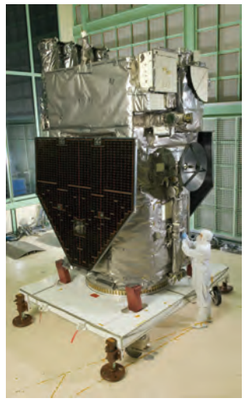
The SDO Spacecraft

SDO is one of the largest solar observing spacecraft ever placed into orbit. Its solar panels are 6.5 meters (21.3 ft) wide when extended and will provide SDO all the power it needs from the Sun. The specially-filtered telescopes will take images of the Sun with 10 times greater resolution than high-definition television. Total mass of the spacecraft at launch is 3,100 kg (6,800 lb).



SDO nearing completion in 2009

Data for Everyone

Each day in orbit, SDO will gather as much as 1.4 terabytes of data. Scientists, educators, and members of the general public will be able to browse this huge volume of data giving researchers and others a powerful new way to view the Sun.

SDO's dedicated ground station in Las Cruces, NM

SDO is part of the Living With a Star Program within NASA's Heliophysics Division

Visit us on the Web at:
http://sdo.gsfc.nasa.gov

For information on Heliophysics programs and missions, see:
http://nasascience.nasa.gov/heliophysics

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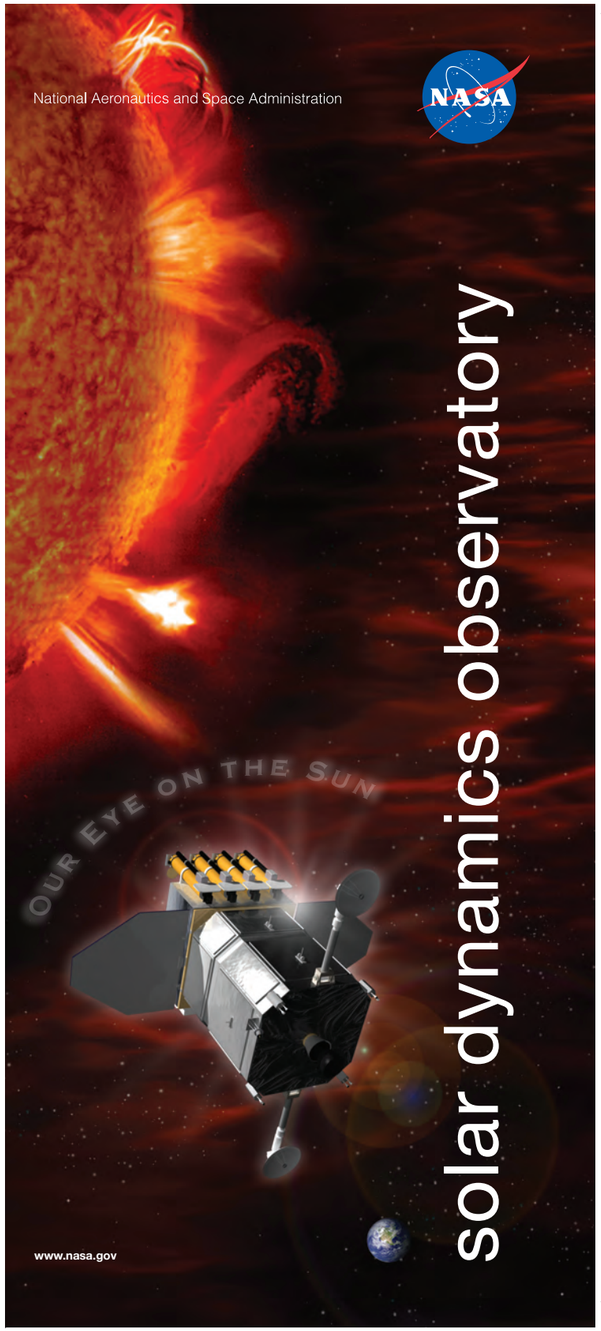
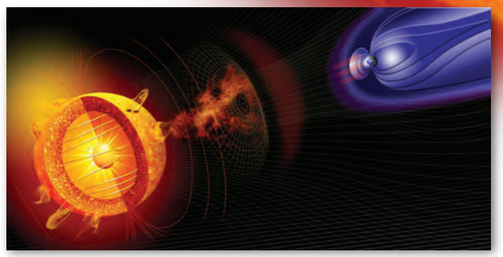


SDO: Our Eye on the Sun

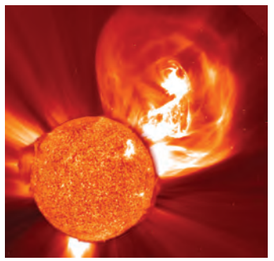
SDO Science



Solar storm impacting Earth and its magnetic shield

Solar activity and variability are key concerns of our modern, increasingly technological society. Solar flares and coronal mass ejections can disable satellites, cause power grid failures, and disrupt GPS communications. Furthermore, because the Sun is so powerful, even small changes in its irradiance could have effects on climate.

The Solar Dynamics Observatory (SDO) is designed to probe solar variability in a way that no other mission can match.



Solar storm shooting into space

High-speed cameras on SDO will take rapid-fire snapshots of solar flares and other magnetic activity. This will have the same transformative effect on solar physics that the invention of high-speed photography had on many sciences in the 19th century.

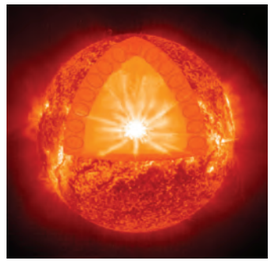
SDO doesn't stop at the stellar surface. A sensor on the observatory can actually look inside the Sun at the very source of solar activity—the solar dynamo itself. There SDO will find vital clues to the mystery of the solar cycle and help scientists predict the future of solar activity.

SDO Instruments

Magnetic activity on the surface of the Sun

The Solar Dynamics Observatory has three main instruments.

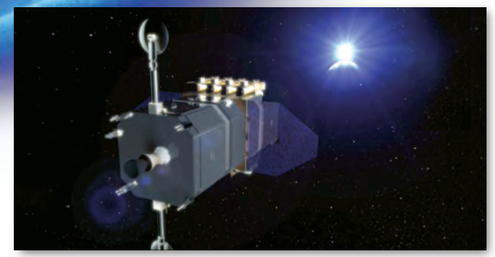
- The ***Extreme Ultraviolet Variability Experiment (EVE)*** will measure fluctuations in the Sun's ultraviolet output. EUV radiation from the Sun has a direct and powerful effect on Earth's upper atmosphere, heating it, puffing it up, and breaking apart atoms and molecules.



SDO will study the solar interior

- The ***Helioseismic and Magnetic Imager (HMI)*** will map solar surface magnetic fields and peer beneath the Sun's opaque surface using a technique called helioseismology. A key goal of this experiment is to decipher the physics of the Sun's magnetic dynamo.
- The ***Atmospheric Imaging Assembly (AIA)*** is a battery of four telescopes designed to photograph the Sun's surface and atmosphere. AIA filters cover 10 different wavelength bands, or colors, selected to reveal key aspects of solar activity.

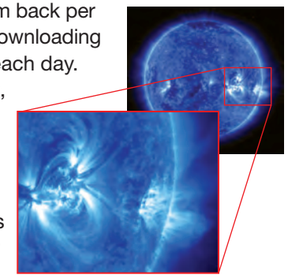
An Avalanche of Data



SDO's orbit will allow continuous observations of the Sun

Imagine watching a high-definition movie that never stops. The enormous screen is filled with the raging Sun, unleashing huge solar flares and billion-ton clouds of hot plasma. The amount of data and images SDO will beam back per day is equivalent to downloading half-a-million songs each day.

By some estimates, SDO will transmit as much as 50 times more science data than any mission in NASA history. Images with 10 times greater resolution than high-definition television recorded every 0.75 seconds will reveal every nuance of solar activity. Because such fast cadences have never been attempted before by an orbiting observatory, the potential for discovery is great.



SDO's images are super HD

The data rate is equally great. To handle the load, NASA has set up a pair of dedicated radio antennas near Las Cruces, New Mexico. SDO's geosynchronous orbit will keep the observatory in constant view of the two 18-meter dishes around the clock for the duration of the observatory's five-year prime mission. Not a single bit should be lost.