12-12-2007

UNH Space Scientists Reach Milestone In NASA Sun- Earth Mission

David Sims
UNH Media Relations

UNH Media Relations

UNH Space Scientists Reach Milestone In NASA Sun-Earth Mission

Contact: David Sims
603-862-5369
Science Writer
Institute for the Study of Earth, Oceans, and Space

December 12, 2007

DURHAM, N.H. – Scientists, engineers, and technicians at the University of New Hampshire's Space Science Center learned recently that the next phase of a large and complex NASA mission they have been working on for several years will now proceed to the next critical phase.

NASA administrator Michael Griffin gave the go-ahead to the space agency's Magnetospheric Multiscale Mission, meaning that the cast of participants, including those at UNH, can move from the design phase and begin building instruments for the four-satellite mission. UNH has been awarded $61 million from NASA for its role in the mission, which will study little-understood, fundamental processes of Earth's magnetosphere – the comet-shaped magnetic shield that protects the Earth from solar and cosmic radiation.

"This decision propels us forward into the busiest engineering phase of the mission," says Roy Torbert, director of the Space Science Center within the Institute for the Study of Earth, Oceans, and Space at UNH and the university's principal investigator for the mission. Torbert adds, "This is where the engineering and the science come together for this exciting NASA mission."

As part of an international team from 12 institutions, over the next several years UNH scientists, engineers, graduate and undergraduate students will help construct two Electron Drift Instruments for each of the four spacecraft. An EDI is designed to measure electric fields and electron drifts using a controlled beam of electrons. In addition, UNH will construct the central electronic controls for all the instruments being built to measure the spectrum of electromagnetic fields around the spacecraft. This "FIELDS" instrument suite will be comprised of six sensors per spacecraft and will be centrally managed by UNH.

The mission is designed to explore the plasma processes that govern the interaction of the Earth's magnetic field with the highly charged solar wind. Plasma is a highly ionized gas sometimes described as the fourth state of matter. Plasmas occupy 99 percent of the observable universe and the physics of plasmas is key to understanding many violent processes throughout the universe.

One of those processes is magnetic reconnection, in which magnetic fields reconfigure themselves and release enormous amounts of energy. However, only around the Earth's magnetosphere can direct measurements of reconnection be easily made. Reconnection, a main focus of the MMS mission, is the basic mechanism by which energy from the Sun and the solar wind is transferred into the Earth's magnetospheric system.

Reconnection is widely believed to play a crucial role in space and astrophysical phenomena such as magnetospheric substorms and solar flares. It is a crucial process to understand in order to be able to predict "space weather" conditions. For example, a blast of this energy from substorms or solar flares can affect satellites, Earth-based instruments and power grids;

shower astronauts and aircraft flying over the Earth's poles with deadly radiation; and light up the sky with aurora.

In 2005, UNH received the largest, single research award in the history of the institution, $38 million from NASA, to build instruments for MMS. The NASA award to UNH has now increased to just over $61 million to, among other aspects of the mission, accommodate post-launch operations that will be carried out by SSC scientists, engineers, and technicians.

The MMS mission is managed by the NASA Goddard Space Flight Center, which will build the four spacecraft and the inter-spacecraft ranging and communication system. Southwest Research Institute leads the science investigation and development of the instrument suite together with numerous partners including UNH, NASA GSFC, Johns Hopkins University Applied Physics Laboratory, University of Colorado, and international partners in Austria, Sweden, France and Japan. Launch for the MMS mission is currently planned for 2014.

An image is available to download here: http://unh.edu/news/img/mms_lg.jpg. Caption: Artist's conception of the four MMS spacecraft. Courtesy of NASA.

email this page!