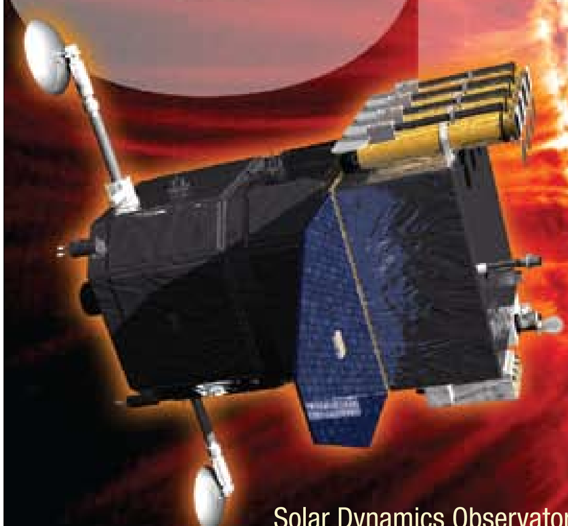
National Aeronautics and Space Administration

Launch Services Program presents...

SDO



Solar Dynamics Observatory (SDO) is the first mission that will be launched for NASA's Living With a Star (LWS) program and is designed to understand the causes of solar variability and its impacts on Earth. SDO will take a closer look at the Sun and help develop the ability to better understand the Sun's influence on Earth and Near-Earth space by studying the solar atmosphere. SDO will perform several measurements that will help characterize the interior of the Sun, the Sun's magnetic field, the hot plasma of the solar corona, and the density of radiation that creates the ionosphere of the planets. By better understanding the Sun and how it works, scientists will be able to better predict and better forecast the "weather out in space" providing earlier warning to protect our aircraft, satellites and astronauts when working in space.

Launch Vehicle: Atlas V-401

Launch Location: Cape Canaveral Air Force Station, FL

Launch Date: 2010

www.nasa.gov

SP-2008-10-150-KSC

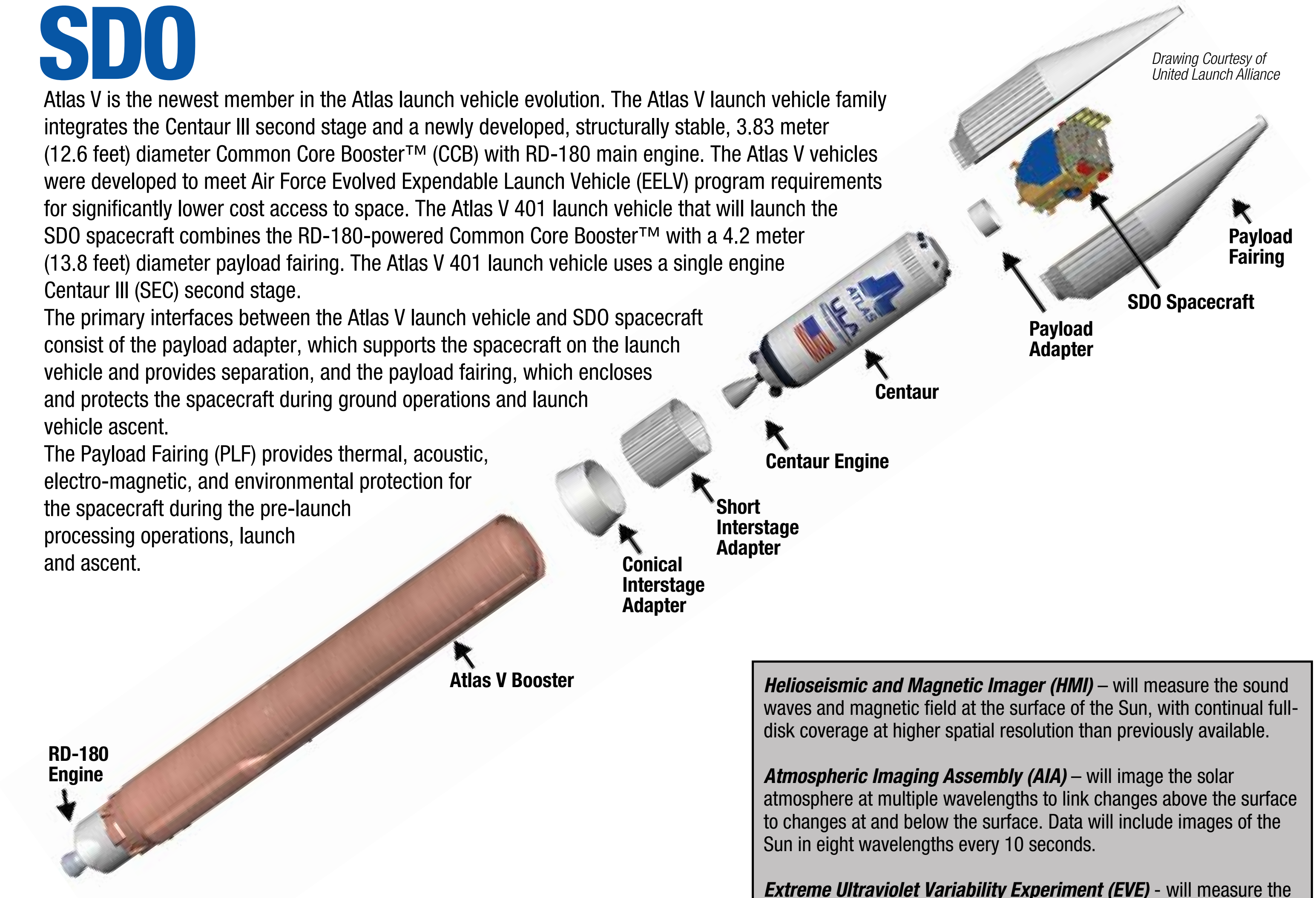
Spacecraft rendering courtesy of Chris Meaney/NASA
Solar Image courtesy of Stanford-Lockheed Institute for Space Research - TRACE

SDO

Atlas V is the newest member in the Atlas launch vehicle evolution. The Atlas V launch vehicle family integrates the Centaur III second stage and a newly developed, structurally stable, 3.83 meter (12.6 feet) diameter Common Core Booster™ (CCB) with RD-180 main engine. The Atlas V vehicles were developed to meet Air Force Evolved Expendable Launch Vehicle (EELV) program requirements for significantly lower cost access to space. The Atlas V 401 launch vehicle that will launch the SDO spacecraft combines the RD-180-powered Common Core Booster™ with a 4.2 meter (13.8 feet) diameter payload fairing. The Atlas V 401 launch vehicle uses a single engine Centaur III (SEC) second stage.

The primary interfaces between the Atlas V launch vehicle and SDO spacecraft consist of the payload adapter, which supports the spacecraft on the launch vehicle and provides separation, and the payload fairing, which encloses and protects the spacecraft during ground operations and launch vehicle ascent.

The Payload Fairing (PLF) provides thermal, acoustic, electro-magnetic, and environmental protection for the spacecraft during the pre-launch processing operations, launch and ascent.



Helioseismic and Magnetic Imager (HMI) – will measure the sound waves and magnetic field at the surface of the Sun, with continual full-disk coverage at higher spatial resolution than previously available.

Atmospheric Imaging Assembly (AIA) – will image the solar atmosphere at multiple wavelengths to link changes above the surface to changes at and below the surface. Data will include images of the Sun in eight wavelengths every 10 seconds.

Extreme Ultraviolet Variability Experiment (EVE) - will measure the solar extreme-ultraviolet (EUV) spectral irradiance with unprecedented spectral resolution, temporal cadence, and precision to understand variations on the timescales which influence Earth's climate and near-Earth space.

Instrument Module (IM) – structure holding SDO's three science instruments, AIA, HMI and EVE.

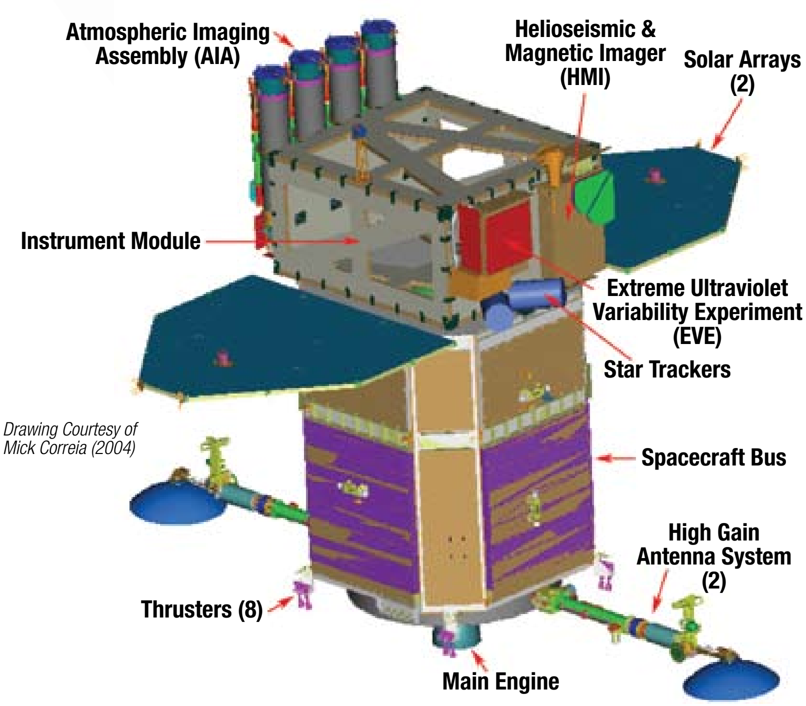
Main Engine – propels SDO through space to geosynchronous orbit using 22.5 Newton (100 pounds of force) of thrust.

High Gain Antenna System (HGAS) – sends science data from the SDO instruments to a dedicated ground system at a rate of 150 Megabytes per second using a Ka-band frequency of 26 gigahertz.

Spacecraft Bus – structure housing the components of the observatory such as electronic boxes, battery electrical harnessing and propulsion tanks.

Star Trackers – use star field patterns to measure the attitude of the spacecraft (where the instruments are pointed in space).

Solar Arrays – panels of solar cells that will generate electric power for the spacecraft.



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