STEREO IMPACT

PROBLEM REPORT
PR-3005
Waterman/Walpole
8/17/04

PR Numbers: 1xxx=UCB, 2xxx=Caltech/JPL, 3xxx=UMd, 4xxx=GSFC/SEP, 5xxx=GSFC/Mag, 6xxx=CESR, 7xxx=Keil, 8xxx=ESTEC, 9xxx=MPAe

Assembly : Time of Flight Electronics	**SubAssembly : ATOF**
Component/Part Number: HVPS FM 1/ 52103	**Serial Number: 002**
Originator: Waterman/Walpole	**Organization: UMd**
Phone : 301-405-4517	**Email : waterman@uleis.umd.edu**

Failure Occurred During (Check one √)

X Functional test ☐ Qualification test ☐ S/C Integration ☐ Launch operations

Environment when failure occurred:

☐ Ambient ☐ Vibration ☐ Shock ☐ Acoustic
☐ Thermal **X** Vacuum ☐ Thermal-Vacuum ☐ EMI/EMC

Problem Description

The problem occurred during testing of the ETU Telescope and the flight HVPS S/N002 with the ETU Electronics. The ETU Telescope and the flight HVPS were both in the vacuum chamber under vacuum. The voltage monitor of the HVPS began to oscillate up and down. This occurred when the voltage was in a steady state, last command of B8 (3810V output) and then was commanded to 0 volts using the HVRAMP 00. The monitor voltage performed as expected until the voltage reached approximately 1000V. At that point, the voltage monitor jumped up to 5 volts (5000V output) and then to 2.7V (2700V output) and then down to 0.8V (800V output). The voltage monitor then jumps back up to 5 volts and then to 2.7V and then down to 0.8V. This cycle repeated until the HVPS was manually commanded to a particular voltage level.

Analyses Performed to Determine Cause

We discussed the command problem with the Software engineer, Tom Nolan. Tom explained that the command does not have any feedback, it commands the HVLEVEL to a new value every second. Further investigation was performed to record the actual behavior of the HVPS command voltage. This was accomplished by the following. The testing involved the ETU electronics without the HVPS. Using an HP Voltmeter and Lab View, the HVPS command voltage was recorded and plotted, see page two plot. The HVPS was commanded to C8 (4.14V). Next the HVPS was commanded to 0V using the HVRAMP 00. The command voltage begins to step down towards 0V. The command voltage never reaches 0V. The command voltage reaches approximately 0.250V and then, in one step jumps back to approximately 4.75V. The voltage then begins to step down towards zero but never reaches zero. The command voltage steps down to approximately 0.250V. Then in one step, it jumps back up to approximately 4.75V. This cycle continued repeating, until a manual command was issued. The electronics and the MCP that were exposed to the voltage were non-flight. The HVPS, on the other hand was never operated outside its expected operating limits. It had a good vacuum, it was designed to supply the voltages it provided and it was never subject to transient loads due to breakdowns in the telescope.

Corrective Action/ Resolution

X Rework ☐ Repair ☐ Use As Is ☐ Scrap

The conclusion is that the problem is due to a Software error and is not due to a Hardware problem. The Software Engineer, Tom Nolan was contacted, and his subsequent investigation revealed the source of the problem in software. The software problem was fixed and a new version of the MISC software was provide to UMd. The software version number was SIT_FSW_20040818 (Build 1.1) and was changed to SIT_FSW_20040903 (Build 1.2). This software was loaded into the ETU electronics and the tests of the HVPS command voltage level were repeated, this time with correct results. Details of the problem and correction performed reside on the IMPACT SIT and HET flight software configuration reporting system website http://epact2.gsfc.nasa.gov/SCRS/scrs.html. Reference #SCRS026.

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Date Action Taken:_____9/3/04_____ **Retest Results**:__unit performed nominally after software fix_

Corrective Action Required/Performed on other Units □ Serial Number(s): ___use 0903 software version in fm1 and fm2 units_____

Closure Approvals

Subsystem Lead:	_____	Date:_____
IMPACT Project Manager:	_____	Date _____
IMPACT QA:	_____	Date:_____
NASA IMPACT Instrument Manager:	_____	Date:_____