECT
                  = COLUMN
OBJECT
                  = "BZ OB"
NAME
DATA TYPE
                  = ASCII REAL
START BYTE
                  = 64
BYTES
                  = 9
                  = "NANOTESLA"
UNIT
                  = "nT"
UNIT ID
                  = "MAGNETIC FIELD Z COMPONENT, CALIBRATED, TEMPERATURE
DESCRIPTION
CORRECTED DATA, S/C-COORDINATES, OB SENSOR"
                  = COLUMN
END OBJECT
OBJECT
                  = COLUMN
                  = "T OB"
NAME
                  = ASCII_REAL
DATA TYPE
START BYTE
                  = 74
BYTES
                  = 6
                  = "KELVIN"
UNIT
UNIT ID
                  = "K"
                  = "TEMPERATURE OF RPCMAG OB SENSOR"
DESCRIPTION
                  = COLUMN
END OBJECT
OBJECT
                  = COLUMN
                  = "QUALITY FLAGS"
NAME
                  = CHARACTER
DATA TYPE
START BYTE
                  = 81
BYTES
                  = 8
                   = "
DESCRIPTION
 These flags describe the quality of the magnetic field data.
 The quality is coded in a 8 byte string. Each character can have
 the following values:
           MEANING:
  VALUE:
            property described by flag is still unknown
    х
    0
            no disturbance, good quality
    1..9
            specific disturbance/problems, see below
```

Description of the specific flags:



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FLAG-STRING FLAG DESCRIPTION 87654321 ::::::: 1 IMPACT OF REACTION WHEELS :::::: x = impact not assessed :::::: 0 = no disturbance 1 = disturbance eliminated during data analysis :::::: 2 = disturbance elimination failed :::::: :::::: 3 = data disturbed :::::: ::::::: CURRENTS: :::::: x = impact not assessed ::::: 0 = no disturbance 1 = disturbance eliminated during data analysis ::::: 2 = disturbance elimination failed ::::: 3 = data disturbed ::::: ::::: :::::: BOOM DEPLOYMENT: ::::: 0 = boom deployed1 = boom stowed::::: 2 = boom deployment ongoing. Data only valid in ::::: ::::: instrument coordinates 3 = pyros fired for boom release ::::: ::::: ::::: 4 OFFSET RELATED EFFECTS: x = offset issues not assessed :::: 0 = no offset problems:::: :::: 1 = offset behavior not clear :::: 2 = offset drifts, sensor not in thermal :::: equilibrium thus temperature model N/A 3 = offset drifts, reason unknown :::: 4 = ofset jump detected, reason unknown :::: :::: ::::---- 5 CORRELATION BETWEEN IB AND OB SENSOR x = correlation not assessed ::: ::: 0 = perfect correlation 1 = good correlation ::: 2 = poor correlation ::: 3 = IB and OB show different long term behavior ::: ::: ::: :::---- 6 OTHER IMPACTS DECREASING THE QUALITY x = no assessment :: 0 = no other problems detected :: 1 = TBD:: 2 = TBD:: 3 = TBD:: 4 = TBD:: 5 = data disturbed by AC signal originated in s/c:: :: 6 = data noisy due to power on failure 7 = data not calculatable due to thermistor failure :: 8 = sensor saturated due to huge external field :: 9 = sensor saturated, instrument power on sequence failed :: :: ::---- 7 TBD x = no assessment : : :---- 8 TBD : x = no assessment : ...

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END_OBJECT = COLUMN END_OBJECT = TABLE END



4.3.7 Data Product "CALIBRATED LEVEL_C Magnetic Field data" Design

PDS VERSION ID = PDS3LABEL REVISION NOTE = "V1.0" RELEASE ID = 0001REVISION ID = 0000RECORD TYPE = FIXED LENGTH RECORD BYTES = 125 FILE RECORDS = 86298 = "RO-E-RPCMAG-3-EAR1-CALIBRATED-V1.0" DATA_SET_ID DATA_SET_NAME = "ROSETTA-ORBITER EARTH RPCMAG 3 EAR1 CALIBRATED V1.0" PRODUCT_ID PRODUCT_CREATION_TIME = "RPCMAG050303T0000_CLC_OB_M2" = 2007-04-17T15:27:28 PRODUCT_TYPE = "RDR" MISSION ID = "ROSETTA" MISSION NAME = "INTERNATIONAL ROSETTA MISSION" = "EARTH SWING-BY 1" MISSION PHASE NAME = "RO" INSTRUMENT HOST ID = "ROSETTA-ORBITER" INSTRUMENT HOST NAME = "RPCMAG" INSTRUMENT_ID INSTRUMENT NAME = "ROSETTA PLASMA CONSORTIUM - FLUXGATE MAGNETOMETER" INSTRUMENT_TYPE INSTRUMENT_MODE_ID INSTRUMENT_MODE_DESC = "MAGNETOMETER" = "SID2" = " NORMAL MODE: 32 PRIMARY & 1 SECONDARY VECTORS PER 32 SECONDS" TARGET NAME = "EARTH" TARGET TYPE = "PLANET" START TIME = 2005 - 03 - 03T00:00:00.265STOP TIME = 2005 - 03 - 03T23:59:59.176NOTE = " MAGNETIC COORDINATE SYSTEM : ECLIPJ2000" COORDINATE_SYSTEM_CENTER_NAME = "EARTH" SPACECRAFT_CLOCK_START_COUNT = "1/68428780.58959" SPACECRAFT_CLOCK_STOP_COUNT = "1/68515179.52121" = 2453432.5000030678 = 2453433.4999904637 START JULIAN DATE VALUE STOP JULIAN DATE VALUE 35569.78) 35275.69) SC SUN POSITION VECTOR = (142079138.88, -44931842.69, SC TARGET POSITION VECTOR = (693384.03, -174751.39, SC TARGET VELOCITY VECTOR = (-3.91, -0.22)0.86, 709557.557 SPACECRAFT ALTITUDE = SUB SPACECRAFT LATITUDE = 999.999 = 999.999 SUB SPACECRAFT LONGITUDE =" NOTE The values of the keywords SC_SUN_POSITION_VECTOR, SC_TARGET_POSITION_VECTOR and SC_TARGET_VELOCITY_VECTOR, are related to the ECLIPJ2000 reference frame. 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>" = "ATNR P040302093352 00053.BC" SPICE FILE NAME = "ROS LBOOM_V0.B" SPICE_FILE NAME SPICE FILE NAME = "ROS V11.TF" = "EARTH_TOPO_050714.TF" SPICE FILE NAME

Document No. : RO-IGEP-TR0009 Institut für IGEP Geophysik und extraterrestrische Physik Issue/Rev. No. : 2.9 RPC-MAG EAICD Date : 5 September 2007 TU Braunschweig Page : 68 = "EARTHFIXEDIAU.TF" SPICE FILE NAME = "EARTHFIXEDITRF93.TF" SPICE FILE NAME SPICE_FILE_NAME = "ROS RPC V11.TI" SPICE_FILE_NAME = "NAIF0008.TLS" = "PCK00008.TPC" SPICE FILE NAME = "DE403-MASSES.TPC" SPICE FILE NAME = "EARTH 000101 060918_060627.BPC" SPICE FILE NAME SPICE FILE NAME = "ROS $0\overline{7}0312$ STEP.TSC" = "DE405.BSP" SPICE FILE NAME = "ORER SPICE FILE NAME 00031.BSP" = "ORHR SPICE FILE NAME 00052.BSP" = "RPC MAG_TEAM" PRODUCER ID PRODUCER_FULL NAME = "INGO RICHTER" = "IGEP-TU-BRAUNSCHWEIG" PRODUCER_INSTITUTION_NAME DATA_QUALITY_ID = "N/A" DATA_QUALITY_DESC = " ONLY 'GOOD' RAW DATA HAVE BEEN PROCESSED AND STORED" PROCESSING LEVEL ID = 3 = " DESCRIPTION THIS FILE CONTAINS CALIBRATED MAGNETIC FIELD VECTOR DATA OBTAINED BY THE OUTBOARD MAGNETOMETER ABOARD THE ROSETTA S/C. GROUND CALIBRATION RESULTS HAVE BEEN APPLIED TO THE RAW DATA. FIELD IS ROTATED TO ECLIPJ2000 COORDINATES. THE S/C POSITION IS GIVEN IN ECLIPJ2000 COORDINATES AS WELL." NOTE - " LBL & TAB FILE HAVE BEEN GENERATED BY S/W: GEN CAL DATA, VERSION V20070330" NOTE _ " S/C ATTITUDE COMPUTED USING FILE ATNR FDRRMA DAP040302093352 00053.ROS" = " NOTE S/C POSITION COMPUTED USING FILE ORER FDLRMA DA 00031.ROS" = " NOTE GROUND CALIBRATION FILE: RPCMAG GND CALIB FSDPU FMOB.TXT" = " NOTE INFLIGHT CALIBRATION FILE: RPCMAG 002 CALIB OB.TXT" FLIGHT SOFTWARE VERSION ID = " \overline{F} IL: \overline{V} 1.0" PLATFORM OR MOUNTING DESC = "MAGNETOMETER BOOM: DEPLOYED" ^TABLE = "RPCMAG050303T0000 CLC OB M2.TAB" OBJECT = TABLE = "RPCMAG-OB-SID2-CLC" NAME INTERCHANGE FORMAT = ASCII = 86298 ROWS COLUMNS = 9 ROW BYTES = 125 OBJECT = COLUMN NAME = "TIME UTC" = TIME DATA TYPE START BYTE = 1 BYTES = 26 = "UTC TIME OF OBSERVATION: YYYY-MM-DDTHH:MM:SS.FFFFFF" DESCRIPTION = COLUMN END OBJECT OBJECT = COLUMN = "TIME OBT" NAME = ASCII REAL DATA TYPE START BYTE = 28

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BYTES DESCRIPTION 1.1.2003: SSSS END_OBJECT	= 15 = "S/C CLOCK AT OBSERVATION TIME,SE SSSS.FFFFF" = COLUMN	ECONDS SINCE 00:00 AT
OBJECT NAME DATA_TYPE START_BYTE BYTES UNIT UNIT_ID DESCRIPTION END_OBJECT	<pre>= COLUMN = "POSITION_X" = ASCII_REAL = 44 = 13 = "KILOMETER" = "km" = "SPACECRAFT POSITION, X COMPONENT = COLUMN</pre>	F, ECLIPJ2000"
OBJECT NAME DATA_TYPE START_BYTE BYTES UNIT UNIT_ID DESCRIPTION END_OBJECT	<pre>= COLUMN = "POSITION_Y" = ASCII_REAL = 58 = 13 = "KILOMETER" = "km" = "SPACECRAFT POSITION, Y COMPONENT = COLUMN</pre>	F, ECLIPJ2000"
OBJECT NAME DATA_TYPE START_BYTE BYTES UNIT UNIT_ID DESCRIPTION END_OBJECT	<pre>= COLUMN = "POSITION_Z" = ASCII_REAL = 72 = 13 = "KILOMETER" = "km" = "SPACECRAFT POSITION, Z COMPONENT = COLUMN</pre>	F, ECLIPJ2000"
OBJECT NAME DATA_TYPE START_BYTE BYTES UNIT UNIT_ID DESCRIPTION CORRECTED DATA END_OBJECT	= "nT" = "MAGNETIC FIELD X COMPONENT, CALI OB SENSOR, ECLIPJ2000"	IBRATED, TEMPERATURE
OBJECT NAME DATA_TYPE START_BYTE BYTES UNIT UNIT_ID DESCRIPTION CORRECTED DATA END_OBJECT	<pre>- ''NANOTESLA" = "'NT" = "MAGNETIC FIELD Y COMPONENT, CALI OB SENSOR, ECLIPJ2000"</pre>	IBRATED, TEMPERATURE
OBJECT NAME DATA_TYPE	= COLUMN = "BZ_OB" = ASCII_REAL	

Document No. : RO-IGEP-TR0009 Institut für IGEP Geophysik und extraterrestrische Physik Issue/Rev. No. : 2.9 RPC-MAG EAICD Date : 5 September 2007 TU Braunschweig Page 70 = 106 START BYTE BYTES = 9 UNIT = "NANOTESLA" UNIT ID = "nT" = "MAGNETIC FIELD Z COMPONENT, CALIBRATED, TEMPERATURE DESCRIPTION CORRECTED DATA, OB SENSOR, ECLIPJ2000" = COLUMN END OBJECT OBJECT = COLUMN = "QUALITY FLAGS" NAME DATA TYPE = CHARACTER START BYTE = 116 BYTES = 8 DESCRIPTION = " These flags describe the quality of the magnetic field data. The quality is coded in a 8 byte string. Each character can have the following values: VALUE: MEANING: property described by flag is still unknown х 0 no disturbance, good quality 1..9 specific disturbance/problems, see below Description of the specific flags: FLAG-STRING FLAG DESCRIPTION 87654321 :::::: 1 IMPACT OF REACTION WHEELS ::::::: x = impact not assessed :::::: 0 = no disturbance 1 = disturbance eliminated during data analysis ::::: :::::: 2 = disturbance elimination failed 3 = data disturbed :::::: :::::: ::::::: CURRENTS: x = impact not assessed :::::: 0 = no disturbance ::::: 1 = disturbance eliminated during data analysis :::::: 2 = disturbance elimination failed ::::: 3 = data disturbed ::::: ::::: ::::: 3 BOOM DEPLOYMENT: 0 = boom deployed::::: 1 = boom stowed::::: 2 = boom deployment ongoing. Data only valid in ::::: instrument coordinates ::::: 3 = pyros fired for boom release ::::: ::::: ::::: 4 OFFSET RELATED EFFECTS: :::: x = offset issues not assessed 0 = no offset problems:::: 1 = offset behavior not clear :::: :::: 2 = offset drifts, sensor not in thermal :::: equilibrium thus temperature model N/A 3 = offset drifts, reason unknown :::: 4 = ofset jump detected, reason unknown :::: :::: ::::---- 5 CORRELATION BETWEEN IB AND OB SENSOR ::: x = correlation not assessed 0 = perfect correlation ::: 1 = good correlation :::



4.3.8 Data Product "RESAMPLED LEVEL_K Magnetic Field data" Design

PDS_VERSION_ID =	PDS3
LABEL_REVISION_NOTE =	"V1.0"
RELEASE ID =	0001
REVISION ID =	0000
RECORD TYPE =	FIXED LENGTH
RECORD BYTES =	90 —
FILE RECORDS =	77755
DATA SET ID =	"RO-E-RPCMAG-4-EAR1-RESAMPLED-V1.0"
DATA SET NAME = "ROSETTA-ORBITER	EARTH RPCMAG 4 EAR1 RESAMPLED V1.0"
PRODUCT ID =	"RPCMAG050301T0000 CLK OB M2"
PRODUCT CREATION TIME =	2007-04-17T15:32:00
PRODUCT TYPE =	"REFDR"
MISSION ID =	"ROSETTA"
MISSION NAME =	"INTERNATIONAL ROSETTA MISSION"
MISSION PHASE NAME =	"EARTH SWING-BY 1"
INSTRUMENT HOST ID =	"RO"
INSTRUMENT HOST NAME =	"ROSETTA-ORBITER"
INSTRUMENT ID =	"RPCMAG"
INSTRUMENT NAME = "ROSETTA PLASM	A CONSORTIUM - FLUXGATE MAGNETOMETER"
INSTRUMENT TYPE =	"MAGNETOMETER"
INSTRUMENT MODE ID =	"SID2"
INSTRUMENT MODE DESC =	"
— —	


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GROUND CALIBRAT	ION FILE: RPCMAG GND CALIB FS	DPU FMOB.TXT"	
NOTE	= "		
INFLIGHT CALIBR	ATION FILE: RPCMAG_002_CALIB_	OB.TXT"	
FLIGHT_SOFTWARE_	VERSION_ID = "FIL:V1.0" FING_DESC = "MAGNETOMETE	D DOOL	
PLATFORM_OR_MOUN	TING_DESC = "MAGNETOMETE	K_ROOW: DEPTOA	ED"
^TABLE	= "RPCMAG050301T0000_CLK_0	B_M2.TAB"	
OBJECT	= TABLE		
NAME	= "RPCMAG-OB-SID2-CLK"		
INTERCHANGE FORM	AT = ASCII		
ROWS -	= 77755		
COLUMNS	= 7		
ROW_BYTES	= 90		
OBJECT	= COLUMN		
NAME	= "TIME_UTC"		
DATA TYPE	= TIME		
START BYTE	= 1		
BYTES	= 26		
	= "UTC TIME OF OBSERVATION	: YYYY-MM-DDTH	H:MM:SS.FFFFFF"
END_OBJECT	= COLUMN		
OBJECT	= COLUMN		
NAME	= "TIME OBT"		
DATA_TYPE	= ASCII_REAL		
START BYTE	= 28		
	- 15		
DESCRIPTION	= "S/C CLOCK AT OBSERVATIO	N TIME, SECONDS	SINCE 00:00
AT 1.1.2003: SS	SSSSSS.FFFFF"	, -	
END_OBJECT	= COLUMN		
OBJECT	= COLUMN		
NAME	= "BX OB"		
DATA TYPE	= ASCII REAL		
START BYTE	= 44		
BYTES	= 9		
UNIT	= "NANOTESLA" = "nT" = "MAGNETIC FIELD X COMPON		
UNIT_ID	= "nT"		
DESCRIPTION	= "MAGNETIC FIELD X COMPON	ENT, CALIBRATE	D, TEMPERATURE
CORRECTED DATA,	S/C-COORDINATES, OB SENSOR,		
HEATER DISTURBA			
END_OBJECT	= COLUMN		
OBJECT	= COLUMN		
NAME	= "BY_OB"		
DATA_TYPE	= ASCII_REAL		
NAME DATA_TYPE START_BYTE BYTES	= 54		
BYTES	= 9		
UNIT	= "NANOTESLA"		
UNIT ID	= "nT"		
CORRECTED DATA,	= "MAGNETIC FIELD Y COMPON S/C-COORDINATES, OB SENSOR,	ENT, CALIBRATE	D, TEMPERATURE
HEATER DISTURBA END OBJECT			
-			
	- COLUMN		
OBJECT	= COLUMN		
OBJECT NAME DATA TYPE	= COLUMN = "BZ_OB" = ASCIL DEAL		
OBJECT NAME DATA_TYPE START_BYTE	= COLUMN = "BZ_OB" = ASCII_REAL		

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BYTES UNIT UNIT_ID DESCRIPTION CORRECTED DATA, S HEATER DISTURBANC END_OBJECT	/C-COORDINATES, OB SENSOR,	NT, CALIBRATED	, TEMPERATURE
DATA_TYPE START_BYTE BYTES UNIT UNIT_ID	<pre>= COLUMN = "T_OB" = ASCII_REAL = 74 = 6 = "KELVIN" = "K" = "TEMPERATURE OF RPCMAG OB = COLUMN</pre>	SENSOR"	
0 no dis	ty described by flag is stil turbance, good quality ic disturbance/problems, see e specific flags:		
FLAG-STRING FLAG 87654321 ::::::: :::::: :::::: :::::: ::::::	DESCRIPTION IMPACT OF REACTION WHEELS x = impact not assessed 0 = no disturbance 1 = disturbance eliminated 2 = disturbance elimination		alysis
:::::::	<pre>3 = data disturbed IMPACT OF LANDER HEATER CUR x = impact not assessed 0 = no disturbance 1 = disturbance eliminated 2 = disturbance elimination 3 = data disturbed</pre>	RENTS: during data and	alysis
::::: ::::: ::::: ::::: ::::: ::::: ::::	<pre>BOOM DEPLOYMENT: 0 = boom deployed 1 = boom stowed 2 = boom deployment ongoing instrument coordinates 3 = pyros fired for boom re</pre>		lid in
::::: ::::: 4 :::: ::::	OFFSET RELATED EFFECTS: x = offset issues not asses 0 = no offset problems	sed	

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	1				
::::	-	fset behavio			
::::				ot in thermal ature model N	
		fset drifts,			1/ A
				ason unknown	
	1 01				
	5 CORREL	ATION BETWEE	N IB AND	OB SENSOR	
:::	x = co	rrelation no	t assesse	d	
:::	0 = pe	rfect correl	ation		
:::	1 = go	od correlati	on		
:::	2 = po	or correlati	on		
:::	3 = IB	and OB show	differen	t long term b	ehavior
:::					
:::					
		IMPACTS DECR	EASING TH	E QUALITY	
::		assessment			
::		other probl	ems detec	ted	
::	1 = TB				
::	2 = TB $3 = TB$				
::	3 - 1B 4 = TB				
			hy AC si	gnal originat	ed in s/c
::		ta noisy due			
•••				ue to thermis	tor failure
::				huge externa	
::					on sequence failed
::			,	Ŧ	1
::	7 TBD				
:	x = no	assessment			
:					
:	8 TBD				
:	x = no	assessment			
: "					
END_OBJECT END_OBJECT	= COLU				
END_OBJECT	= TABL	Ľ			

4.3.9 Data Product "RESAMPLED LEVEL_L Magnetic Field data" Design

PDS_VERSION_ID = PDS3 PDS_VERSION_ID LABEL_REVISION_NOTE = "V1.0" RELEASE ID — = 0001 REVISION ID = 0000 RECORD_TYPE = FIXED_LENGTH RECORD BYTES = 125 = 2697 FILE RECORDS = "RO-E-RPCMAG-4-EAR1-RESAMPLED-V1.0" DATA SET ID DATA SET NAME = "ROSETTA-ORBITER EARTH RPCMAG 4 EAR1 RESAMPLED V1.0"

Document No. : RO-IGEP-TR0009 Institut für IGEP Geophysik und extraterrestrische Physik Issue/Rev. No. : 2.9 RPC-MAG EAICD : 5 September 2007 Date TU Braunschweig Page : 76 = "RPCMAG050302T0000 CLL IB M2" PRODUCT ID PRODUCT CREATION TIME = 2007 - 04 - 17T15:36:12PRODUCT_TYPE = "REFDR" = "ROSETTA" MISSION_ID = "INTERNATIONAL ROSETTA MISSION" MISSION NAME = "EARTH SWING-BY 1" MISSION PHASE NAME = "RO" INSTRUMENT HOST ID = "ROSETTA-ORBITER" INSTRUMENT HOST NAME INSTRUMENT ID = "RPCMAG" INSTRUMENT NAME = "ROSETTA PLASMA CONSORTIUM - FLUXGATE MAGNETOMETER" INSTRUMENT TYPE = "MAGNETOMETER" = "SID2" INSTRUMENT MODE ID INSTRUMENT_MODE_DESC = " NORMAL MODE: 32 PRIMARY & 1 SECONDARY VECTORS PER 32 SECONDS" TARGET NAME = "EARTH" TARGET_TYPE START_TIME = "PLANET" = 2005-03-02T00:00:05.506 STOP_TIME NOTE = " = 2005-03-02T23:59:47.253 MAGNETIC COORDINATE SYSTEM : ECLIPJ2000" COORDINATE SYSTEM CENTER NAME = "SUN" SPACECRAFT_CLOCK_START_COUNT = "1/68342386.10199" SPACECRAFT CLOCK STOP COUNT = "1/68428767.58151" START_JULIAN_DATE_VALUE = 2453431.5000637276 = 2453432.4998524659 STOP JULIAN DATE VALUE = (141573665.73, -47461799.43, = (1028792.53, -248982.98, = (-3.87, 0.86, = 1053511.616 SC SUN POSITION VECTOR 54803.86) SC_TARGET_POSITION_VECTOR SC_TARGET_VELOCITY_VECTOR SPACECRAFT_ALTITUDE 54402.28) -0.22)= 999.999 SUB SPACECRAFT LATITUDE SUB SPACECRAFT LONGITUDE = 999.999 =" NOTE The values of the keywords SC SUN POSITION VECTOR, SC TARGET POSITION VECTOR and SC TARGET VELOCITY VECTOR, are related to the ECLIPJ2000 reference frame. 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>" SPICE FILE NAME = "ATNR P040302093352 00053.BC" SPICE FILE NAME = "ROS LBOOM VO.B" SPICE FILE NAME = "ROS_V11.TF" SPICE FILE NAME = "EARTH TOPO 050714.TF" = "EARTHFIXEDIAU.TF" SPICE FILE NAME = "EARTHFIXEDITRF93.TF" SPICE FILE NAME SPICE FILE NAME = "ROS RPC V11.TI" = "NAIF0008.TLS" = "PCK00008.TPC" SPICE_FILE_NAME SPICE_FILE_NAME = "DE403-MASSES.TPC" SPICE FILE NAME = "EARTH 000101 060918 060627.BPC" SPICE FILE NAME SPICE FILE NAME = "ROS 070312 STEP.TSC" SPICE FILE NAME = "DE405.BSP" SPICE FILE NAME = "ORER 00031.BSP" SPICE_FILE_NAME = "ORHR 00052.BSP" PRODUCER ID = "RPC MAG TEAM" PRODUCER_FULL NAME = "INGO RICHTER" PRODUCER_INSTITUTION_NAME = "IGEP-TU-BRAUNSCHWEIG"

IGEP TU Braunschweig	tut für hysik und terrestrische RPC-MAG EAICD k	Issue/Rev. No.	: RO-IGEP-TR0009 : 2.9 : 5 September 2007 : 77
DATA_QUALITY_ID DATA_QUALITY_DESC ONLY 'GOOD' RAW I PROCESSING_LEVEL_I	= " DATA HAVE BEEN PROCESSED AND	STORED"	
INBOARD MAGNETOME BEEN APPLIED TO T THE S/C POSITION	= " IS CALIBRATED MAGNETIC FIELD TER ABOARD THE ROSETTA S/C. THE RAW DATA. FIELD IS ROTATH IS GIVEN IN ECLIPJ2000 COOM BEEN ELIMINATED" = "	GROUND CALIBRA ED TO ECLIPJ20	ATION RESULTS HAVE 00 COORDINATES.
LBL & TAB FILE HA NOTE	.VE BEEN GENERATED BY S/W: GP = "	EN_CAL_DATA, VI	ERSION V20070330"
-	UTED USING FILE ATNR_FDRRMA_	_DAP0403020933	52_00053.ROS"
S/C POSITION COME	UTED USING FILE ORHR_FDRRMA_ = "	_DA	00052.ROS"
NOTE GROUND CALIBRATIC NOTE	N FILE: RPCMAG_GND_CALIB_FSI = "	OPU_FMIB.TXT"	
INFLIGHT CALIBRAT	TION FILE: RPCMAG_002_CALIB_T RSION_ID = "FIL:V1.0" NG_DESC = "MAGNETOMETER		ED"
^TABLE	= "RPCMAG050302T0000_CLL_I	8_M2.TAB"	
OBJECT NAME INTERCHANGE_FORMAT ROWS COLUMNS ROW_BYTES OBJECT NAME	<pre>= TABLE = "RPCMAG-IB-SID2-CLL" ' = ASCII = 2697 = 9 = 125 = COLUMN = "TIME UTC"</pre>		
DATA_TYPE	= TIME = 1 = 26 = "UTC TIME OF OBSERVATION:	: YYYY-MM-DDTHI	H:MM:SS.FFFFFF"
OBJECT NAME DATA_TYPE START_BYTE BYTES DESCRIPTION 1.1.2003: SSSSSSS END_OBJECT	= "S/C CLOCK AT OBSERVATION SSS.FFFFF"	N TIME, SECONDS	SINCE 00:00 AT
OBJECT NAME DATA_TYPE START_BYTE BYTES UNIT UNIT_ID DESCRIPTION END_OBJECT	<pre>= COLUMN = "POSITION_X" = ASCII_REAL = 44 = 13 = "KILOMETER" = "km" = "SPACECRAFT POSITION, X O = COLUMN</pre>	COMPONENT, ECL	IPJ2000"



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OBJECT NAME DATA_TYPE START_BYTE BYTES UNIT UNIT_ID DESCRIPTION END_OBJECT	<pre>- 15 = "KILOMETER" = "km" = "SPACECRAFT POSITION, Y COMPONENT, ECLIPJ2000"</pre>
OBJECT NAME DATA_TYPE START_BYTE BYTES UNIT UNIT_ID DESCRIPTION END_OBJECT	<pre>= 72 = 13 = "KILOMETER" = "km" = "SPACECRAFT POSITION, Z COMPONENT, ECLIPJ2000"</pre>
	<pre>= 86 = 9 = "NANOTESLA" = "nT" = "MAGNETIC FIELD X COMPONENT, CALIBRATED, TEMPERATURE EB SENSOR, ECLIPJ2000, CE ELIMINATED"</pre>
UNIT_ID DESCRIPTION	<pre>= "BY_IB" = ASCII_REAL = 96 = 9 = "NANOTESLA" = "nT" = "MAGNETIC FIELD Y COMPONENT, CALIBRATED, TEMPERATURE EB SENSOR, ECLIPJ2000, CE ELIMINATED"</pre>
DATA_TYPE START_BYTE BYTES UNIT UNIT_ID DESCRIPTION CORRECTED DATA, I HEATER DISTURBANC END_OBJECT	<pre>= 106 = 9 = "NANOTESLA" = "nT" = "MAGNETIC FIELD Z COMPONENT, CALIBRATED, TEMPERATURE EB SENSOR, ECLIPJ2000, CE ELIMINATED" = COLUMN</pre>
	= COLUMN = "QUALITY_FLAGS" = CHARACTER

Document No. : RO-IGEP-TR0009 Institut für Geophysik und extraterrestrische Physik IGEP Issue/Rev. No. : 2.9 RPC-MAG EAICD Date : 5 September 2007 TU Braunschweig Page : 79 = 116 START BYTE BYTES = 8 DESCRIPTION = " These flags describe the quality of the magnetic field data. The quality is coded in a 8 byte string. Each character can have the following values: VALUE: MEANING: property described by flag is still unknown x 0 no disturbance, good quality specific disturbance/problems, see below 1..9 Description of the specific flags: FLAG-STRING FLAG DESCRIPTION 87654321 ::::::: IMPACT OF REACTION WHEELS x = impact not assessed ::::::: 0 = no disturbance :::::: 1 = disturbance eliminated during data analysis :::::: :::::: 2 = disturbance elimination failed ::::::: 3 = data disturbed ::::::: :::::::----- 2 IMPACT OF LANDER HEATER CURRENTS: x = impact not assessed ::::: 0 = no disturbance ::::: 1 = disturbance eliminated during data analysis ::::: ::::: 2 = disturbance elimination failed ::::: 3 = data disturbed ::::: ::::: BOOM DEPLOYMENT: 0 = boom deployed ::::: 1 = boom stowed::::: 2 = boom deployment ongoing. Data only valid in ::::: instrument coordinates ::::: 3 = pyros fired for boom release ::::: ::::: ::::: 4 OFFSET RELATED EFFECTS: x = offset issues not assessed :::: 0 = no offset problems:::: 1 = offset behavior not clear :::: 2 = offset drifts, sensor not in thermal :::: equilibrium thus temperature model N/A :::: :::: 3 = offset drifts, reason unknown 4 = ofset jump detected, reason unknown :::: :::: ::::---- 5 CORRELATION BETWEEN IB AND OB SENSOR ::: x = correlation not assessed 0 = perfect correlation ::: 1 = good correlation ::: ::: 2 = poor correlation3 = IB and OB show different long term behavior ::: ::: ::: :::---- 6 OTHER IMPACTS DECREASING THE QUALITY x = no assessment :: :: 0 = no other problems detected :: 1 = TBD:: 2 = TBD3 = TBD:: 4 = TBD::

Geop	- itut für hysik und terrestrische RPC-MAG EAIC k	Issue/Rev. No	: RO-IGEP-TR0009 : 2.9 : 5 September 2007 : 80
:: :: :: ::	5 = data disturbed by AC 6 = data noisy due to pow 7 = data not calculatable 8 = sensor saturated due 9 = sensor saturated, ins	er on failure due to thermis to huge externa	stor failure 1 field
:	x = no assessment		
: : 8 : : :	B TBD x = no assessment		
END_OBJECT END_OBJECT END	= COLUMN = TABLE		

4.3.10 Data Product "RESAMPLED LEVEL_E Magnetic Field data" Design

PDS VERSION ID = PDS3 LABEL REVISION NOTE = "V1.0" RELEASE ID = 0001 REVISION ID = 0000= FIXED LENGTH RECORD TYPE = 90 RECORD BYTES = 428 = "RO-M-RPCMAG-4-MARS-RESAMPLED-VGND" FILE RECORDS DATA_SET_ID = "RO-M-RPCMAG-4-MARS-RESAMPLED-VGND DATA_SET_NAME = "ROSETTA-ORBITER MARS RPCMAG 4 MARS RESAMPLED VGND" "DDOMAGO70223 CLE OR \$200" PRODUCT_ID= "RPCMAG070223_CLE_OB_A200"PRODUCT_CREATION_TIME= 2007-04-03T09:43:20PRODUCT_TYPE= "REFDR"MISSION_ID"REFDR" = "REFDR"MISSION_IDMISSION_NAMEMISSION_PHASE_NAME= "MARS_SWING-BY"INSTRUMENT_HOST_ID= "RO"INSTRUMENT_HOST_NAME= "ROSETTA-ORBITER"INSTRUMENT_ID= "ROCMAC" INSTRUMENT_NAME = "ROSETTA PLASMA CONSORTIUM - FLUXGATE MAGNETOMETER" INSTRUMENT_TYPE = "MAGNETOMETER" INSTRUMENT_MODE_ID = "AVERAGED" INSTRUMENT_MODE_DESC = "200 S AVERAGES TARGET_NAME = "MARS" = "200 S AVERAGES" TARGET_TYPE = "PLANET" NOTE = " MAGNETIC COORDINATE SYSTEM : INSTRUMENTCOORDS" = 2007-02-23T00:13:35.239 = 2007-02-23T00:15:55.239 START TIME STOP TIME = 2007-02-23T23:56:55.239 SPACECRAFT_CLOCK_START_COUNT = "1/130810386.23371"
SPACECRAFT_CLOCK_STOP_COUNT = "1/130895786.23371"

 START_JULIAN_DATE_VALUE
 = 2454154.5094356369

 STOP_JULIAN_DATE_VALUE
 = 2454155.4978615632



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FLIGHT_SOFTWARE_VE PLATFORM_OR_MOUNTI	RSION_ID = "FIL:V1.0" NG_DESC = "MAGNETOMETER	BOOM: DEPLOYE	D"
^TABLE	= "RPCMAG070223_CLE_OB_A200	.TAB"	
OBJECT NAME INTERCHANGE_FORMAT ROWS COLUMNS ROW_BYTES	<pre>= TABLE = "RPCMAG-OB-200S_AVERAGE-C = ASCII = 428 = 7 = 90</pre>	CLE"	
OBJECT NAME DATA_TYPE START_BYTE BYTES DESCRIPTION END_OBJECT	<pre>= COLUMN = "TIME_UTC" = TIME = 1 = 26 = "UTC TIME OF OBSERVATION: = COLUMN</pre>	ҮҮҮҮ-MM-DDTHH	:MM:SS.FFFFFF"
DATA_TYPE START_BYTE BYTES	= 28 = 15 = "S/C CLOCK AT OBSERVATION	I TIME, SECONDS	SINCE 00:00
	<pre>= COLUMN = "BX_OB" = ASCII_REAL = 44 = 9 = "NANOTESLA" = "nT" = "MAGNETIC FIELD X COMPONE CTED DATA, S/C-COORDINATES, = COLUMN</pre>		
NAME DATA_TYPE START_BYTE BYTES UNIT UNIT_ID DESCRIPTION	<pre>= "NANOTESLA" = "nT" = "MAGNETIC FIELD Y COMPONE CTED DATA, S/C-COORDINATES,</pre>	CNT, CALIBRATED 2005_AVERAGE-C	', 'B SENSOR"
OBJECT NAME DATA_TYPE START_BYTE BYTES UNIT UNIT_ID DESCRIPTION TEMPERATURE CORRE	<pre>= COLUMN = "BZ_OB" = ASCII_REAL = 64 = 9 = "NANOTESLA" = "nT" = "MAGNETIC FIELD Z COMPONE CTED DATA, S/C-COORDINATES,</pre>	ENT, CALIBRATED 2005_AVERAGE-C	", B SENSOR"

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END_OBJECT	= COLUMN		
OBJECT NAME DATA_TYPE START_BYTE BYTES UNIT UNIT_ID DESCRIPTION END_OBJECT	<pre>= COLUMN = "T_OB" = ASCII_REAL = 74 = 6 = "KELVIN" = "K" = "TEMPERATURE OF RPCMAG = COLUMN</pre>	OB SENSOR"	
The quality is coo the following valu VALUE: MEANING	5:	ach character ca	
0 no dist	y described by flag is s curbance, good quality c disturbance/problems,		
Description of the			
	<pre>IMPACT OF REACTION WHEEL x = impact not assessed 0 = no disturbance 1 = disturbance eliminat 2 = disturbance eliminat</pre>	ed during data a	nalysis
2 2 2 2 2 2 2 2 2 2 2 2 2 2	<pre>3 = data disturbed IMPACT OF LANDER HEATER x = impact not assessed 0 = no disturbance 1 = disturbance eliminat 2 = disturbance eliminat</pre>	ed during data a	nalysis
::::: :::::: :::::: 3 ::::: ::::: :::::	<pre>3 = data disturbed BOOM DEPLOYMENT: 0 = boom deployed 1 = boom stowed 2 = boom deployment ongo</pre>	ing. Data only v	alid in
::::: ::::: ::::: ::::: 4 :::: ::::	<pre>instrument coordinat 3 = pyros fired for boom OFFSET RELATED EFFECTS: x = offset issues not as 0 = no offset problems</pre>	release	
	<pre>1 = offset behavior not 2 = offset drifts, senso equilibrium thus tem 3 = offset drifts, reaso 4 = ofset jump detected,</pre>	r not in thermal perature model N n unknown	

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	CORRELATION BETWEEN IB AND OB SENSOR x = correlation not assessed 0 = perfect correlation 1 = good correlation 2 = poor correlation 3 = IB and OB show different long term behavior	
	<pre>OTHER IMPACTS DECREASING THE QUALITY x = no assessment 0 = no other problems detected 1 = TBD 2 = TBD 3 = TBD 4 = TBD 5 = data disturbed by AC signal originated in s/c 6 = data noisy due to power on failure 7 = data not calculatable due to thermistor failure 8 = sensor saturated due to huge external field 9 = sensor saturated, instrument power on sequence failed</pre>	
::	TBD x = no assessment	
: : : :	TBD x = no assessment	
END_OBJECT END_OBJECT END	= COLUMN = TABLE	

4.3.11 Data Product "RESAMPLED LEVEL_F Magnetic Field data" Design

PDS VERSION ID =	PDS3
LABEL REVISION NOTE =	"V1.0"
RELEASE ID =	0001
REVISION ID =	0000
RECORD TYPE =	FIXED LENGTH
RECORD BYTES =	90 —
FILE RECORDS =	86397
DATA SET ID =	"RO-E-RPCMAG-4-EAR1-RESAMPLED-V1.0"
DATA SET NAME = "ROSETTA-ORBITER	EARTH RPCMAG 4 EAR1 RESAMPLED V1.0"
PRODUCT ID =	"RPCMAG050305 CLF OB A1"
PRODUCT CREATION TIME =	2007-04-17T16:12:58
PRODUCT TYPE =	"REFDR"
MISSION ID =	"ROSETTA"
MISSION_NAME =	"INTERNATIONAL ROSETTA MISSION"

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MISSION_PHASE_NAME INSTRUMENT_HOST_ID INSTRUMENT_HOST_NAME INSTRUMENT_ID INSTRUMENT_NAME = "ROSET INSTRUMENT_MODE_ID INSTRUMENT_MODE_ID INSTRUMENT_MODE_DESC TARGET_NAME TARGET_TYPE NOTE = " MAGNETIC_COORDINATE_SYS START_TIME	= "RPCMAG" TA PLASMA CONSORTIUM = "MAGNETOMETE] = "AVERAGED" = "1 S AVERAGE] = "EARTH" = "PLANET" STEM : S/C-COORDS" = 2005-03-05T0	-BY 1" ITER" - FLUXGATE MAGN R" S" 0:00:00.715	NETOMETER"
STOP_TIME SPACECRAFT_CLOCK_START_C SPACECRAFT_CLOCK_STOP_CC	$\begin{array}{rcl} &=& 2005 - 03 - 05T23 \\ \text{COUNT} &=& "1/68601581. \\ \text{OUNT} &=& "1/68687977. \end{array}$	3:59:56.715 03648" 03648"	
START_JULIAN_DATE_VALUE STOP_JULIAN_DATE_VALUE SC_SUN_POSITION_VECTOR SC_TARGET_POSITION_VECTO SC_TARGET_VELOCITY_VECTO SPACECRAFT_ALTITUDE SUB_SPACECRAFT_LATITUDE SUB_SPACECRAFT_LONGITUDE NOTE	= 37218.3 = -34.082	oo, J.	90, 7610.90) 39, 8208.04) 38, 1.23)
The values of the ke SC_TARGET_POSITION_V are related to the E SUB_SPACECRAFT_LATIT are northern Latitud planetocentric IAU_< for the time t= STAF	eywords SC_SUN_POSITION VECTOR and SC_TARGET_VI SCLIPJ2000 reference f: SUDE and SUB_SPACECRAF de and eastern Longitud (TARGET_NAME> frame. A RT_TIME. in <km> velocities in</km>	ELOCITY_VECTOR, rame. I_LONGITUDE de in the stand ll values are d	dard computed
SPICE_FILE_NAME SPICE_FILE_NAME SPICE_FILE_NAME SPICE_FILE_NAME SPICE_FILE_NAME SPICE_FILE_NAME SPICE_FILE_NAME	= "ATNR_P040303 = "ROS_LBOOM_V = "ROS_V11.TF" = "EARTH_TOPO = "EARTHFIXEDI = "EARTHFIXEDI = "ROS_RPC_V11	2093352_00053.H 0.B" 050714.TF" AU.TF" IRF93.TF" .TI"	
SPICE_FILE_NAME SPICE_FILE_NAME SPICE_FILE_NAME SPICE_FILE_NAME SPICE_FILE_NAME SPICE_FILE_NAME SPICE_FILE_NAME SPICE_FILE_NAME	= "NAIF0008.TL; = "PCK00008.TPG = "DE403-MASSE; = "EARTH_00010; = "ROS_070312_; = "DE405.BSP" = "ORER = "ORHR	C" S.TPC" 1_060918_060627 STEP.TSC" 00031_F	BSP"
PRODUCER_ID PRODUCER_FULL_NAME PRODUCER_INSTITUTION_NAM DATA_QUALITY_ID DATA_QUALITY_DESC ONLY 'GOOD' RAW DATA HA PROCESSING LEVEL ID	= "RPC_MAG_TEAN = "INGO RICHTEN E = "IGEP-TU-BRAN = "N/A" = "	M" R" UNSCHWEIG"	
DESCRIPTION THIS FILE CONTAINS CALL	= "	VECTOR DATA OF	BTAINED BY THE

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BEEN APPLIED TO 7 COORDINATES.DATA	METER ABOARD THE ROS THE RAW DATA. FIELD ARE AVERAGED TO 1 S = "	IS ROTATE		
NOTE GROUND CALIBRATIC NOTE INFLIGHT CALIBRAT NOTE DATA SOURCE FOR C FLIGHT SOFTWARE VE	AVE BEEN GENERATED I	_CALIB_FSD D2_CALIB_O ATA"	 PU_FMOB.TXT" B.TXT"	
	$ING_{DESC} = "MAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAG$:D"
NAME INTERCHANGE_FORMAT	= "RPCMAG050305_C1 = TABLE = "RPCMAG-OB-1S_AT F = ASCII = 86397 = 7 = 90			
START_BYTE BYTES	= COLUMN = "TIME_UTC" = TIME = 1 = 26 = "UTC TIME OF OBS = COLUMN	SERVATION:	YYYY-MM-DDTHH	I:MM:SS.FFFFFF"
DATA_TYPE START_BYTE BYTES DESCRIPTION AT 1.1.2003: SSSS END_OBJECT	= 28 = 15 = "S/C CLOCK AT ON SSSSSS.FFFFF" = COLUMN	BSERVATION	TIME, SECONDS	SINCE 00:00
	ECTED DATA, S/C-COOR			
OBJECT NAME DATA_TYPE START_BYTE BYTES UNIT UNIT_ID DESCRIPTION	<pre>= COLUMN = "BY_OB" = ASCII_REAL = 54 = 9 = "NANOTESLA" = "nT" = "MAGNETIC FIELD ECTED DATA, S/C-COON</pre>	Y COMPONE RDINATES,	NT, CALIBRATEL 1S_AVERAGE-OB), SENSOR"

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END_OBJECT	= COLU	MN			
OBJECT NAME DATA_TYPE START_BYTE BYTES UNIT UNIT_ID DESCRIPTION TEMPERATURE CO END_OBJECT	= 64 = 9 = "NAN = "nT" = "MAG	OB" I_REAL OTESLA" NETIC FIELD TA, S/C-COOR			
OBJECT NAME DATA_TYPE START_BYTE BYTES UNIT UNIT_ID DESCRIPTION END_OBJECT	= COLU = "T_C = ASCI = 74 = 6 = "KEI = "K" = "TEM = COLU	B" I_REAL VIN" IPERATURE OF	RPCMAG OB	SENSOR"	
OBJECT NAME DATA_TYPE START_BYTE BYTES DESCRIPTION These flags de The quality is the following	= CHAR = 81 = 8 = " escribe the s coded in values:	LITY_FLAGS" ACTER			
0 no	operty desc disturbanc ecific dist	ribed by fla e, good qual urbance/prob fic flags:	ity		
FLAG-STRING FI	_	-			
87654321 	x = im 0 = nc 1 = di 2 = di	OF REACTION pact not ass disturbance sturbance el sturbance el ta disturbed	essed iminated (imination	during data ar failed	nalysis
	x = im 0 = nc 1 = di 2 = di	OF LANDER H pact not ass disturbance sturbance el sturbance el ta disturbed	essed iminated (imination	during data ar	nalysis
:::::: :::::: :::::: :::::: ::::::: ::::	0 = bc 1 = bc 2 = bc	om deployed om stowed		. Data only va	alid in

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:::::	3 = pyros fired for boom release	
:::::	A OPECEM DELAMED PERCAG.	
	4 OFFSET RELATED EFFECTS: x = offset issues not assessed	
::::	0 = no offset problems	
::::	1 = offset behavior not clear	
	2 = offset drifts, sensor not in thermal	
	equilibrium thus temperature model N/A	
	3 = offset drifts, reason unknown	
	4 = ofset jump detected, reason unknown	
	4 Office Jump deceeted, feason anknown	
	5 CORRELATION BETWEEN IB AND OB SENSOR	
:::	x = correlation not assessed	
:::	0 = perfect correlation	
:::	1 = good correlation	
:::	2 = poor correlation	
:::	3 = IB and OB show different long term behavior	
:::		
:::		
:::	6 OTHER IMPACTS DECREASING THE QUALITY	
::	x = no assessment	
::	0 = no other problems detected	
::	1 = TBD	
::	2 = TBD	
::	3 = TBD	
::	4 = TBD	
::	5 = data disturbed by AC signal originated in s/c	
::	6 = data noisy due to power on failure	
::	7 = data not calculatable due to thermistor failure	
::	8 = sensor saturated due to huge external field	
::	<pre>9 = sensor saturated, instrument power on sequence failed</pre>	
::		
::	7 TBD	
:	x = no assessment	
:		
:	8 TBD	
:	x = no assessment	
:		
"		
END_OBJECT	= COLUMN	
END_OBJECT	= TABLE	
END		

4.3.12 Data Product "RESAMPLED LEVEL_G Magnetic Field data" Design

PDS_VERSION_ID= PDS3LABEL_REVISION_NOTE= "V1.0"RELEASE_ID= 0001REVISION_ID= 0000RECORD_TYPE= FIXED_LENGTHRECORD_BYTES= 125FILE_RECORDS= 6955

Document No. : RO-IGEP-TR0009 Institut für IGEP Geophysik und extraterrestrische Physik Issue/Rev. No. : 2.9 RPC-MAG EAICD : 5 September 2007 Date TU Braunschweig Page : 89 = "RO-X-RPCMAG-4-CVP-RESAMPLED-V1.0" DATA SET ID DATA SET NAME = "ROSETTA-ORBITER CHECK RPCMAG 4 CVP RESAMPLED V1.0" PRODUCT_ID = "RPCMAG040906_CLG_OB_A1" PRODUCT_CREATION_TIME PRODUCT_TYPE $= 2007 - 04 - 04T11 \cdot 28 \cdot 16$ = "REFDR" = "ROSETTA" MISSION ID MISSION NAME = "INTERNATIONAL ROSETTA MISSION" = "COMMISSIONING" MISSION PHASE NAME = "RO" INSTRUMENT HOST ID INSTRUMENT HOST NAME = "ROSETTA-ORBITER" = "RPCMAG" INSTRUMENT ID INSTRUMENT NAME = "ROSETTA PLASMA CONSORTIUM - FLUXGATE MAGNETOMETER" = "MAGNETOMETER" INSTRUMENT_TYPE = "AVERAGED" INSTRUMENT MODE ID = "1 S AVERAGES" INSTRUMENT_MODE_DESC = "CHECKOUT" TARGET_NAME TARGET_TYPE NOTE = " = "N/A" MAGNETIC COORDINATE SYSTEM : ECLIPJ2000" COORDINATE SYSTEM CENTER NAME = "SUN" = 2004-09-06T20:02:43.486 START TIME STOP TIME = 2004 - 09 - 06T23:59:57.486SPACECRAFT CLOCK START COUNT = "1/53121746.77760" = "1/53135980.77760" SPACECRAFT CLOCK STOP COUNT START_JULIAN_DATE_VALUE = 2453255.3352255328 STOP JULIAN DATE VALUE = 2453255.4999709032 SC_SUN_POSITION_VECTOR SC_TARGET_POSITION_VECTOR SC_TARGET_VELOCITY_VECTOR = (-151341561.80, -34993845.93, 540018.39) = "N/A" = "N/A" SPACECRAFT_ALTITUDE = "N/A" SUB SPACECRAFT LATITUDE = 999.999SUB SPACECRAFT LONGITUDE = 999.999 =" NOTE The values of the keywords SC SUN POSITION VECTOR, SC TARGET POSITION VECTOR and SC TARGET VELOCITY VECTOR, are related to the ECLIPJ2000 reference frame. 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>" SPICE FILE NAME = "ATNR P040302093352 00053.BC" = "ROS LBOOM VO.B" SPICE FILE NAME SPICE FILE NAME = "ROS V11.TF" = "EARTH TOPO 050714.TF" SPICE FILE NAME SPICE_FILE_NAME = "EARTHFIXEDIAU.TF" SPICE FILE NAME = "EARTHFIXEDITRF93.TF" = "ROS RPC V11.TI" SPICE_FILE_NAME = "NAIF0008.TLS" SPICE_FILE_NAME = "PCK00008.TPC" SPICE FILE NAME = "DE403-MASSES.TPC" SPICE FILE NAME SPICE FILE NAME = "EARTH 000101 060918_060627.BPC" SPICE FILE NAME = "ROS 070312 STEP.TSC" SPICE FILE NAME = "DE405.BSP" = "ORER __00031.BSP" SPICE FILE NAME = "ORHR SPICE FILE NAME 00052.BSP" = "RPC MAG TEAM" PRODUCER ID PRODUCER FULL NAME = "INGO RICHTER"

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PRODUCER_INSTITUTIO DATA_QUALITY_ID DATA_QUALITY_DESC ONLY 'GOOD' RAW DA PROCESSING_LEVEL_II	= "N/A" = " ATA HAVE BEEN PROCES	"	NSCHWEIG" STORED"	
OUTBOARD MAGNETOMI BEEN APPLIED TO TH THE S/C POSITION I DATA ARE AVERAGED NOTE	= " S CALIBRATED MAGNET: ETER ABOARD THE ROSI HE RAW DATA. FIELD : IS GIVEN IN ECLIPJ: TO 1 S MEANS." = " VE BEEN GENERATED B	ETTA S/C. IS ROTATE 2000 COOR	GROUND CALIB D TO ECLIPJ200 DINATES AS WE	RATION RESULTS HAVE 00 COORDINATES. LL.
NOTE	= "			
NOTE	UTED USING FILE ATNI = "			—
S/C POSITION COMPUNIE	UTED USING FILE ORHI = "	R_FDRRMA_	DA	00052.ROS"
GROUND CALIBRATION	N FILE: RPCMAG_GND_(= "	CALIB_FSD	PU_FMOB.TXT"	
	ION FILE: RPCMAG_002 = "	2_CALIB_O	B.TXT"	
DATA SOURCE FOR CI	LG DATA: LEVEL_C DAT	TA"		
PLATFORM_OR_MOUNTIN	RSION_ID = ⁻ "FIL NG_DESC = "MAGI	NETOMETER	BOOM: DEPLOY	ED"
^TABLE	= "RPCMAG040906_CL0			
INTERCHANGE_FORMAT ROWS COLUMNS	= TABLE = "RPCMAG-OB-1S_AVN = ASCII = 6955 = 9 = 125	ERAGE-CLG	n	
START_BYTE BYTES	<pre>= COLUMN = "TIME_UTC" = TIME = 1 = 26 = "UTC TIME OF OBSI = COLUMN</pre>	ERVATION:	YYYY-MM-DDTHI	H:MM:SS.FFFFFF"
NAME DATA_TYPE START_BYTE BYTES DESCRIPTION AT 1.1.2003: SSSSS END_OBJECT OBJECT NAME DATA_TYPE START_BYTE BYTES	= COLUMN = COLUMN = "POSITION X"	SERVATION	TIME, SECONDS	SINCE 00:00

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DESCRIPTION END_OBJECT	= "SPACECRA = COLUMN	FT POSIT	ION, X CO	OMPONENT, ECLI	PJ2000"
- OBJECT NAME DATA_TYPE START_BYTE BYTES UNIT UNIT_ID DESCRIPTION END_OBJECT OBJECT	= 58 = 13 = "KILOMETE = "km" = "SPACECRA = COLUMN = COLUMN = "POSITION = ASCII_REA = 72 = 13	L R" FT POSIT _Z" L	ION, Y CO	OMPONENT, ECLI	PJ2000"
UNIT UNIT_ID DESCRIPTION END_OBJECT			ION, Z CO	OMPONENT, ECLI	PJ2000"
OBJECT NAME DATA_TYPE START_BYTE BYTES UNIT UNIT_ID DESCRIPTION CORRECTED DATA, END_OBJECT	= 86 = 9 = "NANOTESL = "nT" = "MAGNETIC	A" FIELD X			, TEMPERATURE
OBJECT NAME DATA_TYPE START_BYTE BYTES UNIT UNIT_ID DESCRIPTION CORRECTED DATA, END_OBJECT	= "NANOTESL = "nT" = "MAGNETIC 1S AVERAGE-OB	A" FIELD Y	COMPONEI ECLIPJ2	NT, CALIBRATED 000"	, TEMPERATURE
OBJECT NAME DATA_TYPE START_BYTE BYTES UNIT UNIT_ID DESCRIPTION CORRECTED DATA, END_OBJECT	= 106 = 9 = "NANOTESL = "nT" = "MAGNETIC 1S AVERAGE-OB	A" FIELD Z			, TEMPERATURE
OBJECT	= COLUMN = "QUALITY_ = CHARACTER	FLAGS"			

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The quality the followi VALUE: x 0	<pre>= 8 = " describe the quality of the magnetic field data. is coded in a 8 byte string. Each character can have ng values: MEANING: property described by flag is still unknown no disturbance, good quality specific disturbance/problems, see below</pre>
Description	of the specific flags:
FLAG-STRING 87654321	FLAG DESCRIPTION
	<pre> 1 IMPACT OF REACTION WHEELS x = impact not assessed 0 = no disturbance 1 = disturbance eliminated during data analysis 2 = disturbance elimination failed 3 = data disturbed</pre>
::::::: ::::::::	2 IMPACT OF LANDER HEATER CURRENTS: x = impact not assessed
	0 = no disturbance 1 = disturbance eliminated during data analysis 2 = disturbance elimination failed 3 = data disturbed
	<pre> 3 BOOM DEPLOYMENT: 0 = boom deployed 1 = boom stowed 2 = boom deployment ongoing. Data only valid in instrument coordinates 3 = pyros fired for boom release</pre>
	<pre> 4 OFFSET RELATED EFFECTS: x = offset issues not assessed 0 = no offset problems 1 = offset behavior not clear 2 = offset drifts, sensor not in thermal equilibrium thus temperature model N/A 3 = offset drifts, reason unknown 4 = ofset jump detected, reason unknown</pre>
	<pre> 5 CORRELATION BETWEEN IB AND OB SENSOR x = correlation not assessed 0 = perfect correlation 1 = good correlation 2 = poor correlation 3 = IB and OB show different long term behavior</pre>
	<pre> 6 OTHER IMPACTS DECREASING THE QUALITY x = no assessment 0 = no other problems detected 1 = TBD 2 = TBD 3 = TBD 4 = TBD 5 = data disturbed by AC signal originated in s/c</pre>

	itut für ohysik und terrestrische RPC-MAG EAICD k	Document No. Issue/Rev. No. Date Page	: RO-IGEP-TR0009 : 2.9 : 5 September 2007 : 93
	<pre>6 = data noisy due to powe 7 = data not calculatable 8 = sensor saturated due t 9 = sensor saturated, inst</pre>	due to thermis b huge externa	l field
:: 7 : :	7 TBD x = no assessment		
: 8 : : :	3 TBD x = no assessment		
END_OBJECT END_OBJECT END	= COLUMN = TABLE		



4.3.13 Data Product "RESAMPLED LEVEL_H Magnetic Field data" Design

PDS VERSION ID = PDS3LABEL REVISION NOTE = "V1.0" RELEASE ID = 0001REVISION ID = 0000RECORD TYPE = FIXED LENGTH RECORD BYTES = 125 = 33280 FILE RECORDS = "RO-X-RPCMAG-4-CVP-RESAMPLED-V1.0" DATA_SET_ID DATA_SET_NAME = "ROSETTA-ORBITER CHECK RPCMAG 4 CVP RESAMPLED V1.0" PRODUCT_ID PRODUCT_CREATION_TIME = "RPCMAG040907T1226_CLH_OB_M4" = 2007-04-04T18:17:08 PRODUCT TYPE = "REFDR" MISSION ID = "ROSETTA" MISSION NAME = "INTERNATIONAL ROSETTA MISSION" = "COMMISSIONING" MISSION PHASE NAME = "RO" INSTRUMENT HOST ID = "ROSETTA-ORBITER" INSTRUMENT HOST NAME = "RPCMAG" INSTRUMENT_ID INSTRUMENT NAME = "ROSETTA PLASMA CONSORTIUM - FLUXGATE MAGNETOMETER" INSTRUMENT_TYPE INSTRUMENT_MODE_ID INSTRUMENT_MODE_DESC = "MAGNETOMETER" = "SID4" = " MEDIUM MODE: 160 PRIMARY & 1 SECONDARY VECTORS PER 32 SECONDS" TARGET NAME = "CHECKOUT" TARGET_TYPE NOTE = " = "N/A" MAGNETIC COORDINATE SYSTEM : ECLIPJ2000" COORDINATE SYSTEM CENTER NAME = "SUN" START TIME = 2004-09-07T12:26:36.898 STOP TIME = 2004-09-07T14:17:32.698 SPACECRAFT_CLOCK_START_COUNT = "1/53180780.21186" SPACECRAFT_CLOCK_STOP_COUNT = "1/53187436.07998" = 2453256.0184826162 = 2453256.0955173387 START JULIAN DATE VALUE STOP JULIAN DATE VALUE SC SUN POSITION VECTOR = (-151129554.88, -36671570.58, 551379.01) SC TARGET POSITION VECTOR = "N/A" SC TARGET VELOCITY VECTOR = "N/A" = "N/A" SPACECRAFT ALTITUDE SUB SPACECRAFT LATITUDE = 999.999 = 999.999 SUB SPACECRAFT LONGITUDE =" NOTE The values of the keywords SC_SUN_POSITION_VECTOR, SC TARGET POSITION VECTOR and SC TARGET VELOCITY VECTOR, are related to the ECLIPJ2000 reference frame. 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>" = "ATNR P040302093352 00053.BC" SPICE FILE NAME = "ROS LBOOM_V0.B" SPICE_FILE NAME = "ROS_V11.TF" SPICE FILE NAME = "EARTH_TOPO_050714.TF" SPICE FILE NAME

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AT 1.1.2003: S END_OBJECT OBJECT NAME DATA_TYPE START_BYTE BYTES UNIT UNIT_ID DESCRIPTION END_OBJECT	<pre>= COLUMN = COLUMN = "POSITION_X" = ASCII_REAL = 44 = 13 = "KILOMETER" = "km" = "SPACECRAFT POSITION, X COMPONENT, ECLIPJ2000" = COLUMN</pre>
OBJECT NAME DATA_TYPE START_BYTE BYTES UNIT UNIT_ID DESCRIPTION END_OBJECT	<pre>= COLUMN = "POSITION_Y" = ASCII_REAL = 58 = 13 = "KILOMETER" = "km" = "SPACECRAFT POSITION, Y COMPONENT, ECLIPJ2000" = COLUMN</pre>
OBJECT NAME DATA_TYPE START_BYTE BYTES UNIT UNIT_ID DESCRIPTION END_OBJECT	<pre>= COLUMN = "POSITION_Z" = ASCII_REAL = 72 = 13 = "KILOMETER" = "km" = "SPACECRAFT POSITION, Z COMPONENT, ECLIPJ2000" = COLUMN</pre>
OBJECT NAME DATA_TYPE START_BYTE BYTES UNIT UNIT_ID DESCRIPTION REACTION WHEEL	= COLUMN = "BX_OB" = ASCII_REAL
START_BYTE BYTES UNIT UNIT_ID DESCRIPTION	= 9 = "NANOTESLA"

Document No. : RO-IGEP-TR0009 Institut für IGEP Geophysik und extraterrestrische Physik Issue/Rev. No. : 2.9 RPC-MAG EAICD Date : 5 September 2007 TU Braunschweig Page : 97 END OBJECT = COLUMN OBJECT = COLUMN NAME = "BZ OB" DATA TYPE = ASCII REAL START BYTE = 106 = 9 BYTES = "NANOTESLA" UNTT = "nT" UNIT ID = "MAGNETIC FIELD Z COMPONENT, CALIBRATED, TEMPERATURE AND DESCRIPTION REACTION WHEEL CORRECTED DATA, ,OB SENSOR, ECLIPJ2000" END OBJECT = COLUMN OBJECT = COLUMN NAME = "QUALITY FLAGS" = CHARACTER DATA TYPE START BYTE = 116 = 8 BYTES = " DESCRIPTION These flags describe the quality of the magnetic field data. The quality is coded in a 8 byte string. Each character can have the following values: VALUE: MEANING: property described by flag is still unknown x 0 no disturbance, good quality 1..9 specific disturbance/problems, see below Description of the specific flags: FLAG-STRING FLAG DESCRIPTION 87654321 :::::: I IMPACT OF REACTION WHEELS :::::: x = impact not assessed 0 = no disturbance ::::::: 1 = disturbance eliminated during data analysis :::::: 2 = disturbance elimination failed :::::: 3 = data disturbed ::::::: :::::: :::::::---- 2 IMPACT OF LANDER HEATER CURRENTS: x = impact not assessed ::::: 0 = no disturbance::::: ::::: 1 = disturbance eliminated during data analysis 2 = disturbance elimination failed ::::: 3 = data disturbed::::: ::::: :::::: BOOM DEPLOYMENT: 0 = boom deployed::::: 1 = boom stowed::::: ::::: 2 = boom deployment ongoing. Data only valid in ::::: instrument coordinates 3 = pyros fired for boom release ::::: ::::: :::::---- 4 OFFSET RELATED EFFECTS: x = offset issues not assessed :::: 0 = no offset problems:::: 1 = offset behavior not clear :::: :::: 2 = offset drifts, sensor not in thermal :::: equilibrium thus temperature model N/A 3 = offset drifts, reason unknown :::: 4 = ofset jump detected, reason unknown ::::

	t für vsik und rrestrische RPC-MAG EAICD Document No. : RO-IGEP-TR0009 Issue/Rev. No. : 2.9 Date : 5 September 2007 Page : 98	
: :	CORRELATION BETWEEN IB AND OB SENSOR x = correlation not assessed 0 = perfect correlation 1 = good correlation 2 = poor correlation 3 = IB and OB show different long term behavior	
	OTHER IMPACTS DECREASING THE QUALITY x = no assessment 0 = no other problems detected 1 = TBD 2 = TBD 3 = TBD 4 = TBD 5 = data disturbed by AC signal originated in s/c 6 = data noisy due to power on failure 7 = data not calculatable due to thermistor failure 8 = sensor saturated due to huge external field 9 = sensor saturated, instrument power on sequence failed	d
:: :: : : : :	TBD x = no assessment TBD x = no assessment	
END_OBJECT END_OBJECT END	= COLUMN = TABLE	

4.3.14 Data Product "RESAMPLED LEVEL_I Magnetic Field data" Design

LABEL REVISION NOTE = RELEASE ID = REVISION_ID = RECORD_TYPE = RECORD_BYTES = FILE_RECORDS = DATA_SET_ID = DATA_SET_NAME = "ROSETTA-ORBITER PRODUCT_ID = PRODUCT_CREATION_TIME = PRODUCT_TYPE = MISSION_ID =	PDS3 "V1.0" 0001 0000 FIXED_LENGTH 125 2860 "RO-M-RPCMAG-4-MARS-RESAMPLED-V1.0" MARS RPCMAG 4 MARS RESAMPLED V1.0" "RPCMAG070225_CLI_OB_A30" 2007-04-20T13:51:04 "REFDR" "ROSETTA" "INTERNATIONAL ROSETTA MISSION"
MISSION_PHASE_NAME =	"MARS SWING-BY"
	"RO" "ROSETTA-ORBITER"

Document No. : RO-IGEP-TR0009 Institut für IGEP Geophysik und extraterrestrische Physik Issue/Rev. No. : 2.9 RPC-MAG EAICD Date : 5 September 2007 TU Braunschweig Page : 99 = "RPCMAG" INSTRUMENT ID INSTRUMENT NAME = "ROSETTA PLASMA CONSORTIUM - FLUXGATE MAGNETOMETER" INSTRUMENT_TYPE = "MAGNETOMETER" INSTRUMENT_MODE_ID = "AVERAGED" = "30 S AVERAGES" INSTRUMENT MODE DESC NOTE = " MAGNETIC COORDINATE SYSTEM : ECLIPJ2000" COORDINATE SYSTEM CENTER NAME = "MARS" = "MARS" TARGET NAME TARGET TYPE = "PLANET" START TIME = 2007 - 02 - 25T00:00:15.034STOP TIME = 2007 - 02 - 25T23:49:45.034= "1/130982386.08039" SPACECRAFT_CLOCK_START_COUNT SPACECRAFT CLOCK STOP COUNT = "1/131068156.08039" START_JULIAN_DATE_VALUE = 2454156.5001740051 STOP JULIAN DATE VALUE = 2454157.4928823384 4967554.99) SC SUN POSITION VECTOR = (-18390375.74, 215330839.05, SC TARGET_POSITION_VECTOR = (-14097.50, -62052.37, 2999.38) = (SC TARGET VELOCITY VECTOR 1.42, 8.75, -0.59)60308.072 SPACECRAFT ALTITUDE = = SUB SPACECRAFT LATITUDE 0.142 SUB SPACECRAFT LONGITUDE = 63.187 _" NOTE The values of the keywords SC_SUN_POSITION_VECTOR, SC_TARGET_POSITION_VECTOR and SC_TARGET_VELOCITY_VECTOR, are related to the ECLIPJ2000 reference frame. 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>" = "ATNR P040302093352 00053.BC" SPICE FILE NAME SPICE FILE NAME = "ROS LBOOM VO.B" SPICE FILE NAME = "ROS V11.TF" SPICE_FILE_NAME = "EARTH TOPO 050714.TF" SPICE_FILE_NAME = "EARTHFIXEDIAU.TF" = "EARTHFIXEDITRF93.TF" SPICE_FILE_NAME = "RSSD0001.TF" SPICE_FILE_NAME = "ROS_RPC_V11.TI"
= "NAIF0008.TLS" SPICE_FILE_NAME SPICE_FILE_NAME SPICE FILE NAME = "PCK00008.TPC" SPICE FILE NAME = "DE403-MASSES.TPC" SPICE FILE NAME = "EARTH 000101 060918 060627.BPC" = "ROS $0\overline{7}0312$ STEP.TSC" SPICE FILE NAME = "C2001Q4.BSP" SPICE FILE NAME = "C2002T7.BSP" SPICE FILE NAME SPICE FILE NAME = "DE405.BSP" = "DSNSTNS.BS" SPICE_FILE_NAME = "ORER SPICE_FILE_NAME 00031.BSP" SPICE FILE NAME = "ORFR 00052.BSP" = "ORGR SPICE FILE NAME 00052.BSP" ____00052.BSP" SPICE FILE NAME = "ORHR 00052.BSP" SPICE FILE NAME = "ORMR SPICE FILE NAME = "HONDA45P.BS" PRODUCER ID = "RPC MAG TEAM" = "INGO RICHTER" PRODUCER FULL NAME PRODUCER_INSTITUTION NAME = "IGEP-TU-BRAUNSCHWEIG" = "N/A" DATA QUALITY ID

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= " DATA QUALITY DESC ONLY 'GOOD' RAW DATA HAVE BEEN PROCESSED AND STORED" PROCESSING LEVEL ID = 4 = " DESCRIPTION THIS FILE CONTAINS CALIBRATED MAGNETIC FIELD VECTOR DATA OBTAINED BY THE OUTBOARD MAGNETOMETER ABOARD THE ROSETTA S/C. GROUND CALIBRATION RESULTS HAVE BEEN APPLIED TO THE RAW DATA. FIELD IS ROTATED TO ECLIPJ2000 COORDINATES. THE S/C POSITION IS GIVEN IN ECLIPJ2000 COORDINATES AS WELL. DATA ARE AVERAGED TO 30 S MEANS. DATA HAVE BEEN CORRECTED WITH RESPECT TO THE REACTION WHEEL SIGNATURES" = " NOTE LBL & TAB FILE HAVE BEEN GENERATED BY S/W: GEN_CAL_DATA, VERSION V20070412" = " NOTE S/C ATTITUDE COMPUTED USING FILE ATNR FDRRMA DAP040302093352 00053.ROS" = " NOTE S/C POSITION COMPUTED USING FILE ORMR FDRRMA DA 00052.ROS" = " NOTE GROUND CALIBRATION FILE: RPCMAG GND CALIB FSDPU FMOB.TXT" ="" NOTE INFLIGHT CALIBRATION FILE: RPCMAG_070225_006_CALIB_OB.TXT" = " REACTION WHEEL SIGNATURE CORRECTION HAS BEEN PERFORMED" = "INPUT DATA: LEVEL_H" NOTE = " NOTE DATA SOURCE FOR LEVEL H DATA WERE LEVEL C DATA" FLIGHT_SOFTWARE_VERSION_ID = "FIL:V1.0" = "MAGNETOMETER BOOM: DEPLOYED" PLATFORM OR MOUNTING DESC ^TABLE = "RPCMAG070225 CLI OB A30.TAB" OBJECT = TABLE = "RPCMAG-OB-30S AVERAGE-RW CORR-CLI" NAME INTERCHANGE FORMAT = ASCII ROWS = 2860COLUMNS = 9 ROW BYTES = 125 OBJECT = COLUMN = "TIME UTC" NAME = TIME DATA TYPE START BYTE = 1 = 26 BYTES = "UTC TIME OF OBSERVATION: YYYY-MM-DDTHH:MM:SS.FFFFFF" DESCRIPTION END OBJECT = COLUMN OBJECT = COLUMN NAME = "TIME OBT" DATA TYPE = ASCII REAL START BYTE = 28 BYTES = 15 = "S/C CLOCK AT OBSERVATION TIME, SECONDS SINCE 00:00 DESCRIPTION AT 1.1.2003: SSSSSSSSS.FFFFF" END OBJECT = COLUMN OBJECT = COLUMN = "POSITION X" NAME DATA TYPE = ASCII REAL = 44 START BYTE BYTES = 13

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UNIT UNIT_ID DESCRIPTION END_OBJECT	<pre>= "KILOMETER" = "km" = "SPACECRAFT POSITION, X C = COLUMN</pre>	OMPONENT, ECL	IPJ2000"
OBJECT NAME DATA_TYPE START_BYTE BYTES UNIT UNIT_ID DESCRIPTION END_OBJECT	<pre>= COLUMN = "POSITION_Y" = ASCII_REAL = 58 = 13 = "KILOMETER" = "km" = "SPACECRAFT POSITION, Y C = COLUMN</pre>	OMPONENT, ECL	IPJ2000"
OBJECT NAME DATA_TYPE START_BYTE BYTES UNIT UNIT_ID DESCRIPTION END_OBJECT	<pre>= COLUMN = "POSITION_Z" = ASCII_REAL = 72 = 13 = "KILOMETER" = "km" = "SPACECRAFT POSITION, Z C = COLUMN</pre>	OMPONENT, ECL:	IPJ2000"
	<pre>= COLUMN = "BX_OB" = ASCII_REAL = 86 = 9 = "NANOTESLA" = "nT" = "MAGNETIC FIELD X COMPONE 30S_AVERAGE-OB SENSOR, RW COR = COLUMN</pre>		
CORRECTED DATA,	<pre>= COLUMN = "BY_OB" = ASCII_REAL = 96 = 9 = "NANOTESLA" = "nT" = "MAGNETIC FIELD Y COMPONE 30S_AVERAGE-OB SENSOR, RW COR = COLUMN</pre>	NT, CALIBRATEI RECTED, ECLIPO	D, TEMPERATURE J2000"
DESCRIPTION	<pre>= 106 = 9 = "NANOTESLA" = "nT" = "MAGNETIC FIELD Z COMPONE 30S_AVERAGE-OB SENSOR, RW COR</pre>		
NAME	= "QUALITY_FLAGS"		

Document No. : RO-IGEP-TR0009 Institut für Geophysik und extraterrestrische Physik IGEP Issue/Rev. No. : 2.9 RPC-MAG EAICD Date : 5 September 2007 TU Braunschweig Page : 102 DATA TYPE = CHARACTER START BYTE = 116 BYTES = 8 = " DESCRIPTION These flags describe the quality of the magnetic field data. The quality is coded in a 8 byte string. Each character can have the following values: VALUE: MEANING: property described by flag is still unknown х 0 no disturbance, good quality 1..9 specific disturbance/problems, see below Description of the specific flags: FLAG-STRING FLAG DESCRIPTION 87654321 ::::::: 1 IMPACT OF REACTION WHEELS x = impact not assessed ::::::: 0 = no disturbance :::::: 1 = disturbance eliminated during data analysis :::::: ::::::: 2 = disturbance elimination failed 3 = data disturbed :::::: ::::::: ::::::---- 2 IMPACT OF LANDER HEATER CURRENTS: x = impact not assessed :::::: 0 = no disturbance ::::: ::::: 1 = disturbance eliminated during data analysis ::::: 2 = disturbance elimination failed ::::: 3 = data disturbed ::::: ::::: BOOM DEPLOYMENT: 0 = boom deployed ::::: 1 = boom stowed::::: 2 = boom deployment ongoing. Data only valid in ::::: instrument coordinates ::::: 3 = pyros fired for boom release ::::: ::::: ::::: 4 OFFSET RELATED EFFECTS: x = offset issues not assessed :::: 0 = no offset problems:::: :::: 1 = offset behavior not clear 2 = offset drifts, sensor not in thermal :::: :::: equilibrium thus temperature model N/A 3 = offset drifts, reason unknown :::: 4 = ofset jump detected, reason unknown :::: :::: ::::---- 5 CORRELATION BETWEEN IB AND OB SENSOR x = correlation not assessed ::: ::: 0 = perfect correlation ::: 1 = good correlation2 = poor correlation ::: ::: 3 = IB and OB show different long term behavior ::: ::: :::---- 6 OTHER IMPACTS DECREASING THE QUALITY x = no assessment :: :: 0 = no other problems detected :: 1 = TBD2 = TBD:: 3 = TBD::

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	<pre>4 = TBD 5 = data disturbed by AC s 6 = data noisy due to powe 7 = data not calculatable 8 = sensor saturated due t 9 = sensor saturated, inst</pre>	r on failure due to thermis o huge externa	tor failure l field
:	7 TBD x = no assessment		
: { : : : "	3 TBD x = no assessment		
END_OBJECT END_OBJECT END	= COLUMN = TABLE		

4.3.15 Data Product "DERIVED LEVEL_J Magnetic Field data" Design

= PDS3 = "V1.0" PDS VERSION ID LABEL REVISION NOTE RELEASE_ID _ = 0001 REVISION ID = 0000 RECORD TYPE = FIXED LENGTH RECORD BYTES = 125 FILE RECORDS = 86348 DATA SET ID = "RO-E-RPCMAG-5-EAR1-DERIVED-V1.0" DATA SET NAME = "ROSETTA-ORBITER EARTH RPCMAG 5 EAR1 DERIVED V1.0" = "RPCMAG050302 CLJ OB A1 U" PRODUCT ID = 2007 - 04 - 17T16:25:13PRODUCT_CREATION_TIME PRODUCT_TYPE = "DDR" = "ROSETTA" MISSION_ID = "INTERNATIONAL ROSETTA MISSION" MISSION NAME MISSION_NAME=INTERNATIONAL ROOMMISSION_PHASE_NAME="EARTH SWING-BY 1"INSTRUMENT_HOST_ID="RO"INSTRUMENT_HOST_NAME="ROSETTA-ORBITER"INSTRUMENT_ID="ROPCMAG" INSTRUMENT_TYPE = "MAGNETOMETER" INSTRUMENT_MODE_ID = "AVUEST INSTRUMENT NAME = "ROSETTA PLASMA CONSORTIUM - FLUXGATE MAGNETOMETER" = "1 S AVERAGES" INSTRUMENT MODE DESC NOTE = " MAGNETIC_COORDINATE_SYSTEM : ECLIPJ2000" COORDINATE_SYSTEM_CENTER_NAME = "SUN" = "EARTH" TARGET NAME TARGET_TYPE START_TIME = "PLANET" = 2005-03-02T00:00:07.005 STOP TIME = 2005-03-02T23:59:14.005 SPACECRAFT_CLOCK_START_COUNT = "1/68342387.59800"
SPACECRAFT_CLOCK_STOP_COUNT = "1/68428734.59800"



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START_JULIAN_DATE VALUE = 2453431.5000810768 = 2453432.43510 = (141573674.90, -47461/55.00, = (1028786.74, -248981.70, = (-3.87, 0.86, = 1053505.673 STOP_JULIAN_DATE_VALUE = 2453432.4994676509 SC_SUN_POSITION_VECTOR SC_TARGET_POSITION_VECTOR SC_TARGET_VELOCITY_VECTOR SPACECRAFT_ALTITUDE 54803.53) 54401.95) -0.22)SUB SPACECRAFT LATITUDE = 999.999 SUB_SPACECRAFT_LONGITUDE _ '' NOTE The values of the keywords SC SUN POSITION VECTOR, SC TARGET POSITION VECTOR and SC TARGET VELOCITY VECTOR, are related to the ECLIPJ2000 reference frame. 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>" SPICE FILE NAME = "ATNR P040302093352 00053.BC" = "ROS LBOOM VO.B" SPICE FILE NAME = "ROS V11.TF" SPICE FILE NAME = "EARTH TOPO 050714.TF" SPICE FILE NAME = "EARTHFIXEDIAU.TF" SPICE FILE NAME SPICE_FILE_NAME = "EARTHFIXEDITRF93.TF" = "ROS RPC V11.TI" SPICE_FILE_NAME = "NAIF0008.TLS" = "PCK00008.TPC" = "DE403-MASSES.TPC" SPICE_FILE_NAME SPICE_FILE_NAME SPICE_FILE_NAME SPICE_FILE_NAME = "EARTH 000101 060918 060627.BPC" SPICE FILE NAME = "ROS 070312 STEP.TSC" SPICE FILE NAME = "DE405.BSP" SPICE FILE NAME = "ORER 00031.BSP" = "ORHR SPICE FILE NAME PRODUCER ID = "RPC MAG TEAM" PRODUCER_FULL NAME = "INGO RICHTER" = "IGEP-TU-BRAUNSCHWEIG" PRODUCER INSTITUTION NAME = "N/A" DATA_QUALITY_ID DATA_QUALITY_DESC = " ONLY 'GOOD' RAW DATA HAVE BEEN PROCESSED AND STORED" = " PROCESSING LEVEL ID = .5 = " DESCRIPTION THIS FILE CONTAINS CALIBRATED MAGNETIC FIELD VECTOR DATA OBTAINED BY THE MAGNETOMETER ABOARD THE ROSETTA S/C. GROUND CALIBRATION RESULTS HAVE BEEN APPLIED TO THE RAW DATA. FIELD IS ROTATED TO ECLIPJ2000 COORDINATES. THE S/C POSITION IS GIVEN IN ECLIPJ2000 COORDINATES AS WELL. DATA ARE AVERAGED TO 1 S MEANS. A PCA HAS BEEN APPLIED. THIS DATA SET CONTAINS THE UNCORRELATED DATA OF THE OB SENSOR" NOTE = " LBL & TAB FILE HAVE BEEN GENERATED BY S/W: GEN CAL DATA, VERSION V20070330" NOTE = " S/C ATTITUDE COMPUTED USING FILE ATNR FDRRMA DAP040302093352 00053.ROS" = " NOTE S/C POSITION COMPUTED USING FILE ORHR FDRRMA DA 00052.ROS" NOTE = " GROUND CALIBRATION FILE: RPCMAG GND CALIB FSDPU F.TXT" = " NOTE INFLIGHT CALIBRATION FILE: RPCMAG_002 CALIB .TXT"

= "DATA SOURCE FOR PCA: LEVEL G DATA"

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NOTE = " DATA SOURCE FOR LEVEL_G DATA were LEVEL_L DATA" FLIGHT_SOFTWARE_VERSION_ID = "FIL:V1.0" PLATFORM_OR_MOUNTING_DESC = "MAGNETOMETER_BOOM: DEPLOYED"								
^TABLE	= "RPCMAG050302_CLJ_OB_A1_U	.TAB"						
OBJECT NAME INTERCHANGE_FORMAT ROWS COLUMNS ROW_BYTES	<pre>= TABLE = "RPCMAG-UNCORRELATED-OB-P C = ASCII = 86348 = 9 = 125</pre>	CA_DATA-1S_AVI	ERAGE-CLJ"					
OBJECT NAME DATA_TYPE START_BYTE BYTES DESCRIPTION END_OBJECT	<pre>= COLUMN = "TIME_UTC" = TIME = 1 = 26 = "UTC TIME OF OBSERVATION: = COLUMN</pre>	YYYY-MM-DDTHI	H:MM:SS.FFFFFF"					
	<pre>= COLUMN = "TIME_OBT" = ASCII_REAL = 28 = 15 = "S/C CLOCK AT OBSERVATION</pre>	TIME, SECONDS	SINCE 00:00					
START_BYTE BYTES UNIT	SSSSSS.FFFFF" = COLUMN = COLUMN = "POSITION_X" = ASCII_REAL = 44 = 13 = "KILOMETER" = "km" = "SPACECRAFT POSITION, X C = COLUMN	omponent, ecl.	IPJ2000"					
OBJECT NAME DATA_TYPE START_BYTE BYTES UNIT UNIT_ID DESCRIPTION END_OBJECT	<pre>= COLUMN = "POSITION_Y" = ASCII_REAL = 58 = 13 = "KILOMETER" = "km" = "SPACECRAFT POSITION, Y C = COLUMN</pre>	OMPONENT, ECL	IPJ2000"					
OBJECT NAME DATA_TYPE START_BYTE BYTES UNIT UNIT_ID DESCRIPTION END_OBJECT	<pre>= COLUMN = "POSITION_Z" = ASCII_REAL = 72 = 13 = "KILOMETER" = "km" = "SPACECRAFT POSITION, Z C = COLUMN</pre>	OMPONENT, ECL.	IPJ2000"					



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OBJECT = COLUMN = "BX UNCORRELATED" NAME DATA_TYPE = ASCII REAL START BYTE = 86 = 9 BYTES = "NANOTESLA" UNIT = "nT" UNIT ID = "MAGNETIC FIELD X COMPONENT OB SENSOR, CALIBRATED, DESCRIPTION TEMPERATURE CORRECTED DATA, 1S AVERAGE- PCA, UNCORRELATED DATA, ECLIPJ2000" END OBJECT = COLUMN OBJECT = COLUMN = "BY UNCORRELATED" NAME DATA_TYPE = ASCII REAL = 96 START_BYTE BYTES = 9 = "NANOTESLA" UNIT = "nT" UNIT ID = "MAGNETIC FIELD Y COMPONENT OB SENSOR, CALIBRATED, DESCRIPTION TEMPERATURE CORRECTED DATA, 1S AVERAGE- PCA, UNCORRELATED DATA, ECLIPJ2000" END OBJECT = COLUMN OBJECT = COLUMN = "BZ_UNCORRELATED" NAME DATA TYPE = ASCII REAL START BYTE = 106= 9 BYTES = "NANOTESLA" UNIT = "nT" UNIT ID = "MAGNETIC FIELD Z COMPONENT OB SENSOR, CALIBRATED, DESCRIPTION TEMPERATURE CORRECTED DATA, 1S AVERAGE- PCA, UNCORRELATED DATA, ECLIPJ2000" = COLUMN END OBJECT OBJECT = COLUMN = "QUALITY FLAGS" NAME DATA TYPE = CHARACTER START BYTE = 116 BYTES = 8 = " DESCRIPTION These flags describe the quality of the magnetic field data. The quality is coded in a 8 byte string. Each character can have the following values: VALUE: MEANING: property described by flag is still unknown х 0 no disturbance, good quality 1..9 specific disturbance/problems, see below Description of the specific flags: FLAG-STRING FLAG DESCRIPTION 87654321 ::::::: 1 IMPACT OF REACTION WHEELS :::::: x = impact not assessed 0 = no disturbance:::::: 1 = disturbance eliminated during data analysis :::::: :::::: 2 = disturbance elimination failed :::::: 3 = data disturbed :::::: ::::::---- 2 IMPACT OF LANDER HEATER CURRENTS:

Document No. : RO-IGEP-TR0009 Institut für Geophysik und extraterrestrische Physik IGEP Issue/Rev. No. : 2.9 RPC-MAG EAICD Date : 5 September 2007 TU Braunschweig Page : 107 x = impact not assessed ::::: 0 = no disturbance::::: 1 = disturbance eliminated during data analysis ::::: ::::: 2 = disturbance elimination failed ::::: 3 = data disturbed ::::: :::::: BOOM DEPLOYMENT: 0 = boom deployed::::: ::::: 1 = boom stowed2 = boom deployment ongoing. Data only valid in ::::: ::::: instrument coordinates 3 = pyros fired for boom release ::::: ::::: :::::---- 4 OFFSET RELATED EFFECTS: :::: x = offset issues not assessed 0 = no offset problems :::: 1 = offset behavior not clear :::: :::: 2 = offset drifts, sensor not in thermal equilibrium thus temperature model N/A :::: :::: 3 = offset drifts, reason unknown :::: 4 = ofset jump detected, reason unknown :::: ::::---- 5 CORRELATION BETWEEN IB AND OB SENSOR x = correlation not assessed ::: 0 = perfect correlation ::: 1 = good correlation ::: ::: 2 = poor correlation::: 3 = IB and OB show different long term behavior ::: ::: :::---- 6 OTHER IMPACTS DECREASING THE QUALITY x = no assessment :: 0 = no other problems detected :: 1 = TBD:: :: 2 = TBD3 = TBD:: 4 = TBD:: 5 = data disturbed by AC signal originated in s/c:: 6 = data noisy due to power on failure :: :: 7 = data not calculatable due to thermistor failure 8 = sensor saturated due to huge external field :: 9 = sensor saturated, instrument power on sequence failed :: :: ::---- 7 TBD : x = no assessment :---- 8 TBD x = no assessment : : ... END OBJECT = COLUMN END OBJECT = TABLE END



5 Appendix: Available Software to read PDS files

There is no special S/W available to read our PDS files.

6 Appendix: Example of Directory Listing of Data Set X



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RO-E-RPCMAG-3-EAR1-CP RO-E-RPCMAG-3-EAR1-CP RO-E-RPCMAG-3-EAR1-CP RO-E-RPCMAG-3-EAR1-CP RO-E-RPCMAG-3-EAR1-CP RO-E-RPCMAG-3-EAR1-CP RO-E-RPCMAG-3-EAR1-CP RO-E-RPCMAG-3-EAR1-CP RO-E-RPCMAG-3-EAR1-CP RO-E-RPCMAG-3-EAR1-CP RO-E-RPCMAG-3-EAR1-CP RO-E-RPCMAG-3-EAR1-CP RO-E-RPCMAG-3-EAR1-CP RO-E-RPCMAG-3-EAR1-CP RO-E-RPCMAG-3-EAR1-CP RO-E-RPCMAG-3-EAR1-CP RO-E-RPCMAG-3-EAR1-CP RO-E-RPCMAG-3-EAR1-CP	ALIBRATED-V1.0\\ ALIBRATED-V1.0\\ ALIBRATED-V1.0\\ ALIBRATED-V1.0\\ ALIBRATED-V1.0\\ ALIBRATED-V1.0\\ ALIBRATED-V1.0\\ ALIBRATED-V1.0\\ ALIBRATED-V1.0\\ ALIBRATED-V1.0\\ ALIBRATED-V1.0\\ ALIBRATED-V1.0\\ ALIBRATED-V1.0\\ ALIBRATED-V1.0\\\	VOLDESC.CAT PDSVOLUME.XML CALIB\CALINFO.T CALIB\RPCMAG_00 CALIB\RPCMAG_00 CALIB\RPCMAG_00 CALIB\RPCMAG_00 CALIB\RPCMAG_GN CALIB\RPCMAG_GN CALIB\CLA_OFFSE CALIB\CLA_OFFSE CALIB\CLA_OFFSE CALIB\CLA_OFFSE CALIB\CLA_OFFSE	2_CALIB_IB. 2_CALIB_OB. 2_CALIB_IB. 22_CALIB_OB. 10_CALIB_FSI 10_CALIB_FSI 10_CALIB_FSI 10_CALIB_FSI 10_CALIB_FSI 10_CALIB_FSI 15_CALIB_TXT TTS_IB.LBL TTS_IB.LBL	TXT LBL LBL DPU_FMIB.TXT DPU_FMOB.TXT DPU_FMIB.LBL	
RO-E-RPCMAG-3-EAR1-CA RO-E-RPCMAG-3-EAR1-CA RO-E-RPCMAG-3-EAR1-CA RO-E-RPCMAG-3-EAR1-CA RO-E-RPCMAG-3-EAR1-CA RO-E-RPCMAG-3-EAR1-CA RO-E-RPCMAG-3-EAR1-CA RO-E-RPCMAG-3-EAR1-CA RO-E-RPCMAG-3-EAR1-CA RO-E-RPCMAG-3-EAR1-CA RO-E-RPCMAG-3-EAR1-CA RO-E-RPCMAG-3-EAR1-CA RO-E-RPCMAG-3-EAR1-CA	LIBRATED-V1.0\C LIBRATED-V1.0\C LIBRATED-V1.0\C LIBRATED-V1.0\C LIBRATED-V1.0\C LIBRATED-V1.0\C LIBRATED-V1.0\C LIBRATED-V1.0\C LIBRATED-V1.0\C LIBRATED-V1.0\C LIBRATED-V1.0\C	CALIB\CLA_OFFSE CALIB\RPCMAG_SC CATALOG\CATINFC CATALOG\CATASET CATALOG\ROSETTA CATALOG\ROSETTA CATALOG\RPCMAG_ CATALOG\RPCMAG_ CATALOG\RPCMAG_ CATALOG\RPCMAG_ INDEX\INDEX.LBI INDEX\INDEX.TAB INDEX\INDEX.TAB INDEX\INDEX.TAB	TS_OB.LBL ALIGN.TXT TXT CAT INSTCAT.CAT MISSION.CA INST.CAT PERS.CAT REF.CAT SOFTWARE.CA TXT ZNG	ΛT	
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