SwRI energetic particle instruments selected for Solar Probe Plus mission

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NASA selected two instruments led by Southwest Research Institute, which measure energetic particles for the Solar Probe Plus spacecraft, slated to launch by 2018. This first-ever journey into the Sun's outer atmosphere - called the corona - will seek to answer two of the biggest mysteries in heliophysics: why the Sun's corona is so much hotter than its inner regions, and how the solar wind is accelerated. The answers to these questions can be obtained only through in-situ measurements down in the corona.

"Solar Probe Plus will be a historic mission and we are really excited to be providing complete measurements of the energetic particles" said Dr. Dave McComas, an assistant vice president of SwRI' Space Science and Engineering Division who chaired NASA's Solar Probe Plus Science and Technology Definition Team. McComas will serve as principal investigator for the energetic particle instrument suite - the Integrated Science Investigation of the Sun (ISIS). "These measurements will let us finally determine the sources and acceleration mechanisms of solar energetic particles that are dangerous for human space explorers and can adversely affect our highly technology-based lives here on Earth."

The energetic particle instruments will measure key properties of the accelerated particles ejected from the Sun. The ISIS low energy instrument measures the composition and intensities of protons and heavy elements as well as energetic electrons in multiple directions at the lower energies where the acceleration processes begin, while the ISIS high energy instrument measures the energy spectra, composition, and

angular distributions of protons, heavy elements and electrons at the higher, more hazardous energies.

By making the first-ever direct measurements of the near-Sun regions where the acceleration takes place, the SwRI-led instruments will provide critical data that, when integrated with other solar and interplanetary processes, will lead to a better understanding of Sun and solar system space weather. Understanding the connections between the Sun and its planets will provide insight into the impact of solar activity on humans, technological systems and even the presence of life itself in the universe.

Solar Probe Plus will determine the structure and dynamics of the Sun's magnetic field, investigate how the solar atmosphere is heated and accelerated to produce the solar wind, and explore mechanisms that accelerate and transport high energy particles from the solar atmosphere to the edge of the solar system. During the height of solar activity, which occurs roughly once every 11 years, processes such as solar flares and coronal mass ejections release huge quantities of energized matter, magnetic fields and electromagnetic radiation into space. These high-energy particles, known as solar energetic particles, present a serious radiation threat to human explorers living and working outside low-Earth orbit, to technological assets in space such as communications satellites and to the electric power transmission grids on the ground. Developing a way to forecast hazardous space weather is one of the major scientific goals of NASA and the Solar Probe Plus mission.

SwRI is partnering with Johns Hopkins University Applied Physics Laboratory in Laurel, Md., to produce the low-energy instrument, and the team producing the higher energy instrument includes the Jet Propulsion Laboratory, Caltech and Goddard Space Flight Center.

More information: solarprobe.gsfc.nasa.gov/

Provided by Southwest Research Institute

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