Title: **GIADA FS MODEL REPORT OF IN-FLIGHT INTERFERENCE SCENARIO PART 1A (20 - 21 SEPT '04)**

GIADA FS MODEL

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PREPARED	APPROVED		AUTHORIZED
GIADA PI TEAM L. COLANGELI, P. PALUMBO, V. DELLA CORTE INAF – Osservatorio di Capodimonte NApoli		M. GIUSTINI PAM Space Program Quality Assurance	
M. COSI SYS. ENG. Electro-Optics Product Line - - Instrument System Engineering			M. COSI PM Electro-Optics Product Line - - Instrument System Engineering

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REVISIONS LOG

REV	DOCUMENT CHANGE ORDER	DATE	CHANGES DESCRIPTION	PREPARED
0	-	20-09-2004	First issue	M. Cosi & PI Team
1	-	11-10-2004	PI contribution & corrections to the report Correction of typing errors	M. Cosi &PI Team

1. SCOPE AND APPLICABILITY

1.1 SCOPE

The II part of the in flight commissioning is composed by two test scenario: the interference (parts 1A and 1B) and the pointing scenarios. The Interference scenario is started the 20 of September and is finished the 22 of September; it is divided in two parts: Interference Part 1A from 20 to 21 September and the Interference scenario 1B from 21 to 22 September. Following the Interference scenario, the Pointing is run in two distinguished days: the 23 of September and 30 September.

This document reports the II part of the in-flight commissioning activities performed on GIADA experiment in the period from 20 and 21 September 2004 (Interference scenario 1A).

1.2 APPLICABILITY

This report is applicable to GIADA FS model on board the Rosetta S/C now flying @ about 74.2×10^6 km from the Earth (about 4 minutes of delay between S/C and Earth in the radio link communication). The Rosetta S/C has been launched from Kourou on 2 March 2004. The data have been retrieved from DDS by means of the PI Workstation located @ INAF - Osservatorio Astronomico di Capodimonte in Naples.

GIADA IWS software configuration is GES 4.2.1 plus RSOConverter v1.1.1. GIADA in flight software configuration is 2.3 plus four additional patches (one 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 Issue 4.7 09/08/2004	Flight Control Procedure
AD4	GIA-GAL-MA-007 Issue 2	GIADA Flight Spare User Manual
AD5	RO-EST-DP-028 dated 04/08/2004	ITL Procedure for Interference scenario

2.2 REFERENCE DOCUMENT

None.

3. DEFINITIONS AND ABBREVIATIONS

3.1 ABBREVIATIONS

ACK	Acknowledge
ADC	Analogue To Digital converter
ADP	Acceptance Data Package
AFT	Abbreviated Functional Tests
AIV	Assembly, Integration and Verification
ALS	Alenia Spazio
BT	Bench Test
CCS	Central Checkout Equipment
DDS	Data Disposition System
EGSE	Electrical Ground Support Equipment
EMC	Electromagnetic Compatibility
ESA	European Space Agency
ESOC	European Spacecraft Operation Centre
FB	GIADA Frangibolt
FCP	Flight Control Procedure
FFT	Full Functional Tests
FS	Flight Spare
GA	Galileo Avionica
GDS	Grain Detection System
GIADA	Grain Impact Analyser and Dust Accumulator
GSE	Ground Support Equipment
H/W	Hardware
HK	House Keeping
I/F	InterFace
IAA	Instituto de Astrofisica de Andalucia – Granada (E)
INAF-OAC	INAF - Osservatorio Astronomico di Capodimonte – Napoli (I)
IS	Impact Sensor
IST	Integrated System Test
IWS	Instrument Workstation
KAL	Keep Alive Line
LCL	Latch Current Limiter
LFT	Limited Functional Tests
MBS	Micro Balance Sensor
MTL	Mission TimeLine
NA	Not Applicable
OBCP	On-Board Control Procedure
PI	Principal Investigator
PM	Progress Meeting
PS	GIADA Power Supply
PZT	(IS) Piezo Sensor
QM	Qualification Model
RMOC	Rosetta Mission Operation Centre
RW	Reed Switch
S/C	Rosetta Spacecraft
S/S	GIADA Sub-system (e.g. IS or GDS or MBS)
S/W	Software

SIS	Spacecraft Interface Simulator
SPT	Specific Performance test
SSMM	Solid State Mass Memory on-board of Rosetta Spacecraft
STD	Standard
TBC	To Be Confirmed
TBD	To Be Defined
TC	Telecommand
TM	Telemetry
UPA	Università Parthenope – Napoli (I)
UTC	Universal Time Code

4. DESCRIPTION OF ACTIVITIES

The Interference scenario test was performed in the period from 20 to 22 September 2004, according to the Interference scenario plan provided by ESA/ESOC (ROS-RSSD-PO-002 dated 06/08/2004). Two parts are foreseen: Interference 1A (which was performed in the period from the morning of 20 of September to the morning of the 21 of September) and the second Interference 1B (which will be performed during the period from the late afternoon of 21 of September to the morning of the 22 of September). The Interference scenario 1A is divided, for GIADA, in two sections: the first, in which GIADA is switched-on for approximately one and half hours and the second, starting from the afternoon of 20 of September, in which GIADA is switched-on for about five hours. In the Interference scenario 1B GIADA is switched-on for approximately nine hours starting from the afternoon of 21 of September.

This document reports the GIADA behaviour during the Interface Scenario Part 1A. The GIADA team (PI and GA) located in the INAF – Osservatorio di Capodimonte in Naples with the support of the ESOC people located in the RMOC room at ESOC, have started the activities @ 20:30 local time of 20 September.

TM is expected to start to arrive (at **New-Norcia** Ground Station) at 18.30 UTC (20:30 local time) of the 20 September and to finish at 02.45 UTC (04:45 local time) of the 21 September.

Commands have been previously loaded in the Rosetta S/C and sent to GIADA via MTL (see section 7 for the input procedures in ITL format). The plan foresees to use the nominal FCPs which have been already validated in the previous GIADA Commissioning (refer to 4.1 for the FCP list and duration). Ground Commands capability is only given when the S/C is on-pass from the **New-Norcia** Ground Station.

4.1 FCP LIST

The following table lists all the used FCP's during the GIADA commissioning as well as the absolute and relative starting time for each procedure. Time is GMT.

Procedure Number	Notes	absolute starting time from Itl	Time from switch on
		20 Sept. 2004	
AGDF001A, B and C	Switch GIADA on main, patch CF with default, patch SW (one patch at a time) and dump	10^h40^m	0
AGDS035A	Go to COVER	11^h10^m	0^h30^m
AGDS090A	Cover opening OBCP [arm cover, open cover with heaters 5+6+4 on]	11^h11^m	0^h31^m
AGDS065A	Go to SAFE	11^h21^m	0^h41^m
AGDS110A	Go to NORMAL and enable Science TM	11^h22^m	0^h42^m
AGDS065A	Go to SAFE	11^h55^m	1^h15^m
AGDS035A	Go to COVER	11^h56^m	1^h16^m
AGDS070A	Cover closing OBCP [arm cover, close cover without heaters]	11^h57^m	1^h17^m
AGDS065A	Go to SAFE	12^h10^m	1^h30^m
AGDF060A	Go to SAFE, dump memory CF, switch off OBCP [close cover OBCP with heaters 6+4 on, go to SAFE, Report context, Reset VD .... switch off]	12^h11^m	1^h31^m
AGDF001A, B and C	Switch GIADA on main, patch CF with default, patch SW (one patch at a time) and dump	21^h00^m	0
AGDS035A	Go to COVER	21^h30^m	0^h30^m
AGDS090A	Cover opening OBCP [arm cover, open cover with heaters 5+6+4 on]	21^h31^m	0^h31^m
AGDS065A	Go to SAFE	21^h41^m	0^h41^m
AGDS110A	Go to NORMAL and enable Science TM	21^h42^m	0^h42^m
AGDS065A	Go to SAFE	22^h10^m	1^h10^m
AGDS110A	Go to NORMAL and enable Science TM	22^h46^m	2^h46^m
AGDS120A	Calibrate GDS, IS and MBS Repeated 25 times, every 6 minutes	23^h00^m (last 01^h24^m)	3^h00^m
		21 Sept. 2004	
AGDS065A	Go to SAFE	01^h30^m	4^h30^m
AGDS035A	Go to COVER	01^h31^m	4^h31^m
AGDS070A	Cover closing OBCP [arm cover, close cover without heaters]	01^h32^m	4^h32^m
AGDS065A	Go to SAFE	01^h45^m	4^h45^m
AGDF060A	Go to SAFE, dump memory CF, switch off OBCP [close cover OBCP with heaters 6+4 on, go to SAFE, Report context, Reset VD .... switch off]	02^h00^m	5^h00^m
AGDF001A, B and C	Switch GIADA on main, patch CF with default, patch SW (one patch at a time) and dump	17^h00^m	0
AGDS035A	Go to COVER	17^h30^m	0^h30^m
AGDS090A	Cover opening OBCP [arm cover, open cover with heaters 5+6+4 on]	17^h31^m	0^h31^m
AGDS065A	Go to SAFE	17^h41^m	0^h41^m
AGDS110A	Go to NORMAL and enable Science TM	17^h46^m	0^h46^m
AGDS120A	Calibrate GDS, IS and MBS Repeated 50 times, every 6 minutes	22^h54^m (last 01^h24^m)	1^h00^m

Procedure Number	Notes	absolute starting time from Itl	Time from switch on
AGDS065A	Go to SAFE	23^h00^m	6^h00^m
		22 Sept. 2004	
AGDS110A	Go to NORMAL and enable Science TM	00^h12^m	7^h12^m
AGDS065A	Go to SAFE	00^h40^m	7^h40^m
AGDS110A	Go to NORMAL and enable Science TM	01^h16^m	8^h16^m
AGDS120A	Calibrate GDS, IS and MBS Repeated 2 times, every 6 minutes	01^h30^m (last 01^h36^m)	8^h30^m
AGDS065A	Go to SAFE	01^h45^m	8^h45^m
AGDS035A	Go to COVER	01^h46^m	8^h46^m
AGDS070A	Cover closing OBCP [arm cover, close cover without heaters]	01^h47^m	8^h47^m
AGDS065A	Go to SAFE	02^h00^m	9^h00^m
AGDF060A	Go to SAFE, dump memory CF, switch off OBCP [close cover OBCP with heaters 6+4 on, go to SAFE, Report context, Reset VD .... switch off]	02^h01^m	9^h01^m
END of interference scenario plan			

Table 1 GIADA Flight Control Procedure (for Interference scenario)

5. INTERFERENCE SCENARIO PART 1A TEST REPORT

5.1 INTERFERENCE SCENARIO 1A – 1ST MAIN I/F SWITCH-ON (20/09/04)

5.1.1 Activities log

The following activities have been performed in sequence by preloaded timeline command sequences.

UTC	Description
20 Sep 2004 - 10:40	Beginning of activity – GIADA power on
20 Sep 2004 - 11:10	Cover open operation
20 Sep 2004 - 11:22	Go to Normal mode (science enabled)
20 Sep 2004 - 11:55	Science operation disabling – Go to Safe
20 Sep 2004 - 11:56	Cover close operation
20 Sep 2004 - 12:00	GIADA Switch-off

The GIADA switch-on procedure was applied selecting the Main I/F and with the Context File stored in SSMM. The Instrument Main I/F was successfully powered-on by means of the GIADA POWER-ON OBCP on the 20th of September 2004 @ 10:41 (UTC time), which corresponds to a SCET time of about 54297658 sec.

The first expected packet was lost (Connection Report, service 17,2), because it was not synchronised and most probably marked wrongly by DDS. The second packet was an Event Report ('GIADA Safe' mode). GIADA was started synchronised. Afterwards, the first HK report was received (default HK rate is 40s).

After completion of the power-on, as expected, the first patch (regarding the Context File) was sent, as well as the other three required software patches. All have been nominally received and successfully dumped to ground via service 6,6. As result of the Context File patch, GIADA HK rate was changed to 10s rate.

The next step was to open the cover. The operation was successfully completed. Then GIADA was sent to Normal and science telemetry enabled. **The first 210 science packets were lost because their download occurred during the New-Norcia station stop of tracking (@ 22:09 for 25 minutes), as confirmed by ESOC.** During the rest of the test, ***6 more science TM packets were sporadically lost***.

The calculated average rate (over the entire production time) of the TM science packets is about one packet every 6s. **With such rate, the SSMM allocated GIADA buffer (1 Mbytes) should not saturate** (see Section 5.1.3.2).

GIADA behaviour was nominal and after about 30 minutes, the cover was successfully closed. GIADA was sent to Safe mode and switched-off by means of CLOSE_COVER_OBCP (with heaters Cover and Motor Heaters Off).

During this last step, since the 'go to Safe' TC was sent twice, the second TC was correctly refused by GIADA. The following Event was received:

Mon Sep 20 2004 12:11:01.78104

TM Packet Received from GIADA:
APID = 90, 1 (ACKNOWLEDGE)
Source Sequence Count: 82
Packet Length: 21
SCET Time: 54303044.285156 sec.
Packet Type, Subtype: 1, 2

0D A1 C0 52 00 15 03 3C 99 44 49 00 40 01 02 00
1D AC C9 8F 00 05 C4 01 00 00 00 00
==========
Mon Sep 20 2004 12:11:01.78104
TC APID = 1452, TC SSC = 2447;
Command can not be executed in the actual operation mode (TC Packet Type/Subtype = 196,1 - Safe).

The time interval between these two TCs was 1 minute, as expected.

The Instrument has been switched-off @ about 12:19:04 of the 20 Sep. 2004 (UTC Time).

5.1.2 Housekeeping data analysis

The Housekeeping data show a correct behaviour of GIADA along the first switch-on of Main I/F. The following plots (from Figure 1 to Figure 7) report data taken from the HK database.

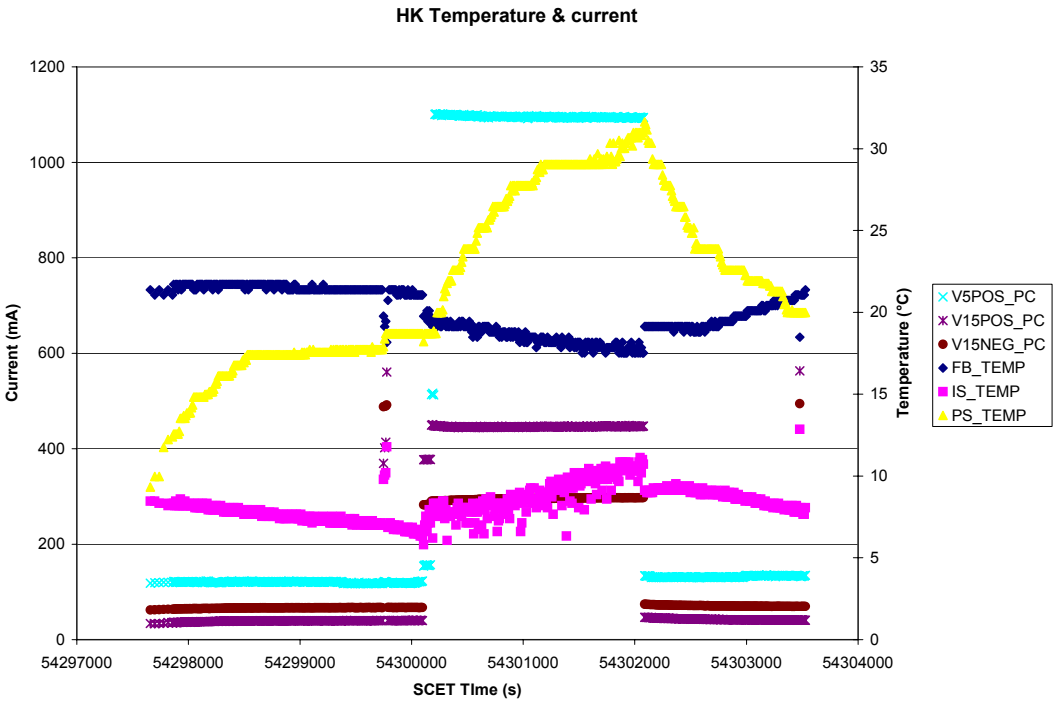

Figure 1 Frangibolt, IS and Power Supply temperatures and +5V, ±15V Currents (MAIN)

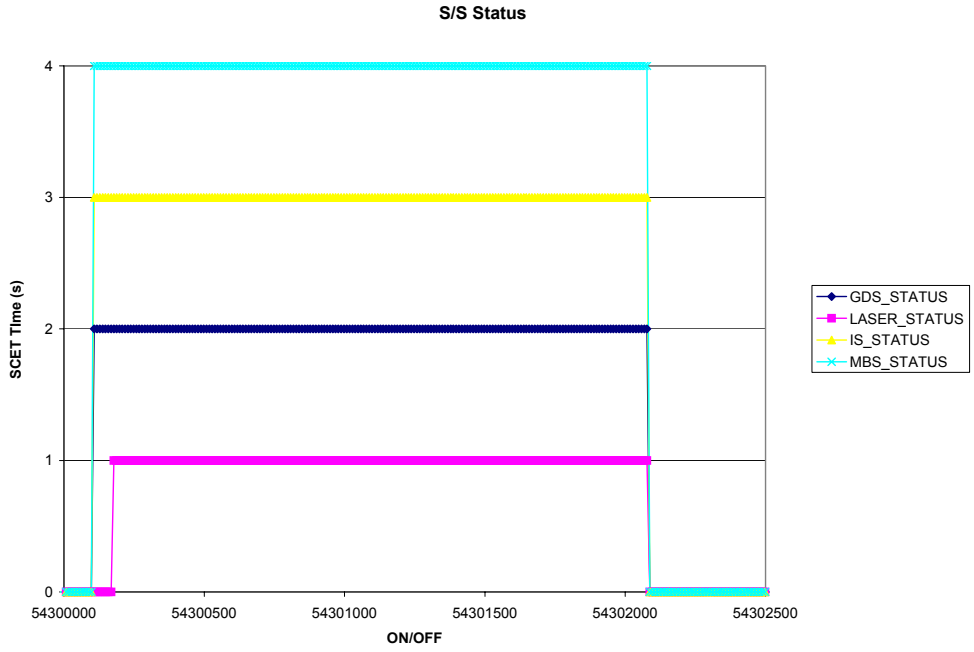

Figure 2 GIADA in Normal Mode – S/S power-on and off sequence (MAIN)

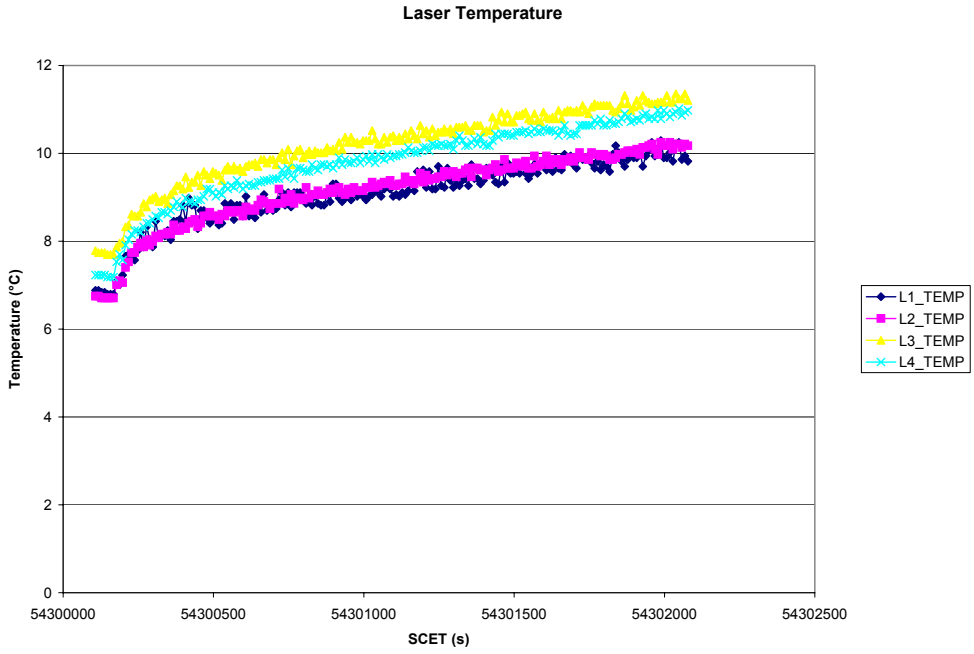

Figure 3 Laser temperatures (MAIN)

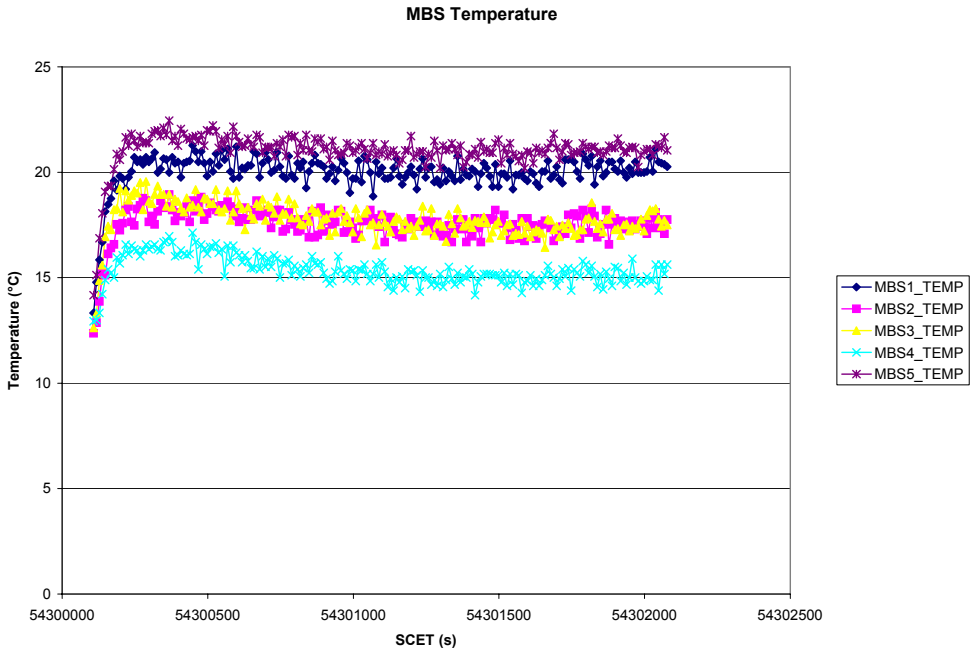

Figure 4 MBS Temperature

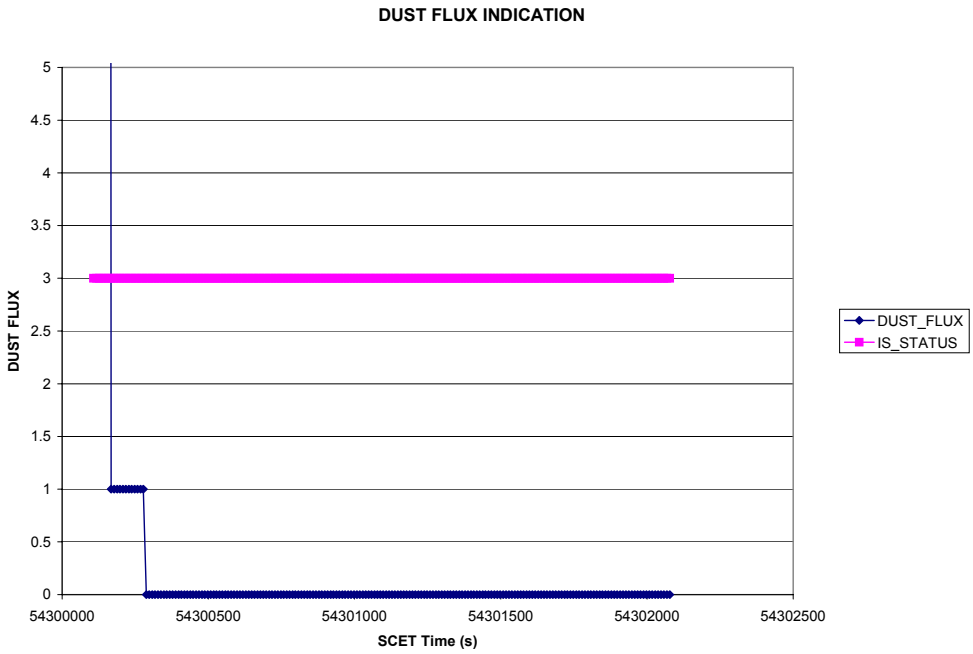

Figure 5 Dust-Flux Monitor (valid only when the IS sub-system is ON) - MAIN

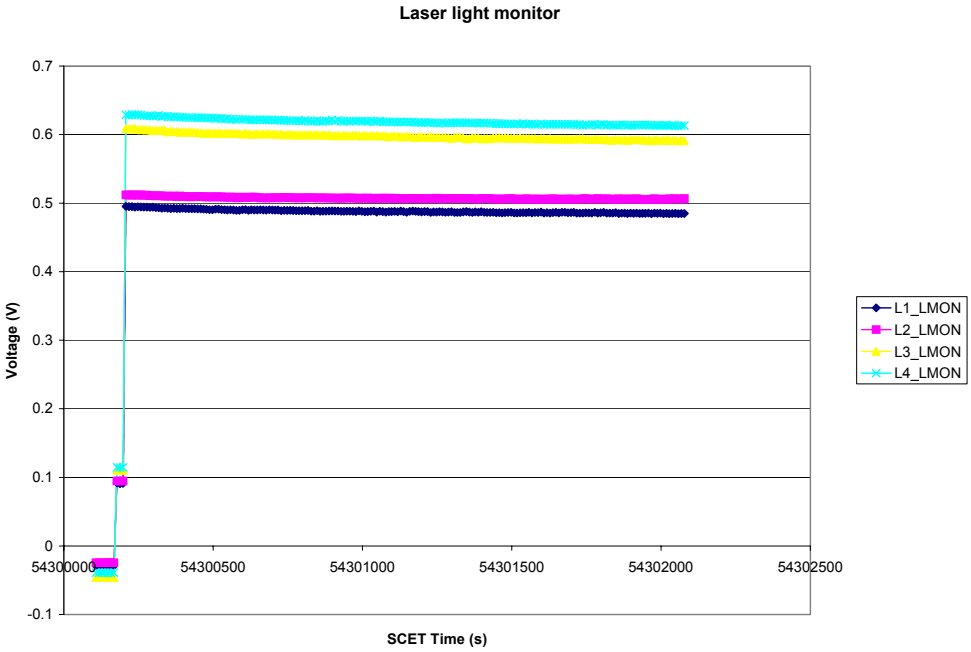

Figure 6 Laser Light Monitors (MAIN)

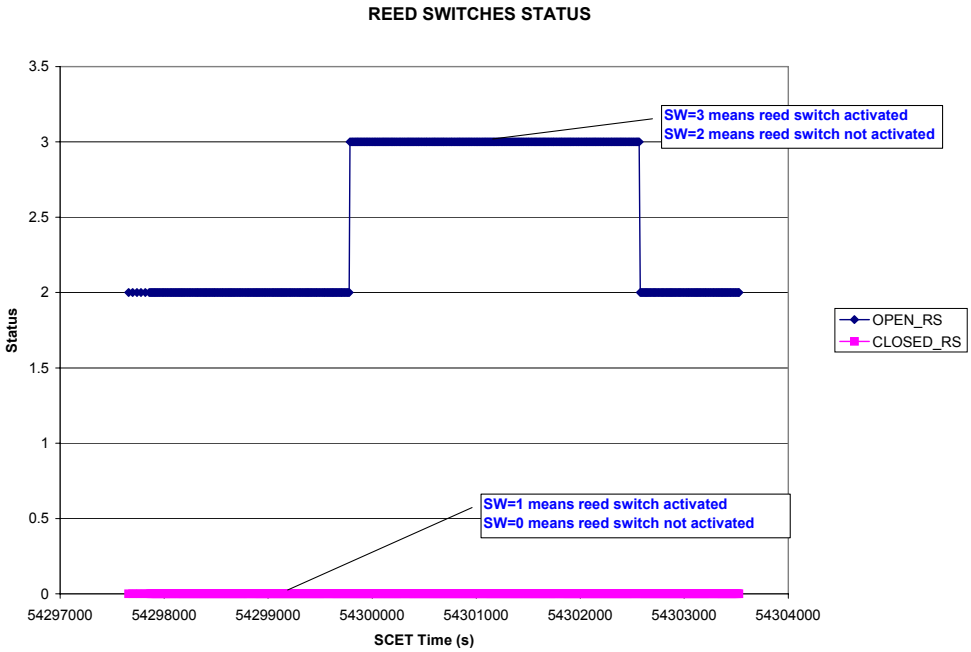

Figure 7 Cover Report (Cover open & close operation) - MAIN

As we can see in Figure 7, the GIADA experiment behaved correctly along the test, as the Cover opened and closed at the right time. The current consumption and the Power Supply temperature are in the expected range (Figure 1). The Power Supply temperature increased from 10°C (@ power-on) up to 30°C at the end of the test (when GIADA was in Normal mode and the maximum power was drawn). The IS temperature was still around 8°C, even with the cover open. The Lasers were properly switched-on and their temperatures increased from 8°C to 11°C at the end of the Normal mode. The five MBS, after switch-on, showed a temperature between 15 - 20°C. No missing packets were found in the TM.

5.1.2.1 Cover open operations

After the cover open operation, the cover resulted completely open, as shown in Figure 8, in which the status of the two reed-switches is reported. The figure is extracted from the cover report, which is received on-ground at the completion of the operation. The correct behaviour is when the sequence of the following conditions appears:

- The reed switch that indicates the Cover-Close position (named RW_CLOSE) is temporarily activated after the start of opening operation and for a short number of steps (expected value: 29 steps).
- The reed switch that indicates the Cover-Open position (named RW_OPEN) is activated after about 125 steps and remains permanently in this status.

Only the second condition is shown in Figure 8, while the first does not appear. This means that the starting position was with the cover not completely closed, most probably due to the last closing operation at commissioning, when the cover bounced due to repeated closing procedure.

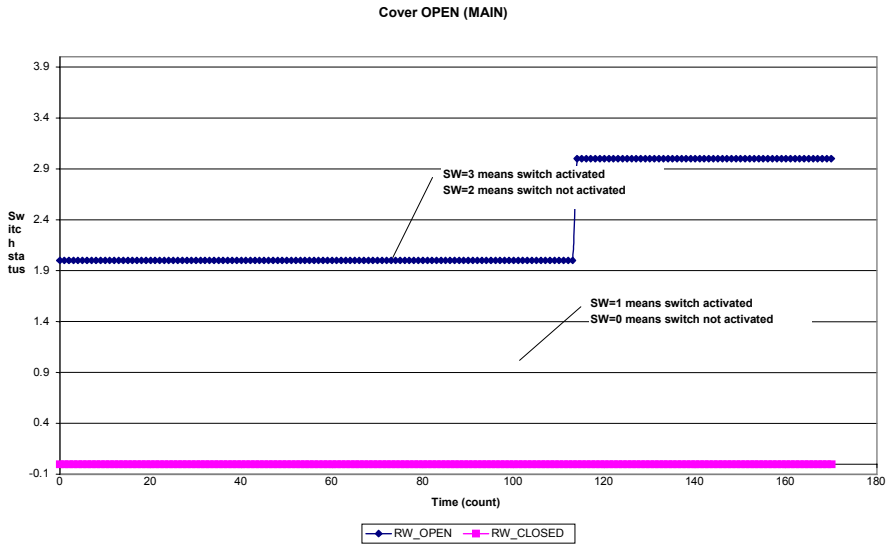

Figure 8 Reed switches Status during the Cover Open operation (MAIN)

5.1.2.2 Cover close operations

After the completion of the tests on the MAIN interface, the cover was successfully closed by command. Figure 9 reports the correct sequence of the two reed-switches. As expected:

- The reed switch that indicates the Cover-Open position (named RW_OPEN) is activated for a small number of steps (about 10 steps) and then remains not active for all remaining movement.
- The reed switch that indicates the Cover-Close position (named RW_CLOSE) is activated after 126 steps for 27 steps and finally reaches the not-activated status that means the cover is close to the closed position.

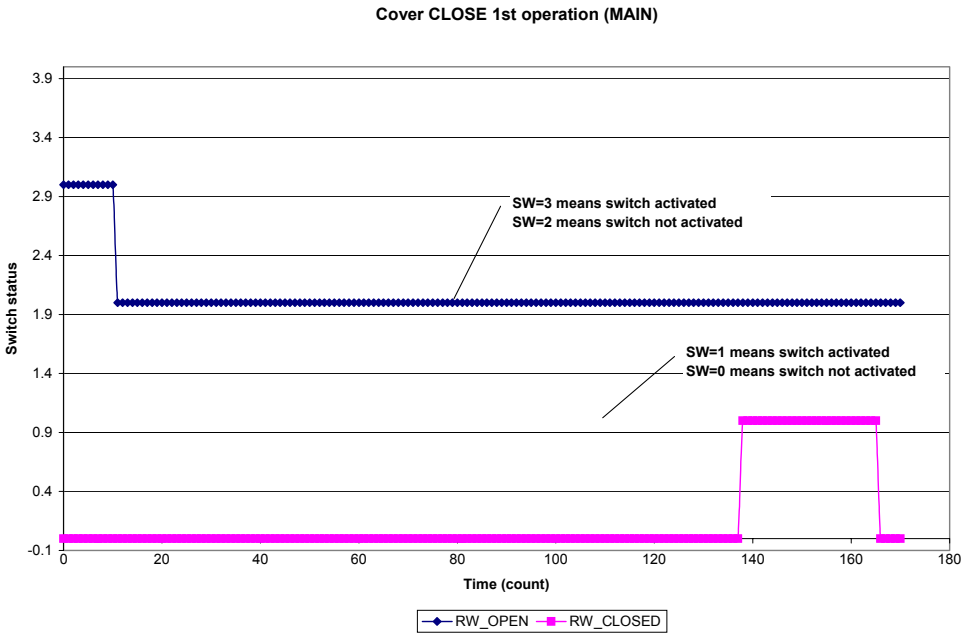

Figure 9 Reed switches Status during Cover Close operation (MAIN)

During the power-off, GIADA cover is automatically closed by the OBCP (Close Cover) despite its actual position. Since the cover was already closed (by the previous Close Cover operation), the new close cover operation resulted (as expected) in a continuous cover bunching over the cover support. This is the reason of the shown status of the two reed-switches in Figure 10, in which the reed switch indicating the Cover-Open position remains always not active and the other is activated several time. In fact, after a bunch on the cover support, the cover returns back and the reed switch indicating the Cover-Close position is newly activated. Considering its last status and the movement direction, the cover results closed when the reed switch passes from activated to not-activated condition.

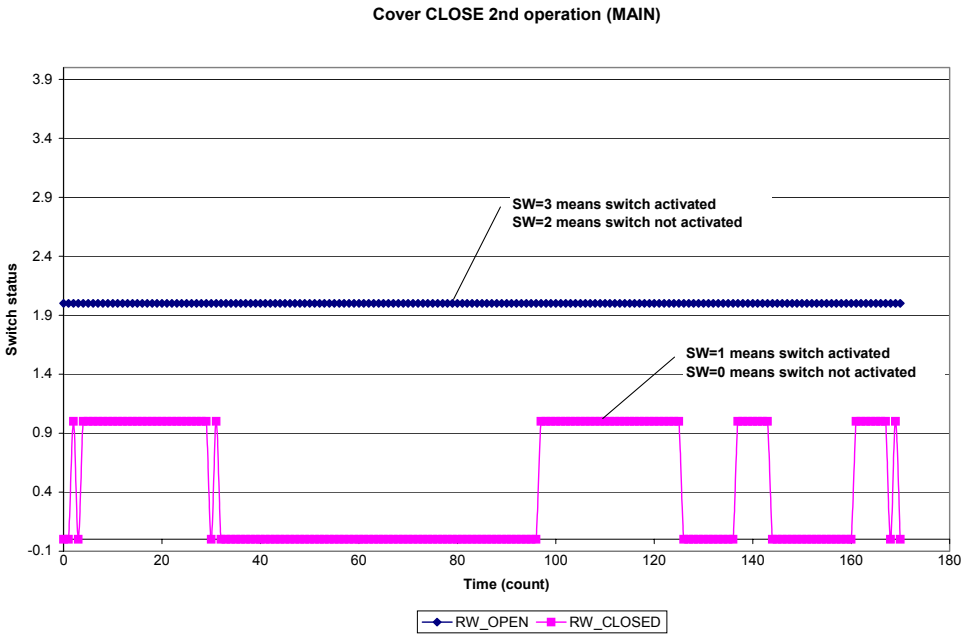

Figure 10 Reed switches Status during Cover Close 2nd operation @ power-off (MAIN)

5.1.3 Engineering evaluation on sensor data

5.1.3.1 IS Sub-system

During this test neither IS calibration nor IS science packets are produced.

5.1.3.2 GDS Sub-system

The detection thresholds of each channel are set to about 0.8V (Context file updated via memory load command). After GIADA was put in Normal mode and the Lasers were switched-on, the left receiver of the GDS sub-system started to record 'ghost detections' due to internal stray-light, while the right receiver did not.

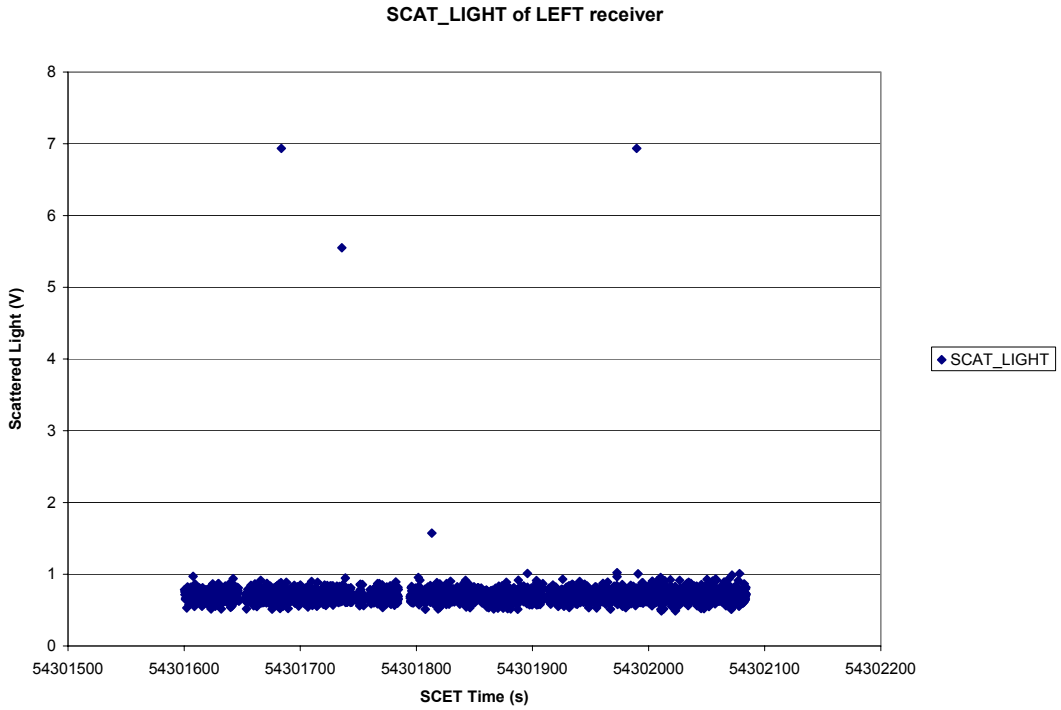

Figure 11 GDS Detection (Left Receiver) – MAIN

The scattered light on the left channel shows an average value of 0.707 V and a standard deviation of 0.175 V. The absolute value is slightly larger than that measured during the first commissioning (0.67 V), while the standard deviation has increased (it was < 50 mV).

As in the previous test, during the GIADA commissioning (April 2004), it was noticed the occurrence of sporadic ghost events with high/saturation amplitude.

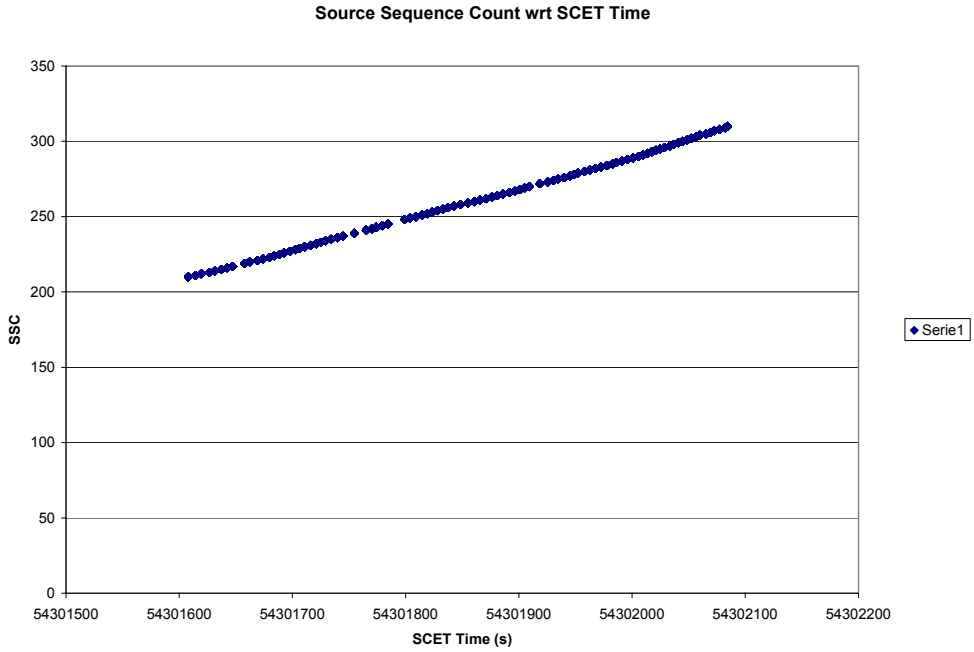

Figure 12 GDS Left receiver production rate wrt. time

Figure 12 shows the GDS (left receiver) production rate with respect to time. It seems that the rate is slightly increasing at the end of the test. The calculated average rate (over the entire production time) is one TM science packet every about 6s. **With such rate, the SSMM allocated GIADA buffer (1 Mbytes) should not saturate**.

5.1.3.3 MBS Sub-system

Comparing the frequency acquisition during this test with those at the first commissioning, a significant increase of frequency of the MBS1, MBS3 and MBS5 is observed (see the two figures below). This point has to be investigated for the future tests.

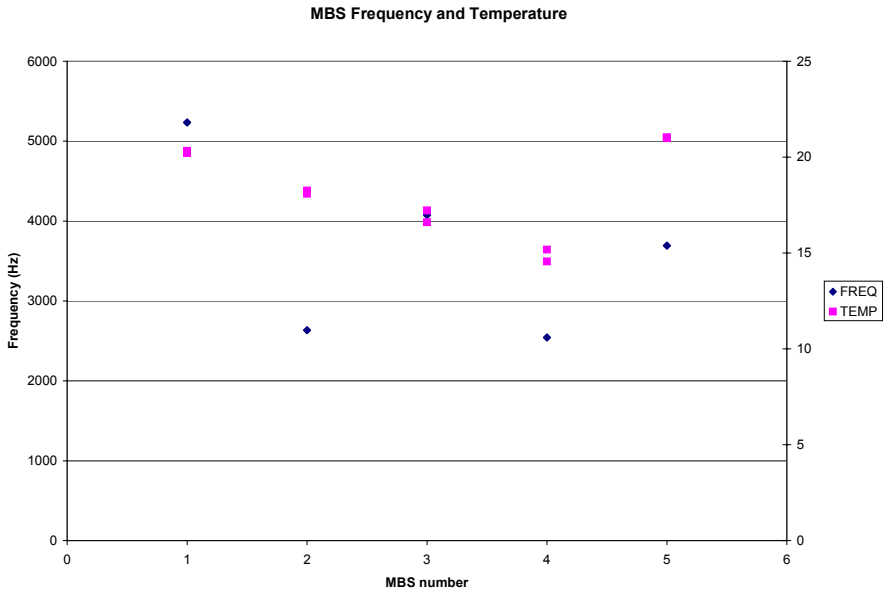

Figure 13 MBS Frequencies and Temperature (MAIN)

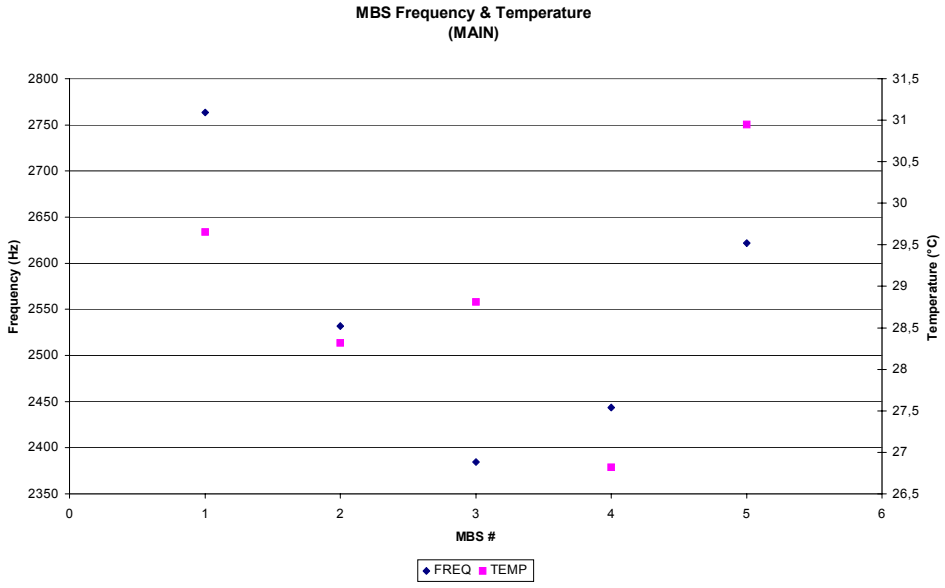

Figure 14 MBS Frequencies and Temperature (MAIN) during the previous commissioning

5.1.3.4 Housekeeping signals on science packets

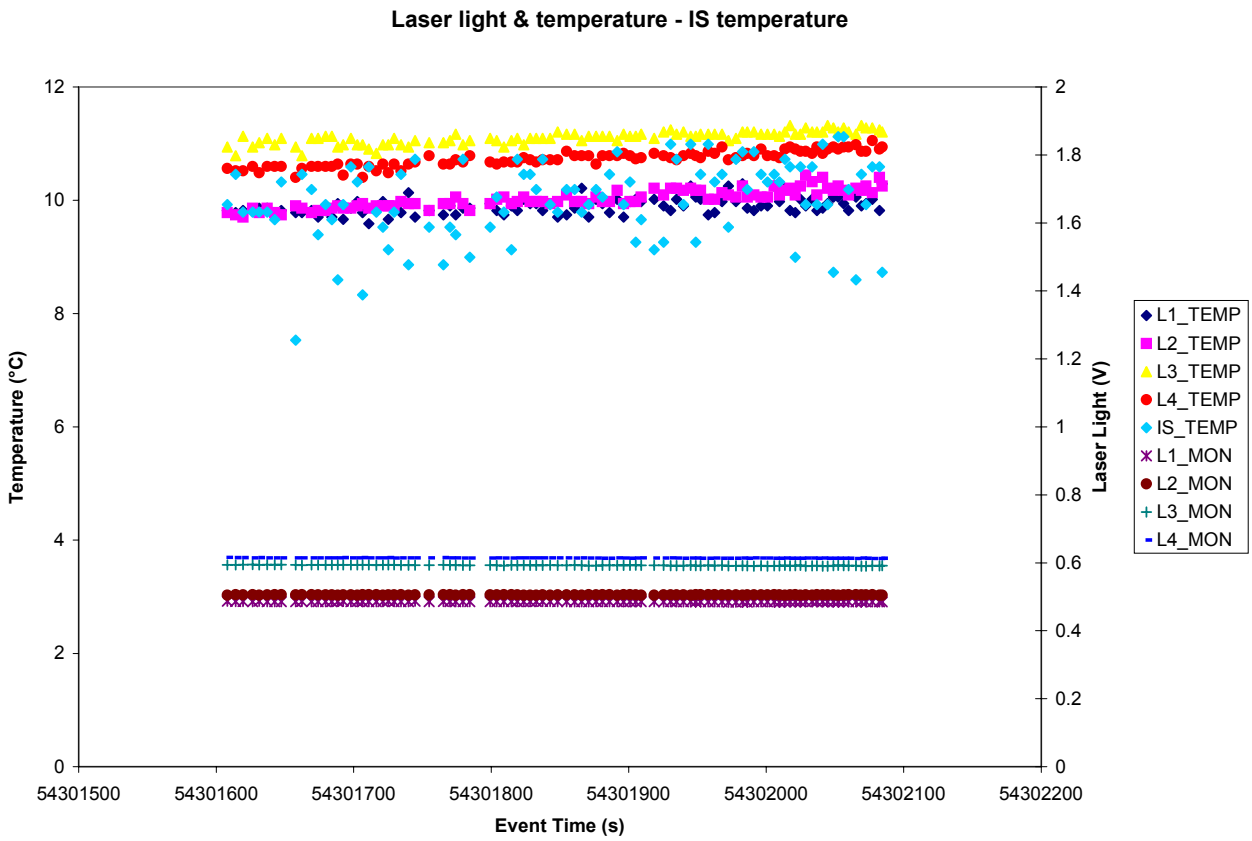

Figure 15 Laser Light Monitors and Laser & IS temperatures (MAIN)

5.2 INTERFERENCE SCENARIO 1A – 2ND MAIN I/F SWITCH-ON (20/09/04)

5.2.1 Activities log

The following activities have been performed in sequence

UTC	Description
20 Sep 2004 - 21:00	GIADA Main interface ON
20 Sep 2004 - 21:31	The cover is opened
20 Sep 2004 - 22:46	GIADA goes to Normal mode and science is enabled. Up to the end of the Normal mode, a periodic (every 6 minutes) calibration is performed
21 Sep 2004 - 01:31	GIADA goes to Cover mode and the cover is closed
21 Sep 2004 - 02:00	GIADA is switched-off

The GIADA switch-on procedure was applied selecting the Main I/F and with the Context File stored in SSMM. The Instrument Main I/F was successfully powered-on by means of the GIADA POWER-ON OBCP on the 20th of September 2004 @ 21:01:14 (UTC time), which corresponds to a SCET Time of about 54334858 sec.

The first expected packet (Connection Report, service 17,2) was received, but it was marked by ESOC system with few second delay because it was not synchronised. The next expected packet was correctly received ('GIADA Safe' mode). GIADA was started synchronised. Afterwards, the first HK report was received (default HK rate is 40 s).

After completion of the power-on, as expected, the first patch (regarding the Context File) was sent, as well as the other three required software patches. All have been nominally received and successfully dumped to ground via service 6,6. As result of the Context File patch, GIADA HK rate was changed to 10 s rate.

The next step was to open the cover. The operation was successfully completed. Then GIADA was sent to Normal and science telemetry enabled until approximately the 22:10. **During this period, only three science packets were lost.** Then GIADA returned to Safe mode until 22:46. **During this period, the loss of tracking from New-Norcia Ground Station occurred and GIADA lost 145 HK packets plus few ACK TM report (service 1, type 1,1 and 1,7) from 22:05:24 to 22:29.34 (see** Figure 21**). No science packets were generated by GIADA in this period (since in Safe mode).** From 22:46, GIADA returned to Normal mode **and all packets (HK and science) were received correctly.**

The calculated average rate of the TM science packets is about one packet every 2.6 s. **With such rate, the SSMM allocated GIADA buffer (1 Mbytes) should be saturated if the download rate does not allow to empty the memory**. Since no missing packets are observed (but a few at the beginning), we conclude that no overwrite of the SSMM GIADA memory occurred.

GIADA behaviour was nominal and @ about 1:31 the cover was successfully closed. GIADA was sent to Safe mode and switched-off by means of CLOSE_COVER_OBCP (with heaters Cover and Motor Heaters Off).

During this last step, since the 'go to Safe' TC was sent twice, the second TC was correctly refused by GIADA. The following Event was received:

```
Tue Sep 21 2004 02:01:02.103511
TM Packet Received from GIADA:
                    APID = 90, 1 (ACKNOWLEDGE)
                    Source Sequence Count: 240
                    Packet Length: 21
                    SCET Time: 54352845.300781 sec.
                    Packet Type, Subtype: 1, 2
-------------------------------------------------
 0D A1 C0 F0 00 15 03 3D 5B CD 4D 00 40 01 02 00
 1D AC CA 05 00 05 C4 01 00 00 00 00
=================================================
Tue Sep 21 2004 02:01:02.103511
        TC APID = 1452, TC SSC = 2565;
        Command can not be executed in the actual operation mode (TC Packet Type/Subtype = 196,1 - Safe).
```

The time interval between these two TCs was 1 minute, as expected.

The Instrument was switched-off @ about 02:09:05 of the 21 Sep. 2004 (UTC Time).

5.2.2 Housekeeping data analysis

5.2.2.1 General

As we can see in the following figures, the GIADA experiment behaved correctly along the test. **The current consumption and the Power Supply temperatures (**Figure 16**) are in the expected range. The current consumption measured in Normal mode for +15V and –15V is about 450mA and 295mA respectively. These values are consistent with previous data from Commissioning test and on-ground TV test (GIA-GAL-TR-527).**

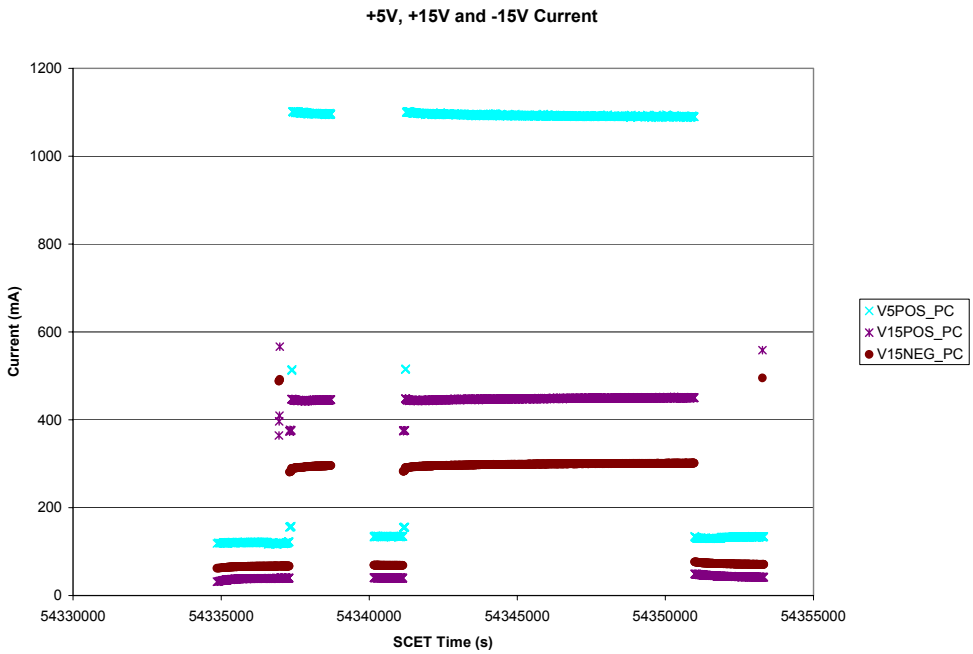

Figure 16 Current consumption on +5V, ±15V power supplies (MAIN)

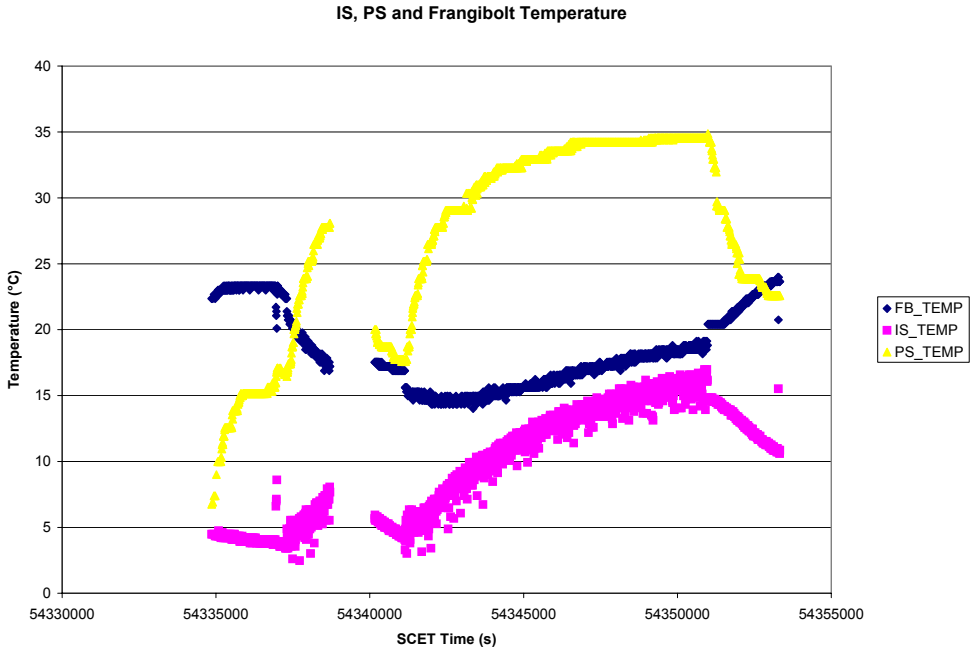

Figure 17 IS and Power Supply temperatures along the test (MAIN)

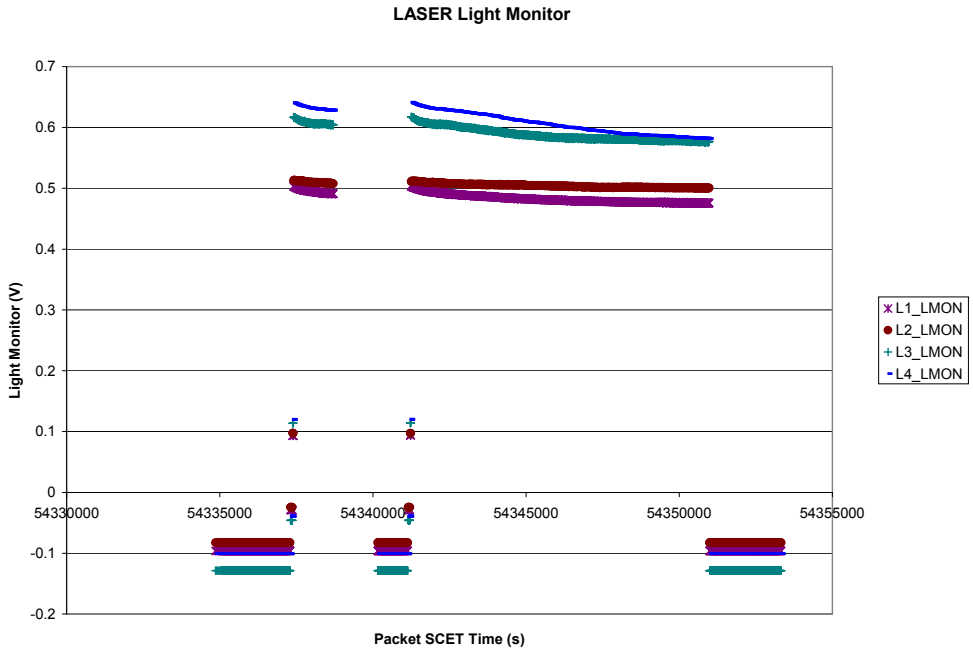

Figure 18 Laser Light Monitors

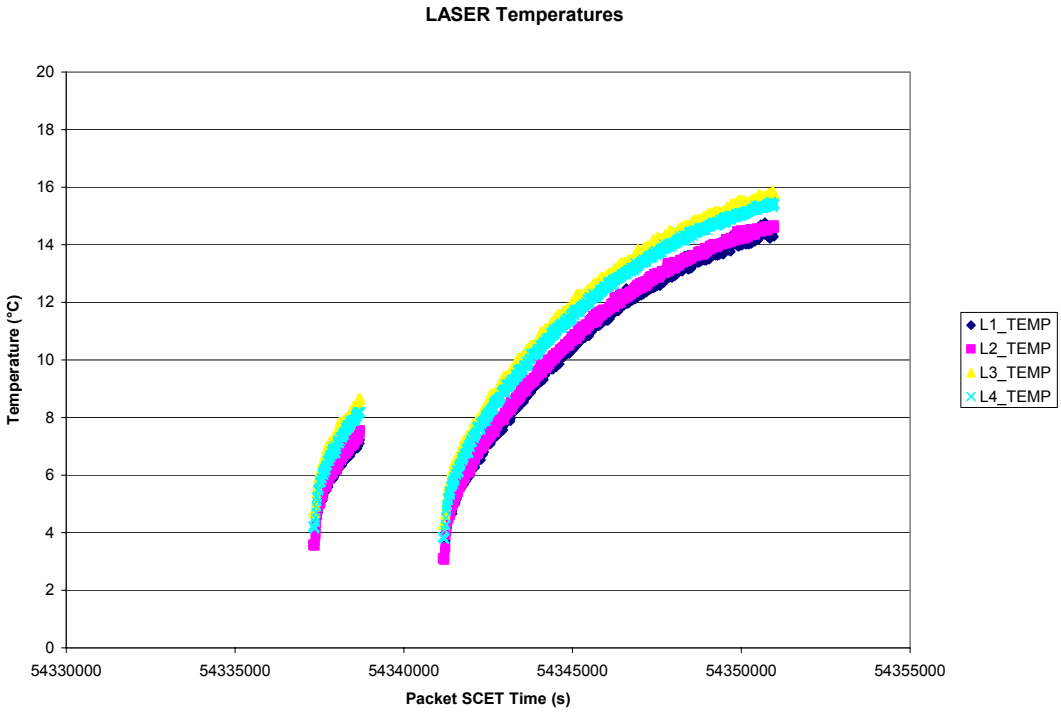

Figure 19 Lasers Temperatures

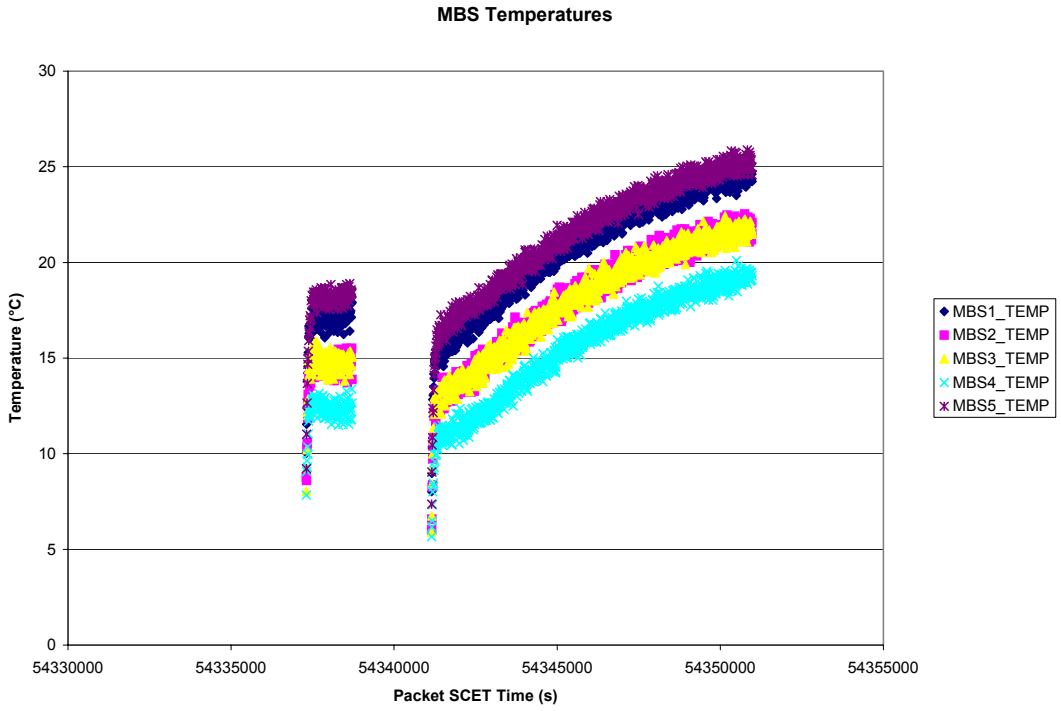

Figure 20 MBS temperatures along the test

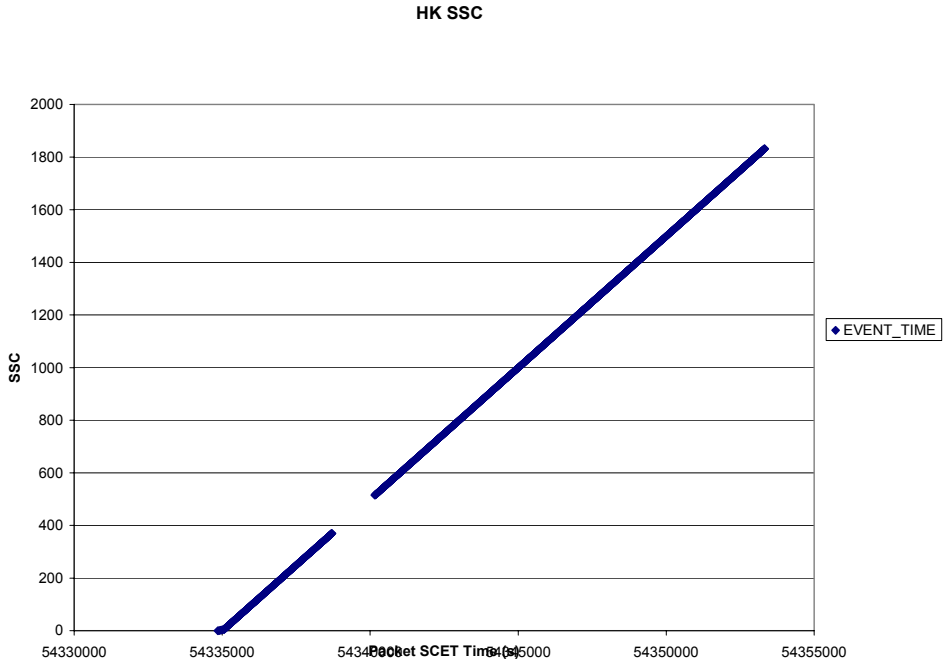

Figure 21 Source Sequence Count for HK TM packets

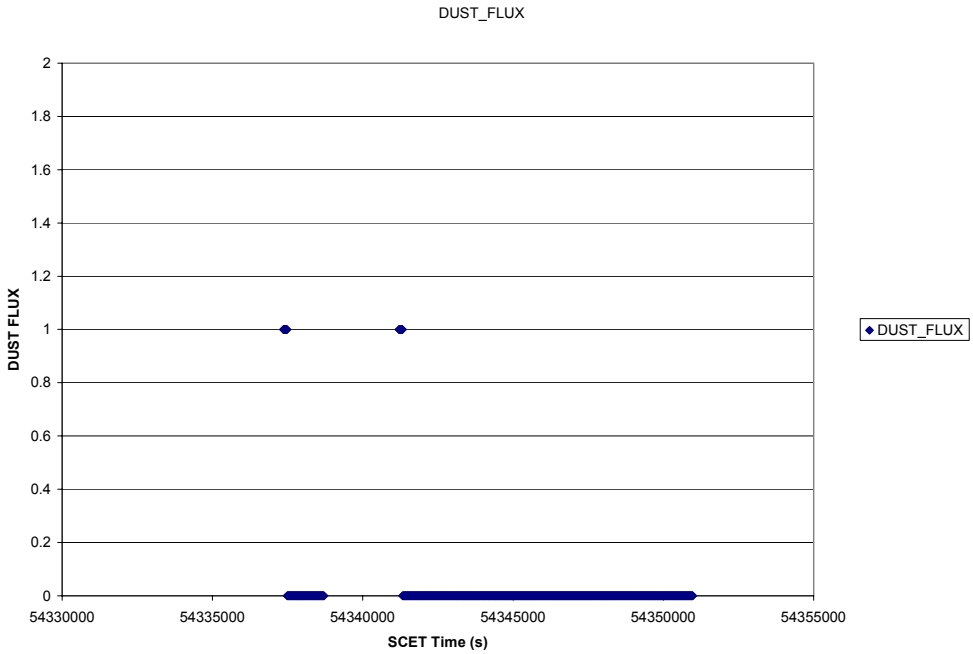

Figure 22 Dust Flux along the test

5.2.2.2 Cover operations

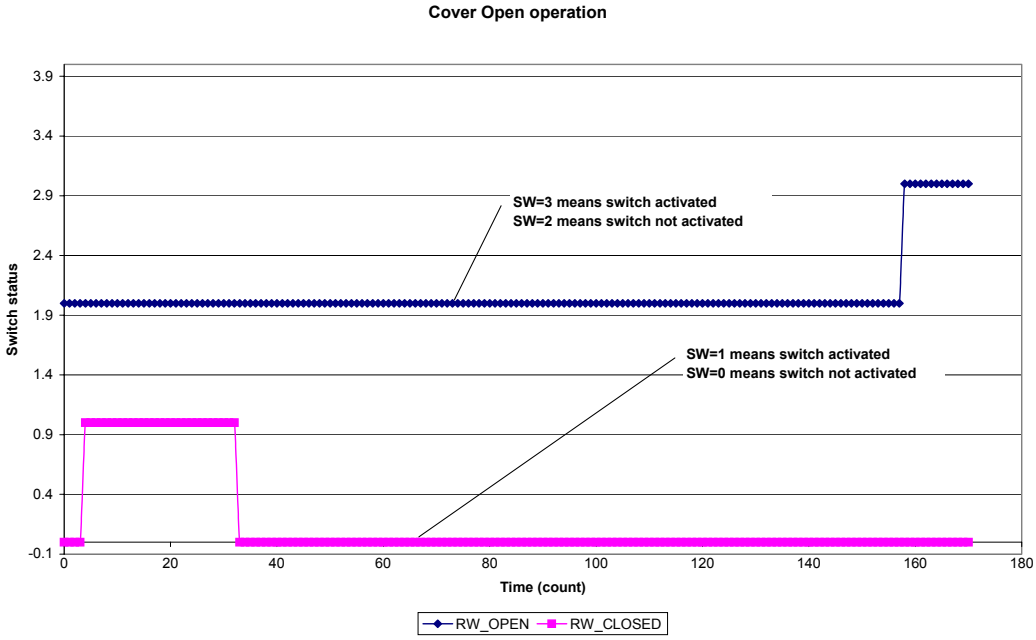

Figure 23 Reed switches Status during the Cover Open operation

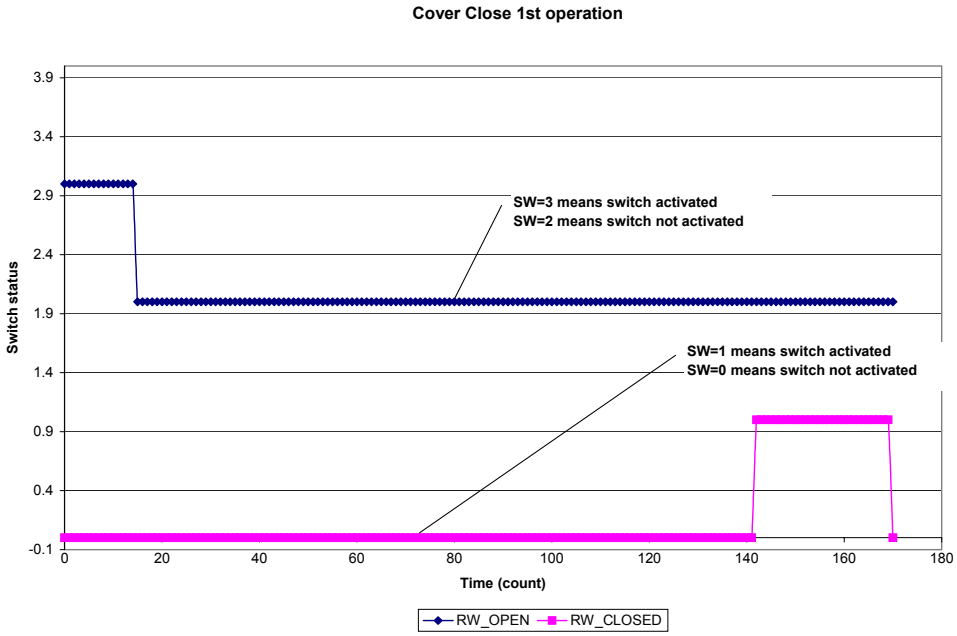

Figure 24 Reed switches Status during Cover Close 1st operation

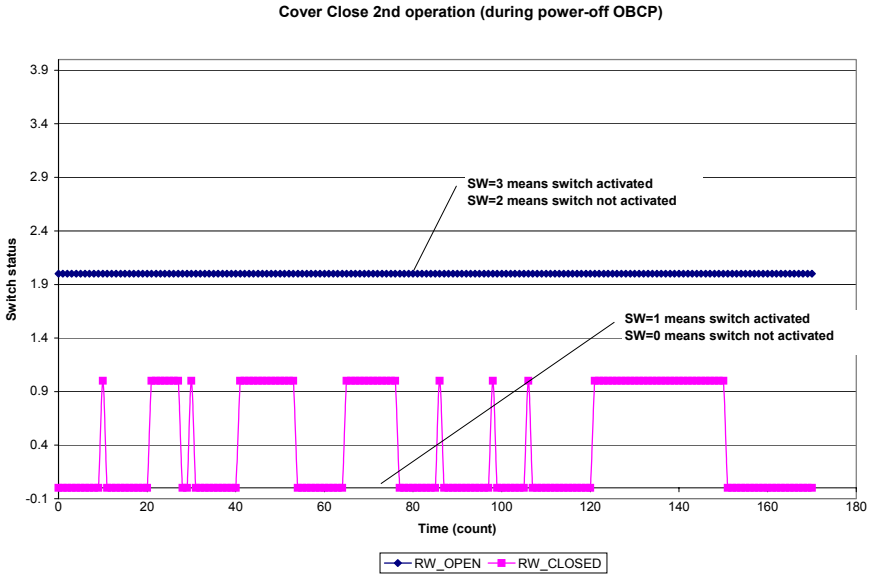

Figure 25 Reed switches Status during Cover Close 2nd operation @ power-off

5.2.3 Engineering evaluation on sensor data

The science TM was almost correctly received, only two packets were missed. Figure 26 shows the SSC of TM packets when GIADA is in Normal mode and science TM is enabled. The flood of TM packets (from a range of one packet every 7.5 s, at the begin of test, to one packet every 1.3 s, at the end of the test) was observed after the lasers were switched on. In this condition, several GDS 'ghost detections' on the Left receiver were found (GDS production rate is discussed in Section 5.2.3.2) due to the level of the internal stray-light (background noise) in combination with the electronic noise. N.B.: at the last test before launch and as confirmed at GIADA Commissioning in April '04, the internal stray-light was in the order of the Left receiver detection threshold.

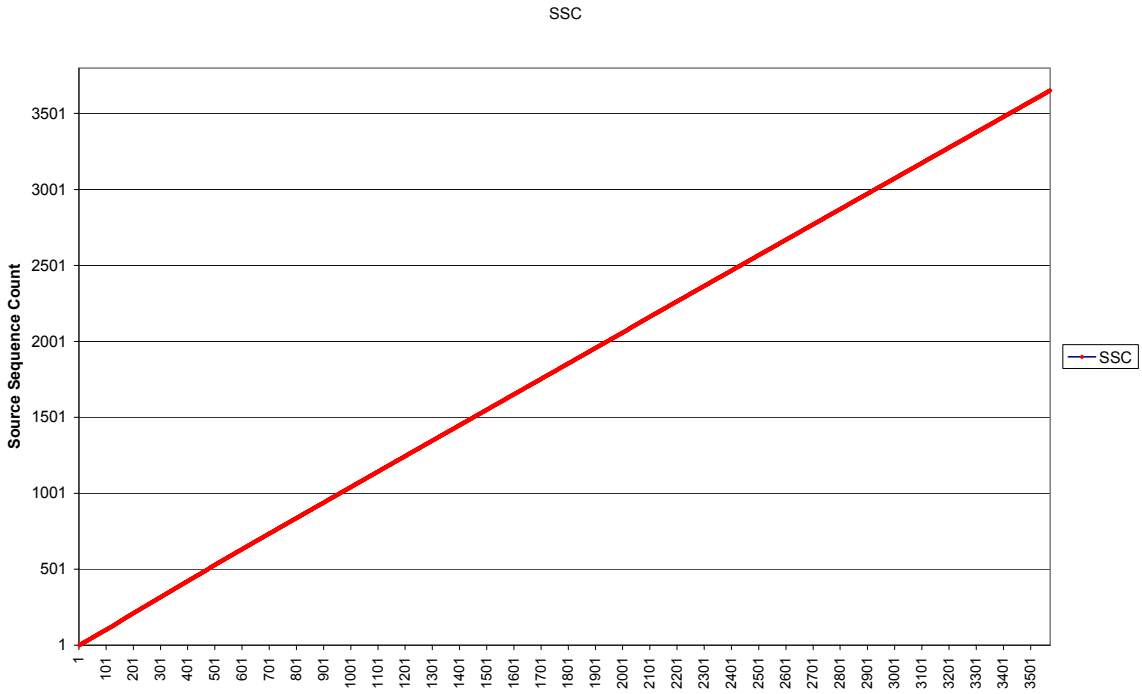

Figure 26 Science TM packet Source Sequence Count

To avoid future flood of events, the detection threshold of GDS Left channel should be changed in the Context File.

5.2.3.1 IS Sub-system

After the sub-system power on, the detection thresholds of each channel were set to 50 mV (Context file updated via memory load command). The Range/Gain configuration is that reported in Table 2.

RANGE	GAIN				
	PZTA	PZTB	PZTC	PZTD	PZTE
Low	High	High	High	High	Low

Table 2 IS Range/Gain configuration

After entering the second Normal mode, the IS was calibrated until the end of the test every 6 minutes. No IS science detections were obtained. Table 3 shows the sequence of the mean and the standard deviation for the IS calibrations with four stimuli @ 10V level.

CALIB #	PZTA		PZTB		PZTC		PZTD		PZTE	
	MEAN	STD	MEAN	STD	MEAN	STD	MEAN	STD	MEAN	STD
1	-0.011	0.064	-0.011	0.064	-0.002	0.044	-0.008	0.000	-0.014	0.044
2	-0.008	0.049	-0.008	0.023	-0.002	0.044	-0.011	0.044	-0.014	0.023
3	-0.008	0.000	-0.011	0.049	-0.002	0.055	-0.011	0.055	-0.014	0.035
4	-0.008	0.035	-0.008	0.003	0.001	0.026	-0.011	0.035	-0.014	0.044
5	-0.008	0.023	-0.008	0.061	0.001	0.000	-0.011	0.049	-0.014	0.049
6	-0.008	0.035	-0.008	0.055	-0.002	0.055	-0.011	0.064	-0.014	0.000
7	-0.011	0.055	-0.008	0.003	-0.002	0.055	-0.011	0.035	-0.014	0.049
8	-0.008	0.023	-0.008	0.023	-0.002	0.055	-0.011	0.055	-0.014	0.035
9	-0.008	0.055	-0.008	0.023	-0.002	0.055	-0.011	0.064	-0.014	0.035
10	-0.011	0.055	-0.008	0.000	-0.002	0.035	-0.011	0.035	-0.014	0.035
11	-0.008	0.061	-0.008	0.000	-0.002	0.049	-0.011	0.049	-0.014	0.049
12	-0.008	0.023	-0.011	0.061	-0.002	0.049	-0.008	0.023	-0.014	0.035
13	-0.008	0.049	-0.008	0.000	-0.002	0.000	-0.011	0.023	-0.014	0.049
14	-0.011	0.061	-0.008	0.000	-0.002	0.055	-0.011	0.055	-0.014	0.044
15	-0.008	0.035	-0.008	0.044	-0.002	0.044	-0.008	0.023	-0.014	0.044
16	-0.008	0.061	-0.011	0.044	-0.002	0.035	-0.011	0.055	-0.014	0.000
17	-0.008	0.000	-0.011	0.061	-0.002	0.055	-0.011	0.000	-0.014	0.035
18	-0.011	0.055	-0.011	0.061	-0.002	0.044	-0.011	0.055	-0.014	0.064
19	-0.011	0.055	-0.008	0.055	-0.002	0.035	-0.011	0.064	-0.014	0.035
20	-0.011	0.061	-0.008	0.000	-0.002	0.055	-0.011	0.049	-0.014	0.044
21	-0.008	0.049	-0.011	0.064	-0.002	0.023	-0.008	0.000	-0.014	0.035
22	-0.008	0.044	-0.011	0.064	-0.002	0.044	-0.011	0.049	-0.014	0.049
23	-0.011	0.055	-0.011	0.055	-0.002	0.049	-0.011	0.061	-0.017	0.064
24	-0.008	0.003	-0.011	0.044	-0.002	0.035	-0.011	0.064	-0.014	0.049
25	-0.011	0.055	-0.008	0.044	-0.002	0.035	-0.011	0.061	-0.014	0.023
26	-0.011	0.049	-0.011	0.055	-0.002	0.044	-0.011	0.035	-0.014	0.035

Table 3 IS channel outputs prior Internal Calibration

As we can see, the channel outputs have a low mean value (negative value means channel output close to 0 V) and a noise level (@ 3σ) close to the detection thresholds. The noise levels are compatible with those measured during on-ground test campaign.

Figure 27 to Figure 33 show the results of the IS internal calibrations. No detections were seen on Channel-E; this is expected since the channel Gain is set to "Low". According to the section 5.2.2.1 of **AD4**, only the 2nd and 4th stimuli are meaningful, except for Channel-C response, for which the voltage/delay time measurements are not stable along the different internal calibrations; the other channels (A, B and D) show a reproducible calibration data set.

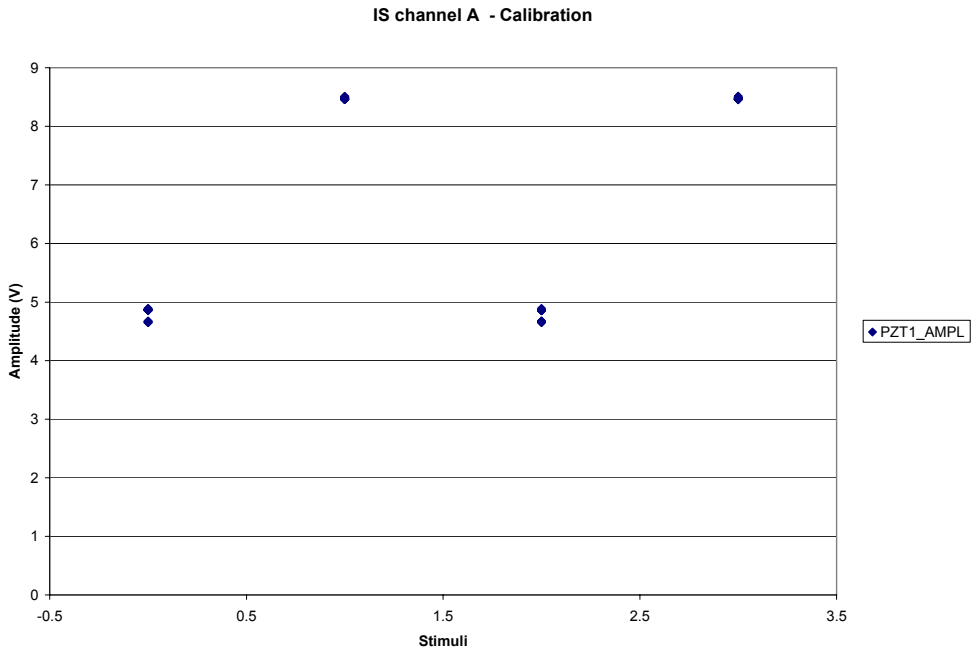

Figure 27 IS Calibration - Channel A Amplitude

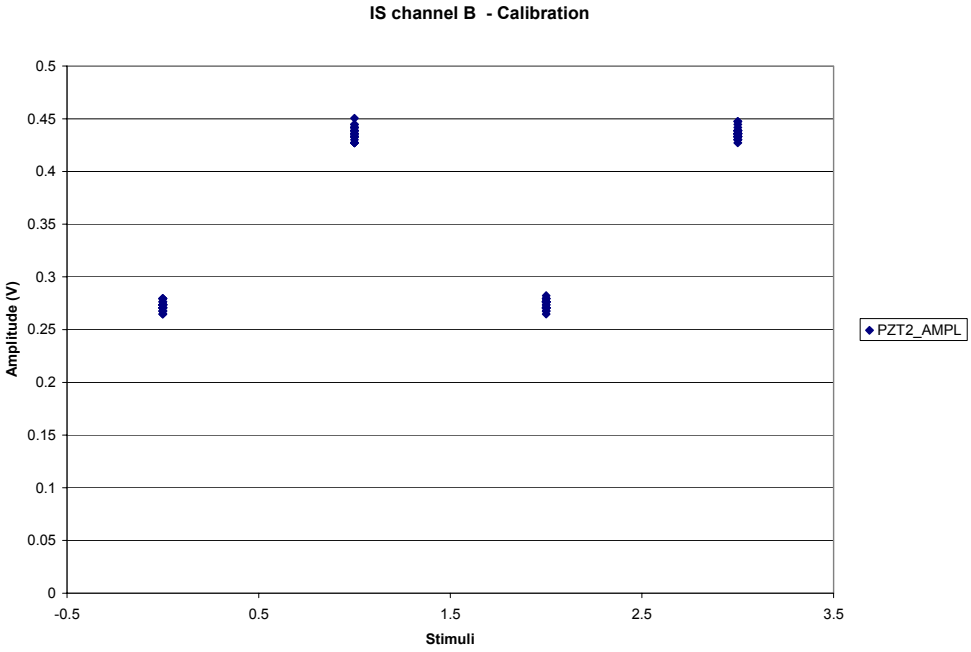

Figure 28 IS Calibration - Channel B Amplitude

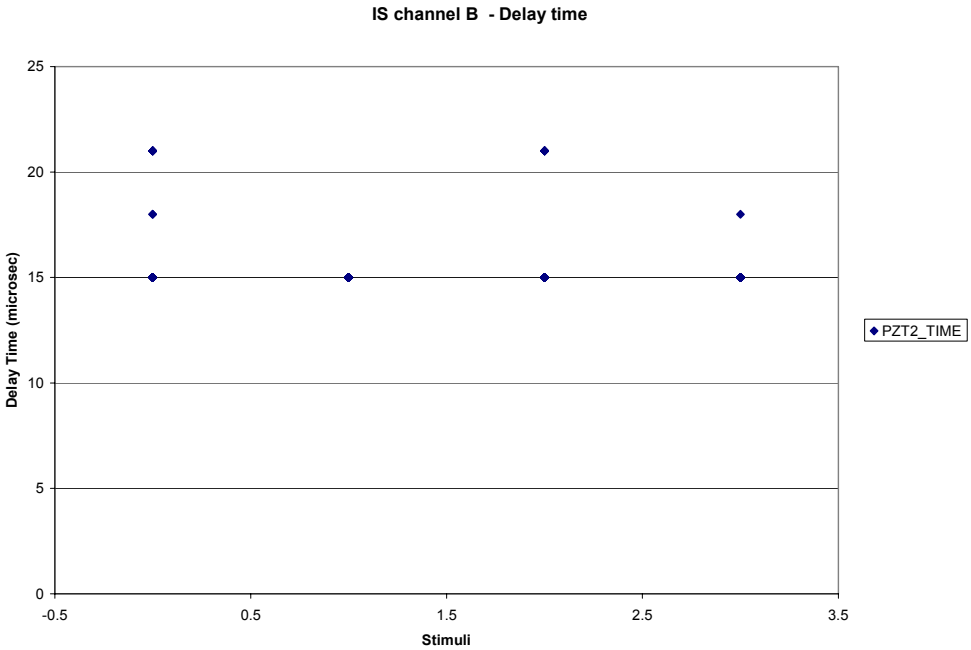

Figure 29 IS Calibration - Channel B Delay Time

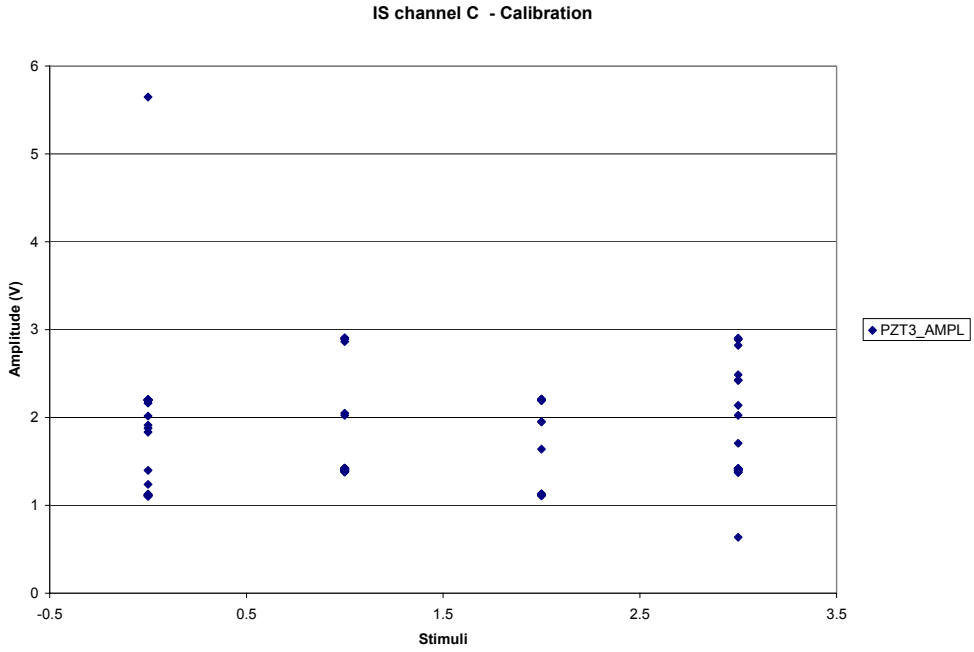

Figure 30 IS Calibration - Channel C Amplitude

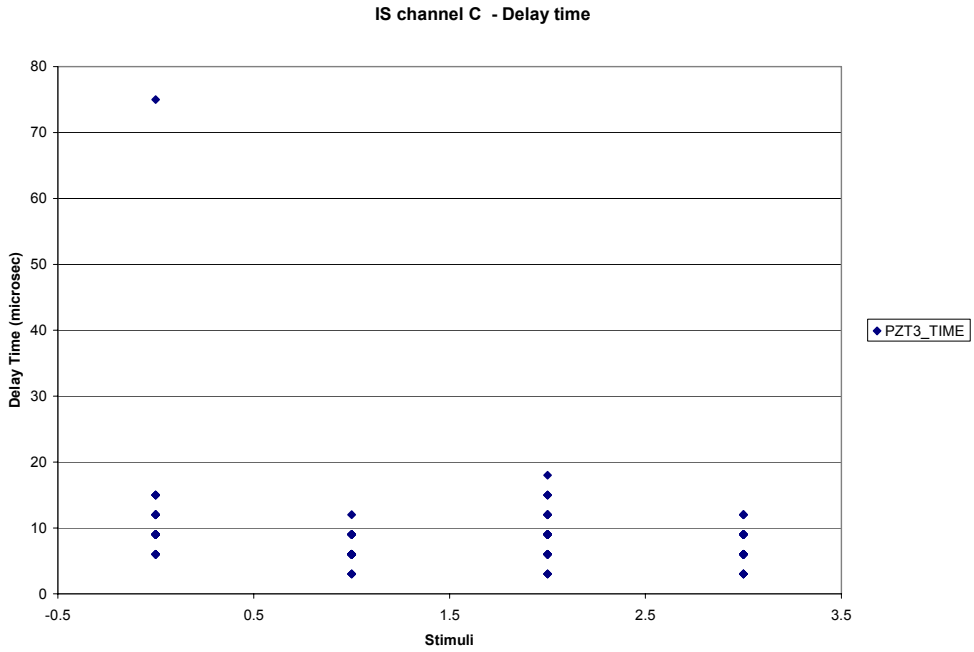

Figure 31 IS Calibration - Channel C Delay Time

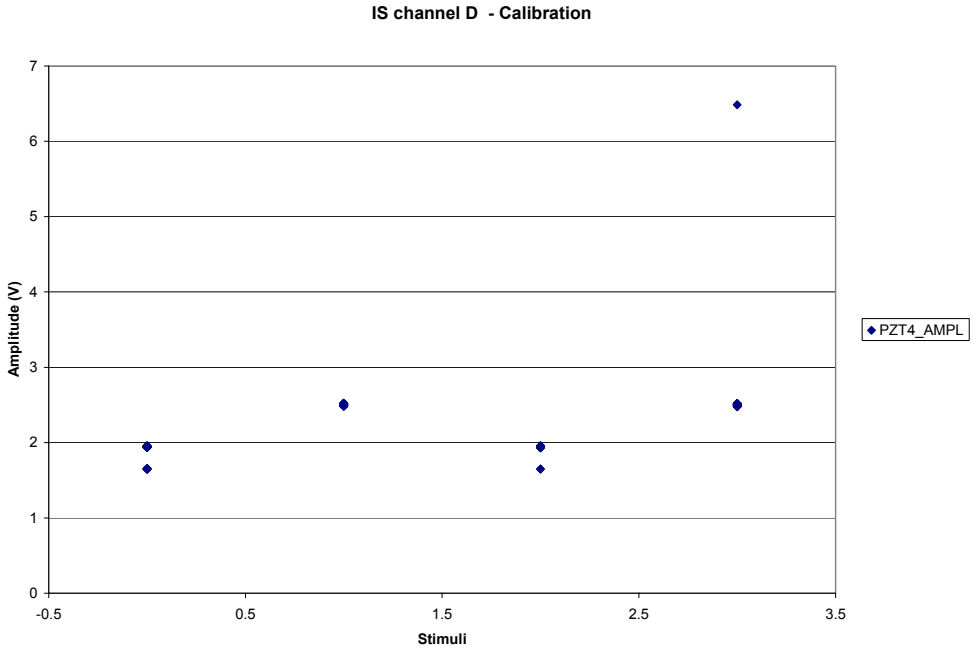

Figure 32 IS Calibration - Channel D Amplitude

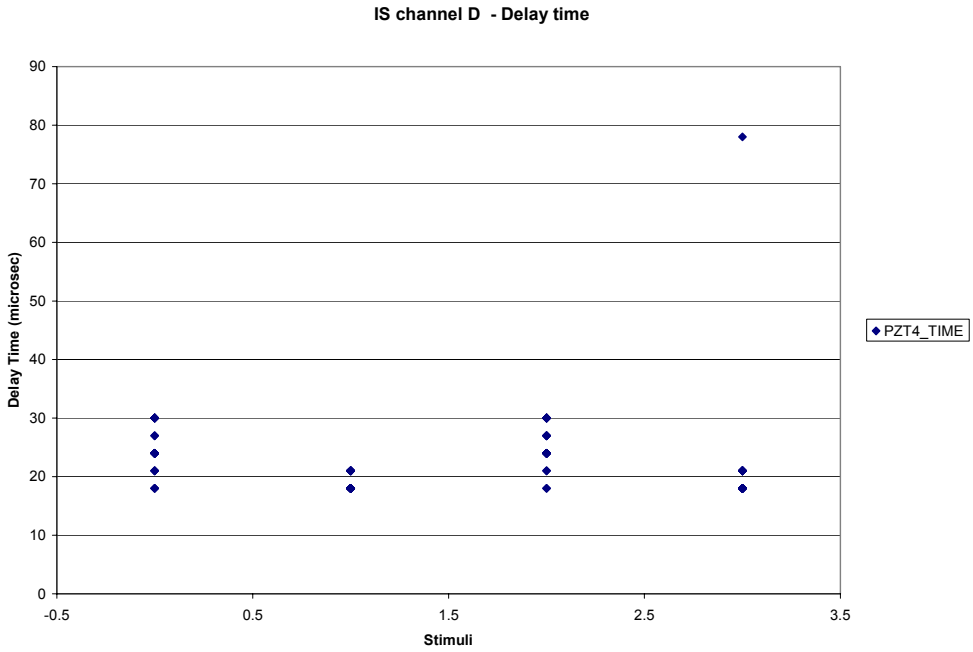

Figure 33 IS Calibration - Channel D Delay Time

5.2.3.2 GDS Sub-system

The detection thresholds of Left and Right channels were set to about 0.8 V (Context file updated via memory load command at GIADA power-on). The nominal operation was to perform periodic GSD calibrations every 6 minutes. The Figure 34 and Figure 35 show the GDS Calibration Left & Right mean value and STD deviation along test.

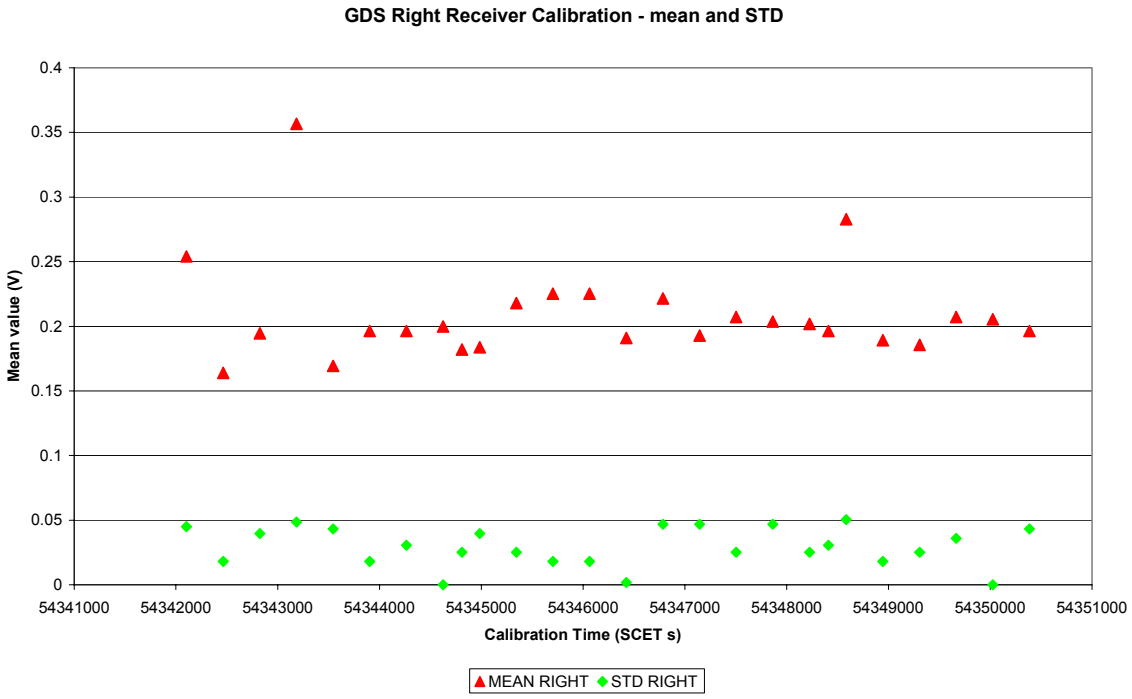

Figure 34 GDS Calibration (Right mean value and STD deviation)

The output level of the Left and Right channels reports a direct measure of the internal stray-light in combination with the electronics noise (may be conducted on the power lines from other instruments). As we can see, the mean value of the Right receiver is always below the detection threshold (no ghost detections were observed on the Right channel) and practically the same as during the previous in-flight test of April '04 (GIADA commissioning) when GIADA was switched on alone. Its average is below 0.25 V (only once increases up to 0.35 V), while its standard deviation is always below 50 mV always. A different situation is observed for the Left receiver:

- At the begin of the test sequence, the mean value is approx. the same as the one measured during the GIADA Commissioning: it was 0.67 V with standard deviation (3σ) < 50 mV, while now it is 0.685 V and 3σ < 40 mV.
- Then, the mean value increases of about 0.2 V reaching at the end of the test 0.85 V and 3σ < 65 mV.

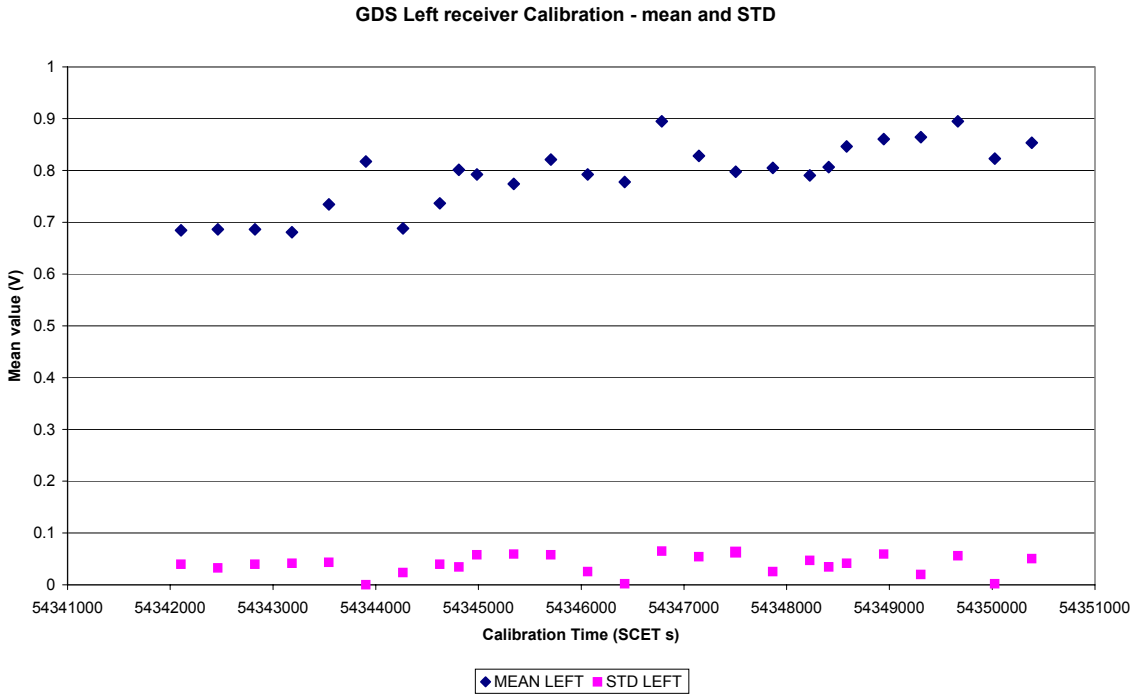

Figure 35 GDS Calibration (Left & Right mean value and STD deviation)

The internal stray-light (in combination with the electronics noise) is above the Left receiver detection threshold and increases from the begin to the end of the test. This is also confirmed by the production rate of GDS ghost events, that is shown in Figure 41: it results lower at begin (about 1 packet every 7.5 s, i.e. 0.133 packet/s) and maximum at the end (about 1 packet every 1.3 s, i.e. 0.766 packet/s). Finally, Figure 36 and Figure 37 shows the laser light monitor and the laser temperature at the time of the GDS calibration.

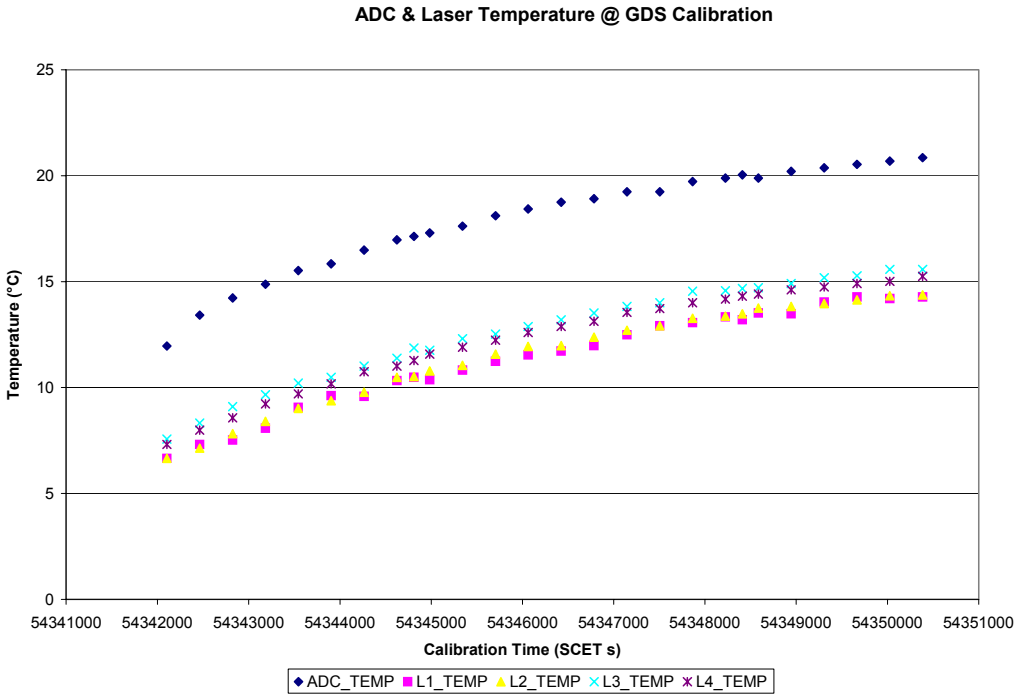

Figure 36 GDS Calibration - ADC & Lasers Temperature

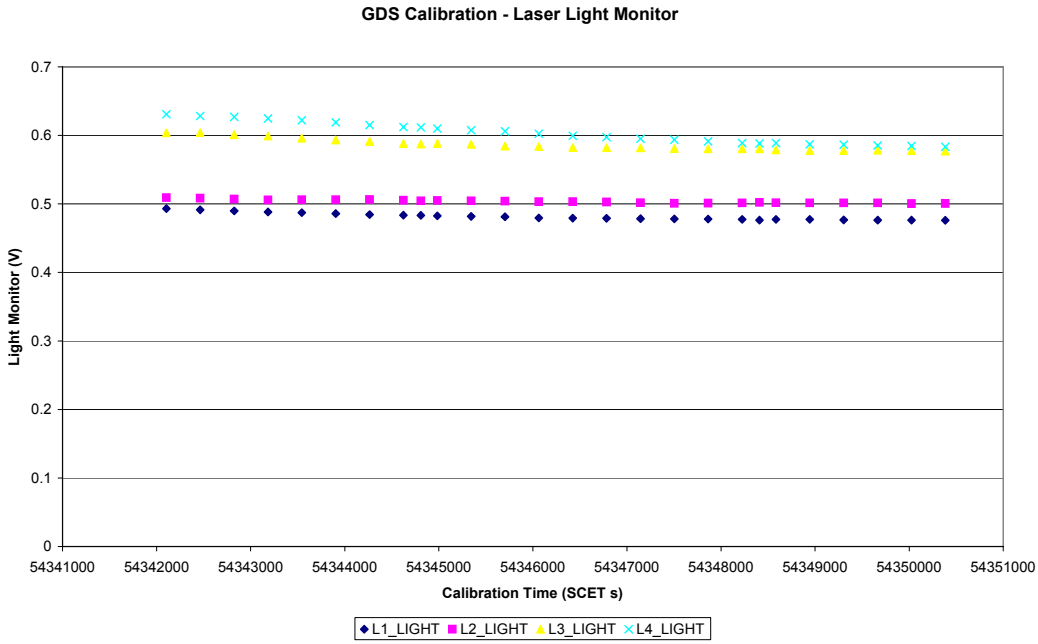

Figure 37 GDS Calibration – Laser Light Monitors

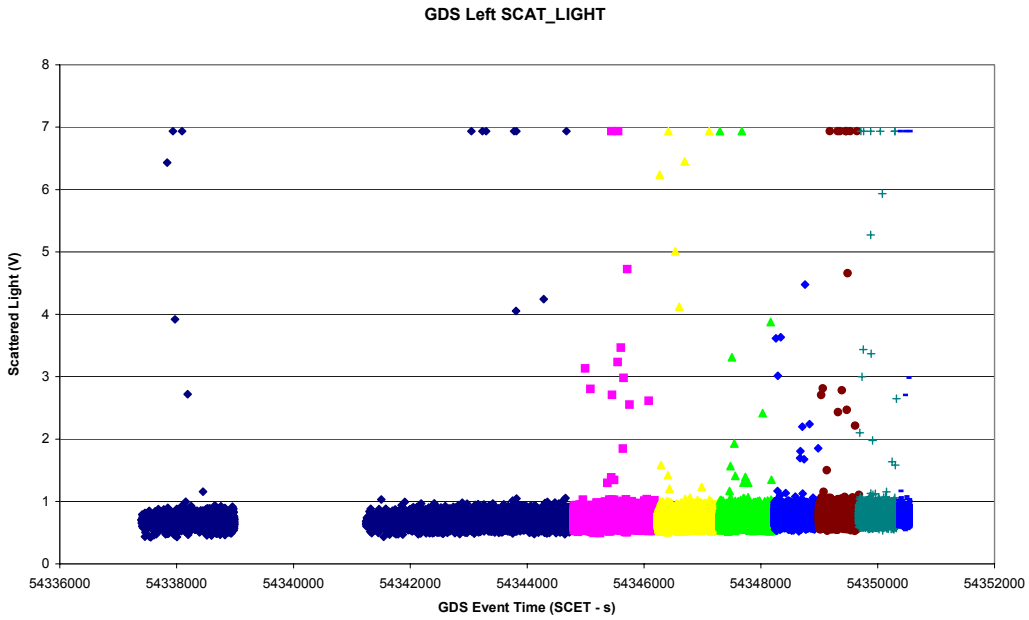

Figure 38 Amplitude of 'ghost detections' on Left receiver

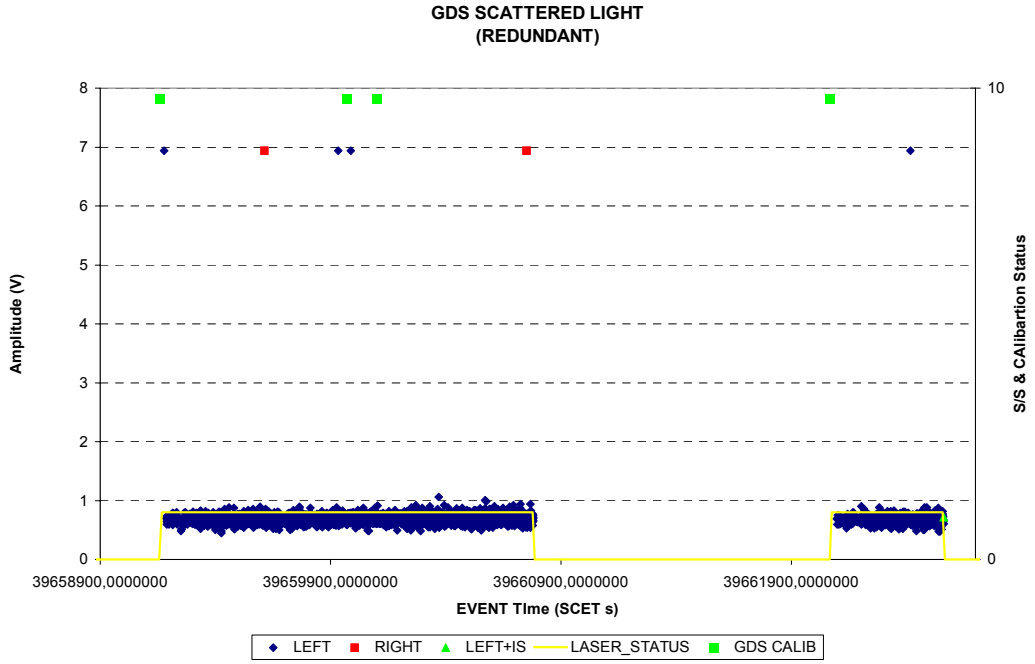

Figure 39 GDS Scattered Light (Left and Right Receivers) @ 1st Commissioning (RED I/F)

Figure 38 shows the Left Receiver 'Ghost detections'. As in the 1st Commissioning (April '04) two 'detection' types can be distinguished:

- The first type in which the detections amplitude is of the order or little above of detection threshold (0.8 V); these are 'ghost detections' due to the high level of the internal stray-light, now in combination with the electronics noise. The noise level is confirmed of the same order than the one found during the 1st Commissioning in April '04 (see Figure 39) only at the beginning of the test. Then, when all the other experiment were operative and the GIADA internal temperature increased, the noise increased and went little above the detection threshold. Due to this high production rate (which is shown in Figure 41), it can be possible to saturate the SSMM Memory, but since the downloading rate was sufficiently high, the SSMM memory allocated for GIADA was not saturated during the test.

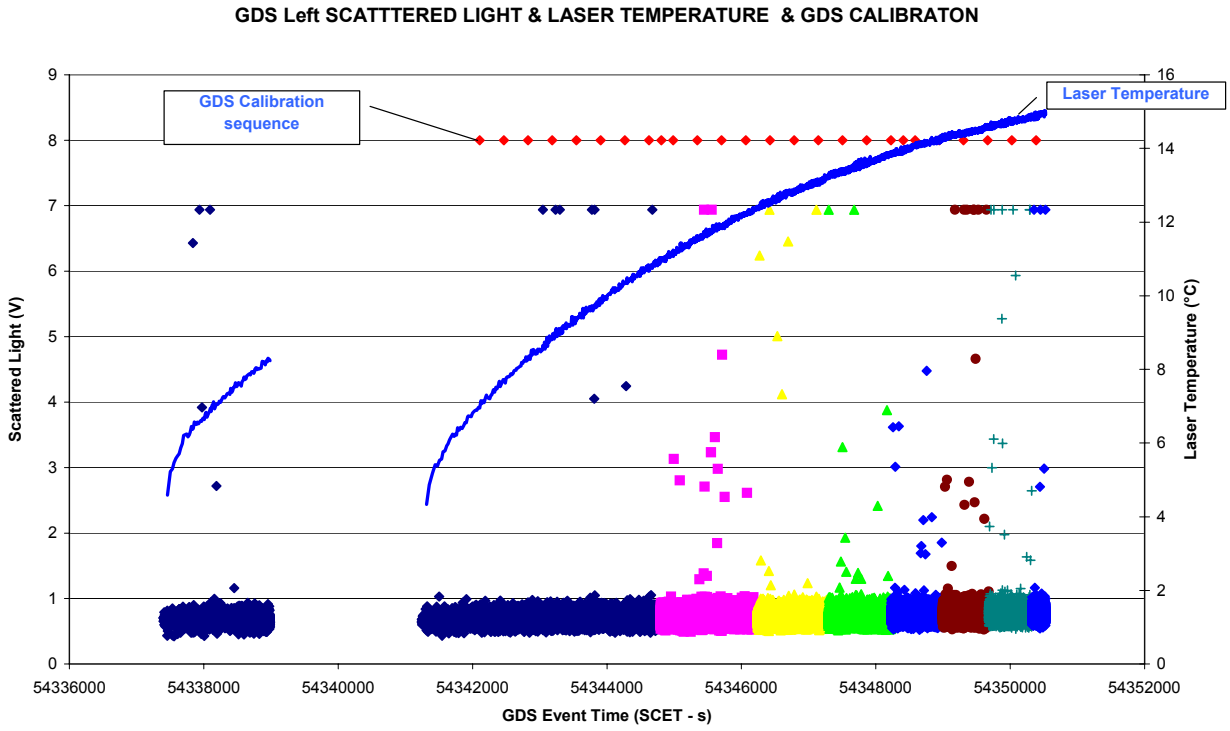

Figure 40 'Ghost detections' on Left receiver wrt Calibration and Temperature

- The second type, in which the detection amplitude on the left receiver is well above the detection threshold or in saturation (6.9375 V). These detections have happened more often than in the 1st Commissioning and seem not correlated to any specific GIADA internal events (such as calibration or relay on-off switching). **An explanation could be the interference** (conducted on the power line) **of the other experiments**. Further dedicated analyses are needed to understand if they are correlated to specific operations of other payloads.

However, in order to minimise these numbers of detections (and thus the GDS data rate and production), the detection threshold of Left cannel should be increased at least at 1-1.2V.

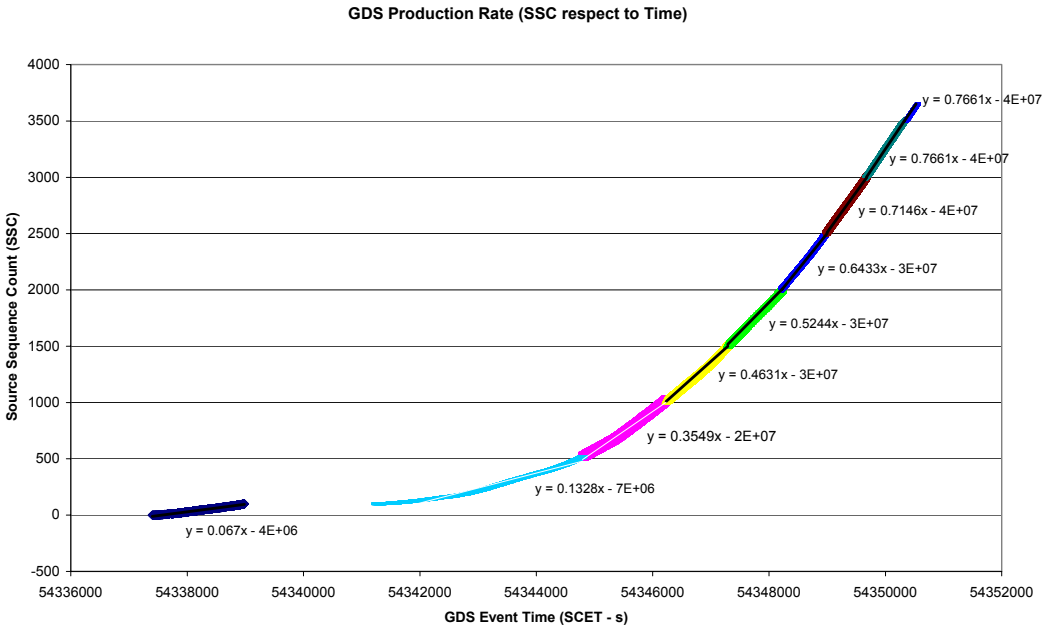

Figure 41 GDS Left Receiver Production rate

Table 4 and Figure 42 show the ADC Reference Voltages along the Interference Part 1A test for the sequence of the IS, GDS and MBS Calibrations. The voltages are quite stable in the temperature range 11 to 20 °C, except in few measurements, where they jump of about 3 mV (which is two-three digits of ADC).

ADC REFERENCE V0		ADC REFERENCE V1		ADC REFERENCE V2		ADC REFERENCE V3	
Mean	STD	Mean	STD	Mean	STD	Mean	STD
9,7799	0,0007	4,3445	0,0012	1,0797	0,0010	-0,0111	0,0010

Table 4. ADC Reference Voltages along the Interference Part 1A.

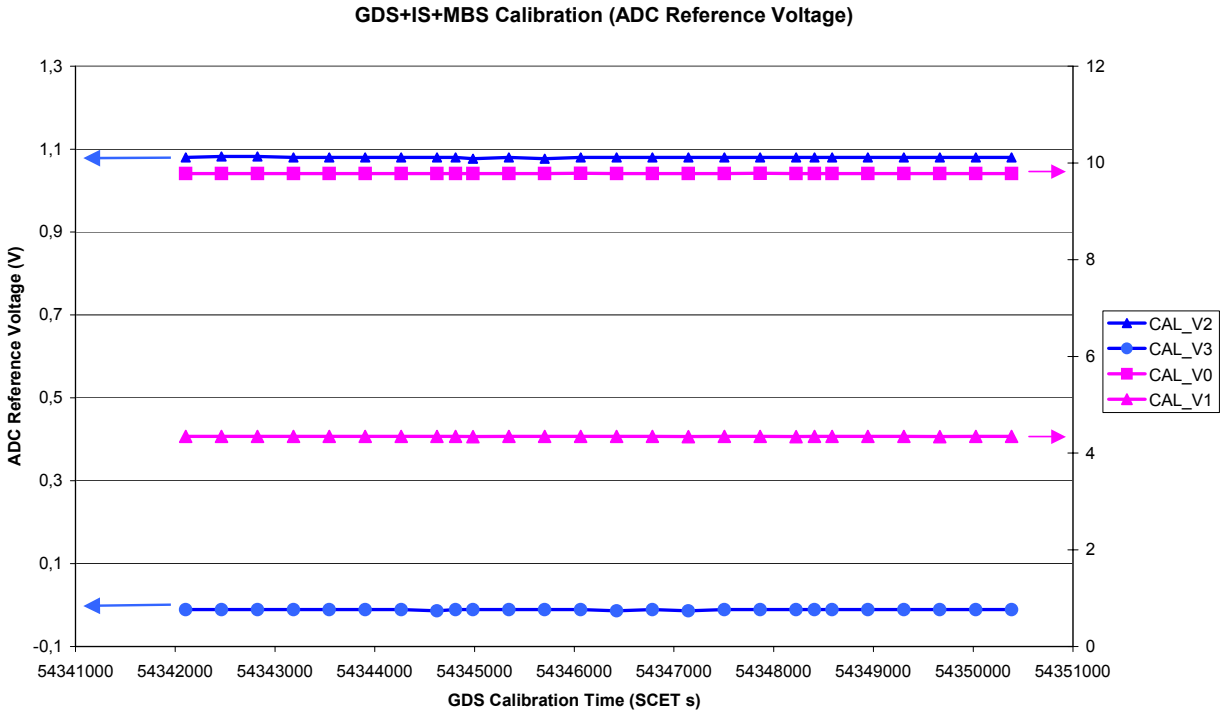

Figure 42 ADC Voltage Reference during Calibration

5.2.3.3 MBS Sub-system normal acquisition

The MBS frequency for three of the MBS (1, 3 & 5) is confirmed to be significantly higher then in the 1st Commissioning.

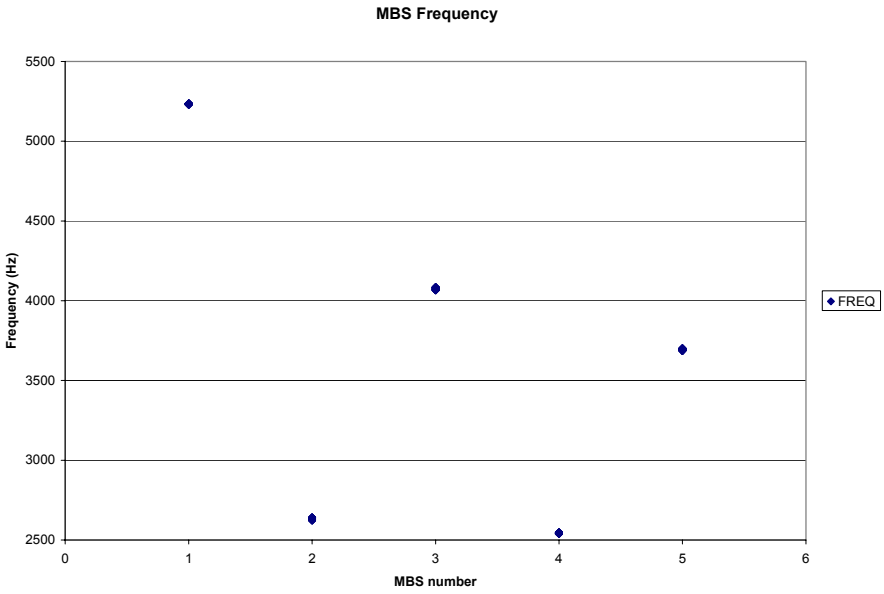

Figure 43 MBS Frequency

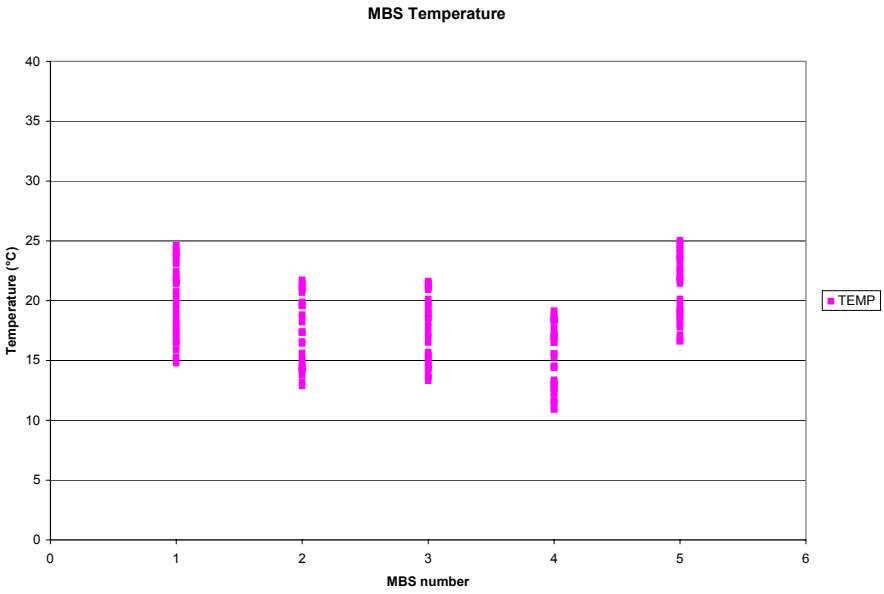

Figure 44 MBS Temperature

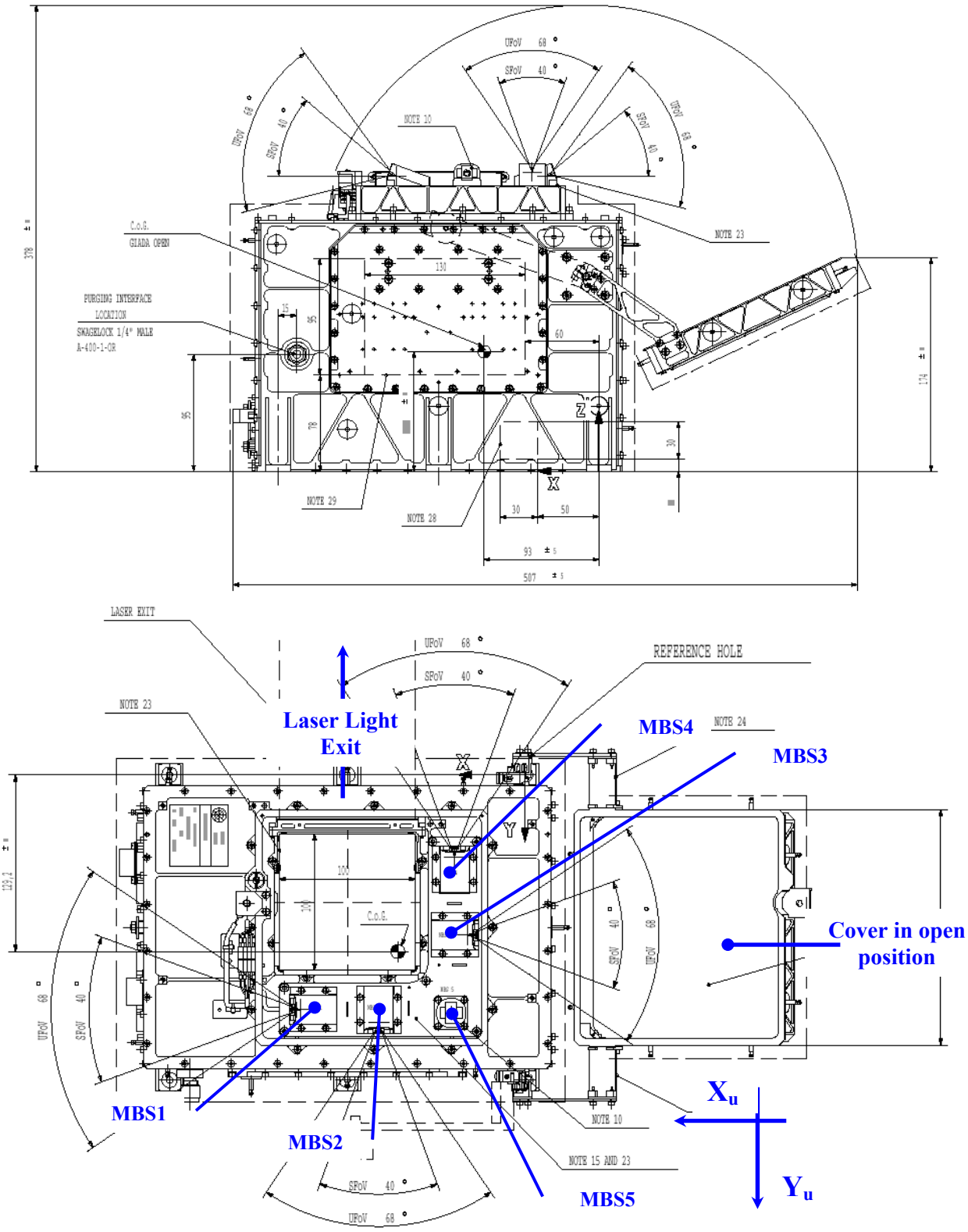

Figure 45 GIADA Cover Open Configuration – MBS location & pointing wrt GIADA unit axes

In detail, the following variations have been observed:

- The MBS1 frequency (MBS1 points to the +Xu direction, as it is shown in Figure 45) is about doubled, from 2700 Hz (data taken during the GIADA 1st Commissioning, refer to Figure 48) to about 5227 Hz @ 25°C.
- The MBS2 frequency (which points to the +Yu direction) is slightly increased of about 100Hz, from 2625Hz (data taken during the GIADA 1st Commissioning, refer to Figure 50) to about 2550Hz @ 20°C.
- The MBS3 frequency (which points to the -Xu direction) is increased of about 1700Hz, from 2365Hz (data taken during the GIADA Commissioning, refer to Figure 52) to about 4085Hz @ 20°C.
- The MBS4 frequency (which points to the -Yu direction) is increased of about 100Hz, from 2548Hz (data taken during the GIADA Commissioning, refer to Figure 54) to about 2548Hz @ 19°C.
- The MBS5 frequency (which points to the +Zu direction) is increased of about 1000Hz, from 2430Hz (data taken during the GIADA Commissioning, refer to Figure 56) to about 3686Hz @ 25°C.

This seems possible because of MBS in-flight contamination due to offgassing-volatised material. **Reasons of this change must be investigated together with other experiments/payloads that have observed similar situation and may require MBS heating at the next GIADA-on opportunity.** From operational point of view, all MBS's work as expected and the frequency dependence vs. temperature (frequency shift due to temperature change) is consistent with the commissioning data.

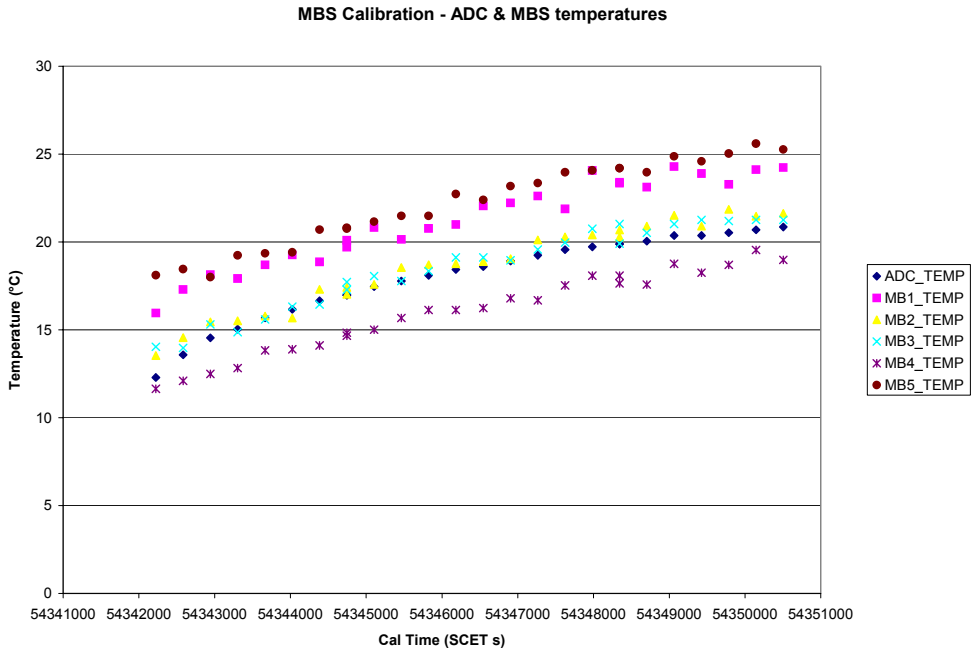

Figure 46 MBS Calibration - ADC & MBS temperatures

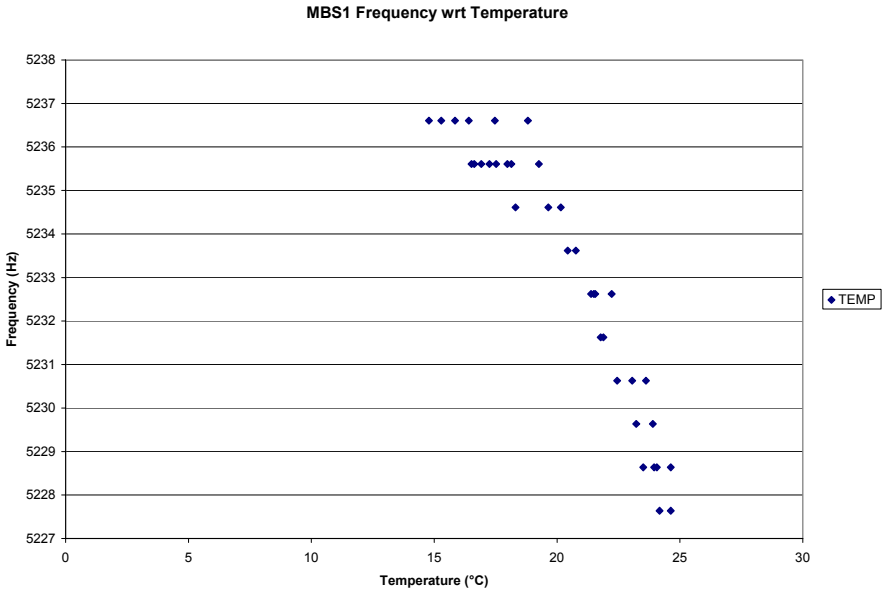

Figure 47 MBS1 Frequency wrt Temperature

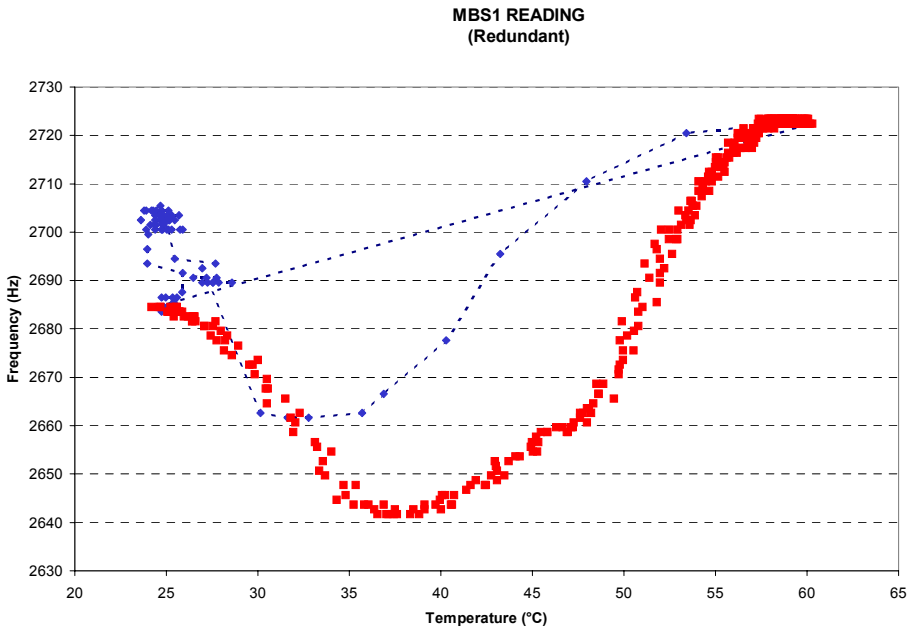

Figure 48 MBS1 Frequency wrt temperature in Normal Acquisition and heating @ Commissioning (April '04)

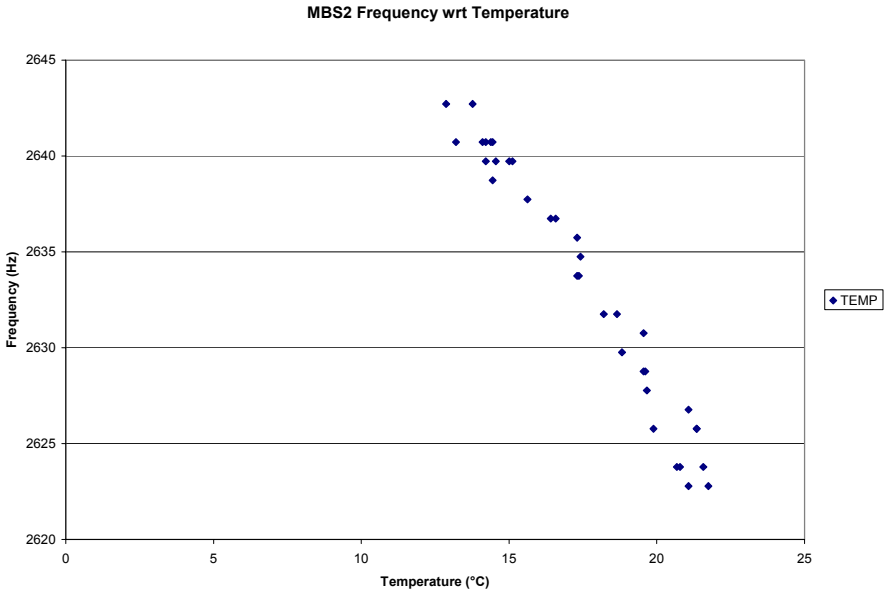

Figure 49 MBS2 Frequency wrt Temperature

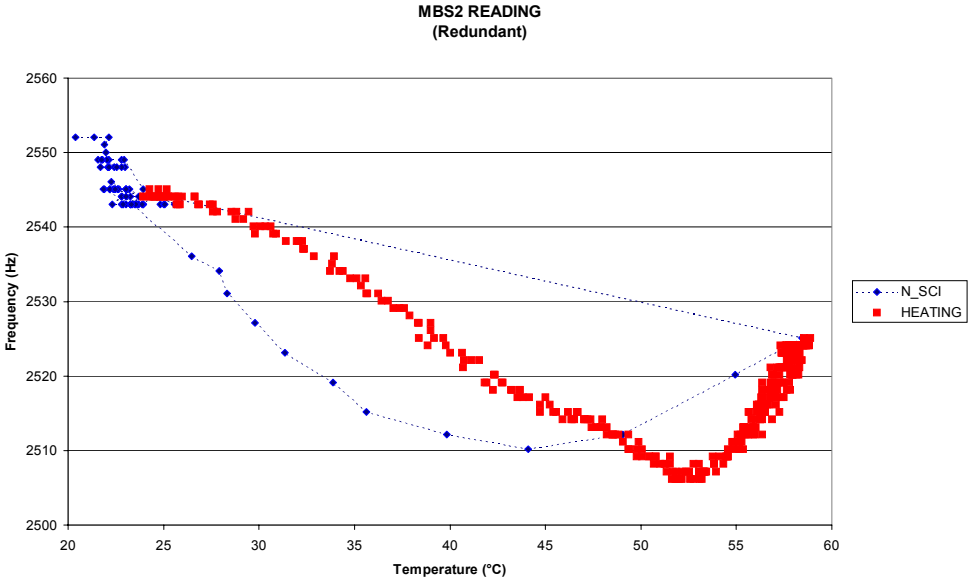

Figure 50 MBS2 Frequency wrt temperature in Normal Acquisition and heating @ Commissioning (April '04)

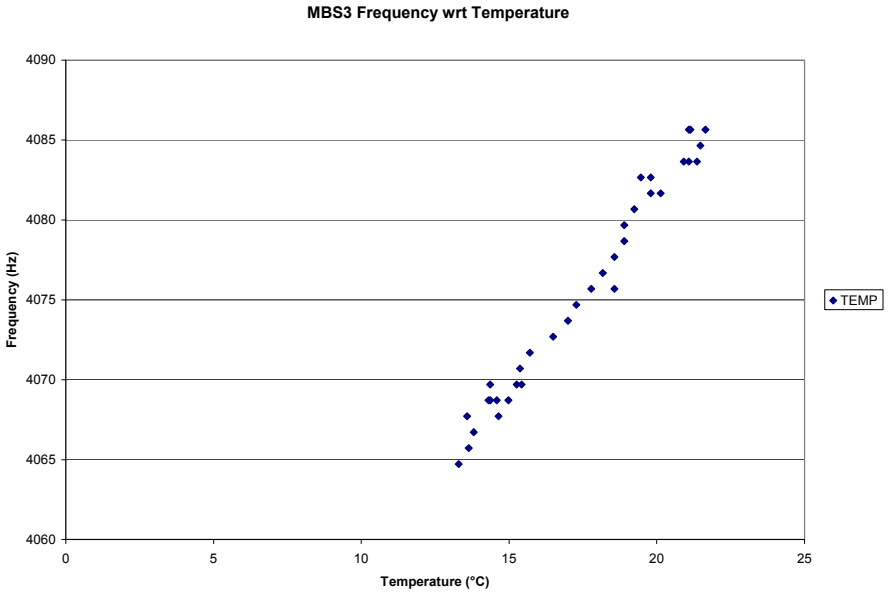

Figure 51 MBS3 Frequency wrt Temperature

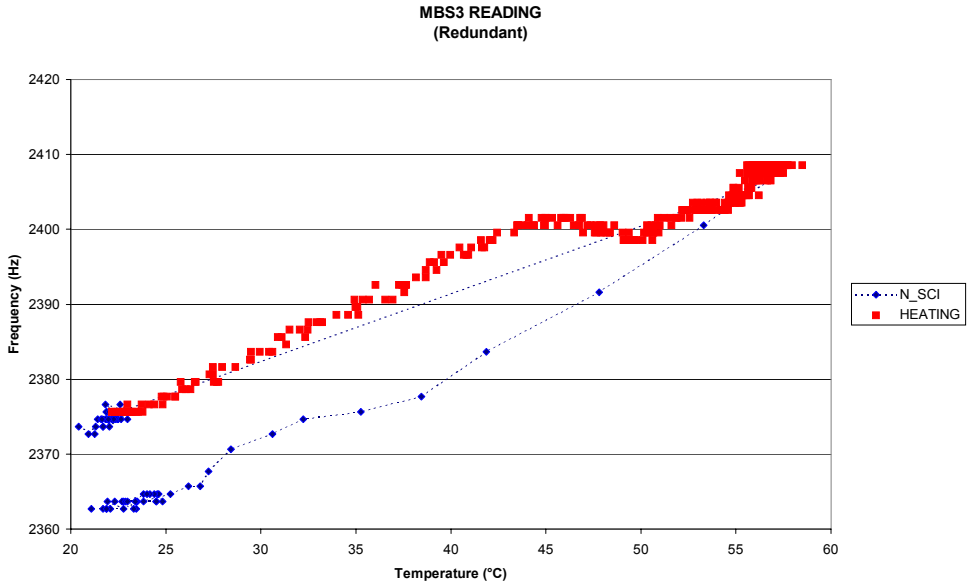

Figure 52 MBS3 Frequency wrt temperature in Normal Acquisition and heating @ Commissioning (April '04)

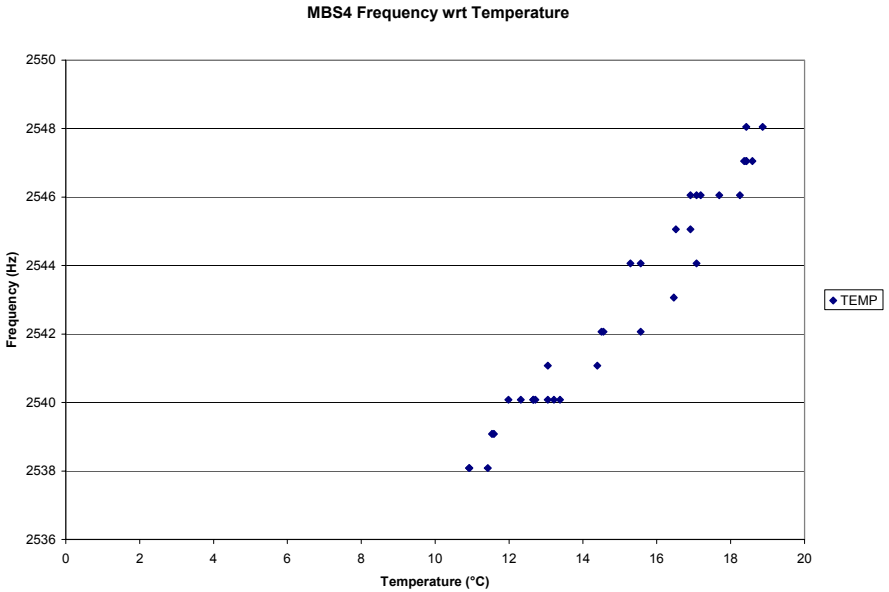

Figure 53 MBS4 Frequency wrt Temperature

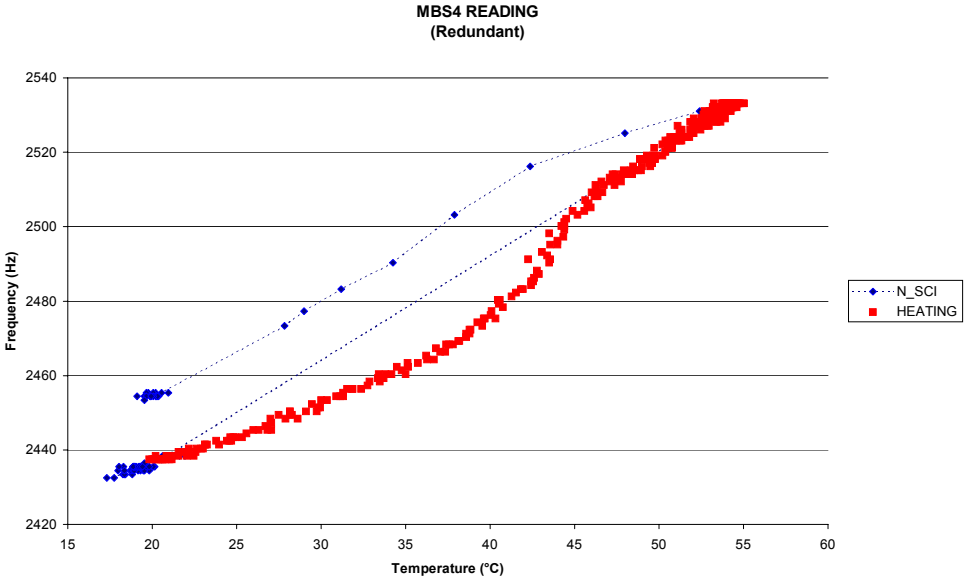

Figure 54 MBS4 Frequency wrt temperature in Normal Acquisition and heating @ Commissioning (April '04)

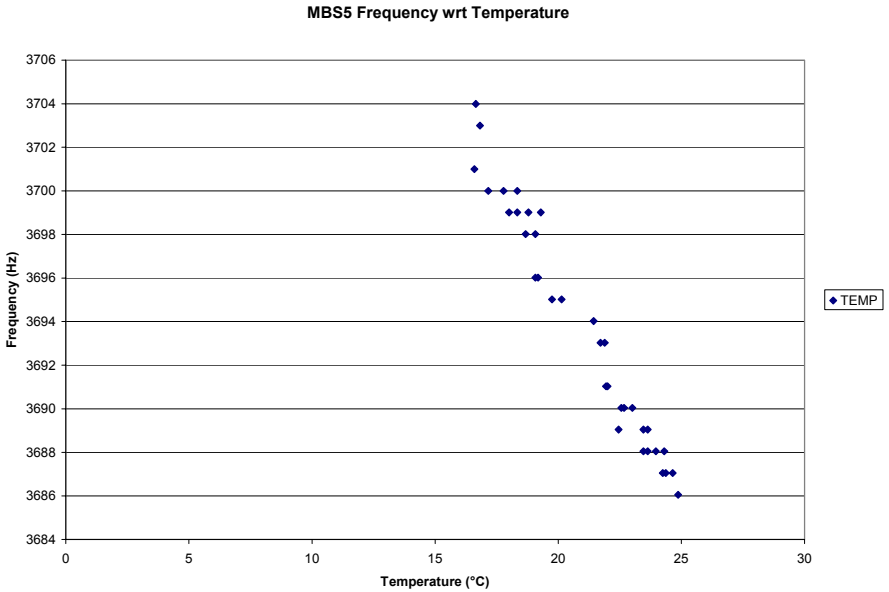

Figure 55 MBS5 Frequency wrt Temperature

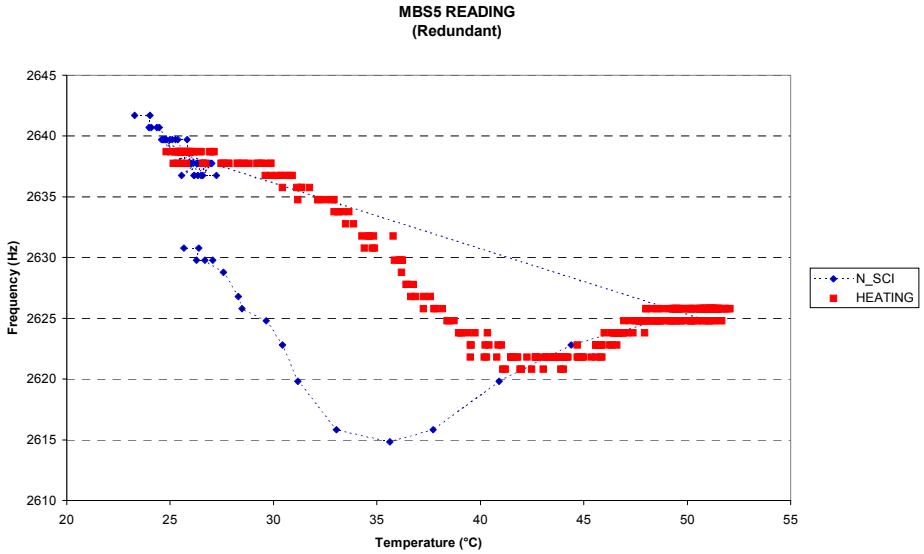

Figure 56 MBS5 Frequency wrt temperature in Normal Acquisition and heating @ Commissioning (April '04

5.2.3.4 Housekeeping signals in science packets

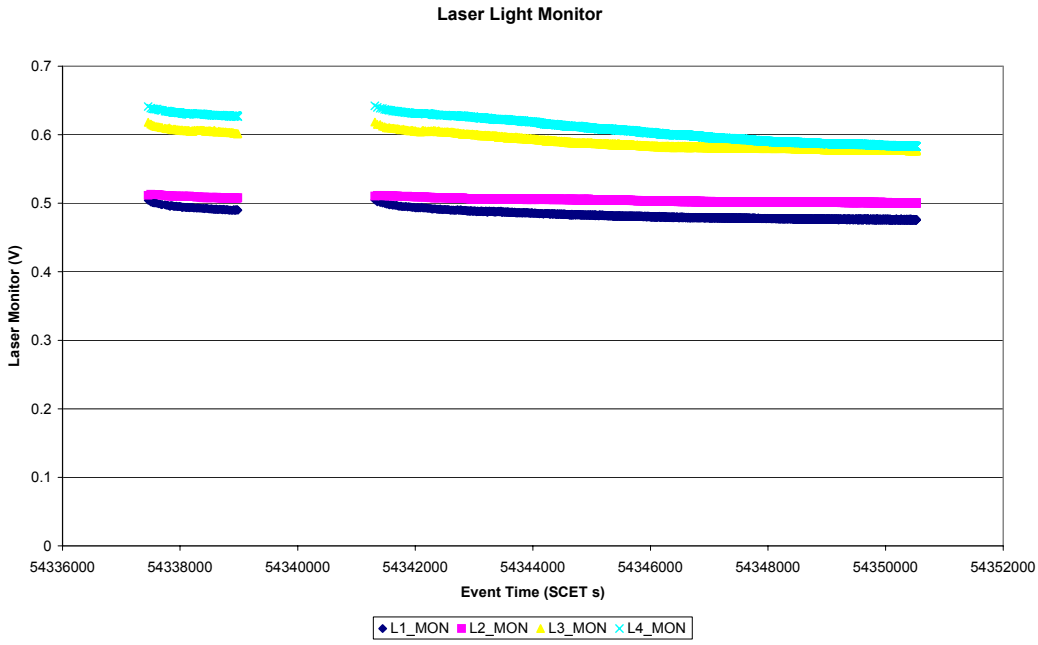

Figure 57 Laser lights monitor (Normal science packet)

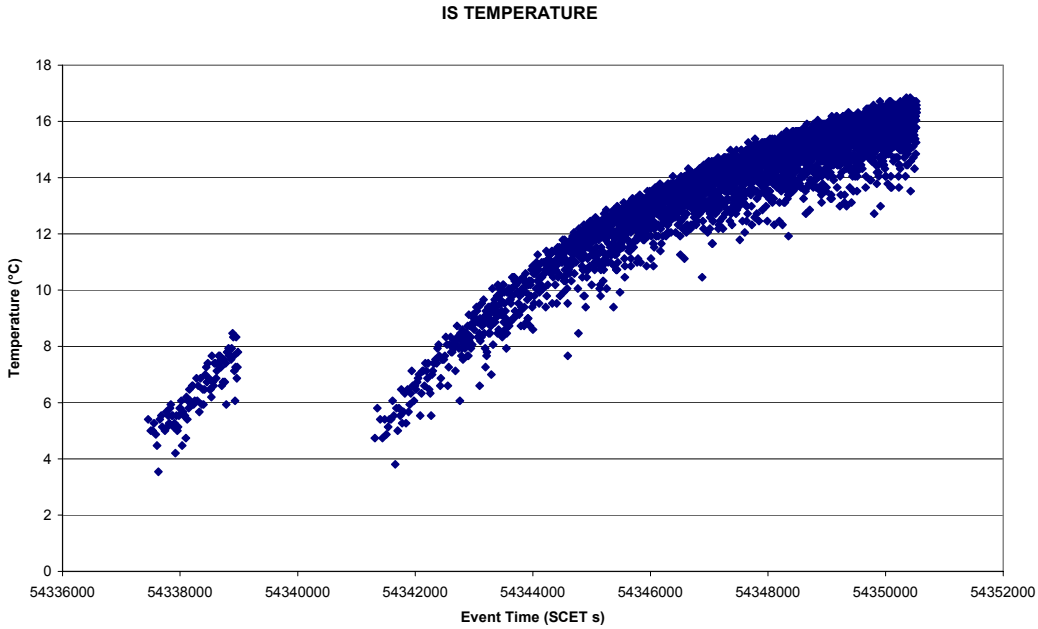

Figure 58 IS temperature (Normal science packet)

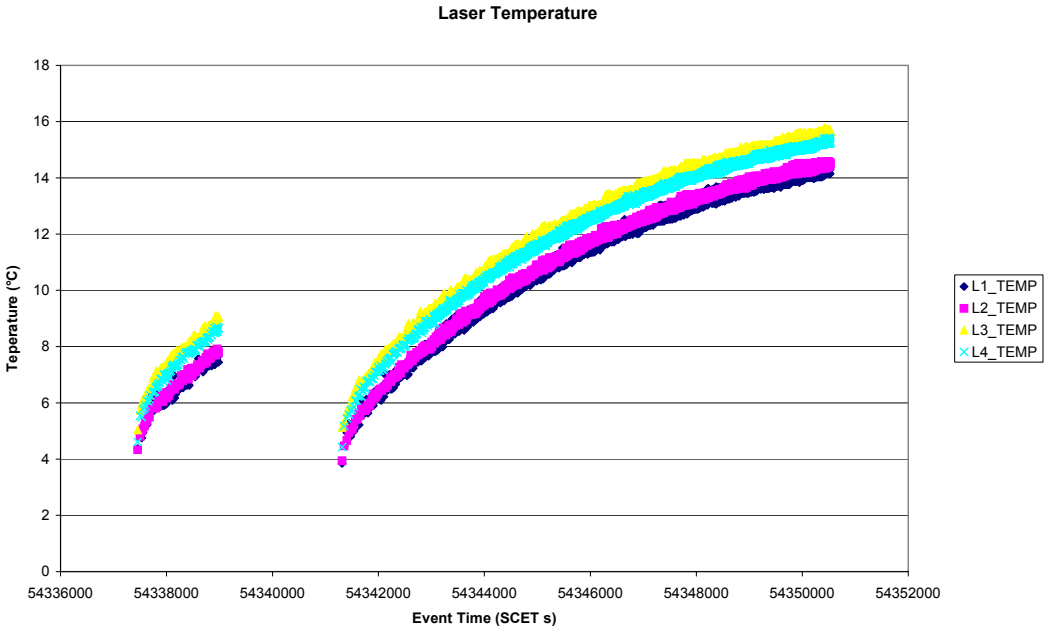

Figure 59 Lasers temperatures (Normal science packet)

6. CONCLUSION

According to the above data elaboration and results, the following conclusions can be drown about the Interference test - Part 1A:

- The 1st GIADA switch-on of the Interference scenario 1A, was made successfully; in particular it has been observed that:
  - The TM were correctly received and only few missing packets were (sporadically) observed (in total: 6 on science and one (17,2) service report at switch-on), but for the first 210 **science packets that were lost because their download occurred during the New-Norcia station stop of tracking.** No saturation of the SSMM memory allocated for GIADA (1 Mbytes) was observed.
  - The internal (Impact Sensor, Laser and Power Supply) and external (Frangibolt and MBS) temperatures were in the nominal range, as well as the current consumption during all the phases of the test. The GIADA cover was correctly open and closed (cover close operations were successfully repeated twice!).
  - One not-acceptance report was received before GIADA power-off, since the 'go to Safe' TC was sent twice (as expected in the ITL sequence), the second TC was correctly refused by GIADA.
  - The Impact sensor (IS) and GDS right receiver have produced no 'ghost events'. The GDS left receiver still produces 'ghost events', due to internal stray-light (refer to GIA-GAL-RP-517 – GIADA Report @ 1st Commissioning) in combination with internal electronics noise. It presents **a slightly larger average value of the scattered light** (measured at the end of the receiver chain) with respect to the 1st Commissioning. This is the reason of the higher production rate of the GDS ghost event (and consequently of the science data) with respect to the 1st Commissioning. For the MBS, **comparing the frequency acquisition during this test with those at the first commissioning, a significant increase of frequency of the MBS1, MBS3 and MBS5 is observed.**
- The 2nd GIADA Main I/F switch-on was correctly performed, however it has been observed that:
  - The TM were correctly received along nine hours of the test and only few packets were sporadically missed, but for the 145 Housekeeping reports plus few Acknowledge reports **that were lost because their download occurred during the New-Norcia station stop of tracking** (22:05:24 to 22:29.34 local time of 20th of September). The GIADA cover was correctly open and closed (cover close operations were successfully repeated twice!).
  - One not-acceptance report was received before GIADA power-off, since the 'go to Safe' TC was sent twice (as expected in the ITL sequence), the 2nd TC was correctly refused by GIADA.

- The internal (Impact Sensor, Laser and Power Supply) and external (Frangibolt and MBS) temperatures were in the nominal range, as well as the current consumption during all the phase of the test. **The current consumption measured in Normal mode for +15V and –15V is about 450mA and 295mA respectively. These values are consistent with previous 1st Commissioning test and on-ground TV test (GIA-GAL-TR-527).**
- As expected, it is observed that the Laser light is decreasing when the temperature is increasing. No Dust Flux indication (i.e., greater than 0) is observed, but for one minute period after the sensor switch-on, performed by means of the internal relay, in which - as understood on ground - few IS ghost events can be observed (Dust Flux indication was one). After GIADA enters in Normal Mode and science TM is enabled, a flood of TM packets (from a range of 1 packet every 7.5 s, at the begin of test, to 1 packet every 1.3 s, at the end of the test) is received after the lasers are switched on. In this condition, several GDS 'ghost detections' on Left receiver are found (GDS production rate is detailed in Section 5.2.3.2) due to the level of the internal stray-light (background noise) in combination with electronic noise. Considering the SSMM down-link rate and this science data production rate, the SSMM file memory allocated for GIADA does not result saturated along all the test.
- The Impact sensor (IS) and GDS right receiver have produced no 'ghost events'. The IS sensor calibration is nominal and it is confirmed, as experienced during the 1st Commissioning, that the **Channel C voltage and delay time measurements are not stable** during the internal calibrations. The Channel E has not produced detections, as during 1st Commissioning, due to the gain configuration (low). In general IS channel outputs are stable along all the Interference part 1A test, as resulting from the noise level measured before the calibration start.
- The GDS left receiver seems more noisy when all the other payloads are switched-on and operating. The internal stray-light in combination with the electronics noise produces a flood of 'GDS Ghost detection' (science events) which increases from the start of the test (in which, GAIDA is switched with Consert only) to the end of the test (in which all the experiments are operating). Specific description is reported in Section 5.2.3.2.
- **The value of frequency for three of the MBS's (1, 3 & 5) is confirmed to be significantly higher then in the 1st Commissioning (April '04)**. This seems due to MBS in-flight contamination due to out gassing of volatile material. **The reasons of this change must be investigated deeper, together with other experiments/payloads that have observed similar situation and may require MBS heating at the next GIADA-on opportunity.** From the operational point of view, each MBS works as expected and the frequency dependence vs. temperature is consistent with the 1st commissioning data.

More in general, the following points should be considered as part of the next in-flight data analysis and recommendations for next tests:

- The GIADA internal stray-light (with or without electronics noise) is definitely higher than the detection threshold of the Left receiver. Depending on the down-link data rate, it can be possible to saturate the SSMM memory file allocated to GIADA and thus loosing important science data. **It is suggested, at next opportunity of S/C operation, to increase the detection threshold to 1.1-1.2V**.
- The behaviour of the MBS is changed from the 1st commissioning. It is suggested to monitor the variation of the reading frequencies with respect the temperature during the next tests and to perform **an MBS heating at the next GIADA-on opportunity.**

7. ATTACHEMENT A – GIADA ITL TIMELINE

INTERFERENCE 1A – 1st part
Executed on 20-September-2004
Pass: 20-September-2004 00: 18:30:00 - 24:00:00

```
GD_PWRON (COUNT = 1)  10:40:00          GIADA  OFF    AGDF001A ( \
                          VGD0001A = "Yes" [ENG])  # GIADA on Main IF
GD_PWRON (COUNT = 1)  10:42:00          GIADA  Safe   AGDF001B
GD_PWRON (COUNT = 1)  10:46:00          GIADA  Safe   AGDF001C
GD_EMISS (COUNT = 1)      11:10:00 GIADA          Safe          AGDS035A      # Goto Cover

Description: "Cover operations with possible vibrations"
GD_EMISS (COUNT = 1)      11:11:00 GIADA          Cover         AGDF090A      # Open Cover
GD_EMISS (COUNT = 1)      11:21:00 GIADA          Cover         AGDS065A      # Goto Safe
GD_EMISS (COUNT = 1)      11:22:00 GIADA          Safe    AGDS110A      # Goto Normal and enable Sci TM

Description: "Switch off GIADA to reduce HK data-volume for scenario"

GD_EMISS (COUNT = 1)      11:55:00  GIADA          Normal        AGDS065A      # Goto Safe
GD_EMISS (COUNT = 1)      11:56:00  GIADA          Safe    AGDS035A      # Goto Cover
GD_EMISS (COUNT = 1)      11:57:00  GIADA          Cover         AGDF070A      # Close Cover
GD_EMISS (COUNT = 1)      12:10:00  GIADA          Cover         AGDS065A      # Goto Safe
GD_PWROFF (COUNT = 1)     12:11:00 GIADA  SAFE          AGDF060A      # Safe Mode and OFF via OBCP
```

INTERFERENCE 1A – 2nd part
Executed on 20-September-2004
Pass: 20-September-2004 00:00: 18:30:00 - 24:00:00

```
GD_PWRON (COUNT = 2)  21:00:00          GIADA  OFF    AGDF001A ( \
                          VGD0001A = "Yes" [ENG])  # GIADA on Main IF
GD_PWRON (COUNT = 2)  21:02:00          GIADA  Safe   AGDF001B
GD_PWRON (COUNT = 2)  21:06:00          GIADA  Safe   AGDF001C
GD_EMISS (COUNT = 2)      21:30:00 GIADA          Safe          AGDS035A      # Goto Cover

Description: "Cover operations with possible vibrations"
GD_EMISS (COUNT = 2)      21:31:00 GIADA          Cover         AGDF090A      # Open Cover
GD_EMISS (COUNT = 2)      21:41:00 GIADA          Cover         AGDS065A      # Goto Safe
GD_EMISS (COUNT = 2)      21:42:00 GIADA          Safe    AGDS110A      # Goto Normal and enable Sci TM
GD_EMISS (COUNT = 2)      22:10:00 GIADA          Normal        AGDS065A      # Goto Safe
GD_SUSC (COUNT = 1)       22:46:00 GIADA          Safe    AGDS110A      # Goto Normal and enable Sci TM

Description: "Execute the Calibrate IS, GDS, MBS TC Seq every 6 minutes"
```

Description: "during all the time of this test phase, i.e. up to Goto Safe TC Seq"

2,5 hours of susceptible operations should be scheduled = 150 min/6 = 25 calibrations

```
GD_SUSC (COUNT = 1)     23:00:00 GIADA     NORMAL     AGDS120A ( \
                                           VGDS0010 = 0xF8 \
                                           VGDS0011 = 0x04 \  # Calibrate IS, GDS, MBS
                                           REPEAT = 25 \
                                           SEPARATION = 00:06:00 )
GD_SUSC (COUNT = 1)     23:06:00 GIADA     NORMAL     AGDS120A ( \
                                           VGDS0010 = 0xF8 \
                                           VGDS0011 = 0x04 \  # Calibrate IS, GDS, MBS
GD_SUSC (COUNT = 1)     23:12:00 GIADA     NORMAL     AGDS120A ( \
                                           VGDS0010 = 0xF8 \
                                           VGDS0011 = 0x04 \  # Calibrate IS, GDS, MBS
GD_SUSC (COUNT = 1)     23:18:00 GIADA     NORMAL     AGDS120A ( \
                                           VGDS0010 = 0xF8 \
                                           VGDS0011 = 0x04 \  # Calibrate IS, GDS, MBS
GD_SUSC (COUNT = 1)     23:24:00 GIADA     NORMAL     AGDS120A ( \
                                           VGDS0010 = 0xF8 \
                                           VGDS0011 = 0x04 \  # Calibrate IS, GDS, MBS
GD_SUSC (COUNT = 1)     23:30:00 GIADA     NORMAL     AGDS120A ( \
                                           VGDS0010 = 0xF8 \
                                           VGDS0011 = 0x04 \  # Calibrate IS, GDS, MBS
GD_SUSC (COUNT = 1)     23:36:00 GIADA     NORMAL     AGDS120A ( \
                                           VGDS0010 = 0xF8 \
                                           VGDS0011 = 0x04 \  # Calibrate IS, GDS, MBS
GD_SUSC (COUNT = 1)     23:42:00 GIADA     NORMAL     AGDS120A ( \
                                           VGDS0010 = 0xF8 \
                                           VGDS0011 = 0x04 \  # Calibrate IS, GDS, MBS
GD_SUSC (COUNT = 1)     23:48:00 GIADA     NORMAL     AGDS120A ( \
                                           VGDS0010 = 0xF8 \
                                           VGDS0011 = 0x04 \  # Calibrate IS, GDS, MBS
GD_SUSC (COUNT = 1)     23:54:00 GIADA     NORMAL     AGDS120A ( \
                                           VGDS0010 = 0xF8 \
                                           VGDS0011 = 0x04 \  # Calibrate IS, GDS, MBS
```

INTERFERENCE 1A – 2nd part (CONT'D)
Executed 21-September-2004
Pass on 21-September-2004: 00:00:00 - 02:45:00

```
GD_SUSC (COUNT = 1)     00:00:00 GIADA     NORMAL     AGDS120A ( \
                                           VGDS0010 = 0xF8 \
                                           VGDS0011 = 0x04 \  # Calibrate IS, GDS, MBS
```

```
GD_SUSC (COUNT = 1)     00:06:00 GIADA      NORMAL          AGDS120A ( \
                                            VGDS0010 = 0xF8 \
                                            VGDS0011 = 0x04 \  # Calibrate IS, GDS, MBS
GD_SUSC (COUNT = 1)     00:12:00 GIADA      NORMAL          AGDS120A ( \
                                            VGDS0010 = 0xF8 \
                                            VGDS0011 = 0x04 \  # Calibrate IS, GDS, MBS
GD_SUSC (COUNT = 1)     00:18:00 GIADA      NORMAL          AGDS120A ( \
                                            VGDS0010 = 0xF8 \
                                            VGDS0011 = 0x04 \  # Calibrate IS, GDS, MBS
GD_SUSC (COUNT = 1)     00:24:00 GIADA      NORMAL          AGDS120A ( \
                                            VGDS0010 = 0xF8 \
                                            VGDS0011 = 0x04 \  # Calibrate IS, GDS, MBS
GD_SUSC (COUNT = 1)     00:30:00 GIADA      NORMAL          AGDS120A ( \
                                            VGDS0010 = 0xF8 \
                                            VGDS0011 = 0x04 \  # Calibrate IS, GDS, MBS
GD_SUSC (COUNT = 1)     00:36:00 GIADA      NORMAL          AGDS120A ( \
                                            VGDS0010 = 0xF8 \
                                            VGDS0011 = 0x04 \  # Calibrate IS, GDS, MBS
GD_SUSC (COUNT = 1)     00:42:00 GIADA      NORMAL          AGDS120A ( \
                                            VGDS0010 = 0xF8 \
                                            VGDS0011 = 0x04 \  # Calibrate IS, GDS, MBS
GD_SUSC (COUNT = 1)     00:48:00 GIADA      NORMAL          AGDS120A ( \
                                            VGDS0010 = 0xF8 \
                                            VGDS0011 = 0x04 \  # Calibrate IS, GDS, MBS
GD_SUSC (COUNT = 1)     00:54:00 GIADA      NORMAL          AGDS120A ( \
                                            VGDS0010 = 0xF8 \
                                            VGDS0011 = 0x04 \  # Calibrate IS, GDS, MBS
GD_SUSC (COUNT = 1)     01:00:00 GIADA      NORMAL          AGDS120A ( \
                                            VGDS0010 = 0xF8 \
                                            VGDS0011 = 0x04 \  # Calibrate IS, GDS, MBS
GD_SUSC (COUNT = 1)     01:06:00 GIADA      NORMAL          AGDS120A ( \
                                            VGDS0010 = 0xF8 \
                                            VGDS0011 = 0x04 \  # Calibrate IS, GDS, MBS
GD_SUSC (COUNT = 1)     01:12:00 GIADA      NORMAL          AGDS120A ( \
                                            VGDS0010 = 0xF8 \
                                            VGDS0011 = 0x04 \  # Calibrate IS, GDS, MBS
GD_SUSC (COUNT = 1)     01:18:00 GIADA      NORMAL          AGDS120A ( \
                                            VGDS0010 = 0xF8 \
                                            VGDS0011 = 0x04 \  # Calibrate IS, GDS, MBS
GD_SUSC (COUNT = 1)     01:24:00 GIADA      NORMAL          AGDS120A ( \
                                            VGDS0010 = 0xF8 \
```

VGDS0011 = 0x04 \ # Calibrate IS, GDS, MBS

GD_SUSC (COUNT = 1) 01:30:00 GIADA Normal AGDS065A # Goto Safe

GD_SUSC (COUNT = 1) 01:31:00 GIADA Safe AGDS035A # Goto Cover

GD_SUSC (COUNT = 1) 01:32:00 GIADA Cover AGDF070A # Close Cover

GD_SUSC (COUNT = 1) 01:45:00 GIADA Cover AGDS065A # Goto Safe

GD_PWROFF (COUNT = 2) 02:00:00 GIADA SAFE AGDF060A # Safe Mode and OFF via OBCP

INTERFERENCE 1B
Executed 21-September-2004
Pass on 21-September-2004: 18:30:00 - 24:00:00

GD_PWRON (COUNT = 3) 17:00:00 GIADA OFF AGDF001A (\

VGD0001A = "Yes" [ENG]) # GIADA on Main IF

GD_PWRON (COUNT = 3) 17:02:00 GIADA Safe AGDF001B

GD_PWRON (COUNT = 3) 17:06:00 GIADA Safe AGDF001C

GD_SUSC (COUNT = 2) 17:30:00 GIADA Safe AGDS035A # Goto Cove

Description: "Cover operations with possible vibrations"

GD_SUSC (COUNT = 2) 17:31:00 GIADA Cover AGDF090A # Open Cove

GD_SUSC (COUNT = 2) 17:41:00 GIADA Cover AGDS065A # Goto Safe

GD_SUSC (COUNT = 2) 17:46:00 GIADA Safe AGDS110A # Goto Normal and enable Sci TM

Description: "Execute the Calibrate IS, GDS, MBS TC Seq every 6 minutes"

Description: "during all the time of this test phase, i.e. up to Goto Safe TC Seq"

5 hours of susceptible operations should be scheduled = 300 min/6 = 50 calibrations

GD_SUSC (COUNT = 2) 18:00:00 GIADA NORMAL AGDS120A (\

VGDS0010 = 0xF8 \

VGDS0011 = 0x04 \ # Calibrate IS, GDS, MBS

REPEAT = 50 \

SEPARATION = 00:06:00)

..... x9 .....

GD_SUSC (COUNT = 2) 19:00:00 GIADA NORMAL AGDS120A (\

VGDS0010 = 0xF8 \

VGDS0011 = 0x04 \ # Calibrate IS, GDS, MBS

..... x9 .....

GD_SUSC (COUNT = 2) 20:00:00 GIADA NORMAL AGDS120A (\

VGDS0010 = 0xF8 \

VGDS0011 = 0x04 \ # Calibrate IS, GDS, MBS

..... x9 .....

```
GD_SUSC (COUNT = 2)     21:00:00 GIADA          NORMAL                  AGDS120A ( \
                                                VGDS0010 = 0xF8 \
                                                VGDS0011 = 0x04 \  # Calibrate IS, GDS, MBS
```

..... x9 .....

```
GD_SUSC (COUNT = 2)     22:00:00 GIADA  NORMAL                  AGDS120A ( \
                                                VGDS0010 = 0xF8 \
                                                VGDS0011 = 0x04 \  # Calibrate IS, GDS, MBS
```

..... x8

```
GD_SUSC (COUNT = 2)     22:54:00 GIADA  NORMAL                  AGDS120A ( \
                                                VGDS0010 = 0xF8 \
                                                VGDS0011 = 0x04 \  # Calibrate IS, GDS, MBS

GD_SUSC (COUNT = 2)     23:00:00 GIADA  Normal          AGDS065A        # Goto Safe
```

INTERFERENCE 1B (CONT'D)
Executed 22-September-2004
Pass on 22-September-2004: 00:00:00 - 02:45:00 and 18:30:00 - 24:00:00

```
GD_EMISS (COUNT = 3)    00:12:00 GIADA  Safe            AGDS110A        # Goto Normal and enable Sci TM
GD_EMISS (COUNT = 3)    00:40:00 GIADA  Normal          AGDS065A        # Goto Safe
GD_SUSC (COUNT = 3)     01:16:00 GIADA  Safe            AGDS110A        # Goto Normal and enable Sci TM
```

Description: "Execute the Calibrate IS, GDS, MBS TC Seq every 6 minutes"
Description: "during all the time of this test phase, i.e. up to Goto Safe TC Seq"
12 minutes of susceptible operations should be scheduled = 12 min/6 = 2 calibrations

```
GD_SUSC (COUNT = 3)     01:30:00 GIADA  NORMAL                  AGDS120A ( \
                                                VGDS0010 = 0xF8 \
                                                VGDS0011 = 0x04 \  # Calibrate IS, GDS, MBS
                                                REPEAT = 2 \
                                                SEPARATION = 00:06:00 )
GD_SUSC (COUNT = 3)     01:36:00 GIADA  NORMAL                  AGDS120A ( \
                                                VGDS0010 = 0xF8 \
                                                VGDS0011 = 0x04 \  # Calibrate IS, GDS, MBS
GD_SUSC (COUNT = 3)     01:45:00 GIADA  Normal          AGDS065A        # Goto Safe
GD_SUSC (COUNT = 3)     01:46:00 GIADA  Safe            AGDS035A        # Goto Cover
```

GD_SUSC (COUNT = 3)	01:47:00	GIADA	Cover	AGDF070A	# Close Cover
GD_SUSC (COUNT = 3)	02:00:00	GIADA	Cover	AGDS065A	# Goto Safe
GD_PWROFF (COUNT = 3)	02:01:00	GIADA	SAFE	AGDF060A	# Safe Mode and OFF via OBCP