# Project Details

**ROSES ID:** NRA-NNH04ZSS001N
**Selection Year:** 2005
**Program Element:** Focused Science Topic

**Topic:** Solar origins of plasma and magnetic flux in an ICME

**Project Title:**
Heliospheric Disturbance Propagation from Remote Sensing Observations - Data Analysis and Modeling

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**Summary:**
Earth, immersed in the Sun s atmosphere and bombarded by solar high-energy particles, reacts to these inputs in a variety of ways. We now know that the largest solar coronal disturbances, called coronal mass ejections or CMEs, are the cause of major geomagnetic storms, which can create hazardous conditions affecting satellites and astronauts in orbit, communications, and even ground-based systems. At UCSD we have been at the forefront of remote sensing studies of the origins and propagation of CMEs, and their effects on geospace. We have developed a tomographic technique to track these disturbances outward from the Sun. We have also been involved in the construction of the Solar Mass Ejection Imager (SMEI) launched February 2003 that can can track interplanetary disturbances crossing the large gulf between the solar corona and Earth. SMEI will revolutionize the way we are able to measure heliospheric features and forecast their arrival at Earth by measuring CMEs from near the Sun until they strike Earth 2-3 days later. To understand and forecast how solar transients are produced and propagate, we need to study the interplanetary propagation and signatures of CMEs, and to develop techniques to measure and model heliospheric plasma and their interactions from a global perspective. To accomplish these objectives we propose to: 1) Develop our heliospheric tomography programs for use in near real-time SMEI data analysis. 2) Incorporate existing 3D-MHD programs into our tomography technique. 3) Develop SMEI analysis techniques that use the 0.1% differential photometric precision required for tomographic analysis so that other groups can use these analyses. Our proposed program is relevant to NASA s Sun-Earth Connection Theme and the techniques developed will be pertinent to future NASA space missions such as STEREO, Solar Dynamics Observatory, Telemachus and ESA s Solar Orbiter.

# Publication References:

no references