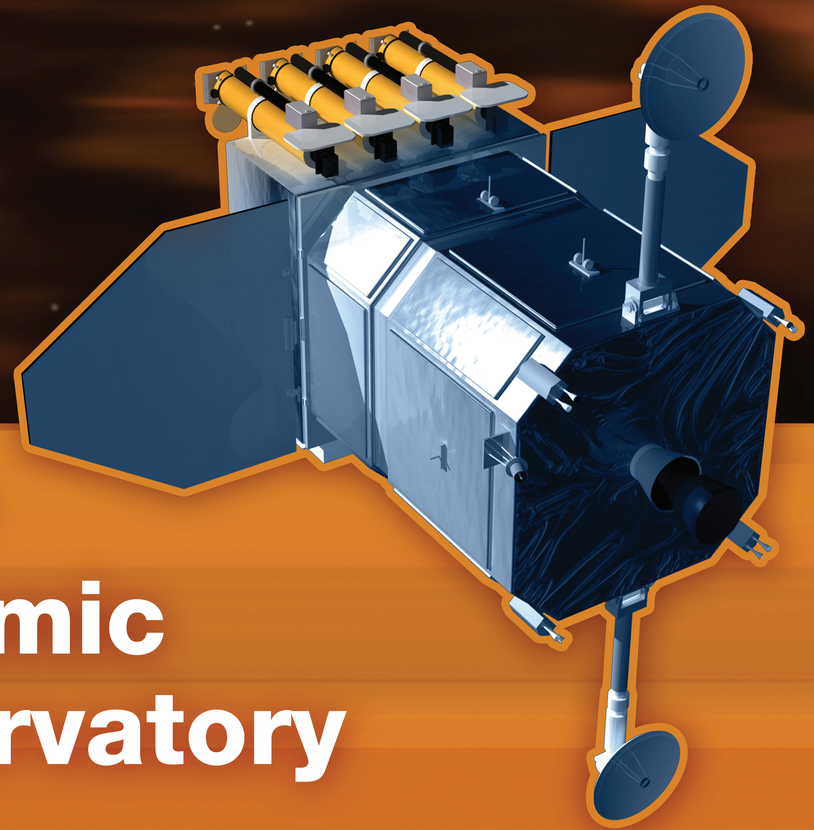

★ SDO is the first mission in the Living With a Star Program within NASA's Heliophysics Division
OUR EYE ON THE SUN
SDO
HMI • AIA • EVE
Solar Dynamic Observatory
What will SDO do?
SDO's Three Instruments
AIA
EVE
HMI
Exploring the Sun in High Definition
★ SDO will study how solar activity is created and how space weather results from that activity.
Data Avalanche
What is EUV?
A Unique Orbit
★ The amount of data and images SDO will beam back per day is equivalent to downloading half-a-million songs each day.
NASA

* SDO is the first mission in the Living With a Star Program within NASA's Heliophysics Division

OUR EYE ON THE SUN

SDO

Solar Dynamic Observatory

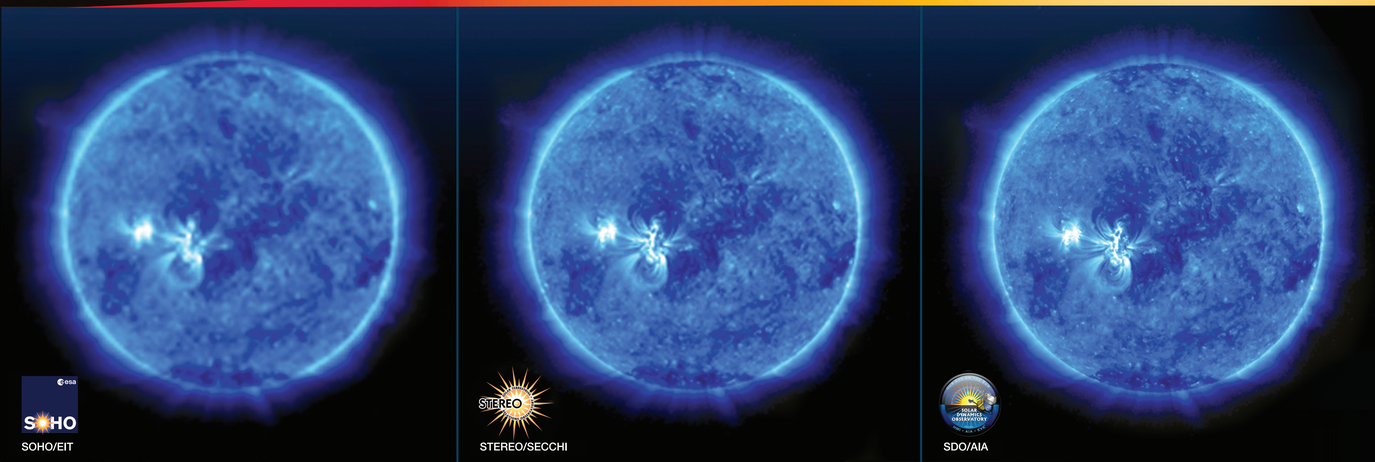


What will SDO do?

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

SDO will improve our understanding of the physics behind the activity displayed by the Sun's atmosphere, which drives space weather in the heliosphere and in planetary environments. Solar activity and space weather are key concerns of our modern, increasingly technological society. Solar flares and coronal mass ejections can disable satellites, cause power grid failure, and disrupt GPS communications. Furthermore, because the Sun is so powerful, even small changes in its irradiance could have effects on climate.

www.nasa.gov

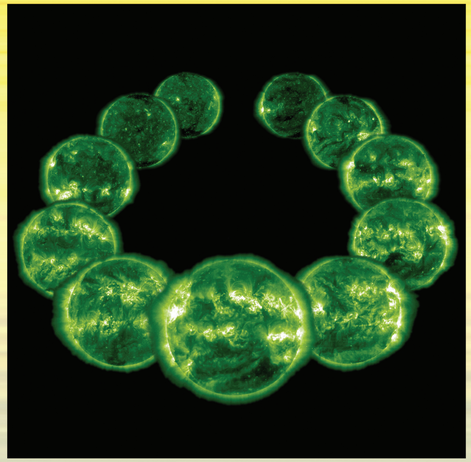


Exploring the Sun in High Defin

Data Avalanche

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. 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 will reveal every nuance of solar activity. SDO's AIA instrument will provide an image every 1.25 seconds. For context, STEREO takes 1 image every 90 seconds and SOHO takes 1 image every 12 minutes.

The image above illustrates the resolution capabilities of the SDO, STEREO, and SOHO spacecraft. An image from SDO's AIA instrument (right) will have 4 times the number of pixels than a STEREO image (middle) and 16 times that of a SOHO image (left).



What is EUV?

EUV or "extreme ultraviolet," is invis
energy form of ultraviolet radiation wi
105 nanometers, EUV photons are muc
than the ordinary UV rays that cause su
Earth's atmosphere blocks solar EU
is easy to detect and arguably the m
activity. To monitor solar EUV emiss
an instrument named "EVE," short f
onboard SDO.

* The amount of data and images SDO will beam back per day is equivalent to downloading half-a-million songs each day.

SDO's Three Instruments

AIA

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.

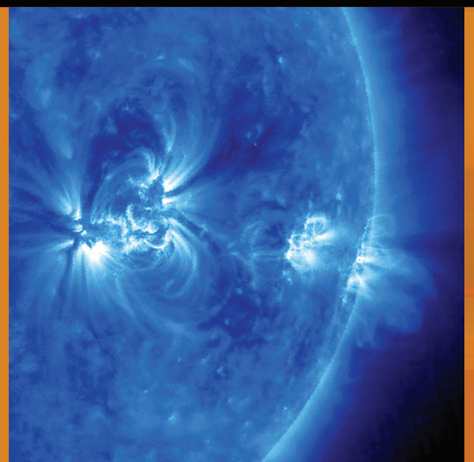
EVE

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.

HMI

The Helioseismic and Magnetic Imager (HMI) will map solar 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.

nition



* **SDO will study how solar activity is created and how space weather results from that activity.**

sible to the human eye. A high-
th wavelengths between 0.1 and
h more energetic and dangerous
unburns. Fortunately for humans,
V. In space, solar EUV emission
ost sensitive indicator of solar
sions, NASA is going to launch
for EUV Variability Experiment,

A Unique Orbit

SDO is a mission that utilizes, for the first time, a unique orbit to provide high-resolution solar magnetic field images, EUV images, and measurements of the solar UV flux falling on the Earth. SDO will orbit the Earth once in 24 hours at an angle offset, or inclined from the equator. This inclined geosynchronous orbit will allow SDO to maintain constant communications with its dedicated ground station near Las Cruces, New Mexico.

Image Credit: NASA/Barbara Lambert