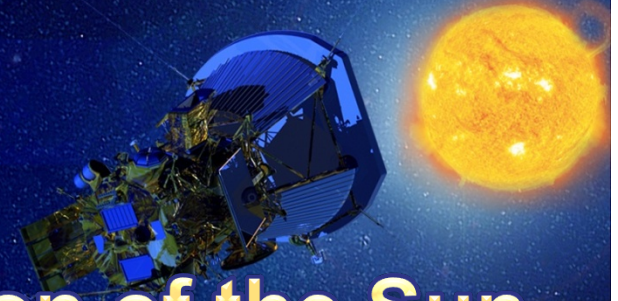


Solar Probe Plus

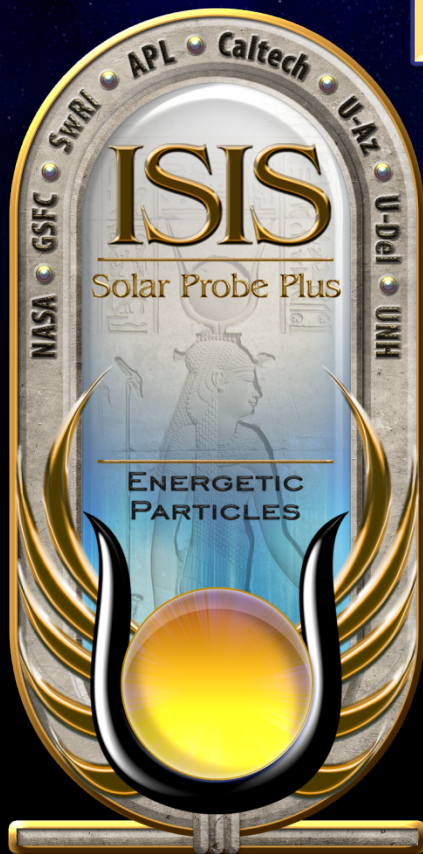
A NASA Mission to Touch the Sun



Integrated Science Investigation of the Sun Energetic Particles

Preliminary Design Review

05 – 06 NOV 2013

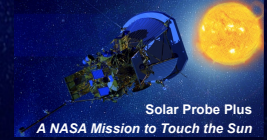


EPI-Hi Electronics

Branislav Kecman / Rick Cook



EPI-Hi Electronics

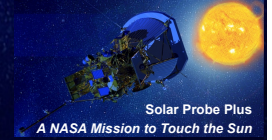


Implementation and Status

Branislav Kecman
Cognizant Electrical Engineer



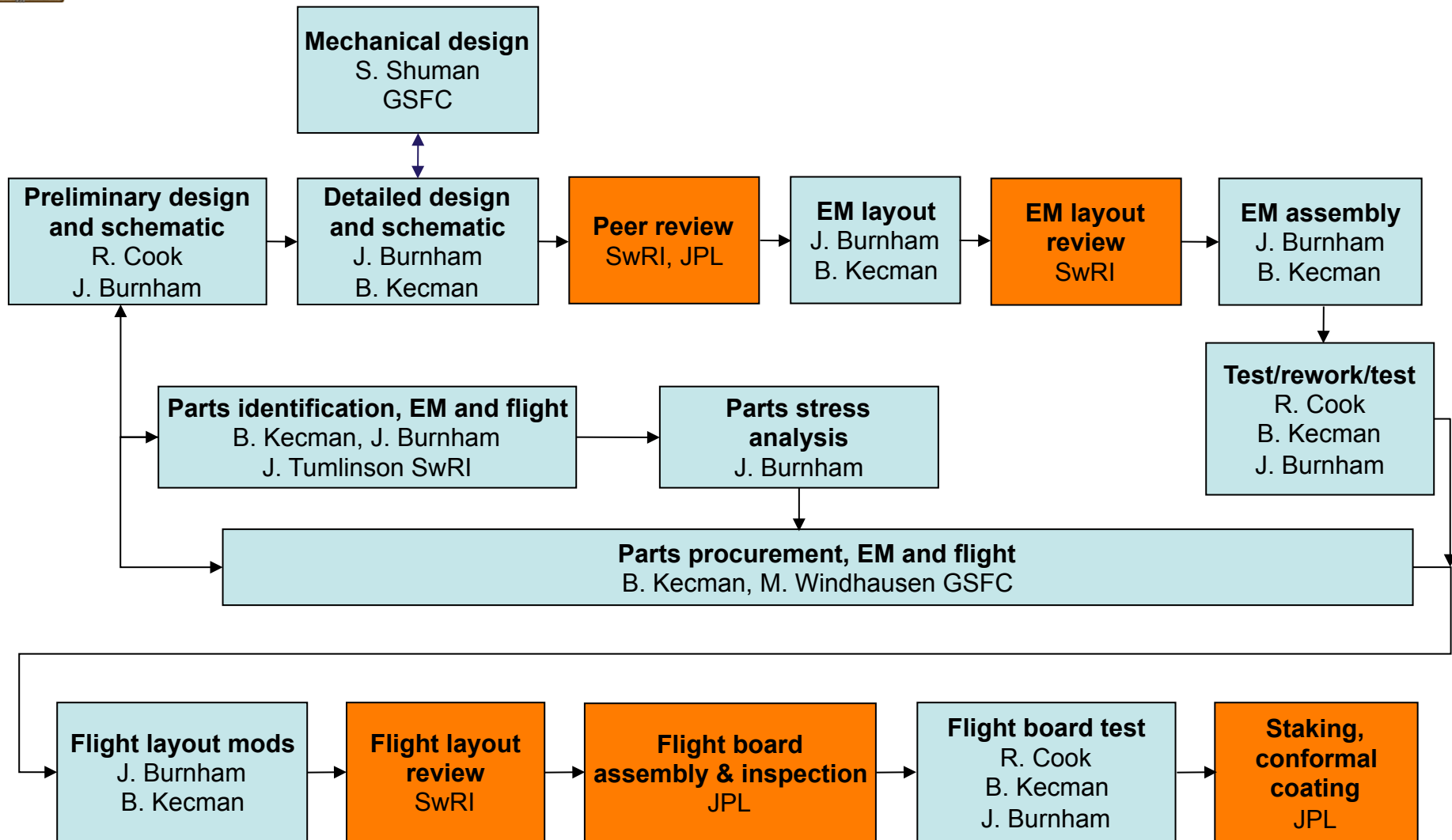
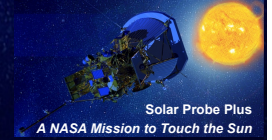
Outline



- Design/Assembly/Test Flow
- Boards Status
 - Layout Example
- Parts Status
 - Major Parts Used
 - In-House Screening
- Resources
 - Power
 - Mass
- Harness Diagram
 - Thermal Harness

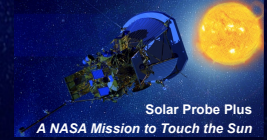


Design/Assembly/Test Flow





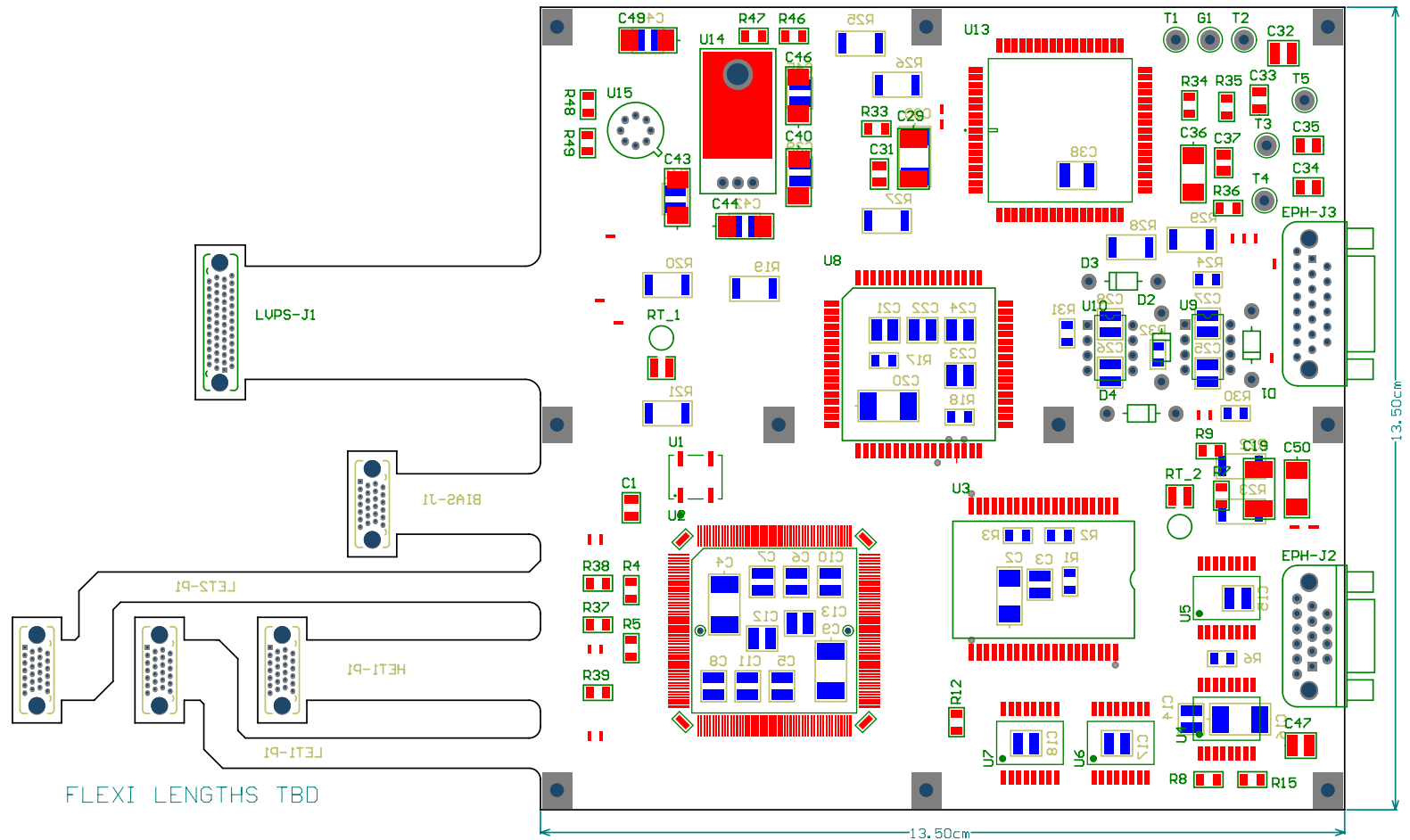
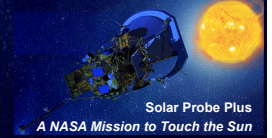
Boards Status



Board	Sche- matics	Peer review	EM layout	EM fab	EM parts procured	EM test start
Telescope (x 3)	80%	√	10%	0	60%	Mar '14
DPU	100%	√	~100%	0	90%	Jan '14
LVPS	100%	√	100%	In process	100%	Nov '13
Bias Supply	100%	√	60%	0	80%	Feb '14

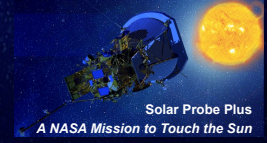


DPU Board Layout





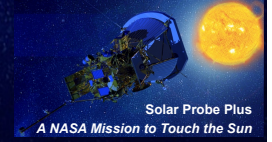
Parts Status



- Parts list submitted to Parts Control Board for review
- All parts comply with Level 2 per NASA EEE-INST-002
- Currently ordering parts for EM and prototype boards
- Will use spare flight parts from Caltech, GSFC, SwRI and JPL stock if Lot Date Code < 5 years old
- Controlled access, temp. and humidity in parts storage
- Using 2 custom databases, Parts & Kits, for inventory tracking and kitting of parts for assembly since ACE ('93)
- Lead bending on all IC packages done at JPL
- JPL will package PHASIC and HKchip
- Screening spec for PHASIC and SOW for HKchip submitted to PCB for review
- Plan to test rad-hard PHASIC and HKchip die for TID and Latch-up at LBNL's 88" Cyclotron



Major Parts Used



Parts with heritage:

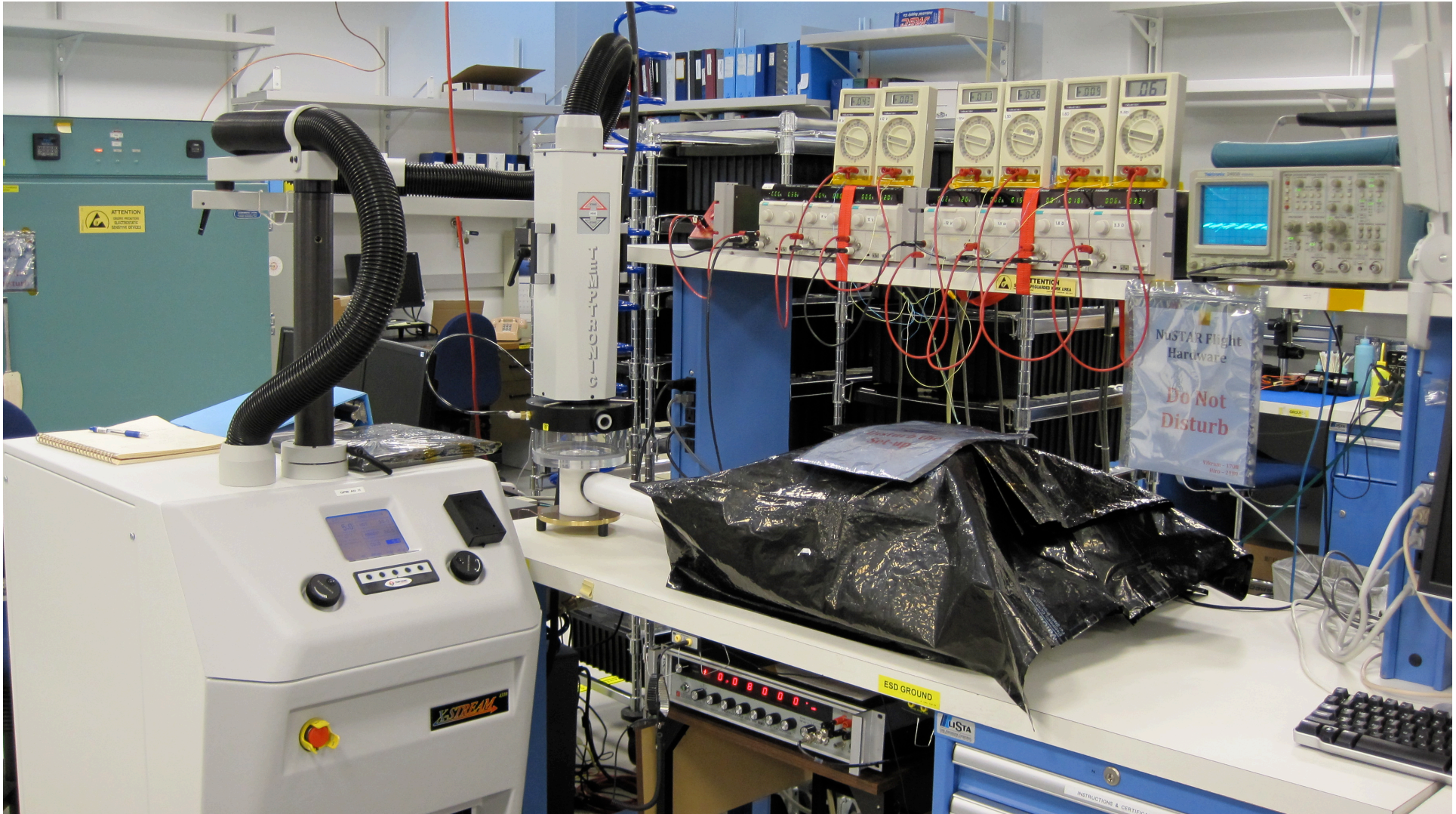
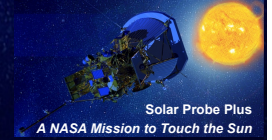
- Microsemi/Actel FPGA, RTAX250SL-CQ208B, NuSTAR
- Aeroflex SRAM 4Mb (128k x 32), UT8R128K32, “
- PHASIC hybrid, heritage STEREO

New parts for SPP:

- Aeroflex SRAM 16Mb (512k x 32), UT8CR512K32
- Aeroflex MRAM 16Mb (2M x 8), UT8MR2M8
- HKchip

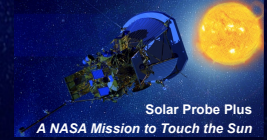


In-House Screening





Resources - Power

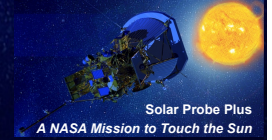


Subsystem	Power [W]
LET1 board	1.06
LET2 board	0.76
HET board	0.95
DPU board	0.62
Bias Supply @ Beginning Of Life	0.12
LVPS @ BOL (70% efficiency)	1.50
Total @ BOL	5.0

End Of Life	
Bias Supply @ End Of Life	0.68
LVPS @ EOL (70% efficiency)	1.74
Total @ EOL	5.8



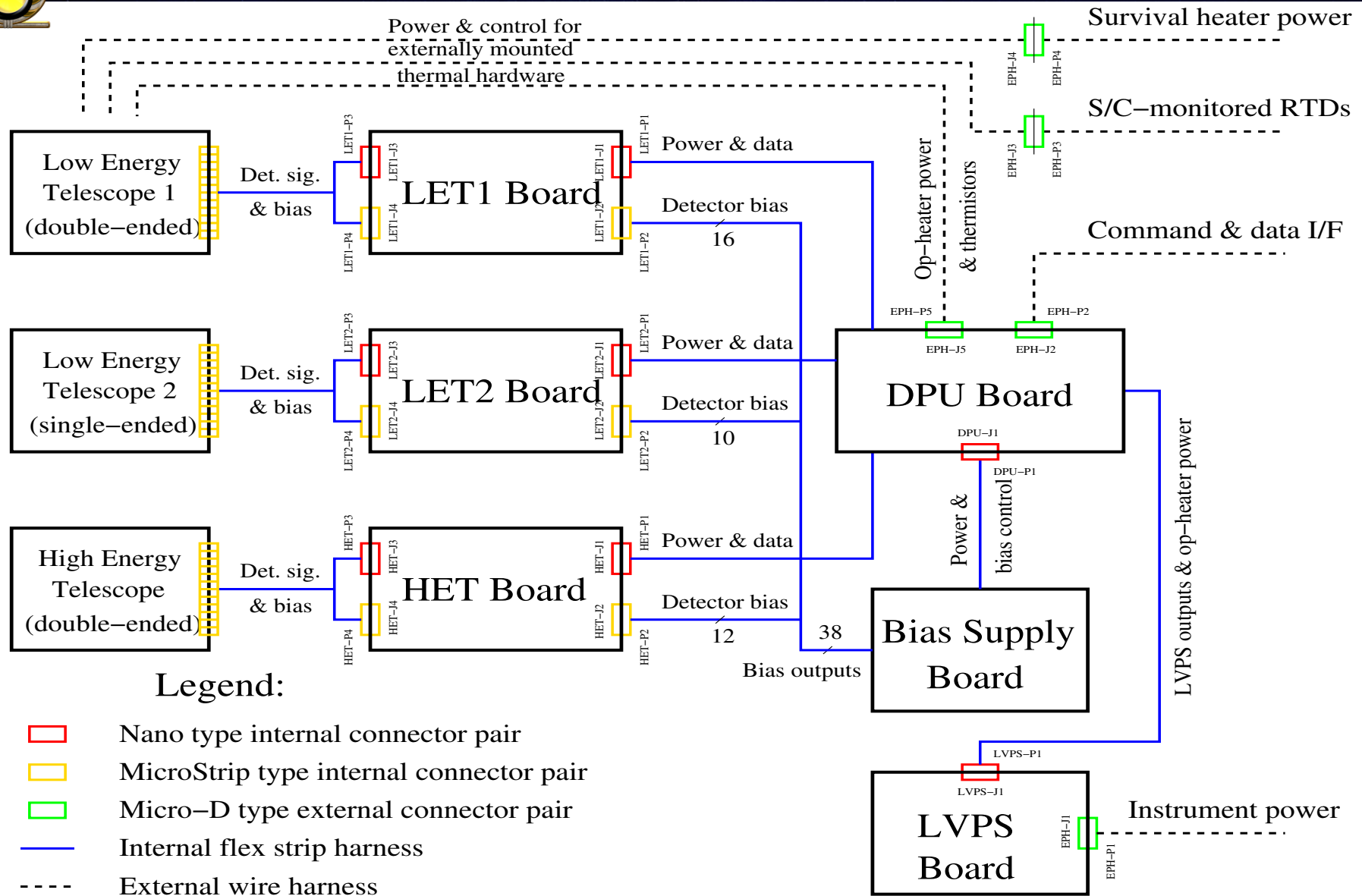
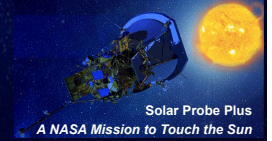
Resources - Mass



Subsystem	Mass [g]
LET1 telescope	225
LET1 board	258
LET2 telescope	145
LET2 board	233
HET telescope	120
HET board	250
DPU board	197
Bias Supply & RF shields	225 + 130
LVPS & RF shields	160 + 100
Elec. box, hardware & shielding	925 + 250 + 100
Telescope brackets	160
Thermal hardware	50
MLI blankets	100
Total	3,628



Harness Diagram





Thermal Harness Diagram

