MONTHLY STATUS REPORT
February, 1999
Solar Terrestrial Relations Observatory (STEREO)

SYSTEM

System level sparing philosophy and Top Level De-scope Plan were developed. Deviations from this philosophy will be dealt with on a case by case basis. Fault-protection architecture is currently under review.

MISSION DESIGN AND NAVIGATION

Developed preliminary mission design for 20 deg/year leading and 28 deg/year lagging spacecraft orbits based on Athena launch. Continued software assessment of Goddard Trajectory Determination System (GTDS) to support STEREO navigation requirements.

PROPULSION AND LAUNCH

Received two proposals from the launch vehicle candidate vendors. United Space Alliance (USA) can provide a "turn key" launch of two spacecraft with STAR 48V kick stages on a single USA reimbursable Shuttle flight. Lockheed Martin can launch two spacecraft with STAR 37 kick stages (Lunar Prospector Configuration) on two Athena II launch vehicles. Final studies show a maximum of 500 kg mass available for each STEREO spacecraft on the Shuttle, while 350 kg is the maximum available on the Athena II.

Continued to meet with potential vendors for the STEREO propulsion system to understand the available qualified component pool.

MECHANICAL DESIGN

Development of the payload configuration for the Athena II launch vehicle (Lunar Prospector configuration) continued. Separation plane interface with STAR 37FM adapter revised from 3-point attachment to 4-point attachment. Drawings received from Thiokol for STAR 37FM motor, Trans-Lunar Injection Stage and STAR 48V motor. Provided views of high-gain antenna when used for Sun-probe-Earth angles greater than 90 degrees in order to assess the antenna-gain attenuation due to field-of-view intrusions by the surrounding structure. Refinements being made to spacecraft structure based on analytical results from finite element model runs.

STRUCTURE

Nearing completion of preliminary spacecraft dynamic finite-element-model analysis. Some minor structural modifications are needed to meet the frequency requirements of the Athena II launch vehicle.

COMMAND AND DATA HANDLING

As reported last month, contact was established with NASA/Goddard personnel to inquire about the possible implementation of the Wideband Advanced Recorder

Processor (WARP) design for the STEREO solid-state recorder (SSR). After review, Goddard's response was that they would be unable to support the development effort.

Assessment of the technical details for the C&DH system baseline design implementation continued with regard to the functional partitioning of the electronics within the Integrated Electronics Module.

TELECOMMUNICATION

A baseline trajectory has been defined for both spacecraft. The downlink capability for both is being analyzed. A preliminary analysis has been performed to determine the degradation on the 1.1 m HGA gain when it is gimbaled beyond 90 deg and the spacecraft structure impinges on the antenna field of view. A degradation of 2 dB up to an angle of 115 deg is estimated and has been included in the analysis. Work has started on investigating portions of the IEM uplink and exciter cards.

GUIDANCE AND CONTROL

G&C technical activity consisted primarily of continued development of the flexible-body dynamic model and simulation.

PRODUCT ASSURANCE

Finished draft of Product Assurance Plan. This preliminary Plan is circulating among SOR supervisors for review and comment before releasing in draft form to the Program Manager for his review. Work continuing on ProcPAR.

GROUND SYSTEM, I&T & MISSION OPS

A Draft Concept of Operations document was completed. A great deal of effort is being expended to understand what TIMED is doing in operations to be able to determine what concepts, software, and operations can be used for STEREO.