

STEREO IMPACT Technical Progress Report

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Subject: IMPACT Monthly Technical Progress Report, Contract NAS5-00133

Lil:

Enclosed is the monthly technical progress report for the STEREO IMPACT project for the month of November 2003.

Sincerely,

David Curtis
IMPACT Project Manager
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CC:

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IMPACT Team

STEREO IMPACT Technical Progress Report

1. IMPACT Overview

This report is presented in sections by institution. Section 1 is an IMPACT Project Manager / System Engineer's overview.

1.1. Contracting / Funding

Funding through mid-November has been received. We are starting to go into the red at UCB (UCB has forward-funded Caltech and Umd through December to avoid delaying work there). Because of pipe-line delays in the system through to the subcontractors (Caltech and UMD) it is important that IMPACT be funded somewhat in advance of expected spending.

1.1.1. Liens

This is a list of Liens. Liens for activities at other institutions are sometimes repeated in their subsections of this report. These liens are estimated additional costs that might be incurred if problems happen. Only problems with a significant likelihood of occurrence are tracked. These liens are usually associated with risks in the risk list (see section 1.5), and you can see the predicted likelihood of occurrence there. Some of these liens have been requested to be encumbered by Project, marked (*).

UCB:

No.	Cause	Amount	Date
1*	LVPS schedule delays extend manpower (Risk UCB29). Cost a 1-month delay at full LVPS team spending rate.	\$35,000	01/04
2	Late failure in thermal vac requires rework/retest (Risk UCB27, etc).	\$30,000	02/04
3	Testing failure requires rebuild/retest a board (using existing spare parts)	\$20,000	~02/04
4	EMC rework and retest required (Risk UCB11). Assume rework can be done in a week or two.	\$30,000	05/04
5	Schedule delays cause the consumption of boom suite schedule contingency (various risks). Cost 35 days of contingency at UCB I&T team rate.	\$50,000	07/04
6	STE calibrations sources. \$12,500 Quote is over the earlier ROM of \$10K.	\$2,500	11/04
7	SEP Thermostats. These were over the budgeted amount. Budget was \$10K at Caltech. Parts were actually \$21,200, paid by UCB (for now Caltech will hold the \$10K against other liens)	\$11,200	11/03

Caltech:

No.	Cause	Amount	Date
1	Budget does not contain funding for investigations of part failures or contamination failures, re-makes of boards if coupons fail, etc. The amounts and timing of these types of expenditures are largely unknown. Board re-makes are in the \$6,000 to \$12,000 range, per board type. The budget does contain funding for board reworks, including adding	\$12,000	12/03

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	haywires, etc.		
2	Unfunded schedule reserve (if we deliver in September 2004 as required rather than July 2004 as currently planned).	\$25,000	8/04
3	Bakeout plans need to be firmed up. May result in more time in JPL bakeout chambers	\$50,000	7/04
4*	GSE Software support (extend a few months after January 2004)	\$60,000	1/04
5*	Engineering Assistant (Risk UCB033)	\$24,000	1/04
6*	Engineering support to maintain schedule (Risk UCB033)	\$63,000	1/04
7*	Technician Support to maintain schedule (Risk UCB033)	\$38,000	1/04

UMd:

No.	Cause	Amount	Date
1	SIT foils fail acoustic test	\$20,000	2/04
2	SIT Vibration (currently planned to be combined with HET instruments, but may not work out)	\$15,000	2/04
3	Parts screening (some parts not yet Oked by PCB and may need addition screening)	\$10,000	9/03
4	Particle Calibration at BNL. This is desired but not required.	\$20,000	11/03
5*	Engineering Support to maintain schedule (Risk UCB033)	\$60,000	1/04

GSFC (Tycho):

No.	Cause	Amount	Date
1	Revise SEP Central/LET/HET vibration analysis if required	\$5,000	11/03
2*	Extra Solid-state Detector Lab manpower support to accommodate late detector delivery (Risk UCB033)	\$20,000	12/03
3	Travel for accelerator end-to-end test	\$5,000	12/03?
4	Tom Nolan flight software support (Risk UCB033)	\$15,000	2/04
5*	Engineering support to maintain schedule (Risk UCB033)	\$40,000	1/04
6			

1.2. Significant System-Level Accomplishments

- Participated in Contamination Control Committee telecom
- Participated in EMC Committee telecom
- Held Parts Control Board meeting to review and approve parts lists for boards ready for flight build

1.3. System Design Updates

- None

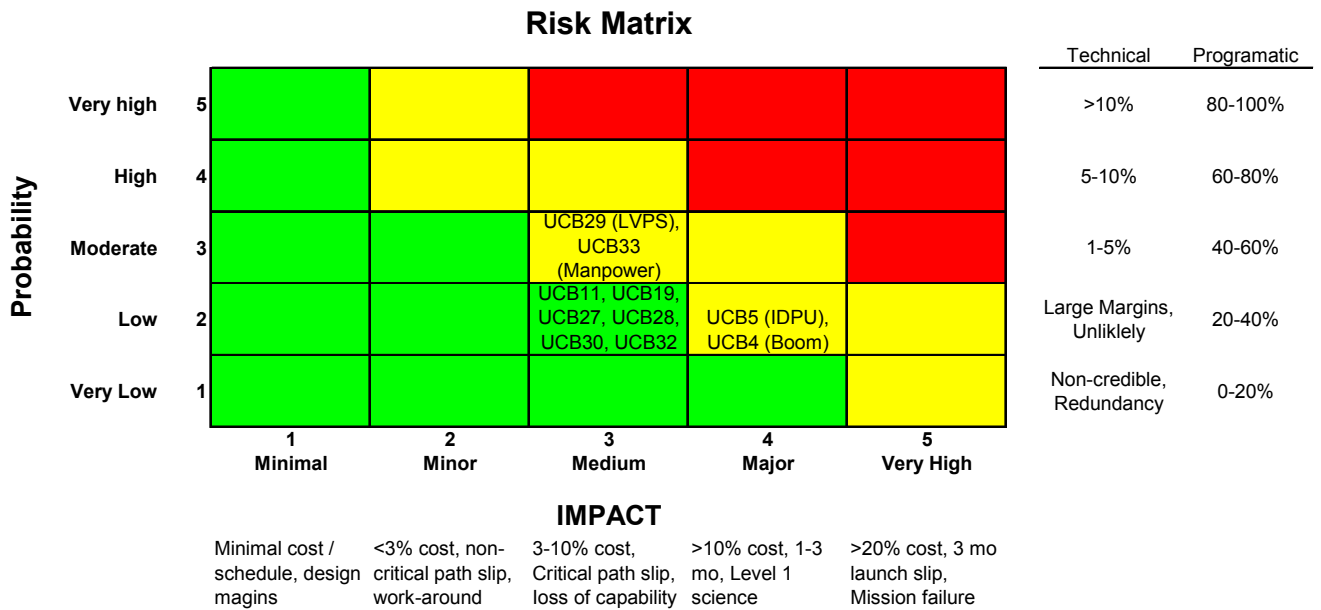
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1.4. System Outstanding Issues

- Cork contamination waiver submitted pending CCB action.
- SWEA VMI Multiplier MRB pending

1.5. Top 10 Risks

Top 10 risks are attached. The HET/LET detector mount issue (UCB31) has pretty much been closed out (off top 10 list). A new risk related to manpower to meet schedule has been added (UCB33).



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IMPACT Top Ten Risks 12/2003

No.	Risk Item	Score	Mitigation	Mitigation Schedule							
				PDR	EM Test	CDR	Sub-system Test	System Test	Env test	Early Orbit Test	
UCB_5	IMPACT boom is a new design. Failure could affect Imager pointing requirements as well as boom-mounted instruments.	MEDIUM	Design for reliability. Early prototype testing. Qual model testing completed. Adequate force margins demonstrated.	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM	LOW
UCB_4	The IDPU is a single point failure mechanism for the IMPACT suite and PLASTIC	MEDIUM	IDPU is a simple, reliable system. Extra attention has been paid to ensuring its reliability, minimizing the risk of fault propagation. Extensive EM & FM testing	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM
UCB_29	LVPS behind schedule, on critical path; further slipping could delay delivery to spacecraft	MEDIUM	Add manpower to LVPS task to avoid further slippage	MEDIUM	MEDIUM	MEDIUM	MEDIUM	LOW	LOW	LOW	LOW
UCB_33	Instrument fabrication & test schedule limited by available personnel	MEDIUM	Subcontract assembly work, authorize overtime, bring on new people	MEDIUM	MEDIUM	MEDIUM	LOW	LOW	LOW	LOW	LOW
UCB_11	Stringent EMI requirements may delay schedule if testing fails	LOW	Careful design, ETU power converter testing, early system testing	MEDIUM	MEDIUM	MEDIUM	LOW	LOW	LOW	LOW	LOW
UCB_27	Actel timing differences between flight & ETU parts may cause failures late in testing impacting delivery schedule	LOW	Do FM Thermal Vac early to allow time for finding and fixing timing problems; for designs on the critical path, consider installing a flight Actel in the ETU & thermal cycle.	MEDIUM	MEDIUM	MEDIUM	LOW	LOW	LOW	LOW	LOW
UCB_28	Thermal limitations of detectors result in a low bakeout temperature which might require a very long bakeout impacting delivery schedule	LOW	Bakeout subsystems prior to detector integration to reduce time of instrument-level bakeout; early bakeout	MEDIUM	MEDIUM	MEDIUM	LOW	LOW	LOW	LOW	LOW
UCB_19	Concern about fragility of ITO surfaces required to meet ESC requirements; failure will impact SWEA science	LOW	Replace ITO with more robust solution where possible; test ITO surfaces during I&T and replace when required	MEDIUM	MEDIUM	MEDIUM	LOW	LOW	LOW	LOW	LOW
UCB_32	Parts Review Boards & Parts Waiver process could delay flight fabrication	LOW	Work to get parts lists approved, waivers into system where PCB cannot agree.	MEDIUM	MEDIUM	LOW	LOW	LOW	LOW	LOW	LOW
UCB_30	SECCHI magnetics (especially filter when motor) may exceed magnetics requirement, impacting MAG science	LOW	Testing completed, shielding implemented.	MEDIUM	MEDIUM	MEDIUM	MEDIUM	LOW	LOW	LOW	LOW

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2. Berkeley Status

2.1. *Summary of Status*

Schedule status through November has been provided separately.

2.2. *Major Accomplishments*

SWEA/STE:

- SWEA/STE flight boards in fabrication.
- STE flight Preamp PWB coupons passed; being kitted for fab
- STE flight detector boards in fabrication; first batch ready to send to detector mounting subcontractor.
- STE, SWEA Pedestal, and STE-U preamp housing in flight fab

IDPU:

- DCB flight units have flight PROMs installed, being prepared for staking & conformal coat.
- Working on Build 3 for IMPACT.
- Full set of boom suite ETU assembled all together at the same time for system tests (see picture below)
- PLASTIC software Build #2.3 completed, ready for IDPU/PLASTIC ETU interface test scheduled for January, after Bern test.

LVPS/HVPS:

- SIT HVPS FM #1 completed test, needs final inspection before delivery.
- SWEA/STE-D LVPS re-layout complete, in review
- PLASTIC LVPS flight PWBs fabed, passed coupon analysis. Parts being kitted for flight build.
- SEP re-layout complete, boards in fab
- IDPU LVPS Layout modifications for flight continuing

Boom:

- All flight parts have been released and are out for manufacture, including rings. Many flight parts have been delivered and are in inspection.
- All flight and spare tubes have been delivered.

GSE:

- Continued additions to C&T GSE, SWEA/STE GSE.

2.3. *Design Updates*

- None.

2.4. *Outstanding Problems*

2.5. *New Problems*

2.6. *Top Risks.*

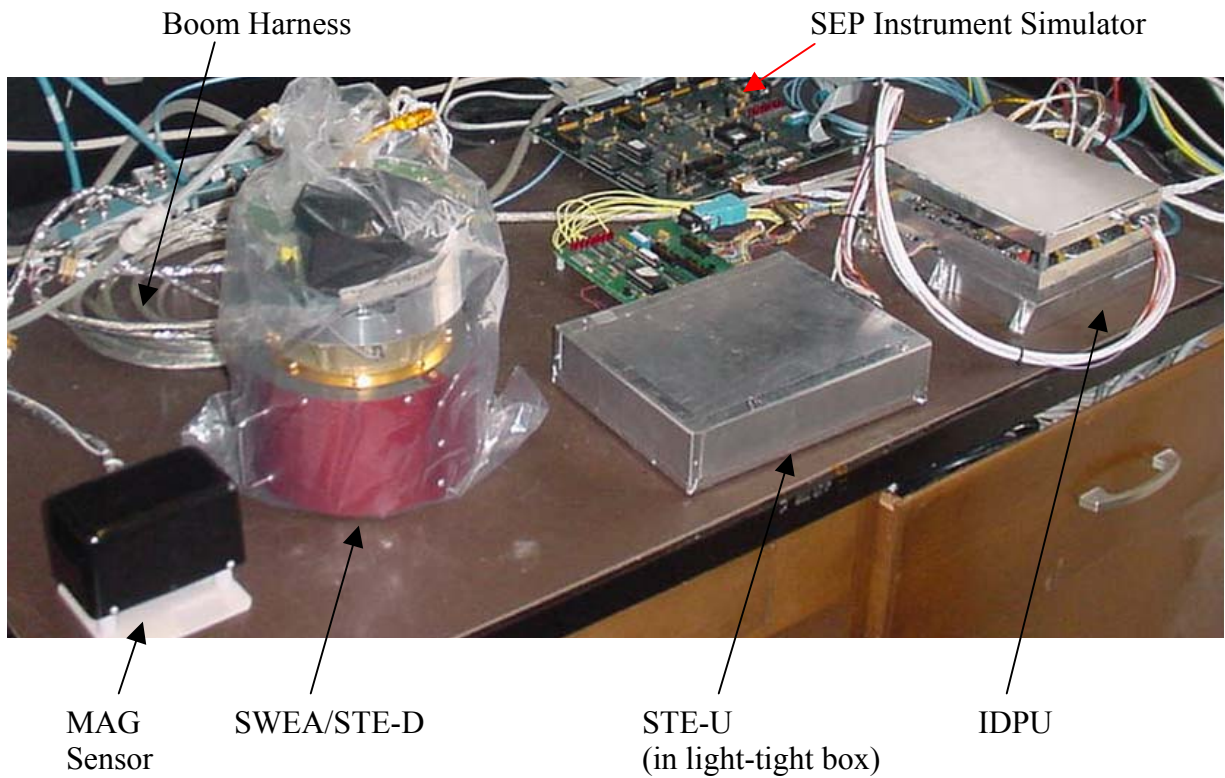
- LVPS schedule tight

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2.7. Problem/Failure Quick Look

ID #	Description	Assignee	Opened	Closed
1001	Qual boom deployment failure in Thermal Vac	McCauley	2003-08-15	

ETU Boom Suite Test / Software Development Setup



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3. GSFC (SEP) Status

STEREO/IMPACT/SEP/GSFC Progress Report for November, 2003 – (von Rosenvinge, Baker, Hawk, Shuman, Nahory, Wortman)

3.1. *Summary of Status*

The current delivery dates of the HET flight units to Caltech are end of April, 2004.

3.2. *Major Accomplishments -*

The LET engineering model housing was delivered to Caltech by Sandy Shuman, who went out to Caltech and assembled it with the engineering PC boards and solid-state detectors (5 L1s, 2 L2s, and 2 L3s). Some minor modifications have been noted for the flight housings as a result of this exercise, but overall the design looks good.

The HET flight model 1 PC board is fully populated except for 2 PHASIC chips and the flight Actel. A version 6 engineering unit Actel has just been burned prior to burning a flight Actel. The first 2 flight PHASICS have been received. The first flight HET board should be completed soon. HET detectors are expected from Micron any day now.

15 remaining H3 mounts were shipped to Micron. This completes the delivery of all flight detector mounts.

The two flight SEPT S/C brackets have been received and will be shipped after mechanical inspection.

Population of the SIT energy board (which we have had for ~ 4 months) is still awaiting final resolution of the SIT parts list.

Progress has been made on the thermal coatings/surfaces for SEPT. Four electronics boxes were selectively black-anodized and Ge-coated black Kapton tape was applied on parts of the exterior. Application of Ag-Teflon tape was delayed until material with certs is available (i.e. until after the SEPT telescopes are shipped to the US). The boxes, a can of Aeroglaze paint, and a bottle of Aeroglaze primer have all been shipped. 4 collimators were also shipped; 8 more collimators and 16 doors are being coated with so-called Goddard Composite.

The detector life-test thermal vacuum system is now up and running reliably. SIT solid-state detector testing is in process.

The SIT thermal vacuum and thermal balance tests have been shifted from Caltech to GSFC.

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3.2.1. Next Month-

- Support the upcoming SWT, and IMPACT team meetings at Berkeley.
- Investigate concerns about the dynamic heating of LET detectors immediately after fairing release.
- Complete thermal coatings of the SEPT parts.
- Deliver the SEPT brackets.
- Start testing of HET detectors.
- Update ICD with APL to include mounting hole diameters and correct LET FOV.
- Update mass of SEP Main.
- Finish populating the HET flight boards and the SIT flight energy board.
- Work on defining the HET and SEPT radioactive sources to be supplied by GSFC.
- Close out remaining RFAs from CDR.

3.3. ***Design Updates***

Work being shifted from UofMD and from Caltech may require some additional funding.

3.4. ***Outstanding Problems***

3.5. ***New Problems***

Mostly continued slow schedule slipping.

3.6. ***Top Risks***

No significant risks at GSFC? Need to ensure that manpower becomes available per the current plan.

We are running behind schedule with respect to detectors and the HET final electronics design. The HET delivery dates have been revised accordingly.

3.7. ***Problem/Failure Quick Look***

4. Kiel/ESTEC (SEPT) Status

November 2003

4.1. *Summary of Status*

- a) Detector incoming inspection completed, 4 out of 28 PIPS showed unacceptable leakage current.
- b) Delay in application of thermal coating causes rescheduling of environmental tests.
- c) FM1 electronics fully tested at ambient and at -40 °C.

4.2. *Major Accomplishments*

- a) Detector vacuum tests completed. Criteria: leakage current and noise performance. 24 out of 28 detectors met the criteria, 4 showed either excessive or varying leakage current and are returned to the manufacturer. As they are premounted in stacks of two, 4 stacks with 8 detectors are not available for flight selection. The remaining 10 stacks are well behaved and sufficient to proceed with flight telescope integration (8 stacks needed).
- b) Radioactive source tests and muon runs ongoing. Calibration runs not possible because flight electronics not yet delivered to Kiel due to non-availability of E-box housing (awaiting thermal coating at GSFC).
- c) SEPT-EM muon run completed. No failures, but noise level higher than expected. Will be repeated in thermal test at low temperatures.
- d) SEPT-EM acoustic test completed. Passed. Report pending.
- e) Preparations for vibration and TV test ongoing.
- f) FM2-E and FM2-NS digital boards tested.
- g) FM2-E and FM2-NS analog boards being manufactured. The late delivery of the E-box had impact on the manpower availability/priority for board manufacturing, hence FM2-E and -NS are not yet ready.
- h) FM1-E and FM1-NS thermal test (-40 °C) passed.
- i) GSE unit 2 +spare delivered by KTH. GSE unit 2 calibrated.
- j) PDFE LAT test has shown a parametric problem: investigations are ongoing with Microtek and Imec to determine if the problem is linked with the test set-up, initial conditions and pass/fail window definition, which is likely to be the case. In case of positive conclusion, the LAT test will be reconducted.
- k) Radiation test report and commercial parts life test report available.
- l) Thermostat and heater hardware clarified: SEPT will have non-redundant survival and non-redundant op-heaters. Survival heaters will be controlled by redundant thermostats (two Klixon 4BTL2-4 in series).
- m) Andy Driesman/JHUAPL and Mark Jarosz/NASA accepted SEPT waiver to power thermal circuitry during instrument level vibration tests (filed 11/7/2003, accepted 11/19/2003).

4.3. *Design Updates*

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4.4. ***Outstanding Problems***

Application of thermal coating at GSFC continues to be delayed. The time slots at the vibration and TV test facilities at ESTEC have been cancelled. Vibration is now booked in weeks 4-5 in 2004, TV in weeks 5-7. New time slot for bakeout not yet available.

4.5. ***New Problems***

Possible delay in PDFE LAT test results.

4.6. ***Top Risks***

4.7. ***Problem/Failure Quick Look***

5. Caltech/JPL (SEP) Status

5.1. Summary of Status

Activities centered on the detector development, electronics development, and flight and GSE software development.

Major Accomplishments:

- Received flight boards for SEP Bias Supply and LET from Pioneer Circuits. All flight boards for which Caltech has responsibility are now in house.
- SEP Bias Supply flight board test coupons passed GSFC inspection. No coupon problems have cropped up so far and only the LET board coupons remain to be analyzed.
- A bunch of detectors were received.
- Based on the results of the detector testing of L1 detectors and the quantity received, we no longer consider the availability of these detectors as a risk item.

Critical Milestones status:

- Milestone 18 (HET-All Flight Detectors Received) has not been accomplished due to detector mount problems, which have now been resolved. A large shipment of HET detectors is planned for December and all HET detectors should be received by sometime in January 2004.
- Milestone 19 (LET-All Flight Detectors Received) has not been accomplished. Mount problems also delayed progress. All L3 and most L2 detectors have been received, as well as enough L1 detectors to populate two sensors. All ordered detectors are now expected by the end of the year.
- Milestone 20 (SEP Package-EM I&T Complete) has not been accomplished. Great progress was made in the EM interface test in October but it was deemed another test is needed early next year.

Detectors:

- Micron Semiconductor delivered additional flight L1 detectors in November. They also sent a few devices that they designate as "B-grade" meaning that they do not meet all flight specifications (most commonly having a lower breakdown voltage and/or higher leakage current than specified). We are testing such detectors in parallel with the flight units since some of the B-grade devices still could be acceptable for flight and would give us some flexibility should Micron run into any schedule problems in completing the rest of the flight units that were ordered.
- A thermal-vacuum life test including L1, L2, and L3 detectors was started at Caltech in early November and will be completed in early December. This test identified two L3 detectors for which leakage currents grew to unacceptable levels over a period of days of operation in vacuum. (Four other L3 detectors have performed stably throughout thermal-vacuum tests.) This relatively high level of fall-out may require Micron to produce a few additional L3 detectors to complete the flight order. This should not, however, impact the LET development schedule since we already have enough L3 detectors to populate the two flight sensor assemblies. None of the L1 or L2 detectors included in the current or previous thermal-vacuum runs had any stability problems.

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- Micron is completing their testing of H1 and H3 detectors and should deliver a significant fraction of the flight units in December. Since these are made from 1-mm-thick silicon wafers like the L3 detectors, it is possible that the leakage current growth problem discussed above may also occur in some of the H detectors.
- Thickness mapping of flight L1 and grade-B L1 detectors using alpha-particle transmission continued. The L1 detectors are turning out to be generally thicker than specified, typically 25 microns rather than 18-22 microns. This greater thickness is attributable to the difficulties encountered by Virginia Semiconductor in lapping, polishing, and measuring the very thin silicon wafers that Micron uses as a starting point. (The devices we have been receiving are still thinner than the 30-micron devices we previously considered as a fallback should there be problems making 20-micron detectors.) We have told Micron that the thicker detectors are acceptable for flight.
- Micron is also doing their final testing on flight L2 detectors and expects to complete the delivery of flight units in December.

Electronics:

- Assembly of SEP Analog/Post-Reg flight boards S/N 1 & 2 continued, based on a positive report following QA inspection of Assembly Instructions and As-Built Parts List. The assembly will be completed in early December and we'll start the assembly of the SEP Central Logic flight boards.
- Finished kitting parts for SEP Central Logic and Bias Supply flight boards.
- Received flight boards for SEP Bias Supply and LET from Pioneer Circuits.
- SEP Bias Supply flight board test coupons passed GSFC inspection.
- Received quote from Texas Instruments for SEP survival thermostat common buy and decided to use the same P/N across the board. The order will be placed from UCB in early December.
- The remaining NVR witness plates from Caltech clean rooms were sent to GSFC for analysis.
- A lot of attention was focused on LET flight firmware development. Integration of self-test functions continues, as does use of the self-tests to explore instrument performance.
- The LET EM rigid-flex PCB assembly was recently assembled together with the mechanical housing and all detectors except L1Bs. Tests with the assembly are in progress. Data has been taken with a Thorium alpha source and needs study.
- The anticipated integration of Andrew Davis' event processing algorithm into the LET flight S/W has not yet occurred, but should happen in the coming weeks.
- We have been preparing to program a flight ACTEL part for the SEP Central MISC. Final minor design modifications were made and a commercial part burned and tested in the SEP Central EM logic board. Voltage margin tests and a hot test (60C) were performed. ACTEL TIMER analysis was used to check the final ACTEL layout.
- A more detailed report on the ACTEL part failure was written to aid in the NASA investigation. While there has been some positive fall out of the investigation (some problems with our handling of the RES* signal to the SEP EEPROMs were discovered and corrected), there has been little or no progress toward understanding the cause of the ACTEL failure. Despite strong evidence that the ACTEL part was defective, ACTEL has still not agreed to a refund. (In fact, ACTEL has yet to provide a replacement part, as they agreed to do, for an earlier flight part which failed during

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programming.) Based on our low yield to date with the flight ACTEL parts (3 programmed: 2 failed, 1 ok) we need to identify an alternate source of flight ACTEL parts. (JPL is currently holding about 10 parts that we might be able to access in an emergency.)

Software (Davis):

- Worked on LET flight software build 3 and LET PHASIC testing.

GSE:

- Serial Port Fanout: to supplement the normal telemetry stream at the accelerator, there will be 57.6 Kbaud RS-232 interface to pass LET events in a binary format from SEP Central to the SEP GSE. This same RS-232 interface will also be the first source of LET events (preceding their introduction into the SEP telemetry stream) for the SEP GSE.
 - Wrote software to capture data on the serial port at 57.6 Kbaud and establish a server socket to act as a data fanout for applications that will process LET events.
 - Tested the data capture and fanout with dummy data provided by a second computer over the RS-232 interface.
 - Software to extract the LET events from the RS-232 data stream will be written when the LET event format for the RS-232 interface is finalized.
 - Testing with SEP Central will require a "tee" for the serial port on SEP Central to be added to the ground hardware.
- Participated in testing of the SEP EM ACTEL prior to the burning of flight-like ACTEL. The goals of the testing were
 - to understand the relative arrival times at SEP Central of the time commands from the IDPU simulator and other signals and
 - to verify that the telemetry remained valid as the ACTEL (EM) was physically stressed.
 - Both goals were accomplished.

5.2. **Design Updates**

- Resource updates will be sent separately.

5.3. **Outstanding Problems**

- The problems with the two flight Actels are being investigated by Actel and by Rich Katz at GSFC.

5.4. **New Problems**

- Higher than expected thermal vacuum run failures of the L3 detectors may require Micron to provide a few additional flight devices.
- Preliminary analysis suggests that the nominal fairing release time will cause excessive heating to the L1 detectors (to 65C). More refined analysis is underway.

5.5. **Top Risks.**

- Actel parts may not be reliable. This would affect many NASA projects.

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- Higher than expected free molecular heating might require a re-design of the LET sensor head.
- The budget is very tight with no reserve being held at Caltech.

5.6. ***Problem/Failure Quick Look***

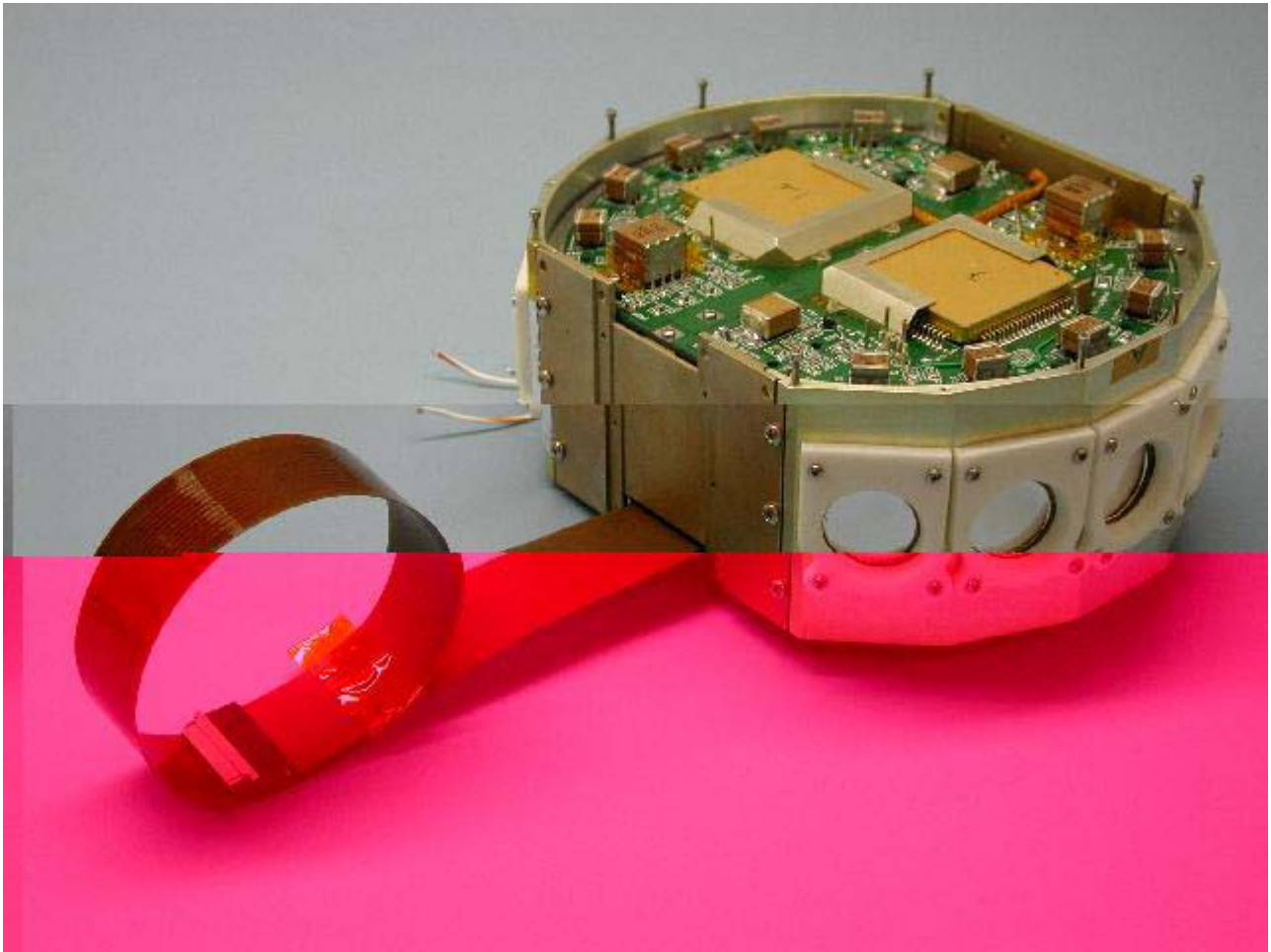
- None.

5.7. ***Lien List***

- Budget does not contain funding for investigations of part failures or contamination failures, re-makes of boards if coupons fail, etc. Some of this has already occurred, as more rework has been required in the hybrid development area than we budgeted for. Some die have failed test, some units have failed PIND testing, and in a couple of cases leaks have occurred after lead bending, which was caused by a problem with the tooling that has been corrected. Currently the yield has improved with 16 of 20 passing electrical test in the last batch. Except for a few re-work stragglers, this will be the last batch for burn-in. So the end is in sight. A guesstimate of the dollar problem is ~\$50K. A better estimate of this overrun should be available in next month's report.
- Overlooked costs: it was not realized that the cost estimate we were given for the hybrids did not include the qualification costs of 10 units. We have asked for a quote from JPL.
- Unfunded schedule reserve: ~\$25,000. This is becoming a reality, as our latest schedules show delivery in September 2004 (as required), whereas we had budgeted for delivery in July 2004.
- Possible under-budgeting of environmental testing and bake out. \$100K has been allocated. However, recent estimates suggest that the thermal balance/thermal vacuum test may require about 3 weeks. Recent cost estimates at JPL suggest that that might take the entire \$100K. We are investigating other places for the environmental test program where the costs may be less.

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LET EM sensor assembly with detectors shown below (sorry about the red band):



6. SIT MONTHLY TECHNICAL PROGRESS REPORT

6.1. **SUMMARY of STATUS**

- a. SIT TELESCOPE - Prototype remains at GSFC to act as model for flight unit components. Flight foils are at GSFC undergoing test. Flight MCPs were tested at UMd and are being stored at GSFC. Flight solid state detectors are at GSFC undergoing test.
- b. SIT TOF System - FM1 was downgraded to ETU and is part of the ETU electronics under test at UMd. Work is proceeding at MPAe to generate a new FM1 and FM2.
- c. SIT Energy System – ETU is integrated in the ETU electronics at UMd
- d. SIT Logic System – The updated ETU logic board and updated motherboard have been integrated with the remaining electronics.. Testing is underway at UMd.
- e. SIT HVPS - Flight HVPS ETU is being built at UCB.
- f. Flight Software – Version 11/20/03 is installed in the ETU under test at UMd.

6.1.1. Schedule Changes

The current SIT schedule is available from Jim Rogers

6.2. **MAJOR ACCOMPLISHMENTS**

6.2.1. This Month

- ETU: The new ETU Actel was installed in the ETU logic and found to have problems – it will run some software but not all, and in particular, not the flight software. A number of test programs were written to identify the problem but so far to no avail.
- Energy board: Parts were tested and resubmitted to GSFC for assembly onto the board. We still do not have QA approval to proceed with the build of the board.
- ATOF Board – The printed circuit boards for the flight ATOF boards were manufactured by UCB, coupon inspected and passed by GSFC and the boards shipped to MPAe for construction.

6.2.2. Next Month

Next month we will find and fix the problems in the Actel, will receive approval to build and will build the energy board and will receive the first flight HVPS from UCB. Flight software development and testing will continue

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6.3. **DESIGN UPDATES**

6.3.1. Resources

	Last Month	This Month	Change
Mass (kg) *	1.46	1.46	0
Power (W)	1.56	1.56	0.0
Telemetry (bps)	418	418	0

* Includes 200g book-kept by GSFC for SIT structure

A new estimate of Actel power for the flight units indicates that power will increase. Previous estimates had neglected the effect of the triple gates in the flight units for single-event upset protection.

6.4. **OUTSTANDING PROBLEMS**

We are continuing to work Energy parts issues.

6.5. **NEW PROBLEMS**

Latest version of the Actel does not run flight software.

6.6. **NEW RISKS**

6.7. **PROBLEM/FAILURE QUICK LOOK**

Starts at first turn-on of flight hardware.

ID #	Description	Assignee	Opened	Closed

7. CESR (SWEA) Status

CESR- TOULOUSE- France

Author : Claude Aoustin / Project Manager

SWEA PROGRESS REPORT # 26 (December 9, 2003)

November 2003

CESR is in charge of :

- Electrostatic analyzer with deflectors, grids and Retractable Cover
- Detector consisting of two MCP rings
- Amplifiers and discriminators
- 3 High voltages

7.1. *Summary of Status*

7.1.1. ETU1

Delivery to UCB was planned for 12/07/2002 : done 26/09/2002

7.1.2. ETU2

- Mechanical fabrication 100 % done
- Integration done for the vacuum test configuration.
- Electronic boards tested (100 %).

7.1.3. FM1 / FM2

- Mechanical fabrication 100 % done.
- Electronics boards fabrication:
 - Done for HV coupling boards
 - Done for amplifiers boards
 - Done for the HV boards

7.2. *Major accomplishments*

FM1 :

- Calibrations finished.
- Delivery to SSL planned 8 December.

FM2 :

- FM2 integrated : 2 parts (bottom with the inner sphere ready for MCP characterization test; top with grids, external sphere and pin puller.

7.3. *Design Updates*

Mass : 967 g (EM is 950g without cover opening mechanism)

Power : 446 mW min ; 662 mW max

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7.4. *Outstanding Problems*

- HV resistors life test 1000 h. on going.
- LT1024 radiation test performed by GSFC. It shows drift of the bias current. This has an impact on the deflectors HV. The 1 Mgohms resistors R18 and R31 have been changed by 5.1 Mgohms resistors. This is minimizing the impact of the radiation and is acceptable for the science data quality up to 12 krads. Furthermore a sheet of 1mm of copper has been added on the top of all the LT1024.

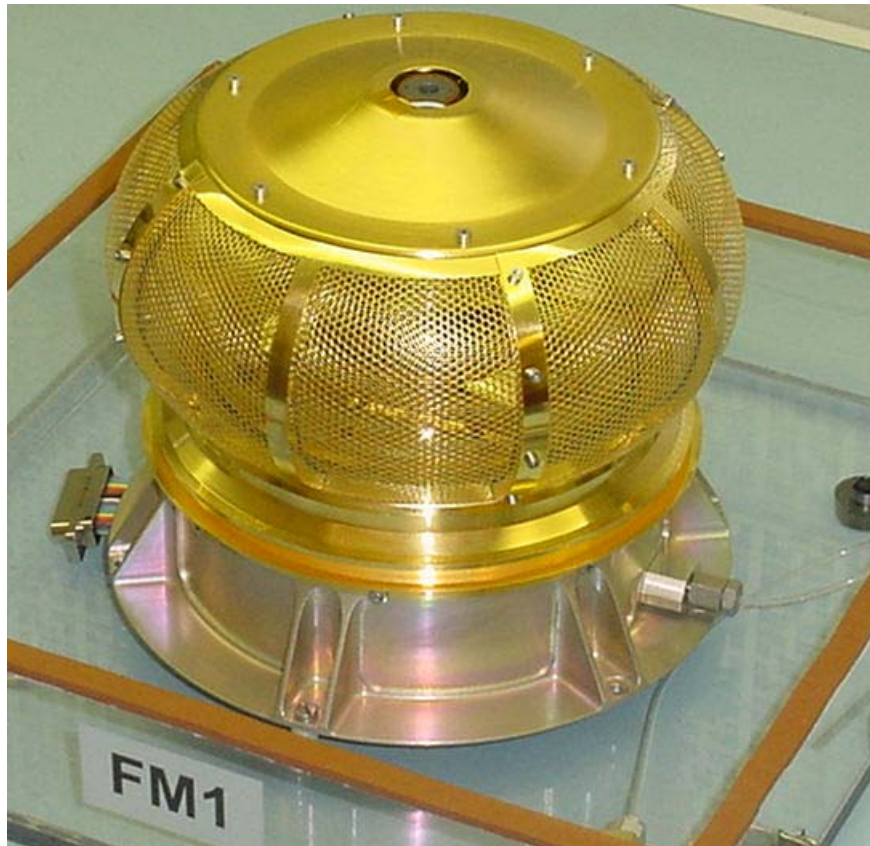
7.5. *New problems*

7.6. *Top Risks*

7.7. *Problem Failure Quick Look*

- HV multiplier from VMI HM 402 P 10 failed at -70°C !
Problem Failure report 6001 updated by Dave.
Failure analysis done by GSFC. It is showing a bad bonding inside the component.

SWEA FM1 at UCB



8. GSFC (MAG) Status

FM1 is complete, tuned and ready for scale factor calibration adjustments. Next step is the test of the A/D-IDPU interface, conformal coating and thermal cycling.

FM2 is waiting to start assembly. The person who assembled FM1 is not available, which stopped work for a while. A new person has been identified.

Problems with parts paperwork and screening have raised concerns with QA. A plan involving a board-level burn-in and possibly a life test on a qual model is under consideration.

STEREO IMPACT Technical Progress Report

9. EPO at UCB

Monthly E/PO Report

October, 2003

Formal Education:

We have set up a date (Feb 25-26th) to test our magnetism/magnetometer boom lesson in the classroom with Libby Dalcamo in an 8th grade science class at the Stanley Middle School in Lafayette, CA.

Informal Education and Public Outreach:

We continued to work with our programmers to develop a plan for creating an interactive web page where one could map data into sound on the STEREO-IMPACT E/PO web page. We also met with Stuart Bale, who works with the STEREO-SWAVES instruments, to collaborate on the data-sounds and visualization Kiosk project. And we met with Karen Meyer, of the NASA SECEF group, who is also interested in the kiosk project.

Respectfully Submitted,
IMPACT E/PO scientists Nahide Craig, Laura Peticolas