Contribution ID: **22** Type: **not specified**

Heliospheric Imaging - Data Processing and Future Plans

Heliospheric imaging has evolved considerably since the early days of SMEI in 2003. Progress has been made from two directions: improving the quality of the data themselves; and developing techniques to exploit the geometry and Thomson scattering physics. Through the former we have improved noise reduction and enabled the detection of smaller and fainter transients and through the latter we have the means to extract additional information about the structure, trajectory, and kinematic evolution of those transients. Both of the currently-functioning heliospheric imagers (SMEI and HI) have room to improve. We present images from a recent breakthrough in separation of the Thomson scattered light from the background in STEREO/HI-2 data, enabling analysis of detailed solar wind structure over 0.5 AU from the Sun and new results in understanding 3-D structure of CMEs and related events.

Despite these advances we are approaching the limit of the information we are able to extract from the current generation of heliospheric imagers. This is largely because of the quality of the datasets (e.g. SMEI is degraded by magnetospheric particles and hot pixels and the HIs are limited in their field of view and suffer motion blur). New instruments are required to take heliospheric imaging to the next level, where transient substructure and small-scale solar wind transients can be tracked and measured.

We will discuss the plan for a next-generation heliospheric imager that has been proposed to the NASA Explorer program. The Solar wind Anatomy and Dynamics Imaging Explorer (SADIE) is a constellation of five nanosat spacecraft that orbit the Earth with varying configuations to optimise cadence and spatial resolution at various times of the mission. The mission has been designed to be low-cost, higly redundant, and to be completed quickly in order to replace the current generation of heliospheric imagers before they have ceased or are no longer useful. Building on hardware and data analysis lessons, SADIE will yield large improvements in spatial resolution and sensitivity compared to existing imagers, enabling detailed understanding of variability and origin of both transient (CME) and "quiet" (slow solar wind) structures.

Authors: Dr DEFOREST, Craig (SWRI, Boulder, CO, USA); Dr HOWARD, Timothy (SWRI, Boulder, CO, USA)

Presenter: Dr HOWARD, Timothy (SWRI, Boulder, CO, USA)