Discovery Dispatch

A Quarterly Newsletter of the NASA Discovery Program

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Discovery Home Page

http://discovery.nasa.gov

A Note from the Discovery Program Manager

Every quarter, each Discovery mission presents a project overview to Program and NASA management, reviewing their latest accomplishments and current status. We thought readers would be interested in a brief summary of this information, covering both the technical status of each mission and their education and public outreach (E/PO) activities. The newsletter also includes Program highlights for recent months. For complete details on each mission, please visit their individual websites.

Each Discovery mission is unique in its objective and its approach. Each faces many challenges as it progresses from defining requirements, to finalizing design, to building the instruments and the spacecraft. All the missions are on track to set new standards for accomplishments within their cost and schedule constraints. The unique Discovery approach to solar system exploration, featuring missions led by Principal Investigators who have complete responsibility for cost, schedule and performance, and teaming arrangements among universities, industry, NASA centers and research laboratories, has proven that "Better, Faster, Cheaper" can succeed.

David Jarrett

Discovery Program Highlights

The first Discovery Program retreat was held in April. All missions sent representatives to the three day session designed to promote an exchange of information, including lessons learned, among missions past and present.

Discovery's first Independent Annual Review was conducted in May, consisting of two days of presentations from the program before a review board representing various parts of NASA. Among the major findings was that the Discovery program management is effective, efficient, and has been successful.

The latest Discovery Announcement of Opportunity was released in May, with a due date for proposals of August 18. Twenty-seven proposals were received in response to the AO. Final selection should take place in summer 2001.

Discovery Program Education and Public Outreach Highlights

Discovery Program bookmarks were produced in the spring, mainly to provide website information for the Program and the missions. Nearly 10,000 were distributed at spring educator conferences and to a variety of schools. Due to popular demand, a second printing took place, with 20,000 going to NASA Educator Resource Centers nationwide.

The Program Office supported the 12th annual week-long NASA Planetary Science Summer School held at Caltech and JPL, titled "Discovery Micromissions: Focused Low-Cost Science." Designed to teach students

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the basics of how to propose a planetary investigation, the 50 participants heard lectures and spent time in JPL's Project Design Center, getting a "crash course" in what it takes to develop a mission concept into a proposable mission design. In the "Education and Public Outreach" session, students learned how to approach writing the E/PO portion of a proposal and about the actual E/PO activities the current missions are conducting.

A Discovery Program overview was presented to the 42 Solar System Educator Fellows gathered at JPL for a four-day training session in August. The nationwide program is designed to provide educators with the tools to inspire and excite young students in grades K-12. The educators learned techniques for training an additional 100 teachers in their state on how to incorporate current space mission data into their curriculum to help students learn about math and science. The goal of the program is to make science a fun and fascinating topic for educators and students.

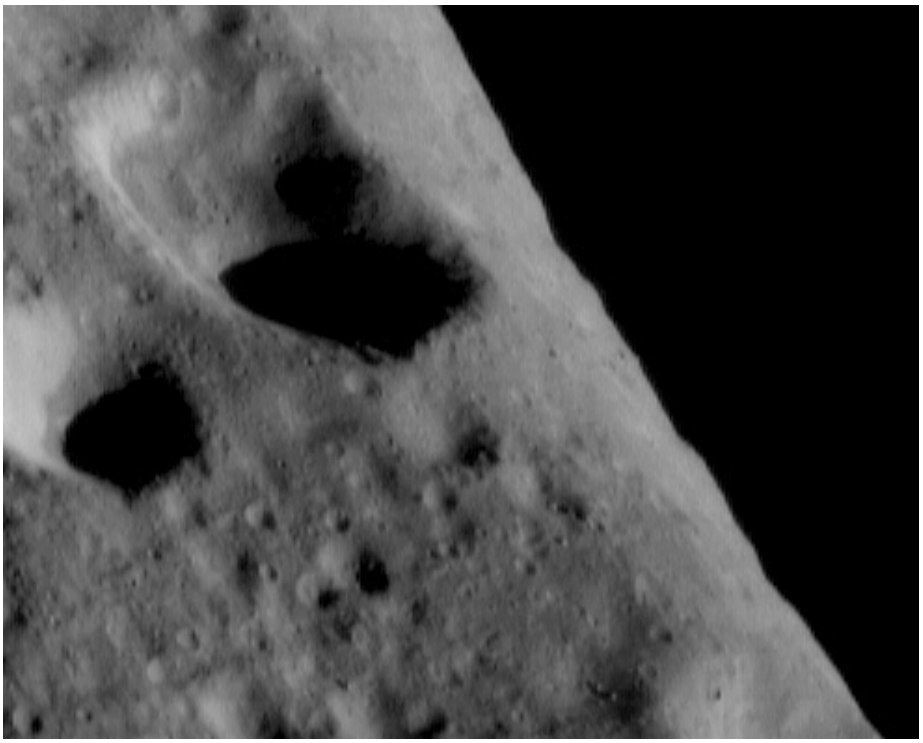
Near Earth Asteroid Rendezvous (NEAR)

The NEAR Shoemaker spacecraft continues to orbit asteroid Eros and send back incredible images and data from the science instruments. Since orbit insertion on February 14, 2000, the spacecraft has provided answers to many science questions. All momentum corrections and orbit changes have taken place flawlessly. The spacecraft has been in a 50 km circular orbit, a 50 x 35 km transfer orbit, and a 35 km orbit, sending back the best and closest images ever taken of an asteroid.

The Near Infrared Spectrometer (NIS) experienced a power surge in May, which appears to have been caused by a partial short in the instrument. It is no longer working, but had collected more than 70% of its data when it was shut off. All other science instruments and spacecraft systems continue to work well. Plans are being initiated for a mission-end scenario in February 2001.

NEAR Shoemaker Education and Public Outreach Highlights

Activities this quarter involved students and teachers attending a variety of summer workshops. Thirty-two gifted and talented 6th and 7th grade students attended the "Maryland Summer Center for Space Science," sponsored by the Maryland Department of Education to teach students the power of technology and how to keep pace with the expanding knowledge of space science. Students worked in small groups to experience the process of planning and launching a simulated space mission, and they built a scale model of a spacecraft designed to be a Discovery mission. They also created mission logos, poster sessions, budgets and E/PO plans, and gave a mission overview presentation to their peers.



On August 28, 2000, the camera on NEAR Shoemaker took this picture of Eros from an orbit 62 miles above the surface. The two craters near the top left are about 1.4 miles and 1 mile in diameter, respectively. The top large crater is thought to be relatively old because many smaller craters are visible on its rim and interior, indicating a very long period of bombardment by impacting meteors.

The Keck Undergraduate Workshop provided NEAR science, mission operations and engineering information for students, faculty and research assistants.

Nineteen K-6 educators from Illinois came to the Applied Physics Lab as part of the Illinois Systemic Initiative DePaul University Educator Workshop to learn how to incorporate data

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from NEAR into their lesson plans. The one-day event was led by NEAR Project Scientist Andy Cheng.

The PBS program, "Passport to the Solar System," filmed a segment on the NEAR Shoemaker mission as part of its series of interactive learning experiences connecting students and teachers directly with leading researchers. The goal is to excite students about science, share the latest findings, and inspire them to become lifelong learners using a combination of video, print and online materials.

Stardust

The Stardust spacecraft continues to perform well as it cruises toward its encounter with Comet Wild 2 in 2004, where it will collect samples of comet dust for return to Earth in 2006. All subsystems are in fine shape as the spacecraft, in Solar Loop #1, heads for an Earth flyby in January 2001.

In the spring, Stardust successfully completed its first round of interstellar dust collection. For more than two months, the spacecraft had its aerogel collector extended in the first of two planned efforts to capture particles of interstellar dust. A second interstellar dust collection phase is planned for mid-2002.

Stardust Education and Public Outreach Highlights

Stardust provided online training for the Solar System Ambassadors, a group of 140 motivated volunteers all across the country, who will use the information about the missions in a variety of ways as they conduct public events designed to share the excitement of space exploration with their communities.

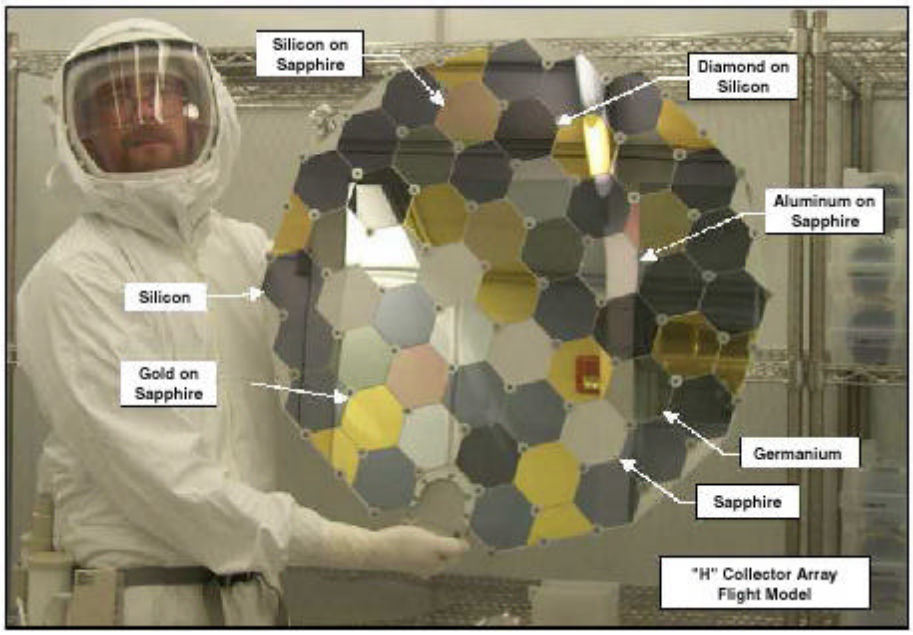
Stardust also participated in a four-day training held at JPL for 42 teachers recently selected as nationwide Solar System Educator Fellows. Among the hands-on projects the teachers learned was "Cookin' Up A Comet," which dramatically simulates formation of a comet using dry ice, sand, soda pop and other ingredients.

Genesis

Genesis is a solar wind sample return mission, scheduled to launch in February 2001. The science objectives are to measure elemental and isotopic abundances of solar wind ions, to collect samples of three different types of solar wind, and to provide a supply of solar material for future analysis.

As the launch approaches, Genesis is finishing testing at Lockheed Martin Astronautics in Denver, in preparation for shipment to the Kennedy Space Center. The mission is on a tight schedule, but overall it is in good shape.

A Finished Array for the Genesis Spacecraft



Genesis Education and Public Outreach Highlights

Genesis staffed a large booth at the annual JPL Open House in June, with management and science personnel on hand to tell the public all about the mission.

The Genesis home page is continually updated and averages about 300,000 hits per month. The latest addition is several "Streaming Video" segments, including one featuring a visit to a clean room at the Johnson Space Center.

Genesis distributes a monthly electronic newsletter with the latest news and information. Click here to subscribe.

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The opportunity to send a Genesis Gram on the spacecraft closed with 800 messages from 38 countries and 36 states.

CONTOUR

The Comet Nucleus Tour, scheduled to launch in 2002 to encounter and study at least two diverse comets, passed its Confirmation Review in February 2000 and has been deep in the throes of implementation ever since. Software requirements were finalized, dust shield tests took place and the baseline design was validated. The mission specification was signed, as were science and navigation task statements and necessary contracts. Most major subcontracts have been placed. In general, all activities are on track.

CONTOUR Education and Public Outreach Highlights

The Space Telescope Science Institute is leading the CONTOUR education and outreach efforts. The home page has recently added teaching modules on comets, a FAQ section, and weekly status reports. A number of project scientists and engineers have given talks about the mission to students and educators, including hands-on workshops called "Expanding Your Horizons" and "Planning Missions to Comets" and lectures on “Exploring Near-Earth Objects.” CONTOUR also participated in the Maryland Summer Center for Space Science Program .

MESSENGER

The MESSENGER mission is a scientific investigation of the planet Mercury planned to launch in 2004 and enter into Mercury orbit in 2009. One of the two newest Discovery missions, MESSENGER began work in January 2000. Successful System Requirements and Conceptual Design Reviews were held in May. Design and development continues, with system engineering, design and navigation, science instruments, spacecraft subsystems and operations all on track.

MESSENGER Education and Public Outreach Highlights

The extensive activities that comprise MESSENGER’s education and outreach efforts are being led the American Association for the Advancement of Science. Other partners include the Challenger Center for Space Science Education, Science Systems and Applications, Inc., the Carnegie Academy for Science Education, Space Explorers Inc., the Center for Educational Resources at Montana State University-Bozeman, the National Air and Space Museum , the American Museum of Natural History in New York, and the Minority University-Space Interdisciplinary Network (MU-SPIN). The team has met twice to begin solidifying their plans.The MESSENGER home page is up and is being expanded.

Deep Impact

The Deep Impact mission will send a 450 kg impactor into the nucleus of Comet P/Temple 1 to answer many basic scientific questions about comets. The spacecraft, which carries its instrument complement and a smart impactor, will launch in early January 2004. The impactor is a simple, battery-powered spacecraft that operates independently of the flyby spacecraft for just one day between separation and impact. The spacecraft will approach the comet in early July 2005 and release the impactor 24 hours before impact. High-precision tracking telescopes are used on both the flyby spacecraft and impactor to target the comet and set the impactor on course to hit the sunlit side of the comet. The flyby spacecraft will observe the impact, crater development, material ejected and the final crater with visible and infrared multi-spectral instruments. The crater produced will depend on comet porosity and strength.

As the second most recently selected Discovery mission, Deep Impact began work in January 2000 and held System Requirements and Conceptual Design Reviews in May. The preliminary spacecraft design is progressing well, as the team considers recommendations made by the review board and works to close action items generated at the review. A number of mission documents have been completed in draft form.

Deep Impact Education and Public Outreach Highlights

Deep Impact was part of a Small Bodies exhibit booth (along with Stardust, NEAR and CONTOUR) at the annual JPL Open House in June. Visitors had the opportunity to view a model of the spacecraft and talk to project personnel about the mission. Also, fact sheets were distributed.

Deep Impact gave a presentation on the details of the mission to the Solar System Educator Fellows who came to JPL for a four-day training institute.

Work continues to produce a video animation of the mission, and the Deep Impact home page is being continually updated and expanded.

ASPERA-3

ASPERA-3 is one of seven scientific instruments that will fly aboard Mars

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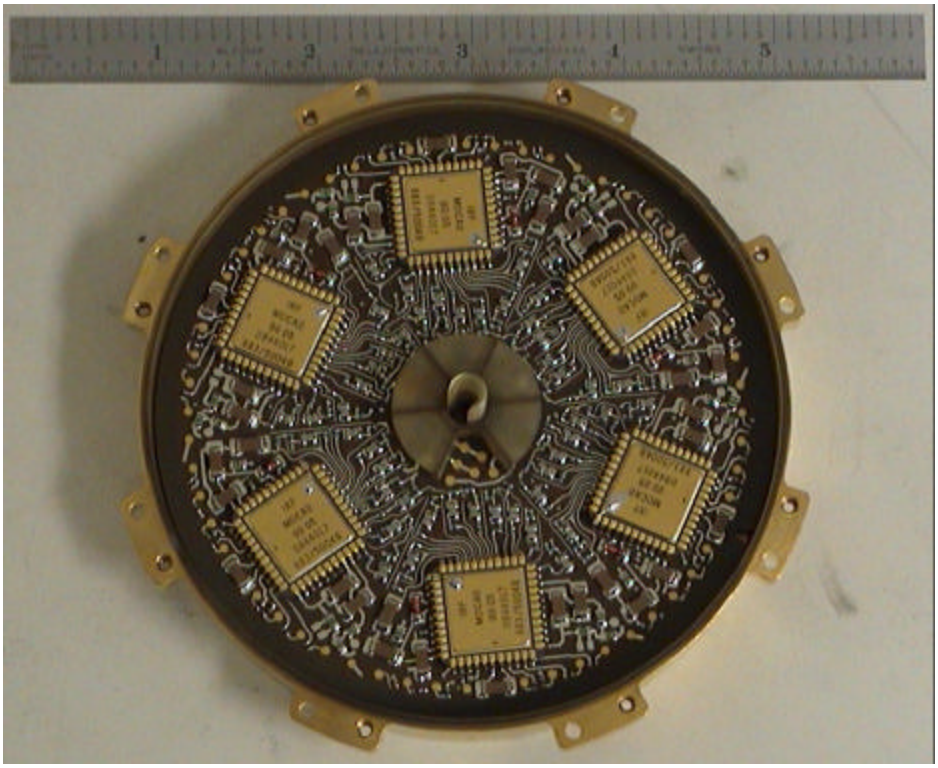
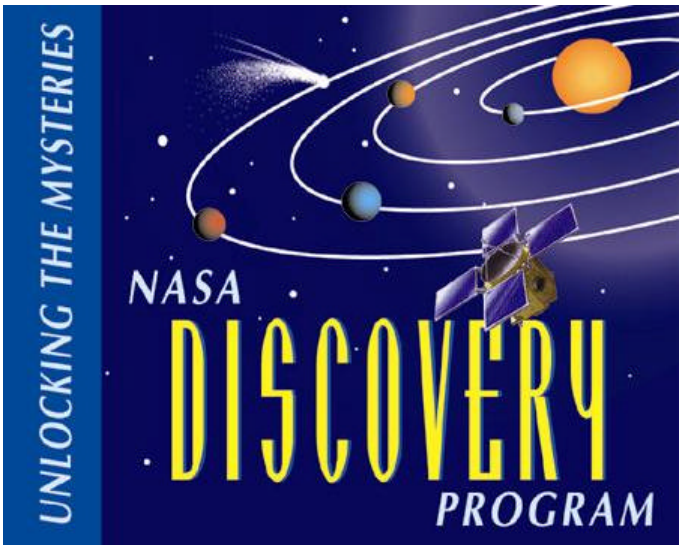
Express, a European Space Agency mission which will launch from Russia in June 2003 and arrive at Mars six months later. The main objective of the mission is to search for sub-surface water from orbit and drop a lander on the Martian surface. The scientific objectives of ASPERA-3 are to study the interaction between the solar wind and the atmosphere of Mars and to characterize the plasma and neutral gas environment in the near-Mars space.

The ASPERA-3 instrument has four sensors to gather data, along with a data processing unit and a scanning platform. Two of the sensors, the Electron Spectrometer (ELS) and the Ion Mass Analyzer (IMA) Imaging Detector, are being funded by NASA as the first Discovery Mission of Opportunity. Currently, the instrument is being assembled at Southwest Research Institute in San Antonio, Texas, and getting ready for shipment to Sweden, the location of the Principal Investigator.



ASPERA-3 has developed an innovative imaging anode board for the Ion Mass Analyzer (IMA). This board represents the densest and most complex board attempted by Southwest Research Institute to date



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