GIADA FS MODEL

No.	PAGES CLASSIFICATION
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55	TOTAL

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REVISIONS LOG

REV	DOCUMENT CHANGE ORDER	DATE	CHANGES DESCRIPTION	PREPARED
0	-	22-09-2004	First issue	M. Cosi & PI Team
1	-	28-10-2004	PI comments Added	M. Cosi & PI Team

1. SCOPE AND APPLICABILITY

1.1 SCOPE

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

This report concerns the Interference Part 1B in-flight commissioning activities performed on GIADA experiment in the period 21 - 22 September 2004.

1.2 APPLICABILITY

This report is applicable to GIADA FS model on board the Rosetta S/C flying @ about 74.2 x 10^6 km from the Earth (about 4 minutes of delay between the S/C and Earth in the radio link communication). The Rosetta S/C was 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
AD6	GIA-GAL-RP-518 Rev 1	GIADA FS MODEL REPORT OF IN-FLIGHT INTERFERENCE SCENARIO PART 1A (20 - 21 SEPT ‘04)

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	Istituto 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): Interference 1A (20 - 21 September) and Interference 1B (21 - 22 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 1B. The GIADA team (PI and GA) located in the INAF – Osservatorio di Capodimonte in Naples with the support of ESOC - RMOC, have started the activities @ 20:30 local time of 21 September.

TM is expected to start to arrive (at **New-Norcia** Ground Station) at 18.30 UTC (20:30 local time) of the 21 September and to finish at 02.45 UTC (04:45 local time) of the 22 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 GAIDA 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 TEST REPORT

5.1 INTERFERENCE SCENARIO 1B (21/09/04 TO 22/09/04)

5.1.1 Activities log

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

UTC	Description
21 Sep 2004 - 17:01	Beginning of activity – GIADA power on
21 Sep 2004 - 17:30	Cover open operation
21 Sep 2004 - 17:46	Go to Normal mode (science enabled)
21 Sep 2004 - 23:00	1st Science operation disabling – Go to Safe
22 Sep 2004 - 00:12	Go to Normal mode (science enabled)
22 Sep 2004 - 00:40	2nd Science operation disabling – Go to Safe
22 Sep 2004 - 01:16	Go to Normal mode (science enabled)
22 Sep 2004 - 01:45	Last Science operation disabling – Go to Safe
22 Sep 2004 - 01:46	GIADA goes in Cover mode and the cover is closed
22 Sep 2004 - 02:09	GIADA Switch-off (with automatic Cover close operation incorporated in the Power-off OBCP)

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 21st of September 2004 @ 17:01 (UTC time), which corresponds to a SCET Time of about 54406858 sec.

The first expected packet was 'lost' (Connection Report, service 17,2), because it was not synchronised and most probably time marked wrongly by DDS. In fact, it was received with a bad assigned time:

Tue Sep 21 2004 18:58:05.347528

TM Packet Received from GIADA:

APID = 90, 7 (EVENT)

Source Sequence Count: 0

Packet Length: 9

SCET Time: 2147483685.960938 sec.

Packet Type, Subtype: 17, 2

0D A7 C0 00 00 09 80 00 00 25 F6 00 40 11 02 00

==========

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 were nominally received and successfully dumped to ground via service 6,6 (the total number of Memory dump files received on-ground was 24). As result of the Context File patch, GIADA HK rate was changed to 10 s rate. GIADA remained in Safe mode until 17:30 (UTC time).

The next step was to open the cover. The operation was successfully completed @ 17:36 (UTC Time) when the Cover Report was received. Then GIADA was sent to Normal @ 17:46 (UTC Time) and science telemetry enabled. The Lasers were switched-on by the Laser_power_on OBCP, upon the reception of the 'Start Switch Lasers ON OBCP' event. The internal calibration of GDS, IS and MBS sub-systems was periodically performed every 6 minutes to check the instrument behaviour along the interference test.

The first 924 science packets were lost because the SSMM memory allocated to GIADA was saturated by the large amount of the science events from GDS Left Receiver ('Ghost detections'). **During the rest of the test, for the same reason, 708 more science TM packets were sporadically lost** (refers to section 5.1.3 for detailed analysis). No HK and ACK TM reports were lost.

The calculated average rate (over the entire production time) of the TM science packets is about one packet every 3.1s. **With such rate, the SSMM allocated GIADA buffer (1 Mbytes) should be saturated** (see sections 5.1.3 and 5.1.3.2 for details) **if the download rate does not allow to empty the memory**.

As expected for the Interference Part 1B scenario, GIADA was commanded in Safe mode @ 23:00 of 21st September for about one hour and 12 minutes with cover open and then, again, in Normal Mode for a limited period of 30 minutes, but without running any periodical calibration. The Laser were switched-on and science TM was enabled.

GIADA was again commanded in Safe mode (22nd of September 2004 00:40 - UTC Time) and again in Normal Mode @ 01:16 (UTC Time) with sub-systems periodical calibration every 6 minutes.

GIADA behaviour was nominal and after about 30 min the cover was successfully closed. GIADA was sent to Safe mode and switched-off by means of GIADA power-off OBCP, in which the cover was automatically closed again (with heaters Cover and Motor Heaters Off).

The Instrument was switched-off @ about 02:09:04 of the 22 Sep. 2004 (UTC Time).

5.1.2 Housekeeping data analysis

The following figures report HK data.

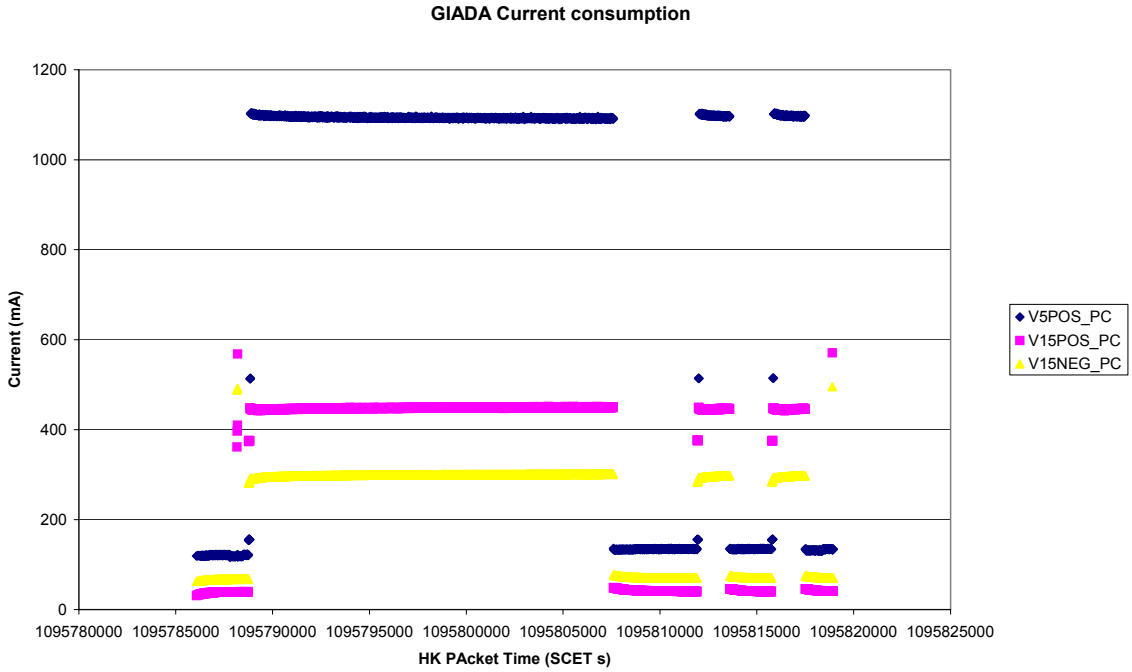

Figure 1 +5V and ±15V Currents

The current consumption (Figure 1) and the Power Supply temperatures (Figure 2) 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 tests and on-ground TV test (GIA-GAL-TR-527). The current consumption on the ±15V power lines is higher than in Normal mode when the cover heaters and the cover motor are activated.

The GIADA experiment behaved correctly along the test and the cover opened and closed at the right times (see Figure 8).

The Power Supply temperature (see Figure 2) increased from 5°C (@ power-on) up to 35°C at the end of the first period, when GIADA was in Normal mode and the maximum power was drawn. Then, GIADA returned in Safe mode and the PS temperature decreased to the TRP value, until GIADA returned in Normal mode (this happened twice). The IS temperature reached about 15°C when GIADA was in Normal mode, even when the cover was open. When the lasers were switched on, the IS temperature reading became noisy (data are spread within 3°C) with respect to GIADA in safe mode. This behaviour was also noticed during on-ground test.

The Lasers were properly switched-on (see Figure 7 for light behaviour) and their temperatures (see Figure 4) increased from 2°C to 14°C at the end of the first period in Normal mode. As expected, the light of each laser decreases when the temperature rises.

No Dust Flux indication (i.e., greater than 0) is observed (see Figure 6), 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).

The five MBS, after switch-on, show a temperature between 5 and 25°C (see Figure 5). **No missing packets have been found in the TM** (see Figure 9)**.**

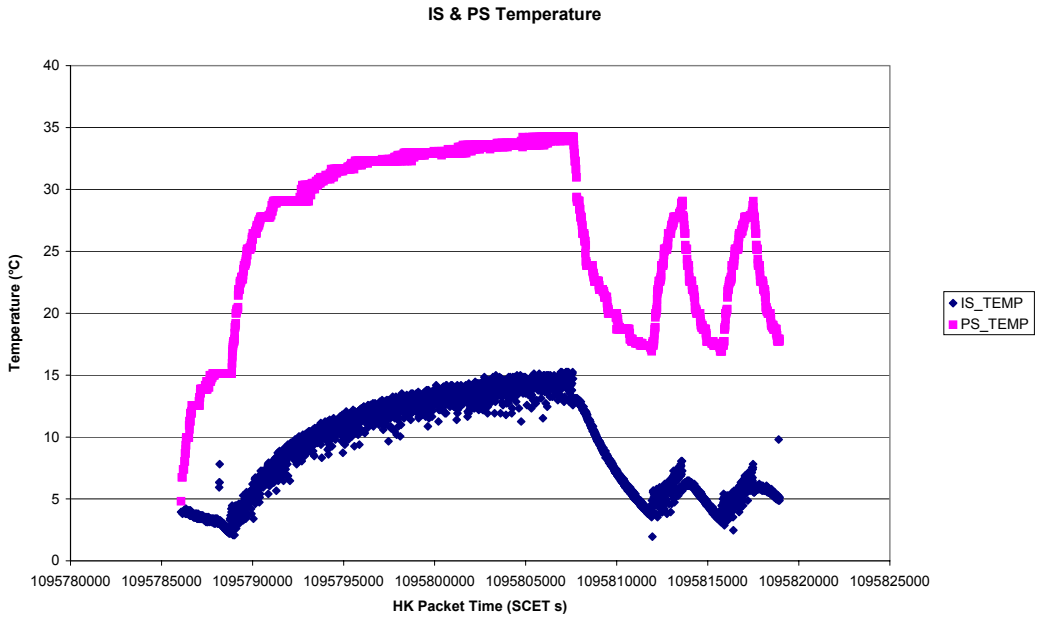

Figure 2 IS & PS Temperatures

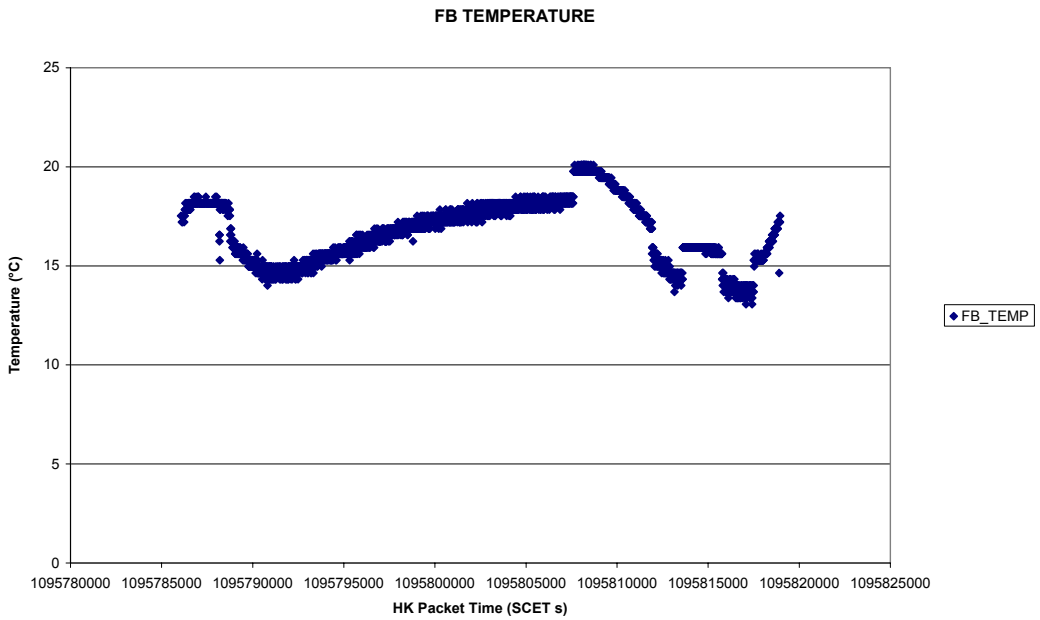

Figure 3 Frangibolt Temperature

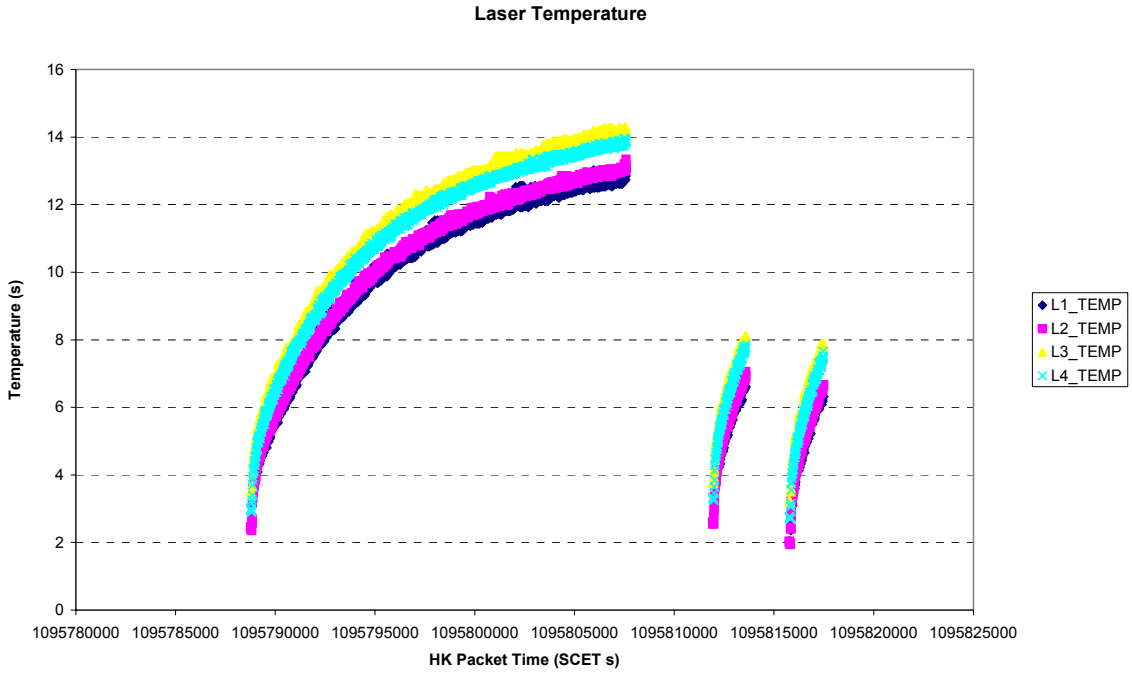

Figure 4 Laser temperatures

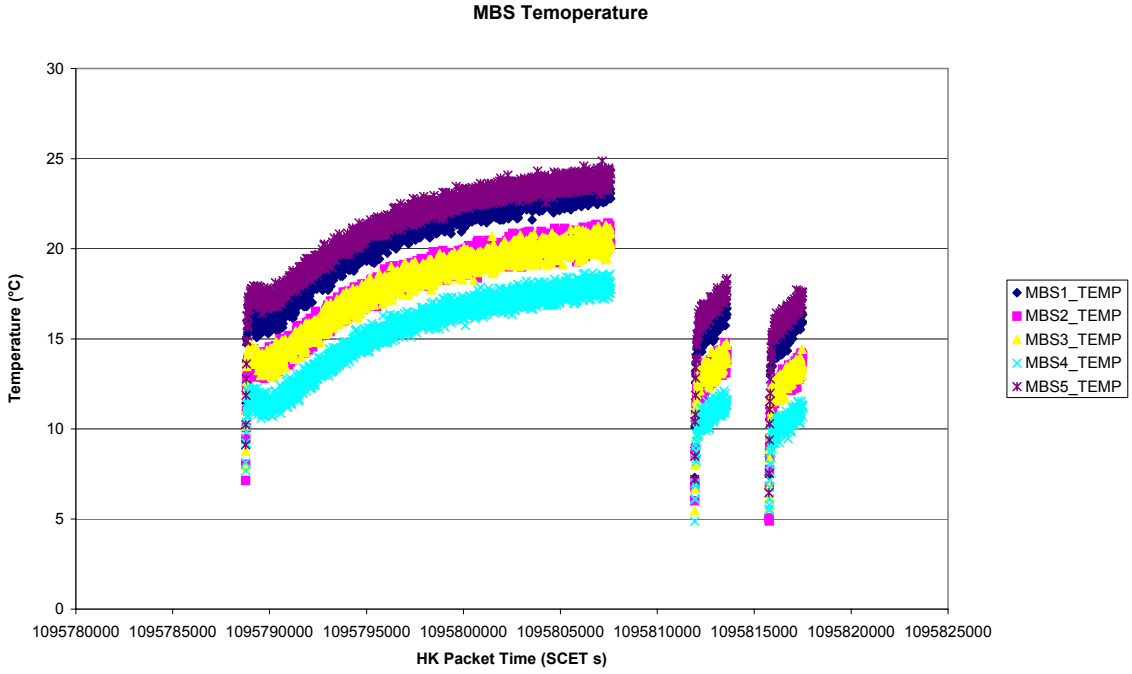

Figure 5 MBS Temperature

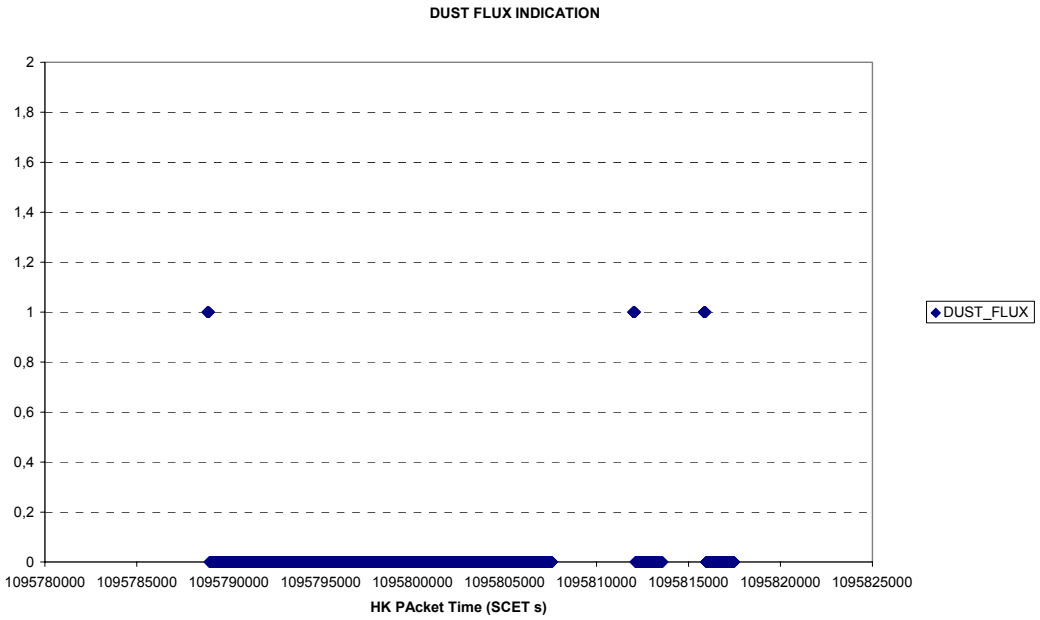

Figure 6 Dust-Flux Monitor (valid only when the IS sub-system is ON)

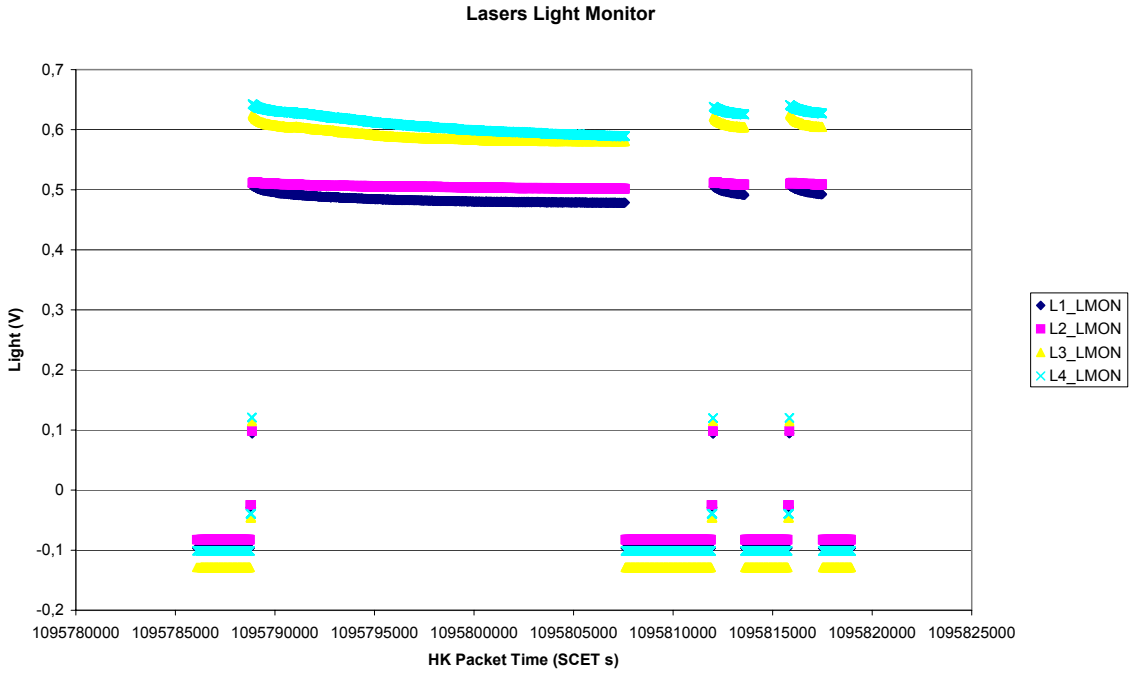

Figure 7 Lasers Light Monitor

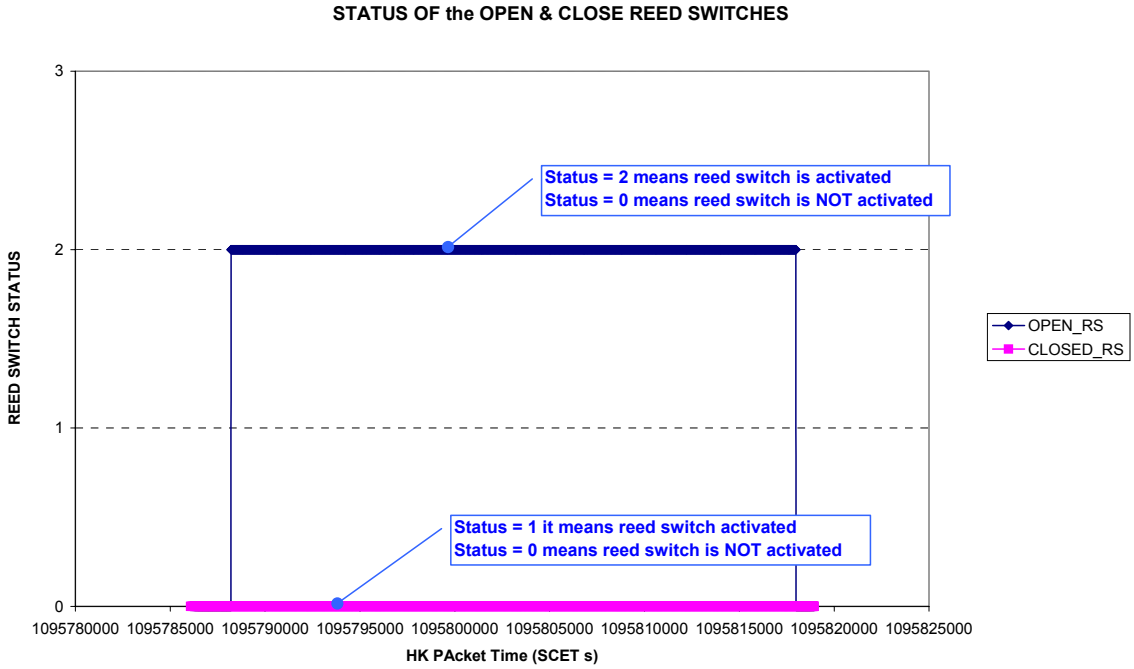

Figure 8 Cover Reed Switch Status (Cover open & close operations)

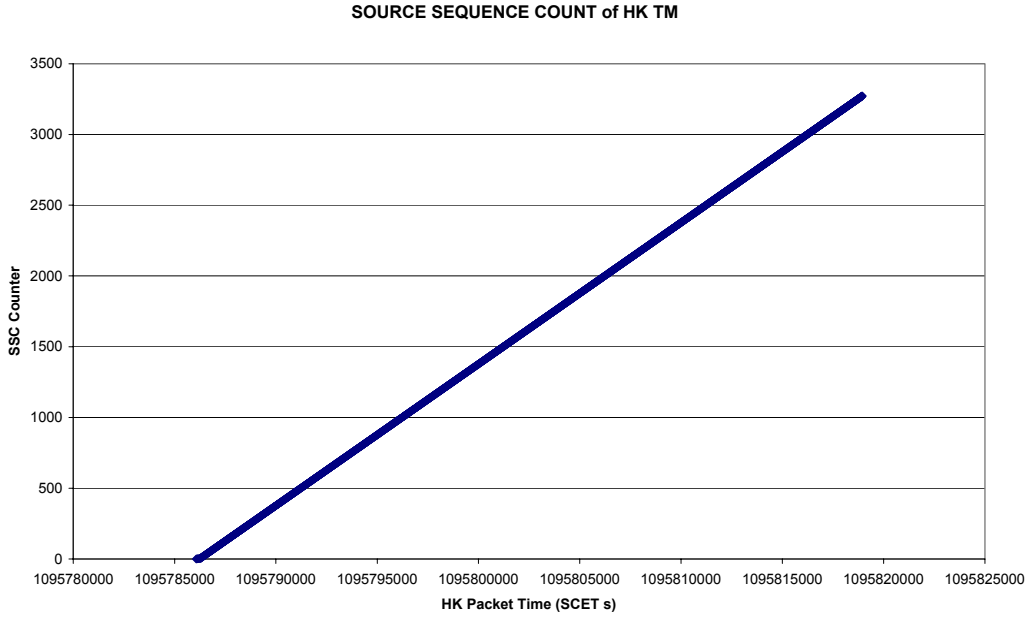

Figure 9 SSC of HK TM

5.1.2.1 Cover open operations

After the cover open operation, the cover resulted completely open, as shown in

Figure 10, where 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 10, 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 performed in the Interference Part 1A, when the cover bounced due to repeated closing procedure. It is suggested to avoid this by skipping the cover close command in the sequence prior to start power-off OBCP.

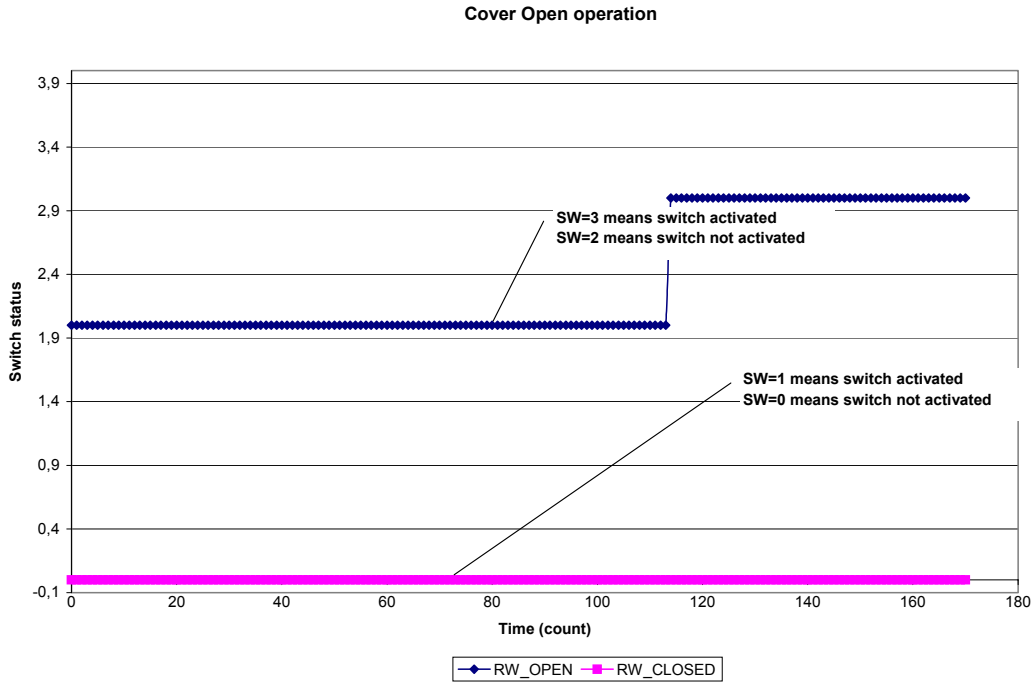

Figure 10 Reed switches status during the Cover Open operation

5.1.2.2 Cover close operations

After the completion of the Interference Part 1B tests, the cover was successfully closed by command @ SCET time of 54438768 s. Figure 11 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.

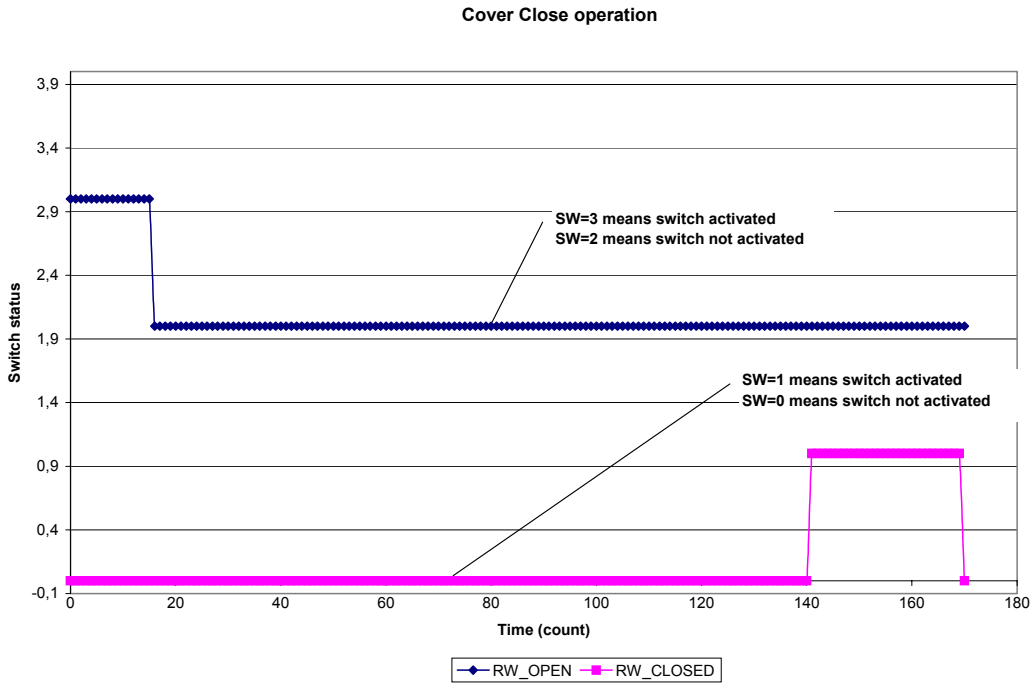

Figure 11 Reed switches status during Cover Close operation

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 12, 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.

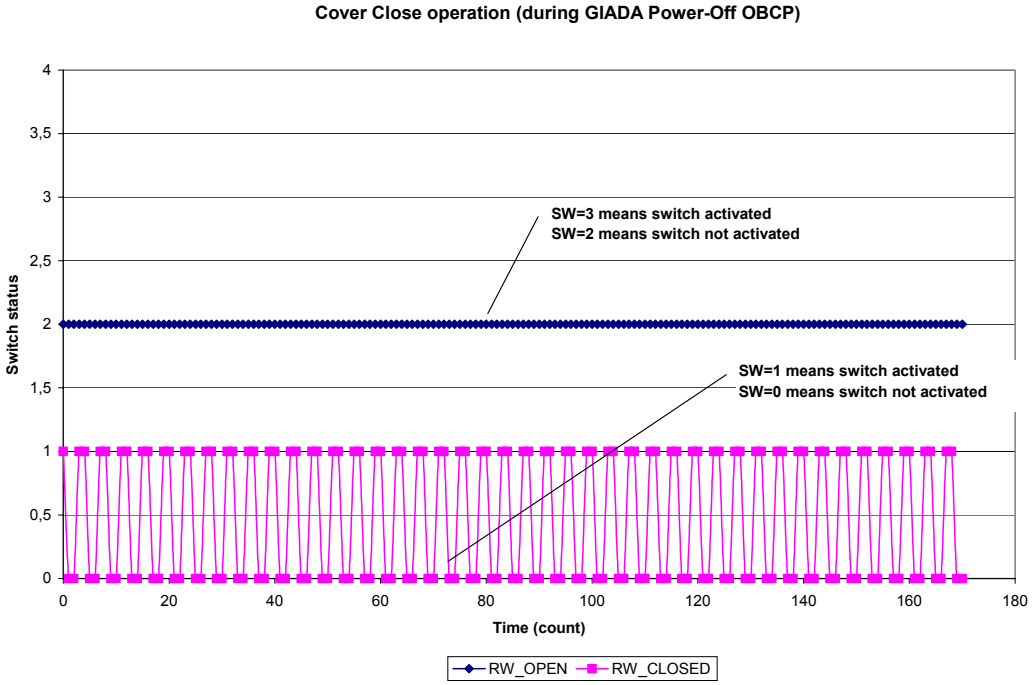

Figure 12 Reed switches status during Cover Close 2nd operation @ power-off

5.1.3 Engineering evaluation on sensor data

Many science TM packets were lost since the allocated SSMM buffer resulted full before the download was started.

Figure 13 shows the SSC of TM packets when GIADA is in Normal mode and science TM is enabled. At the beginning, the Source Sequence Count (SSC) immediately jumps to 925, while at the end, the two discontinuities are due to GIADA in Safe mode so that no science TM packets were produced. After the lasers were switched on, a flood of TM packets, containing GDS 'ghost detections' on the Left receiver, was observed (GDS production rate is more deeply discussed in Section 5.1.3.2) due to the level of the internal stray-light (background noise) in combination with the electronic noise.

The SSMM downloading started about 2 hours after that GIADA entered in Normal mode. In the presence of the high 'Ghost events' production rate, the SSMM memory, allocated to GIADA (1 Mbytes), resulted full. Since the SSMM memory behaves as a circular buffer, the science packets which were produced @ the begin of the Normal mode were overwritten by real time new packets. With such mechanism, the first 924 packets were completely lost and until then the production rate resulted less than the down-link rate; some other TM packets were (sporadically) still lost. The total amount of lost packets is equal to 1632. The reading process of the SSMM is shown in Figure 14. When the number of lost packets becomes constant (i.e. 1632) it means that there are no more lost packets.

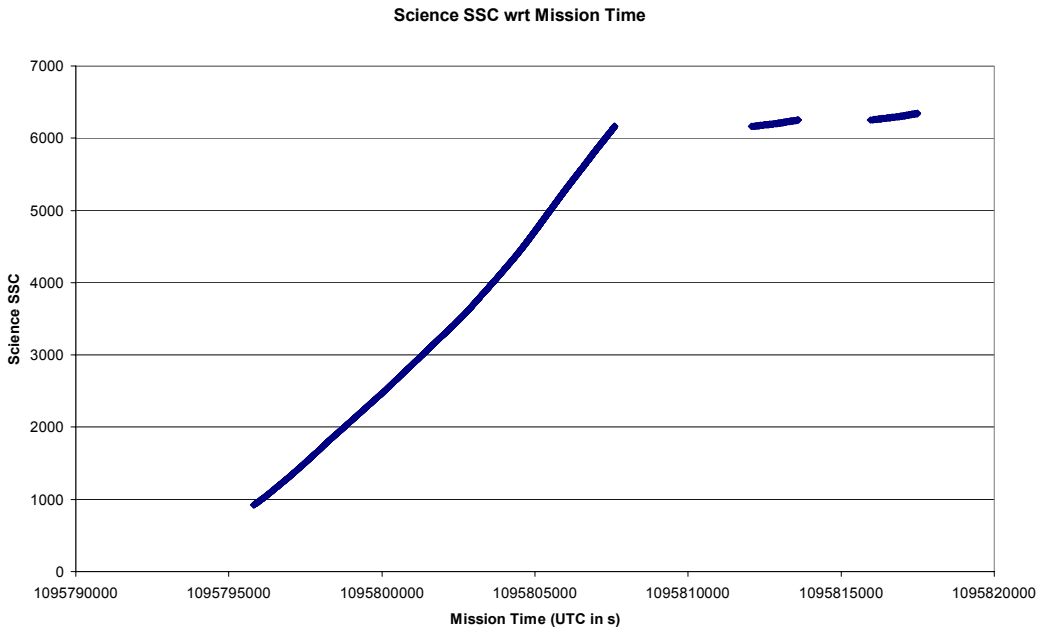

Figure 13 Science TM packet Source Sequence Count

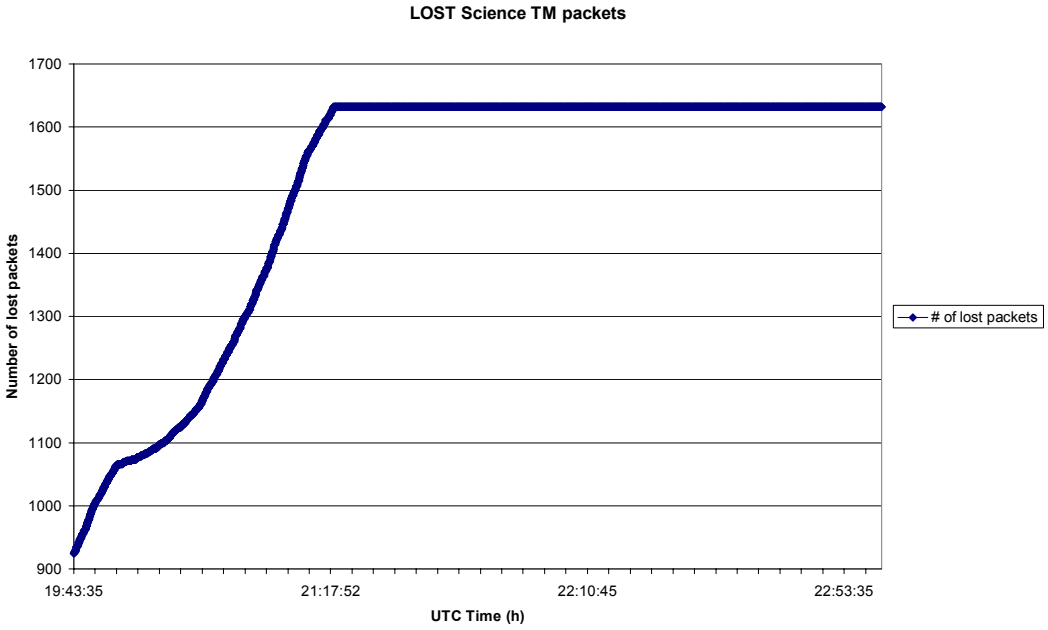

Figure 14 Number of lost science TM packets

To avoid future flood of 'Ghost events' and the potential loss of science TM due to the saturation of the SSMM memory allocated to GIADA (1 Mbytes), the detection threshold of GDS Left channel should be changed and increased up to 1.1-1.2V. Moreover, a larger SSMM memory shall be allocated to GIADA (of the order of 5-6 Mbytes).

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

CAL #	TIME	PZTA		PZTB		PZTC		PZTD		PZTE	
		MEAN	STD	MEAN	STD	MEAN	STD	MEAN	STD	MEAN	STD
1	54416864,3	-0,0078	0,0493	-0,0107	0,0638	-0,002	0,0551	-0,0107	0,0551	-0,0136	0,0435
2	54417224,3	-0,0078	0,0348	-0,0078	0,0232	-0,002	0,0348	-0,0107	0,0348	-0,0136	0,0232
3	54417584,3	-0,0078	0,0348	-0,0078	0	-0,002	0,0493	-0,0107	0,0609	-0,0136	0,0435
4	54417944,3	-0,0078	0,0435	-0,0107	0,0638	-0,002	0,0435	-0,0078	0,0493	-0,0136	0,0348
5	54418664,3	-0,0078	0	-0,0107	0,0638	-0,002	0,0435	-0,0107	0,0493	-0,0136	0,0493
6	54419024,3	-0,0078	0,0638	-0,0078	0,0493	-0,002	0,0435	-0,0107	0,0348	-0,0136	0,0232
7	54419384,4	-0,0078	0,0348	-0,0078	0,0232	-0,002	0,0435	-0,0078	0,0435	-0,0136	0,0348
8	54419744,3	-0,0049	0,0029	-0,0078	0	-0,002	0,0551	-0,0078	0,0232	-0,0136	0
9	54420343,8	-0,0107	0,0638	-0,0107	0,0609	-0,002	0,0609	-0,0107	0,0551	-0,0136	0,0435
10	54420824,3	-0,0107	0,0551	-0,0107	0,0551	-0,002	0,0348	-0,0107	0,0551	-0,0136	0,0232
11	54421184,3	-0,0078	0,0348	-0,0107	0,0609	-0,002	0,0435	-0,0107	0,0638	-0,0136	0,0435
12	54421544,3	-0,0078	0,0348	-0,0107	0,0638	-0,002	0,0435	-0,0107	0,0435	-0,0136	0,0435
13	54421903,4	-0,0107	0,0609	-0,0107	0,0638	-0,002	0,0232	-0,0107	0,0493	-0,0136	0,0493
14	54422624,3	-0,0078	0,0232	-0,0107	0,0638	-0,002	0,0435	-0,0107	0,0551	-0,0136	0
15	54422984,3	-0,0078	0,0551	-0,0078	0,0551	-0,002	0,0435	-0,0107	0,0551	-0,0136	0,0348
16	54423344,3	-0,0078	0,0551	-0,0078	0	-0,002	0,0232	-0,0107	0,0551	-0,0136	0,0232
17	54423704,3	-0,0078	0,0232	-0,0078	0,0348	-0,002	0,0435	-0,0107	0,0638	-0,0136	0,0435
18	54423943,8	-0,0078	0,0609	-0,0107	0,0551	-0,002	0,0493	-0,0078	0	-0,0136	0,0348
19	54424064,3	-0,0078	0,0551	-0,0107	0,0551	-0,002	0,0493	-0,0107	0,0551	-0,0136	0,0493
20	54424424,3	-0,0107	0,0609	-0,0078	0,0348	-0,002	0,0435	-0,0078	0,0348	-0,0136	0,0348
21	54424783,4	-0,0078	0,0348	-0,0078	0,0435	-0,002	0,0493	-0,0107	0,0638	-0,0136	0,0551
22	54425144,3	-0,0078	0,0609	-0,0078	0	-0,002	0,0493	-0,0078	0,0029	-0,0136	0,0348
23	54425504,3	-0,0107	0,0609	-0,0078	0,0551	-0,002	0,0435	-0,0107	0,0493	-0,0136	0,0551
24	54425864,3	-0,0107	0,0638	-0,0078	0	-0,002	0,0551	-0,0107	0,0435	-0,0136	0,0493
25	54426224,3	-0,0078	0,0551	-0,0107	0,0638	-0,002	0,0493	-0,0107	0,0551	-0,0136	0,0348
26	54426584,3	-0,0107	0,0435	-0,0107	0,0551	-0,002	0,0493	-0,0107	0,0493	-0,0136	0,0493
27	54426944,3	-0,0078	0,0348	-0,0107	0,0609	-0,002	0,0493	-0,0107	0,0232	-0,0136	0,0551
28	54427304,3	-0,0078	0	-0,0107	0,0609	-0,002	0,0348	-0,0107	0,0551	-0,0136	0,0232

CAL #	TIME	PZTA		PZTB		PZTC		PZTD		PZTE	
		MEAN	STD	MEAN	STD	MEAN	STD	MEAN	STD	MEAN	STD
29	54437384,3	-0,0107	0,0551	-0,0078	0,0261	-0,002	0,0551	-0,0107	0,0609	-0,0136	0
30	54437744,3	-0,0107	0,0551	-0,0107	0,0551	-0,002	0,0667	-0,0107	0,0348	-0,0136	0

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 or slightly above the detection thresholds. The noise levels are compatible with those measured during on-ground test campaign and in the previous Interference Part 1A test.

Figure 15 to Figure 21 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; Channel-C response is confirmed not stable along the different internal calibrations performed during the test (refer to the voltage/delay time measurements of 2nd and 4th stimuli). However, the behaviour seems quite similar to that observed during the 1st GIADA commissioning (April '04). For the next runs, **it is suggested to increase channel C detection threshold (e.g. 100/150mV) and compare the obtained results**. In fact, since Channel C seems noisy, a higher threshold shall keep the channel detection less susceptible to noise. The other channels (A, B and D) show a reproducible calibration data set. Only four responses of channel D and one of channel A are rather different from the others. The response of Channel D with 6V of amplitude corresponds to a 'Non detection' of the channel.

The channel response during the calibration seems slightly depending on sensor temperature (refer to the channel detection amplitudes relevant to the 2nd and 4th stimuli, which are shown from Figure 22 to Figure 25). The Figure 26 shows the four ADC reference voltages with respect to the ADC temperature: they are not significantly dependent from ADC temperature.

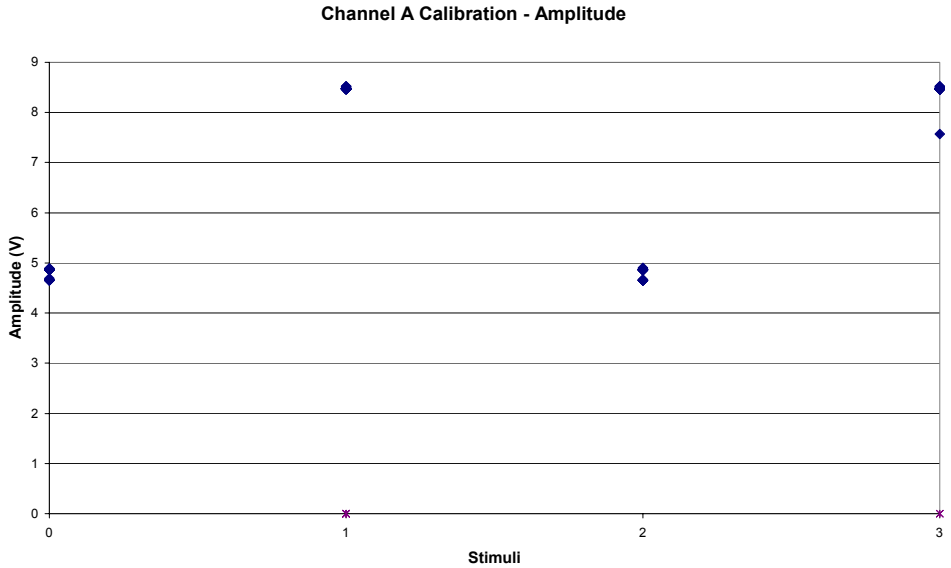

Figure 15 IS Calibration - Channel A Amplitude

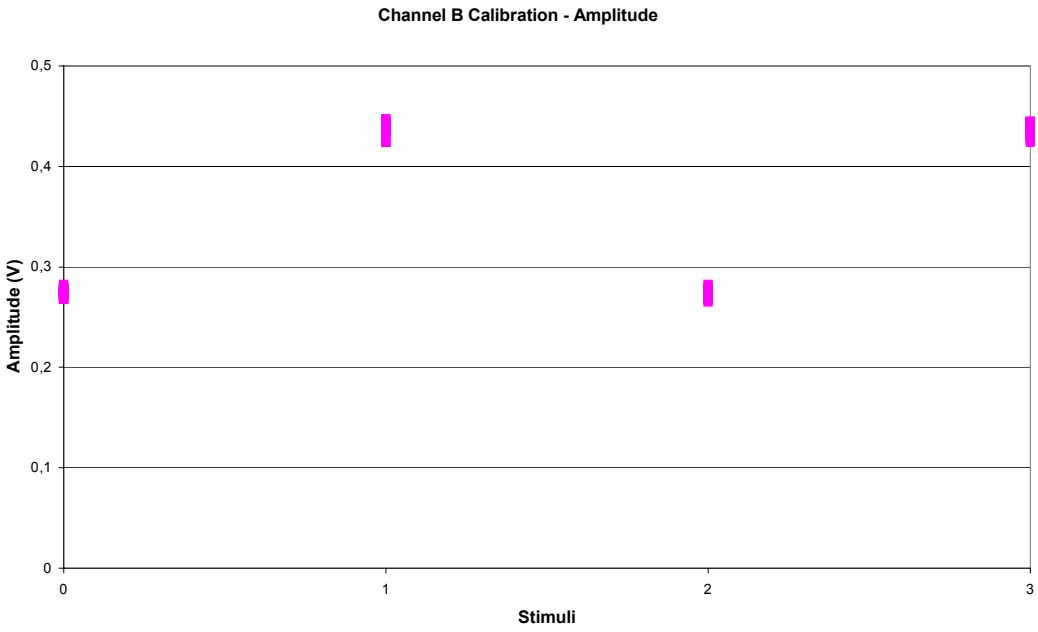

Figure 16 IS Calibration - Channel B Amplitude

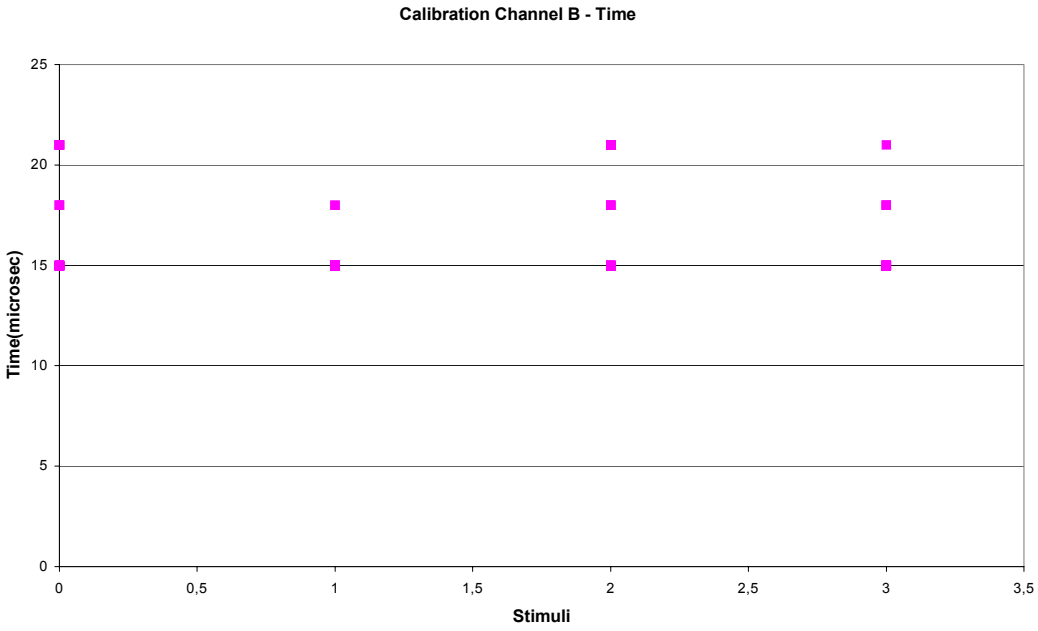

Figure 17 IS Calibration - Channel B Delay Time

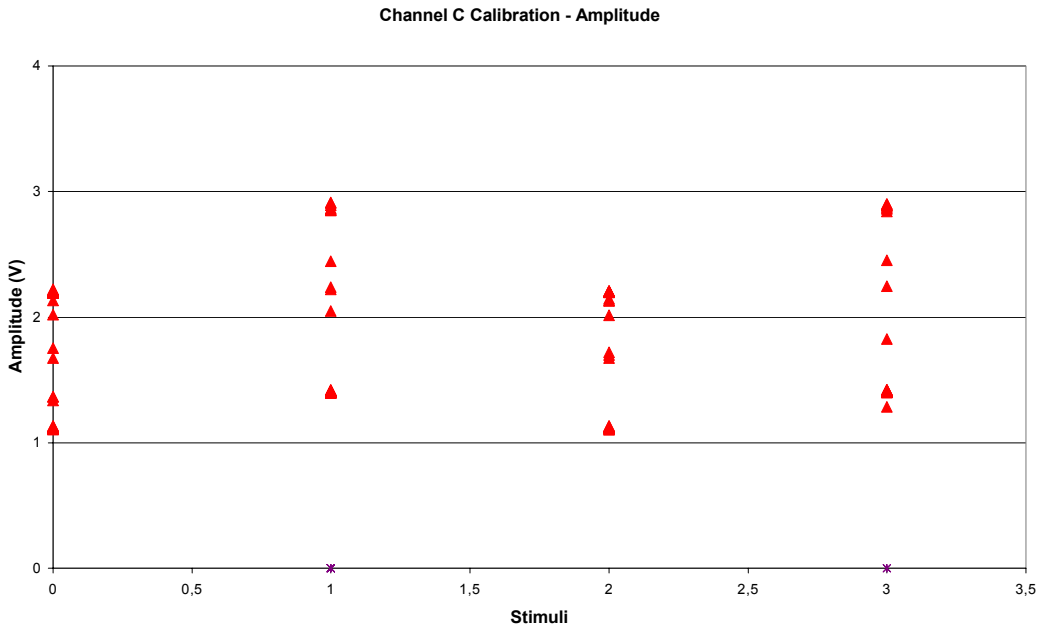

Figure 18 IS Calibration - Channel C Amplitude

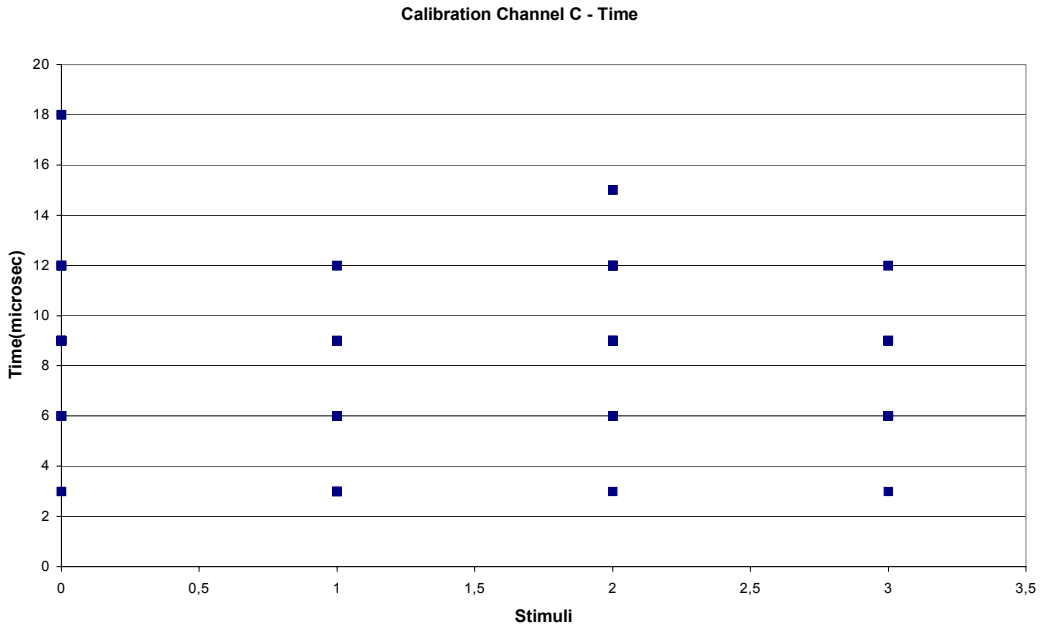

Figure 19 IS Calibration - Channel C Delay Time

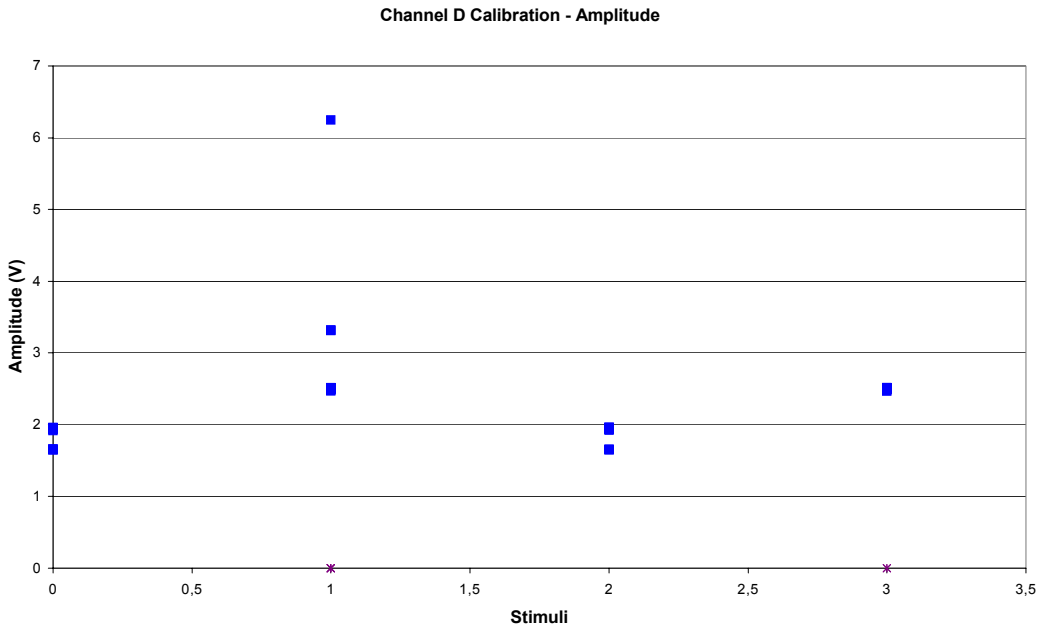

Figure 20 IS Calibration - Channel D Amplitude

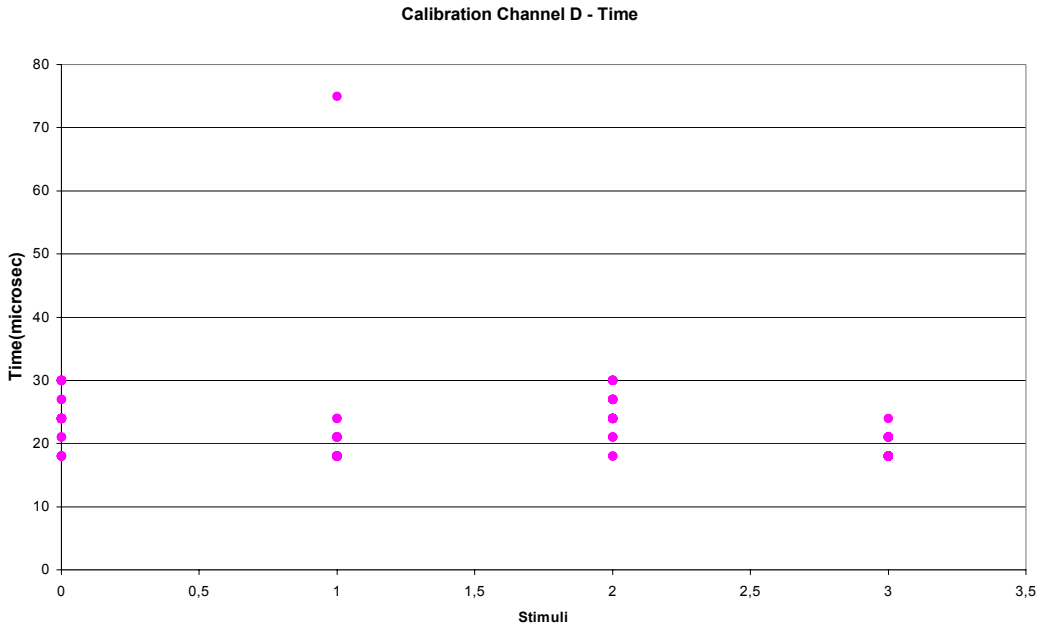

Figure 21 IS Calibration - Channel D Delay Time

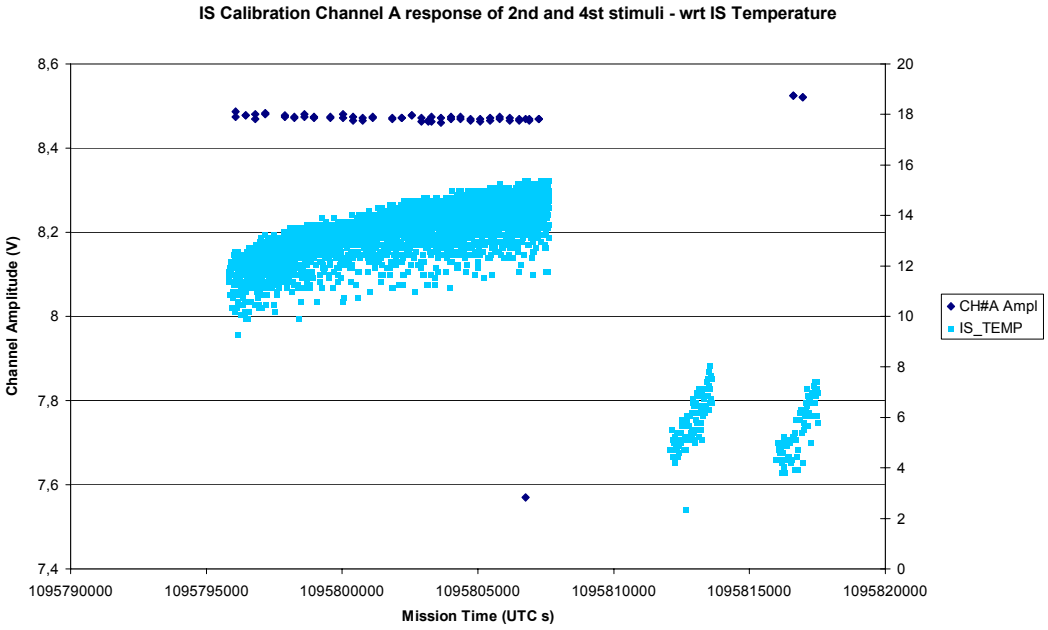

Figure 22 Channel A response wrt IS temperature

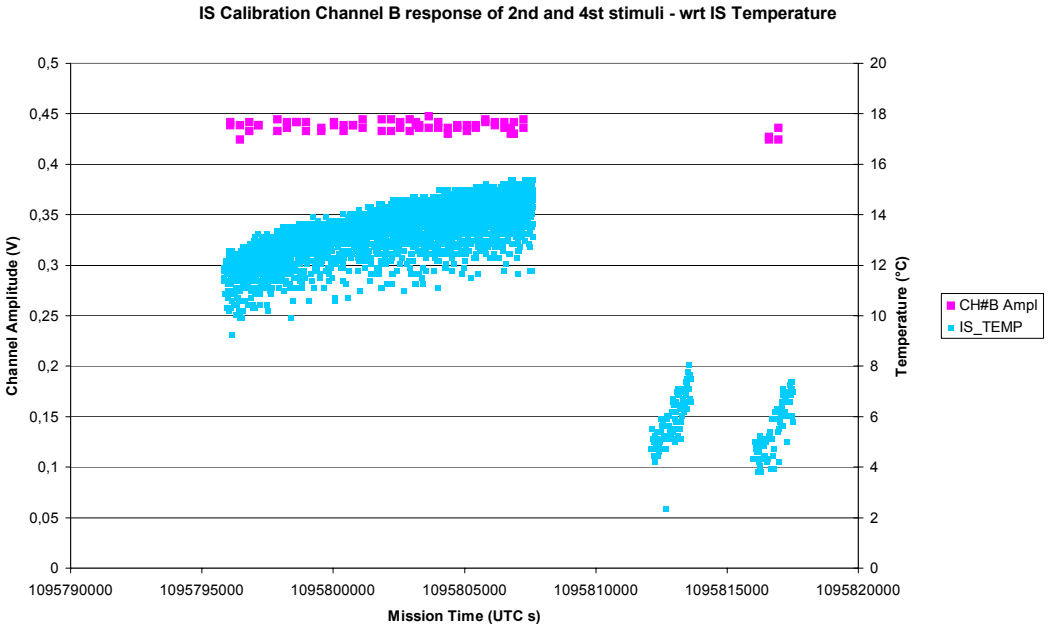

Figure 23 Channel B response wrt IS temperature

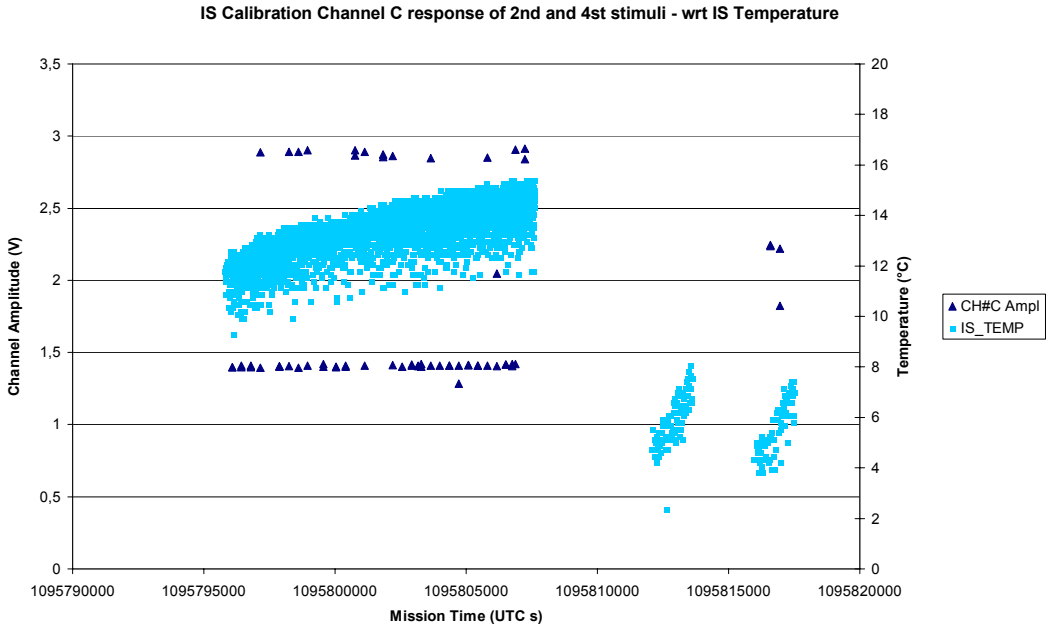

Figure 24 Channel C response wrt IS temperature

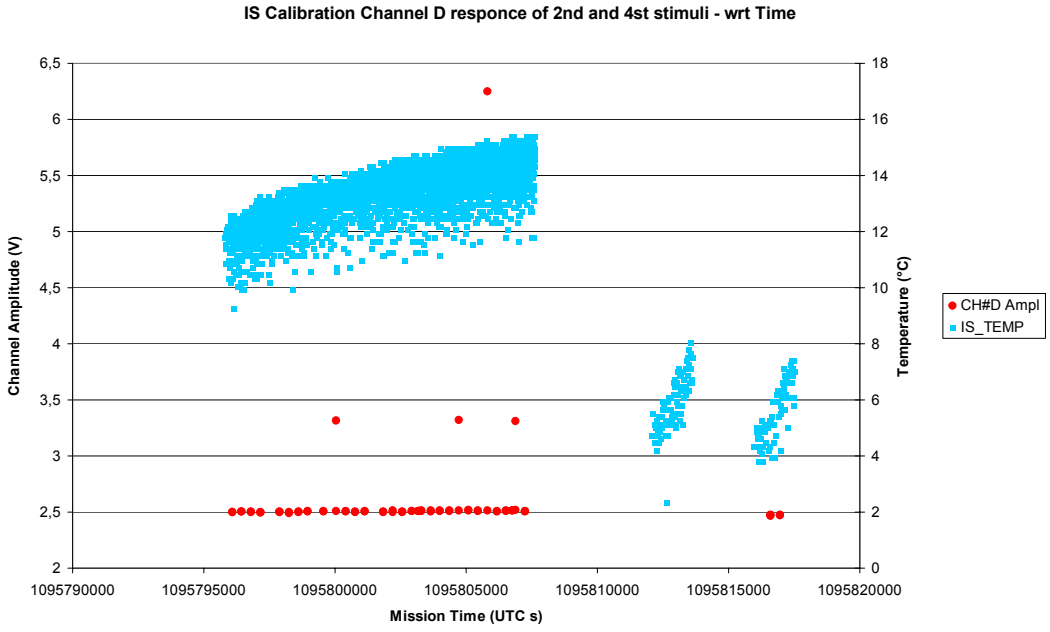

Figure 25 Channel D response wrt IS temperature

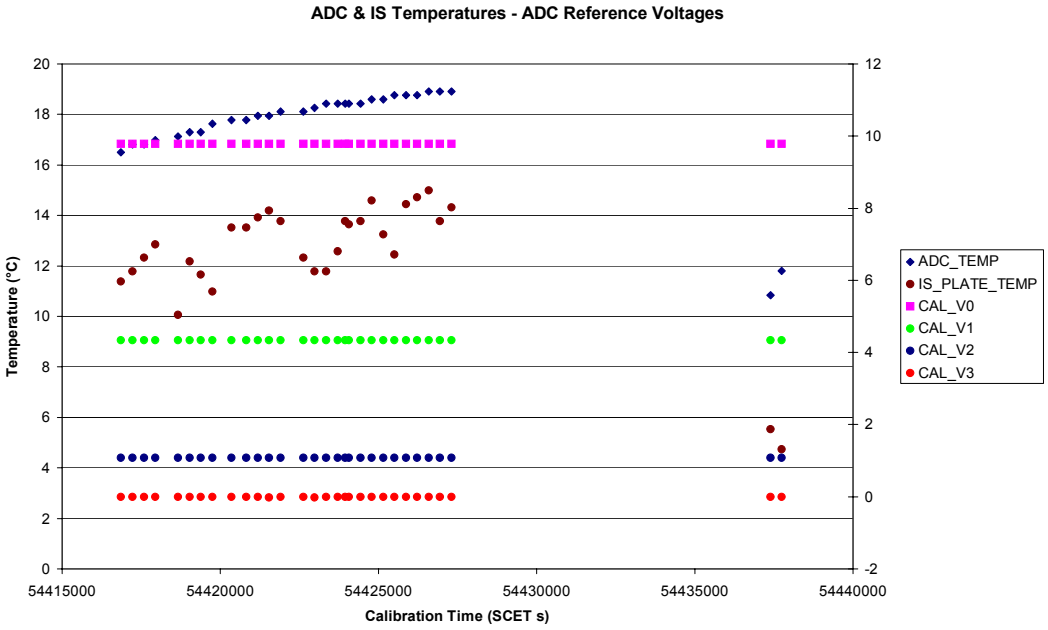

Figure 26 ADC, IS Temperature & ADC Reference Voltages @ IS calibration Time

5.1.3.2 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 GDS calibrations every 3 minutes. Figure 27, Figure 28 and Figure 29 show the GDS Calibration Left & Right mean value and STD along test.

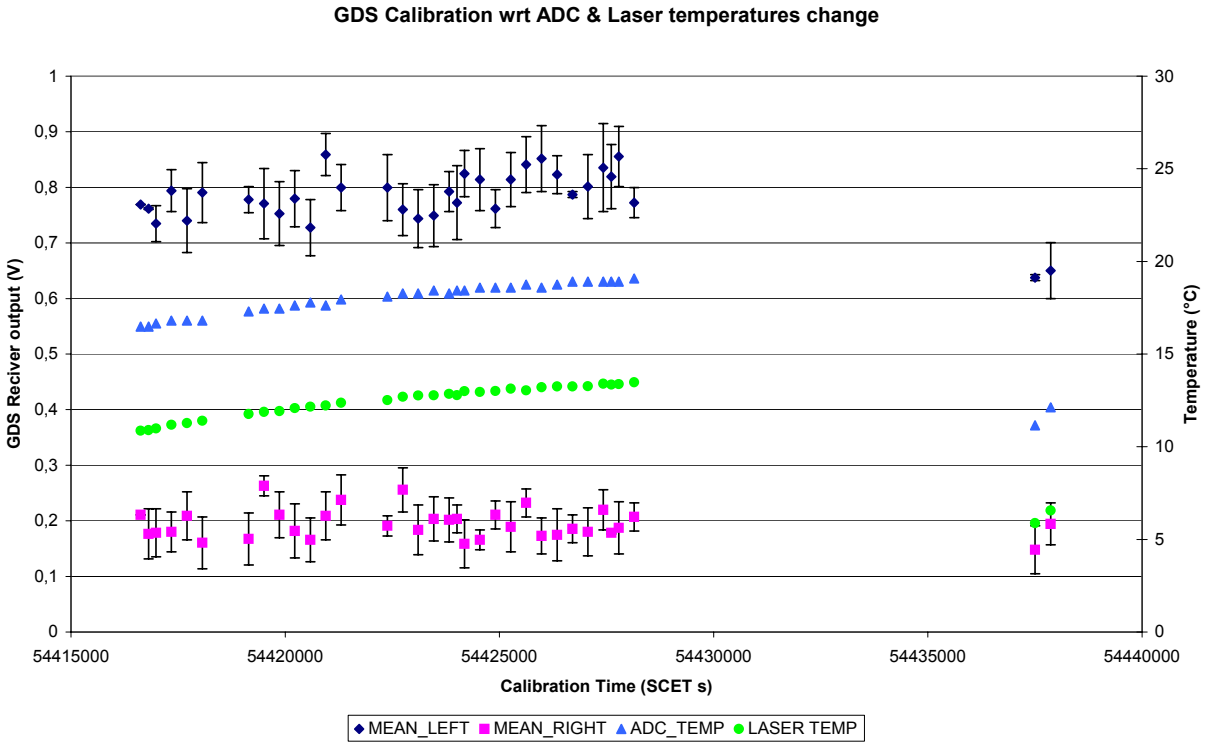

Figure 27 GDS Right & Left Receiver Calibration (mean value and STD deviation)

The output level of the Left and Right channels reports a direct measure of the internal stray-light in combination with the electronics noise that might be conducted on the power lines from other instruments or induced by temperature increasing. As we can see, the mean value of the Right receiver is always below the detection threshold (only few ghost detections were observed on the Right channel) and practically the same as during the previous in-flight test from April '04 when GIADA was switched on alone. Its average is below 0.25 V, while its standard deviation is always below 50 mV. A different situation is observed for the Left receiver:

- At the begin of the test, the mean value is slightly higher than that measured during the 1st GIADA Commissioning: it was 0.67 V with standard deviation (3σ) < 50 mV, while now it is < 0.79 V (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 < 60 mV.

It is noticed that the last two calibrations, which are performed when GIADA Normal mode was resumed after a short period in Safe mode, have shown a mean value of 0.64 V quite similar to the one measured at the 1st Commissioning.

The behaviour seems to depend on the GIADA internal temperature (ADC & Laser temperatures) rising, as we can see from the Figure 30.

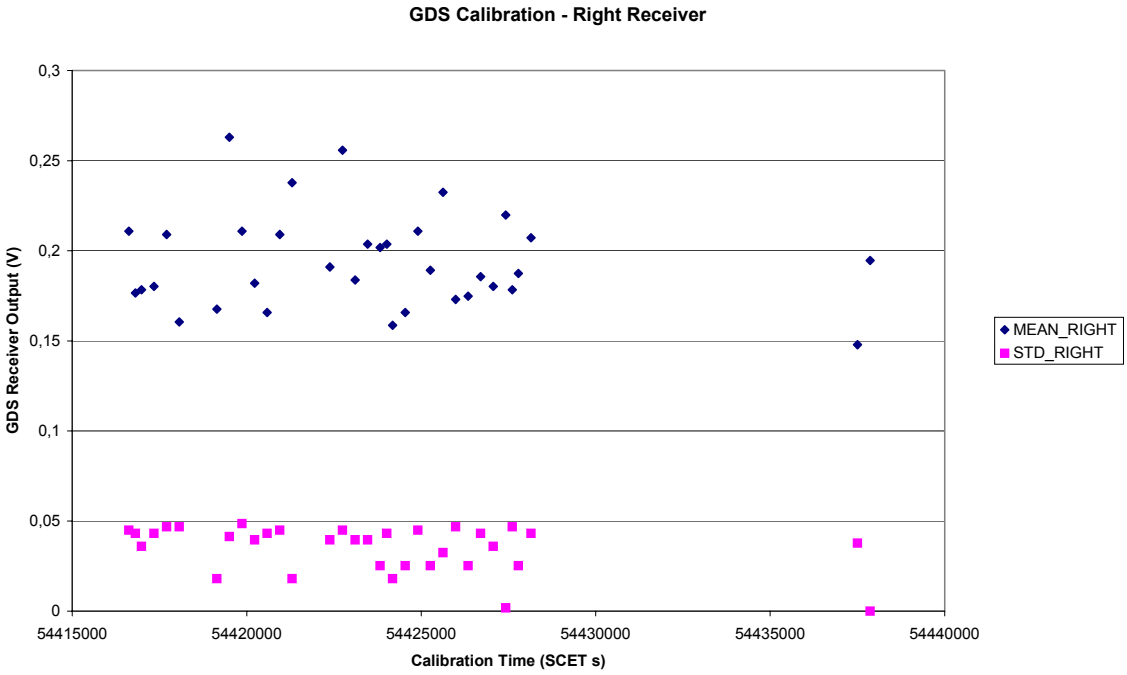

Figure 28 GDS Calibration (Right Receiver - mean value and STD deviation)

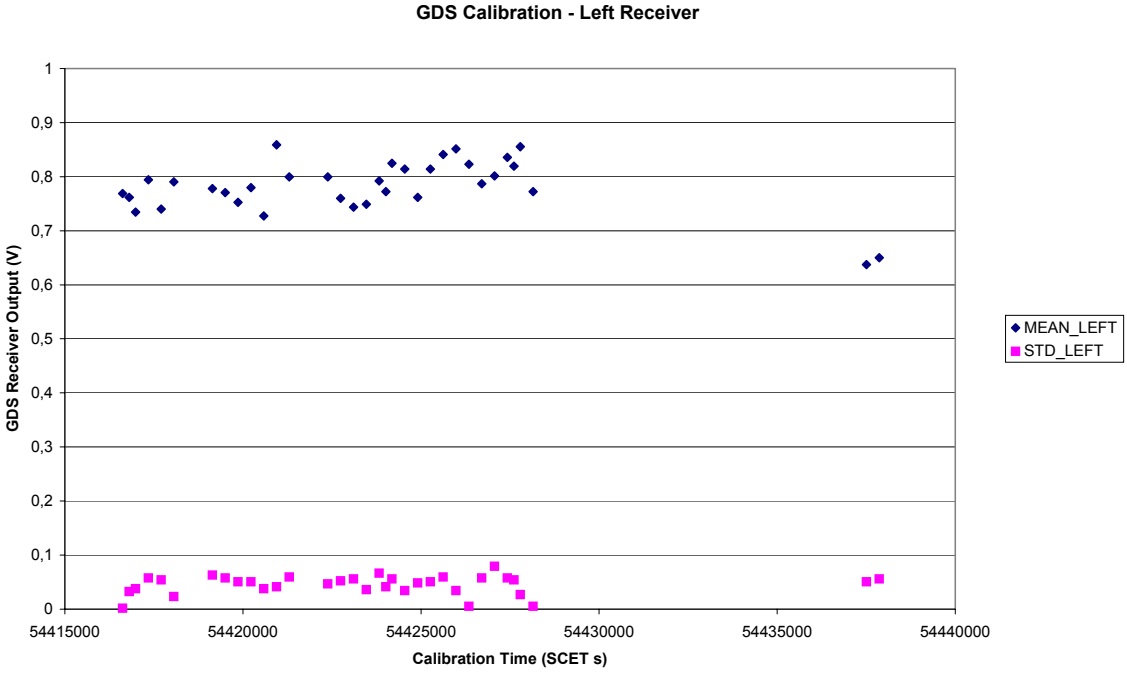

Figure 29 GDS Calibration (Left Receiver - mean value and STD deviation)

Finally, Figure 31 shows also the laser light monitor at the time of the GDS calibration.

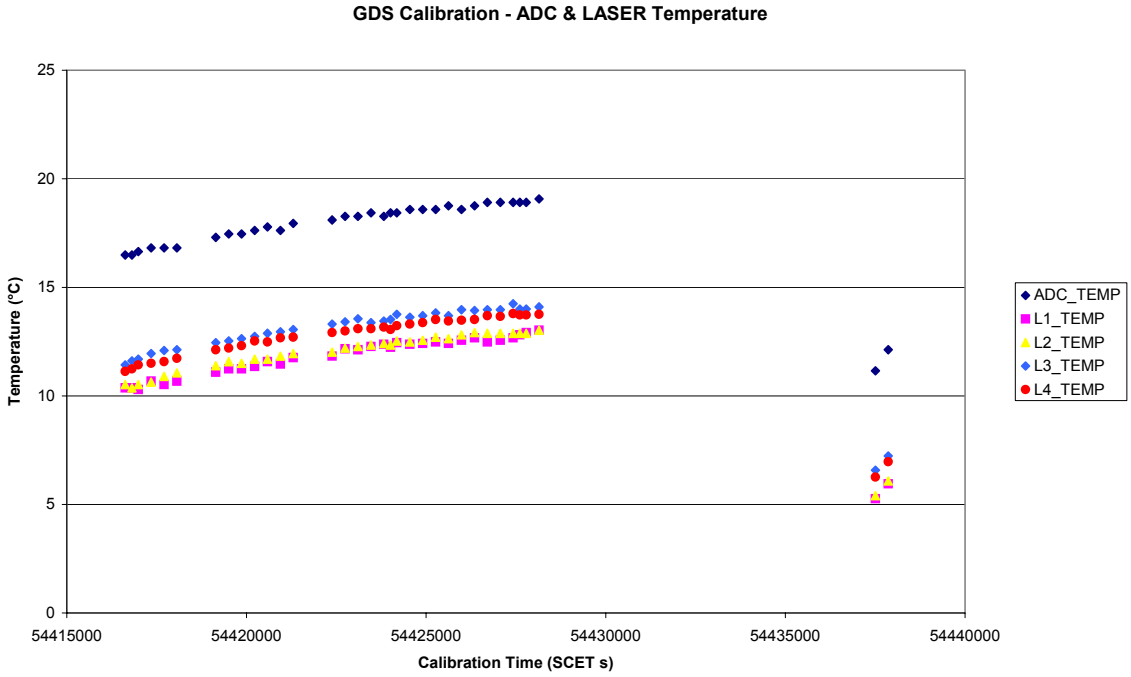

Figure 30 GDS Calibration - ADC & Lasers Temperature

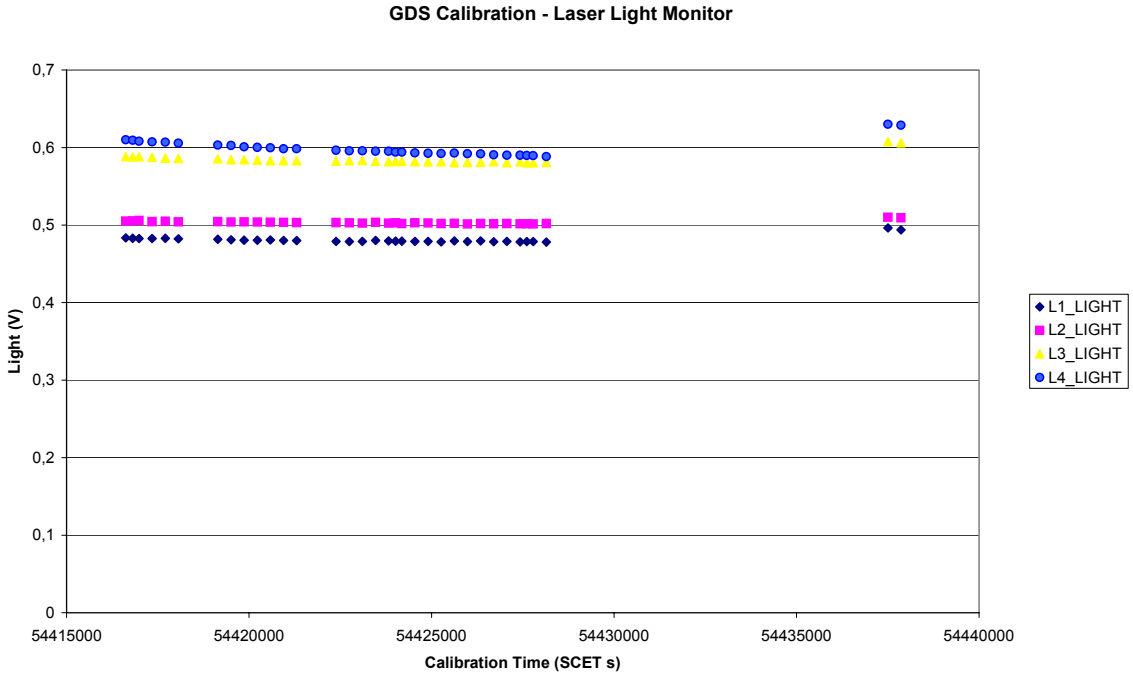

Figure 31 GDS Calibration – Laser Light Monitors

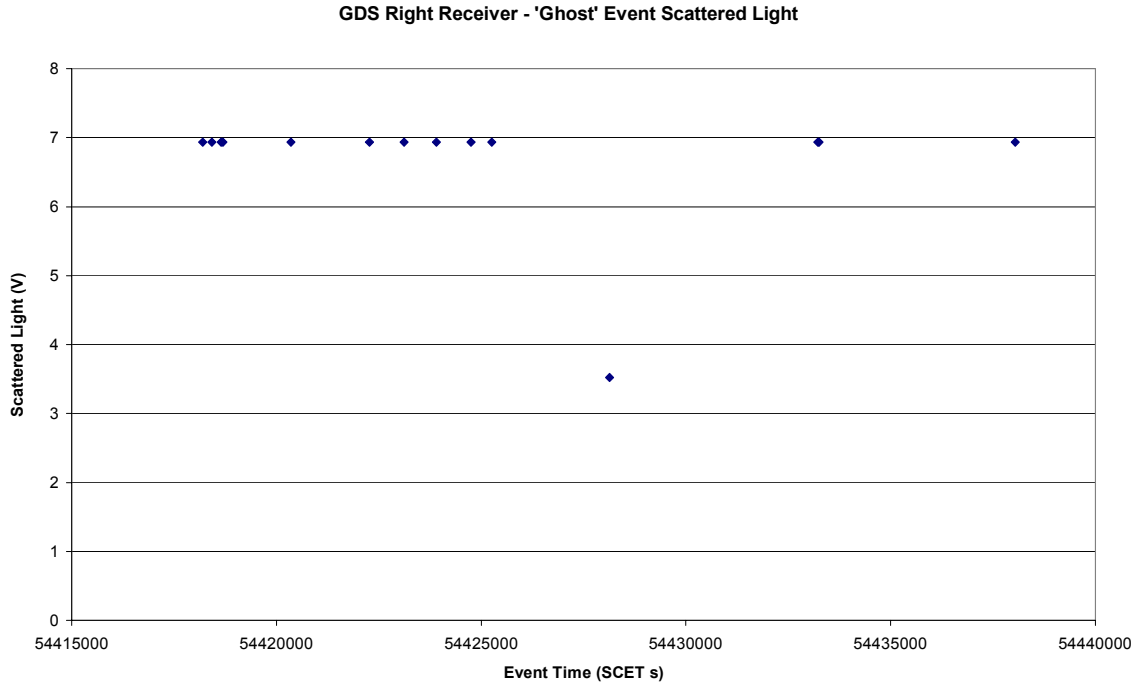

Figure 32 Amplitude of 'ghost detections' on Right receiver

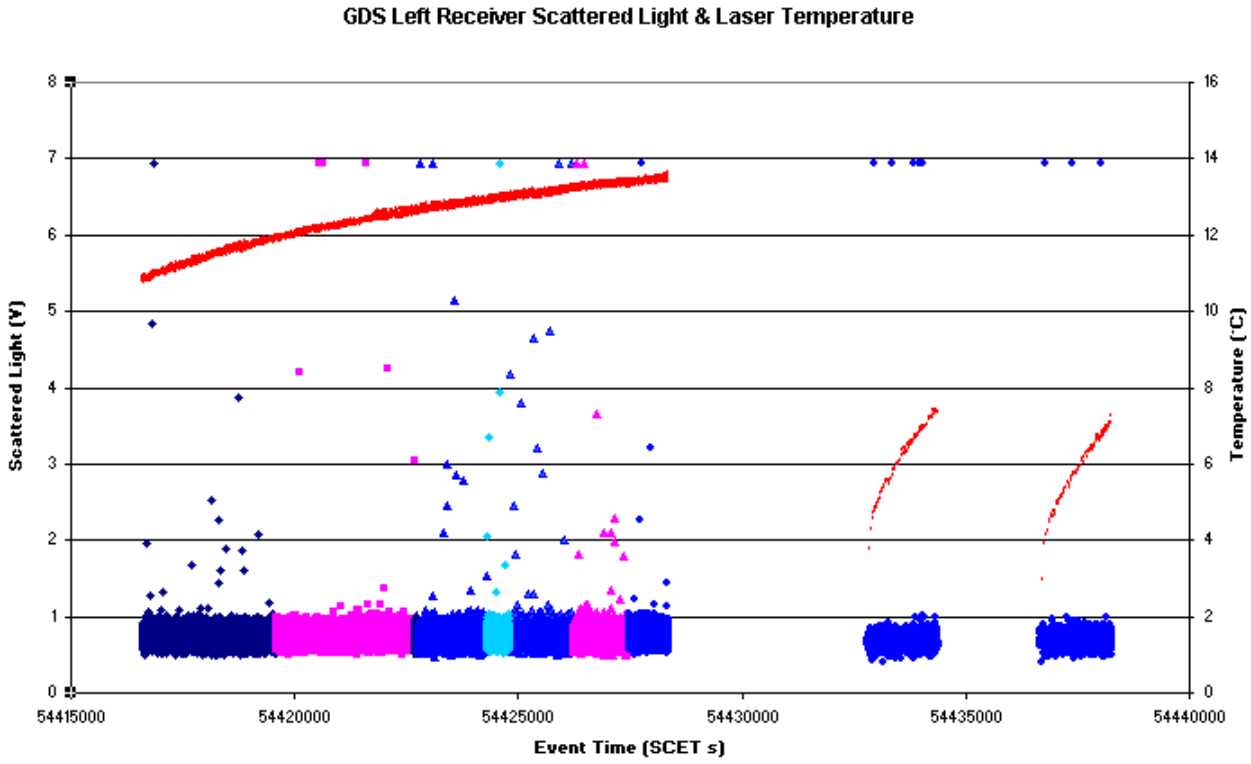

Figure 33 Amplitude of 'ghost detections' on Left receiver & Laser temperature

Figure 33 shows the amplitude of the scattered light of the Left Receiver 'Ghost detections', while Figure 32 reports the Right Receiver 'Ghost detections'. Concerning the detections on Left Receivers two 'detection' types can be distinguished (as in the previous Interference Part 1A and 1st Commissioning in April '04):

- The first type (Figure 34) in which the detection amplitude is of the order or little above the detection threshold (0.8 V); these are 'ghost detections' due to the high level of the internal stray-light in combination with electronics noise. The noise level is confirmed of the same order than the one found during the 1st Commissioning in April '04 only when the temperature of laser is lower than 10°C (last part of the test). When all the other experiment were operative and the GIADA internal temperature is between 10 to 14 °C (first part of the test), the noise increased and went little above the detection threshold. Due to this high production rate (which is shown in Figure 35) and late start of the downlink with respect to the time when GIADA was in Normal mode, the SSMM Memory was saturated and packets were lost.

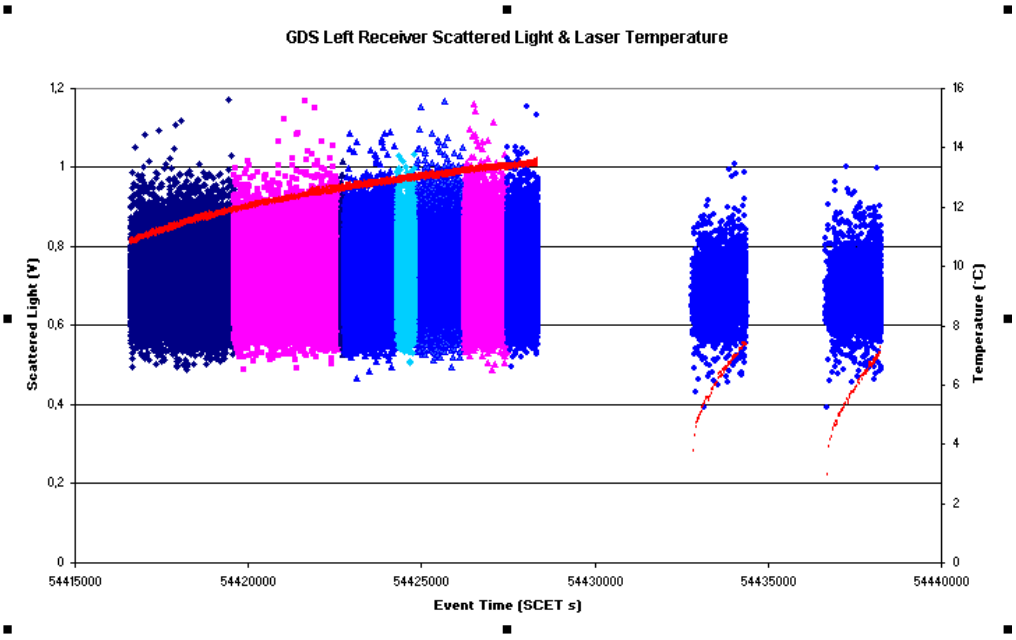

Figure 34 Amplitude of 'ghost detections' on Left receiver & Laser temperature

- The second type (refer to Figure 32 and Figure 33), in which the detection amplitude on both the Left and Right Receivers is well above the detection threshold or in saturation (6.9375 V). The detections on left have happened more often than in the 1st Commissioning (but with the same frequency as in the Interference Part 1A) 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 (for example GIADA should be switched on alone but in the same temperature conditions).

The conclusion is that, in order to minimise the number of detections (and thus the GDS data rate and production) and consequently possible SSMM saturation, the detection threshold of the Left Channel must be increased up to 1-1.2V. The modification is proposed for the next incoming test (Pointing scenario).

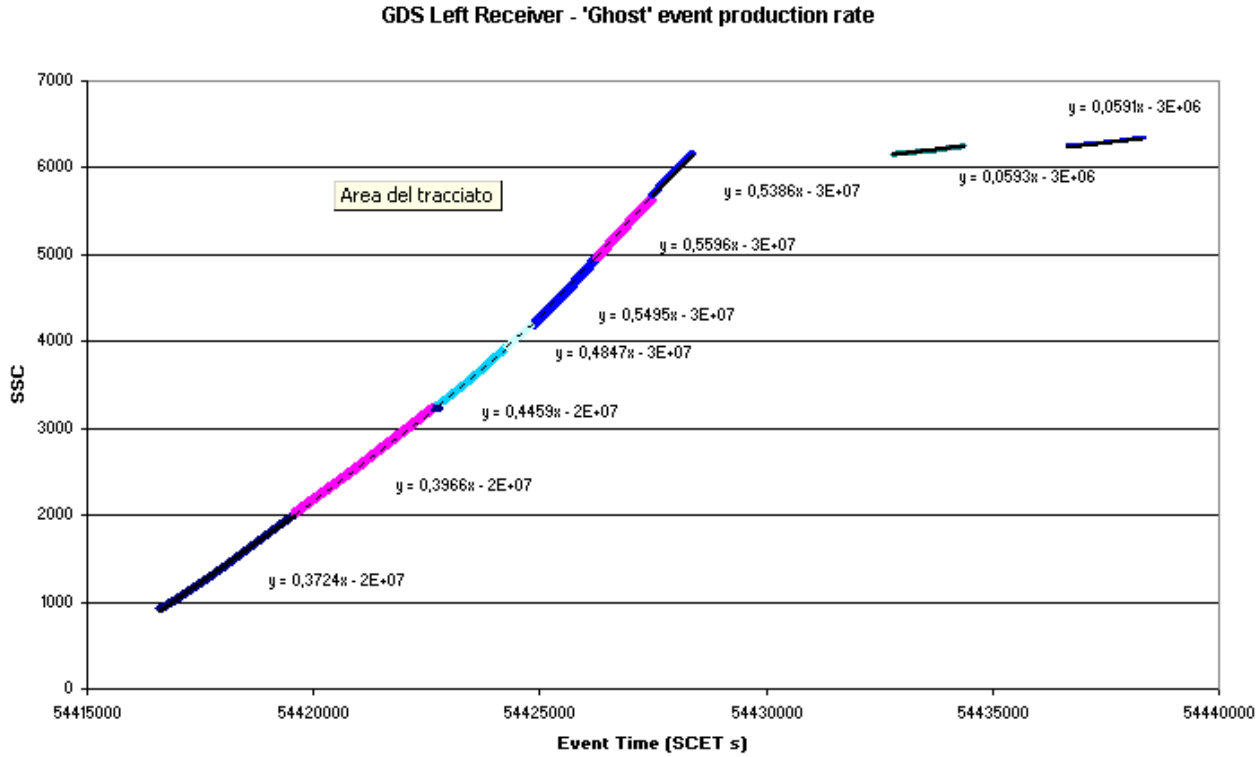

Figure 35 GDS Left Receiver Production rate

Table 4 and Figure 36 show the ADC Reference Voltages along the Interference Part 1B 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**
9,7798	0,0005	4,3445	0,0012	1,0796	0,0008	-0,0109	0,0007

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

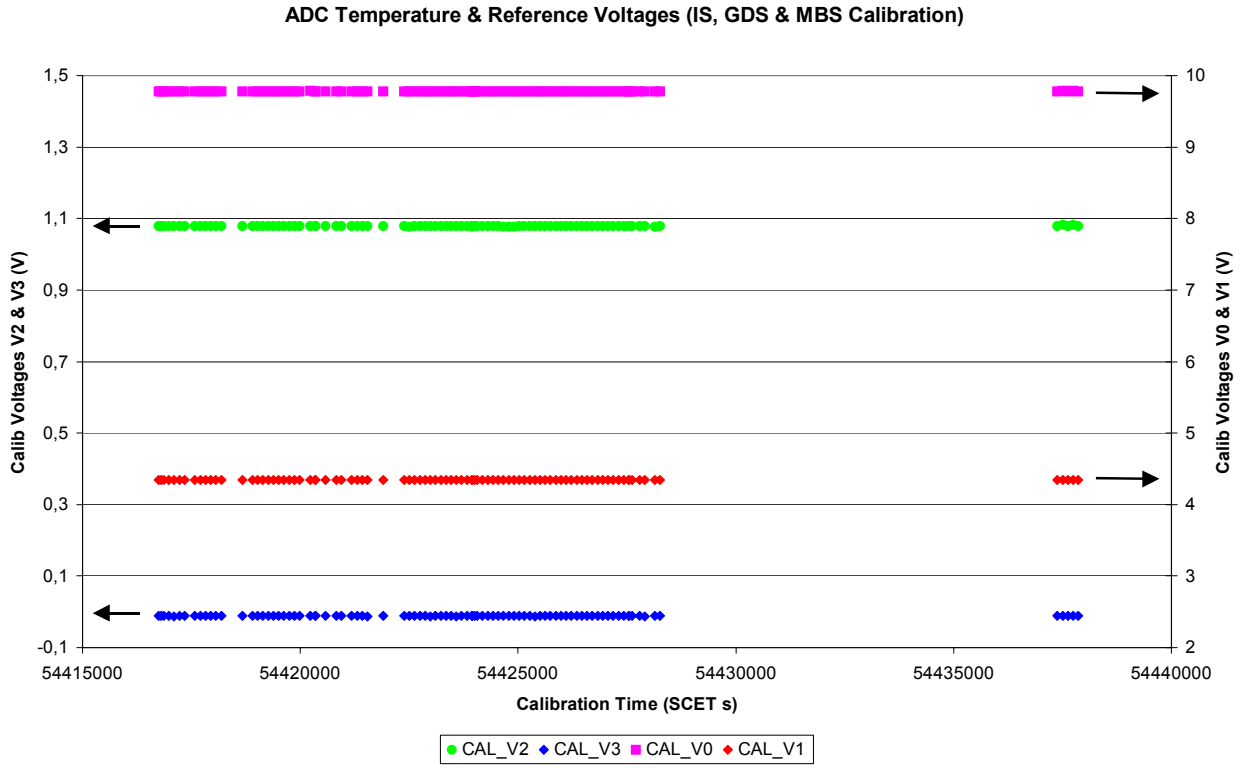

Figure 36 ADC Voltage Reference during Calibration

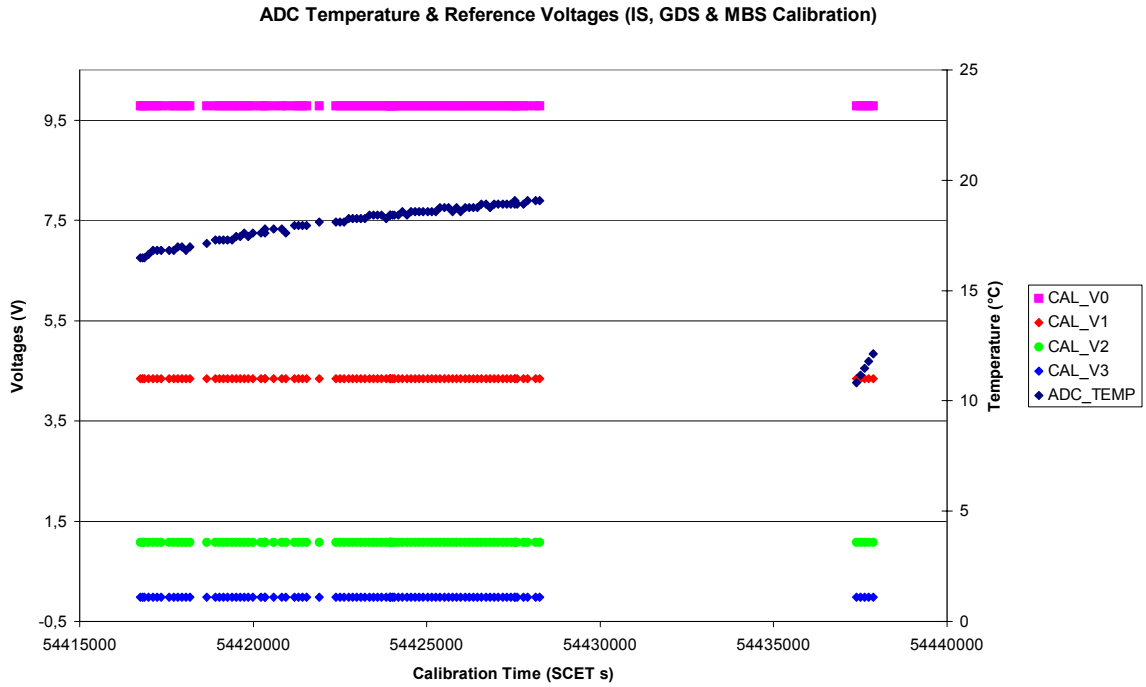

Figure 37 ADC Voltage Reference wrt ADC temperature during Calibration

5.1.3.3 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; the five MBS frequency measurements are almost the same (MBS 1, 3, 4 & 5) or slightly increased (MBS 2) with respect to that taken during the Interference Part 1A.

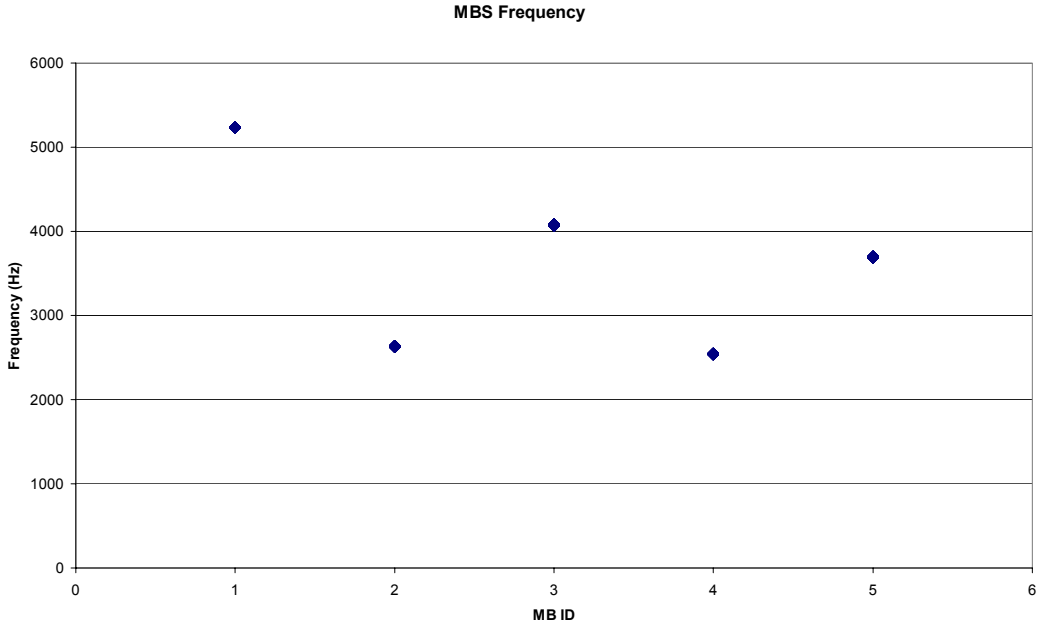

Figure 38 MBS Frequency

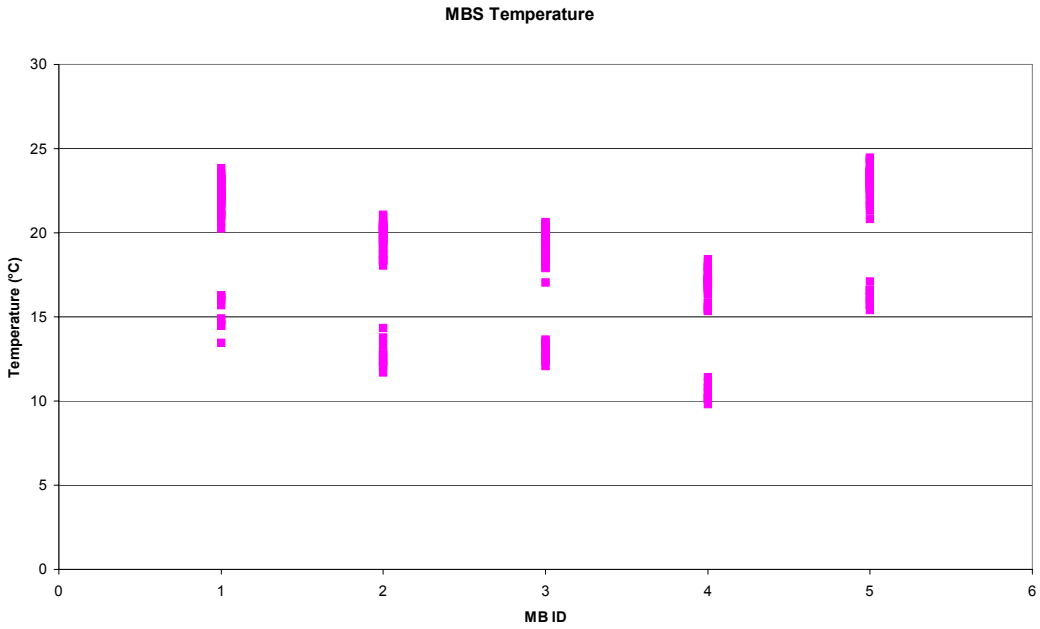

Figure 39 MBS Temperature

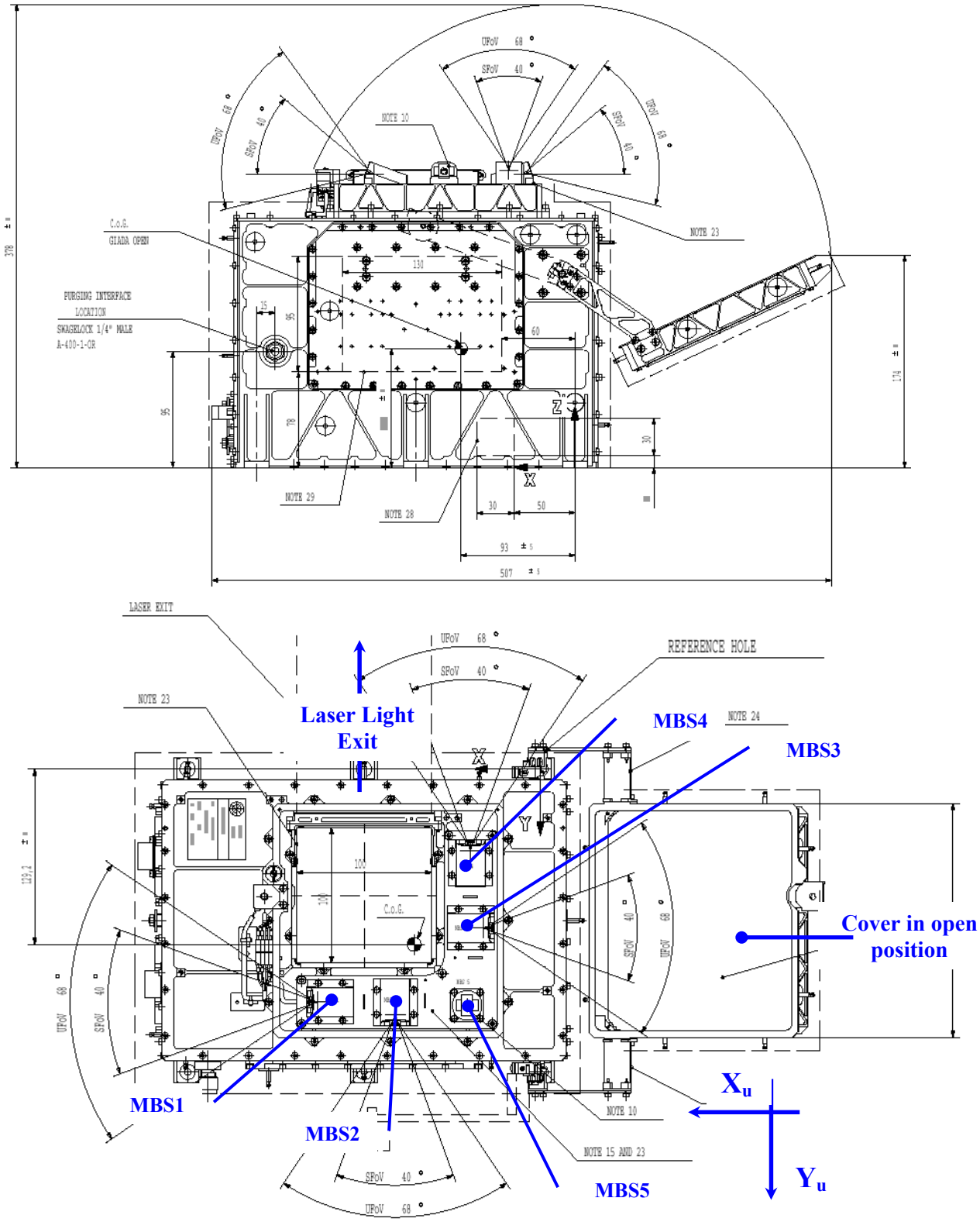

Figure 40 GIADA Cover Open Configuration – MBS location & pointing wrt GIADA unit axes

In detail, the following variations have been observed:

- The MBS1 frequency (MBS1 points to the +Xu direction, as it is shown in Figure 40) is about doubled, from 2700 Hz (data taken during the GIADA 1st Commissioning) to about 5227 Hz @ 25°C (Interference part 1A) and now to 5230Hz @ 24°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) to about 2550Hz (Interference part 1A) and now to 2625Hz @ 20°C.
- The MBS3 frequency (which points to the -Xu direction) is increased of about 1700Hz, from 2365Hz (data taken during the GIADA Commissioning) to about 4085Hz (Interference part 1A) and now to 4081Hz @ 20°C.
- The MBS4 frequency (which points to the -Yu direction) is increased of about 100Hz, from 2548Hz (data taken during the GIADA Commissioning) to about 2548Hz @ 19°C (Interference part 1A) and now to 2546Hz @ 18°C.
- The MBS5 frequency (which points to the +Zu direction) is increased of about 1000Hz, from 2430Hz (data taken during the GIADA Commissioning) to about 3686Hz @ 25°C (Interference part 1A) and now to 2687Hz @ 24.5°C.

It is confirmed that this effect seems due to MBS in-flight contamination due to out-gassing of volatile 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 the operational point of view, it is confirmed that all MBS's work as expected and the frequency dependence vs. temperature (frequency shift due to temperature change) is consistent with the 1st Commissioning data.

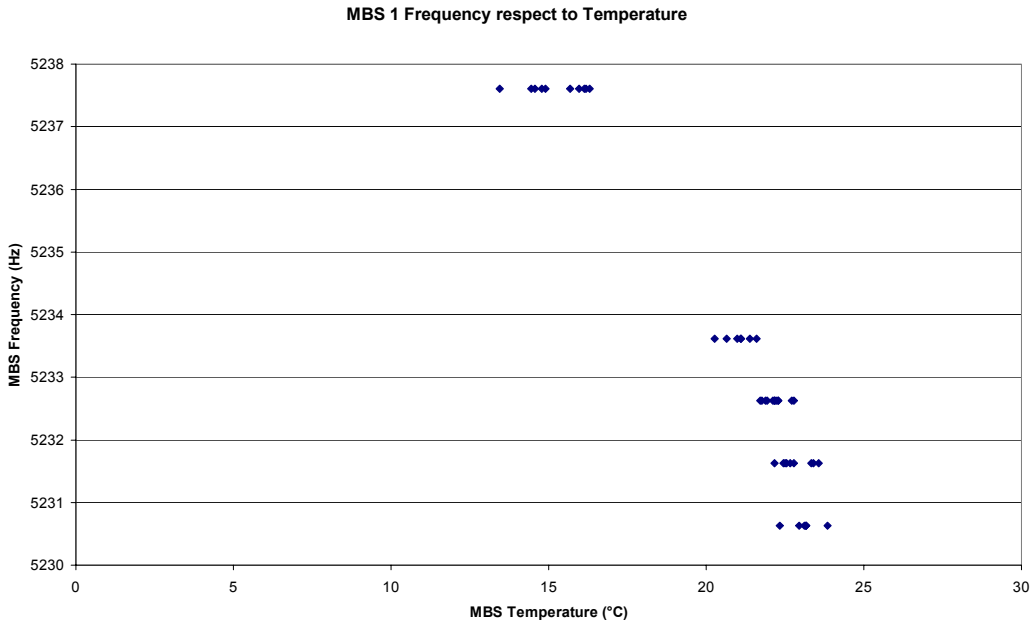

Figure 41 MBS1 Frequency wrt Temperature

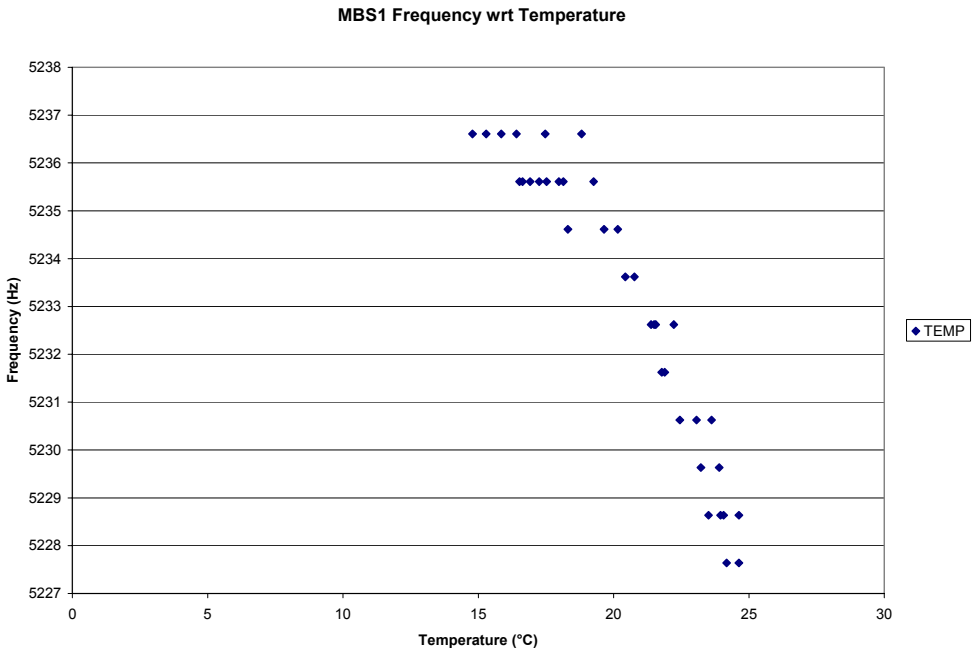

Figure 42 MBS1 Frequency wrt Temperature (Interference Part 1A)

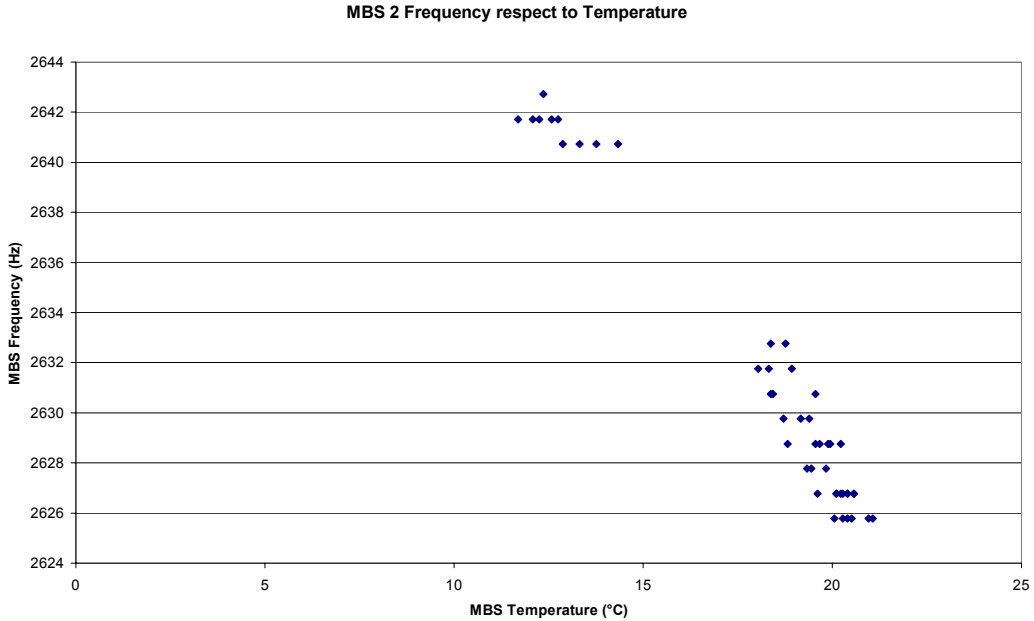

Figure 43 MBS2 Frequency wrt Temperature

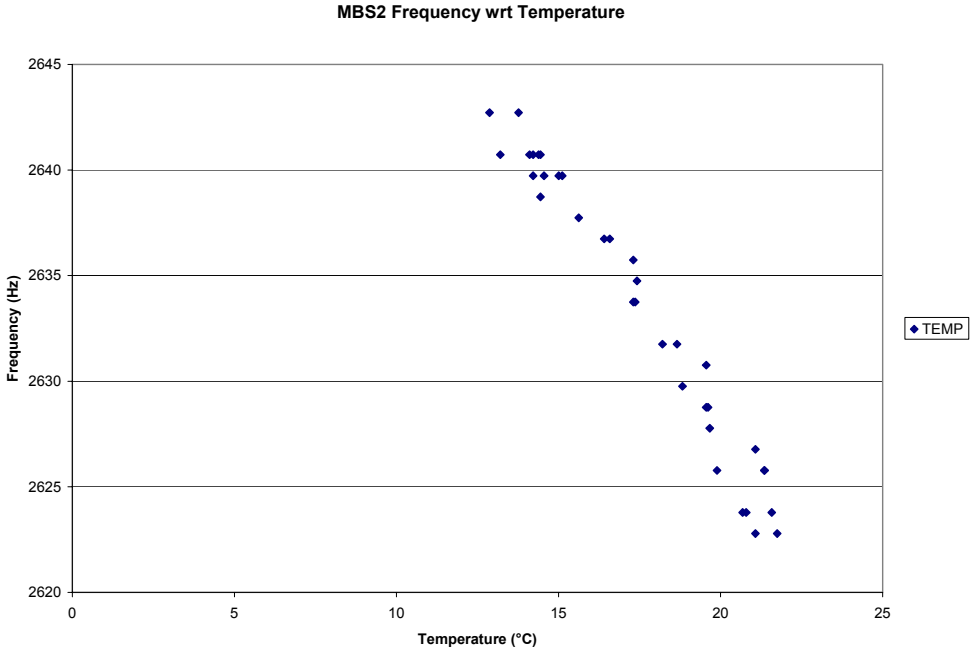

Figure 44 MBS2 Frequency wrt Temperature (Interference Part 1A)

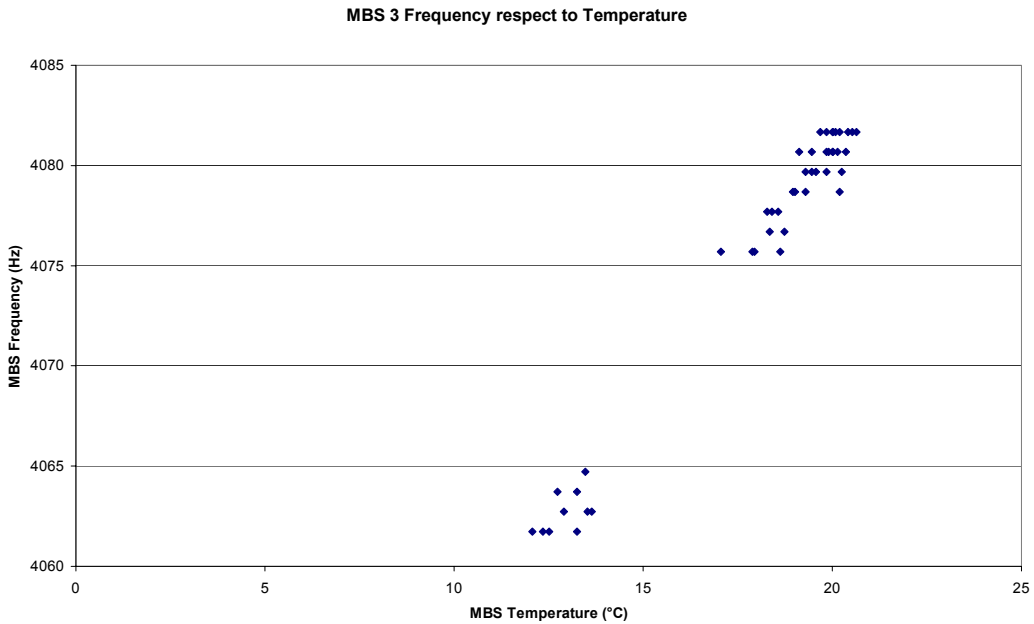

Figure 45 MBS3 Frequency wrt Temperature

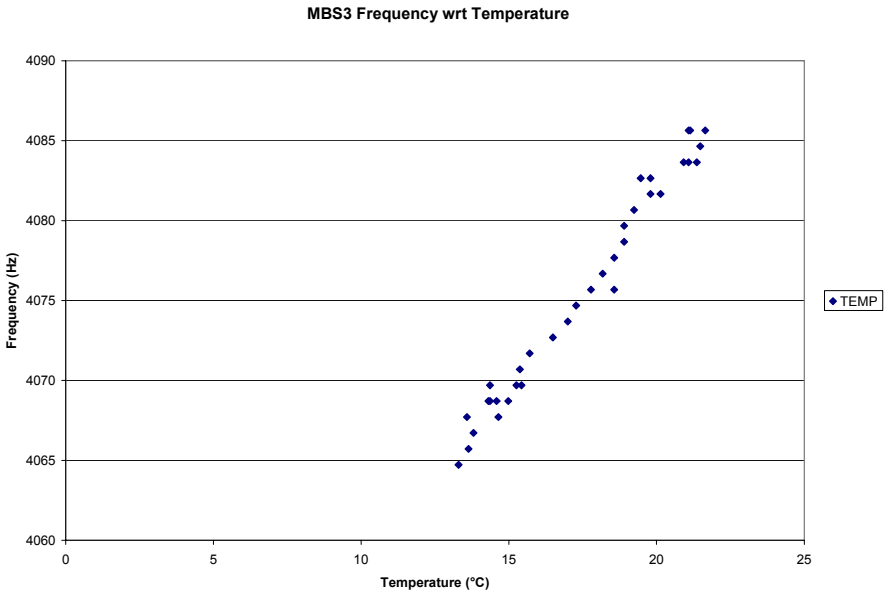

Figure 46 MBS3 Frequency wrt Temperature (Interference Part 1A)

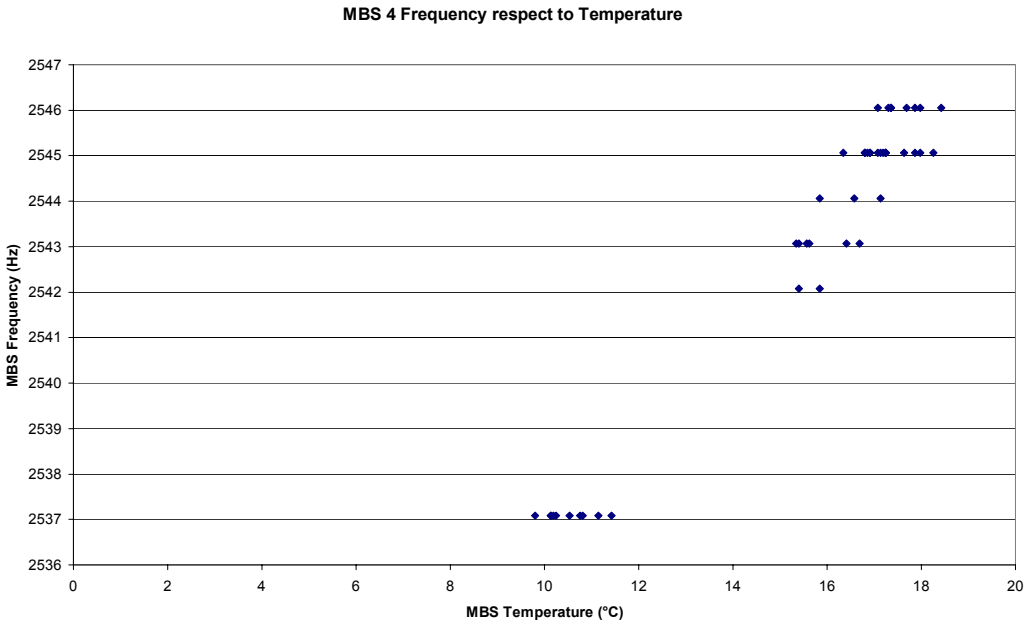

Figure 47 MBS4 Frequency wrt Temperature

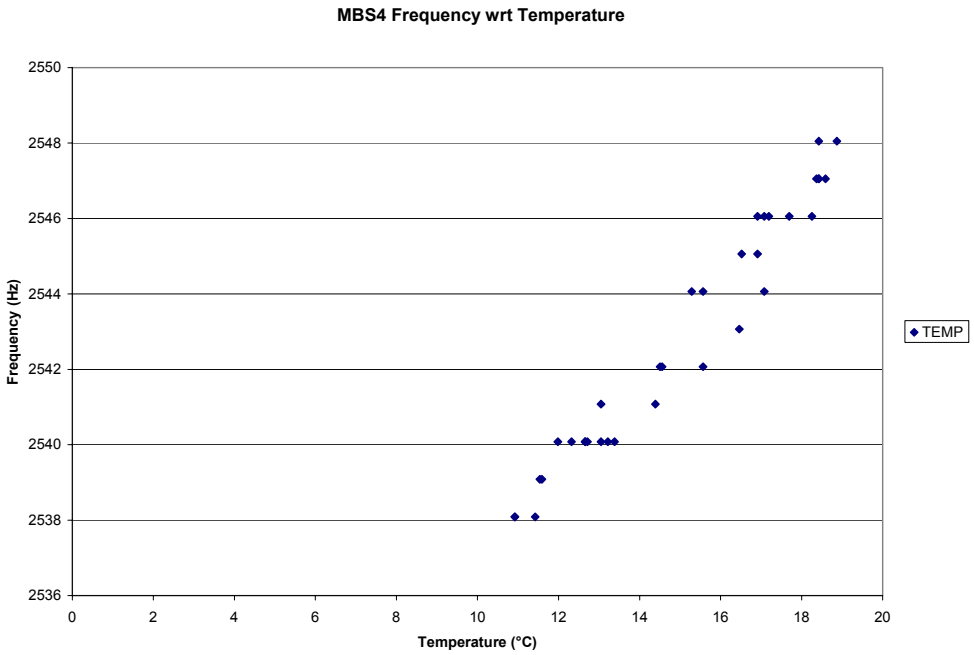

Figure 48 MBS4 Frequency wrt Temperature (Interference Part 1A)

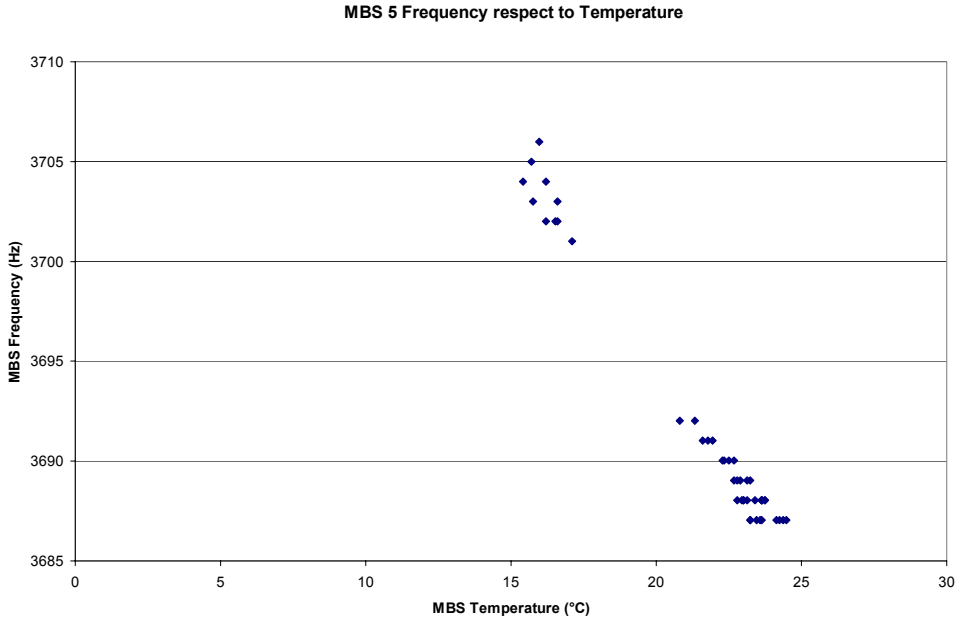

Figure 49 MBS5 Frequency wrt Temperature

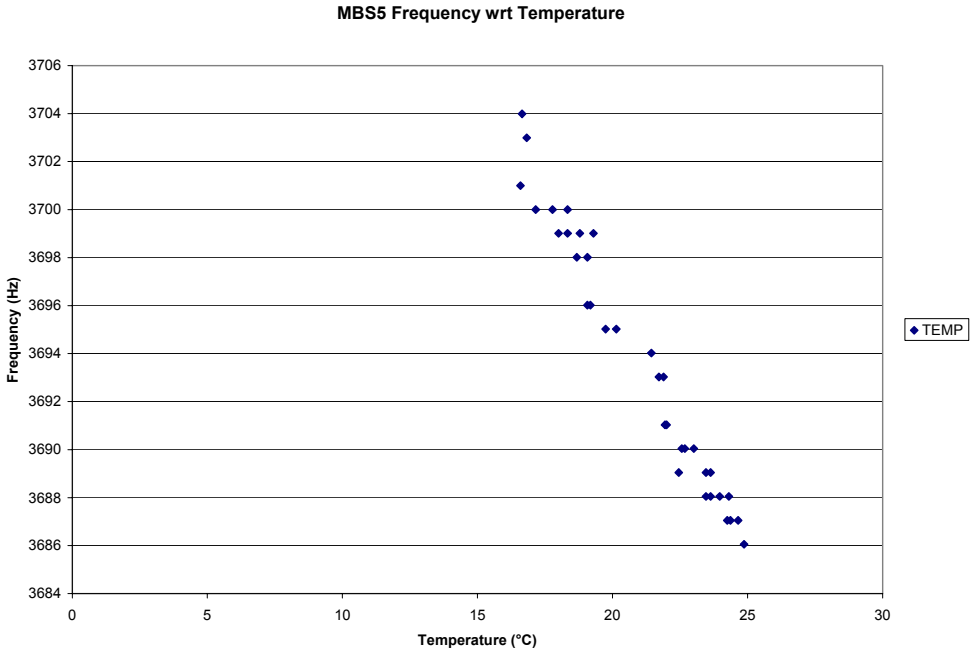

Figure 50 MBS5 Frequency wrt Temperature (Interference Part 1A)

5.1.3.4 Housekeeping signals in science packets

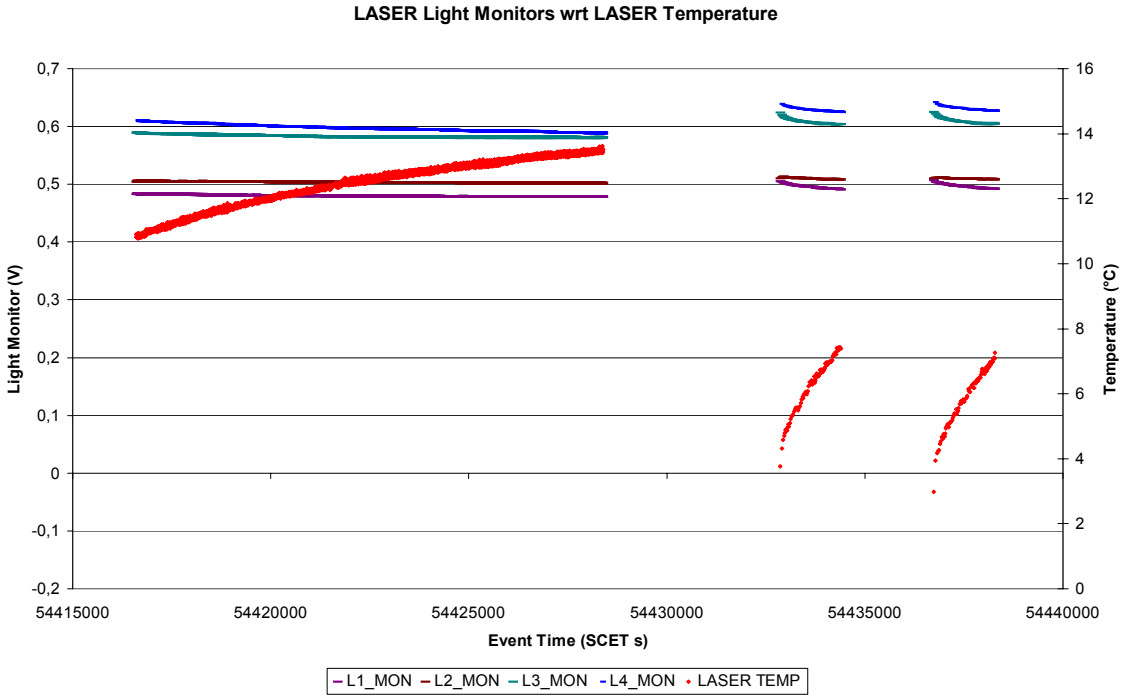

Figure 51 Laser light monitor (Normal science packet)

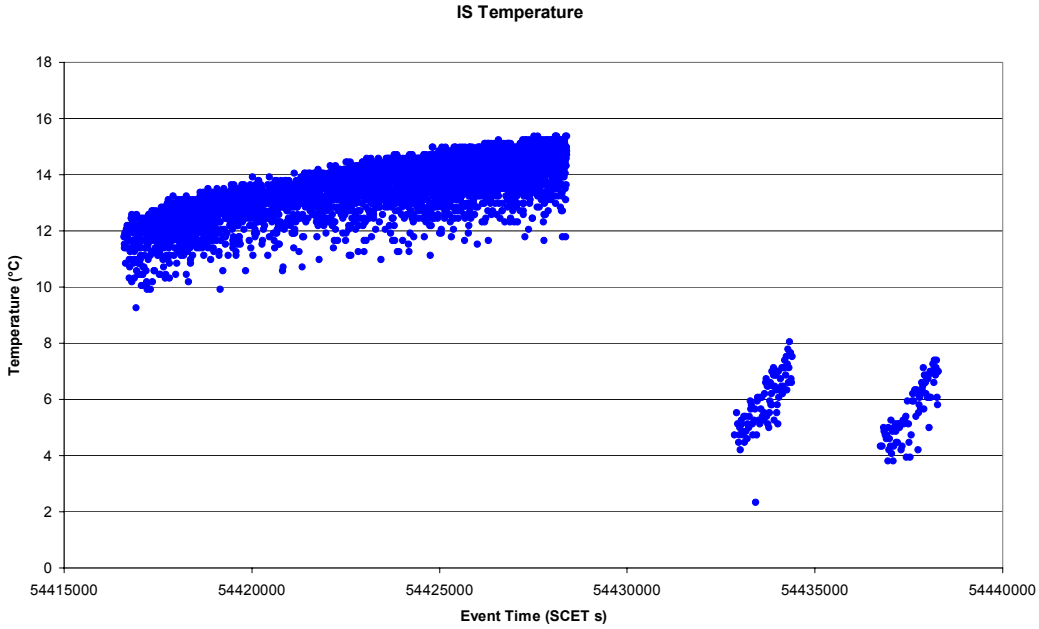

Figure 52 IS temperature (Normal science packet)

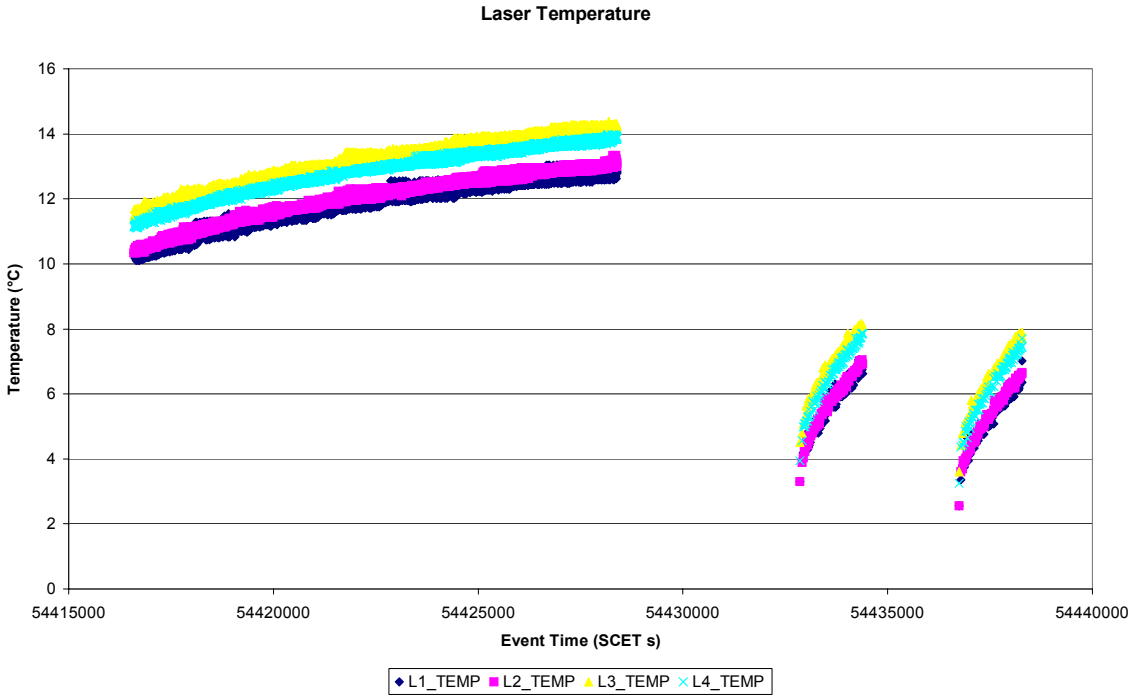

Figure 53 Lasers temperatures (Normal science packet)

6. CONCLUSION

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

- The HK and ACK TM reports were correctly received and no missing packets were observed. The data missing problem was related to the science TM packets only. In total, **1632 science TM reports were lost** along the Interference Part 1B scenario. Saturation of the SSMM memory allocated for GIADA (1 Mbytes) was observed since the beginning of the science data down-link. The saturation was caused by the high production rate (already observed during the previous Interference Part 1A) of GDS 'Ghost events' and by the start time of the science data down-link from the SSMM which was (as planned) few hours after GIADA science was enabled. It is suggested **to increase the detection threshold of the Left Channel up to 1-1.2V** and to **ask for a larger SSMM memory allocated to GIADA (of the order of 5-6 Mbytes).**
- 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 current consumption measured in Normal mode for +5V, +15V and –15V is about 1110÷1090mA, 440÷450mA and 290÷300mA respectively. These values are consistent with previous Part 1A Interference scenario.** As expected, the +5V current consumption decreases when the temperature increases due to the behaviour of the lasers and the relevant electronics drivers.
- The Cover (open & close) operations were successfully performed. However, to avoid the cover bouncing in the close position and thus the cover can remain open, it is suggested for the next tests to **skip the cover close command in the sequence prior to start power-off OBCP.**
- As expected, it is observed that the Laser light decreases when the Temperature increases. 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 1). After GIADA enters in Normal Mode and science TM is enabled, a flood of TM packets (from a range of 1 packet every 2.7 s, at the begin of test, to 1 packet every 1.8 s, before GIADA is entered in Safe mode) is received after the lasers are switched on. In this condition, few GDS 'Ghost detection' on Right channel and several GDS 'ghost detections' on Left receiver are found (GDS production rate is detailed in Section 5.1.3.2) due to the level of the internal stray-light (background noise) in combination with electronic noise. Considering the start of the SSMM down-link and this science data production rate, the SSMM file memory allocated for GIADA resulted saturated and science TM were lost.

- The Impact sensor (IS) has produced no 'ghost events'. The IS sensor calibration is nominal and it is confirmed, as experienced during the Interference part 1A, that the **Channel C voltage and delay time measurements are not stable** during the internal calibrations. The Channel E has not produced detections due to the unchanged gain configuration (low). The other channels (A, B and D) show a quite reproducible calibration data set: only four responses of channel D and one of channel A are quite different from the others. In general, the IS channel outputs are stable along all the Interference part 1B test, as resulting from the noise level measured before the calibration start. The channel response during the calibration seems to slightly depend on the IS sensor temperature.
- The GDS left receiver seems more noisy when all the other payloads are switched-on and operating. Moreover the standard deviation seems increasing when the temperature increases.
- **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:

- It is suggested to **increase channel C detection threshold** (e.g. 100/150mV) and compare the obtained results. Since Channel C seems noisy, a higher threshold should keeps the channel detection less susceptible to noise.
- 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 and start time, it can be possible to saturate the SSMM memory file allocated to GIADA and thus loose 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.**
- **The connection report (17, 2), being it un-synchronised (time quality = bad), seems marked by DDS with a wrong UTC time (refer to section 5.1.1). ESOC to investigate on this subject.**

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