STEREO IMPACT

PROBLEM REPORT
PR-1039
FM2 STE-D Door
2005-04-21

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

Assembly : IMPACT SWEA/STE-D	**SubAssembly :** STE-D Door
Component/Part Number:	**Serial Number:** FM2
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Failure Occurred During (Check one √)

√ Functional test □ Qualification test □ S/C Integration □ Launch operations

Environment when failure occurred:

□ Ambient □ Vibration □ Shock □ Acoustic
□ Thermal √ Vacuum □ Thermal-Vacuum □ EMI/EMC

Problem Description

FM2 STE-D door failed to open completely during thermal vac hot plateau #4 CPT test. Repeated attempts with increased motion timeouts failed to open the door. A review of the recorded door opening times indicate that the door started to mis-behave intermittently after vibration and got progressively worse through thermal vac.

Analyses Performed to Determine Cause

Chamber was broken and the unit was observed while door actuations were attempted. It was determined that the door actuation spring tension adjustment was not correct, and that the setscrew that is supposed to hold the tension adjustment screw in place was missing. The setscrew was not found in the area so it is believed that the set screw was never installed.

Corrective Action/ Resolution

√ Rework □ Repair □ Use As Is □ Scrap

The door was re-adjusted and the set screw installed. The door was cycled 100 times (at ambient) to verify that the setting is stable. The unit went through workmanship vibration, passed post-vib testing, and back into thermal vac. The door worked fine during the first hot cycle, but failed cold. The unit was again removed from the chamber and analyzed. It was found that the actuator wires had been 'cooked' due to repeated attempts to open with long motion timeouts. We believe that the actuator wire was partially damaged during the first problem due to unsuccessful motion attempts with long timeouts such that it could no longer actuate the door under the stress of very cold temperatures. The actuator wires were replaced and the unit was returned to thermal vac for the final 4 cycles. During the first and last hot and cold soaks 20 door actuations were performed successfully with no trend in door timing.

Date Action Taken: 4/21/2005, 5/3/2005 **Retest Results**: Success

Corrective Action Required/Performed on other Units □ Serial Number(s): _

No significant adverse trend was seen in a review of the other 3 STE units door timing. The other 3 STE doors were inspected to verify that the set screws were in place (no disassembly required)(FM1 STE-U, STE-D inspected at APL on 5/27/2005). The other doors have no history of failed actuations with their current actuator wires, so we believe their actuator wires are fine. Therefore the wire in these units were not subjected to any overrides in the timeout. Software safe guards are in place within the flight software and the Command and Telemetry GSE.

Closure Approvals

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