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FROM : A. Ricciu, M. Vitta **DATE :** 07/10/2005

REF : 50948 **PROJECT Nr:** 1916 **PAGE:** 1 **OF :** 7

INTERNAL COPIES (e-mail): M. Vitta, E. Francini

SUBJECT : Major NCRs

Dear Sirs,
Please find attached the major NCRs NCR-HERS-CGS-B-004 and NCR-DPU-CGS-B-032 (related to the old DPU-FIRST contract).

The original documents will follow by ordinary mail.

Best regards,

Alessandro Ricciu

Massimo Vitta

CARLO GAVAZZI SPACE SpA

HERSCHEL DPUs/ICU

NON CONFORMANCE REPORT

NCR ref: 1 | Doc.N°: NCR-HERS-CGS-D-004 | Rev.: 1 | Date: 26/09/2005 | Page 1 of 2 | attach: /

2 NCR Title: unreliability of the Boot SW Telemetry packet

IDENTIFICATION

3 Supplier	4 Purchase Order N°.	5 Model	6 Subsystem	7 Procedure/Work Item N°
		CFM HIFI (1916)	NA	NA

8 NC ITEM Identification	9 Drawing N°. Rev.	10 P.N. / C.I. N°	11 Serial N°
HERSCHEL DPUs/ICU CFM	12-GEN-05.00 ver 1.0	12-GEN-05.00	

12 Next Higher Unit Id.	13 Drawing N°. Rev.	14 P.N. / C.I. N°	15 Serial N°.
NA	NA	NA	NA

DESCRIPTION

16 NON CONFORMANCE Detected During:

RECEIVING INSP. [ ] MANUFACT. [ ] ASSEMBLY/INTEGRATION [ ] FINAL INSPECTION [ ] TEST [X] OTHER..... [ ]

17 Initiator, Dept., Date, Signature : A. Bertoli SW Engineer (26/9/2005)

18 Description of NON CONFORMANCE

Unreliability of the telemetry packets APID 400 of the boot software during the OBS uploading procedure. The following errors were detected and SPRs were raised by IFSI.

- The APID counter uncorrectly managed when TM(5,1) and TM(5,4) is received
- The TM(5,4) packet page lost is not received when one TC is lost
- During the OBS uploading some TM(5,1) packets have an uncorrect CRC

18 Requirements violated

BSRD-100,
BSRD-150
BSRD-240

INTERNAL NRB DISPOSITIONS

20 INTERNAL NRB Dispositions:

1)other informations about the problems
2) investigation of the problems

21 Verifications

See page 2

22 Suspected cause of NC: HANDLING [ ] TRANSPORTATION [ ] TEST EQUIPMENT [ ] TOOLS [ ] SW [X] DESIGN [ ]
OPERATOR/PROCEDURE ERROR [ ] PART [ ] MATERIAL [ ] PROCESS [ ] TEST [ ] OTHER..... [ ]

23 Classification: MINOR [ ] MAJOR [X]

Corrective/Preventive Actions; 24

25 REQUEST FOR WAIVER: YES [ ] NO [ ] N°

26 Analysis Required: YES [X] NO [ ] N°

27 Other related documents:

Department:	28 P.A.	29 Syst. Engineering	30 Sw Engineering	30 P.M.	31 C.C.
Name:	M. Viale	G. Megistrali	A. Bertoli	A. Ricciu	C. Cinquepalmi
Signature:					
Date:	06/10/05	6/10/05	5/10/2005	6/10/05	6/10/05

CUSTOMER/HIGHER LEVEL CONTRACTOR NRB DISPOSITIONS

32 CUSTOMER/HIGHER LEVEL CONTRACTOR NRB Dispositions (Class Major Only):

21 Verifications

33 Finally determined Cause of NC

34 Corrective/Preventive Actions;

35 Customer/HLContractor Approval:

Department:				
Name:				
Signature:				
Date:				

36 CLOSE OUT CERTIFICATION

CGS PA/QA	PA/QA Stamp

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0 **HERSCHEL DPUs/ICU**

NON CONFORMANCE REPORT

1 NCR ref

Doc N°: NCR-HERS-CGS-D-004
Rev.: 1 Date: 26/09/2005
Page 2 of 2 attach: /

37 **CONTINUATION SHEET**

X SUSPECTED CAUSE OF NC ☐ INTERNAL NRB DISPOSITION ☐ DESCRIPTION OF NC
☐ FINALLY DETECTED CAUSE ☐ CUSTOMER NRB DISPOSITION ☐ CORRECT/PREVENT. ACTIONS
☐ REQUIREMENTS VIOLATED

21 Verifications

1) Other Information about the problems — 26/09/2005

1) Two APID counters are managed for the TM(5,1) and TM(5,4) packets. Basically there two separate APIDcounter for TM(5,1) packet and TM(5,4) packet. This is not correct. The same APID counter should be used for both TM packets
2) The TM(5,4) memory page lost is not generated when one TC is not received from the boot software during the uploadng procedure.
3) during the OBS uploading procedure the CRC of some TM(5,1) packets transmitted by Boot Sw is wrong

The Software Problem report was raised by IFSI, The HIFI SPR references are SPR-384, SPR-383, SPR-382

Current version of the Boot Software 12-GEN-05.00ver1.0

2) Investigation of the first Poblem — 26/09/2005

Performing the inspection of the code, the incorrect management has been idenified. Actually two counters are managed for APID counter of the TM(5,1) and TM(5,4) packets. The function SendTelemtry has been modified and only one counter has been inserted for the APID management.

3) investigation of the second Problem — 26/09/2005

Performing code inspection of the Page lost management the problem has been identified. Uncorrect TC page counter initialization and compare condition has been detected and isolated. The TCManagement function has been modified concerning the page lost check.

4) investigation of the third problem — 27/09/2005

Performing the inspection of the code no error was detected but several access to the MILBUS has been identfied during the Telemetry packet preparation. The Milbus management during the Telemetry packet preparation was changed. Basically now the packet is prepared in data memoryand it is written to the Milbus one shot.

5) Test of the new Boot Software — 29/09/2005

The test procedure for the Memory Page lost detection has been changed. Instead of select Start / stop button on CDMS simulator (this doesn't allow to control how many TCs are lost), a TC is deleted from the EGSE TCs set and the uploading is launched.

The same problems have been verified and detected on the CFM1 unit available at CGS, with Boot Sw 12-HERS-05.00ver1.0. In particular concerning the CRC problem the following CRC error rate was detected according to the error rate commincated by IFSI,
- about 2 / 3 wrong CRC packets during 1 OBS uploading (about 1600 TM(5,1) packets).
Therefore the Tests for the code correction verification have been performed on CFM1

After the installation of the Boot SW with the new modification the following testa have been performed

- about 30 tests of Load and Boot procedure and 500 uploading procedures were performed during the test session. A program for CRC check has been generated to check the CRC of the received telemetry packets
  - At the end of the test session the following results have been found: about 500000 telemetry TM(5,1) packets has been received and no CRC errors in the TM(5,1) packets have been detected.
- The APID counter is correctly managed and the TM(5,4)
- TM(5,4) packet page lost error messages is generated when one TC is lost.

The modification will be implemented in the Boot software 12-GEN-05.00 ver1.1
The modification shall be applicable to all the units PACS, SPIRE, HIFI

6) Actions and Conclusion — 13/10/2005

The Boot Software 12-GEN-05.00ver1.1 will be initially installed on CFM HIFI. The Boot SW upgrade for the other two units PACS and SPIRE will be decided after the 13/10/2005 progress meeting concerning the consolidation of the Boot Sw requirements.

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HSO/FIRST-DPU

NON CONFORMANCE REPORT

1 NCR ref

Doc.Nº: NCR-DPU-CGS-B-032
Rev.: 1 Date: 28/9/2005
Page 1 of 2 attach: Ann. A

2 NCR Title: Anomaly on power section of PACS DPU AVM1

IDENTIFICATION

3 Supplier	4 Purchase Order Nº.	5 Model	6 Subsystem	7 Procedure/Work Item Nº
CGS	NA	EM	NA	NA

8 NC ITEM Identification	9 Drawing Nº. Rev	10 P.N. / C.I. Nº	11 Serial Nº
DC/DC board	DPU-EM-300.00-0 /	DPU-EM-300.00-0	02
12 Next Higher Unit Id.	13 Drawing Nº. Rev.	14 P.N. / C.I. Nº	15 Serial Nº.
NA	NA	NA	-

DESCRIPTION

16 NON CONFORMANCE Detected During:
RECEIVING INSP. [ ] MANUFACT. [ ] ASSEMBLY/INTEGRATION [ ] FINAL INSPECTION [ ] TEST [X] OTHER [ ]

17 Initiator, Dept., Date, Signature G. Magistrati Orb.Infr. 28/09/05

18 Description of NON CONFORMANCE
During PACS IMT testing 2 power anomalies have been detected as described in NCR HP-113000-ASED-NC-141 (see annex A)

19 Requirements violated
NONE

INTERNAL NRB DISPOSITIONS

20 INTERNAL NRB Dispositions:
The board was provided inside a box, produced by IFSI and not included in the CGS supply

Continues on next page

21 Verifications

22 Suspected cause of NC:
HANDLING [X] TRANSPORTATION [ ] TEST EQUIPMENT [ ] TOOLS [ ] SW [ ] DESIGN [ ]
OPERATOR/PROCEDURE ERROR [ ] PART [ ] MATERIAL [ ] PROCESS [ ] TEST [ ] OTHER [ ]

23 Classification
MINOR [ ] MAJOR [X]

24 Corrective/Preventive Actions:
None

25 REQUEST FOR WAIVER
YES [ ] NO [X] Nº

26 Analysis Required
YES [ ] NO [X] Nº

27 Other related documents:
None

Department:	28 P.A.	29 Syst. Engineering	30 P.M.	30	31 C.Q.
Name:	M. VITA	G. MAGISTRATI	A. RICCU		J. CINQUEPALM
Signature:					
Date:	28/9/05	28/9/05	28/09/05		30/9/15

CUSTOMER/HIGHER LEVEL CONTRACTOR NRB DISPOSITIONS

32 CUSTOMER/HIGHER LEVEL CONTRACTOR NRB Dispositions (Class Major Only):

21 Verifications

33 Finally determined Cause of NC

34 Corrective/Preventive Actions:

35 Customer/HLContractor Approval:

Department:				
Name:				
Signature:				
Date:				

36 CLOSE OUT CERTIFICATION

CGS PA/QA	PA/QA Stamp

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HSO/FIRST-DPU

NON CONFORMANCE REPORT

1 NCR ref

Doc.N°: NCR-DPU-CGS-B-032

Rev.: 1 Date: 28/9/2005

Page 2 of 2 attach: Ann. A

37 CONTINUATION SHEET

☐ SUSPECTED CAUSE OF NC ☒ INTERNAL NRB DISPOSITION ☐ DESCRIPTION OF NC

☐ FINALLY DETECTED CAUSE ☐ CUSTOMER NRB DISPOSITION ☐ CORRECT/PREVENT. ACTIONS

☐ REQUIREMENTS VIOLATED

1) Perform an Impedance measurement between 28Vdc Hot and Return side at box level on J01

2) Remove the top cover of the box and to measure the impedances among the secondary power voltages and the return line

3) Power on the Unit and to measure the current provided to the unit

4) Extract the DC/DC board from the box

5) Perform a visual inspection on the DC/DC board

6) Measure the continuity of the Filter Inductor placed on the input of the 28Vdc feed

7) Bypass the Inductor using a wire soldered on the soldering side of the DC/DC board

8) Test the DC/DC board in stand alone configuration

9) Remove the bypass and refresh/reinforce the soldering points of the inductor

21 Verifications

1) CLOSED. 28/9/05
A value of 300kohm approx. has been measured. Sucai.

2) CLOSED. 28/9/05
No anomalous values have been detected (no permanent short circuit are present on secondary side of the DC/DC). Sucai.

3) CLOSED. 28/9/05
A current consumption of 0A @28Vdc has been measured; it seems that also the input stage circuitry of the DC/DC is not supplied. Sucai.

4) CLOSED 28/9/05 Sucai.

5) CLOSED ~~28/09/05~~
NO PROBLEMS DETECTED
C. G. S.

6) CLOSED 28/9/05
An anomaly has been detected: The inductor L1 is open. Sucai.

7) CLOSED 28/9/05 Sucai.

8) CLOSED 28/9/05
The DC/DC board has been powered ON with dummy loads and it works properly. Sucai.

ANNEX A TO: NCR-DPU-CGS-3-032

Wednesday September 21 2005 4:56 PM

Company	Project Name	NCR-No: HP-113000-ASED-NC-1491
ESTEC	HERSCHEL-PLANCK	Related internal NCR-No:
		Critical Item: Yes [X] No [ ] Revision 0
		Page 1 of 2

Nonconformance Report

NCR Title PACS DPU power anomaly

NC Item Identification PACS

Next Higher Assembly HERSCHEL INSTRUMENTS AND TELESCOPE (CFE)

Drawing No | Sr No.

Procedure No

Supplier MPE | Purchase Order

Subsystem | Model EQM

NC Observation
Date: 21-SEP-05 Location: ASED OTN

NC Detected During Test

Description of Nonconformance | Requirements Violated

During PACS IMT testing 2 power anamolies were seen as follows:
1) DPU rebooted itself during testing -> No power surge was identified on PLM SCOE
2) DPU's power consumption dropped to zero during test.
PACS (all modules) were powered down on request of PACS instrument team.
DPU was restarted after 40 minutes, power consumption stayed at 0 A.

Power cable was checked with breakout box.
Result: 28 V is available at the end of the PLM SCOE cable.

NRB to be held, to decide on further investigations

Initiator: Date, Name and Signature 21-SEP-05 D. HENDRY

Internal NRB Dispositions

21.09.05 Internal NRB, ASED,PACS,ASP,ESA
Perform initial investigations as follows.
Disconnect cable DB 32 GO1 3-22 and 4-23 measure voltage result 28 volts.
Insert break out box in line GO1 and reconnect harness,measure voltage during DPU switch on, result initial current peak of 150 ma then zero current.
Disconnect GO1 and connect 50 ohm load and measure switch on current and voltage, result 28v ok and 250 ma current ok
Initial conclusion power SCOE is operating ok and fault is within the DPU.
Convene customer NRB

Ref. to MoMs

Classification:
Major [X] Minor [ ]

Customer Notification

Cause of NC Ref to Failure Report	Corrective/Preventative Actions	Verification

	PA	Engineering								
Date: Name: Signature:	21-SEP-05 D.Hendry	21-SEP-05 S.Idler	21-SEP-05 D.Hendry	21-SEP-05 S.Ilsen	21-SEP-05 C.Schlosser	21-SEP-05 A.Heske	21-SEP-05 W.Pinter-Krainer	21-SEP-05 G.Doubrovik	21-SEP-05 H.Feuchtgruber	21-SEP-05 E.Wiezorrek

Wednesday September 21,2005 4:55 PM

Company	Project Name	NCR-No: HP-113000-ASED-NC-1491
ESTEC	HERSCHEL-PLANCK	Related Internal NCR-No:
		Critical Item: Yes [X] No [ ] Revision 0
		Page 2 of 2

Nonconformance Report - Continuation Sheet -

Customer NRB Dispositions (Class Major Only) Ref. to MoMs

Verification

21.09.05 ESA,ASP,ASED,PACS,
Following Initial investigations it was considered that the SCOE and harness were not the cause of the failure and PACS recommend to deintegrate the DPU and return to the supplier for failure investigations.
PACS state that no similar problem has been seen during any lower level testing, during ILT the instrument was power on for a max of 3 days, during the present IMT phase PACS has been on for max of 5 days (in stand by during HIFI IMT and weekend). Unit temp was 28 degees C.
All Instruments use the same design of DPU I/F power circuit
PACS have a replacement unit model CFM at MPI which can be available at OTN by 09-00 tomorrow, this unit needs to have a OBSW upload with Issue 7.68 ,present unit has 7.65, the new issue is for internal H/W changes and to be compatible with I EGSE
AI/1 PACS
The unit will have stand alone test at MPI following OBSW upload.
The Mechanical I/F of the CFM is the same as existing AVM.
AI/2PACS
The electrical I/F (no redundancy)Connector configuration with respect to which redundancy is connected needs to be confirmed by PACS to ensure correct harness length.
AI/3 PACS
PACS to raise NCR to track the failure investigations of the AVM
List of activities:
1)Swith off HIFI and SPIRE
2) Switch off power SCOE and CDMU FE
3)Check grounding of power SCOE and DPU.
4) Electrically disconnect DPU using general ESD protection no specific order for connector removal is required.
5)Mechanically deintegrate unit.
6)Perform SCOE power on electrical check and current and voltage measurement using dummy loads (analogue measurement).
7)Mechanically integrate CFM
8)Electrical integration check of power and isolation
9)perform DPU power up check.
10)Pack AVM in transport container and return to supplier for failure investigations.

Finally Determined Cause of NC Ref to Failure Report	Corrective/Preventative Actions	
Request for Waiver Yes [ ] No [ ] Reference:	Alert Yes [ ] No [ ] Reference:	Other related Documents
		NCR Close Out

NRB Approval
Organization/
Name

Date, Signature