Lockheed Martin Sensor Aboard For Interstellar Boundary Explorer (IBEX) Mission Launch

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NASA's Interstellar Boundary Explorer (IBEX) mission -- the first designed to globally image the extreme edge of our solar system -- is ready for launch on a Pegasus rocket from Kwajalein Atoll in the Marshall Islands, on October 19. The Lockheed Martin Space Systems Company's Advanced Technology Center (ATC) has lead the development of the IBEX-Lo sensor. The Southwest Research Institute (SwRI) awarded the contract to the ATC.

IBEX-Lo is one of two sensors on the Small Explorer spacecraft that will measure neutral atoms created by the interaction of the solar wind with the interstellar medium -- the gas, dust and radiation environment between the stars. Such neutral atoms are created beyond the orbit of Pluto and then enter our solar system. The energy bands are split into two ranges, one measured by IBEX-Lo and the other by IBEX-Hi. A team at Los Alamos National Laboratory and SwRI built the IBEX-Hi sensor. The IBEX spacecraft will fly in a highly elliptical orbit around the Earth and will make all-sky "images" of the arriving neutral atoms every six months for two years.

Dr. Stephen A. Fuselier is the lead investigator for IBEX-Lo and Mr. Eric Hertzberg served as the lead engineer on sensor development. Both are members of the ATC's Space Physics Department, while the overall IBEX project is under the direction of the Principal Investigator, Dr. Dave McComas at SwRI.

"After several years of work developing this sensor at the ATC, it is very satisfying to finally reach this milestone, and we look forward with anticipation to getting the IBEX mission underway," says Fuselier. "IBEX data will enable us to imagine sitting inside a giant bubble inflated by the solar wind and getting a picture of the walls from the inside out," explains Dr. Fuselier. "The continuous wind from the sun keeps the bubble inflated and the edges of our solar system are defined by the interaction between this wind and the surrounding interstellar medium. By measuring the number of arriving neutral atoms at a variety of energies, we can determine many of the properties of the boundaries of our solar system."

An appreciation of the physics that underlies the interstellar boundary will allow scientists to better understand how the out-flowing solar wind mediates the in-flowing radiation from the galaxy. The regulation of this radiation could well have affected the formation and evolution of life on Earth, and thus might provide a means for examining the probability of life around other stars. In particular, it is at such boundaries that roughly 90% of low energy cosmic radiation is deflected away from the inner solar system, so by understanding their properties scientists will be better able to model the process that may have provided an environment favorable for life on this planet.

The IBEX-Lo sensor was built by a team of scientists and engineers at the ATC in Palo Alto, Calif., the University of New Hampshire in Durham, N.H., SwRI in San Antonio, Texas, the NASA Goddard Space Flight Center in Greenbelt, Md, and the University of Bern in Bern, Switzerland. The team integrated and calibrated the sensor at the University of Bern.

The Explorer Program is designed to provide frequent, low-cost access to space for physics and astronomy missions with small to mid-sized spacecraft. NASA has successfully launched seven Small Explorer missions since 1992. The NASA Goddard Space Flight Center manages the Explorer Program for the Science Mission Directorate.

The Lockheed Martin Space Systems Advanced Technology Center (ATC) is a world-class provider of advanced scientific and space technologies, prototypes, and research for physical, electronic, information/computing, materials, engineering, and electro-optical applications.

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