The Compact SIM (CSIM) and Compact TIM (CTIM) Instruments

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The Compact Spectral Irradiance Monitor (CSIM) and the Compact Total Irradiance Monitor (CTIM) are CubeSat instruments to demonstrate next-generation technology for monitoring spectral and total solar irradiance. Both instruments include novel silicon-substrate room temperature vertically aligned carbon nanotube (VACNT) bolometers. CSIM, a two-channel 6U CubeSat instrument similar in design to the SORCE and TSIS SIM instruments, has a planned launch in late 2018 and a target two-year operation life. It will monitor solar spectral irradiance from 200-2400nm with an accuracy of <0.25%. To achieve this accuracy, it will be calibrated in the same facility as TSIS SIM, the LASP Spectral Radiometry Facility. TSIS SIM will have been performing solar observations for approximately nine months by the launch of CSIM, so the direct comparison of initial solar observations of CSIM to the concurrent TSIS SIM observations will allow us to independently validate the degradation-correction scheme in place on TSIS SIM. Then, during the 2-year CSIM mission, we can use TSIS SIM as reference to independently test the on-orbit degradation correction scheme of CSIM.

The CTIM instrument, a four-channel 6U CubeSat instrument, is currently in the development phase. Like CSIM, the basic design is similar to the SORCE, TCTE and TSIS TIM instruments. It will measure the total irradiance of the sun with an accuracy of <0.01%. The underlying technology, including the silicon VACNT bolometers, has been demonstrated at the prototype-level. The design of the CTIM instrument and CubeSat are currently being finalized. In 2018-2019 we will build, and environmentally qualify, a CTIM instrument in that will be ready for a future flight opportunity.