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1 ACRONYMS

AIV	Assembly, Integration, Verification
AR	Anomaly Report
ASW	Application Software
BEM	Back End Module
BEU	Back End Unit
CCS	Central Check-out System
CDMU	Central Data Management Unit
CoP	Commissioning Phase
CPV	Calibration and Performance Verification
CSL	Centre Spatiale de Liège
DAE	Data Acquisition Electronics
DPU	Digital Processing Unit
EGSE	Electrical ground Support Equipment
FEM	Front End Module
I-EGSE	Instrument EGSE
ILT	Instrument Level Tests
IST	Integrated Satellite Test
OBC	On Board Clock
RAA	Radiometer Array Assembly
REBA	Radiometric Electronic Box Assembly
S/C	Spacecraft
SCOE	Spacecraft Control and Operation System
SPU	Signal Processing Unit
SUSW	Start- Up Software
SVM	Service Module
TBC	To Be Checked
TBW	To Be Written
TC	Telecommand
TM	Telemetry
UFT	Unit Functional Test



2 APPLICABLE AND REFERENCE DOCUMENTS

2.1 Applicable Documents

- [AD1] Herschel/Planck Instrument Interface document Part A, SCI-PT-IIDA-04624 Issue 3.3
- [AD2] Herschel/Planck Instrument Interface document Part B, SCI-PT-IIDB-04142 Issue 3.1
- [AD3] Herschel/Planck Instrument Interface document Part B, SCI-PT-IIDB-04142 Issue 3.1, Annex 3, ICD 750800115
- [AD4] Herschel/Planck Instrument Interface document Part A, SCI-PT-IIDA-04624 Issue 3.3 Annex 10
- [AD5] Planck-LFI In-Orbit Calibration and Verification Phase Report: Executive Summary, PL-LFI-PST-RP-086 1.1

2.2 Reference Documents

- [RD1] Planck Instrument Testing at PFM S/C levels, H-P-3-ASP-TN-0676, Issue 1.0
- [RD2] Planck LFI User Manual, PL-LFI-PST-MA-001 Issue 4.0
- [RD3] Planck LFI Operation Plan, PST-PL-011 Issue 3.0

2.3 Annex Documents

- [AN1] Planck LFI TN on LFI 26 S behaviour



3 INTRODUCTION

3.1 Purpose and Scope

This document summarises the activities performed by the LFI Instrument Operation Team in November 2009.

3.2 Team

LFI Personnel involved on a daily basis is:

LFI Instrument Operation Manager	Anna Gregorio UniTs anna.gregorio@ts.infn.it
LFI Calibration Scientist	Aniello Mennella UniMi aniello.mennella@fisica.unimi.it
LFI IOT	Francesco Cuttaia, Anna Gregorio, Michele Maris, Aniello Mennella, Gianluca Morgante, Dave Pearson, Daniele Tavagnacco, Luca Terenzi



4 LFI Activities

4.1 Daily Operations

OD considered: 172 to 201 corresponding to DoY 305 to 334.

On a daily basis the LFI IOT performed the following analysis (see the LFI wiki <http://belzebu.lambrate.inaf.it/twiki/bin/view/LFI/DailyOperations>):

1. check science real time data during the DTCP: OK;
2. check the DQR and WHR (see § 4.3): OK;
3. check all the data per OD (first by looking at a Compressed Data Set produced by averaging daily data over 1 min and then if necessary on the full data set): OK;
4. check the TM rate by looking at the “Telemetry Bulletin” (<http://belzebu.lambrate.inaf.it/twiki/bin/view/LFI/DailyTelemetryBulletin>, <http://belzebu.lambrate.inaf.it/twiki/bin/view/LFI/TMBudgetAnalysis>, ftp://FLTOPS_user@192.167.166.51:2121/Telemetry_DM/db): OK;
5. check of peculiar behaviour of the instrument (DAE gain change, change in Output Voltage, ...):
 - a. In Table 1 below the updated list of DAE gain change up to November the 30th;
 - b. Sudden Change in Output Voltage: 26 S;
6. check any LFI production of event report TM(5,x) or TC rejection/failure TM(1,2) / TM(1,8):
 - a. Several TM(5,1) – alarm reports were produced in November, all related to an EDAC intervention. See § 5.2 for the complete list of these events, no TM(5,2) or TM(5,4);
 - b. No TM(1,2) or TM(1,8) were produced by the LFI.

Event #	OD	Channel	Time start	Time end	Gain before change			Gain after change			Saturated?
					DEC	BINARY	Physical	DEC	BINARY	Physical	
1	89-91	LF124S-11	2009-08-11T04:25:06Z	2009-08-13T13:50:53Z	10	1010	4	-1	NOK	UNKNOWN	YES
2	107-110	LF121S-10	2009-08-28T16:36:28Z	2009-08-31T15:39:09Z	9	1001	6	15	1111	48	NO
3	114-116	LF123M-00	2009-09-04T17:15:05Z	2009-09-07T12:45:02Z	9	1001	6	11	1011	24	NO
4	116	LF125M-00	2009-09-07T04:51:20Z	2009-09-07T12:45:02Z	3	11	8	2	10	4	NO
5	124	LF120M-00	2009-09-15T10:30:07Z	2009-09-15T13:27:10Z	9	1001	6	11	1011	24	YES (only sky)
6	126-127	LF128S-11	2009-09-17T03:33:05Z	2009-09-18T11:16:45Z	9	1001	6	11	1011	24	YES (only sky)
7	128	LF123S-11	2009-09-18T17:14:20Z	2009-09-19T11:19:34Z	9	1001	6	-1	NOK	UNKNOWN	YES
8	132	LF122S-11	2009-09-23T08:23:38Z	2009-09-23T08:53:17Z	9	1001	6	8	1000	3	NO
9	140	LF123M-01	2009-10-01T07:31:38Z	2009-10-01T08:08:22Z	9	1001	6	11	1011	24	NO
10	144	LF118S-11	2009-10-05T09:59:02Z	2009-10-05T10:17:12Z	9	1001	6	-1	NOK	UNKNOWN	YES
11	150	LF123M-00	2009-10-11T02:34:42Z	2009-10-11T03:09:02Z	9	1001	6	11	1011	24	NO
12	154	LF118S-10	2009-10-14T18:08:46Z	2009-10-14T18:39:20Z	9	1001	6	8	1000	3	NO
13	157	LF120S-10	2009-10-18T04:18:55Z	2009-10-18T04:33:40Z	9	1001	6	-1	NOK	UNKNOWN	YES
14	165	LF125S-10	2009-10-26T10:33:36Z	2009-10-26T11:05:36Z	3	11	8	1	1	2	NO
15	171	LF121M-00	2009-10-31T17:06:57Z	2009-10-31T17:22:45Z	9	1001	6	8	1000	3	NO
16	177	LF121M-01	2009-11-07T07:49:20Z	2009-11-07T08:14:56Z	9	1001	6	-1	NOK	UNKNOWN	YES
17	187	LF122M-00	2009-11-16T15:57:53Z	2009-11-16T16:11:57Z	9	1001	6	-1	NOK	UNKNOWN	YES

Table 1 DAE Gain change events



4.2 SCS Operations

In the period OD172 to OD201 (DoY 305 - 334) SCS behaviour has been nominal, no event or alarm has been generated.

Cooler operations have been based on the planned weekly adjustments:

Date of Upload	Actual Time of Upload	Parameters Change	TPF File
5.11.2009	309.17.58.40	Cycletime: 910s (was 915s) All desorption powers increased by 0.5 W	PFSCCLPM_LUT_PWRT_N_0017.ipf
12.11.2009	316.17.41.49	LPSB power: 1.24 (was 1.25) W Desorption Powers: Bed1 160.5W to 161.5W, Bed2 158.5W to 160W, Bed3 158.5W to 160W, Bed4 154.5W to 155.5W, Bed5 158.5W to 160W, Bed6 158.5W to 159.5W	PFSCCLPM_LUT_PWRT_N_0018.ipf
19.11.2009	323.17.25.39	Cycle-time: decrease 910 to 905 LPSB power: 1.23 (was 1.24) W DE Powers: Bed1 161.5W to 162.5W, Bed2 160 W to 161W, Bed3 160W to 161W, Bed4 155.5W to 156.5W, Bed5 160W to 161W, Bed6 159.5W to 160.5W	PFSCCLPM_LUT_PWRT_N_0019.ipf
26.11.2009	330.17.39.17	LPSB power: 1.22 (was 1.23) W DE Powers: Bed1 162.5W to 164W, Bed2 161 W to 163W, Bed3 161W to 163W, Bed4 156.5W to 159W, Bed5 161W to 163W, Bed6 160.5W to 163W	PFSCCLPM_LUT_PWRT_N_0020.ipf

Table 2 SCS weekly adjustments in November 2009



SCS OT daily analysis has included the following steps:

1. check all cooler data per OD with particular attention to main operational parameters
 - High Pressure
 - Cold End temperatures and their stability
 - LPSB pressure and temperature
 - Beds temperature and pressure
 - Warm Radiator interfaces
 - VG3 Interfaces
2. check the DQR and WHR (see § 4.3), that are part of the LFI reports

4.3 Daily and Weekly Reports

DQR production normal:

DQR	Production Date	Time	Note
DQRL_LFISDA_D_03112009_0172_00001.PLAN	11/3/2009	14:38	
DQRL_LFISDA_D_04112009_0173_00001.PLAN	11/4/2009	16:17	
DQRL_LFISDA_D_05112009_0174_00001.PLAN	11/5/2009	16:45	
DQRL_LFISDA_D_06112009_0175_00001.PLAN	11/6/2009	23:03	
DQRL_LFISDA_D_07112009_0176_00001.PLAN	11/7/2009	15:56	
DQRL_LFISDA_D_09112009_0177_00001.PLAN	11/9/2009	14:29	
DQRL_LFISDA_D_09112009_0178_00001.PLAN	11/9/2009	16:13	
DQRL_LFISDA_D_10112009_0179_00001.PLAN	11/10/2009	13:48	
DQRL_LFISDA_D_11112009_0180_00001.PLAN	11/11/2009	14:15	
DQRL_LFISDA_D_12112009_0181_00001.PLAN	11/12/2009	15:19	
DQRL_LFISDA_D_12112009_0105_00002.PLAN	11/12/2009	17:21	New production (gain constant)
DQRL_LFISDA_D_12112009_0118_00004.PLAN	11/12/2009	17:21	New production (gain constant)
DQRL_LFISDA_D_12112009_0117_00003.PLAN	11/12/2009	17:21	New production (gain constant)
DQRL_LFISDA_D_12112009_0116_00003.PLAN	11/12/2009	17:21	New production (gain constant)
DQRL_LFISDA_D_12112009_0115_00003.PLAN	11/12/2009	17:21	New production (gain constant)
DQRL_LFISDA_D_12112009_0114_00002.PLAN	11/12/2009	17:21	New production (gain constant)
DQRL_LFISDA_D_12112009_0113_00003.PLAN	11/12/2009	17:21	New production (gain constant)
DQRL_LFISDA_D_12112009_0112_00003.PLAN	11/12/2009	17:21	New production (gain constant)
DQRL_LFISDA_D_12112009_0111_00002.PLAN	11/12/2009	17:21	New production (gain constant)
DQRL_LFISDA_D_12112009_0110_00002.PLAN	11/12/2009	17:21	New production (gain constant)
DQRL_LFISDA_D_12112009_0109_00002.PLAN	11/12/2009	17:21	New production (gain constant)
DQRL_LFISDA_D_12112009_0108_00002.PLAN	11/12/2009	17:21	New production (gain constant)
DQRL_LFISDA_D_12112009_0107_00002.PLAN	11/12/2009	17:21	New production (gain constant)
DQRL_LFISDA_D_12112009_0106_00002.PLAN	11/12/2009	17:21	New production (gain constant)
DQRL_LFISDA_D_13112009_0182_00001.PLAN	11/13/2009	13:24	
DQRL_LFISDA_D_14112009_0183_00001.PLAN	11/14/2009	15:27	
DQRL_LFISDA_D_16112009_0184_00001.PLAN	11/16/2009	14:19	



DQRL_LFISDA_D_16112009_0185_00001.PLAN	11/16/2009	14:20	
DQRL_LFISDA_D_17112009_0186_00001.PLAN	11/17/2009	14:30	
DQRL_LFISDA_D_18112009_0187_00001.PLAN	11/18/2009	15:01	
DQRL_LFISDA_D_19112009_0188_00001.PLAN	11/19/2009	16:45	
DQRL_LFISDA_D_20112009_0120_00002.PLAN	11/20/2009	16:14	New production (gain constant)
DQRL_LFISDA_D_20112009_0119_00003.PLAN	11/20/2009	16:14	New production (gain constant)
DQRL_LFISDA_D_20112009_0125_00002.PLAN	11/20/2009	16:14	New production (gain constant)
DQRL_LFISDA_D_20112009_0124_00002.PLAN	11/20/2009	16:14	New production (gain constant)
DQRL_LFISDA_D_20112009_0123_00002.PLAN	11/20/2009	16:14	New production (gain constant)
DQRL_LFISDA_D_20112009_0122_00002.PLAN	11/20/2009	16:14	New production (gain constant)
DQRL_LFISDA_D_20112009_0121_00003.PLAN	11/20/2009	16:14	New production (gain constant)
DQRL_LFISDA_D_20112009_0189_00001.PLAN	11/20/2009	16:18	
DQRL_LFISDA_D_21112009_0190_00001.PLAN	11/21/2009	16:12	
DQRL_LFISDA_D_23112009_0192_00001.PLAN	11/23/2009	13:44	SGR
DQRL_LFISDA_D_24112009_0191_00001.PLAN	11/24/2009	18:32	Scanning problem (HP-1134)
DQRL_LFISDA_D_25112009_0192_00002.PLAN	11/25/2009	11:15	SGR
DQRL_LFISDA_D_25112009_0193_00001.PLAN	11/25/2009	11:15	SGR
DQRL_LFISDA_D_25112009_0194_00001.PLAN	11/25/2009	14:10	
DQRL_LFISDA_D_26112009_0195_00001.PLAN	11/26/2009	10:53	
DQRL_LFISDA_D_27112009_0196_00001.PLAN	11/27/2009	11:59	
DQRL_LFISDA_D_28112009_0197_00001.PLAN	11/28/2009	18:03	
DQRL_LFISDA_D_30112009_0199_00001.PLAN	11/30/2009	14:01	
DQRL_LFISDA_D_30112009_0198_00001.PLAN	11/30/2009	14:01	
DQRL_LFISDA_D_01122009_0200_00001.PLAN	12/1/2009	15:06	
DQRL_LFISDA_D_02122009_0201_00001.PLAN	12/2/2009	15:20	

WHR production normal:

DQR	Production Date	Time	Note
WHRL_LFISDA_D_05112009_0012_00001.PLAN	11/5/2009	16:46	
WHRL_LFISDA_D_12112009_0004_00014.PLAN	11/12/2009	17:23	New production (gain constant)
WHRL_LFISDA_D_12112009_0003_00002.PLAN	11/12/2009	17:23	New production (gain constant)
WHRL_LFISDA_D_12112009_0013_00001.PLAN	11/12/2009	17:36	
WHRL_LFISDA_D_19112009_0014_00001.PLAN	11/19/2009	16:45	
WHRL_LFISDA_D_20112009_0005_00001.PLAN	11/20/2009	16:16	New production (gain constant)
WHRL_LFISDA_D_26112009_0015_00001.PLAN	11/26/2009	14:18	
WHRL_LFISDA_D_03122009_0016_00001.PLAN	12/3/2009	16:46	

4.4 Instrument Commanding Requests

One single Commanding Request was discussed in November and then posted and applied early December.



4.4.1 P-ICR-0037: Restore step by step the default configuration on LFI 26 S

We required to restore the default configuration on LFI 26 S1 and S2 (see § 5.1). The configuration should be applied step by step on each of the channels. This Requires the application of 16 TPFs in the right order and a last additional procedure to restore the full default LFI configuration.

The procedure was posted on December the 1st (via manual CR due to a problem in the WIHT) and then run on December 3rd, 2009 without any problem. The test was completed successfully.



5 Anomaly Status

One anomaly was raised in November. Here a short report on all of the open ARs.

5.1 P_SC-49: Anomalous variation on LFI RCA26 Drain Current channels

The observed misbehaviour is a sudden step change of the voltage output by about 5 % affecting both diodes in LFI26S (the change takes place almost instantaneously). The impact on science is estimated to be minimum. The nature of the effect is not yet understood though something can already be excluded (e.g. popcorn noise would be very strictly correlated with drain current behaviour which is not the case here).

From MOC analysis it is clear that no MTL commanding was on-going at the time, and there was no obvious TCS activity seen around this event.

An ad-hoc TC sequence was analysed and implemented by the LFI Instrument Team to recover the nominal setting, see also § 4.4.1.

See the TN with a detailed analysis of the problem here annexed [AN-1].

5.2 P_SC-21: EDAC Intervention

Since LFI switch on (June 4th) many event reports have been generated all indicating that EDAC single errors have been encountered. The average rate is about 1 every 3 days. The corresponding memory areas are spread on DPU and SPU and both on Data and Program RAM.

By now these memory areas were outside the used region of memories.

These types of events are indeed foreseen and indicate that the EDAC is working as expected.

No double errors arose up to now, that would cause an error report TM(5,4), meaning that there is no memory damage.

In the table below the list of these events.

Type	Subtype	Sid	APID	SSC	Date	OB-time
5	1	5002	1536	16344	11/4/2009	05:12.4
5	1	5002	1536	11001	11/6/2009	05:13.8
5	1	5002	1536	13254	11/12/2009	28:42.6
5	1	5002	1536	8163	11/20/2009	28:49.5
5	1	5002	1536	11863	11/24/2009	05:20.3
5	1	5002	1536	6477	11/26/2009	05:29.4
5	1	5002	1536	12086	11/30/2009	05:29.5



6 Conclusions

All the LFI and SCS activities foreseen during this month have been successfully completed.
In summary the LFI/SCS is healthy and is behaving as expected.



7 Acknowledgements

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