

ROSETTA-RPC-MAG

To Planetary Science Archive Interface Control Document

EAICD

RO-IGEP-TR0009

Issue 3.3 18 February 2010

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Change Log

| Date | Sections Changed | Reasons for Change |
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| 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 |
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| | 4.3.1.9 | 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 |
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| 28.10.200 | | | | EAICD Acronym ind | cluded in Acronym List, |
| 9 | | | | List extended with I | RPCMAG_INST.CAT |
| | | | | Acronyms | |
| 26.1.2010 | 3.2 | | | • | according to S/W changes eview in October 2009 |
| | | | | LEVEL_H description disturbance correct | on update due to LAP tion |
| 18.2.2010 | 3.3 | | | Logbook Items add | led |



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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.

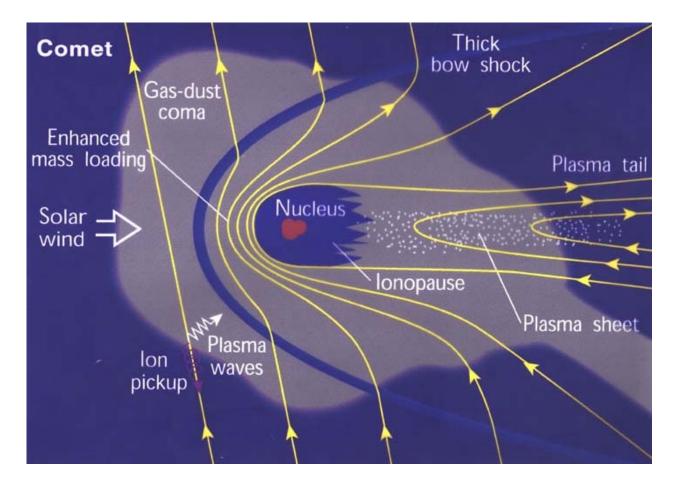
To explain this draping effect C.S. Wu and R.C. Davidson in 1972 studied the pick-up of cometary ions and the associated mass loading of the solar wind.

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

RO-IGEP-TR-0028, RPCMAG Step by step Calibration Procedure



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

| ADC: | Analog-Digital-Converter | | |
|---------------|--|--|--|
| AQP: | Acquisition Period | | |
| ASIC: | Application Specific Integrated Circuit | | |
| B-FIELD: | Magnetic Field | | |
| CG: | 67P/Churyumov-Gerasimenko | | |
| CO-I: | Co-Investigator | | |
| CuL: | Kupferlackdraht, Enamelled copper wire | | |
| DDS: | Data Distribution System | | |
| DPU: | Digital Processing Unit | | |
| DS-1: | NASA's Deepspace 1 Mission | | |
| EAICD: | Experimenter to Archive Interface Control Document | | |
| EID-B: | Experiment Interface Document , Part B | | |
| EMC: | Electromagnetic Compatibility | | |
| ESA: | European Space Agency | | |
| ESTEC: | European Space Research and Technology Centre | | |
| FGM: | Fluxgate-Magnetometer | | |
| FM: | Flight Model | | |
| FMECA: | Failure Mode Effects and Criticality Analysis | | |
| FPGA: | Field programmable Gate Array | | |
| FCP: | Flight Control Procedure | | |
| FS: | Flight Spare Model | | |
| HK: | Housekeeping data (Supply voltages, Ref. Voltages, Temperatures) | | |
| H/W: | Hardware | | |
| IABG: | Industrieanlagenbetriebsgesellschaft | | |
| IB: | Inboard Sensor | | |
| ID: Identifi | er | | |
| I/F: | Interface | | |
| IGEP: IWF: | Institut fuer Geophysik und extraterrestrische Physik, TU-Braunschweig Institut fuer Weltraumforschung,Graz | | |



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| LCL: | Latching Current Limiter |
|-------------|---|
| LEXAN: | Polycarbonate resin thermoplastic |
| MACOR: | Machinable glas ceramic |
| MAG: | Magnetometer |
| MIP: | RPC Mutual Impedance Probe |
| NASA: | National Aeronautics and Space Administration |
| OB: | Outboard Sensor |
| OPAMP: | Operational Amplifier |
| PCB: | Printed Circuit Board |
| PDS: | Planetary Data System |
| PERMALLOY: | Nickel Iron magnetic alloy |
| PI: | Principal Investigator |
| PIU: | RPC Power Interface Unit |
| PSA: | Planetary Science Archive |
| PT1000: | Platinum Thermistor with 1000 Ohm nominal resistance |
| RAW: | Data in units of ADC counts in instrument coordinates |
| ROKSY: | ROSETTA Knowledge Management System |
| ROMAP: | ROSETTA Lander Magnetometer |
| RPC: | ROSETTA Plasma Consortium |
| RPCMAG: | ROSETTA Orbiter Magnetometer |
| RPC-MAG: | ROSETTA Orbiter Magnetometer |
| RPC-0: | RPC Main Electronics Box |
| SADM: | Solar Array Drive Mechanism |
| S/C: | Spacecraft |
| SID: | Science Mode Identifier |
| S/W: | Software |
| SEU: | Single Event Upset |
| SEL: | Single Event Latch-up |
| TC: | Telecommand |
| TM: | Telemetry |
| TM: | Technical Manager |
| TS: | Time series |
| UV: | Ultraviolet |
| us: microse | econd |
| Wrt.: | with respect to |
| | |



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1.9 Contact Names and Addresses

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Responsible for the RAW2ASCII S/W, which converts Raw TM files to ASCII files:

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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.

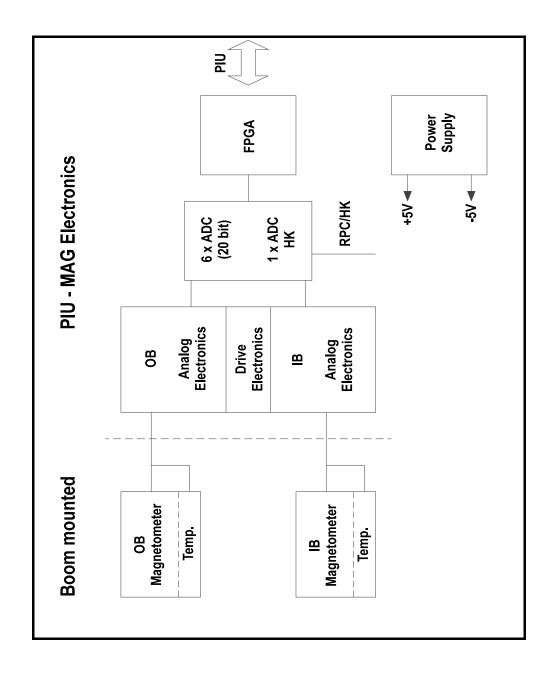
To further eliminate spacecraft fields and zero-offsets the so called multi-magnetometer technique will be applied in conjunction with statistical in-flight techniques. To increase time resolution 6 A/D converters (one for each of the six sensor channels) will be used synchronously. The A/D converters 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



2.1 Data Handling Process

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

2.1.1 Data Processing from DDS to 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:
 - o 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
 - o 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
 - Elimination of LAP Disturbance
 - Considering Lander heater current disturbance
 - o Setting Quality flags to CALIBRATED, RESAMPLED, and DERIVED data
 - 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
- this 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_RA | RPCMAGyymmddThhmm RAW <sensor> <mode>.ASS</mode></sensor> | | | | |
|----------------------------|---|--|--|--|--|
| Auxiliary data - Attitude: | ATyyyymmdd.ROS | | | | |
| Auxiliary data - Position: | POSyymmdd.ROS | | | | |
| Housekeeping data: | RPCMAGyymmddThhmm_RAW_HK.ASC | | | | |
| Calibration files: | RPCMAG_GND_CALIB_FSDPU_FM <sensor>.TXT,</sensor> | | | | |
| Boom alignment file: | RPCMAG_SC_ALIGN.TXT | | | | |
| | | | | | |

• Functions of GEN_CAL_DATA:

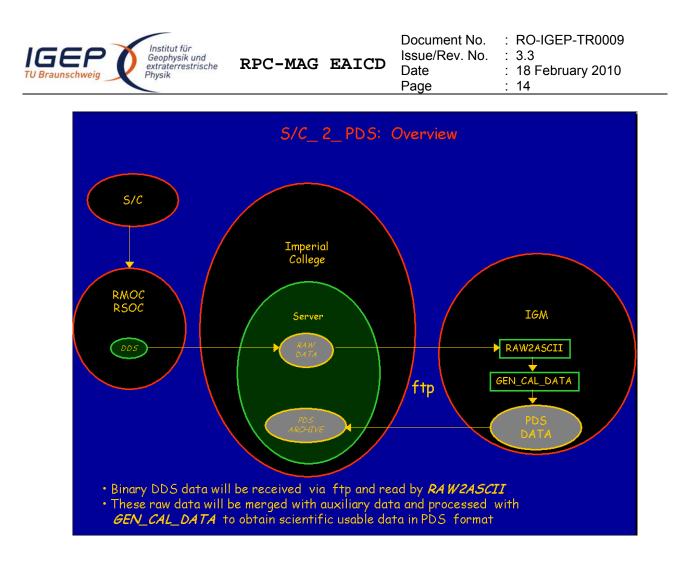
1) apply temperature dependent ground calibration results to get B-field in unit coordinates.

2) 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.

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2.1.2 Conversion of ADC-Counts to Physical Values

The measured values of the instrument are digitized by ADC-converters. The conversion from the raw ADCcounts to meaningful physical raw values (still uncalibrated) is different for magnetic field values and housekeeping values like e.g. instrument voltages. The following subsections shows detailed algorithms of the conversion from ADC counts to physical values:

• Science Data: Magnetic field values (range = +-15000nT, 20 Bit):

MAX_B = +15000 nT

 $MIN_B = -15000 nT$

 $COUNTS = 2^{20} = 1048576$

NOMINAL_FACTOR = (MAX_B - MIN_B) / COUNTS

The binary values of the 20-bit ADC Output are in the range of 00000h : FFFFh corresponding to decimal values of 0 :(COUNTS-1)

As the ADC is operated in bipolar mode the nominal relation between counts and magnetic field is as follows:

00000h <-> MIN_B

80000h <-> 0

FFFFFh <-> MAX_B

The conversion routine from binary TM data to ASCII Rawdata converts the binary values to signed integers in the following way

00000h -> -COUNTS/2

80000h -> 0

FFFFh -> +COUNTS/2

These signed integers in the range from -COUNTS/2 to +COUNTS/2 are the EDITED RAW DATA.Unit is [counts]. To convert these into uncalibrated [engineering, enT] nanotesla values, the following algorithm is applied:

B= [ADCvalue + COUNTS/2] * NOMINAL_FACTOR + MIN_B [enT]

Also the Housekeeping Reference Voltage is monitored via a 20-bit ADC and converted in the same manor.



• Housekeeping Data: Magnetic field values (range = +-15000nT, 16 bit)

MAX_B = +15000 nT MIN_B = -15000 nT COUNTS = 2^16 = 65536 NOMINAL_FACTOR = (MAX_B - MIN_B) / COUNTS

The binary values of the 16 bit ADC Output are in the range of 0000h : FFFFh corresponding to decimal values of 0 :(COUNTS-1). As the ADC is operated in bipolar mode the nominal relation between counts and magnetic field is as follows:

0000h <-> MIN_B 8000h <-> 0 FFFFh <-> MAX B

The conversion routine from binary TM data to ASCII Rawdata converts the binary values to signed integers in the following way

0000h -> -COUNTS/2

8000h -> 0

FFFFh -> +COUNTS/2

These signed integers in the range from -COUNTS/2 to +COUNTS/2 are the EDITED RAW DATA.Unit is [counts].

To convert these into uncalibrated [engineering, enT] nanotesla values, the following algorithm is applied:

B= [ADCvalue + COUNTS/2] * NOMINAL_FACTOR + MIN_B [enT]



• Housekeeping Data: Voltages (range = +-5V, 16 bit)

 $MAX_V = +2.5 V$ $MIN_V = -2.5 V$ $COUNTS = 2^{16} = 65536$ $NOMINAL_FACTOR = (MAX_V - MIN_V) / COUNTS$

The binary values of the 16 bit ADC Output are in the range of 0000h : FFFFh corresponding to decimal values of 0 :(COUNTS-1). As the ADC is operated in bipolar mode the nominal relation between counts and magnetic field is as follows:

0000h <-> MIN_V 8000h <-> 0

FFFFh <-> MAX_V

The conversion routine from binary TM data to ASCII Rawdata converts the binary values to signed integers in the following way

0000h -> -COUNTS/2

8000h -> 0

FFFFh -> +COUNTS/2

These signed integers in the range from -COUNTS/2 to +COUNTS/2 are the EDITED RAW DATA.Unit is [counts].

To convert these into voltages, the following algorithm is applied:

U= [ADCvalue + COUNTS/2] * NOMINAL_FACTOR + MIN_V [V]

Also the nominal temperatures are computed from HK voltages in a similar way. Some voltage are monitored as 8bit values; the conversion, however, is done in the same way.



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

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.

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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 residual fields 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. A quite similar filter also purges the data from the LAP disturbances, which occured as constant frequency lines (mode dependent) in the dynamic spectrum.

During the Earth Swing 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 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 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 |

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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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.

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:

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:

IB & OB Data in Instrument coordinates, derived from LEVEL A data, data resampled to 0 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 0 resampled to specified average interval, e.g. 1s, or 1 min UTC, OBT, BX, BY, BZ, T, QUALITY

LEVEL_G Data:

o 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 0 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

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|---|---|
|---|---|

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

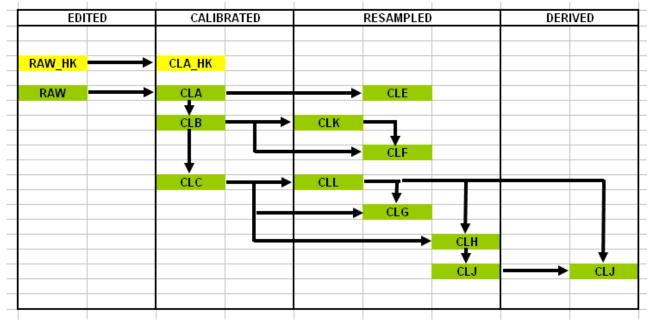
One file for correlated data (_C), and

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 or LAP disturbance also CLH data will be generated.

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





2.2.3 Software

We do not intend to deliver any software.

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|-------------------------|---------------|--|---|
|-------------------------|---------------|--|---|

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.

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

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|-------------------------|---------------|---------------|---|
|-------------------------|---------------|---------------|---|

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

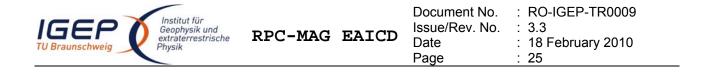
Actually it is not planned to deliver other derived data products than the described ones in section 2.4.5.

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.

The Attitude information 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 quaternions. The actual attitude can be evaluated using the OASW S/W provided by ESOC.



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:

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

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-V3.0"

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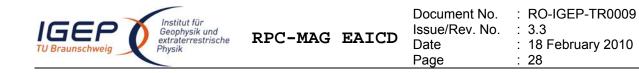
- RVM1,RVM2 : Rendezvous Maneuvre .
- NCD : Near comet Drift
- FAT / CAT: Far / Close Approach Trajectory
- TGM : Transition to Global mapping
- GMP: Global mapping Phase
- **COP** : Close Observation Phase
- SSP : Lander delivery
- LOW / HIGH :Comet Activity low/ high
- MINC: Comet Activity moderate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

Accumulated Phases:

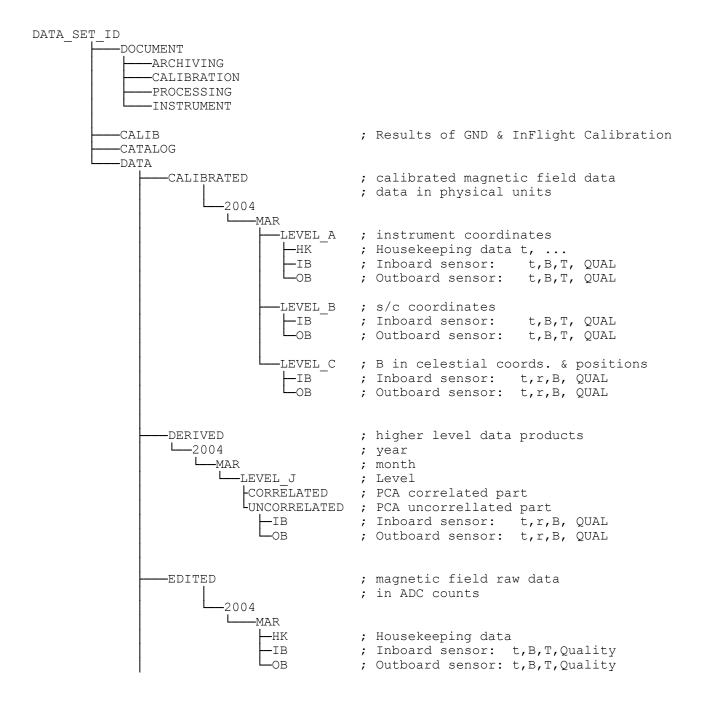
- APPR : Approach FAT to COP
- ESCO : Escort LOW to PERI
- COM : Comet FAT to PERI

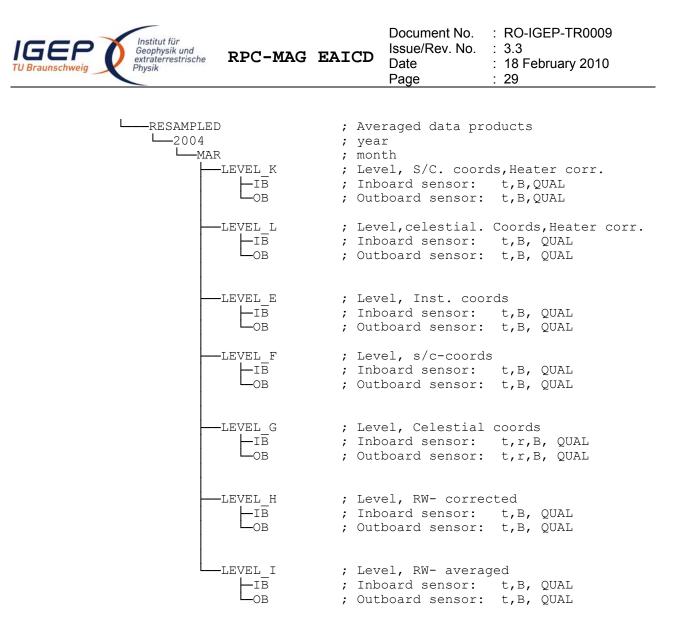
Designators according to RO-EST-PL-5011, Table 2

- Description: processing level... •
- V3.0 version number .



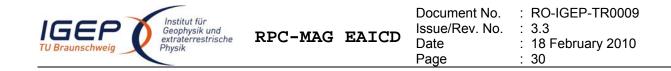
3.1.3 Data Directory Naming Convention





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></inst> | <begin observation="" of=""></begin> | <level></level> | <pre>_<sensor></sensor></pre> | _A <avera< th=""><th>ge>.<ext></ext></th></avera<> | ge>. <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> <begin of observation>_<level>_<sensor>_<inst mode>.<ext> RPCMAG yymmddThhmm CLK IB M1..M6 LBL CLL OB TAB CLI

Example: RPCMAG040528T1230_CLK_OB_M3.LBL 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> | <pre>_<sensor></sensor></pre> | _A <average>_</average> | U. <ext></ext> |
|---------------|--------------------------------------|-----------------|-------------------------------|-------------------------|----------------|
| RPCMAG | yymmdd | CLJ | IB | 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:

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

Example: RPCMAG040528T1230_HK.LBL 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/nnnnnnnnnnnnn"

Spacecraft Clock (OBT) in TAB files: nnnnnnnnnnnnn

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 system 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 Ecliptic 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: perpendicular to X in Ecliptic plane, Z: Perpendicular |

3.2.3 Reference Systems



| | 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-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 |
| | |
| | :::::: 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 |
| | |



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| # | | 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 |
| | :: | |
| | :: | |
| | :: | |
| # | :: | 4 = |
| # | :: | 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 |
| # | | |
| | :: | |
| | | x = no assessment |
| | : | |
| | | 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)

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 has 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

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



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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 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.



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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 RPCMAG_SC_ALIGN.TXT ; Info File

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_0B.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_OB.TXT**; Inflight Calib. for the OB sensor, February 27, 2007

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

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| Physik RPC-N | Page | : 40 |

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.

File format:

TIME Bx_GND By_GND Bz_GND Bx_IFL By_IFL Bz_IFL OFF_X OFF_Y OFF_Z T

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 | | | |
| RPCMAG_PERS.CAT | • | | | |
| | 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. | | | |
| | | | | |



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

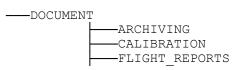
The needed geometry information will be taken from the ancillary files provided by RSOC via the DDS. These files are not PDS compliant. RSOC is responsible for archiving them. Thus, there will not be any GEOMETRY directory.

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 contains the calibration protocols and analysis reports. Also a SETEP by STEP Calibration Procedure is added here.

The documents are saved in the original version as TeX or WORD or PDF files.

For a detailed instrument overview the Instrument Paper RPCMAG_INSTRUMENT is added as PDF version.

A good overview about all instrument operations and events occurring during flight is presented in the RPCMAG Logbook-file. This file is available in ASCII format. Most parts of this file are directly extracted from the DDS TC logging file and the DDS Events file.

3.4.3.9 Data Directory

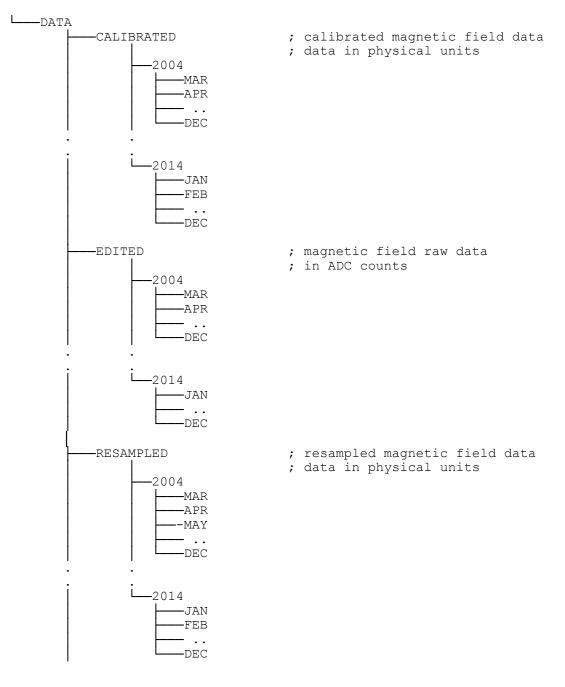
Refer to 3.1.3



4 Detailed Interface Specifications

4.1 Structure and Organization Overview

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.



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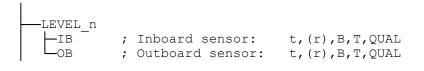
Each "Month" directory contains the different Level and sensor directories as described in Chapter 3.1.3. For the CALIBRATED data we have

| 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 |
| LB | ; 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 |
| LUNCORRELATED | ; | PCA uncorrellated part |
| —IB | ; | Inboard sensor: t,r,B,QUAL |
| | ; | Outboard sensor: t,r,B,QUAL |

4.2 Data Sets, Definition and Content

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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.



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4.3.1.3 Instrument and Detector Descriptive Data Elements

• INSTRUMENT MODE ID = "SID<n>"

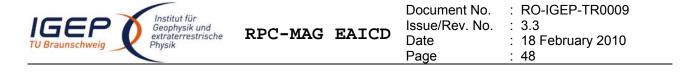
The instrument can operate in six modes SID1 ... SID6 (n=1..6). Meaning:

- o SID1: Minimum Mode
- o SID2: Normal Mode
- SID3: Burst Mode
- SID4: Medium Mode
- o 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 | 1⁄4 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 | |
| HK | 1280 Hz | 32 s | 8 words | 4 bits/s | | House |
| | Internal | | | | | 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 = PDS3LABEL REVISION NOTE = "V1.0" RECORD TYPE = FIXED LENGTH RECORD BYTES = 79 FILE RECORDS = 85435 DATA SET ID = "RO-E-RPCMAG-2-EAR1-RAW-V3.0" DATA SET NAME = "ROSETTA-ORBITER EARTH RPCMAG 2 EAR1 RAW V3.0" = "RPCMAG050301T0014 RAW OB M2" PRODUCT ID PRODUCT CREATION TIME = 2009 - 12 - 11T08:49:33= "EDR" PRODUCT TYPE = "ROSETTA" MISSION ID = "INTERNATIONAL ROSETTA MISSION" MISSION NAME = "EARTH SWING-BY 1"
= "EARTH SWINGBY 1"
= "RO" MISSION_PHASE_NAME OBSERVATION TYPE INSTRUMENT HOST ID INSTRUMENT_HOST_NAME INSTRUMENT_ID = "ROSETTA-ORBITER" = "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"

| Institut für Geophysik und extraterrestrische Physik | C-MAG | EAICD | Document No. Issue/Rev. No. Date Page | : 3.3 | EP-TR0009 oruary 2010 |
|--|--|---|--|---|----------------------------------|
| TARGET_NAME TARGET_TYPE NOTE = " MAGNETIC_COORDINATE_SYSTEM : START_TIME STOP_TIME SPACECRAFT_CLOCK_START_COUNT SPACECRAFT_CLOCK_STOP_COUNT | = 2005 = 2005 = "1/6 | NET" ENTCOORDS -03-01T00 -03-01T23 8256861.2 | :14:40.654 :59:59.498 0971" | | |
| 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 | = 2453 = 2453 = (14 = (= (| 430.51019 431.49999 1029080.4 1358534.8 -3.8 1391758.9 A" | 27551 41904 4, -49951700. 4, -322205. 5, 0. | 29, 99, 86, | 73686.10) 73167.86) -0.22) |
| The values of the keywords SC_TARGET_POSITION_VECTOR are related to the ECLIPJ? SUB_SPACECRAFT_LATITUDE and are northern Latitude and planetocentric IAU_ <targe? for the time t= START_TIM Distances are given in <kr< td=""><td>and SC 2000 ref nd SUB_S eastern C_NAME> E. n> veloc = {"AT</td><td>TARGET_VE erence fr PACECRAFT Longitud frame. Al ities in NR_P04030</td><td>LOCITY_VECTOR ame. LONGITUDE e in the stan l values are <km s="">, Angle 2093352_00091</km></td><td>dard computed s in <de< td=""><td></td></de<></td></kr<></targe? | and SC 2000 ref nd SUB_S eastern C_NAME> E. n> veloc = {"AT | TARGET_VE erence fr PACECRAFT Longitud frame. Al ities in NR_P04030 | LOCITY_VECTOR ame. LONGITUDE e in the stan l values are <km s="">, Angle 2093352_00091</km> | dard computed s in <de< td=""><td></td></de<> | |
| | "RO "RO "RO "RO "RO "RO "RO | S_SA_2005 S_SA_2006 S_SA_2007 S_SA_2008 S_SA_2008 S_SA_2009 | | | |
| | "RO "RO "NA "PC "DE | S_HGA_200 S_RPC_V15 IF0009.TL K00008.TP 403-MASSE S_090309_ ER | 9_V0045.BC", .TI", S", C", S.TPC", STEP.TSC", 00031 | .BSP", .BSP", | |
| | "RO "EA "EA "EA | HR MR HO S_RPC_STR S_STRUCT_ RTH_TOPO_ RTHFIXEDI RTHFIXEDI | 00091 00052 00052 00077 UCT_V1.BSP", V1.BSP", 050714.TF", | .BSP", .BSP", .BSP", .BSP", | , |
| PRODUCER_ID PRODUCER_FULL_NAME PRODUCER_INSTITUTION_NAME DATA_QUALITY_ID | = "ING | | | | |

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|--|---|---|------------------|---|
| DATA_QUALITY_DESC THE DATA QUALITY CODE: 0= GOOD DAT BIT0:X, BIT1:Y,BI PROCESSING_LEVEL_I | A; 1= BAD DA T2:Z, BIT3=0 | TA EACH SEN | ISOR HAS ITS OWN | |
| DESCRIPTION THIS FILE CONTAIN MAGNETOMETER ABOA SENSOR. ALL VALUE FIELD IS GIVEN IN NOTE LBL & TAB FILE HA FLIGHT_SOFTWARE_VE PLATFORM_OR_MOUNTI | RD THE ROSET S ARE 20 BIT INSTRUMENT VE BEEN GENE RSION ID | TA S/C AND THE ADC COUNTS. COORDINATES" = " RATED BY S/W: = "FIL.V1 0" | GEN_CAL_DATA, V | THE OUTBOARD TERSION V20091209" |
| ^TABLE | = "RPCMAG05 | 0301T0014_RAW_ | OB_M2.TAB" | |
| OBJECT NAME INTERCHANGE_FORMAT ROWS COLUMNS ROW_BYTES | = TABLE = "RPCMAG-O = ASCII = 85435 = 7 = 79 | B-SID2-RAW" | | |
| OBJECT NAME DATA_TYPE START_BYTE BYTES DESCRIPTION END_OBJECT | = COLUMN = "TIME_UTC = TIME = 1 = 26 = "UTC TIME = COLUMN | | DN: YYYY-MM-DDTH | H:MM:SS.FFFFFF" |
| OBJECT NAME DATA_TYPE START_BYTE BYTES DESCRIPTION AT 1.1.2003: SSSS END_OBJECT | SSSSS.FFFFF" | l k at observati | ON TIME, SECONDS | SINCE 00:00 |
| OBJECT NAME DATA_TYPE START_BYTE BYTES UNIT DESCRIPTION MAGNETIC FIELD X INSTRUMENT COORE VALUE IS GIVEN I END_OBJECT | = " COMPONENT, INATES, OB S N ADC_COUNTS | UNCALIBRATED F ENSOR. " | RAW DATA, | |
| END_OBJECT OBJECT NAME DATA_TYPE START_BYTE BYTES UNIT | = COLUMN = "BY_OB" = ASCII_INT = 52 = 7 = "N/A" | EGER | | |

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|--------------------------------------|--|
| VALUE IS GIV END_OBJECT | OORDINATES, OB SENSOR. IN IN ADC_COUNTS" = COLUMN |
| UNIT DESCRIPTION INSTRUMENT CO | <pre>= COLUMN = "BZ_OB" = ASCII_INTEGER = 60 = 7 = "N/A" = "MAGNETIC FIELD Z COMPONENT, UNCALIBRATED RAW DATA, OORDINATES, OB SENSOR. EN IN ADC_COUNTS" = COLUMN</pre> |
| DESCRIPTION | = 68 = 7 = "N/A" = "RAW TEMPERATURE OF RPCMAG OB SENSOR. IN IN ADC_COUNTS" |
| BYTES | <pre>= COLUMN = "QUALITY" = ASCII_INTEGER = 76 = 2 = "REFER TO DATA_QUALITY_DESC. VALUE REPRESENTS A FLAG" = COLUMN</pre> |
| END_OBJECT END | = TABLE |

4.3.3 Data Product "EDITED Housekeeping data" Design

| PDS VERSION ID = | PDS3 |
|----------------------------------|---------------------------------|
| LABEL REVISION NOTE = | "V1.0" |
| RECORD TYPE = | FIXED LENGTH |
| RECORD BYTES = | 106 — |
| FILE RECORDS = | 2697 |
| DATA SET ID = | "RO-E-RPCMAG-2-EAR1-RAW-V3.0" |
| DATA SET NAME = "ROSETTA-ORBITER | EARTH RPCMAG 2 EAR1 RAW V3.0" |
| PRODUCT ID = | "RPCMAG050301T0002 RAW HK" |
| PRODUCT CREATION TIME = | 2009-12-11T08:49:24 |
| PRODUCT TYPE = | "EDR" |
| MISSION ID = | "ROSETTA" |
| MISSION NAME = | "INTERNATIONAL ROSETTA MISSION" |
| MISSION PHASE NAME = | "EARTH SWING-BY 1" |
| OBSERVATION_TYPE = | "EARTH SWINGBY 1" |

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|---|--|--|---|
| INSTRUMENT_HOST_ID INSTRUMENT_HOST_NAME INSTRUMENT_ID INSTRUMENT_NAME = "ROSETTA | = "RO" = "ROSETTA-ORBI = "RPCMAG" | | |
| INSTRUMENT_NAME - ROSEIIA INSTRUMENT_TYPE INSTRUMENT_MODE_ID | = "MAGNETOMETER = "HK" | ۲ " | |
| INSTRUMENT_MODE_DESC TARGET_NAME TARGET_TYPE | = "HOUSEKEEPING = "EARTH" = "PLANET" | G MODE: 8 WORD | s per 32 seconds" |
| NOTE = " MAGNETIC_COORDINATE_SYSTEM | 4 : INSTRUMENTCOORDS | | |
| START_TIME STOP_TIME SPACECRAFT_CLOCK_START_COUN SPACECRAFT_CLOCK_STOP_COUNT | | 3:59:57.375)2522" | |
| | = 2453430.50145 | 509149 | |
| STOP_JULIAN_DATE_VALUE SC_SUN_POSITION_VECTOR SC_TARGET_POSITION_VECTOR SC_TARGET_VELOCITY_VECTOR SPACECRAFT_ALTITUDE SUB_SPACECRAFT_LATITUDE | = 2453431.49996 = (141024080.5 = (1361441.3 = (-3.6 = 1394740.6 = "N/A" | 54, -49973623. 35, -322852. 35, 0. | 87, 73852.35) 72, 73333.05) 86, -0.22) |
| SUB_SPACECRAFT_LONGITUDE NOTE The values of the keywo | = "N/A" =" | | |
| SC_TARGET_POSITION_VEC are related to the ECL SUB_SPACECRAFT_LATITUD are northern Latitude a planetocentric IAU_ <tan< td=""><td>TOR and SC_TARGET_VE IPJ2000 reference fr and SUB_SPACECRAFT and eastern Longituc RGET_NAME> frame. Al</td><td>ELOCITY_VECTOR came. F_LONGITUDE de in the stan</td><td>dard</td></tan<> | TOR and SC_TARGET_VE IPJ2000 reference fr and SUB_SPACECRAFT and eastern Longituc RGET_NAME> frame. Al | ELOCITY_VECTOR came. F_LONGITUDE de in the stan | dard |
| for the time t= START_ Distances are given in SPICE FILE NAME | | | |
| | "ROS_LBOOM_V "ROS_V14.TF" | 70.вс", [—] ', | |
| | "ROS_SA_2004 "ROS_SA_2005 "ROS_SA_2006 | 5_V0001.BC", | |
| | "ROS_SA_2007 "ROS_SA_2008 "ROS_SA_2009 | з_v0037.вс", | |
| | "ROS_HGA_200 "ROS_HGA_200 | 08_V0018.BC", 09_V0045.BC", | |
| | "ROS_RPC_V15 "NAIF0009.TI "PCK00008.TF | LS", PC", | |
| | "DE403-MASSE "ROS_090309_ "ORER | _STEP.TSC", | .BSP", |
| | "ORFR "ORGR | 00067 | .BSP", .BSP", |
| | "ORHR "ORMR | 00052 | .BSP", .BSP", |
| | "ORHO "ROS_RPC_STF "ROS_STRUCT_ | RUCT_V1.BSP", | .BSP", |
| | "EARTH_TOPO "EARTHFIXED] "EARTHFIXED] | ĀU.TF", | |

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|--|
| "EARTH_000101_060918_060627.BPC", "DE405.BSP"} |
| PRODUCER_ID= "RPC_MAG_TEAM"PRODUCER_FULL_NAME= "INGO RICHTER"PRODUCER_INSTITUTION_NAME= "IGEP-TU-BRAUNSCHWEIG"DATA_QUALITY_ID= "N/A"DATA_QUALITY_DESC= "N/A"PROCESSING_LEVEL_ID= 2 |
| DESCRIPTION = " THIS FILE CONTAINS HOUSEKEEPING RAW DATA OBTAINED BY THE FLUXGATE MAGNETOMETER ABOARD THE ROSETTA S/C. ALL VALUES ARE 20 BIT ADC COUNTS." NOTE = " LBL & TAB FILE HAVE BEEN GENERATED BY S/W: GEN_CAL_DATA, VERSION V20091209" FLIGHT_SOFTWARE_VERSION_ID = "FIL:V1.0" PLATFORM_OR_MOUNTING_DESC = "MAGNETOMETER_BOOM: DEPLOYED" |
| <pre>PLATFORM_OR_MOUNTING_DESC = "MAGNETOMETER_BOOM: DEPLOYED" ^TABLE = "RPCMAG050301T0002 RAW HK.TAB"</pre> |
| OBJECT = TABLE NAME = "RPCMAG-HK-RAW" INTERCHANGE_FORMAT = ASCII ROWS = 2697 COLUMNS = 13 ROW BYTES = 106 |
| OBJECT= COLUMNNAME= "TIME_UTC"DATA_TYPE= TIMESTART_BYTE= 1BYTES= 26DESCRIPTION= "UTC TIME OF OBSERVATION: YYYY-MM-DDTHH:MM:SS.FFFFFF"END_OBJECT= COLUMN |
| OBJECT= COLUMNNAME= "TIME_OBT"DATA_TYPE= ASCII_REALSTART_BYTE= 28BYTES= 15DESCRIPTION= "S/C CLOCK AT OBSERVATION TIME, SECONDS SINCE 00:00AT 1.1.2003: SSSSSSSS.FFFFF"END_OBJECT= COLUMN |
| OBJECT= COLUMNNAME= "T_OB"DATA_TYPE= ASCII_INTEGERSTART_BYTE= 44BYTES= 7UNIT= "N/A"DESCRIPTION= "TEMPERATURE OF THE RPCMAG OUTBOARD SENSOR.VALUE IS GIVEN IN ADC_COUNTS"END_OBJECT= COLUMN |
| OBJECT= COLUMNNAME= "T_IB"DATA_TYPE= ASCII_INTEGERSTART_BYTE= 52BYTES= 7 |

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|---|--|--------------------------------|---|
| UNIT DESCRIPTION TEMPERATURE OF VALUE IS GIVEN END_OBJECT | = "N/A" = " THE RPCMAG INBOARD SENSOR. IN ADC_COUNTS" = COLUMN | | |
| OBJECT NAME DATA_TYPE START_BYTE BYTES DESCRIPTION END_OBJECT | <pre>= COLUMN = "STAGE_A_ID" = ASCII_INTEGER = 60 = 1 = "FILTER TYPE IDENTIFICATIC = COLUMN</pre> | N FLAG A" | |
| OBJECT NAME DATA_TYPE START_BYTE BYTES DESCRIPTION END_OBJECT | <pre>= COLUMN = "STAGE_B_ID" = ASCII_INTEGER = 62 = 1 = "FILTER TYPE IDENTIFICATIC = COLUMN</pre> | N FLAG B" | |
| OBJECT NAME DATA_TYPE START_BYTE BYTES DESCRIPTION END_OBJECT | <pre>= COLUMN = "FILTER_CFG" = ASCII_INTEGER = 64 = 1 = "FILTER CONFIGURATION FLAGE = COLUMN</pre> | ;" | |
| | = 66 = 7 = "N/A" = " FERENCE VOLTAGE: 2.5 V. | | |
| VALUE IS GIVEN : END_OBJECT | IN ADC_COUNTS" = COLUMN | | |
| NAME DATA_TYPE START_BYTE BYTES UNIT DESCRIPTION | | | |
| VALUE IS GIVEN I END_OBJECT | IN ADC COUNTS" | | |
| OBJECT NAME DATA_TYPE START_BYTE BYTES UNIT DESCRIPTION | <pre>= COLUMN = "MAG_POS_VOLTAGE" = ASCII_INTEGER = 78 = 3 = "N/A" = "</pre> | | |

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|--|--|--------------|--------------|---|
| | EN IN ADC_COUNTS' = COLUMN | , | | |
| INSTRUMENT C | = 82 = 7 = "N/A" = " LD X COMPONENT, U OORDINATES, OB-SE | JNCALIBRATEI |) RAW DATA, | |
| END_OBJECT OBJECT NAME DATA_TYPE START_BYTE BYTES UNIT | = COLUMN = "BY_OB" = ASCII_INTE = 90 = 7 = "N/A" | | | |
| INSTRUMENT C | LD Y COMPONENT, U COORDINATES, OB-SE EN IN ADC COUNTS' | ENSOR. |) RAW DATA, | |
| MAGNETIC FIE INSTRUMENT C VALUE IS GIV | = COLUMN = "BZ_OB" = ASCII_INTE = 98 = 7 = "N/A" = " LD Z COMPONENT, U COORDINATES, OB-SE EN IN ADC_COUNTS' = COLUMN | JNCALIBRATEI |) RAW DATA, | |
| END_OBJECT END | = TABLE | | | |



= PDS3 PDS VERSION ID LABEL REVISION NOTE = "V1.0" RECORD TYPE = FIXED LENGTH = 106 RECORD BYTES FILE RECORDS = 2697 DATA_SET_ID = "RO-E-RPCMAG-2-EAR1-RAW-V3.0" DATA_SET_NAME = "ROSETTA-ORBITER EARTH RPCMAG 2 EAR1 RAW V3.0" = "RPCMAG050301T0002 RAW HK" PRODUCT_ID PRODUCT_CREATION_TIME = 2009-12-11T08:49:24 PRODUCT TYPE -= "EDR" MISSION ID = "ROSETTA" MISSION NAME = "INTERNATIONAL ROSETTA MISSION" MISSION PHASE NAME = "EARTH SWING-BY 1" = "EARTH SWINGBY 1" OBSERVATION TYPE = "RO" INSTRUMENT HOST ID = "ROSETTA-ORBITER" INSTRUMENT_HOST_NAME = "RPCMAG" INSTRUMENT_ID INSTRUMENT_NAME = "ROSETTA PLASMA CONSORTIUM - FLUXGATE MAGNETOMETER" = "MAGNETOMETER" INSTRUMENT_TYPE = "HK" INSTRUMENT_MODE_ID 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 - 01T00:02:05.359STOP TIME = 2005 - 03 - 01T23:59:57.375SPACECRAFT_CLOCK_START_COUNT = "1/68256106.02522" SPACECRAFT_CLOCK_STOP_COUNT = "1/68342378.02522" START JULIAN DATE VALUE = 2453430.5014509149

 START_JULIAN_DATE_VALUE
 = 2453430.5014509149

 STOP_JULIAN_DATE_VALUE
 = 2453431.4999696184

 SC_SUN_POSITION_VECTOR
 = (141024080.54, -49973623.87, 73852.35)

 SC_TARGET_POSITION_VECTOR
 = (1361441.35, -322852.72, 73333.05)

 SC_TARGET_VELOCITY_VECTOR
 = (-3.85, 0.86, -0.22)

 = (-3.85, = 1394740.801 SPACECRAFT_ALTITUDE SUB_SPACECRAFT_LATITUDE SPACECRAFT ALTITUDE = "N/A" = "N/A" 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 00091.BC", "ROS LBOOM_V0.BC", "ROS V14.TF", "ROS_SA_2004_V0001.BC", "ROS_SA_2005_V0001.BC", "ROS_SA_2006_V0001.BC", "ROS_SA_2007_V0001.BC", "ROS_SA_2008_V0037.BC", "ROS_SA_2009_V0048.BC",



Document No. : RO-IGEP-TR0009 Issue/Rev. No. : 3.3 RPC-MAG EAICD Date : 18 February 2010 Page : 58 "ROS_HGA_2008_V0018.BC", "ROS_HGA_2009_V0045.BC", "ROS_RPC_V15.TI", "NAIF0009.TLS", "PCK00008.TPC", "DE403-MASSES.TPC", "ROS_090309_STEP.TSC", "ORER 00031.BSP", "ORFR 00067.BSP",

"ORGR 00091.BSP", 00091.BSP", "ORHR "ORMR 00052.BSP", "ORHO 00077.BSP", "ROS RPC STRUCT V1.BSP", "ROS_STRUCT_V1.BSP", "EARTH_TOPO_050714.TF", "EARTHFIXEDIAU.TF", "EARTHFIXEDITRF93.TF", "EARTH 000101 060918 060627.BPC", "DE405.BSP"} PRODUCER ID = "RPC MAG TEAM" = "INGO RICHTER" PRODUCER FULL NAME = "IGEP-TU-BRAUNSCHWEIG" PRODUCER INSTITUTION_NAME = "N/A" DATA_QUALITY_ID DATA QUALITY DESC = "N/A" PROCESSING LEVEL ID 2 = " DESCRIPTION THIS FILE CONTAINS HOUSEKEEPING RAW DATA OBTAINED BY THE FLUXGATE MAGNETOMETER ABOARD THE ROSETTA S/C. ALL VALUES ARE 20 BIT ADC COUNTS." = " NOTE LBL & TAB FILE HAVE BEEN GENERATED BY S/W: GEN CAL DATA, VERSION V20091209" FLIGHT SOFTWARE VERSION ID = "FIL:V1.0" PLATFORM OR MOUNTING DESC = "MAGNETOMETER BOOM: DEPLOYED" ^TABLE = "RPCMAG050301T0002 RAW HK.TAB" OBJECT = TABLE = "RPCMAG-HK-RAW" NAME INTERCHANGE FORMAT = ASCII = 2697 ROWS = 13COLUMNS ROW BYTES = 106 OBJECT = COLUMN = "TIME UTC" NAME DATA TYPE = TIME START BYTE = 1 = 26 BYTES DESCRIPTION = "UTC TIME OF OBSERVATION: YYYY-MM-DDTHH:MM:SS.FFFFFF" 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"

Document No. : RO-IGEP-TR0009 Institut für IGEP Geophysik und extraterrestrische Physik Issue/Rev. No. : 3.3 RPC-MAG EAICD : 18 February 2010 Date TU Braunschweig Page : 59 END OBJECT = COLUMN OBJECT = COLUMN NAME = "T OB" DATA TYPE = ASCII INTEGER START BYTE = 44 = 7 BYTES = "N/A" UNTT = " DESCRIPTION TEMPERATURE OF THE RPCMAG OUTBOARD SENSOR. VALUE IS GIVEN IN ADC COUNTS" = COLUMN END OBJECT OBJECT = COLUMN = "T IB" NAME = ASCII_INTEGER DATA_TYPE START BYTE = 52 = 7 BYTES = "N/A" UNIT = " DESCRIPTION TEMPERATURE OF THE RPCMAG INBOARD SENSOR. VALUE IS GIVEN IN ADC COUNTS" END OBJECT = COLUMN OBJECT = COLUMN NAME = "STAGE A ID" DATA_TYPE = ASCII INTEGER START BYTE = 60 BYTES = 1 = "FILTER TYPE IDENTIFICATION FLAG A" DESCRIPTION = COLUMN END_OBJECT OBJECT = COLUMN NAME = "STAGE B ID" = ASCII_INTEGER DATA TYPE START BYTE = 62 = 1 BYTES = "FILTER TYPE IDENTIFICATION FLAG B" DESCRIPTION END OBJECT = COLUMN OBJECT = COLUMN = "FILTER CFG" NAME DATA TYPE = ASCII INTEGER START BYTE = 64 BYTES = 1 = "FILTER CONFIGURATION FLAG" DESCRIPTION END OBJECT = COLUMN OBJECT = COLUMN = "MAG REF VOLTAGE" NAME DATA TYPE = ASCII INTEGER START BYTE = 66 = 7 BYTES = "N/A" UNTT DESCRIPTION = " MAGNETOMETER REFERENCE VOLTAGE: 2.5 V. VALUE IS GIVEN IN ADC COUNTS" END OBJECT = COLUMN OBJECT = COLUMN

Document No. : RO-IGEP-TR0009 Institut für IGEP Issue/Rev. No. : 3.3 Geophysik und extraterrestrische Physik RPC-MAG EAICD : 18 February 2010 Date TU Braunschweig Page : 60 = "MAG NEG VOLTAGE" NAME DATA TYPE = ASCII INTEGER START_BYTE = 74 BYTES = 3 = "N/A" UNIT = " DESCRIPTION MAGNETOMETER NEGATIVE SUPPLY VOLTAGE:-5V. VALUE IS GIVEN IN ADC COUNTS" END OBJECT = COLUMN OBJECT = COLUMN = "MAG POS VOLTAGE" NAME = ASCII_INTEGER DATA TYPE START BYTE = 78 BYTES = 3 = "N/A" UNIT = " DESCRIPTION MAGNETOMETER POSITIVE SUPPLY VOLTAGE:+5V. VALUE IS GIVEN IN ADC COUNTS" END OBJECT = COLUMN OBJECT = COLUMN = "BX OB" NAME DATA TYPE = ASCII INTEGER START BYTE = 82 BYTES = 7 = "N/A" UNIT = " DESCRIPTION MAGNETIC FIELD X COMPONENT, UNCALIBRATED RAW DATA, INSTRUMENT COORDINATES, OB-SENSOR. VALUE IS GIVEN IN ADC COUNTS" = COLUMN END OBJECT OBJECT = COLUMN = "BY OB" NAME DATA TYPE = ASCII INTEGER START BYTE = 90 BYTES = 7 = "N/A" UNIT = " DESCRIPTION MAGNETIC FIELD Y COMPONENT, UNCALIBRATED RAW DATA, INSTRUMENT COORDINATES, OB-SENSOR. VALUE IS GIVEN IN ADC COUNTS" END OBJECT = COLUMN OBJECT = COLUMN = "BZ OB" NAME DATA TYPE = ASCII INTEGER START BYTE = 98 BYTES = 7 = "N/A" UNIT = " DESCRIPTION MAGNETIC FIELD Z COMPONENT, UNCALIBRATED RAW DATA, INSTRUMENT COORDINATES, OB-SENSOR. VALUE IS GIVEN IN ADC COUNTS" END OBJECT = COLUMN END OBJECT = TABLE END



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4.3.5 Data Product "CALIBRATED LEVEL A Magnetic Field data" Design

PDS VERSION ID = PDS3 = "V1.0" LABEL REVISION NOTE RECORD TYPE = FIXED LENGTH RECORD BYTES = 90 FILE RECORDS = 86261 = "RO-E-RPCMAG-3-EAR1-CALIBRATED-V3.0" DATA SET ID DATA SET NAME = "ROSETTA-ORBITER EARTH RPCMAG 3 EAR1 CALIBRATED V3.0" PRODUCT ID = "RPCMAG050302T0000_CLA_OB_M2" PRODUCT CREATION TIME = 2009-12-11T08:50:18 PRODUCT TYPE = "RDR" MISSION ID = "ROSETTA" MISSION NAME = "INTERNATIONAL ROSETTA MISSION" = "EARTH SWING-BY 1" MISSION PHASE NAME = "EARTH SWINGBY 1" OBSERVATION TYPE = "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 = "SID2" INSTRUMENT MODE DESC = " NORMAL MODE: 32 PRIMARY & 1 SECONDARY VECTORS PER 32 SECONDS" TARGET NAME = "EARTH" = "PLANET" TARGET TYPE NOTE = " MAGNETIC_COORDINATE_SYSTEM : INSTRUMENTCOORDS" START TIME = 2005-03-02T00:00:45.737 STOP TIME = 2005-03-03T00:00:07.464 SPACECRAFT_CLOCK_START_COUNT = "1/68342418.12288" SPACECRAFT_CLOCK_STOP_COUNT = "1/68428779.58897" START JULIAN DATE VALUE = 2453431.5005293638 STOP JULIAN DATE VALUE = 2453432.5000863895 SC SUN POSITION VECTOR = (141573911.73, -47460624.75, 54794.95) = (141375311.73, -248948.51, -3.87, -3.87, -248948.51, -3.87, -SC TARGET POSITION VECTOR 54393.42) = (_ SC TARGET VELOCITY VECTOR -3.87, 0.86, -0.22)SPACECRAFT ALTITUDE 1053352.128 = "N/A" SUB_SPACECRAFT_LATITUDE = "N/A" 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 00091.BC", SPICE FILE NAME "ROS LBOOM VO.BC", "ROS_V14.TF", "ROS_SA_2004_V0001.BC", "ROS_SA_2005_V0001.BC", "ROS_SA_2006_V0001.BC", "ROS_SA_2007_V0001.BC", "ROS SA 2008 V0037.BC", "ROS SA 2009 V0048.BC",



PRODUCER ID

PRODUCER FULL NAME

Document No. : RO-IGEP-TR0009 Issue/Rev. No. : 3.3 RPC-MAG EAICD Date : 18 February 2010 Page : 62 "ROS_HGA_2008_V0018.BC", "ROS_HGA_2009_V0045.BC", "ROS_RPC_V15.TI", "NAIF0009.TLS", "PCK00008.TPC", "DE403-MASSES.TPC", "ROS_090309_STEP.TSC", "ORER 00031.BSP", "ORFR 00067.BSP", "ORGR 00091.BSP", "ORHR "ORMR "ORHO 00077.BSP", "ROS RPC STRUCT V1.BSP", "ROS_STRUCT_V1.BSP", "EARTH_TOPO_050714.TF", "EARTHFIXEDIAU.TF", "EARTHFIXEDITRF93.TF", "EARTH 000101 060918 060627.BPC", "DE405.BSP"} = "RPC MAG TEAM" = "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 INSTRUMENT-COORDINATES" NOTE = " LBL & TAB FILE HAVE BEEN GENERATED BY S/W: GEN CAL DATA, VERSION V20091209" = " NOTE GROUND CALIBRATION FILE: RPCMAG GND CALIB FSDPU FMOB.TXT" ... NOTE = INFLIGHT CALIBRATION FILE: RPCMAG 002 CALIB OB.TXT" = " NOTE TIMESTAMPS (UTC) OF PRIMARY SENSOR VECTORS HAVE BEEN SHIFTED BY 8.20 s and TIMESTAMPS (UTC) OF SECONDARY SENSOR VECTORS HAVE BEEN SHIFTED BY 31.95 s IN ORDER TO CORRECT DIGITAL FILTER TRANSFER FUNCTION." FLIGHT SOFTWARE VERSION ID = "FIL:V1.0" = "MAGNETOMETER BOOM: DEPLOYED" PLATFORM OR MOUNTING DESC ^TABLE = "RPCMAG050302T0000_CLA_OB_M2.TAB" OBJECT = TABLE = "RPCMAG-OB-SID2-CLA" NAME INTERCHANGE FORMAT = ASCII = 86261 ROWS = 7 COLUMNS ROW BYTES = 90 OBJECT = COLUMN = "TIME UTC" NAME = TIME DATA TYPE START BYTE = 1

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|---|---|-------------------------|---|
| BYTES DESCRIPTION END_OBJECT | = 26 = "UTC TIME OF OBSERVATION: = COLUMN | YYYY-MM-DDTHH | :MM:SS.FFFFFF" |
| OBJECT NAME DATA_TYPE START_BYTE BYTES DESCRIPTION AT 1.1.2003: SS END_OBJECT | = 15 = "S/C CLOCK AT OBSERVATION | TIME, SECONDS | SINCE 00:00 |
| OBJECT NAME DATA_TYPE START_BYTE BYTES UNIT UNIT_ID DESCRIPTION CORRECTED DATA, END_OBJECT | <pre>= COLUMN = "BX_OB" = ASCII_REAL = 44 = 9 = "NANOTESLA" = "nT" = "MAGNETIC FIELD X COMPONE INSTRUMENT-COORDINATES, OB SE = COLUMN</pre> | NT, CALIBRATED NSOR" | , TEMPERATURE |
| DESCRIPTION | <pre>= COLUMN = "BY_OB" = ASCII_REAL = 54 = 9 = "NANOTESLA" = "nT" = "MAGNETIC FIELD Y COMPONE INSTRUMENT-COORDINATES, OB SE = COLUMN</pre> | NT, CALIBRATED NSOR" | , TEMPERATURE |
| UNIT_ID DESCRIPTION | = "NANOTESLA" | NT, CALIBRATED NSOR" | , TEMPERATURE |
| START_BYTE BYTES UNIT UNIT ID | = 6 = "KELVIN" = "K" = "TEMPERATURE OF RPCMAG OB | SENSOR" | |
| OBJECT NAME DATA_TYPE START_BYTE | = COLUMN = "QUALITY_FLAGS" = CHARACTER = 81 | | |

| IGEP TU Braunschweig | Institut für Geophysik und extraterrestrische Physik | RPC-MAG | EAICD | Document No. Issue/Rev. No. Date Page | : RO-IGEP-TR0009 : 3.3 : 18 February 2010 : 64 |
|---|---|--|---|--|---|
| The quality the followi VALUE: x 0 | = 8 = " describe the is coded in a ng values: MEANING: property descr no disturbance specific distu | i 8 byte str tibed by fla , good qual | ing. Each g is stil ity | character car l unknown | |
| Description | of the specif | ic flags: | | | |
| 87654321 | 0 = no | OF REACTION pact not asso disturbance | essed | | |
| | 2 = dis 3 = dat 2 IMPACT | turbance el a disturbed OF LANDER H | imination EATER CUR | | lalysis |
| | 0 = no 1 = dis 2 = dis 3 = dat | turbance el a disturbed | iminated imination | during data an failed | nalysis |
| | 1 = boo 2 = boo ins | om deployed om stowed | rdinates | . Data only va lease | alid in |
| | 0 = no 1 = off 2 = off equ 3 = off | set issues offset prob set behavio set drifts, nilibrium th set drifts, | not asses lems r not cle sensor n us temper reason u | ar ot in thermal ature model N, | /A |
| :::: ::: ::: ::: ::: ::: ::: ::: | 0 = per 1 = good $2 = pood$ | fect correl of correlation of correlation | t assesse ation on on | | ehavior |
| | 0 = no 1 = TBI 2 = TBI 3 = TBI 4 = TBI | assessment other probl))) | ems detec | | ed in s/c |

| Geop | itut für hysik und terrestrische RPC-MAG EAIC k | Issue/Rev. No | : RO-IGEP-TR0009 : 3.3 : 18 February 2010 : 65 |
|-------------------|---|-----------------|---|
| :: | 6 = data noisy due to pow | er on failure | |
| :: | 7 = data not calculatable | | stor failure |
| :: | 8 = sensor saturated due | to huge externa | al field |
| :: | 9 = sensor saturated, ins | trument power o | on sequence failed |
| :: | | | |
| :: 7 | ' TBD | | |
| : | x = no assessment | | |
| : | | | |
| : 8 | B TBD | | |
| : | x = no assessment | | |
| : | | | |
| " | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | | |
| END_OBJECT | = COLUMN | | |
| END_OBJECT END | = TABLE | | |

4.3.6 Data Product "CALIBRATED LEVEL_B Magnetic Field data" Design

| PDS VERSION ID = PDS3 LABEL REVISION_NOTE = "V1.0" RECORD_TYPE = FIXED_LENGTH RECORD_TYPE = 90 FILE RECORDS = 86261 DATA_SET_ID = "ROSETTA-ORBITER EARTH RPCMAG 3 EAR1 CALIBRATED V3.0" PRODUCT_TD = "RCMAGOS0302T000_CLA_OB_M2" PRODUCT_CREATION_TIME = 2009-12-11T08:50:18 PRODUCT_CREATION_TIME = 2009-12-11T08:50:18 PRODUCT_TYPE = "RDR" MISSION_NAME = "ROSETTA" MISSION_ID = "ROSETTA" MISSION_TD = "ROSETTA" MISSION_TON_TYPE = "EARTH SWING-BY 1" OBSERVATION_TYPE = "EARTH SWING-BY 1" OBSERVATION_TYPE = "ROCMAGG" INSTRUMENT_HOST_NAME = "ROSETTA-ORBITER" INSTRUMENT_HOST_NAME = "ROSETTA-ORBITER" INSTRUMENT_MAME = "ROSETTA PLASMA CONSORTIUM - FLUXGATE MAGNETOMETER" INSTRUMENT_TODE_ID = "RICMAG" INSTRUMENT_MODE_ID = "SID2" INSTRUMENT_MODE_ID = "SID2" INSTRUMENT_MODE_DESC = " MAGNETIC_COORDINATE_SYSTEM : INSTRUMENTORDE PER 32 SECONDS" TARGET_TYPE = "PLANET" NORTAL MODE: 32 PRIMARY & 1 SECONDARY VECTORS PER 32 SECONDS" TARGET_TYPE = "PLANET" MAGNETIC_COORDINATE_SYSTEM : INSTRUMENTOORDS" START_TIME = 2005-03-03T00:00:07.464 SPACECRAFT_CLOCK_STOP_COUNT = "1/68342418.12288" SPACECRAFT_CLOCK_STOP_COUNT = "1/68428779.58897" START_JULIAN_DATE_VALUE = 2453431.5005293638 STOP_JULIAN_DATE_VALUE = 2453431.5005293638 | PDS_VERSION_ID | = PDS3 |
|---|---------------------------------|---|
| FILE_RECORDS= 80201DATA_SET_ID= "RO-E-RPCMAG-3-EAR1-CALIBRATED-V3.0"DATA_SET_NAME= "ROSETTA-ORBITER EARTH RPCMAG 3 EAR1 CALIBRATED V3.0"PRODUCT_ID= "RPCMAG05030210000_CLA_OB_M2"PRODUCT_CREATION_TIME= 2009-12-11108:50:18PRODUCT_TYPE= "RDR"MISSION_ID= "ROSETTA"MISSION_PHASE_NAME= "INTERNATIONAL ROSETTA MISSION"MISSION_PHASE_NAME= "INTERNATIONAL ROSETTA MISSION"MISSION_PHASE_NAME= "EARTH SWING-BY 1"OBSERVATION_TYPE= "EARTH SWINGBY 1"INSTRUMENT_HOST_ID= "RO"INSTRUMENT_HOST_NAME= "ROPCMAG"INSTRUMENT_TYPE= "RORGETTA-ORBITER"INSTRUMENT_TYPE= "MAGNETOMETER"INSTRUMENT_TYPE= "MAGNETOMETER"INSTRUMENT_MODE_ID= "SID2"INSTRUMENT_MODE_DESC= "NORMAL_MODE_32 PRIMARY & 1 SECONDARY VECTORS PER 32 SECONDS"TARGET_TYPE= "PLANET"NOTE = "= 2005-03-02T00:00:45.737STOP_TIME= 2005-03-03T00:00:7.464SPACECRAFT_CLOCK_START_COUNT= "1/68428179.58897"START_JULIAN_DATE_VALUE= 2453431.5005293638STOP_TULIAN_DATE_VALUE= 2453431.5005293638 | LABEL_REVISION_NOTE : | = "V1.0" |
| FILE_RECORDS= 80201DATA_SET_ID= "RO-E-RPCMAG-3-EAR1-CALIBRATED-V3.0"DATA_SET_NAME= "ROSETTA-ORBITER EARTH RPCMAG 3 EAR1 CALIBRATED V3.0"PRODUCT_ID= "RPCMAG050302T0000_CLA_OB_M2"PRODUCT_CREATION_TIME= 2009-12-11T08:50:18PRODUCT_TYPE= "RDR"MISSION_ID= "ROSETTA"MISSION_PHASE_NAME= "INTERNATIONAL ROSETTA MISSION"MISSION_PHASE_NAME= "INTERNATIONAL ROSETTA MISSION"MISSION_PHASE_NAME= "RO"INSTRUMENT_HOST_ID= "RO"INSTRUMENT_HOST_NAME= "ROC"INSTRUMENT_TAPE= "ROCMAG"INSTRUMENT_MAME= "ROCMAG"INSTRUMENT_TAPE= "ROCMAG"INSTRUMENT_TAPE= "ROCMAG"INSTRUMENT_TAPE= "ROCNAG"INSTRUMENT_TAPE= "ROCNAG"INSTRUMENT_TAPE= "ROCNAG"INSTRUMENT_TAPE= "ROCNAG"INSTRUMENT_TAPE= "ROCNAG"INSTRUMENT_TAPE= "SID2"INSTRUMENT_MODE_DESC= "INSTRUMENT_MODE_DESC= "INSTRUMENT_MAME= "EARTH"TARGET_TAPE= "PLANET"NOTE = "= 2005-03-02T00:00:45.737STOP_TIME= 2005-03-02T00:00:7.464SPACECRAFT_CLOCK_START_COUNT= "I/68428179.58897"START_JULIAN_DATE_VALUE= 2453431.5005293638START_JULIAN_DATE_VALUE= 2453431.5005293638 | RECORD_TYPE : | = FIXED_LENGTH |
| FILE_RECORDS= 80201DATA_SET_ID= "RO-E-RPCMAG-3-EAR1-CALIBRATED-V3.0"DATA_SET_NAME= "ROSETTA-ORBITER EARTH RPCMAG 3 EAR1 CALIBRATED V3.0"PRODUCT_ID= "RPCMAG050302T0000_CLA_OB_M2"PRODUCT_CREATION_TIME= 2009-12-11T08:50:18PRODUCT_TYPE= "RDR"MISSION_ID= "ROSETTA"MISSION_PHASE_NAME= "INTERNATIONAL ROSETTA MISSION"MISSION_PHASE_NAME= "INTERNATIONAL ROSETTA MISSION"MISSION_PHASE_NAME= "RO"INSTRUMENT_HOST_ID= "RO"INSTRUMENT_HOST_NAME= "ROC"INSTRUMENT_TAPE= "ROCMAG"INSTRUMENT_MAME= "ROCMAG"INSTRUMENT_TAPE= "ROCMAG"INSTRUMENT_TAPE= "ROCMAG"INSTRUMENT_TAPE= "ROCNAG"INSTRUMENT_TAPE= "ROCNAG"INSTRUMENT_TAPE= "ROCNAG"INSTRUMENT_TAPE= "ROCNAG"INSTRUMENT_TAPE= "ROCNAG"INSTRUMENT_TAPE= "SID2"INSTRUMENT_MODE_DESC= "INSTRUMENT_MODE_DESC= "INSTRUMENT_MAME= "EARTH"TARGET_TAPE= "PLANET"NOTE = "= 2005-03-02T00:00:45.737STOP_TIME= 2005-03-02T00:00:7.464SPACECRAFT_CLOCK_START_COUNT= "I/68428179.58897"START_JULIAN_DATE_VALUE= 2453431.5005293638START_JULIAN_DATE_VALUE= 2453431.5005293638 | RECORD_BYTES : | = 90 |
| PRODUCT_ID= "RPCMAG050302T0000_CLA_OB_M2"PRODUCT_CREATION_TIME= 2009-12-11T08:50:18PRODUCT_TYPE= "RDR"MISSION_ID= "ROSETTA"MISSION_NAME= "INTERNATIONAL ROSETTA MISSION"MISSION_PHASE_NAME= "EARTH SWING-BY 1"OBSERVATION TYPE= "EARTH SWINGBY 1"INSTRUMENT_HOST_ID= "RO"INSTRUMENT_HOST_NAME= "ROSETTA-ORBITER"INSTRUMENT_ID= "ROCMGG"INSTRUMENT_MODE_ID= "SID2"INSTRUMENT_MODE_DESC= "NORMAL MODE: 32 PRIMARY & 1 SECONDARY VECTORS PER 32 SECONDS"TARGET_NAME= "EARTH"TARGET_TYPE= "PLANET"MAGNETIC_COORDINATE_SYSTEM : INSTRUMENTCOORDS"START_TIME= 2005-03-02T00:00:45.737STOP_TIME= "1/68424118.12288"SPACECRAFT_CLOCK_START_COUNT= "1/68428779.58897"START_JULIAN_DATE_VALUE= 2453431.5005293638START_JULIAN_DATE_VALUE= 2453431.5005293638 | FILE_RECORDS : | = 86261 |
| PRODUCT_ID= "RPCMAG050302T0000_CLA_OB_M2"PRODUCT_CREATION_TIME= 2009-12-11T08:50:18PRODUCT_TYPE= "RDR"MISSION_ID= "ROSETTA"MISSION_NAME= "INTERNATIONAL ROSETTA MISSION"MISSION_PHASE_NAME= "EARTH SWING-BY 1"OBSERVATION TYPE= "EARTH SWINGBY 1"INSTRUMENT_HOST_ID= "RO"INSTRUMENT_HOST_NAME= "ROSETTA-ORBITER"INSTRUMENT_ID= "ROCMGG"INSTRUMENT_MODE_ID= "SID2"INSTRUMENT_MODE_DESC= "NORMAL MODE: 32 PRIMARY & 1 SECONDARY VECTORS PER 32 SECONDS"TARGET_NAME= "EARTH"TARGET_TYPE= "PLANET"MAGNETIC_COORDINATE_SYSTEM : INSTRUMENTCOORDS"START_TIME= 2005-03-02T00:00:45.737STOP_TIME= "1/68424118.12288"SPACECRAFT_CLOCK_START_COUNT= "1/68428779.58897"START_JULIAN_DATE_VALUE= 2453431.5005293638START_JULIAN_DATE_VALUE= 2453431.5005293638 | DATA_SET_ID : | <pre>= "RO-E-RPCMAG-3-EAR1-CALIBRATED-V3.0"</pre> |
| <pre>INSTRUMENT_TYPE = "MAGNETOMETER" INSTRUMENT_MODE_ID = "SID2" INSTRUMENT_MODE_DESC = " NORMAL MODE: 32 PRIMARY & 1 SECONDARY VECTORS PER 32 SECONDS" TARGET_NAME = "EARTH" TARGET_TYPE = "PLANET" NOTE = " MAGNETIC_COORDINATE_SYSTEM : INSTRUMENTCOORDS" START_TIME = 2005-03-02T00:00:45.737 STOP_TIME = 2005-03-03T00:00:07.464 SPACECRAFT_CLOCK_START_COUNT = "1/68428179.58897" START_JULIAN_DATE_VALUE = 2453431.5005293638 STOP_JULIAN_DATE_VALUE = 2453432.5000863895</pre> | DATA_SET_NAME = "ROSETTA-ORBITE | ER EARTH RPCMAG 3 EAR1 CALIBRATED V3.0" |
| <pre>INSTRUMENT_TYPE = "MAGNETOMETER" INSTRUMENT_MODE_ID = "SID2" INSTRUMENT_MODE_DESC = " NORMAL MODE: 32 PRIMARY & 1 SECONDARY VECTORS PER 32 SECONDS" TARGET_NAME = "EARTH" TARGET_TYPE = "PLANET" NOTE = " MAGNETIC_COORDINATE_SYSTEM : INSTRUMENTCOORDS" START_TIME = 2005-03-02T00:00:45.737 STOP_TIME = 2005-03-03T00:00:07.464 SPACECRAFT_CLOCK_START_COUNT = "1/68428179.58897" START_JULIAN_DATE_VALUE = 2453431.5005293638 STOP_JULIAN_DATE_VALUE = 2453432.5000863895</pre> | PRODUCT_ID : | = "RPCMAG050302T0000_CLA_OB_M2" |
| <pre>INSTRUMENT_TYPE = "MAGNETOMETER" INSTRUMENT_MODE_ID = "SID2" INSTRUMENT_MODE_DESC = " NORMAL MODE: 32 PRIMARY & 1 SECONDARY VECTORS PER 32 SECONDS" TARGET_NAME = "EARTH" TARGET_TYPE = "PLANET" NOTE = " MAGNETIC_COORDINATE_SYSTEM : INSTRUMENTCOORDS" START_TIME = 2005-03-02T00:00:45.737 STOP_TIME = 2005-03-03T00:00:07.464 SPACECRAFT_CLOCK_START_COUNT = "1/68428179.58897" START_JULIAN_DATE_VALUE = 2453431.5005293638 STOP_JULIAN_DATE_VALUE = 2453432.5000863895</pre> | PRODUCT_CREATION_TIME : | = 2009-12-11T08:50:18 |
| <pre>INSTRUMENT_TYPE = "MAGNETOMETER" INSTRUMENT_MODE_ID = "SID2" INSTRUMENT_MODE_DESC = " NORMAL MODE: 32 PRIMARY & 1 SECONDARY VECTORS PER 32 SECONDS" TARGET_NAME = "EARTH" TARGET_TYPE = "PLANET" NOTE = " MAGNETIC_COORDINATE_SYSTEM : INSTRUMENTCOORDS" START_TIME = 2005-03-02T00:00:45.737 STOP_TIME = 2005-03-03T00:00:07.464 SPACECRAFT_CLOCK_START_COUNT = "1/68428179.58897" START_JULIAN_DATE_VALUE = 2453431.5005293638 STOP_JULIAN_DATE_VALUE = 2453432.5000863895</pre> | PRODUCT_TYPE : | = "RDR" |
| <pre>INSTRUMENT_TYPE = "MAGNETOMETER" INSTRUMENT_MODE_ID = "SID2" INSTRUMENT_MODE_DESC = " NORMAL MODE: 32 PRIMARY & 1 SECONDARY VECTORS PER 32 SECONDS" TARGET_NAME = "EARTH" TARGET_TYPE = "PLANET" NOTE = " MAGNETIC_COORDINATE_SYSTEM : INSTRUMENTCOORDS" START_TIME = 2005-03-02T00:00:45.737 STOP_TIME = 2005-03-03T00:00:07.464 SPACECRAFT_CLOCK_START_COUNT = "1/68428179.58897" START_JULIAN_DATE_VALUE = 2453431.5005293638 STOP_JULIAN_DATE_VALUE = 2453432.5000863895</pre> | MISSION_ID : | = "ROSETTA" |
| <pre>INSTRUMENT_TYPE = "MAGNETOMETER" INSTRUMENT_MODE_ID = "SID2" INSTRUMENT_MODE_DESC = " NORMAL MODE: 32 PRIMARY & 1 SECONDARY VECTORS PER 32 SECONDS" TARGET_NAME = "EARTH" TARGET_TYPE = "PLANET" NOTE = " MAGNETIC_COORDINATE_SYSTEM : INSTRUMENTCOORDS" START_TIME = 2005-03-02T00:00:45.737 STOP_TIME = 2005-03-03T00:00:07.464 SPACECRAFT_CLOCK_START_COUNT = "1/68428179.58897" START_JULIAN_DATE_VALUE = 2453431.5005293638 STOP_JULIAN_DATE_VALUE = 2453432.5000863895</pre> | MISSION_NAME : | = "INTERNATIONAL ROSETTA MISSION" |
| <pre>INSTRUMENT_TYPE = "MAGNETOMETER" INSTRUMENT_MODE_ID = "SID2" INSTRUMENT_MODE_DESC = " NORMAL MODE: 32 PRIMARY & 1 SECONDARY VECTORS PER 32 SECONDS" TARGET_NAME = "EARTH" TARGET_TYPE = "PLANET" NOTE = " MAGNETIC_COORDINATE_SYSTEM : INSTRUMENTCOORDS" START_TIME = 2005-03-02T00:00:45.737 STOP_TIME = 2005-03-03T00:00:07.464 SPACECRAFT_CLOCK_START_COUNT = "1/68428179.58897" START_JULIAN_DATE_VALUE = 2453431.5005293638 STOP_JULIAN_DATE_VALUE = 2453432.5000863895</pre> | MISSION_PHASE_NAME : | = "EARTH SWING-BY 1" |
| <pre>INSTRUMENT_TYPE = "MAGNETOMETER" INSTRUMENT_MODE_ID = "SID2" INSTRUMENT_MODE_DESC = " NORMAL MODE: 32 PRIMARY & 1 SECONDARY VECTORS PER 32 SECONDS" TARGET_NAME = "EARTH" TARGET_TYPE = "PLANET" NOTE = " MAGNETIC_COORDINATE_SYSTEM : INSTRUMENTCOORDS" START_TIME = 2005-03-02T00:00:45.737 STOP_TIME = 2005-03-03T00:00:07.464 SPACECRAFT_CLOCK_START_COUNT = "1/68428179.58897" START_JULIAN_DATE_VALUE = 2453431.5005293638 STOP_JULIAN_DATE_VALUE = 2453432.5000863895</pre> | OBSERVATION_TYPE : | = "EARTH SWINGBY 1" |
| <pre>INSTRUMENT_TYPE = "MAGNETOMETER" INSTRUMENT_MODE_ID = "SID2" INSTRUMENT_MODE_DESC = " NORMAL MODE: 32 PRIMARY & 1 SECONDARY VECTORS PER 32 SECONDS" TARGET_NAME = "EARTH" TARGET_TYPE = "PLANET" NOTE = " MAGNETIC_COORDINATE_SYSTEM : INSTRUMENTCOORDS" START_TIME = 2005-03-02T00:00:45.737 STOP_TIME = 2005-03-03T00:00:07.464 SPACECRAFT_CLOCK_START_COUNT = "1/68428179.58897" START_JULIAN_DATE_VALUE = 2453431.5005293638 STOP_JULIAN_DATE_VALUE = 2453432.5000863895</pre> | INSTRUMENT_HOST_ID : | = "RO" |
| <pre>INSTRUMENT_TYPE = "MAGNETOMETER" INSTRUMENT_MODE_ID = "SID2" INSTRUMENT_MODE_DESC = " NORMAL MODE: 32 PRIMARY & 1 SECONDARY VECTORS PER 32 SECONDS" TARGET_NAME = "EARTH" TARGET_TYPE = "PLANET" NOTE = " MAGNETIC_COORDINATE_SYSTEM : INSTRUMENTCOORDS" START_TIME = 2005-03-02T00:00:45.737 STOP_TIME = 2005-03-03T00:00:07.464 SPACECRAFT_CLOCK_START_COUNT = "1/68428179.58897" START_JULIAN_DATE_VALUE = 2453431.5005293638 STOP_JULIAN_DATE_VALUE = 2453432.5000863895</pre> | INSTRUMENT HOST NAME | = "ROSETTA-ORBITER" |
| <pre>INSTRUMENT_TYPE = "MAGNETOMETER" INSTRUMENT_MODE_ID = "SID2" INSTRUMENT_MODE_DESC = " NORMAL MODE: 32 PRIMARY & 1 SECONDARY VECTORS PER 32 SECONDS" TARGET_NAME = "EARTH" TARGET_TYPE = "PLANET" NOTE = " MAGNETIC_COORDINATE_SYSTEM : INSTRUMENTCOORDS" START_TIME = 2005-03-02T00:00:45.737 STOP_TIME = 2005-03-03T00:00:07.464 SPACECRAFT_CLOCK_START_COUNT = "1/68428179.58897" START_JULIAN_DATE_VALUE = 2453431.5005293638 STOP_JULIAN_DATE_VALUE = 2453432.5000863895</pre> | INSTRUMENT_ID : | = "RPCMAG" |
| <pre>INSTRUMENT_MODE_DESC = " NORMAL MODE: 32 PRIMARY & 1 SECONDARY VECTORS PER 32 SECONDS" TARGET_NAME = "EARTH" TARGET_TYPE = "PLANET" NOTE = " MAGNETIC_COORDINATE_SYSTEM : INSTRUMENTCOORDS" START_TIME = 2005-03-02T00:00:45.737 STOP_TIME = 2005-03-03T00:00:07.464 SPACECRAFT_CLOCK_START_COUNT = "1/68342418.12288" SPACECRAFT_CLOCK_STOP_COUNT = "1/68428779.58897" START_JULIAN_DATE_VALUE = 2453431.5005293638 STOP_JULIAN_DATE_VALUE = 2453432.5000863895</pre> | | |
| <pre>INSTRUMENT_MODE_DESC = " NORMAL MODE: 32 PRIMARY & 1 SECONDARY VECTORS PER 32 SECONDS" TARGET_NAME = "EARTH" TARGET_TYPE = "PLANET" NOTE = " MAGNETIC_COORDINATE_SYSTEM : INSTRUMENTCOORDS" START_TIME = 2005-03-02T00:00:45.737 STOP_TIME = 2005-03-03T00:00:07.464 SPACECRAFT_CLOCK_START_COUNT = "1/68342418.12288" SPACECRAFT_CLOCK_STOP_COUNT = "1/68428779.58897" START_JULIAN_DATE_VALUE = 2453431.5005293638 STOP_JULIAN_DATE_VALUE = 2453432.5000863895</pre> | INSTRUMENT_TYPE : | = "MAGNETOMETER" |
| NORMAL MODE: 32 PRIMARY & 1 SECONDARY VECTORS PER 32 SECONDS"TARGET_NAME= "EARTH"TARGET_TYPE= "PLANET"NOTE = "= "OUDS-03-02T00:00:45.737MAGNETIC_COORDINATE_SYSTEM : INSTRUMENTCOORDS"START_TIME= 2005-03-02T00:00:45.737STOP_TIME= 2005-03-03T00:00:07.464SPACECRAFT_CLOCK_START_COUNT= "1/68342418.12288"SPACECRAFT_CLOCK_STOP_COUNT= "1/68428779.58897"START_JULIAN_DATE_VALUE= 2453431.5005293638STOP_TULIAN_DATE_VALUE= 2453432.5000863895 | INSTRUMENT_MODE_ID : | = "SID2" |
| TARGET_NAME= "EARTH"TARGET_TYPE= "PLANET"NOTE = ""MAGNETIC_COORDINATE_SYSTEM : INSTRUMENTCOORDS"START_TIME= 2005-03-02T00:00:45.737STOP_TIME= 2005-03-03T00:00:07.464SPACECRAFT_CLOCK_START_COUNT= "1/68342418.12288"SPACECRAFT_CLOCK_STOP_COUNT= "1/68428779.58897"START_JULIAN_DATE_VALUE= 2453431.5005293638STOP_TULIAN_DATE_VALUE= 2453432.5000863895 | | |
| TARGET_TYPE= "PLANET"NOTE = "MAGNETIC_COORDINATE_SYSTEM : INSTRUMENTCOORDS"START_TIME= 2005-03-02T00:00:45.737STOP_TIME= 2005-03-03T00:00:07.464SPACECRAFT_CLOCK_START_COUNT= "1/68342418.12288"SPACECRAFT_CLOCK_STOP_COUNT= "1/68428779.58897"START_JULIAN_DATE_VALUE= 2453431.5005293638STOP_TULIAN_DATE_VALUE= 2453432.5000863895 | | |
| TARGET_TYPE= "PLANET"NOTE = "MAGNETIC_COORDINATE_SYSTEM : INSTRUMENTCOORDS"START_TIME= 2005-03-02T00:00:45.737STOP_TIME= 2005-03-03T00:00:07.464SPACECRAFT_CLOCK_START_COUNT= "1/68342418.12288"SPACECRAFT_CLOCK_STOP_COUNT= "1/68428779.58897"START_JULIAN_DATE_VALUE= 2453431.5005293638STOP_TULIAN_DATE_VALUE= 2453432.5000863895 | TARGET NAME : | = "EARTH" |
| MAGNETIC_COORDINATE_SYSTEM : INSTRUMENTCOORDS" START_TIME = 2005-03-02T00:00:45.737 STOP_TIME = 2005-03-03T00:00:07.464 SPACECRAFT_CLOCK_START_COUNT = "1/68342418.12288" SPACECRAFT_CLOCK_STOP_COUNT = "1/68428779.58897" START_JULIAN_DATE_VALUE = 2453431.5005293638 STOP_TULIAN_DATE_VALUE = 2453432.5000863895 | TARGET TYPE : | = "PLANET" |
| START_JULIAN_DATE_VALUE = 2453431.5005293638 | NOTE = " | |
| START JULIAN DATE VALUE = 2453431.5005293638 STOR JULIAN DATE VALUE = 2453432.5000863895 | MAGNETIC COORDINATE SYSTEM : II | INSTRUMENTCOORDS" |
| START JULIAN DATE VALUE = 2453431.5005293638 STOR JULIAN DATE VALUE = 2453432.5000863895 | START_TIME = | = 2005-03-02T00:00:45.737 |
| START_JULIAN_DATE_VALUE = 2453431.5005293638 | STOP_TIME : | = 2005-03-03T00:00:07.464 |
| START_JULIAN_DATE_VALUE = 2453431.5005293638 | SPACECRAFT CLOCK START COUNT | = "1/68342418.12288" |
| START JULIAN DATE VALUE = 2453431.5005293638 STOR JULIAN DATE VALUE = 2453432.5000863895 | SPACECRAFT CLOCK STOP COUNT | = "1/68428779.58897" |
| START_JULIAN_DATE_VALUE= 2453431.5005293638STOP_JULIAN_DATE_VALUE= 2453432.5000863895SC_SUN_POSITION_VECTOR= (141573911.73, -47460624.75, 54794.95)SC_TARGET_POSITION_VECTOR= (1028637.03, -248948.51, 54393.42)SC_TARGET_VELOCITY_VECTOR= (-3.87, 0.86, -0.22)SPACECRAFT_ALTITUDE= 1053352.128 | | |
| STOP JULIAN DATE VALUE= 2453432.5000863895SC_SUN POSITION VECTOR= (141573911.73, -47460624.75, 54794.95)SC_TARGET POSITION VECTOR= (1028637.03, -248948.51, 54393.42)SC_TARGET VELOCITY VECTOR= (-3.87, 0.86, -0.22)SPACECRAFT_ALTITUDE= 1053352.128 | START_JULIAN_DATE_VALUE : | = 2453431.5005293638 |
| SC_SUN_POSITION_VECTOR= (141573911.73, -47460624.75, 54794.95)SC_TARGET_POSITION_VECTOR= (1028637.03, -248948.51, 54393.42)SC_TARGET_VELOCITY_VECTOR= (-3.87, 0.86, -0.22)SPACECRAFT_ALTITUDE= 1053352.128 | STOP_JULIAN_DATE_VALUE : | = 2453432.5000863895 |
| SC_TARGET_POSITION_VECTOR = (1028637.03, -248948.51, 54393.42) SC_TARGET_VELOCITY_VECTOR = (-3.87, 0.86, -0.22) SPACECRAFT_ALTITUDE = 1053352.128 | SC_SUN_POSITION_VECTOR : | = (141573911.73, -47460624.75, 54794.95) |
| $SC_TARGET_VELOCITY_VECTOR = (-3.87, 0.86, -0.22)$ $SPACECRAFT_ALTITUDE = 1053352.128$ | SC_TARGET_POSITION_VECTOR : | = (1028637.03, -248948.51, 54393.42) |
| SPACECRAFT_ALTITUDE = 1053352.128 | SC_TARGET_VELOCITY_VECTOR : | = (-3.87, 0.86, -0.22) |
| | SPACECRAFT_ALTITUDE : | = 1053352.128 |

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|---|--|---|--|
| <pre>SUB_SPACECRAFT_LATITUDE SUB_SPACECRAFT_LONGITUDE NOTE The values of the keywor SC_TARGET_POSITION_VECTO are related to the ECLIP SUB_SPACECRAFT_LATITUDE are northern Latitude an planetocentric IAU_<targ for the time t= START_TI Distances are given in < SPICE_FILE_NAME</targ </pre> | R and SC_TARGET_VE J2000 reference fr and SUB_SPACECRAFT d eastern Longitud ET_NAME> frame. Al ME. km> velocities in = {"ATNR_P04030 "ROS_LBOOM_V "ROS_LBOOM_V "ROS_SA_2004 "ROS_SA_2004 "ROS_SA_2004 "ROS_SA_2005 "ROS_SA_2006 "ROS_SA_2006 "ROS_SA_2009 "ROS_RPC_V15 "NAIF0009.TL "PCK00008.TP "DE403-MASSE "ROS_090309 "ORER "ORFR "ORFR "ORFR "ORFR "ORFR "ORFR "ORFR "ORFR "ORHA "ORHA "ORHA "ROS_STRUCT_" "EARTH_TOPO "EARTHFIXEDI | LOCITY_VECTOR ame. LONGITUDE e in the stand l values are <km s="">, Angle. 2093352_00091 0.BC", V0001.BC", V0001.BC", V0001.BC", V0001.BC", V0001.BC", V0001.BC", V0001.BC", V0001.BC", V0001.BC", V0001.BC", V0001.BC", V0001.BC", V0001.BC", O001.BC", V0001.BC", O001.BC", O0031. 00067 00091 00052 00077 UCT_V1.BSP", 050714.TF", TRF93.TF", 1_060918_0606. 00061</km> | dard computed s in <deg>" .BC", BSP", .BSP", .BSP", .BSP", .BSP", .BSP",</deg> |
| PRODUCER_ID PRODUCER_FULL_NAME PRODUCER_INSTITUTION_NAME DATA_QUALITY_ID DATA_QUALITY_DESC ONLY 'GOOD' RAW DATA HAVE B PROCESSING_LEVEL_ID | = "N/A" = " | " NSCHWEIG" | |
| DESCRIPTION THIS FILE CONTAINS CALIBRAT OUTBOARD MAGNETOMETER ABOAR OUTBOARD SENSOR. GROUND CAL DATA. FIELD IS GIVEN IN INS NOTE LBL & TAB FILE HAVE BEEN GE NOTE GROUND CALIBRATION FILE: RP NOTE INFLIGHT CALIBRATION FILE: | D THE ROSETTA S/C IBRATION RESULTS H TRUMENT-COORDINATE = " NERATED BY S/W: GE = " CMAG_GND_CALIB_FSD = " | AND THE TEMPE AVE BEEN APPL S" N_CAL_DATA, V PU_FMOB.TXT" | RATURE OF THE IED TO THE RAW |

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|--|--|------------------------------|---|
| TIMESTAMPS (UTC) IN ORDER TO CORRE | = " OF PRIMARY SENSOR VECTORS HA OF SECONDARY SENSOR VECTORS CT DIGITAL FILTER TRANSFER A RSION_ID = "FIL:V1.0" NG_DESC = "MAGNETOMETER | HAVE BEEN SHIF FUNCTION." | TED BY 31.95 s |
| ^TABLE | = "RPCMAG050302T0000_CLA_01 | B_M2.TAB" | |
| OBJECT NAME INTERCHANGE_FORMAT ROWS COLUMNS ROW_BYTES | = TABLE = "RPCMAG-OB-SID2-CLA" = ASCII = 86261 = 7 = 90 | | |
| 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-DDTHH | :MM:SS.FFFFFF" |
| OBJECT NAME DATA_TYPE START_BYTE BYTES DESCRIPTION AT 1.1.2003: SSSS END_OBJECT | = ASCII_REAL = 28 = 15 = "S/C CLOCK AT OBSERVATION | N TIME, SECONDS | SINCE 00:00 |
| BYTES UNIT UNIT_ID DESCRIPTION | NSTRUMENT-COORDINATES, OB SI | ENT, CALIBRATED ENSOR" | , TEMPERATURE |
| CORRECTED DATA, I | = "BY_OB" = ASCII_REAL = 54 = 9 | ENT, CALIBRATED ENSOR" | , TEMPERATURE |
| OBJECT NAME DATA_TYPE START_BYTE BYTES | = COLUMN = "BZ_OB" = ASCII_REAL = 64 = 9 | | |

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|---------------------------|--|------------------------------------|-------------------------------|
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| UNIT | = "NANOTESLA" | | |
| UNIT ID | = "nT" | | |
| DESCRIPTION | = "MAGNETIC FIELD Z COMPONEN | NT, CALIBRATED, | , TEMPERATURE |
| | NSTRUMENT-COORDINATES, OB SEN | NSOR" | |
| END_OBJECT | = COLUMN | | |
| OBJECT | = COLUMN | | |
| | = "T_OB" | | |
| _ | = ASCII_REAL = 74 | | |
| BYTES | = 6 | | |
| UNIT | = "KELVIN" | | |
| UNIT_ID | = "K" | | |
| DESCRIPTION END OBJECT | = "TEMPERATURE OF RPCMAG OB = COLUMN | SENSOR" | |
| END_ODDEC1 | | | |
| | = COLUMN | | |
| | = "QUALITY_FLAGS" = CHARACTER | | |
| DATA_TYPE START BYTE | = 81 | | |
| BYTES | = 8 | | |
| DESCRIPTION | = " | | |
| | ibe the quality of the magnet ded in a 8 byte string. Each | | |
| the following val | | character can | llave |
| VALUE: MEANIN | G: | | |
| x proper | ty described by flag is still | l unknown | |
| 0 no dis 19 specif | turbance, good quality ic disturbance/problems, see | below | |
| | | 20101 | |
| Description of th | e specific flags: | | |
| FLAG-STRING FLAG | DESCRIPTION | | |
| 87654321 | | | |
| | IMPACT OF REACTION WHEELS | | |
| ::::::: | <pre>x = impact not assessed 0 = no disturbance</pre> | | |
| :::::: | 1 = disturbance eliminated of | during data ana | alysis |
| :::::: | 2 = disturbance elimination | failed | |
| | 3 = data disturbed | | |
| | IMPACT OF LANDER HEATER CUR | RENTS: | |
| ::::: | x = impact not assessed | | |
| ::::: | 0 = no disturbance | duning data an | 1 |
| :::::: | <pre>1 = disturbance eliminated of 2 = disturbance elimination</pre> | | alysis |
| | 3 = data disturbed | Turrea | |
| ::::: | | | |
| | BOOM DEPLOYMENT: | | |
| ::::: | 0 = boom deployed 1 = boom stowed | | |
| | 2 = boom deployment ongoing | . Data only val | Lid in |
| ::::: | instrument coordinates | | |
| ::::: | 3 = pyros fired for boom rel | Lease | |
| ::::: ::::: 4 | OFFSET RELATED EFFECTS: | | |
| :::: | x = offset issues not assess | sed | |
| :::: | 0 = no offset problems | | |
| :::: | 1 = offset behavior not clea | | |
| :::: | 2 = offset drifts, sensor no | JU IN UNEIMAL | |

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|------------|--|---|
| | aquilibrium thus town | anatura madal N/A |
| :::: | equilibrium thus temp 3 = offset drifts, reason | |
| :::: | 4 = ofset jump detected, : | |
| :::: | 4 – Olset jump detected, | Leason unknown |
| :::: | 5 CORRELATION BETWEEN IB AN | OR SENSOR |
| | x = correlation not assess | |
| ::: | 0 = perfect correlation | seu |
| | 1 = good correlation | |
| | 2 = poor correlation | |
| | 3 = IB and OB show different | ant long term behavior |
| ::: | 5 ID and OD Show differ | |
| ::: | | |
| ::: | 6 OTHER IMPACTS DECREASING ' | THE OUALTTY |
| :: | x = no assessment | |
| :: | 0 = no other problems det | ected |
| :: | 1 = TBD | |
| :: | 2 = TBD | |
| :: | 3 = TBD | |
| :: | 4 = TBD | |
| :: | 5 = data disturbed by AC | signal originated in s/c |
| :: | 6 = data noisy due to powe | |
| :: | | due to thermistor failure |
| :: | 8 = sensor saturated due | to huge external field |
| :: | 9 = sensor saturated, ins | trument power on sequence failed |
| :: | | |
| :: | 7 TBD | |
| : | x = no assessment | |
| : | | |
| : | 8 TBD | |
| : | x = no assessment | |
| : | | |
| " | | |
| END_OBJECT | = COLUMN | |
| END_OBJECT | = TABLE | |
| END | | |

4.3.7 Data Product "CALIBRATED LEVEL_C Magnetic Field data" Design

| PDS VERSION ID = | PDS3 |
|----------------------------------|--------------------------------------|
| LABEL REVISION NOTE = | "V1.0" |
| RECORD TYPE = | FIXED LENGTH |
| RECORD BYTES = | 90 — |
| FILE RECORDS = | 86261 |
| DATA SET ID = | "RO-E-RPCMAG-3-EAR1-CALIBRATED-V3.0" |
| DATA SET NAME = "ROSETTA-ORBITER | EARTH RPCMAG 3 EAR1 CALIBRATED V3.0" |
| PRODUCT_ID = | "RPCMAG050302T0000_CLA_OB_M2" |
| PRODUCT CREATION TIME = | 2009-12-11T08:50:18 |
| PRODUCT TYPE = | "RDR" |
| MISSION_ID = | "ROSETTA" |
| MISSION_NAME = | "INTERNATIONAL ROSETTA MISSION" |
| MISSION PHASE NAME = | "EARTH SWING-BY 1" |
| OBSERVATION_TYPE = | "EARTH SWINGBY 1" |
| INSTRUMENT_HOST_ID = | "RO" |
| INSTRUMENT_HOST_NAME = | "ROSETTA-ORBITER" |
| INSTRUMENT_ID = | "RPCMAG" |





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PRODUCER ID = "RPC MAG TEAM" PRODUCER_FULL_NAME = "INGO RICHTER" PRODUCER_INSTITUTION_NAME = "IGEP-TU-BRAUNSCHWEIG" 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 V20091209" NOTE _ " GROUND CALIBRATION FILE: RPCMAG GND CALIB FSDPU FMOB.TXT" - **..** NOTE = INFLIGHT CALIBRATION FILE: RPCMAG 002 CALIB OB.TXT" NOTE = " TIMESTAMPS (UTC) OF PRIMARY SENSOR VECTORS HAVE BEEN SHIFTED BY 8.20 s and TIMESTAMPS (UTC) OF SECONDARY SENSOR VECTORS HAVE BEEN SHIFTED BY 31.95 s IN ORDER TO CORRECT DIGITAL FILTER TRANSFER FUNCTION." FLIGHT_SOFTWARE_VERSION_ID = "FIL:V1.0" PLATFORM OR MOUNTING DESC = "MAGNETOMETER BOOM: DEPLOYED" ^TABLE = "RPCMAG050302T0000 CLA OB M2.TAB" = TABLE OBJECT = "RPCMAG-OB-SID2-CLA" NAME INTERCHANGE FORMAT = ASCII = 86261 ROWS COLUMNS = 7 = 90 ROW BYTES OBJECT = COLUMN = "TIME UTC" NAME DATA TYPE = TIME START BYTE = 1 = 26 BYTES = "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 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 REAL START BYTE = 44 BYTES = 9 = "NANOTESLA" UNIT UNIT ID = "nT"

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|--|--|----------------------------|---|
| CORRECTED DATA, INS | "MAGNETIC FIELD X COMPONE TRUMENT-COORDINATES, OB SE COLUMN | | TEMPERATURE |
| NAME = DATA_TYPE = START_BYTE = BYTES = UNIT = UNIT_ID = DESCRIPTION = CORRECTED DATA, INST | COLUMN "BY_OB" ASCII_REAL 54 9 "NANOTESLA" "nT" "MAGNETIC FIELD Y COMPONE TRUMENT-COORDINATES, OB SE COLUMN | | . TEMPERATURE |
| NAME = DATA_TYPE = START_BYTE = BYTES = UNIT = UNIT_ID = DESCRIPTION = CORRECTED DATA, INST | COLUMN "BZ_OB" ASCII_REAL 64 9 "NANOTESLA" "nT" "MAGNETIC FIELD Z COMPONE TRUMENT-COORDINATES, OB SE COLUMN | NT, CALIBRATED, NSOR" | . TEMPERATURE |
| NAME = DATA_TYPE = START_BYTE = BYTES = UNIT = UNIT_ID = DESCRIPTION = | COLUMN "T_OB" ASCII_REAL 74 6 "KELVIN" "K" "TEMPERATURE OF RPCMAG OB COLUMN | SENSOR" | |
| NAME = DATA_TYPE = START_BYTE = BYTES = DESCRIPTION = These flags describe The quality is code the following value VALUE: MEANING: x property | COLUMN "QUALITY_FLAGS" CHARACTER 81 8 " e the quality of the magned d in a 8 byte string. Each s: described by flag is stil rbance, good quality | character can | |
| | disturbance/problems, see | e below | |
| :::::::: x :::::::: 0 :::::::: 1 :::::::: 2 | SCRIPTION MPACT OF REACTION WHEELS = impact not assessed = no disturbance = disturbance eliminated = disturbance elimination = data disturbed | | alysis |

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|---|---|
| : : : : : : : : : : : : : : : : : : | IMPACT OF LANDER HEATER CURRENTS: x = impact not assessed 0 = no disturbance 1 = disturbance eliminated during data analysis 2 = disturbance elimination failed |
| ::::: ::::: ::::: | <pre>3 = data disturbed BOOM DEPLOYMENT: 0 = boom deployed 1 = boom stowed 2 = boom deployment ongoing. Data only valid in</pre> |
| | <pre>instrument coordinates 3 = pyros fired for boom release OFFSET RELATED EFFECTS: x = offset issues not assessed 0 = no offset problems 1 = offset behavior not clear</pre> |
| | <pre>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>x = correlation not assessed 0 = perfect correlation 1 = good correlation 2 = poor correlation 3 = IB and OB show different long term behavior</pre> |
| | <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 |
| END_OBJECT END_OBJECT END | = COLUMN = TABLE |



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4.3.8 Data Product "RESAMPLED LEVEL_K Magnetic Field data" Design

PDS VERSION ID = PDS3 = "V1.0" LABEL REVISION NOTE RECORD TYPE = FIXED LENGTH RECORD BYTES = 90 FILE RECORDS = 86261 = "RO-E-RPCMAG-3-EAR1-CALIBRATED-V3.0" DATA SET ID DATA SET NAME = "ROSETTA-ORBITER EARTH RPCMAG 3 EAR1 CALIBRATED V3.0" PRODUCT ID = "RPCMAG050302T0000_CLA_OB_M2" PRODUCT CREATION TIME = 2009-12-11T08:50:18 PRODUCT TYPE = "RDR" MISSION ID = "ROSETTA" MISSION NAME = "INTERNATIONAL ROSETTA MISSION" = "EARTH SWING-BY 1" MISSION PHASE NAME = "EARTH SWINGBY 1" OBSERVATION TYPE = "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 = "SID2" INSTRUMENT MODE DESC = " NORMAL MODE: 32 PRIMARY & 1 SECONDARY VECTORS PER 32 SECONDS" TARGET NAME = "EARTH" = "PLANET" TARGET TYPE NOTE = " MAGNETIC_COORDINATE_SYSTEM : INSTRUMENTCOORDS" START TIME = 2005-03-02T00:00:45.737 STOP TIME = 2005-03-03T00:00:07.464 SPACECRAFT_CLOCK_START_COUNT = "1/68342418.12288" SPACECRAFT_CLOCK_STOP_COUNT = "1/68428779.58897" START JULIAN DATE VALUE = 2453431.5005293638 STOP JULIAN DATE VALUE = 2453432.5000863895 SC SUN POSITION VECTOR = (141573911.73, -47460624.75, 54794.95) SC TARGET POSITION VECTOR 54393.42) = (_ -3.87, SC TARGET VELOCITY VECTOR 0.86, -0.22)SPACECRAFT ALTITUDE 1053352.128 = "N/A" SUB_SPACECRAFT_LATITUDE = "N/A" 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 00091.BC", "ROS LBOOM VO.BC", "ROS_V14.TF", "ROS_SA_2004_V0001.BC", "ROS_SA_2005_V0001.BC", "ROS_SA_2006_V0001.BC", "ROS_SA_2007_V0001.BC", "ROS SA 2008 V0037.BC", "ROS SA 2009 V0048.BC",



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PRODUCER ID = "INGO RICHTER" PRODUCER FULL NAME = "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 INSTRUMENT-COORDINATES" NOTE = " LBL & TAB FILE HAVE BEEN GENERATED BY S/W: GEN CAL DATA, VERSION V20091209" = " NOTE GROUND CALIBRATION FILE: RPCMAG GND CALIB FSDPU FMOB.TXT" ... NOTE = INFLIGHT CALIBRATION FILE: RPCMAG 002 CALIB OB.TXT" = " NOTE TIMESTAMPS (UTC) OF PRIMARY SENSOR VECTORS HAVE BEEN SHIFTED BY 8.20 s and TIMESTAMPS (UTC) OF SECONDARY SENSOR VECTORS HAVE BEEN SHIFTED BY 31.95 s IN ORDER TO CORRECT DIGITAL FILTER TRANSFER FUNCTION." FLIGHT SOFTWARE VERSION ID = "FIL:V1.0" = "MAGNETOMETER BOOM: DEPLOYED" PLATFORM OR MOUNTING DESC ^TABLE = "RPCMAG050302T0000_CLA_OB_M2.TAB" OBJECT = TABLE = "RPCMAG-OB-SID2-CLA" NAME INTERCHANGE FORMAT = ASCII = 86261 ROWS = 7 COLUMNS ROW BYTES = 90 OBJECT = COLUMN = "TIME UTC" NAME = TIME DATA TYPE START BYTE = 1

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|---|---|-------------------------|---|
| BYTES DESCRIPTION END_OBJECT | = 26 = "UTC TIME OF OBSERVATION: = COLUMN | ҮҮҮҮ-MM-DDTHH | :MM:SS.FFFFFF" |
| OBJECT NAME DATA_TYPE START_BYTE BYTES DESCRIPTION AT 1.1.2003: SS END_OBJECT | = 28 = 15 = "S/C CLOCK AT OBSERVATION | TIME, SECONDS | SINCE 00:00 |
| OBJECT NAME DATA_TYPE START_BYTE BYTES UNIT UNIT_ID DESCRIPTION CORRECTED DATA, END_OBJECT | <pre>= COLUMN = "BX_OB" = ASCII_REAL = 44 = 9 = "NANOTESLA" = "nT" = "MAGNETIC FIELD X COMPONE INSTRUMENT-COORDINATES, OB SE = COLUMN</pre> | NT, CALIBRATED NSOR" | , TEMPERATURE |
| DESCRIPTION | <pre>= COLUMN = "BY_OB" = ASCII_REAL = 54 = 9 = "NANOTESLA" = "nT" = "MAGNETIC FIELD Y COMPONE INSTRUMENT-COORDINATES, OB SE = COLUMN</pre> | NT, CALIBRATED NSOR" | , TEMPERATURE |
| UNIT_ID DESCRIPTION | = "NANOTESLA" | NT, CALIBRATED NSOR" | , TEMPERATURE |
| OBJECT NAME DATA_TYPE START_BYTE BYTES UNIT UNIT_ID DESCRIPTION END_OBJECT | = 6 = "KELVIN" = "K" = "TEMPERATURE OF RPCMAG OB | SENSOR" | |
| OBJECT NAME DATA_TYPE START_BYTE | = COLUMN = "QUALITY_FLAGS" = CHARACTER = 81 | | |

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|--|---|--|---|---------------------------------------|---|
| The quality the followi VALUE: x 0 | is coded in a | a 8 byte str ribed by fla e, good qual | ing. Each g is stil ity | | |
| Description | of the speci | fic flags: | | | |
| 87654321 | $\begin{array}{l} 0 = n 0 \\ 1 = d i \end{array}$ | OF REACTION pact not ass disturbance | essed iminated | during data an | alysis |
| :::::: ::::::: :::::::: | 3 = da 2 IMPACT x = imp | ta disturbed OF LANDER H pact not ass | EATER CUR | | |
| | 1 = di 2 = di 3 = da | sturbance el ta disturbed | imination | during data an failed | alysis |
| | 1 = boo2 = boointegration | om deployed om stowed | rdinates | . Data only va lease | lid in |
| | 0 = no 1 = of 2 = of eq 3 = of | fset issues offset prob fset behavio fset drifts, uilibrium th fset drifts, | not asses lems r not cle sensor n us temper reason u | ar ot in thermal ature model N/ | A |
| | 5 CORREL. x = co. 0 = pe. 1 = go. 2 = po. | ATION BETWEE rrelation no rfect correl od correlati or correlati | N IB AND t assesse ation on on | OB SENSOR | havior |
| | 0 = no 1 = TB 2 = TB 3 = TB 4 = TB | assessment other probl)))) | ems detec | | d in s/c |

| Geop | itut für ohysik und terrestrische RPC-MAG EAICD k | Document No. Issue/Rev. No. Date Page | : RO-IGEP-TR0009 : 3.3 : 18 February 2010 : 78 |
|---------------------------------|--|--|---|
| :: :: :: :: | <pre>6 = data noisy due to powe 7 = data not calculatable 8 = sensor saturated due to 9 = sensor saturated, inst</pre> | due to thermis o huge externa | l field |
| :: :: 7 : | 7 TBD x = no assessment | | |
| : 8 : : : | 3 TBD x = no assessment | | |
| END_OBJECT END_OBJECT END | = COLUMN = TABLE | | |

4.3.9 Data Product "RESAMPLED LEVEL_L Magnetic Field data" Design

| PDS_VERSION_ID = | _ | PDS3 | |
|--|----|---|-----------|
| LABEL REVISION_NOTE = RECORD_TYPE = RECORD_BYTES = | = | "V1.0" | |
| RECORD_TYPE = | = | FIXED_LENGTH | |
| RECORD BYTES = | = | 90 | |
| FILE RECORDS = | = | 86261 | |
| DATA SET ID = | = | 86261 "RO-E-RPCMAG-3-EAR1-CALIBRATED-V3. | .0" |
| | | | .0" |
| DATA_SET_NAME = "ROSETTA-ORBITEF PRODUCT_ID = PRODUCT_CREATION_TIME = PRODUCT_TYPE = MISSION_ID = MISSION_NAME = MISSION_PHASE_NAME = OBSERVATION_TYPE = INSTRUMENT_HOST_ID = INSTRUMENT_HOST_NAME = INSTRUMENT_ID = INSTRUMENT_NAME = "ROSETTA_PLASM | = | "RPCMAG050302T0000 CLA OB M2" | |
| PRODUCT CREATION TIME = | = | 2009-12-11T08:50:18 <u> </u> | |
| PRODUCT TYPE = | = | "RDR" | |
| MISSION ID = | = | "ROSETTA" | |
| MISSION NAME = | = | "INTERNATIONAL ROSETTA MISSION" | |
| MISSION PHASE NAME = | = | "EARTH SWING-BY 1" | |
| OBSERVATION TYPE = | = | "EARTH SWINGBY 1" | |
| INSTRUMENT HOST ID = | = | "RO" | |
| INSTRUMENT HOST NAME = | = | "ROSETTA-ORBITER" | |
| INSTRUMENT ID = | = | "RPCMAG" | |
| INSTRUMENT NAME = "ROSETTA PLASM | MA | CONSORTIUM - FLUXGATE MAGNETOMETE | ER" |
| | | | |
| INSTRUMENT_TYPE = INSTRUMENT_MODE_ID = | = | "SID2" | |
| INSTRUMENT MODE DESC = | = | " | |
| NORMAL MODE: 32 PRIMARY & 1 SEC | | | |
| | | "EARTH" | |
| TARGET TYPE = | | "PLANET" | |
| NOTE = " | | | |
| | NS | TRUMENTCOORDS" | |
| MAGNETIC_COORDINATE_SYSTEM : IN START_TIME = | = | $2005 - 03 - 02 - 00 \cdot 00 \cdot 45 - 737$ | |
| STOP TIME = | _ | 2005-03-03 ⁺ 00·00·07 464 | |
| SPACECRAFT CLOCK START COUNT = | _ | "1/68342418 12288" | |
| STOP_TIME = SPACECRAFT_CLOCK_START_COUNT = SPACECRAFT_CLOCK_STOP_COUNT = | _ | "1/68428779 58897" | |
| | | | |
| START JULIAN DATE VALUE = | _ | 2453431 5005293638 | |
| STOP JULIAN DATE VALUE = | _ | 2453432.5000863895 | |
| SC SUN POSITION VECTOR = | _ | (141573911.7347460624.75. | 54794,95) |
| SC TARGET POSITION VECTOR = | _ | (1028637 03248948 51. | 54393 42) |
| SC TARGET VELOCITY VECTOR = | = | 2453431.5005293638 2453432.5000863895 (141573911.73, -47460624.75, (1028637.03, -248948.51, (-3.87, 0.86, 1053352.128 | -0.22) |
| SPACECRAFT ALTITUDE = | _ | 1053352 128 | 0.22) |
| | | 1000002.120 | |

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|--|--|---|--|
| SUB_SPACECRAFT_LATITUDE SUB_SPACECRAFT_LONGITUDE NOTE The values of the keyw SC_TARGET_POSITION_VEC are related to the ECL SUB_SPACECRAFT_LATITUD are northern Latitude planetocentric IAU_ <ta for the time t= START_ Distances are given in SPICE_FILE_NAME SPICE_FILE_NAME</ta | <pre>TOR and SC_TARGET_VE IPJ2000 reference fr E and SUB_SPACECRAFT and eastern Longitud RGET_NAME> frame. Al IIME.</pre> | DELOCITY_VECTOR, came. P_LONGITUDE de in the stand l values are of <km s="">, Angles 02093352_00091. 0.BC", - - - - - - - - - - - - -</km> | <pre>dard computed s in <deg>" .BC", BSP", BSP", BSP", BSP", BSP", BSP", BSP",</deg></pre> |
| PRODUCER_ID PRODUCER_FULL_NAME PRODUCER_INSTITUTION_NAME DATA_QUALITY_ID DATA_QUALITY_DESC ONLY 'GOOD' RAW DATA HAVE PROCESSING_LEVEL_ID | = "IGEP-TU-BRAU = "N/A" = " | ₹" JNSCHWEIG" | |
| DESCRIPTION THIS FILE CONTAINS CALIBR OUTBOARD MAGNETOMETER ABO OUTBOARD SENSOR. GROUND C DATA. FIELD IS GIVEN IN I NOTE LBL & TAB FILE HAVE BEEN NOTE GROUND CALIBRATION FILE: NOTE INFLIGHT CALIBRATION FILE | ARD THE ROSETTA S/C ALIBRATION RESULTS H NSTRUMENT-COORDINATE = " GENERATED BY S/W: GE = " RPCMAG_GND_CALIB_FSI = " | AND THE TEMPEF HAVE BEEN APPLI ES" EN_CAL_DATA, VE DPU_FMOB.TXT" | RATURE OF THE IED TO THE RAW |

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|--|---|--|---|--|--|--|
| TIMESTAMPS (UTC) (IN ORDER TO CORREC FLIGHT SOFTWARE VER | NOTE = " TIMESTAMPS (UTC) OF PRIMARY SENSOR VECTORS HAVE BEEN SHIFTED BY 8.20 s and TIMESTAMPS (UTC) OF SECONDARY SENSOR VECTORS HAVE BEEN SHIFTED BY 31.95 s IN ORDER TO CORRECT DIGITAL FILTER TRANSFER FUNCTION." FLIGHT_SOFTWARE_VERSION_ID = "FIL:V1.0" PLATFORM_OR_MOUNTING_DESC = "MAGNETOMETER_BOOM: DEPLOYED" | | | | | |
| ^TABLE | = "RPCMAG050302T0000_CLA_OB | _M2.TAB" | | | | |
| OBJECT NAME INTERCHANGE_FORMAT ROWS COLUMNS ROW_BYTES | <pre>= TABLE = "RPCMAG-OB-SID2-CLA" = ASCII = 86261 = 7 = 90</pre> | | | | | |
| DATA_TYPE START_BYTE BYTES | <pre>= COLUMN = "TIME_UTC" = TIME = 1 = 26 = "UTC TIME OF OBSERVATION: = COLUMN</pre> | YYYY-MM-DDTHI | H:MM:SS.FFFFFF" | | | |
| DATA_TYPE START_BYTE BYTES | | TIME, SECONDS | SINCE 00:00 | | | |
| BYTES UNIT UNIT_ID DESCRIPTION CORRECTED DATA, IN | <pre>= COLUMN = "BX_OB" = ASCTI_REAL = 44 = 9 = "NANOTESLA" = "nT" = "MAGNETIC FIELD X COMPONE NSTRUMENT-COORDINATES, OB SE = COLUMN</pre> | NT, CALIBRATE NSOR" | D, TEMPERATURE | | | |
| END_OBJECT | = "nT" = "MAGNETIC FIELD Y COMPONE NSTRUMENT-COORDINATES, OB SE = COLUMN | NT, CALIBRATE NSOR" | D, TEMPERATURE | | | |
| OBJECT NAME DATA_TYPE START_BYTE BYTES | = COLUMN = "BZ_OB" = ASCII_REAL = 64 = 9 | | | | | |

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| UNIT | = "NANOTESLA" | | |
| UNIT ID | = "nT" | | |
| DESCRIPTION | = "MAGNETIC FIELD Z COMPONEN | NT, CALIBRATED, | , TEMPERATURE |
| | NSTRUMENT-COORDINATES, OB SEN | NSOR" | |
| END_OBJECT | = COLUMN | | |
| OBJECT | = COLUMN | | |
| | = "T_OB" | | |
| _ | = ASCII_REAL = 74 | | |
| BYTES | = 6 | | |
| UNIT | = "KELVIN" | | |
| UNIT_ID | = "K" | | |
| DESCRIPTION END OBJECT | = "TEMPERATURE OF RPCMAG OB = COLUMN | SENSOR" | |
| | COLORIN | | |
| | = COLUMN | | |
| | = "QUALITY_FLAGS" = CHARACTER | | |
| START BYTE | = 81 | | |
| BYTES | = 8 | | |
| DESCRIPTION | = " | | |
| | ibe the quality of the magnet ded in a 8 byte string. Each | | |
| the following val | | character can | nave |
| VALUE: MEANIN | | | |
| x proper | ty described by flag is still | l unknown | |
| 0 no dis 19 specif | turbance, good quality ic disturbance/problems, see | below | |
| 1 | | 20101 | |
| Description of th | e specific flags: | | |
| FLAG-STRING FLAG | DESCRIPTION | | |
| 87654321 | | | |
| ::::::: | IMPACT OF REACTION WHEELS x = impact not assessed | | |
| | 0 = no disturbance | | |
| :::::: | 1 = disturbance eliminated of | during data ana | alysis |
| :::::: | 2 = disturbance elimination | failed | |
| | 3 = data disturbed | | |
| | IMPACT OF LANDER HEATER CURI | RENTS: | |
| ::::: | x = impact not assessed | | |
| ::::: | 0 = no disturbance | dumina data an | |
| :::::: | <pre>1 = disturbance eliminated of 2 = disturbance elimination</pre> | | alysis |
| ::::: | 3 = data disturbed | 141104 | |
| ::::: | | | |
| | BOOM DEPLOYMENT: 0 = boom deployed | | |
| ::::: | 1 = boom stowed | | |
| ::::: | 2 = boom deployment ongoing | . Data only val | lid in |
| ::::: | instrument coordinates | _ | |
| ::::: | 3 = pyros fired for boom rei | lease | |
| ::::: ::::: 4 | OFFSET RELATED EFFECTS: | | |
| :::: | x = offset issues not assess | sed | |
| :::: | 0 = no offset problems | | |
| :::: | 1 = offset behavior not clea | | |
| :::: | 2 = offset drifts, sensor no | JU IN UNETINAL | |

| :::: 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 |
| $\begin{array}{ccc} \vdots & 1 &= & \text{TBD} \\ 0 & & & & \text{TDD} \end{array}$ |
| $\begin{array}{c} \vdots \\ 2 &= \text{TBD} \end{array}$ |
| 3 = TBD |
| $\begin{array}{cccc} \vdots & 4 &= & \text{TBD} \\ \hline & & & & & \\ \hline & & & & & \\ \hline & & & &$ |
| :: 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_OBJECT _ TABLE |

4.3.10 Data Product "RESAMPLED LEVEL_E Magnetic Field data" Design

This data product is usually not generated.

PDS_VERSION_ID = PDS3 LABEL_REVISION_NOTE = "V1.0" RECORD_TYPE = FIXED_LENGTH RECORD_BYTES = 90 FILE_RECORDS = 5 DATA_SET_ID = "RO-X-RPCMAG-4-CVP-RESAMPLED-VGND" DATA_SET_NAME = "ROSETTA-ORBITER CHECK RPCMAG 4 CVP RESAMPLED VGND" PRODUCT_ID = "RPCMAG040507_CLE_IB_A200"



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|---|---|--|--|---|
| | "" "" "" "" "" "" "" "" "" "" | ROS_STRUCT EARTH_TOPO EARTHFIXEDI EARTHFIXEDI DE403-MASSE | UCT_V1.BSP", V1.BSP", 050714.TF", AU.TF", TRF93.TF", S.TPC", 1_060918_0606 | ".BSP", 527.BPC", |
| PRODUCER_ID PRODUCER_FULL_NAME PRODUCER_INSTITUTIC DATA_QUALITY_ID DATA_QUALITY_DESC ONLY 'GOOD' RAW DA PROCESSING_LEVEL_II | DN_NAME = "IC = "N/ = " ATA HAVE BEEN PROO | /A" | NSCHWEIG" | |
| DESCRIPTION THIS FILE CONTAINS INBOARD MAGNETOMET BEEN APPLIED TO TH COORDINATES.DATA A NOTE LBL & TAB FILE HAV NOTE GROUND CALIBRATION NOTE INFLIGHT CALIBRATI NOTE DATA SOURCE FOR CI FLIGHT_SOFTWARE_VEF PLATFORM_OR_MOUNTIN | TER ABOARD THE ROS HE RAW DATA. FIELI ARE AVERAGED TO 20 "" VE BEEN GENERATED "" N FILE: RPCMAG_GNI "" ION FILE: NOT USEI "" LE DATA: LEVEL_A I RSION ID = "FI | SETTA S/C. D IS ROTATE D0 S MEANS. BY S/W: GE D_CALIB_FSD D" DATA" IL:V1.0" | GROUND CALIBR D TO INSTRUME " N_CAL_DATA, V PU_FMIB.TXT" | ATION RESULTS HAVE ENTCOORDS VERSION V20091209" |
| ^TABLE | = "RPCMAG040507_0 | CLE_IB_A200 | .TAB" | |
| INTERCHANGE_FORMAT ROWS | = TABLE = "RPCMAG-IB-2005 = ASCII = 5 = 7 = 90 | S_AVERAGE-C | LE" | |
| OBJECT NAME DATA_TYPE START_BYTE BYTES DESCRIPTION END_OBJECT | <pre>= COLUMN = "TIME_UTC" = TIME = 1 = 26 = "UTC TIME OF OF = COLUMN</pre> | BSERVATION: | YYYY-MM-DDTH | IH:MM:SS.FFFFFF" |
| OBJECT NAME DATA_TYPE START_BYTE BYTES DESCRIPTION AT 1.1.2003: SSSSS | = COLUMN = "TIME_OBT" = ASCII_REAL = 28 = 15 = "S/C CLOCK AT (| | | |

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|---|--|-----------------------------------|---------------------------------|---|
| START_BYTE BYTES UNIT UNIT_ID DESCRIPTION | <pre>= COLUMN = "BX_IB" = ASCII_REAL = 44 = 9 = "NANOTESLA" = "nT" = "MAGNETIC FIELD CCTED DATA, S/C-COOF = COLUMN</pre> | | | |
| START_BYTE BYTES UNIT UNIT_ID DESCRIPTION | <pre>= COLUMN = "BY_IB" = ASCII_REAL = 54 = 9 = "NANOTESLA" = "nT" = "MAGNETIC FIELD CCTED DATA, S/C-COOF = COLUMN</pre> | Y COMPONEN RDINATES, 2 | T, CALIBRATED 00S_AVERAGE-II | , B SENSOR" |
| START_BYTE BYTES UNIT UNIT_ID DESCRIPTION | <pre>= COLUMN = "BZ_IB" = ASCII_REAL = 64 = 9 = "NANOTESLA" = "nT" = "MAGNETIC FIELD CCTED DATA, S/C-COOF = COLUMN</pre> | z componen Rdinates, 2 | T, CALIBRATED 00S_AVERAGE-II | , B SENSOR" |
| UNIT UNIT_ID DESCRIPTION | <pre>= COLUMN = "T_IB" = ASCII_REAL = 74 = 6 = "KELVIN" = "K" = "TEMPERATURE OF = COLUMN</pre> | RPCMAG IB | SENSOR" | |
| NAME DATA_TYPE START_BYTE BYTES DESCRIPTION These flags descr The quality is co the following val VALUE: MEANIN x proper 0 no dis | tibe the quality of oded in a 8 byte str ues: IG: ty described by fla turbance, good qual | ring. Each ag is still .ity | character can unknown | |
| 19 specif | ic disturbance/prob e specific flags: | | below | |
| FLAG-STRING FLAG | DESCRIPTION | | | |

Document No. : RO-IGEP-TR0009 Institut für Geophysik und extraterrestrische Physik IGEP Issue/Rev. No. : 3.3 RPC-MAG EAICD : 18 February 2010 Date TU Braunschweig Page : 86 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

4.3.11 Data Product "RESAMPLED LEVEL_F Magnetic Field data" Design

| PDS_VERSION_ID = LABEL_REVISION_NOTE = RECORD_TYPE = RECORD_BYTES = FILE_RECORDS = | = PDS3 | |
|--|---|---|
| LABEL REVISION NOTE = | = "V1.0" | |
| RECORD TYPE - | = FIXED LENGTH | |
| RECORD BYTES = | = "V1.0" = FIXED_LENGTH = 90 | |
| FILE RECORDS = | = 86397 | |
| | $-$ "DO_E_DDCMAC_4_EAD1_DECAMPLED_V2 O" | |
| DATA SET NAME = "ROSETTA-ORBITER | R EARTH RPCMAG 4 EAR1 RESAMPLED V3.0" | |
| PRODUCT ID = | = "RPCMAG050305 CLF OB A1" | |
| PRODUCT CREATION TIME = | = 2009-12-14T10:30:09 | |
| PRODUCT TYPE | = "REFDR" | |
| MISSION ID = | = "ROSETTA" | |
| DATA_SET_ID DATA_SET_NAME = "ROSETTA-ORBITEN PRODUCT_ID PRODUCT_CREATION_TIME PRODUCT_TYPE MISSION_ID MISSION_NAME | = "INTERNATIONAL ROSETTA MISSION" | |
| MISSION PHASE NAME = | = "EARTH SWING-BY 1" | |
| OBSERVATION TYPE = | = "REFDR" = "ROSETTA" = "INTERNATIONAL ROSETTA MISSION" = "EARTH SWING-BY 1" = "EARTH SWINGBY 1" | |
| INSTRUMENT_HOST_ID INSTRUMENT_HOST_NAME INSTRUMENT_ID | = "RO" | |
| INSTRUMENT HOST NAME = | = "ROSETTA-ORBITER" | |
| INSTRUMENT ID = | = "RPCMAG" | |
| INSTRUMENT NAME = "ROSETTA PLASI | MA CONSORTIUM - FLUXGATE MAGNETOMETER" | |
| INSTRUMENT TYPE = | = "MAGNETOMETER" | |
| INSTRUMENT MODE ID = | = "AVERAGED" | |
| INSTRUMENT_TYPE = INSTRUMENT_MODE_ID = INSTRUMENT_MODE_DESC = TARGET_NAME = | = "1 S AVERAGES" | |
| TARGET_NAME = | = "EARTH" | |
| TARGET_TYPE = | "PLANET" | |
| NOTE = " | | |
| MAGNETIC_COORDINATE_SYSTEM : S, | /C-COORDS" | |
| START_TIME = | = 2005-03-05T00:00:00.715 | |
| STOP_TIME = | = 2005-03-05T23:59:56.715 | |
| SPACECRAFT_CLOCK_START_COUNT = | = "1/68601581.03648" | |
| START_TIME = STOP_TIME = SPACECRAFT_CLOCK_START_COUNT = SPACECRAFT_CLOCK_STOP_COUNT = | = "1/68687977.03648" | |
| START JULIAN DATE VALUE | = 2453434.5000082762 = 2453435.4999619797 = (142935361.97, -39764663.90, 7610.90) = (-2744.86, 42722.39, 8208.04) = (1.66, 5.38, 1.23) = 37218.863 = -34.082 = 111.667 =" | |
| STOP JULIAN DATE VALUE | = 2453435.4999619797 | |
| SC SUN POSITION VECTOR = | = (142935361.97, -39764663.90, 7610.90) |) |
| SC TARGET POSITION VECTOR = | = (-2744.86, 42722.39, 8208.04) |) |
| SC TARGET VELOCITY VECTOR = | = (1.66, 5.38, 1.23) |) |
| SPACECRAFT ALTITUDE = | = 37218.863 | |
| SUB SPACECRAFT LATITUDE = | = -34.082 | |
| SUB SPACECRAFT LONGITUDE = | = 111.667 | |
| NOTE – | =" | |
| The values of the keywords S | | |
| | nd SC TARGET VELOCITY VECTOR, | |
| are related to the ECLIPJ200 |)0 reference frame. | |
| SUB SPACECRAFT LATITUDE and | | |
| | astern Longitude in the standard | |
| planetocentric IAU <target n<="" td=""><td>NAME> frame. All values are computed</td><td></td></target> | NAME> frame. All values are computed | |
| for the time t= START_TIME. | | |
| | velocities in <km s="">, Angles in <deg>"</deg></km> | |
| SPICE_FILE_NAME = | = {"ATNR_P040302093352_00091.BC", | |
| | "ROS_LBOOM_V0.BC", | |
| | | |

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|---|---|--|---|
| | "ROS_HGA_200 "ROS_RPC_V15 "NAIF0009.TI "PCK00008.TI "DE403-MASSH "ROS_090309 "ORER "ORFR "ORFR "ORFR "ORFR "ORHR "ORHR "ORHO "ROS_RPC_STH "ROS_RPC_STH "ROS_STRUCT "EARTH_TOPO "EARTHFIXED "EARTHFIXED | 4 V0001.BC", 5 V0001.BC", 5 V0001.BC", 7 V0001.BC", 9 V0048.BC", 9 V0048.BC", 9 V0045.BC", 5.TI", 25.TFC", 5.TEP.TSC", 600031 00067 00091 00091 00052 00077 RUCT_V1.BSP", 050714.TF", 17RF93.TF", 01 060918 06062 | .BSP", .BSP", .BSP", .BSP", .BSP", |
| PRODUCER_ID PRODUCER_FULL_NAME PRODUCER_INSTITUTION_NAME DATA_QUALITY_ID DATA_QUALITY_DESC ONLY 'GOOD' RAW DATA HAVE BE PROCESSING_LEVEL_ID | = "RPC_MAG_TEAN = "INGO RICHTEN = "IGEP-TU-BRAN = "N/A" = " EN PROCESSED AND = 4 | R" JNSCHWEIG" | |
| DESCRIPTION THIS FILE CONTAINS CALIBRATE OUTBOARD MAGNETOMETER ABOARD BEEN APPLIED TO THE RAW DATA COORDINATES.DATA ARE AVERAGE NOTE | THE ROSETTA S/C. . FIELD IS ROTATE | . GROUND CALIB | RATION RESULTS HAVE |
| NOTE LBL & TAB FILE HAVE BEEN GEN NOTE GROUND CALIBRATION FILE: RPC NOTE INFLIGHT CALIBRATION FILE: R | ERATED BY S/W: GH = " MAG_GND_CALIB_FSI = " PCMAG 002 CALIB (| DPU_FMOB.TXT" | ERSION V20091209" |
| NOTE DATA SOURCE FOR CLF DATA: LE FLIGHT_SOFTWARE_VERSION_ID PLATFORM_OR_MOUNTING_DESC | = ⁻ "FIL:V1.0" = "MAGNETOMETER | | ED" |
| | 50305_CLF_OB_A1.5 | IAB" | |
| OBJECT= TABLENAME= "RPCMAG-"INTERCHANGE_FORMAT= ASCIIROWS= 86397COLUMNS= 7ROW_BYTES= 90 | DB-1S_AVERAGE-CLI | ?" | |



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| NAME DATA TYPE | <pre>= COLUMN = "TIME_UTC" = TIME = 1 = 26 = "UTC TIME OF OBSERVATION: YYYY-MM-DDTHH:MM:SS.FFFFFF" = COLUMN</pre> |
|---|---|
| AT 1.1.2003: SSSS END_OBJECT | <pre>= "S/C CLOCK AT OBSERVATION TIME,SECONDS SINCE 00:00 SSSSSS.FFFFF" = COLUMN</pre> |
| OBJECT NAME DATA_TYPE START_BYTE BYTES UNIT UNIT_ID DESCRIPTION TEMPERATURE CORRE END_OBJECT | <pre>= COLUMN = "BX_OB" = ASCTI_REAL = 44 = 9 = "NANOTESLA" = "nT" = "MAGNETIC FIELD X COMPONENT, CALIBRATED, CCTED DATA, S/C-COORDINATES, 1S_AVERAGE-OB SENSOR" = COLUMN</pre> |
| | <pre>= "NANOTESLA" = "nT" = "MAGNETIC FIELD Y COMPONENT, CALIBRATED, CCTED DATA, S/C-COORDINATES, 1S AVERAGE-OB SENSOR"</pre> |
| NAME DATA_TYPE START_BYTE BYTES UNIT UNIT_ID DESCRIPTION | <pre>= COLUMN = "BZ_OB" = ASCII_REAL = 64 = 9 = "NANOTESLA" = "nT" = "MAGNETIC FIELD Z COMPONENT, CALIBRATED, CCTED DATA, S/C-COORDINATES, 1S_AVERAGE-OB SENSOR" = COLUMN</pre> |
| DATA_TYPE START_BYTE BYTES UNIT UNIT ID | = 6 = "KELVIN" = "K" = "TEMPERATURE OF RPCMAG OB SENSOR" |



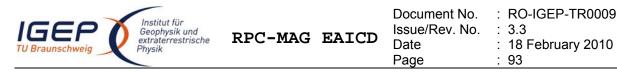
OBJECT = COLUMN = "QUALITY FLAGS" NAME DATA TYPE = CHARACTER START BYTE = 81 BYTES = 8 = " DESCRIPTION These flags describe the quality of the magnetic field data. The quality is coded in a 8 byte string. Each character can have the following values: MEANING: VALUE: Х property described by flag is still unknown 0 no disturbance, good quality specific disturbance/problems, see below 1..9 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 ::::: ::::: ::::: A 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 ::

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|--------------------------------------|--|---|------------------------------------|---|---|
| : | 6 = dat 7 = dat 8 = sen 9 = sen 7 TBD x = no 8 TBD | a noisy due a not calcu sor saturat | to power latable d ed due to | gnal originat on failure ue to thermis huge externa ument power o | tor failure |
| " END_OBJECT END_OBJECT END | = COLUM = TABLE | N | | | |

4.3.12 Data Product "RESAMPLED LEVEL_G Magnetic Field data" Design

| PDS VERSION ID | = | PDS3 |
|--------------------------------|------|---------------------------------------|
| LABEL REVISION NOTE | = | "V1.0" |
| RECORD TYPE - | = | FIXED LENGTH |
| RECORD BYTES | = | 125 |
| FILE RECORDS | = | 86397 |
| DATA SET ID | = | "RO-E-RPCMAG-4-EAR1-RESAMPLED-V3.0" |
| DATA_SET_NAME = "ROSETTA-ORBIT | ΓER | EARTH RPCMAG 4 EAR1 RESAMPLED V3.0" |
| PRODUCT ID | = | "RPCMAG050305 CLG OB A1" |
| PRODUCT_CREATION_TIME | = | 2009-12-14T10:23:31 |
| PRODUCT_TYPE | = | "REFDR" |
| MISSION_ID | = | "ROSETTA" |
| MISSION_NAME | = | "INTERNATIONAL ROSETTA MISSION" |
| | = | "EARTH SWING-BY 1" |
| OBSERVATION_TYPE | = | "EARTH SWINGBY 1" |
| INSTRUMENT_HOST_ID | | "RO" |
| INSTRUMENT_HOST_NAME | = | "ROSETTA-ORBITER" |
| INSTRUMENT_ID | | "RPCMAG" |
| INSTRUMENT_NAME = "ROSETTA PLA | ASMA | A CONSORTIUM - FLUXGATE MAGNETOMETER" |
| INSTRUMENT_TYPE | = | "MAGNETOMETER" |
| INSTRUMENT_MODE_ID | = | "AVERAGED" |
| INSTRUMENT_MODE_DESC | = | "1 S AVERAGES" |
| TARGET_NAME | = | "EARTH" |
| TARGET_TYPE | = | "PLANET" |
| NOTE = " | | |
| MAGNETIC_COORDINATE_SYSTEM : | ECI | LIPJ2000" |
| COORDINATE_SYSTEM_CENTER_NAME | = | "EARTH" |
| START_TIME | = | 2005-03-05T00:00:00.715 |
| STOP_TIME | = | 2005-03-05T23:59:56.715 |
| | | |

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|---|--|--|--|
| SPACECRAFT_CLOCK_START_COUNT SPACECRAFT_CLOCK_STOP_COUNT | = "1/68601581. = "1/68687977. | | |
| SUB_SPACECRAFT_LONGITUDE NOTE The values of the keyword SC_TARGET_POSITION_VECTOR are related to the ECLIPJ SUB_SPACECRAFT_LATITUDE a are northern Latitude and planetocentric IAU_ <targe for the time t= START_TIM</targe | <pre>= (-2744. = (1. = 37218. = -34.082 = 111.667 =" s SC_SUN_POSITIO and SC_TARGET_V 2000 reference f nd SUB_SPACECRAF eastern Longitu T_NAME> frame. A E.</pre> | 619797 97, -39764663. 86, 42722. 66, 5. 863 N_VECTOR, ELOCITY_VECTOR rame. T_LONGITUDE de in the stan 11 values are | 38, 1.23) , dard computed |
| Distances are given in <k SPICE_FILE_NAME</k | <pre>= {"ATNR_P0403 "ROS_LBOOM_" "ROS_V14.TF "ROS_SA_200 "ROS_SA_200 "ROS_SA_200 "ROS_SA_200 "ROS_SA_200 "ROS_SA_200 "ROS_SA_200 "ROS_HGA_20 "ROS_HGA_20 "ROS_HGA_20 "ROS_HGA_20 "ROS_HGA_20 "ROS_HGA_20 "ROS_HGA_20 "ROS_HGA_20 "ROS_HGA_20 "ROS_HGA_20 "ROS_HGA_20 "ROS_HGA_20 "ROS_HGA_20 "ROS_HGA_20 "ROS_RPC_V1 "ORFR "ORFR "ORFR "ORFR "ORFR "ORFR "ORFR "ORFR "ORHR "ORHR "ORHR "ORHC "ROS_RPC_ST "ROS_STRUCT "EARTH_TOPO "EARTHFIXED</pre> | 02093352_00091 V0.BC", ", 4_V0001.BC", 5_V0001.BC", 6_V0001.BC", 8_V0037.BC", 9_V0048.BC", 08_V0018.BC", 09_V0045.BC", 5.TI", LS", PC", ES.TPC", 00031 00052 00091 00091 00091 00077 RUCT_V1.BSP", 050714.TF", IAU.TF", ITRF93.TF", 01_060918_0606 | .BSP", .BSP", .BSP", .BSP", .BSP", .BSP", .BSP", |
| PRODUCER_ID PRODUCER_FULL_NAME PRODUCER_INSTITUTION_NAME DATA_QUALITY_ID DATA_QUALITY_DESC ONLY 'GOOD' RAW DATA HAVE BE PROCESSING_LEVEL_ID | = "N/A" = " | R" UNSCHWEIG" | |
| DESCRIPTION THIS FILE CONTAINS CALIBRATE | = " D MAGNETIC FIELD | VECTOR DATA O | BTAINED 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 1 S MEANS." = " NOTE LBL & TAB FILE HAVE BEEN GENERATED BY S/W: GEN CAL DATA, VERSION V20091209" = " NOTE S/C ATTITUDE COMPUTED USING FILE ATNR FDLRMA DAP040302093352 00091.ROS" = " NOTE 00031.ROS" S/C POSITION COMPUTED USING FILE ORER FDLRMA DA NOTE = " GROUND CALIBRATION FILE: RPCMAG_GND_CALIB_FSDPU_FMOB.TXT" ••• NOTE = INFLIGHT CALIBRATION FILE: RPCMAG_002_CALIB_OB.TXT" NOTE = " DATA SOURCE FOR CLG DATA: LEVEL_L DATA" =""FIL:V1.0" FLIGHT SOFTWARE VERSION ID = "MAGNETOMETER_BOOM: DEPLOYED" PLATFORM OR MOUNTING DESC ^TABLE = "RPCMAG050305 CLG OB A1.TAB" OBJECT = TABLE NAME = "RPCMAG-OB-1S AVERAGE-CLG" INTERCHANGE FORMAT = ASCII = 86397 ROWS COLUMNS = 9 ROW BYTES = 125OBJECT = COLUMN = "TIME UTC" NAME DATA TYPE = TIME START BYTE = 1 = 26 BYTES DESCRIPTION = "UTC TIME OF OBSERVATION: YYYY-MM-DDTHH:MM:SS.FFFFFF" END OBJECT = COLUMN OBJECT = COLUMN = "TIME OBT" NAME DATA TYPE = ASCII REAL = 28 START BYTE = 15 BYTES = "S/C CLOCK AT OBSERVATION TIME, SECONDS SINCE 00:00 DESCRIPTION AT 1.1.2003: SSSSSSSSS.FFFFF" = COLUMN END OBJECT OBJECT = COLUMN = "POSITION X" NAME DATA TYPE = ASCII REAL START BYTE = 44 = 13 BYTES = "KILOMETER" UNIT = "km" UNIT ID = "SPACECRAFT POSITION, X COMPONENT, ECLIPJ2000" DESCRIPTION = COLUMN END OBJECT OBJECT = COLUMN = "POSITION Y" NAME DATA TYPE = ASCII REAL = 58 START BYTE BYTES = 13

| | Institut für Geophysik und Extraterrestrische RPC-MAG EAICD Hysik RPC-MAG EAICD Hysik RPC-MAG EAICD |
|---|---|
| UNIT UNIT_ID DESCRIPTION END_OBJECT | <pre>= "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 CORRECTED DATA, END_OBJECT | <pre>= COLUMN = "BY_OB" = ASCII_REAL = 96 = 9 = "NANOTESLA" = "nT" = "MAGNETIC FIELD Y COMPONENT, CALIBRATED, TEMPERATURE 1S_AVERAGE-OB SENSOR, ECLIPJ2000" = COLUMN</pre> |
| OBJECT NAME DATA_TYPE START_BYTE BYTES UNIT UNIT_ID DESCRIPTION CORRECTED DATA, END_OBJECT | <pre>= COLUMN = "BZ_OB" = ASCII_REAL = 106 = 9 = "NANOTESLA" = "nT" = "MAGNETIC FIELD Z COMPONENT, CALIBRATED, TEMPERATURE 1S_AVERAGE-OB SENSOR, ECLIPJ2000" = COLUMN</pre> |
| The quality is the following w VALUE: MEAN x prop | <pre>= 116 = 8 = " scribe the quality of the magnetic field data. coded in a 8 byte string. Each character can have values:</pre> |



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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
:::::
:::::
:::::: 3 BOOM DEPLOYMENT:
                 0 = \text{boom deployed}
:::::
                 1 = \text{boom stowed}
:::::
                 2 = boom deployment ongoing. Data only valid in
:::::
:::::
                     instrument coordinates
                 3 = pyros fired for boom release
:::::
:::::
::::: 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 = \text{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 = \text{TBD}
::
                 2 = \text{TBD}
::
                  3 = \text{TBD}
::
                  4 = \text{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
:
```

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|-------------------|---|------------|-------|---|--|
| : | 8 TBD | | | | |
| : | x = no | assessment | | | |
| : " | | | | | |
| END_OBJECT | = COLUN | IN | | | |
| END_OBJECT END | = TABLE | 2 | | | |

4.3.13 Data Product "RESAMPLED LEVEL_H Magnetic Field data" Design

PDS VERSION ID = PDS3 LABEL_REVISION_NOTE = "V1.0" RECORD TYPE = FIXED LENGTH RECORD BYTES = 125 FILE RECORDS = 916480 = "RO-E-RPCMAG-4-EAR3-RESAMPLED-V3.0" DATA_SET_ID DATA SET NAME = "ROSETTA-ORBITER EARTH RPCMAG 4 EAR3 RESAMPLED V3.0" PRODUCT_ID = "RPCMAG091113T0000_CLH_OB_M3" PRODUCT_CREATION_TIME = 2010-01-20T15:26:23 PRODUCT_TYPE = "REFDR" = "RPCMAG091113T0000_CLH_OB_M3" MISSION_NAME= "ROSETTA"MISSION_PHASE_NAME= "INTERNATIONAL ROSETTA MISSION"OBSERVATION_TYPE= "EARTH SWING-BY 3"OBSERVATION_TYPE= "EARTH SWINGBY 3"INSTRUMENT_HOST_ID= "RO"INSTRUMENT_HOST_NAME= "ROSETTA-ORBITER"INSTRUMENT_ID= "ROSETTA-ORBITER"INSTRUMENT_ID= "RPCMAG" INSTRUMENT_NAME = "ROSETTA PLASMA CONSORTIUM - FLUXGATE MAGNETOMETER" INSTRUMENT_TYPE = "MAGNETOMETER" INSTRUMENT_MODE_ID = "SID3" INSTRUMENT_MODE_DESC = " BURST MODE: 320 PRIMARY & 16 SECONDARY VECTORS PER 16 SECONDS" TARGET NAME = "EARTH" TARGET_TYPE = "PLANET" NOTE = " MAGNETIC COORDINATE SYSTEM : ECLIPJ2000" COORDINATE SYSTEM CENTER NAME = "EARTH" = 2009-11-13T00:00:39.135 START TIME

 STOP_TIME
 = 2009-11-13T12:44:23.086

 SPACECRAFT_CLOCK_START_COUNT
 = "1/216691199.45896"

 SPACECRAFT_CLOCK_STOP_COUNT
 = "1/216737023.42418"

 START_JULIAN_DATE_VALUE
 = 2455148.5004529520

 STOP_JULIAN_DATE_VALUE
 = 2455149.0308227553

 SC_SUN_POSITION_VECTOR
 = (-94206137.70, -114480855.85, 137944.52)

 SC_TARGET_POSITION_VECTOR
 = (-225968.09, -80438.68, 133137.51)

 SC_TARGET_VELOCITY_VECTOR
 = (7.67, 3.18, -4.67)

 SPACECRAFT_ALTITUDE
 = 267955.259

 SUB_SPACECRAFT_LATITUDE= -19.022SUB_SPACECRAFT_LONGITUDE= 337.063NOTE-" =" 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

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|---|--|--|--|
| are northern Latitude an planetocentric IAU_ <targ for the time t= START_TI Distances are given in < SPICE_FILE_NAME</targ | ET_NAME> frame. ME. km> velocities i = {"ATNR_P040 "ROS_LBOOM "ROS_LBOOM "ROS_SA_20 "ROS_SA_20 "ROS_SA_20 "ROS_SA_20 "ROS_SA_20 "ROS_SA_20 "ROS_SA_20 "ROS_SA_20 "ROS_SA_20 "ROS_SA_20 "ROS_SA_20 "ROS_SA_20 "ROS_SA_20 "ROS_BAGA_2 "ROS_BAGA_2 "ROS_HGA_2 "ROS_HGA_2 "ROS_HGA_2 "ROS_HGA_2 "ROS_HGA_2 "ROS_HGA_2 "ROS_RPC_V "NAIF0009 "PCK00008. "DE403-MAS "ROS_09030 "ORER "ORFR "ORFR "ORFR "ORFR "ORFR "ORFR "ORHO "ROS_RPC_S "ROS_STRUO "EARTH_TOF "EARTHFIXE "EARTHFIXE "ROSD0001. | All values are of the second s | <pre>computed s in <deg>" .BC", BC", BSP", BSP", BSP", BSP", BSP", BSP",</deg></pre> |
| PRODUCER_ID PRODUCER_FULL_NAME PRODUCER_INSTITUTION_NAME DATA_QUALITY_ID DATA_QUALITY_DESC ONLY 'GOOD' RAW DATA HAVE B PROCESSING_LEVEL_ID | = " EEN PROCESSED AN | | |
| DESCRIPTION THIS FILE CONTAINS CALIBRAT OUTBOARD MAGNETOMETER ABOAR BEEN APPLIED TO THE RAW DAT THE S/C POSITION IS GIVEN I LAP DISTURBANCE OCCURRING A DYNAMIC REACTION WHEEL DIST NOTE | D THE ROSETTA S/ A. FIELD IS ROTF N ECLIPJ2000 COC T CONSTANT FREQU | 'C. GROUND CALIB ATED TO ECLIPJ20 DRDINATES AS WEL JENCIES HAS BEEN | RATION RESULTS HAVE 00 COORDINATES. L. ELIMINATED. |
| LBL & TAB FILE HAVE BEEN GE NOTE S/C ATTITUDE COMPUTED USING | = " | | |
| NOTE S/C POSITION COMPUTED USING | = " FILE ORGR_FDLRM | _ | — |
| NOTE GROUND CALIBRATION FILE: RP NOTE | = " CMAG_GND_CALIB_E = " | SDPU_FMOB.TXT" | |

| IGEP TU Braunschweig | ut für nysik und errestrische RPC-MAG EAICI | Issue/Rev. No. | : RO-IGEP-TR0009 : 3.3 : 18 February 2010 : 98 |
|--|--|--------------------------------------|---|
| NOTE REACTION WHEEL CO D:\ROSETTA\DATA\ NOTE DATA SOURCE FOR C FLIGHT SOFTWARE VE | ION FILE: RPCMAG_091113_006 = " RRECTIONS HAVE BEEN COMPUTE REACTION_WHEELS\ASCII_DATA\ = " LH DATA: LEVEL_C DATA" RSION_ID = "FIL:V1.0" NG_DESC = "MAGNETOMETE | CD USING FILE: SCHK7_2009-11- | |
| ^TABLE | = "RPCMAG091113T0000_CLH_C | DB_M3.TAB" | |
| INTERCHANGE_FORMAT ROWS | <pre>= TABLE = "RPCMAG-OB-RW_CORR-CLH" = ASCII = 916480 = 9 = 125</pre> | | |
| OBJECT NAME DATA_TYPE START_BYTE BYTES DESCRIPTION END_OBJECT | <pre>= COLUMN = "TIME_UTC" = TIME = 1 = 26 = "UTC TIME OF OBSERVATION = COLUMN</pre> | I: YYYY-MM-DDTH | H:MM:SS.FFFFFF" |
| BYTES UNIT UNIT_ID DESCRIPTION END_OBJECT | <pre>= COLUMN = COLUMN = "POSITION_X" = ASCII_REAL = 44 = 13 = "KILOMETER" = "km" = "SPACECRAFT POSITION, X = COLUMN</pre> | | |
| UNIT UNIT_ID DESCRIPTION END_OBJECT OBJECT | <pre>= "KILOMETER" = "km" = "SPACECRAFT POSITION, Y = COLUMN = COLUMN = "POSITION_Z" = ASCII REAL</pre> | COMPONENT, ECL | IPJ2000" |

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|--|---|----------|
| UNIT UNIT_ID DESCRIPTION END_OBJECT | <pre>= "KILOMETER" = "km" = "SPACECRAFT POSITION, Z COMPONENT, ECLIPJ2000" = COLUMN</pre> | |
| OBJECT NAME DATA_TYPE START_BYTE BYTES UNIT UNIT_ID DESCRIPTION | <pre>= COLUMN = "BX_OB" = ASCII_REAL = 86 = 9 = "NANOTESLA" = "nT" = "MAGNETIC FIELD X COMPONENT, CALIBRATED, TEMPERATURE AND REACTION WHEEL AND LAP DISTURBANCE CORRECTED DATA OB SENSOR, ECLIPJ2000"</pre> | Δ., |
| END_OBJECT | = COLUMN | |
| OBJECT NAME DATA_TYPE START_BYTE BYTES UNIT UNIT_ID DESCRIPTION END_OBJECT | <pre>= COLUMN = "BY_OB" = ASCII_REAL = 96 = 9 = "NANOTESLA" = "nT" = "MAGNETIC FIELD Y COMPONENT, CALIBRATED, TEMPERATURE AND REACTION WHEEL AND LAP DISTURBANCE CORRECTED DATA OB SENSOR, ECLIPJ2000" = COLUMN</pre> | Δ, |
| - Object | = COLUMN | |
| NAME DATA_TYPE START_BYTE BYTES UNIT UNIT_ID DESCRIPTION | <pre>= "BZ_OB" = ASCII_REAL = 106 = 9 = "NANOTESLA" = "nT" = "MAGNETIC FIELD Z COMPONENT, CALIBRATED, TEMPERATURE AND REACTION WHEEL AND LAP DISTURBANCE CORRECTED DATA OB SENSOR, ECLIPJ2000"</pre> | , |
| END_OBJECT | = COLUMN | |
| START_BYTE BYTES DESCRIPTION These flags de The quality is the following VALUE: MEZ X pro 0 no | <pre>= " scribe the quality of the magnetic field data. coded in a 8 byte string. Each character can have values: NING: perty described by flag is still unknown disturbance, good quality</pre> | |
| | cific disturbance/problems, see below | |
| _ | the specific flags: | |
| 87654321 | AG DESCRIPTION - 1 IMPACT OF REACTION WHEELS | |

Document No. : RO-IGEP-TR0009 Institut für Geophysik und extraterrestrische Physik IGEP Issue/Rev. No. : 3.3 RPC-MAG EAICD : 18 February 2010 Date TU Braunschweig Page 100 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 disturbance1 = 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 = TABLE END



4.3.14 Data Product "RESAMPLED LEVEL_I Magnetic Field data" Design

This data product is usually not generated. Format like LEVEL_L.

4.3.15 Data Product "DERIVED LEVEL_J Magnetic Field data" Design

| PDS VERSION ID | = | PDS3 |
|---|-----|---|
| LABEL REVISION NOTE | = | "V1.0" |
| RECORD TYPE | = | FIXED_LENGTH |
| RECORD BYTES | = | 125 |
| PDS_VERSION_ID LABEL_REVISION_NOTE RECORD_TYPE RECORD_BYTES FILE_RECORDS DATA_SET_ID | = | 125 85459 |
| DATA SET ID | = | 85459 "RO-E-RPCMAG-5-EAR1-DERIVED-V3.0" |
| | σ | EARTH RPCMAG 5 EAR1 DERIVED V3.0" |
| PRODUCT TO | - | "RDCMAG050301 CLI A1 C" |
| | _ | 2000-12-14-10.33.11 |
| PRODUCT_ID PRODUCT_CREATION_TIME PRODUCT_TYPE MISSION_ID MISSION_NAME MISSION_PHASE_NAME OBSERVATION_TYPE | _ | עסט אין |
| MISSION ID | _ | "ΒΟΣΕͲͲΔ" |
| MISSION_ID MISSION_NAME | _ | "INTERNATIONAL ROSETTA MISSION" |
| MISSION_NAME | _ | TRIERNATIONAL ROBLICA MISSION |
| OPSEDVATION TYPE | _ | LARIN SWING-DI I WEADTH SWINGRY 1 |
| ODDIE NUMDED | _ | LARIN SWINGDI I |
| URBII_NUMBER | _ | N/A |
| INSTRUMENT_HOST_ID | = | |
| INSTRUMENT_HOST_NAME | = | "ROSETTA-ORBITER" |
| INSTRUMENT_ID | = | "ROSETTA" "INTERNATIONAL ROSETTA MISSION" "EARTH SWING-BY 1" "N/A" "RO" "ROSETTA-ORBITER" "ROCHTA-ORBITER" |
| INSTRUMENT NAME = "ROSETTA PLAS | MA | CONSORTIOM - FLOXGATE MAGNETOMETER" |
| INSTRUMENT_TYPE | = | "MAGNETOMETER" |
| INSTRUMENT_MODE_ID | = | "AVERAGED" |
| INSTRUMENT_TYPE INSTRUMENT_MODE_ID INSTRUMENT_MODE_DESC NOTE = " | = | "I S AVERAGES" |
| MAGNETIC COORDINATE SYSTEM : E | CL | JPJ2000" |
| COORDINATE SYSTEM CENTER NAME | = | "SUN" |
| TARGET_NAME TARGET_TYPE | = | "EARTH" |
| TARGET TYPE | = | "PLANET" |
| START TIME | = | 2005-03-01T00:14:42.154 2005-03-01T23:59:00 154 |
| | | |
| SPACECRAFT CLOCK START COUNT | = | "1/68256862.70971" |
| SPACECRAFT_CLOCK_START_COUNT SPACECRAFT_CLOCK_STOP_COUNT | = | "1/68342320.70971" |
| | | |
| START JULIAN DATE VALUE | = | 2453430.5102101164 2453431.4993073386 (141029090.37, -49951656.75, 73685.77) (1358529.07, -322204.71, 73167.53) (-3.85, 0.86, -0.22) 1391753.009 |
| STOP JULIAN DATE VALUE | = | 2453431.4993073386 |
| SC SUN POSITION VECTOR | = | (141029090.37, -49951656.75, 73685.77) |
| SC TARGET POSITION VECTOR | = | (1358529.07, -322204.71, 73167.53) |
| SC TARGET VELOCITY VECTOR | = | (-3.85, 0.86, -0.22) |
| SPACECRAFT ALTITUDE | = | 1391753.009 |
| SUB_SPACECRAFT_LATITUDE | = | "N/A" |
| SUB SPACECRAFT LONGITUDE | = | "N/A" |
| SUB_SPACECRAFT_LONGITUDE NOTE | =" | |
| The values of the keywords | SC | SUN POSITION VECTOR, |
| SC TARGET POSITION VECTOR a | | |
| are related to the ECLIPJ20 | | |
| SUB SPACECRAFT LATITUDE and | | |
| | - ~ | |

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|---|--|---|--|
| are northern Latitude and explanetocentric IAU_ <target_d for the time t= START_TIME. Distances are given in <km> SPICE_FILE_NAME</km></target_d | NAME> frame. A: velocities in = {"ATNR_P0403("ROS_LBOOM_Y" "ROS_V14.TF" "ROS_SA_2004" "ROS_SA_2004" "ROS_SA_2004" "ROS_SA_2004" "ROS_SA_2004" "ROS_SA_2004" "ROS_SA_2004" "ROS_SA_2004" "ROS_SA_2004" "ROS_SA_2004" "ROS_HGA_2004" "ROS_HGA_2004" "ROS_HGA_2004" "ROS_HGA_2004" "ROS_HGA_2004" "ROS_HGA_2004" "ROS_HGA_2004" "ROS_HGA_2004" "ROS_HGA_2004" "ROS_HGA_2004" "ROS_HGA_2004" "ROS_HGA_2004" "ROS_HGA_2004" "ROS_HGA_2004" "ROS_HGA_2004" "ROS_RPC_V15" "ORFR "O | <pre>ll values are d</pre> | BSP", BC", BSP", BSP", BSP", BSP", BSP", BSP", BSP", |
| PRODUCER_FULL_NAME PRODUCER_INSTITUTION_NAME DATA_QUALITY_ID DATA_QUALITY_DESC ONLY 'GOOD' RAW DATA HAVE BEEN DESCRIPTION THIS FILE CONTAINS CALIBRATED I MAGNETOMETER ABOARD THE ROSETT. APPLIED TO THE RAW DATA. FIELD S/C POSITION IS GIVEN IN ECLIPT TO 1 S MEANS. A PCA HAS BEEN A | = "N/A" = " PROCESSED AND = " MAGNETIC FIELD A S/C. GROUND (IS ROTATED TO J2000 COORDINA) | R" JNSCHWEIG" STORED" VECTOR DATA OF CALIBRATION RES ECLIPJ2000 COO FES AS WELL. DA | SULTS HAVE BEEN DRDINATES. THE ATA ARE AVERAGED |
| LBL & TAB FILE HAVE BEEN GENER NOTE S/C ATTITUDE COMPUTED USING FI NOTE S/C POSITION COMPUTED USING FI NOTE GROUND CALIBRATION FILE: RPCMA NOTE INFLIGHT CALIBRATION FILE: RPCI | = " LE ATNR_FDLRMA = " LE ORHR_FDLRMA = " G_GND_CALIB_FSI = " MAG_002_CALIB_ | _DAP04030209335 _DA DPU_F.TXT" | 52_00091.ROS" 00091.ROS" |

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|---|---|------------------------|--|--|--|
| 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 | = "RPCMAG050301_CLJ_A1_C.TA | в" | | | |
| OBJECT NAME INTERCHANGE_FORMAT ROWS COLUMNS ROW_BYTES OBJECT NAME | <pre>= TABLE = "RPCMAG-CORR_PCA_DATA-1S_Z = ASCII = 85459 = 9 = 125 = COLUMN = "TIME UTC"</pre> | AVERAGE-CLJ" | | | |
| DATA_TYPE START_BYTE BYTES | = TIME_OIC = TIME = 1 = 26 = "UTC TIME OF OBSERVATION: = COLUMN | YYYY-MM-DDTHH | :MM:SS.FFFFFF" | | |
| DATA_TYPE START_BYTE BYTES DESCRIPTION AT 1.1.2003: SSSSS 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 CO = COLUMN</pre> | OMPONENT, ECLI | PJ2000" | | |
| 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 CO = COLUMN</pre> | OMPONENT, ECLI | PJ2000" | | |
| 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 COLUMN</pre> | OMPONENT, ECLI | PJ2000" | | |

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|--|--|---|---|--------------------------------|--|
| OBJECT NAME DATA_TYPE START_BYTE BYTES UNIT UNIT_ID DESCRIPTION TEMPERATURE CO END_OBJECT | = ASCII = 86 = 9 = "NANO" = "nT" = "MAGNI | ORRELATED" _REAL IESLA" ETIC FIELD : A, 1S_AVERA(| | NT, CALIBRATE CORRELATED DA | D, TA,ECLIPJ2000" |
| OBJECT NAME DATA_TYPE START_BYTE BYTES UNIT UNIT_ID DESCRIPTION TEMPERATURE CO END_OBJECT | = ASCII = 96 = 9 = "NANO' = "nT" = "MAGNI | ORRELATED" _REAL IESLA" ETIC FIELD ⁻ A, 1S_AVERA | | NT, CALIBRATE CORRELATED DA | D, TA,ECLIPJ2000" |
| OBJECT NAME DATA_TYPE START_BYTE BYTES UNIT UNIT_ID DESCRIPTION TEMPERATURE CO END_OBJECT | = ASCĪI = 106 = 9 = "NANO" = "nT" = "MAGNI | ORRELATED" _REAL IESLA" ETIC FIELD : A, 1S_AVERA | | NT, CALIBRATE CORRELATED DA | D, TA,ECLIPJ2000" |
| OBJECT NAME DATA_TYPE START_BYTE BYTES DESCRIPTION | = COLUM = "QUAL = CHARAC = 116 = 8 = " | ITY_FLAGS" | | | |
| x pro 0 no | s coded in a | 8 byte str ibed by flac , good qual | ing. Each g is stil ity | character ca l unknown | |
| Description of | the specif: | ic flags: | | | |
| FLAG-STRING FI 87654321 | 1 IMPACT (x = impa 0 = no (1 = dis 2 = dis 3 = data | OF REACTION act not asso disturbance turbance el turbance el a disturbed | essed iminated imination EATER CUR | | nalysis |

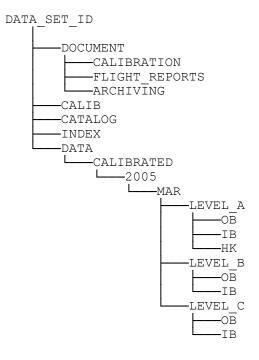
| IGEP TU Braunschweig | titut für physik und aterrestrische RPC-MAG EAICD sik Document No. : RO-IGEP-TR0009 Issue/Rev. No. : 3.3 Date : 18 February 2010 Page : 105 | |
|---|---|--|
| | 0 = no disturbance 1 = disturbance eliminated during data analysis 2 = disturbance elimination failed 3 = data disturbed | |
| ::::: :::::: :::::: :::::: ::::::: :::::: | <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 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> | |
| : : : : : : : | x = no assessment | |
| " END_OBJECT END_OBJECT END | = COLUMN = TABLE | |



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-CALIBRATED-V3.0 RO-E-RPCMAG-3-EAR1-CALIBRATED-V3.0\AAREADME.TXT RO-E-RPCMAG-3-EAR1-CALIBRATED-V3.0\CALIB RO-E-RPCMAG-3-EAR1-CALIBRATED-V3.0\CATALOG RO-E-RPCMAG-3-EAR1-CALIBRATED-V3.0\DATA RO-E-RPCMAG-3-EAR1-CALIBRATED-V3.0\DOCUMENT RO-E-RPCMAG-3-EAR1-CALIBRATED-V3.0\ERRATA.TXT RO-E-RPCMAG-3-EAR1-CALIBRATED-V3.0\INDEX RO-E-RPCMAG-3-EAR1-CALIBRATED-V3.0\VOLDESC.CAT RO-E-RPCMAG-3-EAR1-CALIBRATED-V3.0\CALIB\CALINFO.TXT RO-E-RPCMAG-3-EAR1-CALIBRATED-V3.0\CALIB\RPCMAG_002_CALIB_IB.LBL RO-E-RPCMAG-3-EAR1-CALIBRATED-V3.0\CALIB\RPCMAG_002_CALIB_IB.TXT RO-E-RPCMAG-3-EAR1-CALIBRATED-V3.0\CALIB\RPCMAG_002_CALIB_OB.LBL RO-E-RPCMAG-3-EAR1-CALIBRATED-V3.0\CALIB\RPCMAG_002_CALIB_OB.TXT RO-E-RPCMAG-3-EAR1-CALIBRATED-V3.0(CALIB\RPCMAG_GND_CALIB_FSDPU_FMIB.LBL RO-E-RPCMAG-3-EAR1-CALIBRATED-V3.0(CALIB\RPCMAG_GND_CALIB_FSDPU_FMIB.TXT RO-E-RPCMAG-3-EAR1-CALIBRATED-V3.0/CALIB/RPCMAG_GND_CALIB_FSDPU_FMOB.LBL RO-E-RPCMAG-3-EAR1-CALIBRATED-V3.0/CALIB/RPCMAG_GND_CALIB_FSDPU_FMOB.TXT 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