



TCTE was an experiment to collect high accuracy, high precision measurements of total solar irradiance to monitor changes in solar energy driving Earth's climate system.

## Frequently Asked Questions

### What was the purpose of the TCTE mission?

The Total Solar Irradiance Calibration Transfer Experiment (TCTE) was a collaborative effort between NASA and the National Oceanic and Atmospheric Administration (NOAA) designed to monitor changes in solar irradiance at the top of the Earth's atmosphere. TCTE launched as one of five payloads on the Ball Aerospace-built STPSat-3 satellite, which was designed to support a variety of experimental payloads at different low-Earth orbits.

### What did the TIM instrument measure?

The Total Irradiance Monitor (TIM) measured the Sun's net energy output, or total solar irradiance (TSI). TSI is the spatially and spectrally integrated solar radiation incident at the top of the Earth's atmosphere. TIM continued a solar climate data record, which began from space in 1978, and is used to determine the sensitivity of the Earth's climate to the natural effects of solar forcing. TSI measurements monitor the incident sunlight to the Earth's atmosphere using an ambient temperature active cavity radiometer. Relative changes in solar irradiance have been measured to better than 0.001%/year, allowing determination of possible long-term variations in the Sun's output.



## Quick Facts

**Launch date:** November 19, 2013

**Launch location:** Wallops Island, VA

**Launch vehicle:** Minotaur I

**Mission target:** Low-Earth orbit

**Mission duration:** 5 1/2 years

**Project description:** TCTE was a joint NASA/NOAA mission that measured total solar irradiance to monitor changes in incident solar energy at the top of the Earth's atmosphere.

#### LASP provided:

- The Total Irradiance Monitor (TIM)
- TIM Principal Investigator, Greg Kopp

#### Other organizations involved:

- NASA
- United States Air Force
- Ball Aerospace
- NOAA

### What did the results of TCTE indicate?

Incident sunlight is the dominant energy force driving Earth's climate. In order to understand the causes of climate change, TCTE monitored fluctuations in total solar irradiance. Continuing solar irradiance measurements assisted in maintaining accuracy in this critical long-term data record by overlapping with existing (SORCE and TSIS-1 TIM) and future instruments.

To read more about the TCTE mission, visit:

<http://lasp.colorado.edu/home/missions-projects/quick-facts-tcte>.

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