1024 × 1024 Pixel CCD Cameras for Imaging the Sun in Visible, Near-UV, and Near-IR Wavelengths

D. Duncan, C. Edwards, M. Levay, M. Morrill, A. Tiele, J. Wolfson, (Lockheed Palo Alto Research Labs), L. Hovland (JPL)

This talk will describe the CCD camera systems being developed at Lockheed for NASA flight instruments. A complete camera system includes sensor, camera head with TEC (optional) electronics, sector shutter, bench checkout equipment (computer interfaces), MicroVax, vacuum system (when operating at < 5° C) and software for testing and observing. Starting in 1983, JPL designed and built cameras using TI virtual phase sensors for the Coordinated Instrument Package for SOT. This effort culminated in the CIP brassboard camera, which has done extensive solar observing at SOT. Pk. and La Palma and has digitized the entire SOUP film from Spacelab 2 and other solar films. In 1988, our group at Lockheed began modifying the design and building new cameras with improved performance. We are now building cameras which use either TI virtual phase sensors or SAIC/Ford 3-phase sensors, in work jointly supported by the CIP for OSL and MDI/OSI for SOHO projects. These cameras have 18 micron pixels, large full wells (at least 100,000 e-), fast readout (900 Kpixel/s), moderate read noise (50 e-), summing capability in both dimensions, and very little fringing in narrowband light, due to use of unthinned, front side illuminated sensors. The design is intended for eventual space qualification on free-flying satellites; a brassboard-type camera will also be used on balloon flights of SOUP in the early 1990's.

This work has been supported by NASA contracts NAS5-26813 (OSL) and NAS5-30386 (SOHO).