Orbital
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FACT SHEET

IBEX

Interstellar Boundary Explorer

Mission Description

As part of a Southwest Research Institute team led by Principal Investigator Dr. David McComas, Orbital was selected in January 2005 to develop, build and launch a small spacecraft for NASA's Interstellar Boundary Explorer (IBEX) mission. The spacecraft is based on Orbital's MicroStar™ spacecraft product line.

The IBEX satellite will orbit the Earth every eight days on a highly-elliptical path that takes it to an apogee of 320,000 kilometers (approximately 80 percent of the distance to the Moon) to make the first comprehensive map of the boundary between our Solar System and interstellar space. Measuring this interstellar interaction is important for understanding our protection from galactic cosmic rays – energetic particles from beyond the Solar System – that could pose health risks to future astronauts exploring deep space.

IBEX was launched on October 19, 2008, aboard Orbital's Pegasus® launch vehicle from the Kwajalein Atoll launch site in the central Pacific Ocean. The spacecraft incorporated an on-board solid rocket motor and hydrazine propulsion system to propel it to the final high-altitude orbit beyond Earth's magnetosphere, as required by IBEX's scientific instrument.

Spacecraft

The IBEX spacecraft is based on Orbital's highly reliable MicroStar spacecraft platform, subsystems and supporting software, which has a proven track record of success on a total of 45 missions. The payload consists of two narrow angle image sensors (IBEX-Hi and IBEX-Lo) and a Combined Electronics Unit (CEU).

Designed to be launched in multiple or "piggyback" units, the MicroStar platform supports small payloads (less than 100 kilograms) and provides a three- to five-year mission life.

QUICK FACTS

IBEX's orbit will take it up to 200,000 miles from Earth.

Six months into its mission, IBEX surveyed the entire sky to reveal the structure of the edges of our solar system.

Mission:

NASA Small Explorer (SMEX) Program

Customer:

Southwest Research Institute –
San Antonio, Texas

IBEX in Orbital's satellite manufacturing facility in Dulles, Virginia.

IBEX

Specifications

Mass:	<110 kg (243 lb.)
Power:	<85 W
Stabilization:	Sun-pointing major axis spinner
Orbit:	7,000 km perigee altitude, 50 Earth-radii apogee altitude
Mission Life:	24 months (baseline mission)

Payload

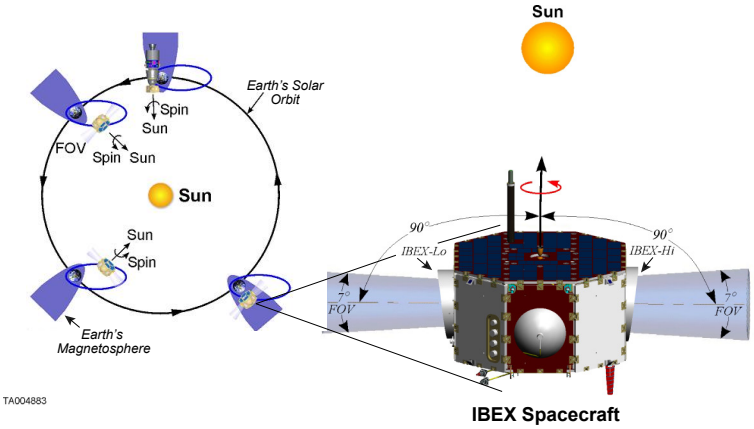
Two single pixel image sensors (IBEX-Hi and IBEX-Lo)
Combined Electronics Unit (CEU)

Launch

Launch Vehicle:	Pegasus® XL
Site:	Kwajalein, Marshall Islands
Date:	October 19, 2008

IBEX Mission

In its elliptical orbit around the Earth, the IBEX spacecraft is pointed towards the sun, and spins continuously. Two narrow angle image sensors (IBEX-Hi and IBEX-Lo) are positioned perpendicular to the spin axis. These special imagers detect neutral atoms from the solar system's outer edge, enabling scientists to map the boundary between our Solar System and interstellar space.



Key Mission Partners

Southwest Research Institute

Principal investigator, mission management, science instruments and operations

Orbital Sciences Corporation

Spacecraft and launch vehicle design, fabrication, test, launch operations, and mission operations

Additional Partners

Lockheed Martin Advanced Technology Center

Applied Physics Laboratory

Los Alamos National Laboratory

Alliant Techsystems

University of New Hampshire

Adler Planetarium and Astronomy Museum

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