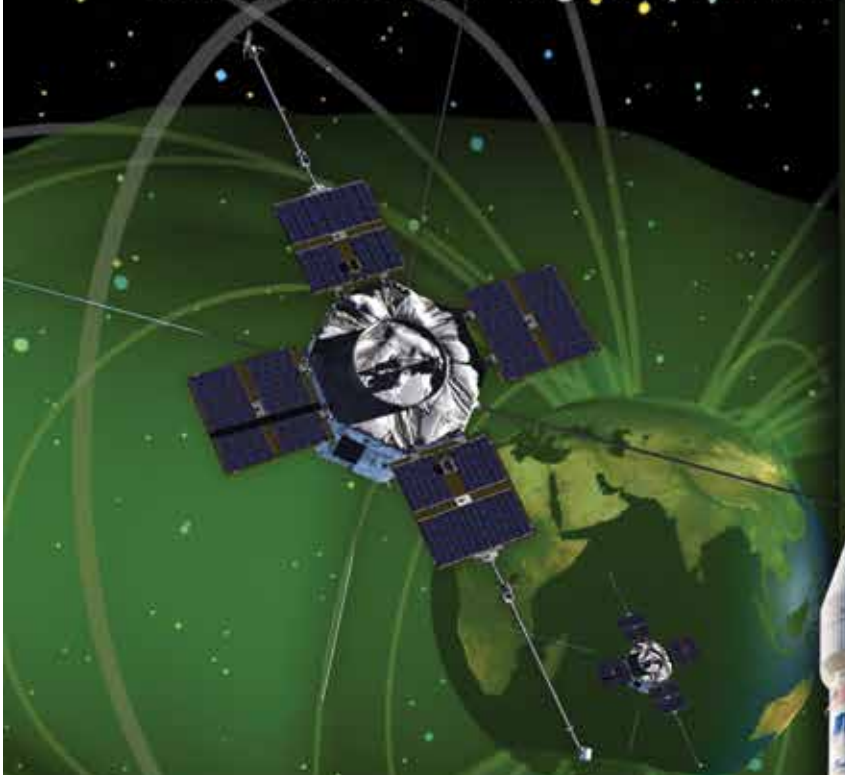
National Aeronautics and Space Administration

National Aeronautics and Space Administration
Launch Services Program presents...

Radiation Belt Storm Probes



The Radiation Belt Storm Probes (RBSP) mission is part of NASA's Living with a Star Program. This mission will explore fundamental processes that operate throughout the solar system. RBSP advances our understanding of dramatic and puzzling aspects of Earth's Radiation Belts. The "Van Allen Belts," named for their discoverer, James Van Allen, are two donut-shaped regions encircling the Earth, where high-energy particles that have been energized by interactions with the sun and space are trapped by our planet's magnetic field. The twin RBSP spacecraft will make measurements within the Van Allen Radiation Belts to help us to further understand the Sun's influence on the Earth and near-Earth space by studying the planet's radiation belts on various scales of space and time. RBSP enables the prediction of extreme and dynamic space conditions. Changes in the Sun's energy flow cause changes in Earth's space. These changes are referred to as space weather and have broad impacts on Earth's systems and inhabitants.

RBSP provides understanding needed to design satellites to survive in space. RBSP will explore space weather, and especially its extreme conditions, all of which can impact our way of life as we become increasingly dependent upon the space based infrastructure. Extreme space weather can disable satellites, cause power grid failures, and disrupt Global Positioning System (GPS) services.

The RBSP mission will answer three overarching science questions:

- Which physical processes produce radiation belt enhancement events?
- What are the dominant mechanisms for relativistic electron loss?
- How do ring current and other geomagnetic processes affect radiation belt behavior?

LAUNCH VEHICLE
Atlas V-401

LAUNCH LOCATION
Cape Canaveral AirForce Station

LAUNCH DATE
2012

www.nasa.gov

SP-2012-03-051-KSC

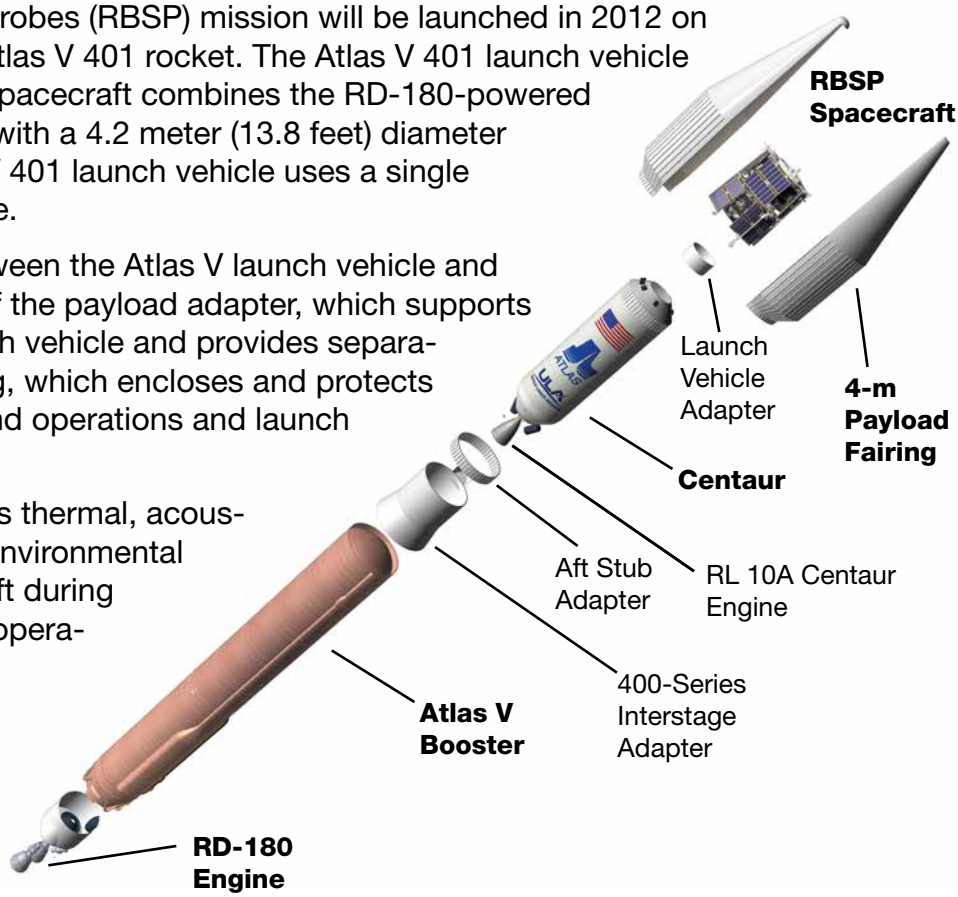
Radiation Belt Storm Probes (RBSP)

The Radiation Belt Storm Probes (RBSP) mission will be launched in 2012 on a United Launch Alliance Atlas V 401 rocket. The Atlas V 401 launch vehicle that will launch the RBSP 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 upper stage.

The primary interfaces between the Atlas V launch vehicle and RBSP 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 provides thermal, acoustic, electro-magnetic, and environmental protection for the spacecraft during the pre-launch processing operations, launch and ascent.

Drawing of Atlas V courtesy of:
United Launch Alliance

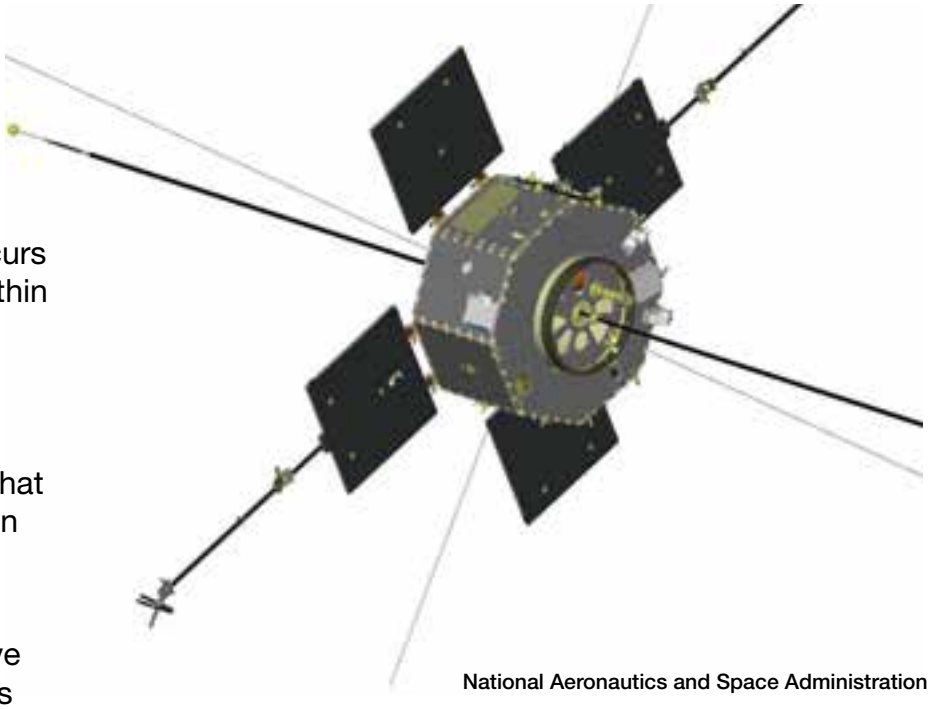


The Applied Physics Laboratory will build and operate the twin RBSP spacecraft for NASA's Living With a Star program.

The RBSP spacecraft will operate entirely within the radiation belts throughout their mission. When intense space weather occurs and the density and energy of particles within the belts increases, the probes will not have the luxury of going into a safe mode, as many other spacecraft must do during storms. The spacecraft engineers must therefore design probes and instruments that are "hardened" to continue working even in the harshest conditions.

The probes will carry a number of instruments and instrument suites to support five experiments that will address the mission's science objectives.

Drawing of RBSP spacecraft courtesy of:
National Aeronautics and Space Administration/John Hopkins University Applied Physics Laboratory



National Aeronautics and Space Administration

John F. Kennedy Space Center
Kennedy Space Center, FL 32899

www.nasa.gov

SP-2012-058-KSC