

The APL News

The Johns Hopkins University • Applied Physics Laboratory

June 2006

APL Tapped to Build NASA's Radiation Belt Storm Probes

by Mike Buckley

NASA has tapped the Lab to develop and operate twin spacecraft to study how the sun interacts with Earth's radiation belts.

Part of NASA's Living With a Star Program, the Radiation Belt Storm Probes mission will examine how solar activity affects Earth's radiation belts – the doughnut-shaped bands of charged particles trapped by Earth's magnetic field that extend some 20,000 miles around our planet. After launch, scheduled for 2012, the two spacecraft will measure the distributions of charged particles as well as the electric and magnetic fields that energize, transport or remove the particles within these belts.

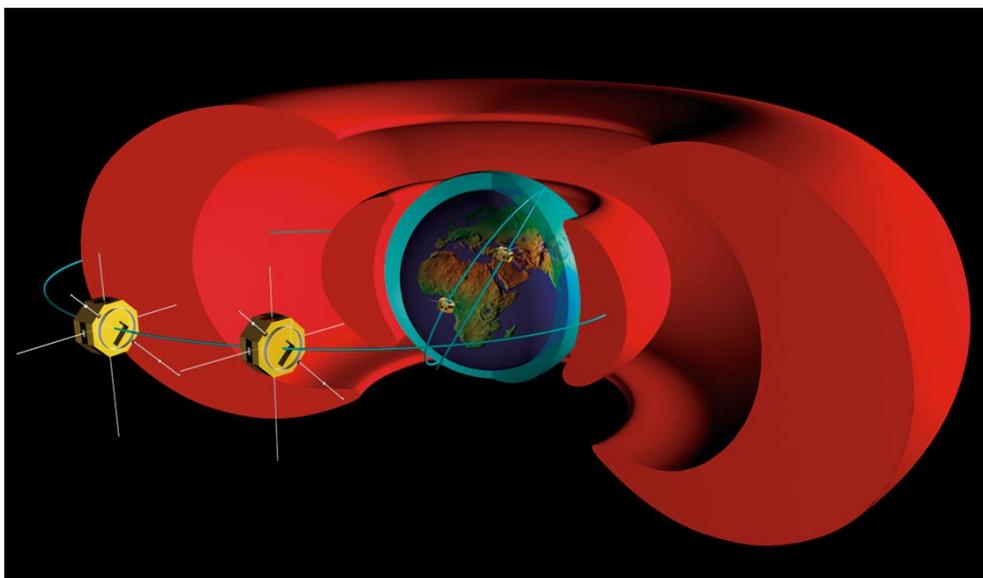
Detailed design of the probes will begin this summer, after NASA selects the spacecraft's science instruments. The mission's science results will be used to develop space weather predictions, much in the same way we forecast weather on Earth. Increased knowledge of the space environment and space weather effects will permit better design and operations of new technology on Earth and in space.

"For the first time, several spacecraft will simultaneously watch activity on the sun and the reaction to that activity within Earth's radiation belts," says the Space

Department's **Ken Potocki**, who manages Living With a Star programs at APL. "These probes will have to work in an incredibly difficult radiation environment where charging and discharging will occur, a lot like flying into an electrical storm. But our team looks forward to the engineering and design challenge. We know how important these data will be."

Radiation Belt Storm Probes is the first project assigned to APL under a NASA contract to design, develop and operate missions in the Living With a Star and Solar Terrestrial Probes programs. The Lab's experience in developing spacecraft to study the sun-Earth relationship includes the TIMED satellite, currently examining solar effects on Earth's upper atmosphere, and the twin STEREO observatories, which after launch this summer, will begin taking the first 3-D images of solar events called coronal mass ejections, which lead to severe magnetic storms around Earth.

APL spacecraft have flown into the charged-particle environment before: the Charge Composition Explorer, one of three spacecraft in the international Active Magnetospheric Particle Tracer Explorers (AMPTE) program of the 1980s, measured the composition of magnetospheric particles, as well as the variation among these particles over space and time. ■



Artist's rendering showing two spacecraft representing the not-yet-designed Radiation Belt Storm Probes that will study the Sun and its effects on Earth.