Lockheed Martin To Develop Sensor For Interstellar Boundary Explorer Mission

The Lockheed Martin Advanced Technology Center (ATC) will lead the development of the Interstellar Boundary Explorer (IBEX)-Lo sensor for the recently selected NASA Small Explorer mission. The Southwest Research Institute (SwRI) awarded the contract to the ATC. Contract terms are not being disclosed. IBEX is the first mission designed to globally image the extreme edge of our solar system. Launch of the IBEX spacecraft will occur in 2008.

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. These 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 will build the IBEX-Hi sensor. The IBEX spacecraft will be 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 will be the lead investigator for IBEX-Lo and Eric Hertzberg will serve as the lead engineer. Both are members of the ATC's Space Physics Department, while the overall project is under the direction of the Principal Investigator, Dr. Dave McComas at SwRI.

"It's like sitting inside a giant bubble and getting a picture of the walls from the inside out," explains Dr. Fuselier. "The continuous wind from the Sun -- the solar wind -- 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. Additionally, it is at such boundaries that roughly 90% of 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 will be 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 and the NASA Goddard Space Flight Center in Greenbelt, Md. After the sensor is integrated at the ATC, it will be calibrated at the University of Bern in Switzerland.

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 six Small Explorer missions since 1992. The NASA Goddard Space Flight Center manages the Explorer Program for the Science Mission Directorate.

The Lockheed Martin Advanced Technology Center is the research and development organization of Lockheed Martin Space Systems Company. Headquartered in Bethesda, Md., Lockheed Martin employs about 130,000 people worldwide and is principally engaged in the research, design, development, manufacture and integration of advanced technology systems, products and services. The corporation reported 2004 sales of $35.5 billion.

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