SEP Mechanical Design

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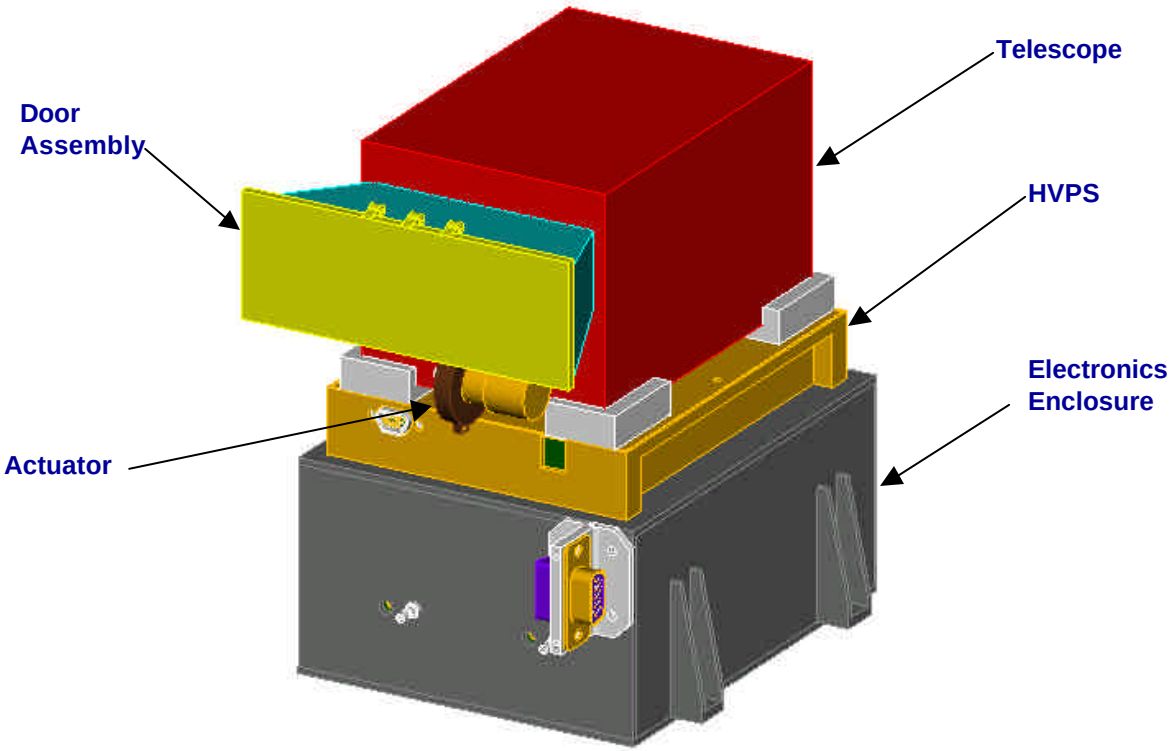
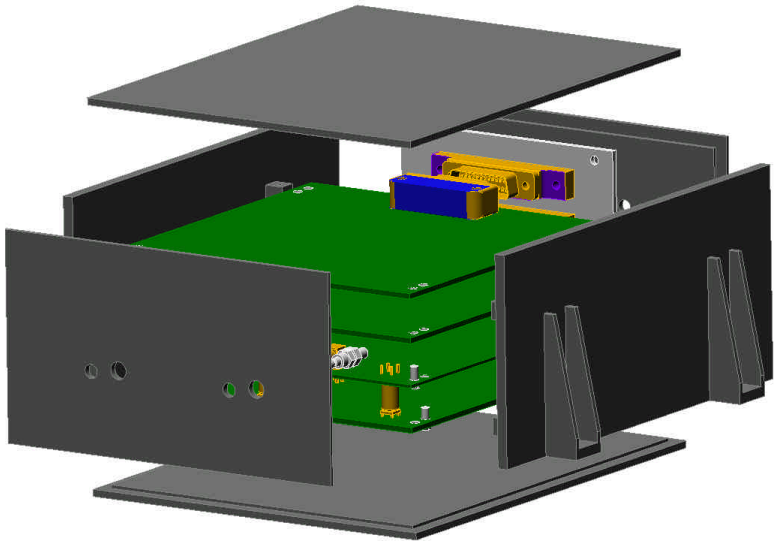
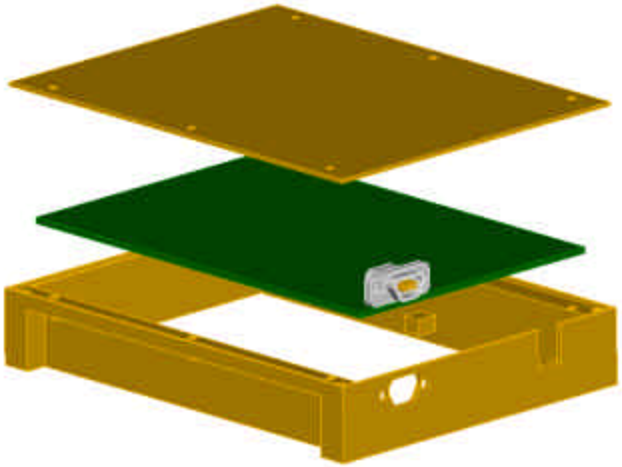
SIT Instrument Assembly



SIT Enclosures

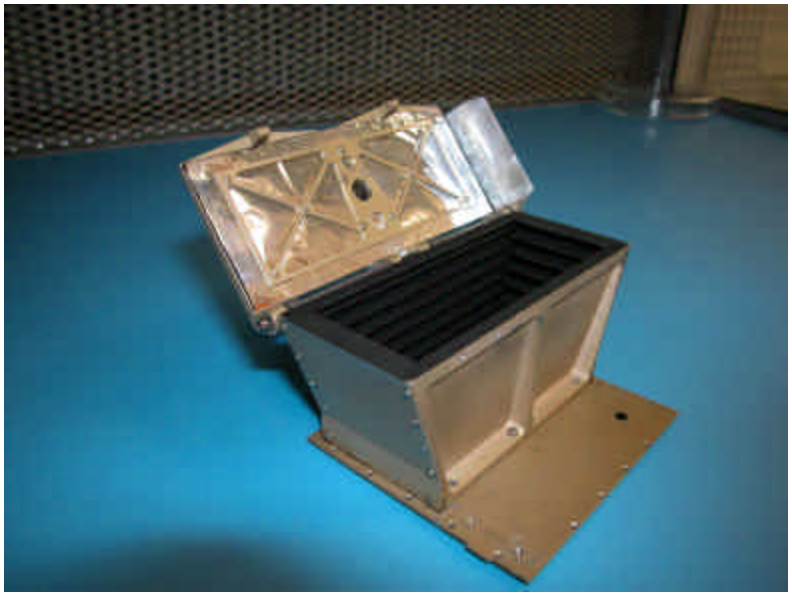




•Electronics enclosure is being designed by GSFC

•High Voltage enclosure is being designed by GSFC

SIT Telescope Door



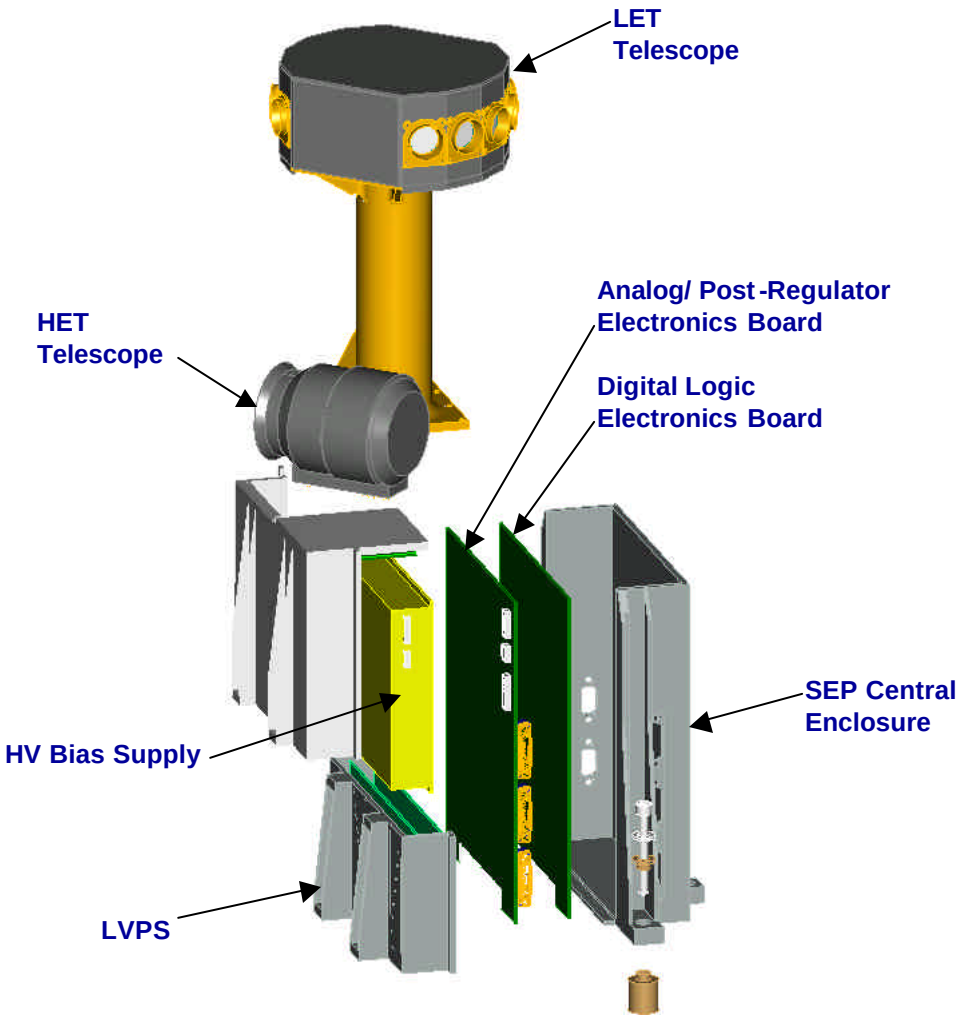
- Single re-settable thermal actuator purchased from TiNi Aerospace.
- One-time opening door is needed for acoustic seal on launch and as a sun blocker during S/C early mission maneuvers.
- Door protects a thin Nickel window at the front of the telescope.
- Single-hinged door with a pre-tensioned spring and hard stop point.

SIT Mechanical Component Status

- The SIT Telescope design is a minor variation on the STEP telescope built earlier for WIND/EPACT.
- Only the SIT door actuator and mechanical enclosures for the electronics are new.
- Designs for new mechanical pieces for SIT are 75% complete.
- Designs for retro-fit of telescope are 50% complete.
- Drawings for SIT overall are 90% complete, new components 40%.

Main SEP Assembly

•Behind S/C configuration shown



Main SEP Electronics Assembly

•Electronics box is made up of 4 major components, the SEP Central Enclosure, the LVPS, the HET Enclosure and the LET Bracket Base.

•All interfacing walls , when attached will provide a continuous RF shield for internal electronics.

•Internal shielding between critical components will create separate shielded areas as necessary.

•Internal boards will be connected using Nanonics cables.

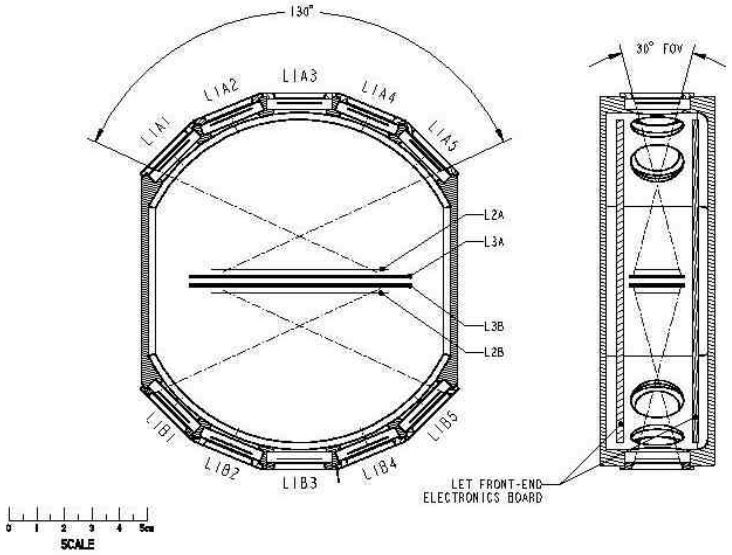
•Connections to the S/C will be via standard D Subminiature connectors

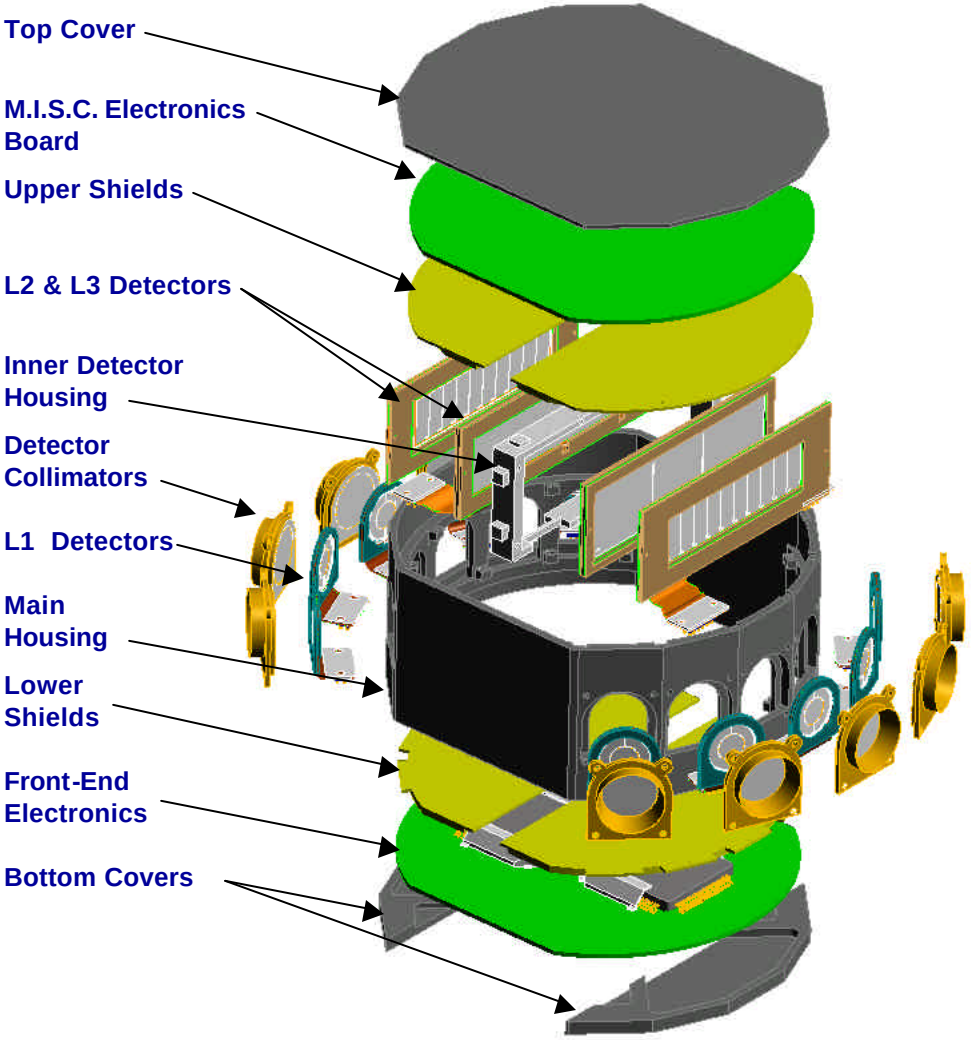
•Connections to external components (SIT and both SEPT's) will be cabled using Micro-D (MDM) connectors.

Main SEP Assembly Status

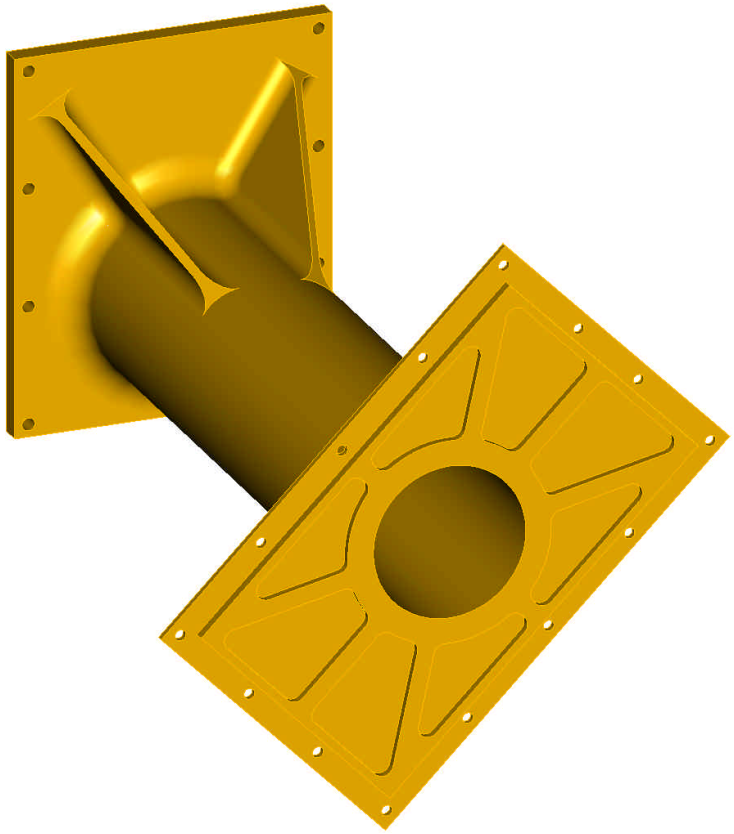
- Designs for Main SEP Electronics Box components are 75% complete.
- HV Bias Shields design is 80% complete.
- Internal bracket designs and cable harnessing runs are 50% complete.
- Drawings are 25% complete.
- Analysis is being performed on the box structure to assure stiffness for the LET bracket as well as internal components.

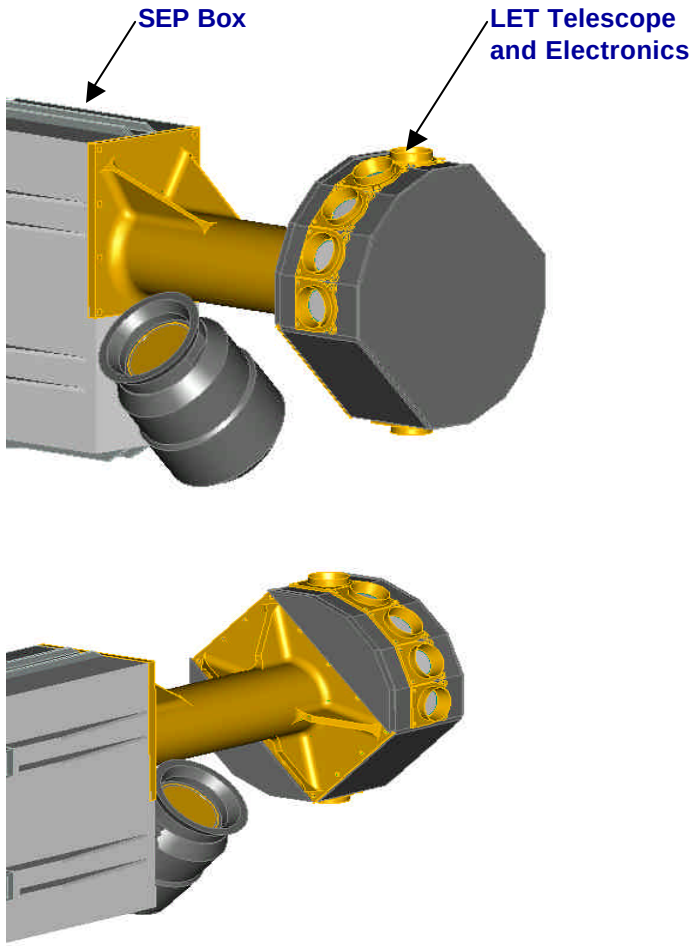
Low Energy Telescope (LET) Schematic





LET Telescope Bracket

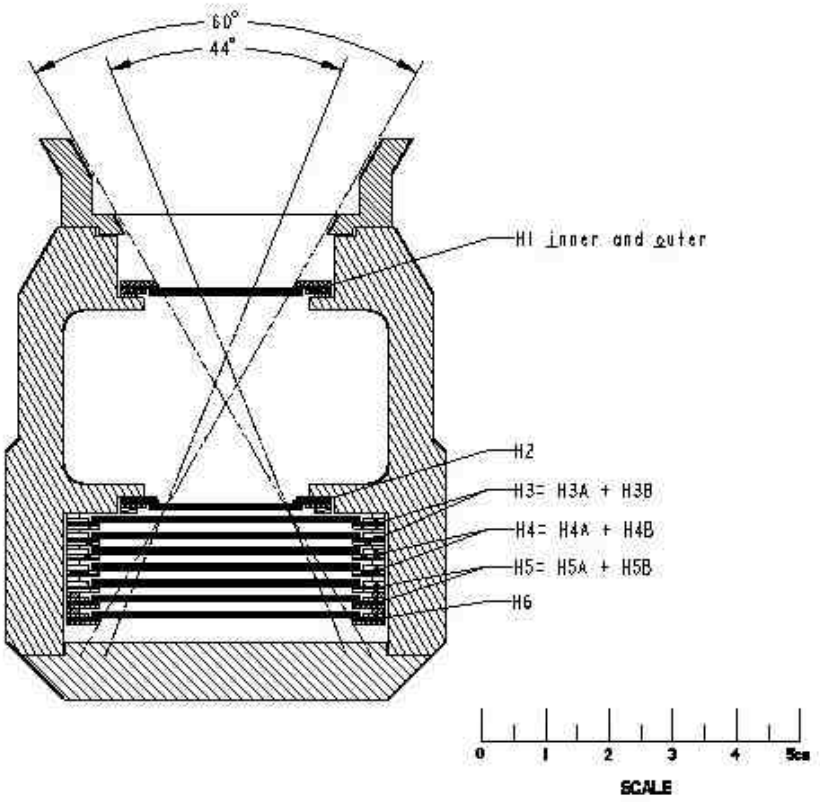


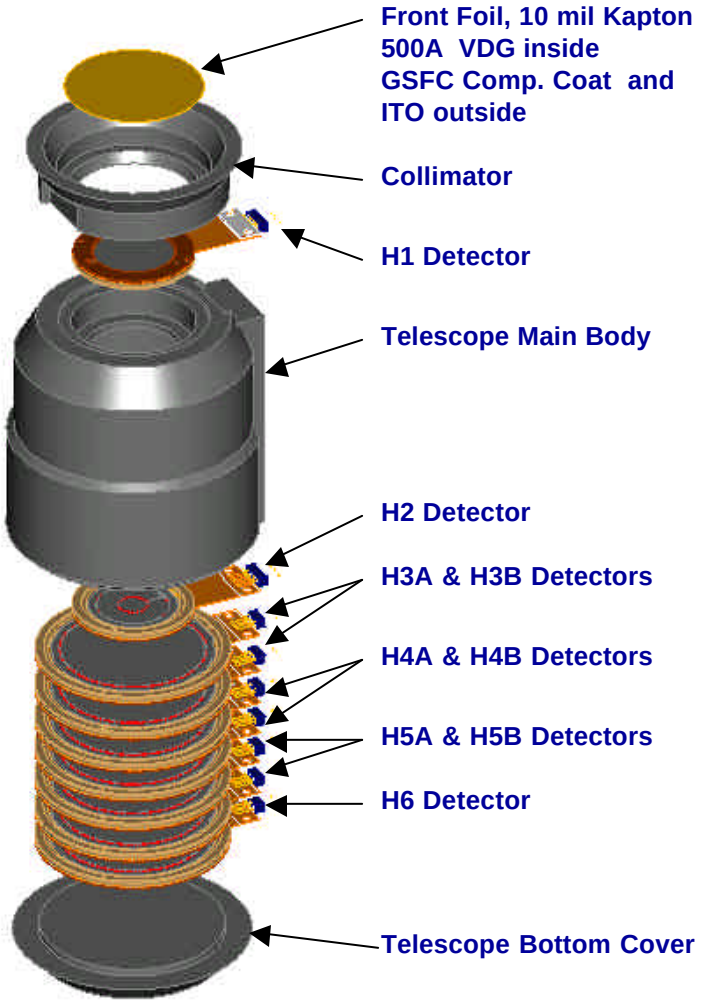


LET Telescope & Bracket Status

- Telescope and enclosure designs are 85% complete.
- Drawings are 40% complete.
- Detector mounts have been fabricated and prototype detectors are being installed into the mounts.
- Bracket vibration analysis results TBD.
- Purge restrictor calculations will be performed upon completion of design
- Vibration and Acoustics tests will be performed on the bracket at the instrument assembly level.

HET Telescope Schematic and Assembly

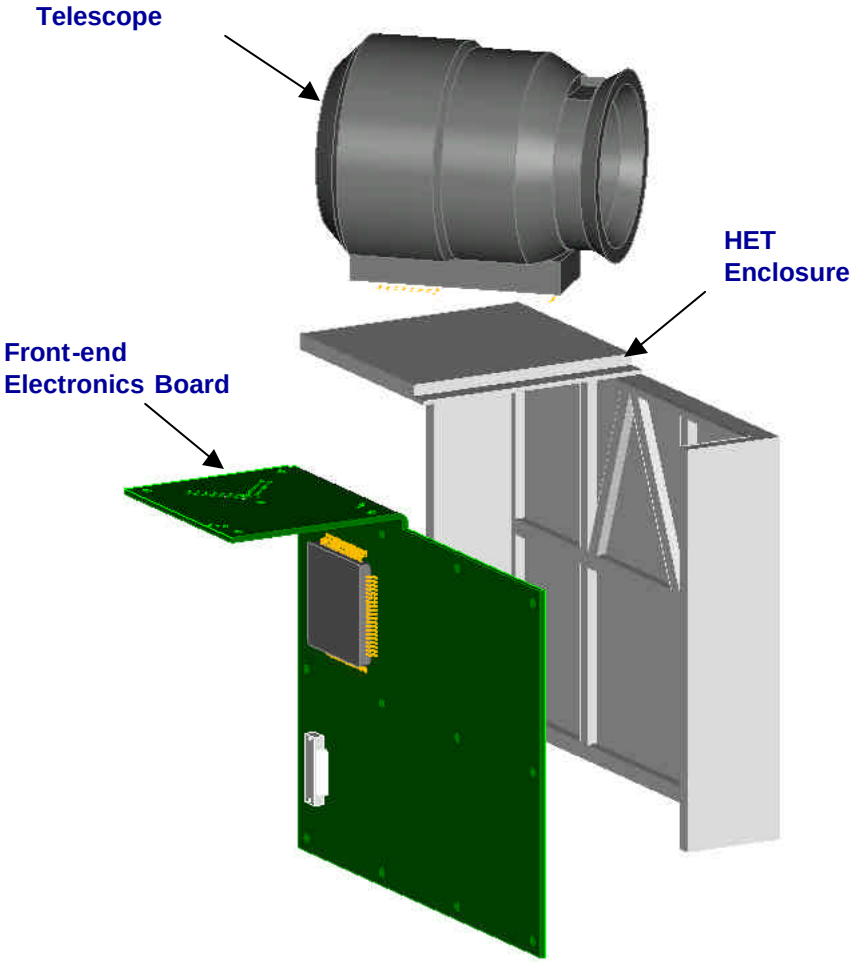




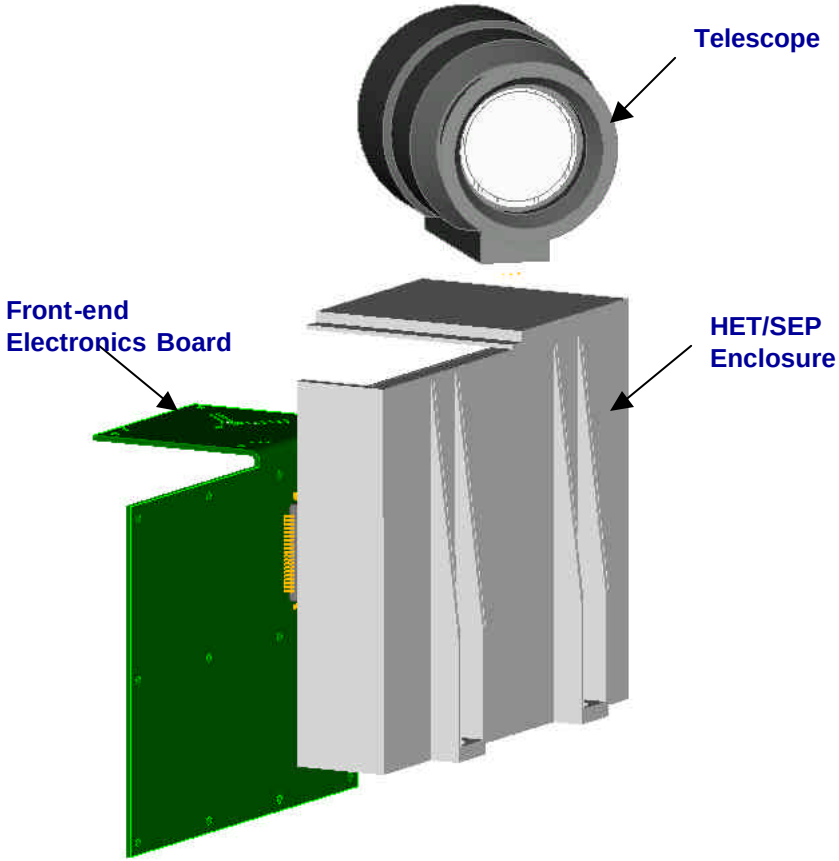
HET Telescope Status

- Telescope and enclosure designs are 80% complete.
- Drawings are 50% complete.
- Detector mounts have been fabricated and prototype detectors are being built.
- Purge: sintered metal restrictor at 15 PSI permits flow rate of 1 liter/hour (~1 volume replacement every 4 minutes)

HET Electronics Assembly



•Inside view of components



•Outside view of components

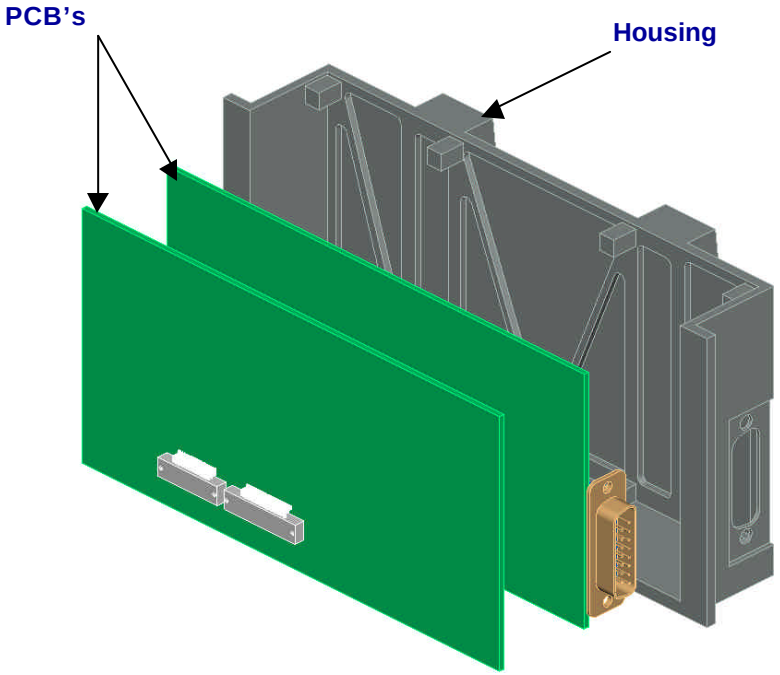
HET Electronics Enclosure

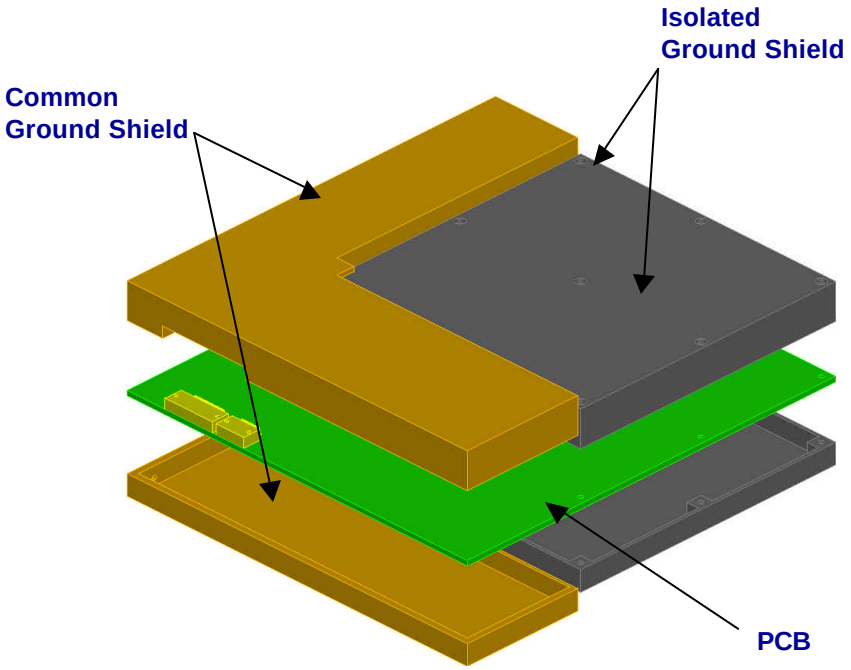
•Electronics enclosure is aluminum and makes up half of the top and two thirds of the side of the Main SEP Electronics Box.

•Provides a base for the Flex/ Rigid PCB assembly to be held in its flight configuration to limit working the flex area.

•Allows telescope to remain attached to electronics from early on through testing and final integration to the Main SEP Box without having to be separated.

SEP Supplies (LVPS & Bias)

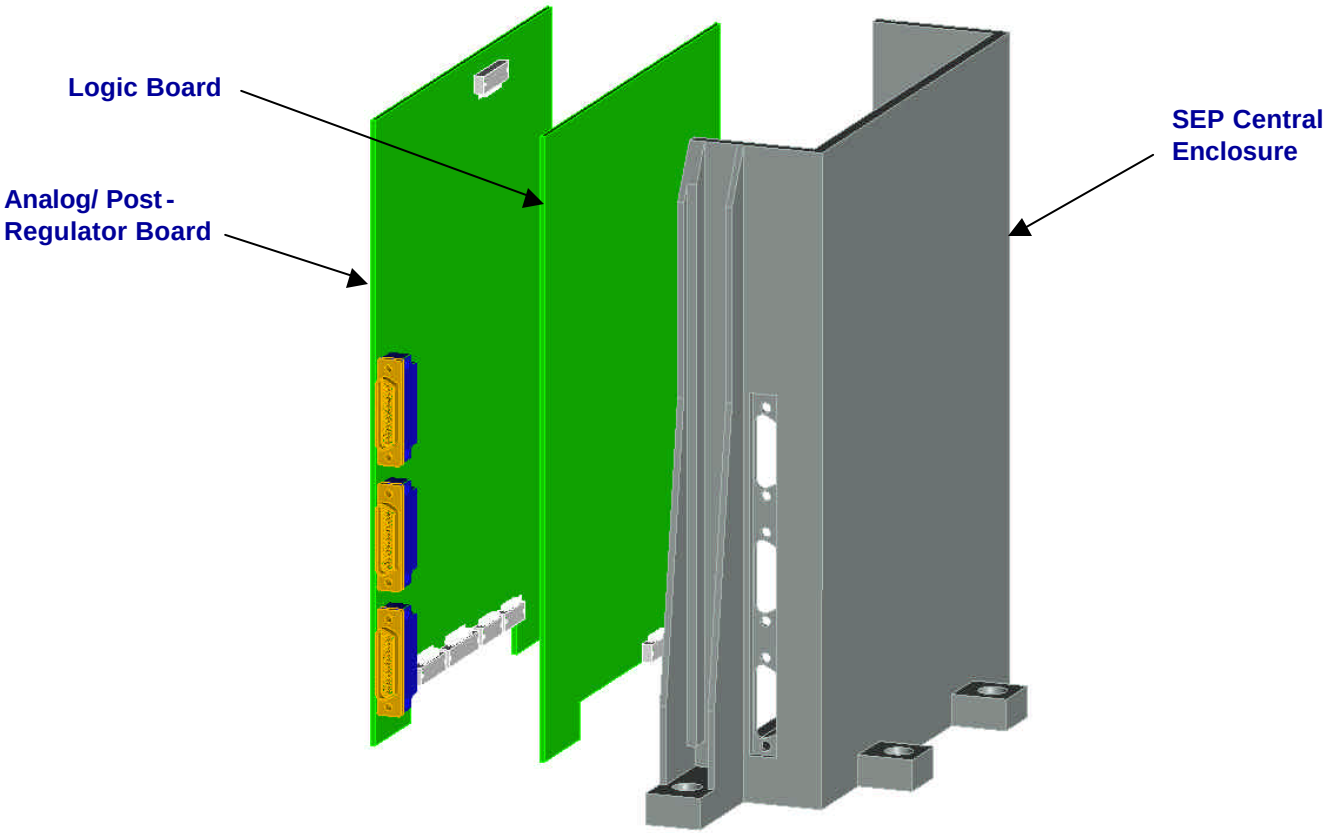




- Low Voltage Power Supply boards are being designed by UC Berkeley
- Housing is being designed at GSFC.

- High Voltage Bias Supply board is being designed by Space Instruments.
- Shields are being designed at GSFC.

SEP Central Assembly

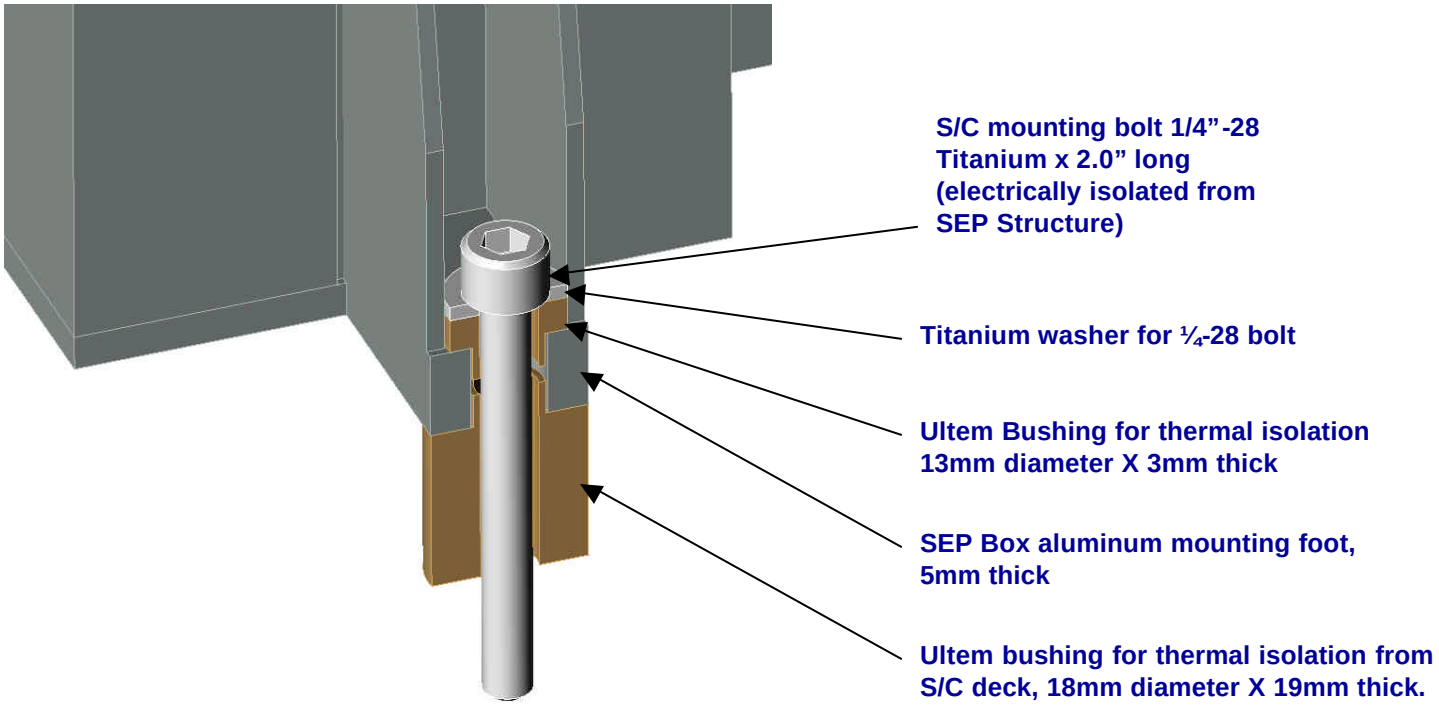


•Houses common electronics for all telescopes

SEP Suite Purge

- 15 PSI dry nitrogen purge accepted from S/C through a ¼" teflon line into distribution manifold on main SEP box.
- Purge is then sent out via three 1/8" teflon lines to the HET, LET and SIT telescopes.
- Purge flow will be restricted by a sintered stainless steel plug at the inlet to each telescope in order to limit the flow per individual telescope needs.

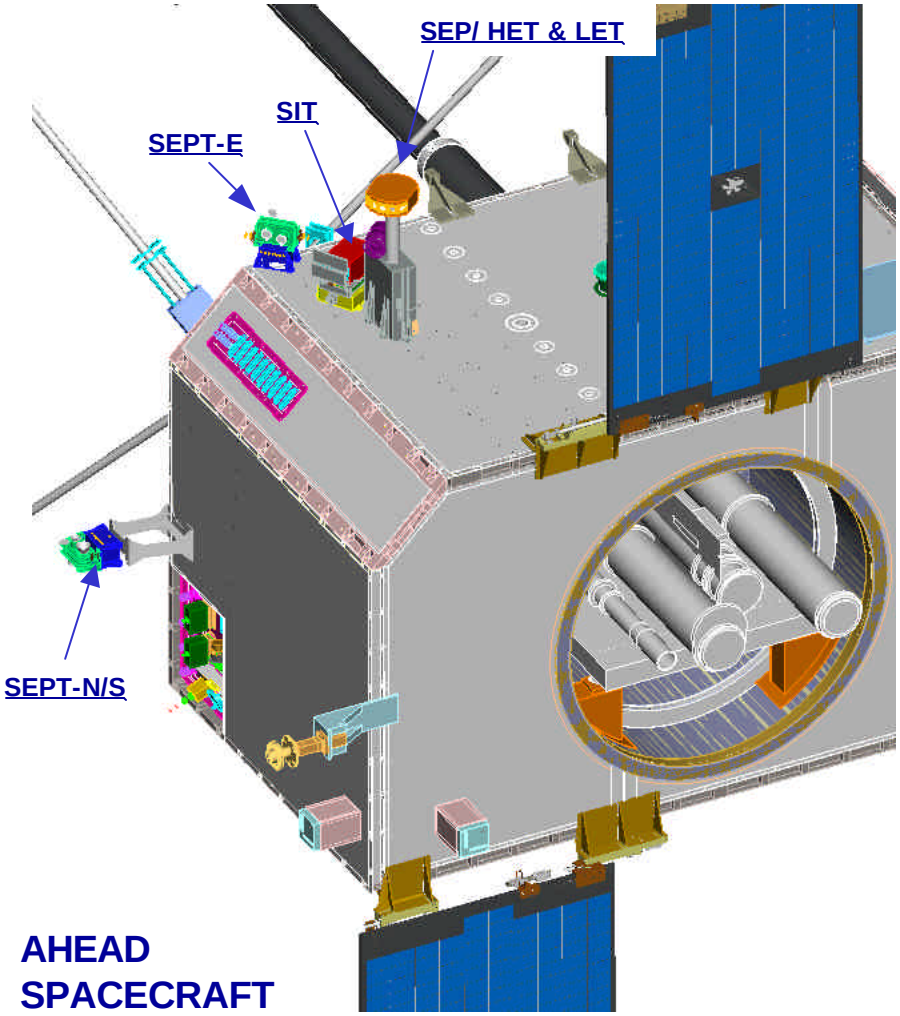
Typical Mounting Foot Showing Thermal Isolation



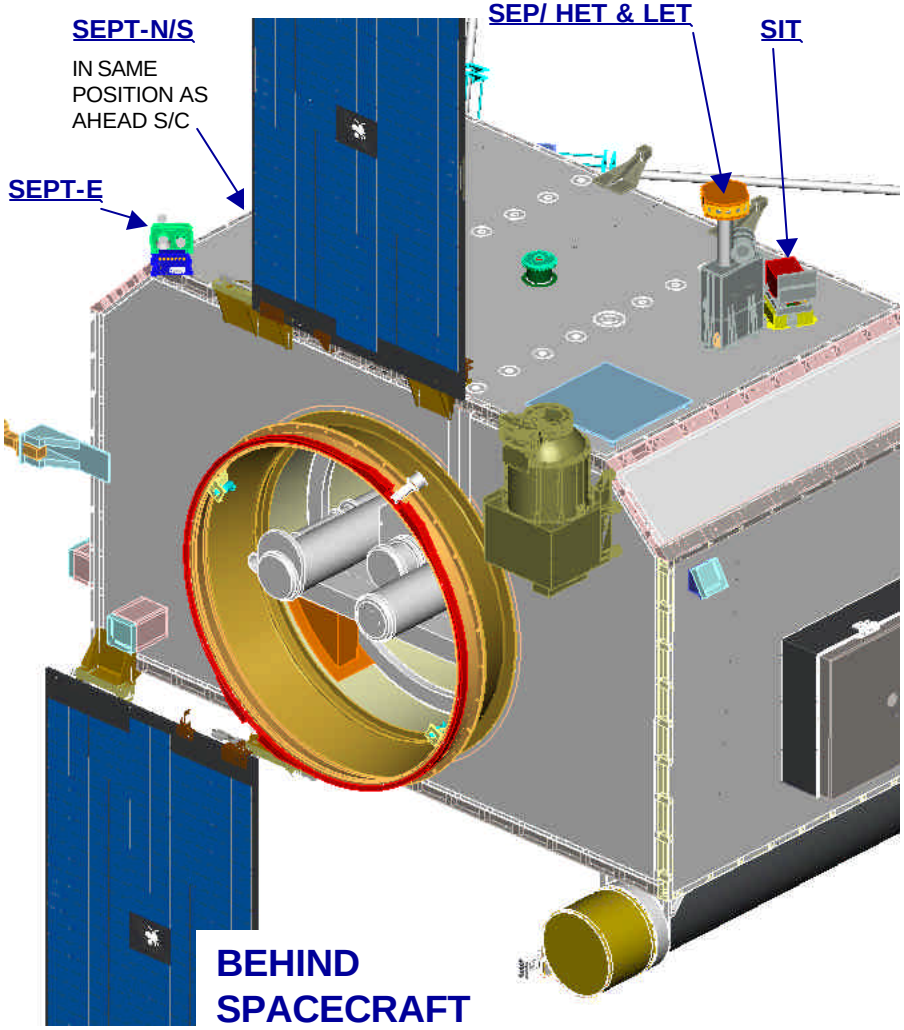
Typical SEP Ground Strap

- Being designed at UC Berkeley
- Design Goal: Thermal resistivity to be < 1/5th of total allowed between instrument and spacecraft.

SEP Instrument Suites

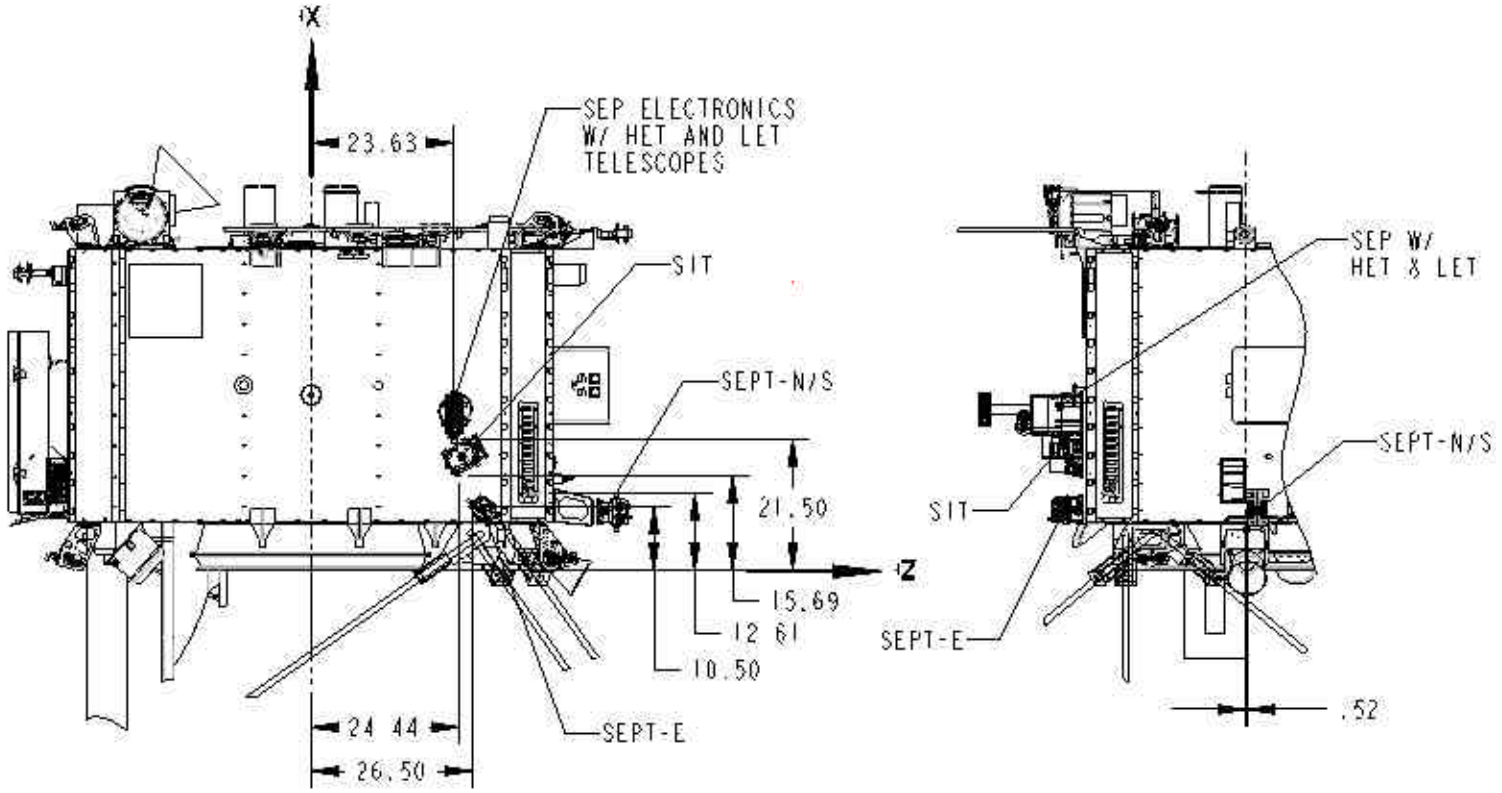


AHEAD SPACECRAFT



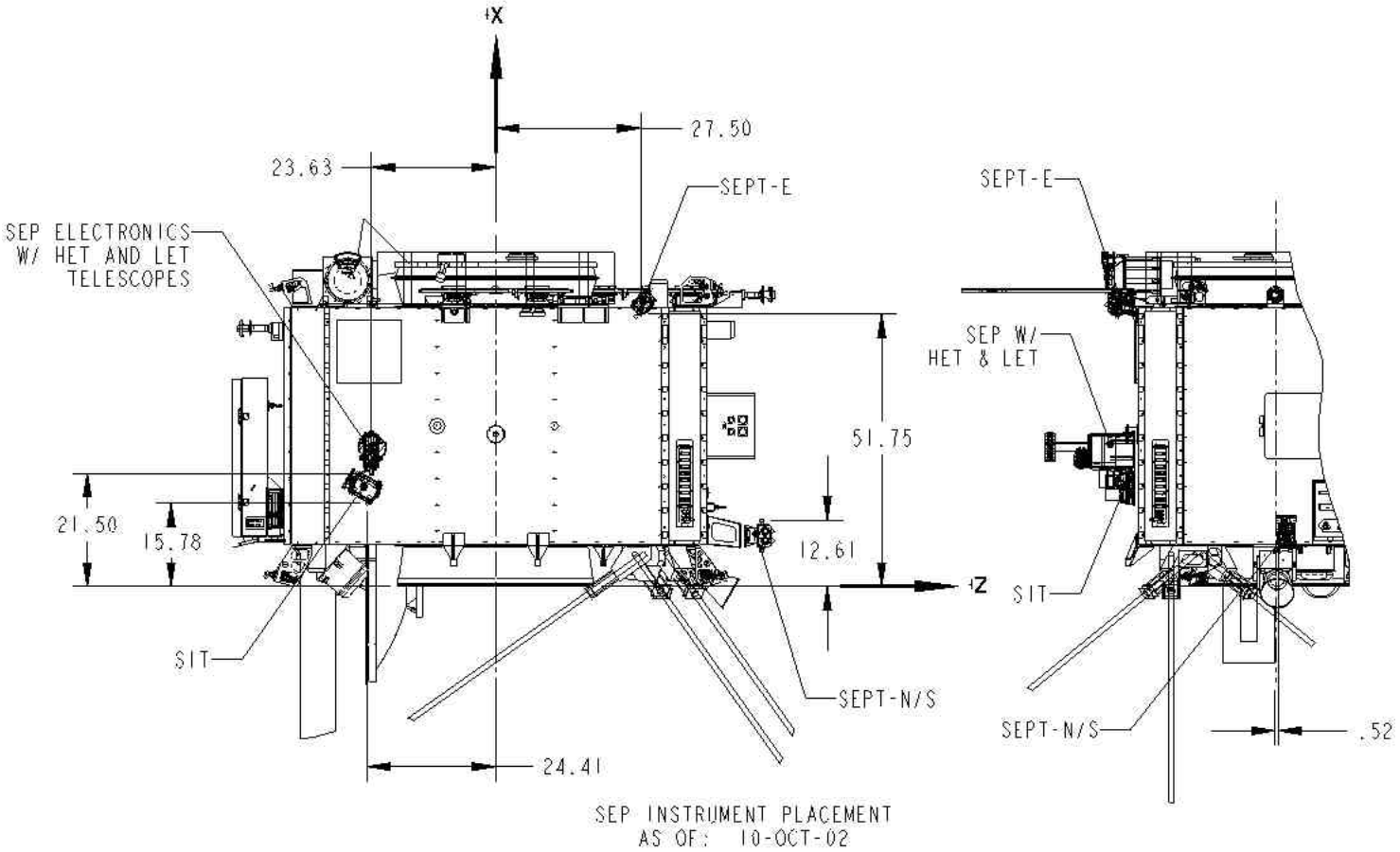
BEHIND SPACECRAFT

SEP Locations on the Ahead Spacecraft

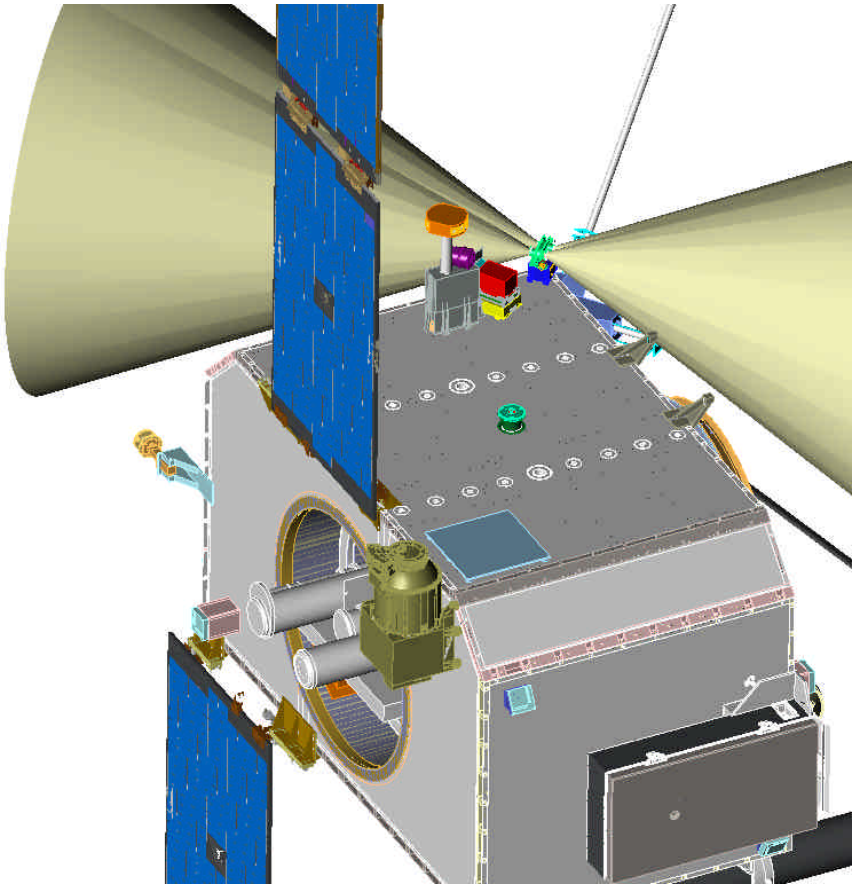


SEP INSTRUMENT PLACEMENT
AS OF, 10-OCT-02

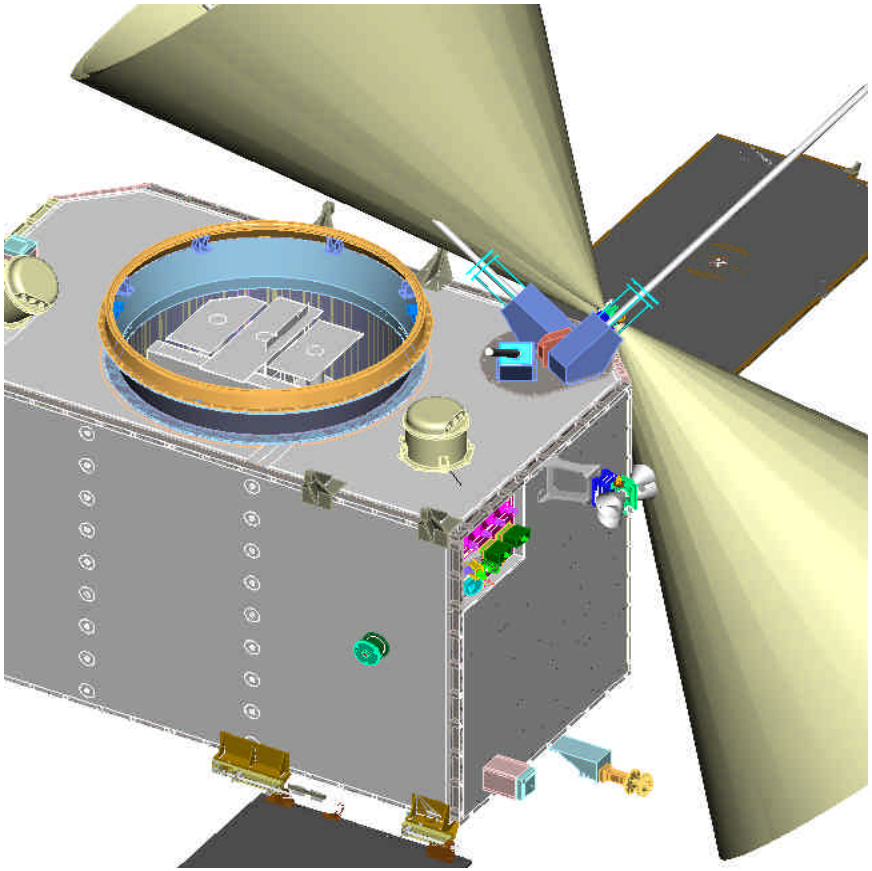
SEP Locations on Behind Spacecraft



SEPT-E F.O.V. (Behind S/C) Impingement and Close-call

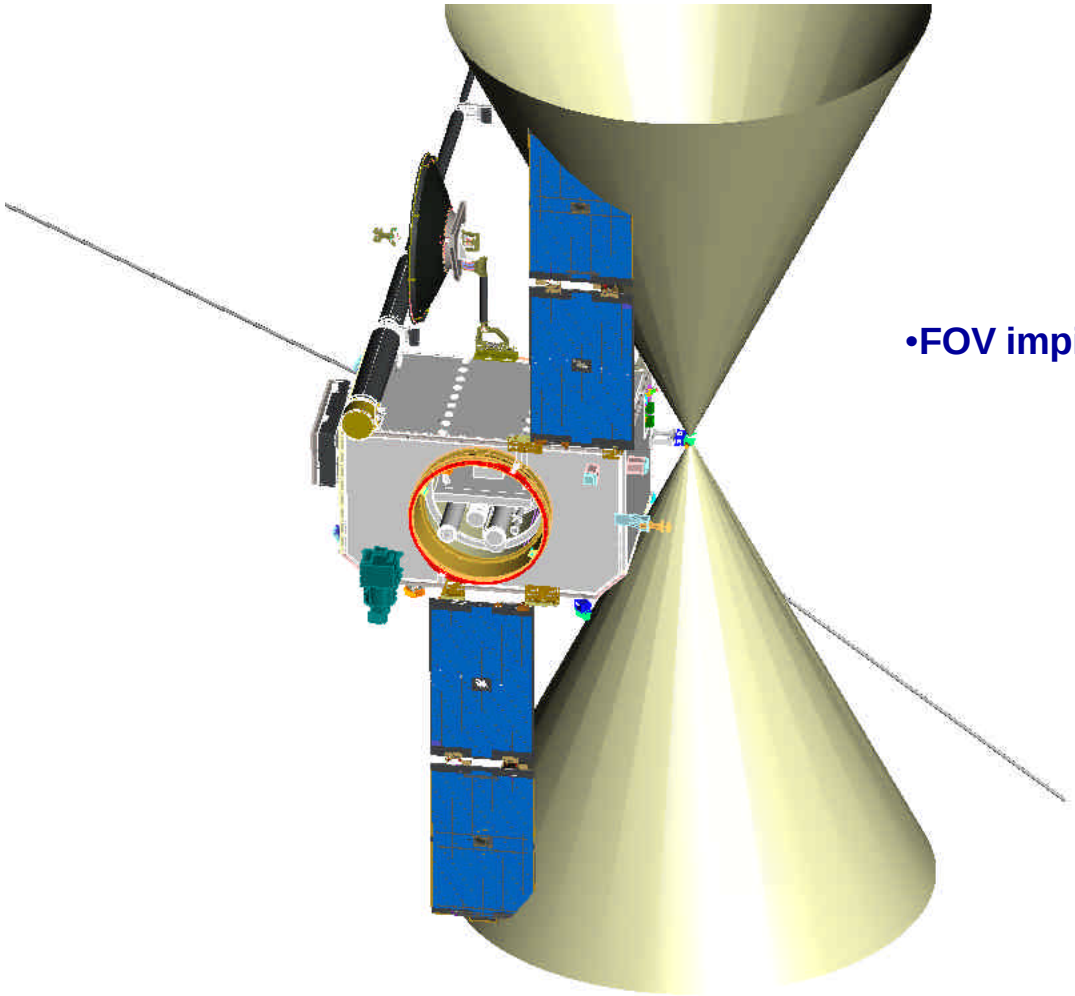


•Rear FOV 0.16” from Solar Panel Catch Bracket



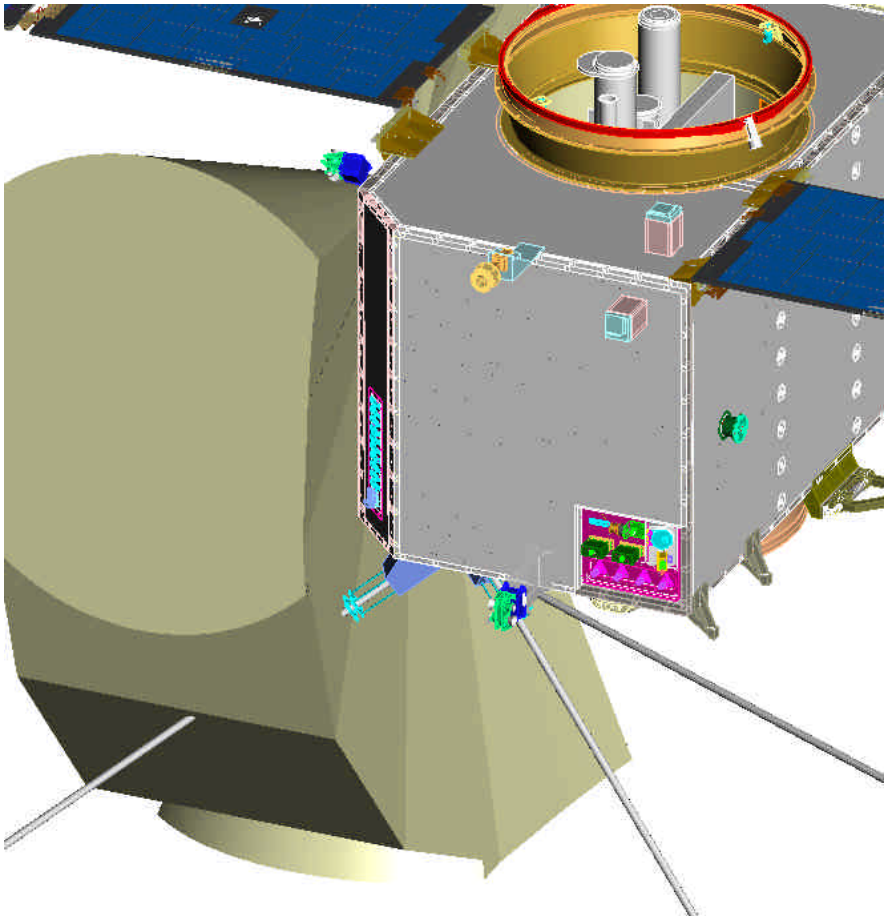
•Rear FOV Impinged by SWAVES Antenna

SEPT-N/S Impingement (both S/C)

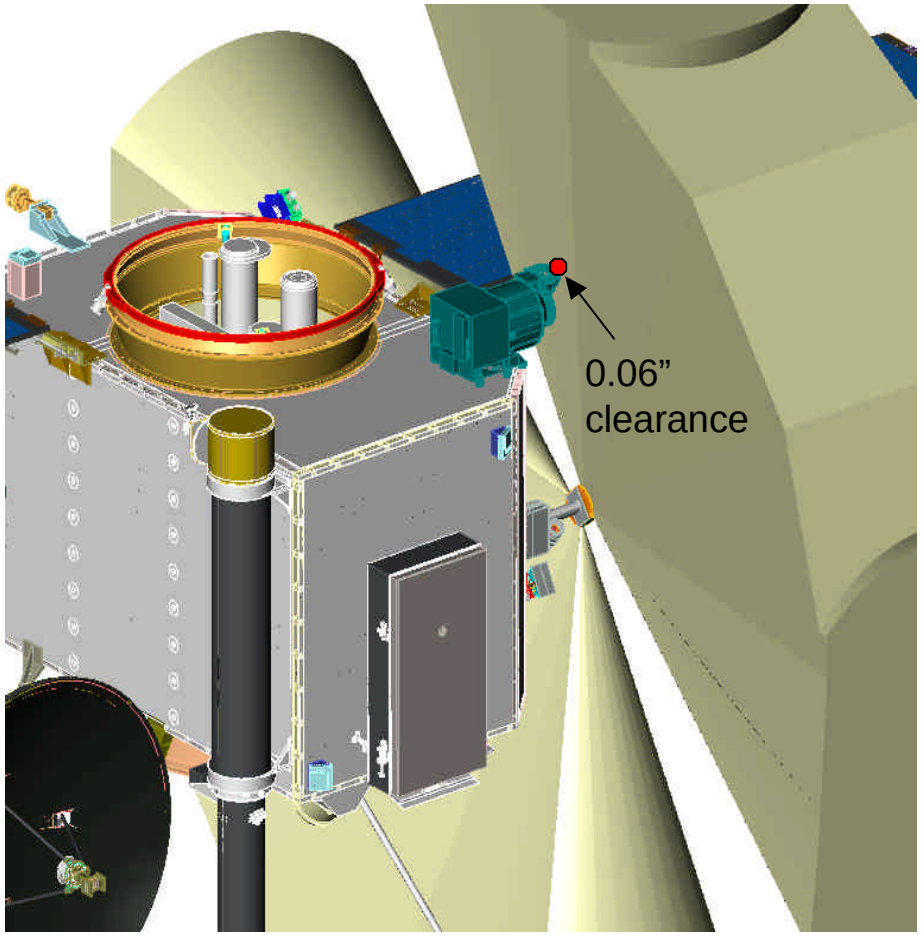


- FOV impingement with Solar Panels

LET Telescope FOV (Behind S/C) Impingement and Close-call



•Rear FOV Impingement with SWAVES Antenna



•Forward FOV impingement was accepted at PDR but has since been cleared