NASA Mission Gets Closer to Solving Magnetic Reconnection Mystery (w/ Videos)

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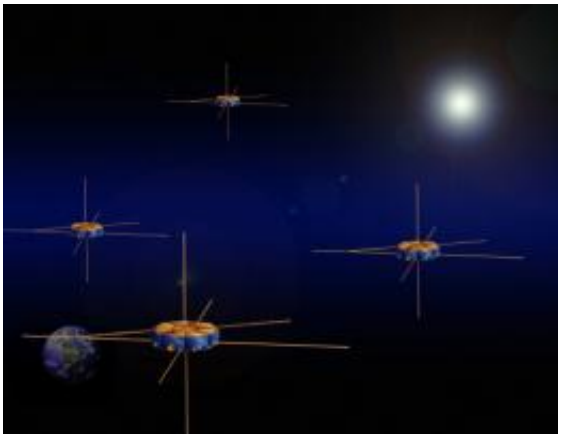

The Magnetospheric Multiscale mission will use four identical spacecraft, variably spaced in Earth orbit, to make three-dimensional measurements of magnetospheric boundary regions and examine the process of magnetic reconnection. Credit: Southwest Research Institute

(PhysOrg.com) -- NASA is designing a mission to investigate one of the most fundamental and explosive physical processes in the universe - magnetic reconnection. Known as the Magnetospheric MultiScale (MMS) mission, it was approved for implementation on June 18, 2009 following a successful Preliminary Design Review in May 2009.

MMS consists of four identical satellites that will fly in a tetrahedron formation through Earth's magnetosphere to discover how magnetic reconnection works. When magnetic fields become tangled, as they

often do in the magnetosphere, they can merge together creating an explosive release of energy, whereby magnetic energy is converted directly into heat and charged-particle kinetic energy. Magnetic reconnection sparks solar flares, powers auroras, and even pops up in nuclear fusion chambers (tokamaks) on Earth. It is the ultimate driver of space weather impacting human technologies such as communications, navigation, and power grids.

NASA's Goddard Space Flight Center (Goddard), Greenbelt, Md. will build all four spacecraft and integrate four sets of instruments into the four MMS observatories. Each observatory is shaped like a giant hockey puck, about 12 feet in diameter and 4 feet in height," said Karen Halterman, MMS Project Manager at NASA Goddard.

Goddard will conduct environmental testing, and support launch vehicle integration and operations. Goddard is also developing the Mission Operations Center that will monitor and control the satellites and provide all the flight dynamics support for the extensive maneuvering and orbit raising required for the mission. Scientists and engineers at Goddard are also building the Fast Plasma Investigation (FPI), which is part of the instrument suite.

The MMS instruments are provided as a suite from Southwest Research Institute (SwRI), San Antonio, Texas. Dr. James L. Burch of SwRI is the MMS Principal Investigator. Under contract to Goddard, SwRI is responsible for the mission science, development of the instruments for the four observatories, science operations, data analysis, theory and modeling, and education and public outreach.

Science team members and instrument development are provided by the University of New Hampshire; Johns Hopkins University Applied Physics Laboratory; NASA Goddard; University of Colorado; Lockheed Martin Advanced Technology Center; Rice University; the University of

Iowa; Aerospace Corporation; and the University of California-Los Angeles. International contributions to the MMS instrument suite are provided by the Austrian Academy of Sciences; Sweden's Royal Institute of Technology and Institute of Space Physics; France's Plasma Physics Laboratory and Toulouse Space Center; and Japan's Institute of Space and Astronautical Science.

MMS is a NASA Science Mission Directorate Heliophysics mission in the Solar Terrestrial Probes Program. MMS is managed by NASA Goddard. Kennedy Space Center is providing launch services. Launch of all four observatories in an Atlas V launch vehicle is scheduled for August 2014.

Provided by NASA's Goddard Space Flight Center