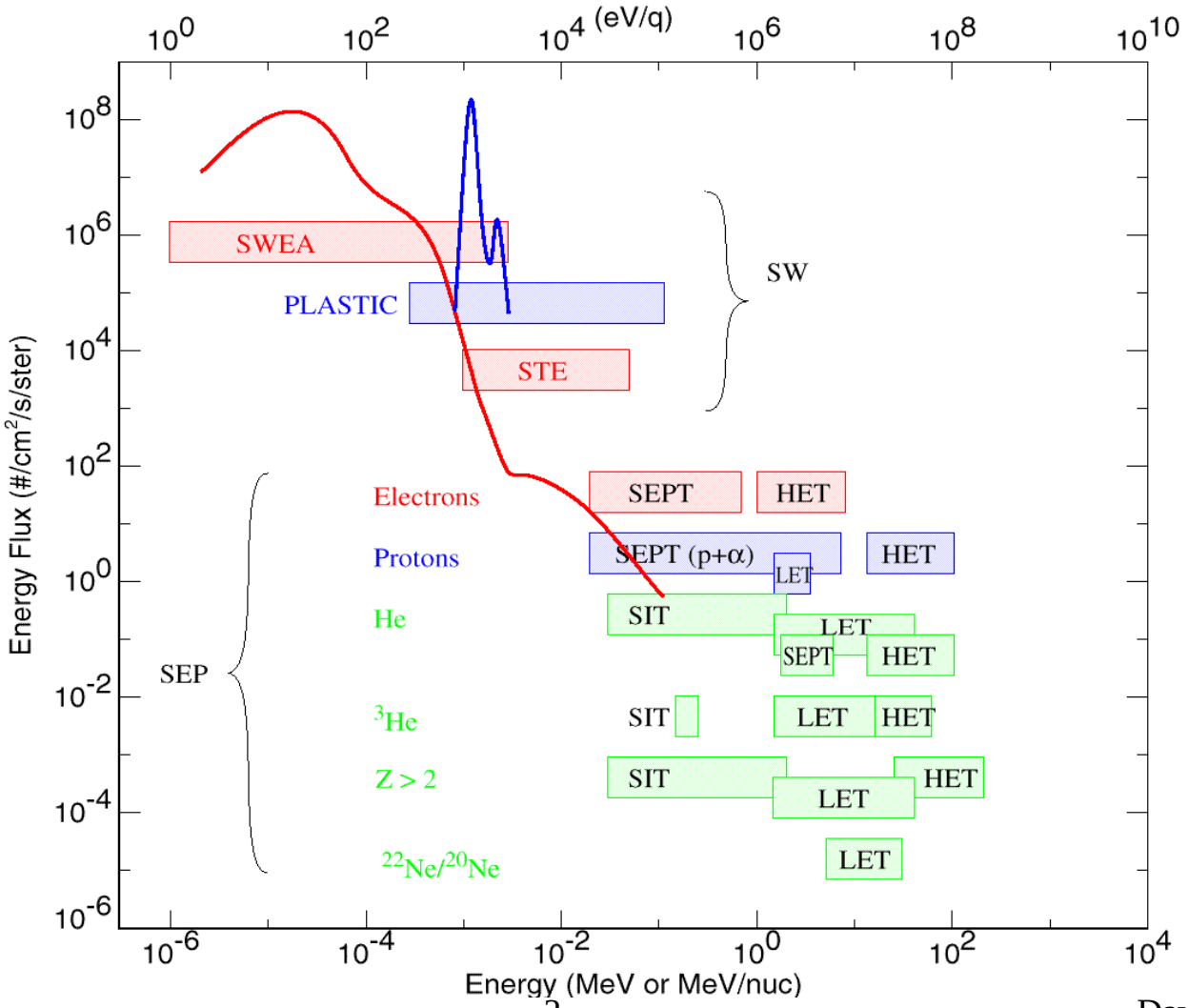
STEREO IMPACT

System Peer Review

2001-August-2, U.C.Berkeley

IMPACT / PLASTIC Energy Coverage



IMPACT Science Summary

Table A.1 IMPACT Summary

Experiment	Instrument	Measurement	Energy or Mag. field range	Mass (kg)	Power (w)	Data Rate (bps)	Time Res.	Instrument provider
SW	STE	Electron flux and anistropy	2-100 keV	0.35	0.20	64	16 s	UCB (Lin)
	SWEA	3D electron distrib., core & halo density, temp. & anisotropy	~0-3 keV	1.71	1.10	394	3D=1 min 2D=8s Mom.=2s	CESR (Sauvaud) + UCB (Lin)
MAG	MAG	Vector field	?500nT, ?65536 nT	0.25	0.0	154	1/8 s	GSFC (Acuna)
SEP	SIT	He to Fe ions	0.03-2 MeV/nuc	0.93	0.66	240	30 s	U. of Md. (Mason) + MPAE (Korth) + GSFC (von Rosenvinge)
		^{3}He	0.15-0.25 MeV/nuc				30 s	
	SEPT	Diff. electron flux	20-400 keV	1.06	1.04	120	1 min	U. of Kiel (Mueller-Mellin) + ESTEC (Sanderson)
		Diff. proton flux	20-7000 keV				1 min	
		Anistropies of e,p	As above				15 min	
	LET	Ion mass 2-28 & anisotropy	1.5-40 MeV/nuc	0.51	0.18	320	1-15 min.	Caltech (Mewaldt) + GSFC (von Rosenvinge) + JPL (Wiedenbeck)
		^{3}He ions flux & anistropy	1.5-1.6 MeV/nuc				15 min.	
		H ions flux & anistropy	1.5-3.5 MeV				1-15 min.	
	HET	Electrons flux & anistropy	1-8 MeV	0.70	0.07	120	1-15 min.	GSFC (von Rosenvinge) + Caltech (Mewaldt) + JPL (Wiedenbeck)
		H	13-100 MeV				1-15 min.	
		He	13-100 MeV				1-15 min.	
		^{3}He	15-60 MeV/nuc				15 min	
	SEP Common	----	----	1.69	1.55	----	----	Caltech (Mewaldt) + GSFC (von Rosenvinge)
IMPACT Common	IDPU (+Mag Analog)	----	----	1.73	3.60	164 +524 Burst	----	UCB (Curtis)

Instrument Requirements

- Instrument Performance Requirements documented in IMPACTPerformanceSpec_E.doc, based on Phase A Report
  - Traceability to level 1 Science & Mission requirements pending generation of level 1 requirements matrix by Project
- Instrument Interface & Resource Requirements documented in IMPACT/Spacecraft ICD
  - Third round ICD in work at APL
- Environmental test requirements documented in 7381-9003
- Contamination Control requirements documented in 7381-9040
- EMC requirements documented in 7381-9030
- Mission Assurance Requirements based on Project System Safety Mission Assurance document, and implemented in IMPACT PAIP
- Programatic requirements (deliverables, cost, schedule, etc.) covered in IMPACT contract
  - Still awaiting Phase B contract

MAG Performance Requirements

Description	Goal	Requirement
Noise level	0.01 nT	
Absolute Accuracy	+/- 0.1 nT	
Range	+/-512 nT, +/-65536 nT	
Drift	+/-0.2 nT/yr	
Time Resolution	1/4 sec. 1/32 sec. (Burst)	

Awaiting refinement from Mario Acuna

SWEA Performance Requirements

Description	Goal	Requirement
FOV	360 x 130 degree	360 x 60 degrees
Resolution	22.5 degree	45 degrees
Energy	1 to 3000eV	20 to 1000eV
Energy Resolution (Telemetry)	65%	100%
Geometric Factor	0.01 cm^2 ster E(eV)	0.001 cm^2 ster E(eV)
Max Count Rate (per 22.5 degree sector)	1E6 counts/sec	1E5 counts/sec
Time Resolution	1 minute (3D) to 2 seconds (moments, burst)	1 minute

STE Performance Requirements

Description	Goal	Requirement
FOV	Two opposite 80 x 80 degree	60 x 60 degree
Resolution	80 x 20 degrees	60 x 20 degrees
Energy	2 - 100 keV	5 – 100 keV
Energy Resolution (Telemetry)	35%	100%
Energy Resolution (Electronic)	300eV FWHM	2keV
Geometric Factor	0.4 cm^2 ster	0.1 cm^2 ster
Background	<1c/s/detector	<30c/s/detector
Max Count Rate (per detector)	100,000 counts/sec	10,000 counts/sec
Time Resolution	16 seconds 2 seconds (burst)	1 minute

SIT Performance Requirements

Description	Goal	Requirement
FOV	17 x 44 degrees	17 x 44 degrees
Energy	30-2,000 keV/nuc He-Fe	30-2,000 keV/nuc He-Fe
Mass Resolution	0.85 AMU (^{16}O at 100keV/nuc)	0.85 AMU (^{4}He at 1MeV/Nuc)
Energy Resolution	20keV FWHM	35keV FWHM @ 22C
Geometric Factor	0.4 cm^2 ster	0.4 cm^2 ster
Background	10^{-2} events/sec in quiet time	10^{-2} events/sec during vac test
Max Event Rate	1000 events/sec	1000 events/sec
Time Resolution	1 Minute	15 Minutes

SEPT Performance Requirements

Description	Goal	Requirement
FOV	2 sets of oppositely directed 52 degree cones each for electrons and protons	2 sets for electrons and protons, each with: 2 oppositely directed view cones in-ecliptic, 2 oppositely directed view cones off-ecliptic, 45 degree full opening angle
Energy	20-400 keV electrons, 20-7000 keV protons	30-400 keV, electrons 30-2000 keV, protons
Energy Resolution (Telemetry)	20% electrons, 20% protons	30%, electrons 30%, protons
Geometric Factor	0.52 cm^2 ster, electrons, 0.68 cm^2 ster, protons	0.4 cm^2 ster, electrons, 0.4 cm^2 ster, protons
Background	< 0.2 counts/s on ground, 20?C	< 2 counts/s on ground, 20?C
Max Event Rate	25,000 counts/s at 2.2 MeV 250,000 counts/s at 55 keV	25,000 counts/s at 2.2 MeV 250,000 counts/s at 55 keV
Time Resolution	60 sec	60 sec

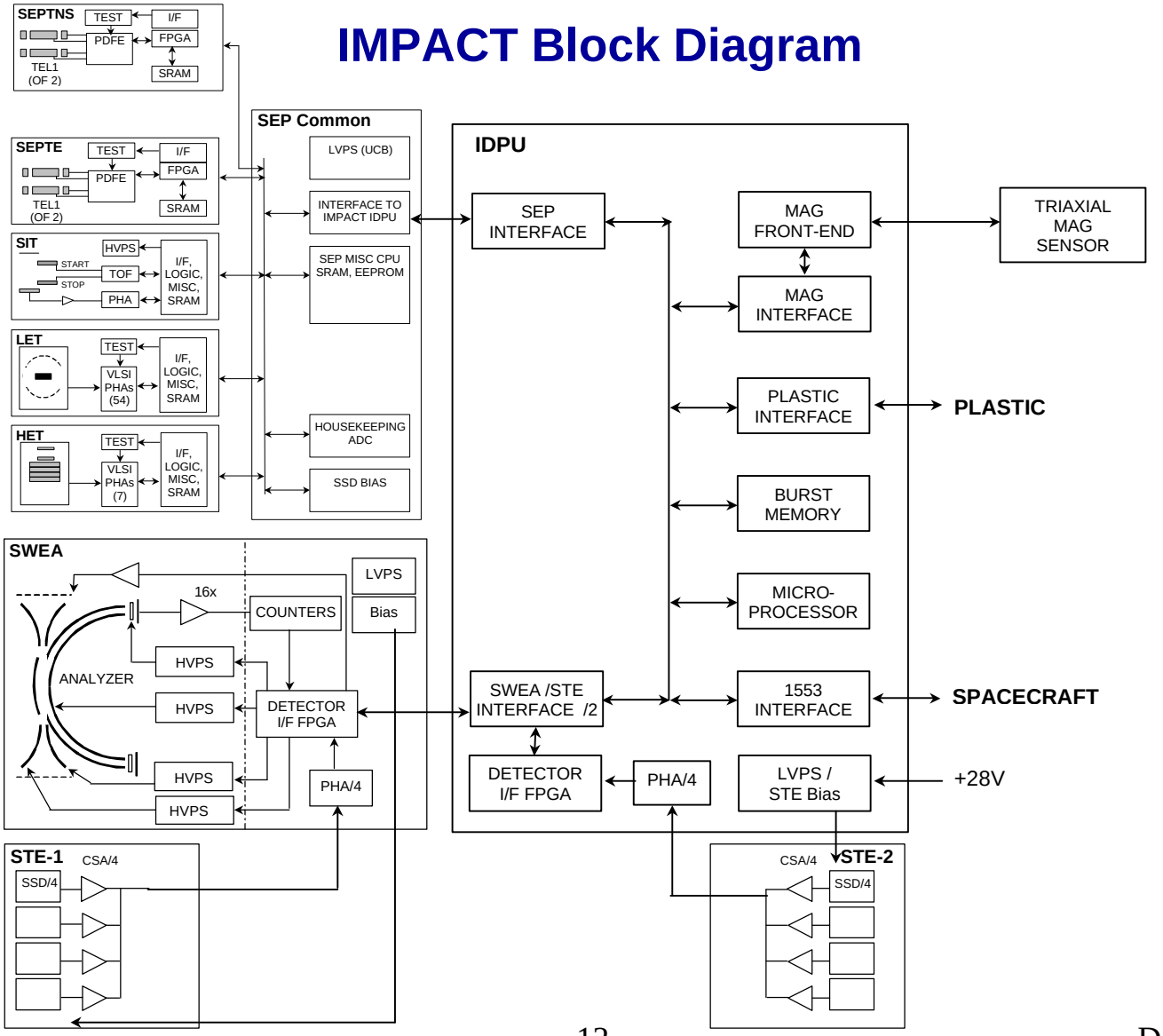
LET Performance Requirements

Description	Goal	Requirement
FOV	2 oppositely directed 130 x 30 degree fans	2 oppositely directed 100 x 30 degree fans
Energy Range (MeV/nucleon)	H: 1.4 - 6 He: 1.4 - 13 O: 2.5 – 25 Fe: 2.5 - 50	H: 1.5 - 3 He: 1.5 - 13 O: 3 – 25 Fe: 3 - 25
Geometric Factor cm^2 ster	H, He: 0.9 5<Z<27: 4.5	H, He: 0.5 5<Z<27: 2
Element Resolution	Also resolve Na, Al, S, Ar, Ca	Resolve H, He, C, N, O, Ne, Mg, Si, Fe
^{4}He Mass Resolution	<0.25 AMU	<0.35 AMU
Max Event Rate	5000 events/sec	1000 events/sec
Energy Binning	8 intervals per species for Z>1 4 intervals for H	6 intervals per species for Z>1 3 intervals for H
Species Binning	Add S, Ar, Ca	H, ^{3}He, ^{4}He, C, N, O, Ne, Mg, Si, Fe
Time Resolution	1 minute H, He, 15 minutes Z>5 4 prioritized events/sec	15 minutes 1 prioritized event/sec
Beacon Telemetry:	1 minute for H, He, 5<Z<27	1 minute for H, He, 5<Z<27

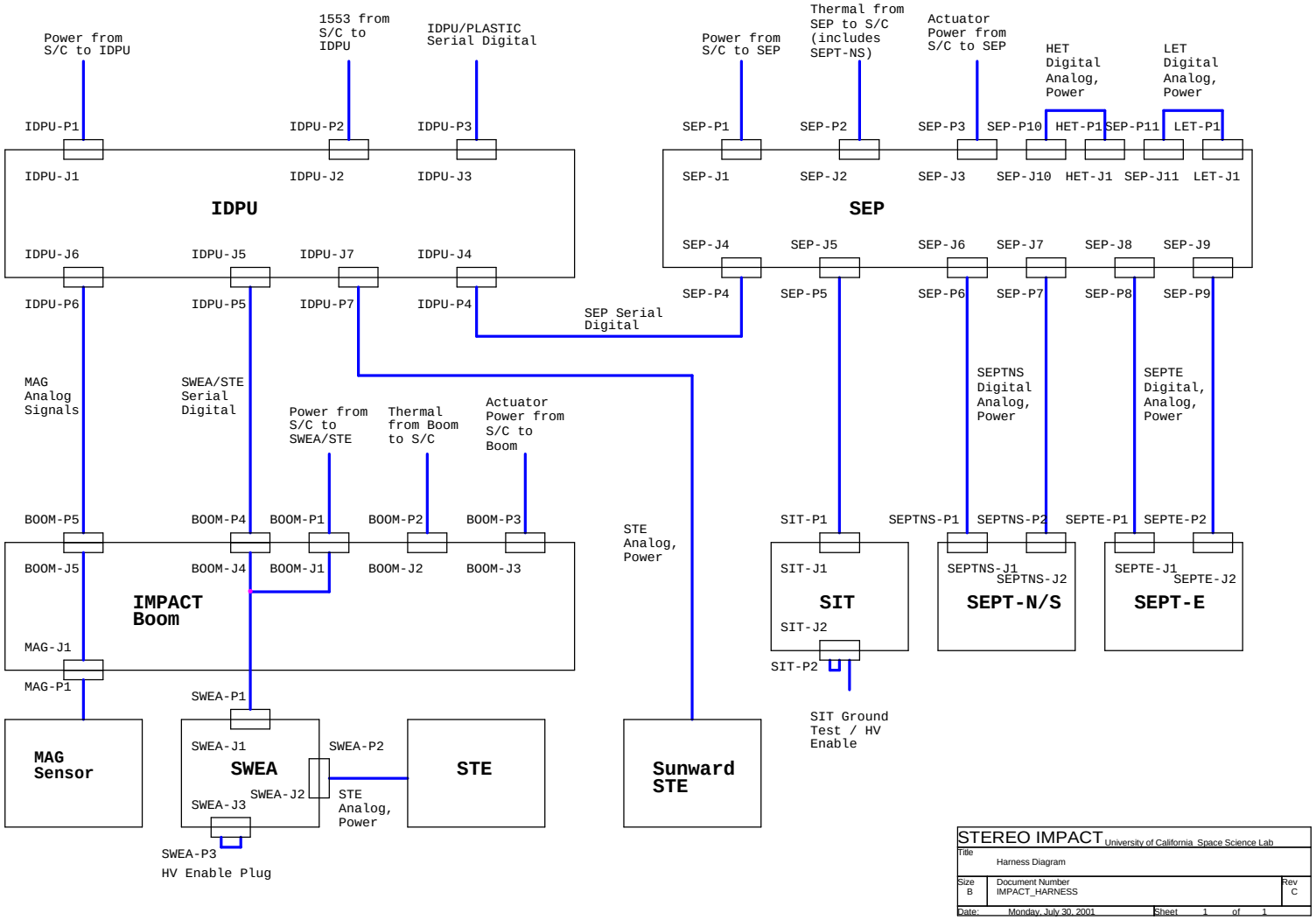
HET Performance Requirements

Description	Goal	Requirement
FOV (full angle)	58 degree cone	50 degree cone
Energy Range (MeV/nucleon)	e: 1 - 6 H, He: 13 - 100 ^{3}He: 16 – 50 ~30 to 80 for 5 < Z < 27	1 – 8 13 – 40 16 – 40 ~30 to 80 for 5 < Z < 15
Geometric Factor, cm^2 ster	0.7	0.5
Element Resolution, dZ (rms), for stopping particles	< 0.3 for 16 < Z < 26	< 0.2 for 1 < Z < 15
^{4}He Mass Resolution	<0.20 amu	<0.25 amu
Max Event Rate	5000 events/sec	1000 events/sec
Energy Binning	Eight intervals per species	Six intervals per species
Species Binning	Add 15 < Z < 27	H, ^{3}He, ^{4}He, 5<Z<15, Electrons
Time Resolution	15 minutes 1 prioritized events/sec	15 minutes 0.3 prioritized event/sec
Beacon Telemetry:	1 minute H, He, e	1 minute H, He, e

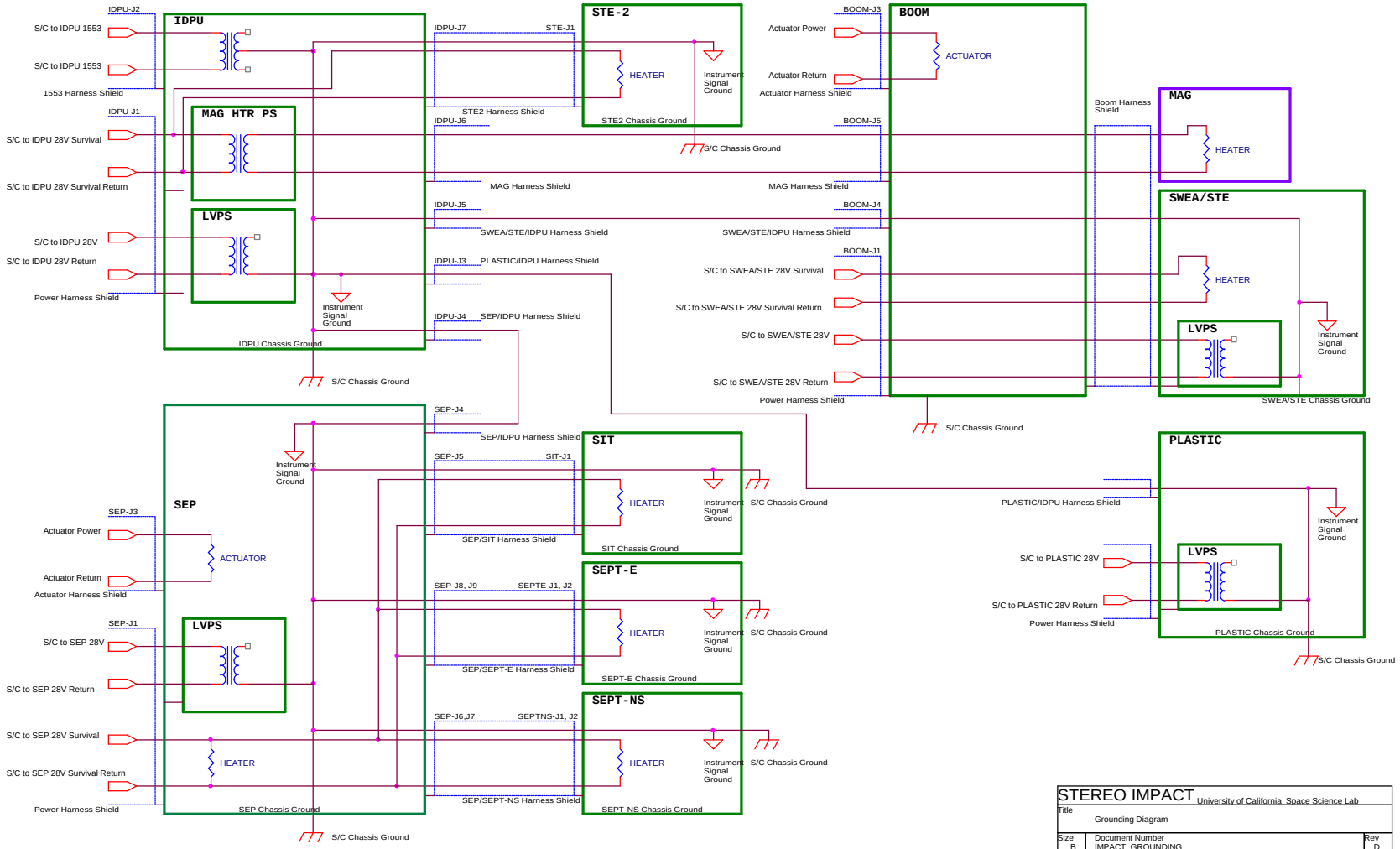
IMPACT Block Diagram



IMPACT Harness Diagram



IMPACT Grounding

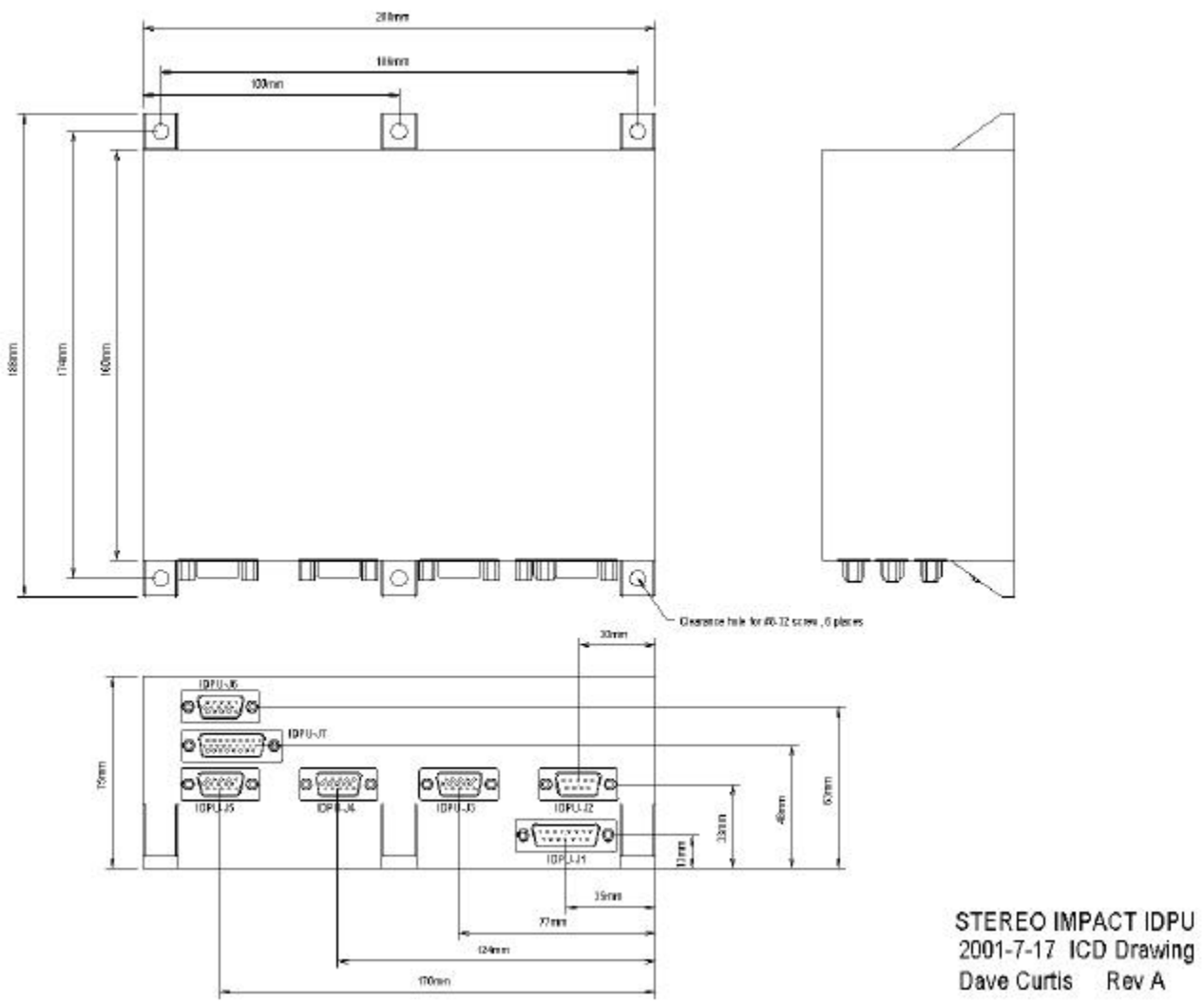


STEREO IMPACT	University of California Space Science Lab	
Title: Grounding Diagram		
Size: B	Document Number: IMPACT_GROUNDING	Rev: D
Date: Monday, July 30, 2001	Sheet 1 of 1	

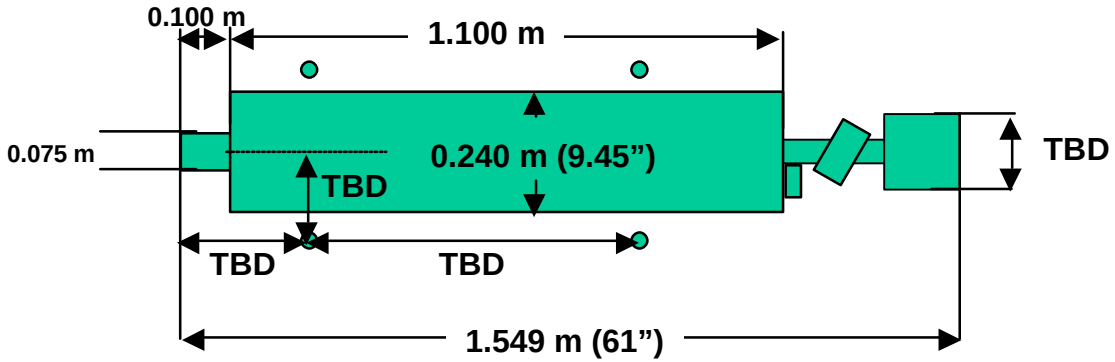
IMPACT Grounding

- **The current IMPACT grounding scheme violates the EMC guidelines:**
  - **SEPT-NS, SEPT-E, and SIT are powered from the LVPS is SEP. This provides a ground loop that may carry secondary ground currents through the chassis ground**
  - **Likewise the Sunward STE is powered from the LVPS in the IDPU**
  - **SEPT-NS has had this configuration for a while, but was deemed acceptable due to the small value of the currents involved and the distance from the Magnetometer**
  - **This issue must be re-opened now that the breaking up of SEP and STE cause still more loops, though all carry small currents**
  - **The alternative is more or more complex power converters, which will cost mass, power, and $.**
- **Note also that the Serial Digital Interface used between the instruments is single-ended.**
  - **Manning has approved the circuit provided no termination capacitor is used at the receiving end.**

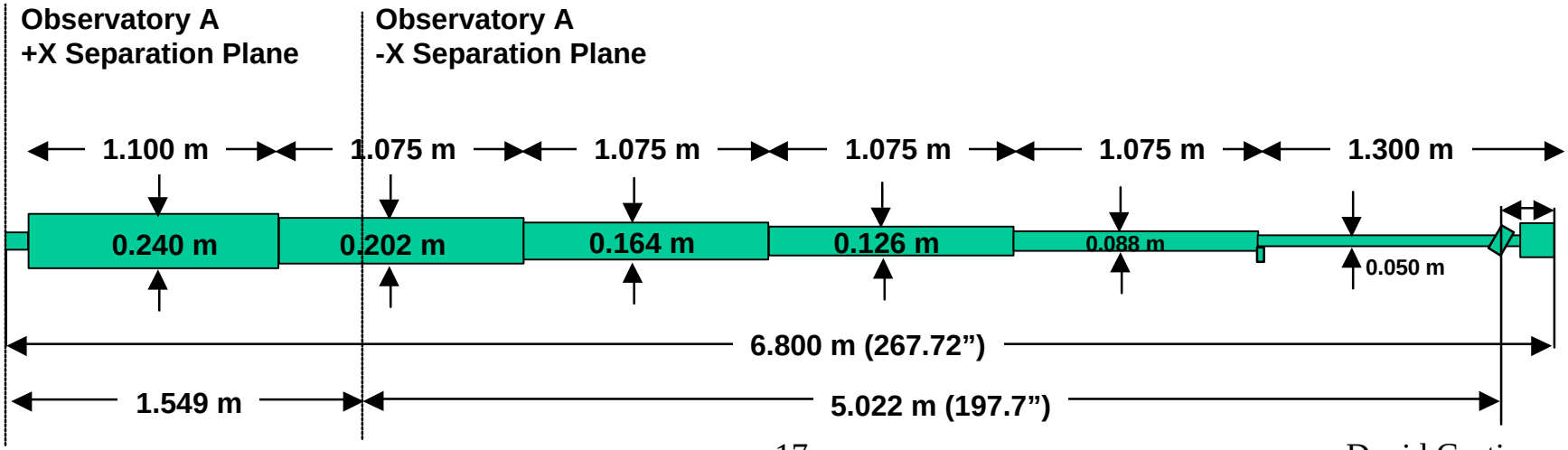
IDPU



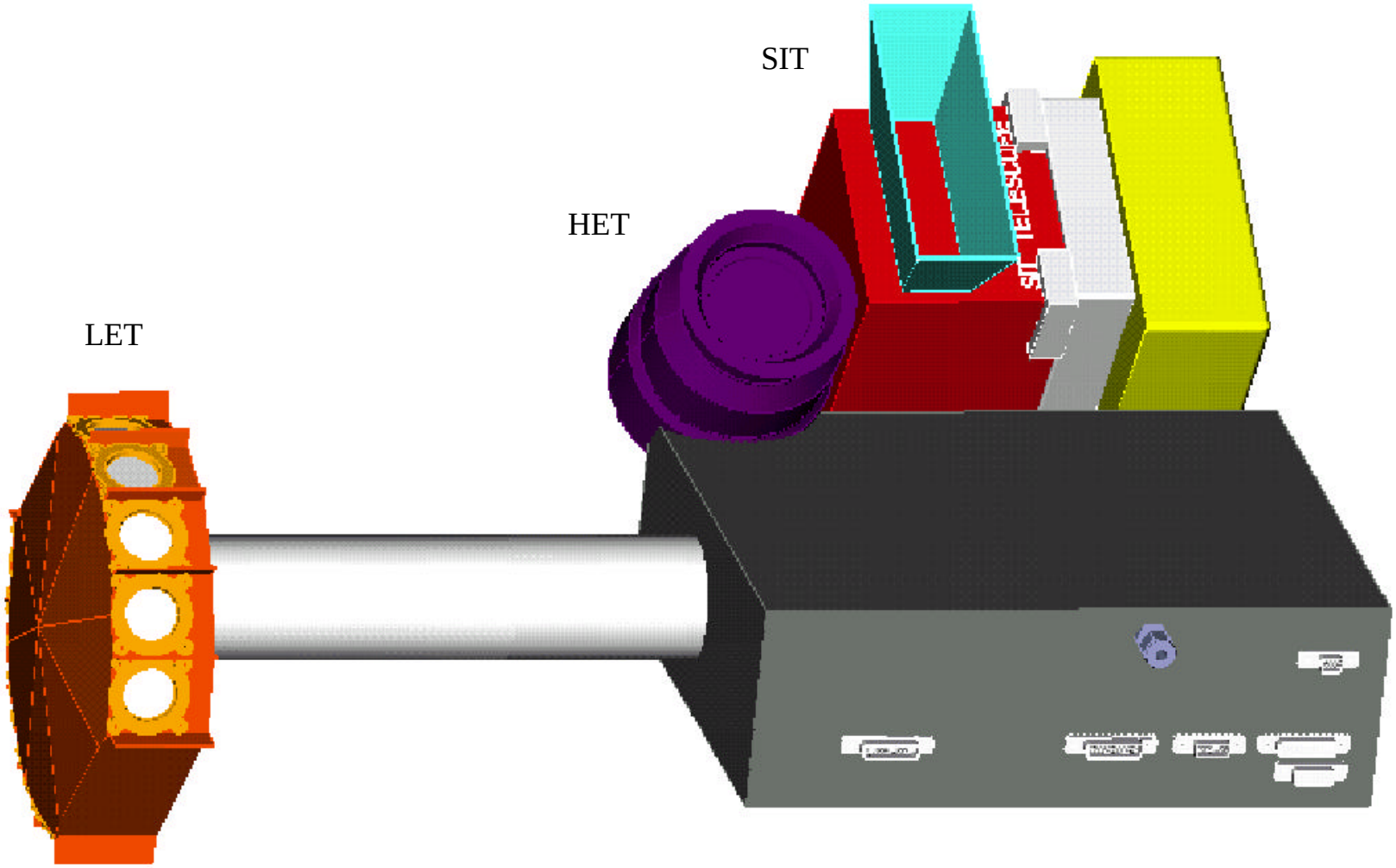
Boom Suite (Obsolete)



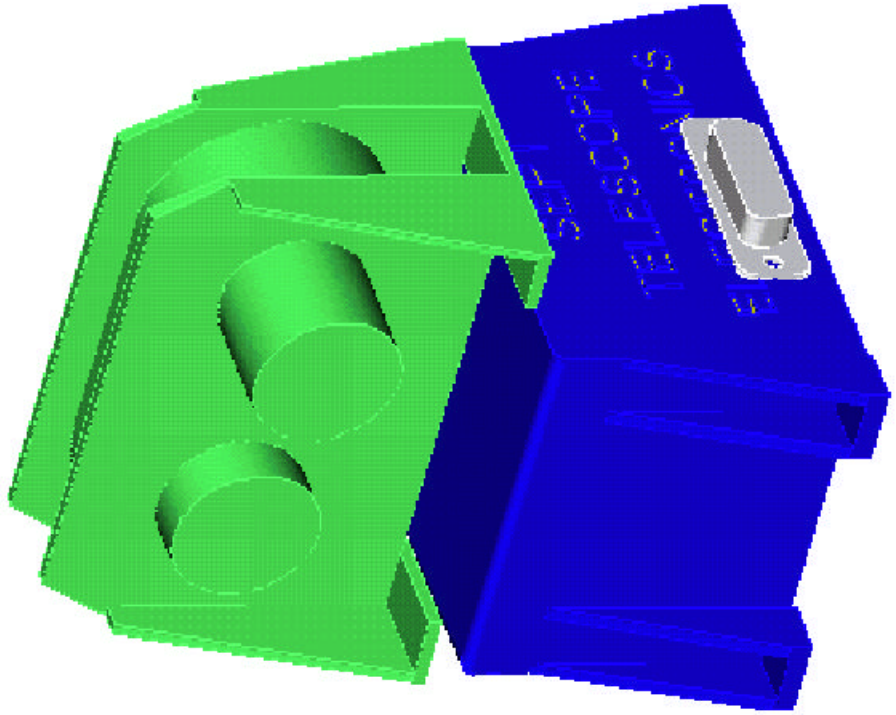
Deployed Configuration **Scale = 1/30**



SEP HET/LET/SIT/Common Electronics



SEP/SEPT



Suite Accommodation Issues

- Awaiting next rev of IMPACT ICD from APL
- A recent reconfiguration has improved the FOV situation for SEP and STE
  - Current FOVs are acceptable, if not perfect
  - Resource requirements changes due to reconfiguration:
    - Split-STE Mass/Power/$ Increase provided to Project
    - Some mass cost for splitting up SEP, at least harness
    - Shorter IMPACT boom should weigh less
- Mass and Power baselines and Not To Exceed values still in negotiation

Verification Matrix

- **The verification matrix will consist of the instrument performance requirements matrix plus selected functional and environmental requirements to verify compliance with the documented Mission Environmental Requirements and ICD**
  - **Performance Requirements listed above. Most will be verified during calibrations or by analysis**
  - **Functional Requirements to be verified by a Comprehensive Functional Test, mostly aimed at verifying electrical functionality and compliance with the electrical interfaces in the ICD**
  - **Software Requirements to be verified in a system-level acceptance test prior to committing to Flight Hardware**
  - **Environmental requirements shall be verified by test or analysis as described in the Verification Plan, outlined below.**

Suite Environmental Test Matrix

System	EMC	Bakeout	Thermal Vac Cycling	Thermal Balance	Sine Vib	Random Vib	Mass props	Failure Free Hours
SEP								
- SEPT-NS		?	-15 - +10C -25 - +30C	TBR	?	?	?	
- SEPT-E		?	-15 - +10C -25 - +30C	TBR	?	?	?	
- SIT		?	-15 - +10C -25 - +30C	TBR	?	?	?	
- HET, LET, Common Elec.		?	-15 - +10C -25 - +30C	TBR	?	?	?	
Boom Assy		?		TBR	?	?	?	
- Boom	Mag Screening		TBD					
- SWEA	Mag Screening		-25 - +50C -30 - +50C					
- STE	Mag Screening		-50 - -30C -50 - +40C					
- Mag Sensor			-20 - +45C -20 - +45C					
IDPU		?	-23 - +55C -30 - +60C		?	?	?	
Flight Harness		?						
IMPACT Suite	RS,RE,CS,CE per EMC Requiurements							100

SEP/LET Verification Matrix

				Verification Matrix for STEREO/IMPACT/SEP/LET																		Revision Date: 7/19/01
																						Revision Number: 1
Hardware Description		Tests																				
Level of Assembly	Item	Noise & Brkdown	Thermal vacuum	Alphas	Elect. test, rm. Temp	Elect. Test, hot	Elect. Test, cold	Vibration, Sinusoidal	Vibration, Random	Shock	Acoustics	Pressure change	Voltage margins	Thermal cycle	Thermal balance	Life Test	EMC/EMI	Magnetics	Leak	Bakeout	Contamination	Comments
C	Detectors, PT & F	X	X	X	X	X	X		X					X								
C	VLSI, PF				X	X	X															
C	Hybrids, PT & F				X	X	X												X		X	
C	LET detector board, EM				X	X	X															
C	LET detector board, F				X																X	
C	LET MISC board, EM				X	X	X						X									
C	LET MISC board, F				X																X	
C	Connectors, F															X					X	
I	Instrument, EM				X	X	X						X	X								
I	Instrument, F		X	X	X	X	X	X	X	A	X	A	X		X	X	X			X	X	

Legend:					
	Level of Assembly	Unit Type		X =	Test required
				A =	Analysis
	C = Component	BB =	Breadboard		
	I = Instrument	EM =	Engineering Model		
		PT =	Prototype		
		PF =	Protoflight		
		F =	Flight		

SEP/HET Verification Matrix

				Verification Matrix for STEREO/IMPACT/SEP/HET																		Revision Date: 7/19/01
																						Revision Number: 1
Hardware Description		Tests																				
Level of Assembly	Item	Noise & Brkdown	Thermal vacuum	Alphas	Elect. test, rm. Temp	Elect. Test, hot	Elect. Test, cold	Vibration, Sinusoidal	Vibration, Random	Shock	Acoustics	Pressure change	Voltage margins	Thermal cycle	Thermal balance	Life Test	EMC/EMI	Magnetics	Leak	Bakeout	Contamination	Comments
C	Detectors, PT & F	X	X	X	X	X	X		X					X								
C	VLSI, PF				X	X	X															
C	Hybrids, PT & F				X	X	X												X		X	
C	HET board, EM				X	X	X						X									
C	HET board, F				X																X	
C	Connectors, F															X					X	
I	Instrument, EM				X	X	X						X	X								
I	Instrument, F		X		X	X	X	X	X	A	X	A	X		X	X	X			X	X	
Legend:																						
	Level of Assembly	Unit Type										X =	Test required									
												A =	Analysis									
	C = Component	BB =	Breadboard																			
	I = Instrument	EM =	Engineering Model																			
		PT =	Prototype																			
		PF =	Protoflight																			
		F =	Flight																			

SEP/SIT Verification Matrix

		Verification Matrix for STEREO/IMPACT/SEP/SIT																				Revision Date: 7/20/01
																						Revision Number: 1
Hardware Description		Tests																				
Level of Assembly	Item	Vacuum	Alphas	Elect. test, rm. Temp	Bench Calibration	Elect. Test, hot	Elect. Test, cold	Vibration, Sinusoidal	Vibration, Random	Shock	Acoustics	Thermal Vacuum	Voltage margins	Thermal cycle	Thermal balance	Life Test	EMC/EMI	Magnetics	Beam Calibration	Bakeout	Contamination	Comments
C	Detectors, F		X									X										
C	Foils PT										X											
C	Telescope PF,F	X	X																		X	
C	Energy board, EM			X		X	X						X									
C	Energy board, F			X																	X	
C	TOF Board, EM			X		X	X						X									
C	TOF Board, F			X																	X	
C	HVPS EM			X		X	X						X									
C	HVPS F			X																	X	
I	Instrument W/O Telescope																			*2		
I	Instrument, PF	X	X	X	X	X	X	X	X	*1		X	X	X	X	X	X	X	X		X	Performed at SEP level or higher
I	Instrument, F	X	X	X	X	X	X	X	X	*1		X	X	X	X	X	X	X	X		X	Performed at SEP level or higher

Legend:

Level of Assembly	Unit Type	X =	Test required
		A =	Analysis
C = Component	BB Breadboard		
I = Instrument	EM Engineering Model	*1	Sine burst test during vibration testing
	PT Prototype	*2	As required
	PF Protoflight		
	F = Flight		

SEP/SEPT Verification Matrix

Verification Matrix for STEREO/IMPACT/SEP Instruments

Revision Number _____

Revision Date _____

Hardware Description				Tests																		
Level of Assembly	Item	Spacecraft	Quantity	Thermal Analysis	Struct. Analysis	Modal Survey/ Sine Sweep	Loads Test/ Sine Burst	Random Vibration	Mechanical Shock	Acoustics	Mass Properties	Pressure Profile	Mechanical Function	Life Test	EMC/EMI	Magnetics	Leak	Thermal	Thermal Balance	Thermal Vacuum	Bakeout	Comments
I	SEPT-E (T)		1	A	A					X			X	X	X	X		X				Engineering Model
I	SEPT-E (PF)	A	1			X		X		X	X		X	X	X	X			X	X		Test to qualification level
I	SEPT-E (F2)	B	1			X		X		X	X		X	X	X				X	X		Test to acceptance level
I	SEPT-NS (F1)	A	1			X		X		X	X		X	X	X				X	X		Test to acceptance level
I	SEPT-NS (F2)	B	1			X		X		X	X		X	X	X				X	X		Test to acceptance level

LEGEND:

Level of Assembly	Unit Type	
		X - Test Required
		T - Test if Analysis Indicates
I = Instrument	PT = Prototype	A - Analysis
C = Component	PF = Protoflight	
L = Laboratory	F = Flight	
	S = Spare	

SEP Common Electronics Verification Matrix

				Verification Matrix for STEREO/IMPACT/SEP/SEP Common																			Revision Date: 7/19/01
																							Revision Number: 1
Hardware Description				Tests																			
Level of Assembly	Item	Noise & Brkdown	Thermal vacuum	Alphas	Elect. test, rm. Temp	Elect. Test, hot	Elect. Test, cold	Vibration, Sinusoidal	Vibration, Random	Shock	Acoustics	Pressure change	Voltage margins	Thermal cycle	Thermal balance	Life Test	EMC/EMI	Magnetics	Leak	Bakeout	Contamination	Comments	
C	LVPS, EM				X	X	X						X				X						
C	LVPS, F				X																X		
C	Analog Post-reg, EM				X	X	X						X										
C	Analog Post-reg, F				X																X		
C	Detector bias supply, EM				X	X	X						X				X						
C	Detector bias supply, F				X																X		
C	Logic board, EM				X	X	X						X										
C	Logic board, F				X									X							X		
C	Connectors, F															X					X		
C	Harnesses, F																				X		
I	Instrument, EM				X	X	X						X				X						
I	Instrument, F		X		X	X	X	X	X	A	X	A	X		X	X	X			X	X		

Legend:

	Level of Assembly	Unit Type			X =	Test required
					A =	Analysis
	C = Component	BB =	Breadboard			
	I = Instrument	EM =	Engineering Model			
		PT =	Prototype			
		PF =	Protoflight			
		F =	Flight			

SEP I&T

- Four instruments tested separately to the extent possible
  - LET at Caltech/JPL
  - HET at GSFC
  - SIT at UMd/GSFC
  - SEPT at Kiel
- SEP Common integrated & tested at Caltech
  - Low Voltage Power Supply from UCB
  - Detector bias supply from Space Instruments
  - Analog/post-reg board from Space Instruments
  - Logic board from Caltech
  - Mechanical parts from GSFC
- SEP Common/IDPU interface test at UCB and/or Caltech
- Integrate into SEP system at Caltech
- Test SEP at Caltech
- Vibration/Thermal vac/Thermal balance at JPL
- EMI/EMC at UCB

Suite I&T Flow

- **Boom Suite:**
  - **SWEA fabricated & calibrated at CESR, delivered to UCB**
  - **SWEA integrated with interface electronics, tested, Thermal Vac tested at UCB**
  - **STE fabricated, calibrated, thermal-vac tested at UCB**
  - **MAG sensor fabricated, calibrated, thermal-vac tested (?) at GSFC**
  - **Boom fabricated, tested, thermal vacuum tested, vibrated at UCB**
  - **Boom/MAG/SWEA/STE integrated at UCB**
  - **Boom vibrated, mass props, baked out as a suite**
- **IDPU**
  - **MAG analog fabricated, tested, calibrated at GSFC**
  - **LVPS, DCB, DIB, box fabricated and tested at UCB**
  - **IDPU Integrated, tested, thermal vac tested, mass props, vibrated at UCB**
- **IMPACT Suite:**
  - **Suite integrated at UCB, functional & EMC testing**

Top Risks

- ITAR problems impede progress
  - Schemes seem to be working so far, but not seamlessly
- Excessive documentation/review requirements risk diverting key personnel from development tasks
- No magnetics oversight at APL
- Continued changes in spacecraft configuration using up time and resources in reconfigurations
- Parts issues:
  - ASIC developments
  - MISC development (54SX72S; mitigated by relaxed schedule)
  - Parts up-screening, radiation screening
  - SEP/LET L1 detectors (new thinning process, ITAR considerations)
  - STE detectors (new application)
  - Possible hang-ups in Parts Control Board
- Complex, interlocked suite development schedules
  - Extension to 2005 launch provides margin, but flat funding decreases its utility and may be unachievable
- Strict mission EMC requirements risk delivery if late test fails

Trade Studies

- LVPS topologies: EMI, space, efficiency, reliability constraints
- SIT TOF design: power vs performance
- SEP configuration: minimize FOV incursions, mass, complexity
- SEP processor selection: capability, power, software logistics
- SEP detector size: sensitivity vs saturation in a large event
- MAG ADC selection: simplify ranging system vs new ADC
- STE detector FETs: minimize noise vs availability, reliability
- Split STE: cost, resources, complexity vs FOV
- Parts selection: reliability, screening costs vs performance, power
  - Mostly in analog front end, LVPS circuits
- Boom thermal: complexity vs heater power
- Boom deployment: reliability, mass, cost, stability
- Boom length: stability/reliability vs SWEA/STE FOV

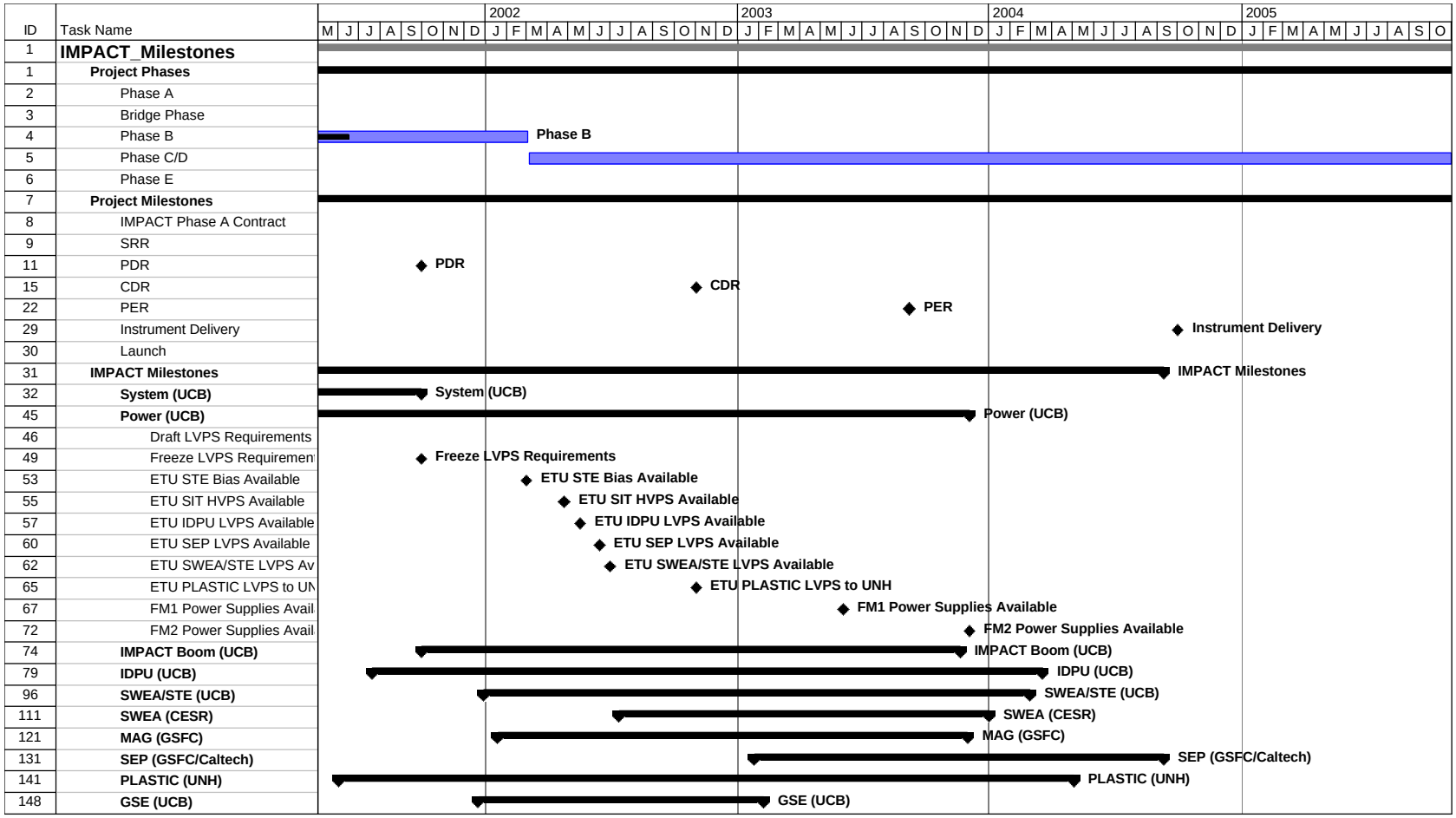
International Activities, SWEA

- CESR and UCB collaborating on SWEA
  - CESR Provides:
    - Analyzer
    - HVPS
    - Preamps
    - DC Analyzer Calibrations
  - UCB Provides:
    - Requirements
    - Digital IDPU Interface & LVPS (common with STE)
    - Boom Mounting
    - AC Analyzer Calibrations (sweeping)
- Interfaces are documented in an ICD
  - No ITAR Issues
  - Interaction between UCB and CESR at telecons, e-mails, and occasional meetings
- CESR and UCB both proceeding towards an ETU, with a combined ETU I&T scheduled for July 2002
- CESR has base-lined Grade 3 EEE parts (based on their funding)
  - A failure in SWEA in general will not affect the rest of IMPACT
  - At most it can take out half of STE (if it takes down the SWEA/STE Power)

International Activities, SEP

- TOF system being built by Max/Planck Lindau using UMd designs
  - GSFC arranged for drawings & documents to be transferred
- Caltech/U. Kiel/EsTEC
  - Regular teleconferences seem to be adequate to this point
- Caltech/Micron/LBL/JPL interaction on L1 detector
  - Micron Ltd. will process front side of 300 um thick, 4” wafers
  - Wafers will be sent to LBL/JPL for thinning to 20 um in detector active areas
  - Wafers will be returned to Micron for processing the backside
  - We’ve discussed this with Caltech/JPL counsel; waiting for advice
- May need GSFC assistance with other hardware transfers
  - No TAA’s likely at Caltech
  - SEPT hardware needs to be imported and possibly exported

IMPACT Milestone Schedule



SEP Milestone Schedule

Peer Review, SEP	4/19/01
Phase B start	6/1/01
Peer Review, IDPU	6/13/01
VLSI chip definition to SIT & HET	6/27/01
Peer Review, Wrapup	8/2/01
PDR	9/11/01
Confirmation Review	3/4/02
Phase CD start	3/4/02
Flight VLSI chips delivery to SIT & HET	4/17/02
All flight detectors ordered	4/29/02
LVPS EM available from UCB	6/17/02
Prelim. I/F test with IDPU	10/4/02
CDR	11/4/02
Detector testing complete	2/3/03
GSE ready	4/28/03
HET delivery to Caltech	6/11/03
Boards fabricated and tested	7/4/03
Integration of LET complete	7/23/03
SIT delivery to Caltech	7/30/03
Integration of HET complete	9/3/03
SEPT delivery to Caltech	9/10/03
Integration of SIT complete	10/22/03
Final flight firmware complete	10/22/03
Integration of SEPT complete	12/10/03
Integration of LET/HET/SIT/SEPT complete	2/4/04
Ready to integrate SEP with IDPU	2/23/04
End-to-end test at accelerator	5/10/04
SEP Env Test Starts	5/31/04
IMPACT EMC Test Starts	6/25/04
Functional/env. testing complete	9/10/04
SEP Delivery to UCB	9/10/04
Pre-ship review	9/27/04
Launch	12/8/05

Action Item Status from Boom Peer Review

Item	Action	Status	Status
123	SWEA Fuse Link Actuator	Changed to TiNi Resettable Actuator	Closable
124	SWEA Cover Control	Controlled by IMPACT	Closed
125	Solar Array Orientation	N-S	Closed
126	Does SWEA fit boom envelope	Yes	Closed
127	STE Cover	Added to baseline	Closed
128	STE and SWEA Thermal	Thermal Analysis in progress. Preliminary estimates indicate 1W operational heater required	Open
129	Detector Covers	Added to baseline	Closed
130	Boom Development Plan	See Boom presentation	Open
131	Define Boom Stowed Configuration	See Boom presentation	Open
132	Boom deployment end-stops	Added	Closed
133	Boom Frequency Requirement	See Boom presentation	Open
134	Boom Mass Estimate	9.25kg	Closeable
135	Boom Stiction	See Boom presentation	Open
136	Boom Coax Size	See Boom presentation	Open
137	Boom Stiffness Requirement	See Boom presentation	Open
138	Boom Stiffness, unlocked	See Boom presentation	Open
139	Solar Array Backside Conductivity (S/C Action)	APL Assures us it meets the requirement	Closeable
140	Boom Surface Characteristics (Conductivity vs Contamination)	Sample of normal surface preparation to be provided to GSFC for contamination analysis	Open

Action Item Status from SEP/MAG Peer Review (1 of 2)

Item	Action	Status	Status
159	SEP Software Configuration Control	Plan Documented in SEP Software Development Plan	In Review by GSFC
160	Parts Radiation tolerance, especially Actel	Radiation effects are considered in parts selection	Closeable
161	Need a Requirements Matrix	Draft matrix in progress	Open
162	Software Development Plan meeting	Done	Closed
163	MISC test plan	In work	Open
164	New Actel Availability backup plan	Given STEREO schedule slip, this is no longer considered a significant risk	Closeable
165	Fixed length telemetry packet impact	Preliminary packet formats have been developed	Closeable
166	6” Mag sensor separation from boom harness requirement	Incorporated into boom design	Closeable
167	IMPACT Schedule	Both top level milestone and detailed subsystem schedules exist for almost all subsystems	Open
168	SEPT Cover Design	Cover selected, detailed design in progress	Closeable
169	SEPT Purge requirements	Provided	Closeable

Action Item Status from SEP/MAG Peer Review (2 of 2)

Item	Action	Status	Status
170	Select SIT detector type	Done (surface barrier)	Closeable
171	Identify SIT HV Contamination Control Requirements	In work	Open
172	LET mast surface treatment	In work	Open
173	Materials List	In work	Open
175	Materials List	In work	Open
176	Contamination Control Plan	In Work	Open
177	Contamination Sensitivity	In Work	Open
178	APL Magnetics Lead	APL preson required, MAG team to present requirements	Open, APL
179	SIT HVPS Frequency Waiver	Informally closed, not yet formally presented	Open
180	SIT TOF Power Increase	Included in baseline	Closeable
181	EMC Plan Should Require checking at MAG frequencies	MAG Requests only a paper survey at this time	Open
182	Mag Heater Frequency Control	Crystal-synchronized	Closeable