



***Solar Terrestrial Relations Observatory (STEREO)
Pre-Phase-A Requirements Review***



Thermal

Carl J. Ercol

**The Johns Hopkins University
Applied Physics Laboratory
11100 Johns Hopkins Road
Laurel, MD 20723-6099**



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Spacecraft Thermal Requirements

- The spacecraft thermal design must accommodate:
 - Solar distance variation between 0.85 and 1.18 AU
 - Solar pointing attitude $\pm 5^\circ$
 - Constant electrical loads
 - Two year mission life
 - Off pointing from sun during STAR-37 firing
- Identical thermal designs for both Spacecraft
 - ESD coating on MLI to limit surface charging
 - No louvers or heat pipes
 - Class 100,000 cleanliness
 - May be reduced to 10,000 when instruments are integrated



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Instrument Thermal Requirements

- Thermally isolated thermal approach
 - Simplifies sub-system level testing
 - Allows for wide interface temperature range
- Instrument team to provide thermal design and analysis
 - Spacecraft will accommodate radiator field-of-views as needed
- Correlated instrument thermal models to be provided to the spacecraft



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Launch Vehicle Thermal Requirements

- Athena Launch does not impose any foreseeable special requirements
- Space Shuttle Launch requires very rigorous analysis
 - Potentially severe hot conditions
 - Limited power cold conditions
 - Reduced thermal models requiredResults iterated by SST/STEREO thermal personnel



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Thermal Vacuum Testing

- Components tested per STEREO Component Environmental Test Plan
- Integrated spacecraft level testing (instruments included)
 - Dual spacecraft configuration using GSFC chamber 290
 - Thermal balance
 - Thermal cycles
 - Minimum 3-hot and cold cycles
 - Minimum 108 cumulative hours at each temperature extreme



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Test Configuration in Chamber 290

