

## Southwest Research Institute (SwRI) 2006 News Release

# NASA selects radiation belt mission candidate for further study

San Antonio — August 3, 2006 — An instrument developed by Los Alamos National Laboratory (LANL) and Southwest Research Institute (SwRI) is part of a proposal selected as a candidate to study the Earth's space weather from a pair of orbiting satellites.

All four of the mission proposals selected by NASA for further study will examine how the Earth's radiation belts form and change during space storms caused by solar activity. This type of radiation is hazardous to astronauts, orbiting satellites and aircraft flying high-altitude polar routes. Each team will receive \$1 million to perform a study focused on cost, management and technical feasibility. NASA will then select one of the teams for full development of the payload.

SwRI and LANL are developing the Helium, Oxygen, Proton and Electron (HOPE) spectrometer for the Radiation Belt Storm Probes — Energetic particle, Composition, and Thermal plasma (RBSP-ECT) mission study, led by Boston University. SwRI will build the electronics unit and microprocessor, write the operating software and develop the spacecraft interfaces. LANL, which leads the HOPE investigation, will build and calibrate the sensor. Plans call for a total of three instruments to be delivered to NASA.

HOPE is designed to measure the ions and electrons that exist in the Earth's plasmasphere, plasma sheet and ring current, including the relative composition of the most important components — hydrogen, helium and oxygen ions — from 1 to 50,000 electron volts. In addition to being source material for the radiation belts, ions play an important role in accelerating plasma to radiation belt energies of many million electron volts.

"They do this by generating plasma waves that can 'surf' other particles to very high energies through resonant interactions," says Dr. David T. Young, lead co-investigator of the instrument and an Institute scientist in

the SwRI Space Science and Engineering Division. "Even after all these years, scientists still don't know how the radiation belts form and how they respond to space weather coming from the sun. This mission will help increase our understanding of these unknown processes."

Space weather storms involve constantly changing magnetic and electric fields and gusts of radiation that produce intense currents in the Earth's ionosphere. These can black out long-distance communications over entire continents and disrupt the global navigational system.

Prof. Harlan Spence of Boston University leads the RBSP-ECT team, and Dr. Herb Funsten of LANL leads HOPE. The other teams funded for the phase A study are led by the University of Iowa at Iowa City, the University of Minnesota at Minneapolis and the New Jersey Institute of Technology at Newark.

The two-spacecraft Radiation Belt Solar Probe mission is scheduled for launch in 2012. The mission is part of NASA's Living with a Star Program, designed to gain understanding of how and why the sun varies, how planetary systems respond to the sun, and solar effects on human space and Earth activities. NASA's Goddard Space Flight Center manages the program for the Science Mission Directorate.

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