# STEREO
# *IMPACT*

## FM2 IDPU Thermal Re-test Report

IMPACT-IDPU-FM2-Thermal-Report.doc
Version A – 2005-Jun-17

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## Document Revision Record

| Rev. | Date | Description of Change | Approved By |
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| A | 2005-Jun-17 | Preliminary Draft | - |
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# 1. Overview

## 1.1. *Introduction*

The Instrument Data Processing Unit (IDPU)  is the part of the STEREO IMPACT instrument suite.  It resides inside the spacecraft, hard-mounted (conductively coupled) to the deck.

After completion of the environmental tests on the FM2 IDPU, there was a problem in EMC test which required replacement of the common mode filter choke in the low voltage power converter (see IMPACT PFR 1042 and reference 5).   Following that rework a workmanship vibration was performed, followed by a 4-cycle thermal cycle test as called out in this test report.

## 1.2. *Applicable Documents*

The following documents are closely interrelated with this specification.  All documents can be found on the Berkeley STEREO/IMPACT FTP site unless otherwise indicated:

http://sprg.ssl.berkeley.edu/impact/dwc/

1. IMPACT IDPU TVAC TEST PLAN
2. APL Document APL 7381-9003 Rev A – STEREO Environment Definition, Observatory and Instrument (on APL web site)
3. TestProcs/IMACT-IDPU-CPT
4. TestReports/IMPACT-IDPU-FM2-Tvac-Report
5. TestReports/IMPACT-FM2-BoomSuite_EMC_Report
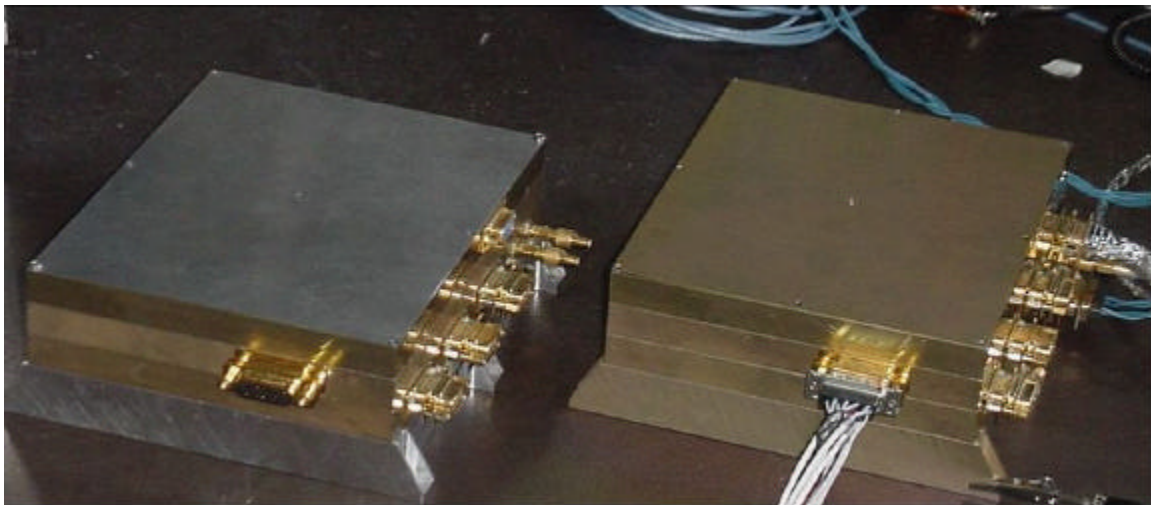6. TestProcs/IMPACT-IDPU-TVacProc



Fig 1.  FM1 and FM2 IDPU

## 2. Test Setup

The test was run in the black portable Tenny at U. C. Berkeley SSL 320. The unit was bagged and purged to prevent humidity and frost. The unit was connected as called out in reference 6 except the flight boom was not available, so ETU MAG and STE-U were used instead. The data logging system is primitive for this thermal system. Temperatures from an external TC mounted to the IDPU used to determine when temperature was reached were recorded manually (see test log).

Four cycles were performed 5 degrees past the operating temperatures designated in reference 6 (i.e. –28 to +60C). CPTs were run at each plateau, and cold-start was performed hot and cold on the first and last cycles.

## 3. Test History

This test was run from June 8-13 2005. The unit was left powered on but with the chamber off over night on the 8th to collect operating hours and get a good purge of the system (the system self-heated to ~44C). The unit was powered off and the chamber sent cold. At cold soak #1 the system was cold-started at both 24V and 35V bus voltage, and a CPT was run. After 1 hour at soak the system was powered off and sent warm. At warm soak #1 the system was again powered-on at both 24V and 35V and a CPT was run. After an hour the unit was sent cold again. At cold soak #2 another CPT was run. After an hour the system was powered off for the night while the chamber warmed up to hot #2. On June 10th the system was powered up and a CPT was run. After an hour the system was sent cold. At cold #3 a CPT was run, and after an hour the system was sent hot. At Hot #3 the CPT was run and the chamber was powered off while the system remained on for the week-end to collect operating hours. On June 13 the chamber was sent cold, and after a while the instrument was powered off. At cold#4 the system was cold-started at 24V and 25V and a CPT was run. The system was then powered off while the chamber warmed up. At hot #4 the system was again cold-started at 24V and 35V and a final CPT was run. After an hour the chamber and the instrument were powered off, ending the test.

All CPTs were nominal and no problems were encountered.

## 4. **Temperature Profile**

The TC used to control the chamber was not recorded. ISTEUDACTemp is an instrument thermistor mounted to the STE-U interface board in the IDPU.

**FM2 IDPU Thermal Cycle Test, ISTEUDACTemp**
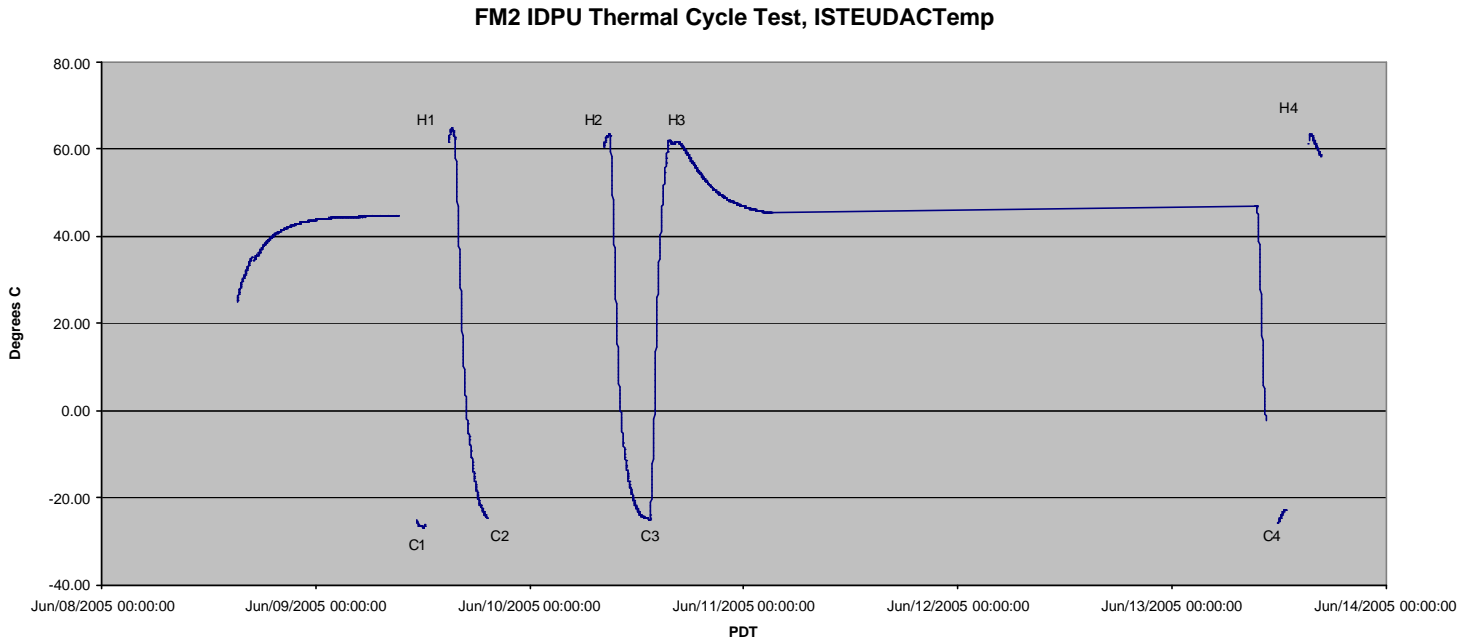
## 5. Trending

### 5.1. *Trending Data Explanation*

- MAG and STE-U trend data was not taken since the flight sensors were not attached.

- IDPU trends show the primary current (data logger) and secondary voltages (instrument housekeeping).  No significant trends.

## 5.2. *IDPU Trending Data*

IDPU FM2 Performance Trend

| Date | File | Test | S/W Version | IDPU Temp | Primary Current, mA | Bus Voltage | 2.5V | 5VD | 5VA | 12VA | STE-U? |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 202 | 28 | 2.49 | 4.98 | 4.86 | 12.92 | |
| Jun 8 2005 | B0506081503.tlm | Post-vib CPT | 24 | 37 | 236 | 24 | 2.49 | 4.98 | 4.85 | 12.92 | ETU |
| | | | | | 165 | 35 | 2.49 | 4.98 | 4.86 | 12.93 | |
| | | | | | 200 | 28 | 2.51 | 5.00 | 4.92 | 12.86 | |
| Jun 9 2005 | B0506090000.tlm | Thermal Retest Cold #1 | 24 | -27 | 235 | 24 | 2.51 | 5.00 | 4.91 | 12.81 | ETU |
| | | | | | 163 | 35 | 2.51 | 5.00 | 4.91 | 12.86 | |
| | | | | | 205 | 28 | 2.49 | 4.98 | 4.82 | 12.94 | |
| Jun 9 2005 | B0506090000.tlm | Thermal Retest Hot #1 | 24 | 64.5 | 235 | 24 | 2.49 | 4.97 | 4.82 | 12.89 | ETU |
| | | | | | 163 | 35 | 2.49 | 4.98 | 4.81 | 12.94 | |
| Jun 9 2005 | B0506090000.tlm | Thermal Retest Cold #2 | 24 | -22.6 | 193 | 28 | 2.51 | 5.00 | 4.92 | 12.88 | ETU |
| Jun 10 2005 | B0506100813.tlm | Thermal Retest Hot #2 | 24 | 63 | 204 | 28 | 2.49 | 4.98 | 4.82 | 12.95 | ETU |
| Jun 10 2005 | B0506100813.tlm | Thermal Retest Cold #3 | 24 | -24.2 | 195 | 28 | 2.51 | 5.00 | 4.92 | 12.88 | ETU |
| Jun 10 2005 | B0506100813.tlm | Thermal Retest Hot #3 | 24 | 62 | 203 | 28 | 2.49 | 4.98 | 4.80 | 12.94 | ETU |
| | | | | | 200 | 28 | 2.51 | 5.00 | 4.91 | 12.86 | |
| Jun 13 2005 | B0506130916.tlm | Thermal Retest Cold #4 | 24 | -24.2 | 230 | 24 | 2.51 | 5.00 | 4.91 | 12.86 | ETU |
| | | | | | 163 | 35 | 2.51 | 5.00 | 4.92 | 12.86 | |
| | | | | | 203 | 28 | 2.49 | 4.98 | 4.79 | 12.95 | |
| Jun 13 2005 | B0506130916.tlm | Thermal Retest Hot #4 | 24 | 63.1 | 235 | 24 | 2.48 | 4.97 | 4.79 | 12.86 | ETU |
| | | | | | 163 | 35 | 2.49 | 4.97 | 4.79 | 12.92 | |