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Poster
We have conceived, designed, and have evaluated components for an All-Sky Heliospheric Imager (ASHI), suitable for flight on future space missions. ASHI was tested last summer on a NASA-sponsored topside balloon flight; this presentation highlights the images taken and the current state of the image data reduction by this instrument on its successful overnight flight. ASHI is currently being promoted as a hosted payload on a DoD Space Test Program satellite. As a simple, light weight (~6kg), and relatively inexpensive instrument, the ASHI system has the principal objective of providing a minute-by-minute and day-by-day near real time acquisition of precision Thomson-scattering photometric maps of the inner heliosphere. The instrument's unique optical system is designed to view a hemisphere of sky starting a few degrees from the Sun. A key photometric specification for the spacecraft ASHI is better than 0.05% differential photometry in one-degree sky bins at 90 degrees elongation that enables the three dimensional (3-D) reconstruction of heliospheric density extending outward from the Sun. The ASHI system, unlike coronagraphs or other planned heliospheric imagers, is intended to maximize the analysis of heliospheric structures that pass the spacecraft. This is especially important where recent high-resolution Solar Mass Ejection Imager (SMEI) and STEREO Heliospheric Imager (HI) analyses have shown CMEs have an evolving and “corrugated” structure when they pass nearby. A successful space-borne flight will have an order of magnitude more throughput than SMEI or the STEREO HI instrumentation, and thus provide a far better science and forecast capability than possible before.

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