

***ACRIM3 Characterization by the LASP/TRF and the Total Solar Irradiance Database***  
***Richard C. Willson [rwillson@acrim.com], ACRIM Principal Investigator, Coronado, California.***

The ACRIMSAT/ACRIM3 flight backup instrument was characterized at the LASP/TRF facility for satellite total solar irradiance (TSI) sensors. The TRF provides NIST traceable SI scale reference and characterization of the effects of scattering and diffraction using a cryogenic radiometer and a laser transfer system. Scale agreement with the radiation standard maintained by NIST was found to be within the uncertainty of the measurements but a significant correction of  $\sim -0.5\%$  was found for scattering and diffraction that has significantly reduced the scale difference between the results of the ACRIMSAT/ACRIM3 and SORCE/TIM satellite experiments. A detailed picture of TSI variability, confirmed by its presence in the results of the three currently operational satellite TSI monitoring experiments, provides new insights into the variability of TSI and reduces the uncertainty of the 35 year satellite TSI time series. A solar magnetic field area proxy, more TSI specific than previous proxies, has been used to demonstrate that the ACRIM TSI composite and its  $+0.04\%$ /decade TSI trend during solar cycles 21 – 23 is the most likely correct representation of the extant satellite TSI database.