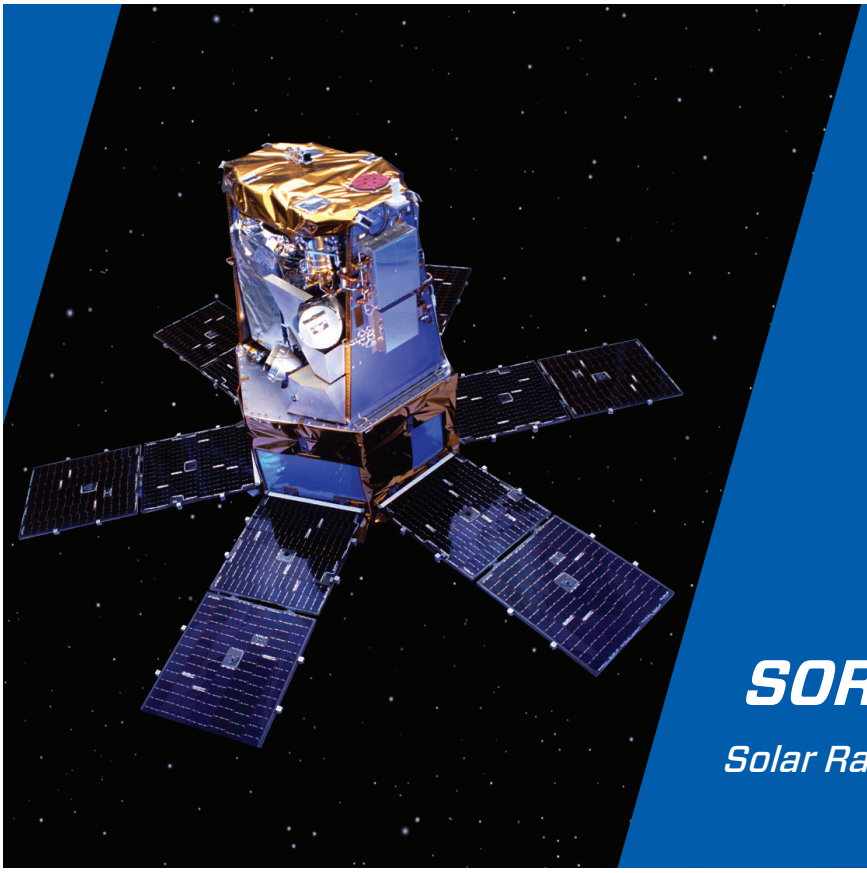

THE VALUE OF PERFORMANCE.

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SORCE

Solar Radiation and Climate Experiment

The Solar Radiation and Climate Experiment (SORCE) consists of a small satellite carrying four instruments that measure total solar radiation and solar spectral radiation with current state-of-the-art accuracy. From its orbit at the top of the Earth's atmosphere, SORCE provides NASA's Earth Science Enterprise (ESE) with precise measurements of solar radiation critical to studies of the Sun and its effect on the Earth. Data obtained by the SORCE instruments is used to model the Sun's output and to explain and predict the effect of the Sun's radiation on the Earth's atmosphere and climate. In addition, the SORCE measurements will address policy-relevant questions from the U.S. Global Change Research Panel including:

- How does the sun's output vary and what is the impact on terrestrial climate?
- What aspects of solar variability are influencing the stratospheric ozone layer?

Northrop Grumman, under contract to the University of Colorado Laboratory for Atmospheric and Space Physics (LASP), provided the SORCE spacecraft bus, instrument integration, satellite (instrument and spacecraft bus) environmental test campaign, and launch operations, and provided flight operations support to LASP mission operators during the spacecraft's commissioning phase.

Facts At A Glance

The mission has completed its planned 5 years and has been approved for extended mission operations. The bus has met or exceeded all requirements since launch.

SORCE has been so efficiently operated that the University of Colorado at Boulder (which manages the mission) presented a $3 million check to NASA to reflect the cost savings associated with the mission.

Mission

- NASA Earth Observing System (EOS) program.
- Merger of previous SOLSTICE/SAVE and TSIM Solar irradiance studies.

Customer

University of Colorado at Boulder, LASP

Specifications

Spacecraft

Satellite Mass:	290 kg (639 lb.)
Redundancy:	Fully redundant
Solar Arrays:	795 W, fixed deployable solar arrays
Stabilization:	3-axis, Zero Momentum Bias
Pointing:	36 arcsec control, 31 arcsec knowledge
Communications:	Redundant S-band transceivers
Mission Life:	5 years; 6-year goal
Orbit:	645 km, 40° inclination
Status:	Baseline mission complete, currently in extended mission operations

Launch

Launch Vehicle:	Pegasus® XL
Site:	KSC, Cape Canaveral, Florida
Date:	January 25, 2003

Instruments

Total Irradiance Monitor (TIM)

Measures the total solar irradiance (TSI) at 100 parts per million accuracy for the duration of the SORCE mission by monitoring changes in incident sunlight to the Earth's atmosphere via an ambient temperature active cavity radiometer.

Spectral Irradiance Monitor (SIM)

Measures the solar spectral irradiance in the 200 to 2,000 nanometer range and contains two completely independent and identical (mirror-image) spectrometers, which are fully interchangeable.

Solar Stellar Comparison Experiment (SOLSTICE)

Provides precise daily measurements of solar spectral irradiance at ultraviolet wavelengths. Measurements provide coverage from 115 nanometer to 300 nanometer with a spectral resolution between 0.1-0.2 nanometer, an absolute accuracy better than 5 percent, and a relative accuracy of 0.5 percent.

Extreme Ultraviolet Photometer System (XPS)

Measures the solar irradiance and consists of a package of twelve silicon XUV photodiodes for measuring the XUV and EUV irradiance from 1 to 35 nanometers.

Key Mission Partners

University of Colorado at Boulder, Laboratory for Atmospheric and Space Physics

Principal Investigator: Dr. Gary J. Rottman, Associate Director LASP/CU; Space and ground segment management, instrument development, ground data system, mission operations and science team management

NASA Goddard Space Flight Center

Project management and science data archives

Northrop Grumman

Spacecraft bus development, satellite integration and test, launch vehicle integration, flight operations support and Pegasus launch vehicle

Science Team Co-Investigators

- Laboratory for Atmospheric and Space Physics (LASP) University of Colorado
- Astrophysical and Planetary Sciences (APS) University of Colorado
- Naval Research Laboratory (NRL)
- High Altitude Observatory/National Center for Atmospheric Research (HAO/NCAR)
- NASA Ames Research Center

Space Segment

The SORCE space segment consists of the LASP-supplied Instrument Module and the Northrop Grumman-supplied spacecraft bus combined to form the SORCE satellite. The spacecraft bus provides all the on-orbit support required for the instrument suite to obtain the mission science data and transmit it to the ground for distribution and processing. SORCE measures the Sun's output with the use of state-of-the-art radiometers, spectrometers, photodiodes, detectors, and bolometers engineered into the suite of instruments.

Ground Segment

The ground segment is comprised of the Mission Operations Center (MOC), the Science Operations Center (SOC), and the ground antenna site. The MOC, located at LASP's facility in Boulder, Colorado, is responsible for command and control of the satellite and mission science planning. NASA's Space/Ground Network, through antenna sites at Wallops Island, Virginia, provides the communication link to the satellite. LASP provides the SOC for science data processing and distribution to the NASA-GSFC Distributed Active Archive Center (DAAC).

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