Lillian Reichenthal , Code 463.0
STEREO IMPACT Instrument Manager
Goddard Space Flight Center
Greenbelt, MD. 20771

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 May 2004.

Sincerely,

David Curtis
IMPACT Project Manager
University of California, Berkeley

CC:

Julie.A.Janus.1@gsfc.nasa.gov
Debra.G.Dusterwald.1@gsfc.nasa.gov
Lillian.S.Reichenthal@nasa.gov
IMPACT Team

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*

A formal proposal responding to SOW changes in launch and Phase E dates has been submitted informally and is going through channels at the University.

Funding through August has been received and subcontracts are being augmented.

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 (*). Items included in the POP04 budget recently submitted are marked in yellow.

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	08/04
3	Testing failure requires rebuild/retest a board (using existing spare parts)	$20,000	~08/04
4	EMC rework and retest required (Risk UCB11). Assume rework can be done in a week or two. Does not include cost of retest of vibration & thermal vac.	$30,000	09/04
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.~~	~~$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
8	Subcontract J&T for board assembly work to maintain schedule	$50,000	1/04
9	Calibration and thermal vac chambers at UCB use oil roughing pumps. Replace those pumps with dry scroll pumps to reduce risk of contamination	$14,000	3/04
10	Increase travel to cover staffing requirements at APL during I&T	$40,000	10/04-1/06
11	Launch delay costs (launch 2/06)	$226,000	12/05
12	Redesign & rework costs should Actels need to be replaced due to reliability problems. Depends strongly on what kind	$500,000	?

	of replacement is selected.		

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. 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. In addition, QA costs have been a far bigger percentage of the overall cost than anticipated. Currently the yield of hybrids has improved with 16 of 20 passing electrical test in the last batch. (Amount = ~$50,000 (guess); Probability = 100%; time frame = March 2004).	$50,000	03/04
2	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. (Amount = $25,000; Probability = 100%; time frame = August 2004).	$25,000	8/04
3	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. (Amount = ~$50,000 (guess); Probability = 50%; time frame = July 2004).	$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
8	Overlooked hybrid 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. (Amount = ~$10,000 (guess); Probability = 100%; time frame = March 2004).	$10,000	3/04
9	Unbudgeted tests: there are a number of tests outlined in the STEREO/IMPACT Requirements Verification Matrix that we are listed as responsible for but for which we did not budget. (Some I wasn't aware of and some I mistakenly thought would be done at UCB as part of EMC testing.) Test plans and procedures will need to be written and existing	$25,000	7/04

	instrumentation either calibrated or new instrumentation obtained. These include requirements 4.10, 4.12, 4.23, 4.27, 4.28, and 4.42. If we have to get JPL to help us, the cost could be significant. (Amount = ~$25,000 (guess); Probability = 50% (UCB might help us); time frame = July 2004).		
10	Launch delay costs to Feb 06	$67,757	12/05
11	Continued detector testing at Caltech in the event that delivery is delayed from October 04 to January 05	$118,089	10/04

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
6	Replacement SSD detectors (only 2 of 5 detectors passed)	$10,000	5/04

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	6/04
4	Tom Nolan flight software support (Risk UCB033)	$15,000	5/04
5*	Engineering support to maintain schedule (Risk UCB033)	$40,000	1/04
6	Tycho's thermal vac chamber is planned for SIT and SEPT tests. If that fails we will have to rent a chamber. Probability low-moderate.	$25,000	8/04
7	Late HET Detector delivery resulting in additional acceptance tests for one instrument	$40,000	7/04
8	LET foils fail acoustic testing	$10,000	5/04
9	HET Actel additional testing	$20,000	6/04
10	SEPT re-test if Kiel cannot pay for it	$30,000	5/04

1.2. *Significant System-Level Accomplishments*

- Participated in Project EMC & Contamination Control committee meetings and MAG workshop
- Participated in various MRB/FRB/PCB meetings; completed rework plan for SEPT
- Reworked schedule to allow core HET/LET systems to get to Accelerator for scheduled calibrations

1.3. *System Design Updates*

- None

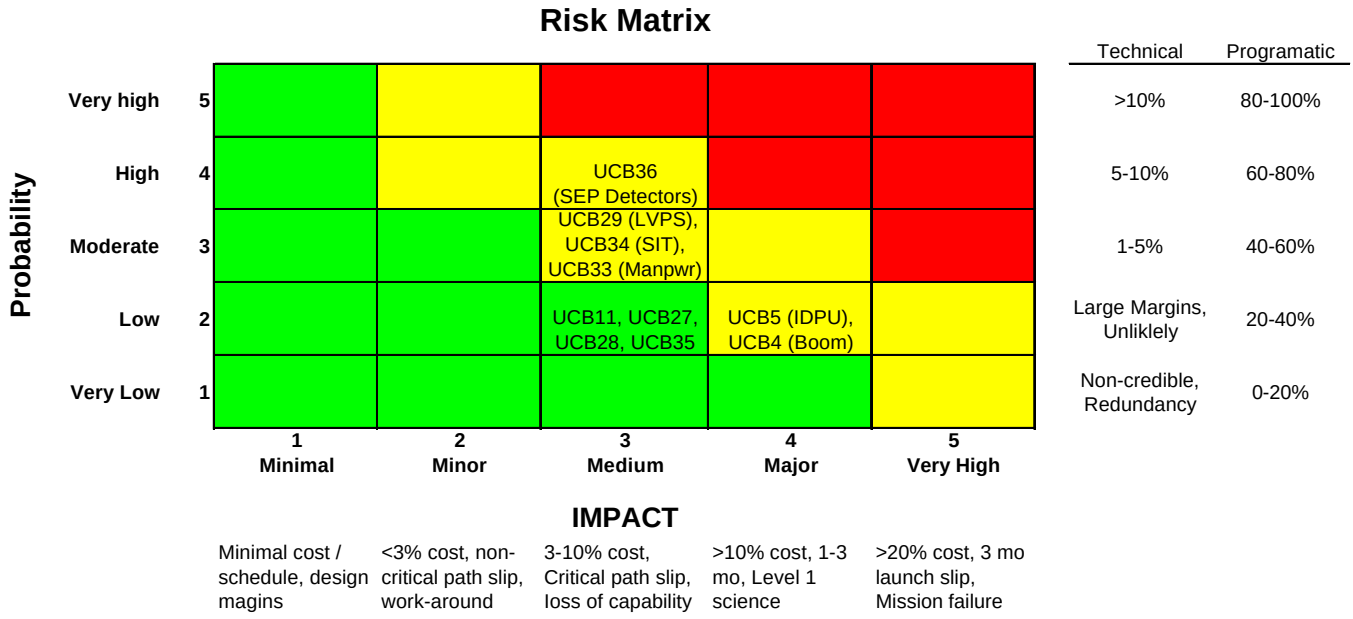
1.4. *System Outstanding Issues*

- The Thermal Balance waiver is still pending CCB action
- How to pay for re-test after SEPT repair

1.5. *Top 10 Risks*

Top 10 risks are attached. No changes to the list.

IMPACT Top Ten Risks 2/2004



No.	Risk Item	Score	Mitigation	Mitigation Schedule			
				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	LOW
UCB_4	The IDPU is a single point failure mechanisim 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
UCB_36	HET, LET, and SIT detector fallout during life test. Not enough HET detectors for the flight build, and few or no spares for SIT and LET. New detectors being obtained, but a there is a schedule risk	MEDIUM	Pree for early delivery of replacement detectors. Proceed with poor detectors and replace them with new ones later in the schedule	MEDIUM	MEDIUM	MEDIUM	LOW
UCB_34	SIT Schedule slippage, on critical path	MEDIUM	Add manpower to recover schedule	MEDIUM	LOW	LOW	LOW
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	LOW	LOW	LOW
UCB_33	Instrument fabrication & test schedule limited by available personnel	MEDIUM	Subcontract assembly work, authorize over-time, bring on new people	LOW	LOW	LOW	LOW
UCB_35	New undiagnosed Actel part failures may impact flight hardware	LOW	Keep abrest of Actel's analysis results; Make changes to minimize ground bounce which may be related to failures according	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	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 &	LOW	LOW	LOW	LOW
UCB_28	Thermal limitations of detectors result in a low bakeout temperature which might require a very long bakeout	LOW	Bakeout subsystems prior to detector integration to reduce time of instrument-level bakeout; early bakeout	LOW	LOW	LOW	LOW

2. Berkeley Status

2.1. *Summary of Status*

Schedule status through February has been provided separately.

2.2. *Major Accomplishments*

SWEA/STE:

- All SWEA/STE boards complete and in test.
- All STE Detector boards tested.
- STE-U FM1 assembled, in test
    - Thermal Balance test complete
    - Thermal Vac #1 door failure (PFR1008) resolved and reworked; Tvac#2 pending

IDPU:

- FM1 and FM2 IDPU complete except for LVPS. FM1 assembled using ETU LVPS and is being used to support STE-U FM1 thermal vac

LVPS/HVPS:

- SIT HVPS FM2 in assembly (bottom of priority queue).
- SWEA/STE-D FM1 LVPS in test.
    - Two difficult issues have held up completion of this test, which is holding up progress in the IDPU LVPS. One of those problems was recently solved.
- PLASTIC FM1 LVPS delivered
- PLASTIC FM2 in test
- SEP FM1 delivered (less conformal coat)
- SEP FM2 in test
- IDPU LVPS assembly complete, ready for test.

Boom:

- FM1 unit "tuning" deployment completed, harness termination in progress.
- FM2 unit ready to replace potentially deformed parts

GSE:

- All GSE delivered. Some added features in progress. Still waiting for definition of SEP housekeeping so appropriate displays can be added.

2.3. *Design Updates*

- None.

2.4. *Outstanding Problems*

2.5. *New Problems*

- A number of issues with the power converters have been discovered and dealt with.

2.6. *Top Risks.*

- LVPS schedule tight
- Open Actel problems

2.7. *Problem/Failure Quick Look*

ID #	Description	Assignee	Opened	Closed
1001	Qual boom deployment failure in Thermal Vac	McCauley	2003-08-15	2004-01-07
1002	STE-U Assembly problems (broken bond wire)	Curtis	2004-04-12	
1004	SEP LVPS Middle FM1 Problem	Heavner	2004-04-23	2004-06-08
1005	SEP LVPS Top FM1 Problem	Heavner	2004-04-27	2004-06-08
1006	STE-U FM1 Mis-wire (thermal vac feed-through)	Curtis	2004-04-30	
1007	SWEA LVPS FM1 LTC1877 Failure	Curtis	2004-05-10	
1008	STE-U FM1 Door failure (cold)	Curtis	2004-05-10	

3. GSFC (SEP) Status

STEREO Progress Report for May, 2004 (GSFC: Tycho von Rosenvinge, Larry Ryan, Sandy Shuman, Kristin Wortman, and John Hawk)

3.1. *Major Accomplishments*

During the past month, our efforts have been focused on three areas: (1) testing of detectors for the HET telescopes, (2) completing the design and fabrication of all the LET, HET, and SEP Central mechanical parts in time for the scheduled accelerator tests at Michigan State University. Preliminary beam at MSU may be obtained as early as July 7, with the main beam time scheduled for July 9 and 10, for a total of 48 hours beam exposure, and (3) completion of flight software. In addition, a flight Actel was programmed for the SIT logic board using the new Actel programming procedure. This Actel has been installed on the SIT logic board together with the required RAM chips. An earlier problem associated with installing capacitors right at the RAM chips was resolved in favor of soldering rather than using epoxy, permitting the installation of the RAM chips on both the SIT flight logic boards. When the first logic board is fully tested, then we will either repeat the process on the second flight board or we will be forced to a new layout of the SIT logic board to reduce ground bounce problems. The latter problems are expected to be worse for the flight Actels than for the commercial Actels used to date.

3.1.1. HET Detector Testing

The HET detectors have been plagued by a variety of problems. They were received late due to problems with the detector mounts, and then, once received, they performed poorly in vacuum life testing. In particular, many have exhibited steadily growing leakage currents which put them way out of spec. We have now tested a total of 16 H1 detectors and 25 H3 detectors. We have 2 good H1 detectors, 1 possibly OK H1 detector, and 1 OK?? H1 detector. We need 4 for flight. We have 10 good H3 detectors and 1 good prototype. We need 14 for flight. There are an additional 11 H3 detectors which are untested, and some new H1s are expected. As soon as the new H1s arrive, life test #3 will be terminated and a new life test started immediately.

3.1.2. Design and Fabrication of the LET, HET, and SEP Central Mechanical Parts

Sandy Shuman has been working on a very tight schedule for the mechanical parts. All the essential parts are now expected to be available in time for the MSU accelerator tests, barring unforeseen difficulties. The current plan is, following the accelerator testing, to disassemble the tested units for conformal coating and for finishing off the mechanical parts. For example, there are some internal brackets for SEP Central which may not be ready in time for early July. However these parts are not essential for the accelerator tests; they will be essential for withstanding launch vibration. These parts will be available by the time that the board conformal coating is completed. As another example, there will be some exterior machining on the LET bracket which will be completed after the accelerator testing.

3.1.3. Flight Software

Customized HET response tables have to be provided for each HET separately to match the specific electronic gains of each pulse height channel. These are being worked on and must be completed in time of the accelerator beam exposures at MSU. The algorithm for setting the leakage current DACs for every detector channel has been worked on. Finally, overall testing of the entire flight software package has been on-going. This work has been proceeding well.

3.1.4. Miscellaneous

Finally, the clock chips on the HET flight boards were observed to have radial cracks and chips in some of the glass seals where the chip leads enter the chip. The clock chip with the most such defects was removed from the HET FM2 board and subjected to a hermeticity test, which it successfully passed. A new clock chip has been placed on the FM2 board and the other one will be left alone. The HET FM2 board is about to undergo retest to verify the new clock chip's operation.

3.2. ***Next Month***

The focus during this next month will be on getting ready for the accelerator tests at MSU. This includes testing of all new HET detectors to see if we can find a complete set of flight-qualifiable detectors.

4. Kiel/ESTEC (SEPT) Status

SEPT Monthly Technical Progress Report
May 2004

4.1. *Summary of Status*

a) Rework activities on all four failure cases mentioned in last month's report have been started.
b) Tentative schedule shows: SEPT cannot participate in a July-04 IMPACT EMC test. If EMC test is delayed to September, SEPT can make it, maybe at the expense of environmental testing, which would have to be delayed until after EMC.

4.2. *Major Accomplishments*

a) Detector failure review board resolution called for turning them in to Canberra for rework. 11 out of 14 detector stacks are disassembled and returned to Canberra for rework. Disassembly created new problems because screws were staked. Mechanical rework in progress. Two more stacks are still in Kiel, but will be shipped to Canberra beginning of June for rework. One stack plus the prototype stack are used in EM SEPT. Eight stacks are needed for flight models.
b) Door opening failure review board initially proposed the use of leaded bronze shafts and brass washers or bushings, which was then discarded because of potential tribological incompatibility and marginal thermal properties. New resolution: use titanium with Tiodize Type IV process on covers, hinge shafts, and pin-puller rods. Covers shall be coated with Goddard composite. If Goddard composite is not compatible with tiodize surface, then mask area before anodising or use Ge-Kapton instead (still TBD). The sensors were completely disassembled; Goddard composite removed from covers; covers, hinge shafts and rods cleaned and shipped to GSFC for tiodize treatment. The collimators are currently being carefully reworked (two are black anodised, two have Goddard composite) to provide positive play for clevises even at -35 °C.
c) Pin-puller failure review board resolution called for turning them in to TiNi for inspection. A total of 10 out of 12 pin-pullers have been disassembled and shipped to TiNi (two are used in EM SEPT).
d) The analogue and digital boards for the spare electronics unit have been populated and tested. Thermal tests, coating, and mechanical assembly will be performed in June. The spare electronics will replace the flight unit electronics for FM2 SEPT-NS that suffered an accident in the Kiel clean room. The damaged flight unit will be repaired by replacing the ACTEL FPGA and will serve as flight spare.

4.3. *Design Updates*

4.4. *Outstanding Problems*

1. IMPACT PR 7001, 7002, 7003, FM2 SEPT-NS accident

4.5. *New Problems*

4.6. *Top Risks*

4.7. *Problem/Failure Quick Look*

ID #	Description	Assignee	Opened	Closed
7001	SEPT-DoorOpening	Mueller-Mellin	2004-02-20	
7002	SEPT-Detector	Mueller-Mellin	2004-03-05	
7003	SEPT-Pinpuller	Mueller-Mellin	2004-03-10	
	FM2 SEPT-NS accident	Mueller-Mellin		

5. Caltech/JPL (SEP) Status

5.1. *Summary of Status*

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

5.2. *Major Accomplishments:*

- Received both sets of intra-instrument harnesses from JPL.
- Clean room facility is now certified and ready to receive flight hardware.
- Set-up the second GSE system.

Critical Milestones status (from Critical/Key Milestone chart of 3/31/04):

- All items related to SEP at Caltech/JPL through 5/31/04 are complete.

Detectors:

- Micron Semiconductor continued delivering 1-mm-thick detectors as replacements for devices that failed thermal-vacuum testing because of excessive leakage current growth. In May, five L3 detectors and two H3 detectors were received. Of these devices, both H3's and two of the L3's were made with minor modifications suggested by Micron to possibly improve stability in vacuum. These included a modification of the metallization and the omission of the silicon-dioxide passivation coating, which had been used on previous devices.
- The detectors were visually inspected and the H3 devices were then shipped to Goddard for further testing. A new thermal vacuum run was started at Caltech to check the stability of the L3 detectors. This test is expected to extend to the middle of June.
- Assembly of the test hardware needed to run the HET/LET/SEP-Central end-to-end test at the Michigan State University National Superconducting Cyclotron Laboratory (MSU/NSCL) got underway at Caltech.

Electronics:

- Finished assembly and QA inspection on both LET flight boards, which are now being tested and await installation of flight Actels and HV chip resistors from Mini-Systems.
- Installed flight Actel on SEP Central Logic FM2 board and performed QA inspection. The board is ready for testing and subsequent conformal coating.
- Received SEP LVPS FM1 unit from UCB in order to integrate it with the rest of SEP Central Electronics before it goes back to UCB for conformal coating.
- Received both sets of intra-instrument harnesses from JPL. The cables are wrapped in lumalloy and have not been baked-out yet.
- I&T clean room facility received both contamination- and ESD-control certification and is now ready for flight hardware. We will be moving I&T operations there as soon as the flight boards bake-out is carried out.
- Development of LET S/W continued.

Software (Davis):

- Worked on verifying LET onboard event processing software using data from LBNL accelerator test and data from recent stim runs. Although some anomalous events were found in the telemetry, these have been understood in terms of features of the LET front-end logic. No significant bugs have yet been found in the onboard processing or formatting software since the LBNL run.
- Added extended event-header option to LET onboard event formatting.
- Updated LET onboard angle-correction tables.

GSE:

- Set-up the second GSE system. The second IDPU simulator arrived from UCB with some minor shipping damage. One IC was partially unseated from its socket, one jumper had fallen from its pins, and one screw that partially held a connector had come loose. After doing the minor fixes, the IDPU box was tested with the second GSE computer. The computer/simulator interface works correctly; the simulator/sensor interface has not yet been tested.
- Finished writing software to identify, locate, and display anomalous LET events.
- Modified the data logging to deal with the problem that occasional irregularities in the telemetry stream would cause errors in the GSE software that built the data structures and cause the logging program to crash.
- Started work on modifications to the GSE software to better identify hardware configurations used when collecting the data and to ease the retrieval of data from the archive.

5.3. *Design Updates*

- No resource updates this month.

5.4. *Outstanding Problems*

- Actel and Rich Katz at GSFC are investigating the problems with the flight Actels. A new programming algorithm has been developed at Actel and it will be used on the LET flight Actels.
- Higher than expected thermal vacuum run failures of the L3 detectors and HET detectors is requiring Micron to provide a few additional flight devices. This may require retrofitting of HET sometime in the summer.
- Preliminary analysis suggests that the nominal fairing release time will cause excessive heating to the L1 detectors (to 65C) based on the heating levels specified, which may have considerable margin (factor 3) over what might actually be experienced. The lower heating level would only heat the detectors to 45C. In the meantime, partly for other reasons, an additional window is being added to LET and perhaps that will mitigate the problem. More calculations are underway.
- Current-limiting resistors on the LET board need to be changed to ones rated higher in voltage.
- Anomalies from LET stim pulser tests and the accelerator test are being investigated and resolved.

5.5. *New Problems*

- No new problems this month.

5.6. *Top Risks.*

- Actel parts may not be reliable. This would affect many NASA projects.
- 1-mm detectors may have a serious leakage current growth problem. However, enough good LET detectors have been identified to populate both flight instruments. HET detectors may be more of a concern, perhaps requiring swapping out detectors later than desired.
- 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.

5.7. *Problem/Failure Quick Look*

- None.

5.8. *Lien List*

- At the time of this writing (6/14/04) a new budget has been submitted. It features delivery of both flight units to APL in October 2004, an additional year of Phase E, an additional 3 months of Phase C/D, and covers all liens listed in this section in previous reports. We have been asked to list in this section the amount of money required to keep testing the flight units in case it is decided that we deliver in January 2005 instead of October 2004. According to the new budget, this amount is $118,089. The budget was prepared a few months ago and the current schedule is calling for delivery in November, rather than October, so some of this lien will likely be needed.

6. SIT MONTHLY TECHNICAL PROGRESS REPORT

6.1. *SUMMARY of STATUS*

a. SIT TELESCOPE – Prototype at UMd for ETU/FM testing. Flight SSDs are still under test at GSFC. Spare SSDs have been ordered.

b. SIT TOF System – FM1 is at UMd and has passed functional test. FM2 has been delivered to UMd and awaits testing. The old FM, which we are using as ETU, is at UMd and being used in ongoing testing.

c. SIT Energy System – FM1 and FM2 have been trimmed and are undergoing testing at UMd. ETU is at UMd available for ETU testing.

d. SIT Logic System – Flight board is at GSFC for assembly. The ETU board is at UMd.

e. Motherboard – The flight MB is at GSFC for assembly.

f. SIT HVPS - Flight HVPS FM1 is undergoing test at UMd.

g. Flight Software – Version 02/26/04 is installed in the ETU under test at UMd.

6.1.1. Schedule Changes

The current SIT schedule is available from the project scheduler.

6.2. *MAJOR ACCOMPLISHMENTS*

6.2.1. This Month

Energy Boards – Trim parts were installed on both boards at GSFC and the bad Amptek PH300RH was replaced with a spare unit from the same lot, obtained by UCB. The boards were returned to UMd where they were functional tested, both boards working well though the threshold was found to have been set aggressively low on both units. Thermal testing was performed on SN2 where it was found that the low threshold caused a problem of excessive SSD discriminator rates at +50C. After consultation with Glenn Mason and inspection of the noise levels being observed on the flight SSDs, it was decided to raise the threshold from ~38 keV to about 100 keV. This was done by changing a jumper to a resistor in one place on each board. SN2 thermal testing was repeated and the bouard found to function over the range of –35 to +50 C. SN1 will be tested next month and the resistor will be installed permanently at time of conformal coat.

Logic Board – A review of the logic board design was held, resulting in a strong recommendation to perform a re-layout of the board correcting several problems and adding a power plane for the +2.5v power line. A new layout was generated (but no boards were produced) but in parallel measurements were made on the ETU to see

how bad the actual problem was. The results of these measurements were encouraging and it was decided to complete the FM1 Logic board for test at UMd using the existing boards. The Actel was programmed using the new algorithm supplied by Actel.

TOF Boards – FM2 TOF analog and digital boards were received from MPAe. We will test them next month.

Mother Board: Assembly was begun on the mother boards. Some shims will be needed under some of the connectors to align their front edges.

Electronics Housing and Fit Check – Sandy got all the mechanical parts for the electronics housing, and we added the flight boards and motherboard (partly assembled) and performed a fit check. Everything fits.

6.2.2. Next Month

Next month we will finish the testing of the Energy boards and the FM2 TOF boards. We will receive the FM1 logic board and test it for ground bounce and Vcca noise to determine whether to go ahead with the completion of FM2. We will receive the mother boards and test them. We will integrate the flight electronics in its housing with the ETU telescope and FM1 HVPS and troubleshoot the lot.

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

6.4. ***OUTSTANDING PROBLEMS***

Excess current in as many as three of our SSDs.

6.5. ***NEW PROBLEMS***

Soldering filter capacitors to the SRAM chips on the logic board requires a waiver.

6.6. ***NEW RISKS***

6.7. ***PROBLEM/FAILURE QUICK LOOK***

Starts at first turn-on of flight hardware.

ID #	Description	Assignee	Opened	Closed
SIT1	Apparent failure of PH300 chip U4 of FM1 energy board	PHW	4/29/04	

7. CESR (SWEA) Status

CESR- TOULOUSE- France **Author : Claude Aoustin / Project Manager**

SWEA PROGRESS REPORT # 32
(June 10, 2004)

May 2004

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: 100% done

7.2. *Major accomplishments*

7.2.1. FM1:

Delivered to SSL: 8 December 2003.

7.2.2. FM2:

- MCP characterization performed in the vacuum chamber started on the 19 February 2004 ended on the 4 of March 2004.
- Calibrations finished 28 of May.
- **Delivery to SSL UCB: 7 June 2004**.

7.3. *Design Updates*

Mass: 967 g (EM is 950g without cover opening mechanism)
Power: 446 mW min; 662 mW max

7.4. *Outstanding Problems*

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!
- Failure analysis done by GSFC. It is showing a bad bonding inside the component.
- IMPACT_PFR_6001_HVPS sent to GSFC by Dave Curtis.
- PFR Closed.

8. GSFC (MAG) Status

FM1 and FM2 complete and delivered to UCB for integration with the IDPU and Boom. See the UCB section for status of that activity.

9. EPO at UCB

Monthly E/PO Report May, 2004

Formal Education:

Todd McGill worked with L. Peticolas to create a web page version of the "Exploring Magnetism" teacher's guide. This is now on-line at:
http://cse.ssl.berkeley.edu/impact/magnetism/flash/mag_flash.html

Informal Education:

We continued to work with Roberto Morales on the STEREO incandescence project. He created a MAX-MSP application that turns solar data into music. This application runs on a Macintosh and does not require MAX-MSP. This application was included in our American Astronomical Society meeting poster, which we created to take to the June AAS meeting in Denver.

Using the Cal Space Summer Grant and STEREO-IMPACT funds, we hired David Bithell, a graduate student at CNMAT, to work on the STEREO incandescence project.
He will help to add to the music project so that it is produces stereo sounds using data from both Helios satellites and using radio wave data.

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