GIADA FS MODEL

REPORT ON
THE PRELANDING PHASE
21/01/2014 - 20/11/2014

PREPARED	APPROVED	AUTHORIZED
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REVISIONS LOG

REV	DOCUMENT CHANGE ORDER	DATE	CHANGES DESCRIPTION	PREPARED
0	-	18-05-2015	First issue	GIADA Team

1. SCOPE AND APPLICABILITY

The Prelanding Phase covers the period of time from the 21st January 2014 until the 20th November 2014. It started after Rosetta successfully completed the Deep Space Hibernation phase.
The first part of the Prelanding Phase was devoted to the Re-Commissioning of the Payload.
The GIADA Re-Commissioning was performed from 27th March 2014 till 13rd April 2014.
The Scientific phase started on 7th May 2014,.

This document reports the configurations used by GIADA FS during the both Re-Commissioning and Scientific Phases.

This report refers to the GIADA FS model on board the Rosetta S/C. The data were retrieved from DDS by means of the PI Workstation located at Instituto di Astrofisica e Planetologia Spaziali in Rome.

We used the MaGx Converter v. 3.0 software on GIADA IWS to covert the DDS data.

GIADA in flight software configuration is 2.3 plus three additional patches (one more patch is used to update the context file).

2. REFERENCES

2.1 APPLICABLE DOCUMENT

AD1	RO-EST-RS-3001/EID A	ROSETTA Experiment Interface Document – Part A
AD2	RO-EST-RS-3009/EIDB	ROSETTA GIADA Experiment Interface Document – Part B
AD3	RO-ESC-PL-5000 – last issue	Flight Control Procedure
AD4	GIA-GAL-MA-007 Issue 4	GIADA Flight Spare Experiment User Manual last version

2.2 REFERENCE DOCUMENT

	None.	

3. DEFINITIONS AND ABBREVIATIONS

3.1 ABBREVIATIONS

CAL	Calibration
CF	Context File
CREP	Cover REPort
CT	Configuration Table
DDS	Data Disposition System
EGSE	Electrical Ground Support Equipment
EQM	Electrical Qualification Model
ESA	European Space Agency
FCP	Flight Control Procedure
FS	Flight Spare
GDS	Grain Detection System
GES	GIADA EGSE SW
GIADA	Grain Impact Analyser and Dust Accumulator
HK	House Keeping
I/F	InterFace
INAF-OAC	INAF - Osservatorio Astronomico di Capodimonte – Napoli (I)
INAF-IAPS	INAF-Istituto di Astrofisica e Planetologia Spaziali – Roma (I)
IRQ	Interrupt ReQuest
IS	Impact Sensor
IWS	Instrument Work-Station
MBS	Micro Balance System
ME	Main Electronics
MTL	Mission TimeLine
MON	Monitor
OBCP	On-Board Control Procedure
PC	Payload Checkout
PI	Principal Investigator
PS	GIADA Power Supply
PZT	(IS) Piezoelectric Sensor
RED	Redundant
REV	Revision
RMOC	Rosetta Mission Operation Centre
RSOC	Rosetta Science Operation Centre
S/C	(Rosetta) Spacecraft
S/S	(GIADA) Sub-system (e.g. IS or GDS or MBS)
SCI	Scientific
SSC	Source Sequence Count
SSMM	Solid State Mass Memory on-board of Rosetta Spacecraft
STP	Short Term Plan (1 week of operations)
SW	Software
TC	TeleCommand
TM	Telemetry
UM	User Manual

UTC	Coordinated Universal Time
VC0	Virtual Channel 0 (Real Time TM packets)
VC1	Virtual Channel 1 (TM packets coming from Mass Memory)

4. DESCRIPTION OF ACTIVITIES

The Prelanding Phase identifies the period of time from the 21st January 2014 until the 20th November 2014. It started after Rosetta successfully completed the Deep Space Hibernation phase.

In the following table there is some information about the Prelanding Phase

Scenario period	Start 21-01-2014	End 20-11-2014
Scenario duration	303 days	
Sundistance	~ 4.46 AU	~ 2.92 AU
Earth distance	~5.33AU	~3.46AU
Propagation delay	~44 min 23s.	~28 min 47s.

From the 17th March 2014 and until the 7th May 2014 has been performed the Rosetta Payload Re-Commissioning Phase dedicated to the post-hibernation re-activation, maintenance and check-out activities for the instruments, after 31 months of hibernation. At the end of the Re-Commissioning started the Scientific Phase of Rosetta.

The GIADA Re-Commissioning was performed with four different tests carried out between 27th March 2014 and 13rd April 2014. In Table 1 are shown the details of GIADA Re-Commissioning.

Name	I/F	Date [UTC]	Operation
GD01	Main	Start 27-03-2014 09.00 End 27-03-2014 11.35	In order to verify only the status of the Instrument and the temperatures of critical device (mechanism, laser diodes) GIADA was switched on and put in Cover Mode during the GD01 without activating the mechanism. This operation was performed using both Main and Redundant Interfaces. The GD01 analysis showed a nominal behaviour for GIADA for both interfaces.
GD01	Redundant	Start 27-03-2014 12.00 End 27-03-2014 15.00	
GD02	Main	Start 02-04-2014 16.00 End 02-04-2014 19.30	During the GD02 Commissioning the following operations were performed using both Main and Redundant I/F. 1. GIADA was switched on without Open Cover; 2. A new Context File was uploaded in order to disable the switch-on of the Laser 3. The three GIADA subsystems, i.e. Impact Sensor (IS), MicroBalances System (MBS) and Grain Detection System (GDS, w/o Laser), were singly switched on and calibrations were singly performed; 4. GIADA went in Normal mode (GDS w/o Laser ,MBS and IS were switched on), calibrations of the three subsystems were performed; 5. GIADA was switched off without Close Cover. The test showed that all the subsystems are in good health: i. the MBS system didn't show any change with respect to the behaviour of PC13 (No contamination); ii. IS maintained a stable behaviour; iii. The electrical noise of GDS resulted as expected;
GD02	Redundant	Start 02-04-2014 20.00 End 03-04-2014 00.00	

GD03	Main	Start 06-04-2014 18.00 End 06-04-2014 22.00	During the GD03 Interactive Commissioning the following operations were performed using the Main I/F. Each of the commands was executed while the GIADA behaviour was monitored from the Control Room at ESOC. 1. GIADA was switched on; 2. It was uploaded a Context File that sets the heating time of the Cover Motor to 60s and the Laser Power to Low; 3. The Cover was opened; 4. GIADA went in Normal Mode (IS, MBS and GDS on) and two calibration of all subsystems were performed; 5. It was uploaded a new Context File, that sets the heating time of the Cover Motor to 30 s and the Laser Power to Medium; 6. GIADA went in Normal and three calibrations of all subsystems were performed; 7. The Cover was closed; 8. The last Context File was saved on board Rosetta; 9. GIADA was switched off without Close Cover. The GD03 showed that the Cover mechanism and the GIADA three subsystems worked nominally
GD04	Main	Start 12-04-2014 07.00 End 12-04-2014 19.32	During the GD04 Commissioning the following operations were performed using both Main and Redundant I/F. 1. GIADA was switched on; 2. The Cover was opened; 3. GIADA went in Normal Mode; 4. IS, MBS and GDS were calibrated every 5 minutes; 5. The Self-Interference test was performed; 6. An MBS Heating was performed; 7. GIADA was switch-off with Close Cover. The GD04 data analysis confirmed that GIADA was working nominally.
GD04	Redundant	Start 12-04-2014 19.00 End 13-04-2014 07.00	

Table 1: GIADA Re-Commissioning

The configurations of GIADA during the Prelanding Phase are described at STP level in Table 2. Here are reported a short description and the anomalies, if occurred.

STP	Date [UTC]	Conf.	Description	Anomalies
003	Start 09-05-2014 15:00:00 End 19-05-2014 15:22:27	Flux Main I/F	GIADA switched on and the Cover was opened. The Context File used during PC 12 was uploaded and GIADA went in Flux Mode with MBS calibration every 30min . MBS Heating performed at the end of STP, before GIADA switch-off with Close Cover.	A PDOP file was sent to RMOC (13-05-2014) in order to Enable Science in Flux Mode in STP003. Error occurred during the MBS Heating Procedure.

004	Start 23-05-2014 14:45:00 End 02-06-2014 14:21:01	Flux Main I/F	GIADA switched on and the Cover was opened. The Context File used during PC 12 was uploaded and GIADA went in Flux Mode with MBS calibration every 30min. MBS Heating performed at the end of STP before GIADA switch-off with Close Cover.	A PDOP file was sent to RMOC (13-05-2014) in order to Enable Science in Flux Mode in STP004. Error occurred during the MBS Heating Procedure in Flux Mode. Due to an error in the procedure wrong telecommands sent to GIADA no impact on data or instrument behaviour
005	Start 06-06-2014 03:31:00 End 17-06-2014 09:44:00	Flux Main I/F	GIADA switched on and the cover was opened. The Context File used during PC 12 was uploaded and GIADA went in Flux Mode (Science Enabled) with MBS Calibration every 6h. MBS Heating performed at the end of STP before GIADA switch-off with Close Cover.	Error occurred during the MBS Heating Procedure in Flux Mode. Due to an error in the procedure wrong telecommands sent to GIADA no impact on data or instrument behaviour
006	Start 20-05-2014 02:30:00 End 01-07-2014 08:35:00	Flux Main I/F	GIADA switched on and the cover was opened. The Context File used during PC 12 was uploaded and GIADA went in Flux Mode (Science Enabled) with MBS Calibration every 6h. MBS Heating performed at the end of STP before GIADA switch-off with Close Cover.	Error occurred during the MBS Heating Procedure in Flux Mode. Due to an error in the procedure wrong telecommands sent to GIADA no impact on data or instrument behaviour
007	Start 04-07-2014 02:35:00 End 08-07-2014_08:35:00	Normal Main I/F	GIADA switched on and the cover was opened . GIADA went in Normal Mode but with GDS off. IS and MBS calibrations every 3h or 6h. MBS Heating performed during Rosetta MWOL. The GIADA switch-off with Close Cover was performed at the end of STP.	Error occurred during the MBS Heating Procedure in Normal Mode with GDS off. Due to an error in the procedure wrong telecommands sent to GIADA no impact on data or instrument behaviour
008	Start 11-07-2014 02:35:00 End 15-07-2014 02:35:00	Normal Main I/F	GIADA switched on and the Cover was opened . GIADA went in Normal Mode but with GDS off. IS and MBS Calibration every 3h or 6h. MBS Heating performed during Rosetta MWOL The GIADA switch-off with Close Cover was performed at the	Error occurred during the MBS Heating Procedure in Normal Mode with GDS off. Due to an error in the procedure wrong telecommands sent to GIADA no impact on data or instrument behaviour

			end of STP.	
009	Start 18-07-2014 02:35:20 End 22-07-2014 02:35:00	Normal Main I/F	GIADA switched on and the Cover was opened . GIADA went in Normal Mode. GDS, IS and MBS calibrations were performed every 4h. On 20-07-2014 at 2.30 a Pointing Test (Calibration every 5 min) was performed. MBS Heating performed during the Rosetta MWOL The GIADA switch-off with Close Cover was performed at the end of STP.	Error occurred during the MBS Heating Procedure in Normal Mode. Due to an error in the procedure wrong telecommands sent to GIADA no impact on data or instrument behaviour
010	Start 25-07-2014 02:35:00 End 01-08-2014 09:59:59	Normal Main I/F	GIADA switched on and the Cover was opened . GIADA went in Normal Mode. GDS, IS and MBS calibrations were performed at different time. MBS Heating performed during the Rosetta MWOL and in accordance with ROSINA instrument. The GIADA switch off w/o Close Cover was performed at the end of STP.	Error occurred during the MBS Heating Procedure in Normal Mode. Due to an error in the procedure wrong telecommands sent to GIADA no impact on data or instrument behaviour
011	Start 01-08-2014 10:00:00 End 05-08-2014 09:59:59	Normal Main I/F	GIADA switched on in Normal Mode. The switch of IS Range (Low/High) was performed every 6h. MBS Heating performed at the end of STP.	Error occurred during the MBS Heating Procedure in Normal Mode. Due to an error in the procedure wrong telecommands sent to GIADA no impact on data or instrument behaviour
012	Start 05-08-2014 10:00:00 End 12-08-2014 09:59:59	Normal /Flux Main I/F	GIADA went in Normal Mode. Switch of IS Range (Low/High) every 6h. As a consequence of a RSGS request, GIADA was set in Flux Mode during the following periods: from 07-08-2014 04:00:00 until 08-08-2014 21:30 and from 10-08-2014 13:00 until 11-08-2014 08:50. MBS Heating performed every 12h.	Error occurred during the MBS Heating Procedure in Normal Mode. Due to an error in the procedure wrong telecommands sent to GIADA no impact on data or instrument behaviour
013	Start 12-08-2014 10:00:00 End 19-08-2014 09:59:59	Normal Main I/F	GIADA went in Normal Mode. Switch of IS Range (Low/High) every 6h.	Error occurred during the MBS Heating Procedure in Normal and Flux Mode. Due

			MBS Heating performed every 12h.	to an error in the procedure wrong telecommands sent to GIADA no impact on data or instrument behaviour
014	Start 19-08-2014 10:00:00 End 25- 08-2014 09:59:59	Normal Main I/F	GIADA went on in Normal Mode. Switch of IS Range (Low/High) every 6h. MBS Heating performed every 12h	The MBS Heating Procedure was modified.
015	Start 25-08-2014 10:00:00 End 02-09-2014 09:59:59	Normal Main I/F	GIADA went in Normal Mode. Switch of IS Range (Low/High) every 6h. MBS Heating performed every 12h.	
016	Start 02-09 -2014 10:00:00 End 09-09-2014 09:59:59	Normal Main I/F	GIADA went in Normal Mode, Switch of IS Range (Low/High) every 6h.	
017	Start 09-09-2014 10:00:00 End 16-09-2014 09:59:59	Normal Main I/F	GIADA went in Normal Mode, Switch of IS Range (Low/High) every 8h.	
018	Start 16-09-2014 10:00:00 End 23-09-2014 09:59:59	Normal Main I/F	GIADA in Normal Mode, Switch of IS Range (Low/High) every 6h. MBS Heating performed at end of STP.	
019	Start 23-09-2014 10:00:00 End 28-09-2014 09:59:59	Normal Main I/F	GIADA in Normal Mode, Switch of IS Range (Low/High) every 6h.	
020	Start 28-09-2014 10:00:00 End 03-10-2014 09:59:59	Normal Main I/F	GIADA in Normal Mode, Switch of IS Range (Low/High) every 6h.	
021	Start 03-10-2014 10:00:00 End 10-10-2014 09:59:59	Normal Main I/F	GIADA in Normal Mode, Switch of IS Range (Low/High) every 6h.	
022	Start 10-10-2014 10:00:00 End 17-10-2014 09:59:59	Normal Main I/F	GIADA in Normal Mode, Switch of IS Range (Low/High) every 6h. No Actions during the CONSERT activation.	
023	Start 17-10-2014 10:00:00 End 24-10-2014 09:59:59	Normal Main I/F	GIADA in Normal Mode, Switch of IS Range (Low/High) every 6h.	
025	Start 24-10-2014 10:00:00 End 30-10-2014 09:59:59	Normal Main I/F	GIADA in Normal Mode, Switch of IS Range (Low/High) every 6h.	

026	Start 30-10-2014 10:00:00 End 05-11-2014 09:59:59	Normal Main I/F	GIADA in Normal Mode, Switch of IS Range (Low/High) every 6h.	
027	Start 05-11-2014 10:00:00 End 11-11-2014 23:59:59	Normal Main I/F	GIADA in Normal Mode, IS Range set to Low.	
028	Start 11-11-2014 00:00:00 End 18-11-2014 23:24:59	Normal Main I/F	GIADA in Normal Mode, IS Range set to Low.	
029	Start 18-11-2014 23:25:00 End 21-11-2014 23:24:59	Normal Main I/F	GIADA in Normal Mode, . Switch of IS Range (Low/High) every 6h. The GIADA switch off w/o Close Cover was performed at the end of STP.	

Table 2: GIADA Operations during the Prelanding Phase

The data were elaborated off-line on the PI IWS at INAF-IAPS in Rome.
No malfunction of the Cover mechanism was manifested during the Prelanding Phase.