

SwRI Will Lead Interstellar Boundary Explorer Mission

February 2 2005

NASA has chosen Southwest Research Institute® (SwRI) to lead the first mission to image the outer boundaries of the solar system, the region separating our solar system from interstellar space. The Interstellar Boundary Explorer (IBEX) is NASA's next Small Explorer. The Explorer Program develops low-cost, rapidly developed space science investigations.

A satellite that will make the first map of the boundary between the Solar System and interstellar space has been selected as part of NASA's Small Explorer program. The Interstellar Boundary Explorer (IBEX) mission will be launched in 2008.

IBEX is the first mission designed to detect the edge of the Solar System. As the solar wind from the sun flows out beyond Pluto, it collides with the material between the stars, forming a shock front. IBEX contains two neutral atom imagers designed to detect particles from the termination shock at the boundary between the Solar System and interstellar space.

"IBEX will make the first images of the interstellar boundaries beyond our solar system, thereby providing a first step to exploring the galactic frontier," says Principal Investigator Dr. David J. McComas, senior executive director of the SwRI Space Science and Engineering Division. The IBEX spacecraft carries a pair of energetic neutral atom (ENA) "cameras" to image interactions between the solar wind blown out by the Sun and the low-density material between the stars < interactions never

before observed directly. "This mission will provide a much deeper understanding of the Sun's interaction with the galaxy and will also address a serious challenge facing manned exploration by studying the region that shields us from the majority of galactic cosmic ray radiation," McComas adds.

The Sun's hot outer atmosphere continuously evaporates into space, forming the million-mile-per-hour solar wind that creates a protective envelope around the solar system, far beyond the most distant planets. IBEX will image the solar system's previously invisible outer boundaries to discover how the solar wind interacts with the galactic medium.

"In addition to revealing many of the interstellar boundary's unknown properties, IBEX will explore how the solar wind regulates the radiation from the galaxy," says McComas. "This radiation poses a major hazard to human space exploration and may have affected the formation and evolution of life on Earth. By examining the underlying physics of our solar system's outer boundaries, IBEX will allow us to extrapolate the present day conditions to those of the past and the future, and offer insight into similar boundaries that surround other stars and stellar systems." To achieve this important mission, SwRI and its partners are developing a small, lightweight spacecraft to launch from a Pegasus rocket dropped from an airplane. The spacecraft will attain a highly elliptical orbit that reaches 150 thousand miles above the Earth.

The IBEX payload consists of two imagers designed to detect neutral atoms from the solar system's outer boundaries and galactic medium. For IBEX, SwRI is partnering with Orbital Science Corporation, Los Alamos National Laboratory, Lockheed Martin Advanced Technology Center, NASA Goddard Space Flight Center, the University of New Hampshire and the Applied Physics Laboratory. The team also includes a number of U.S. and international scientists from universities and other institutions, as well as Chicago's Adler Planetarium, which is leading education and

public outreach for the mission.

IBEX is expected to cost approximately \$134 million and is slated to launch around 2008. It will return global images of the interstellar interaction by the end of the decade.

Citation: SwRI Will Lead Interstellar Boundary Explorer Mission (2005, February 2) retrieved 27 April 2024 from <https://phys.org/news/2005-02-swri-interstellar-boundary-explorer-mission.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.