Discovery Dispatch

A Quarterly Newsletter of the NASA Discovery Program

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A Note from the Program Manager

Congratulations to David Winningham from Southwest Research Institute and his team who built two of the sensors, the Ion Mass Analyzer and Electron Spectrometer, for ASPERA-3, one of seven scientific instruments that will be onboard the European Space Agency's Mars Express spacecraft when it launches from Kazakhstan on June 2. NASA funded these sensors as the first Discovery Mission of Opportunity, part of the Discovery Program which allows U.S. scientists to participate in non-NASA missions. Best of luck to the ASPERA-3 and Mars Express teams for a successful launch and journey to the Red Planet.

Due to technical difficulties, the Deep Impact launch date has been changed. A launch window beginning December 30, 2004, will allow time for more thorough integration and testing of the spacecraft systems before launch, while still placing the spacecraft at Comet Tempel 1 to impact it as originally scheduled on July 4, 2005.

The French space agency CNES announced on April 30 that funding for the NetLander mission has been abandoned due to a funding crisis caused by a disconnect between program planning and available resources. The mission was to deploy four landers, establishing the first network of science stations on Mars. NASA's Office of Space Science was contributing to the development of three NetLander science instruments as a Discovery Mission of Opportunity. We wish JPL Principal Investigator Bruce Banerdt well in his never-ending quest to study Mars.

Dave Jarrett

ASPERA-3: Next Stop Mars

Launch is approaching for the Mars Express spacecraft which carries seven scientific instruments, including ASPERA-3, which is funded in part by NASA as a Discovery Mission of Opportunity.

Artist's conception of Mars Express at the Red Planet.

The European Space Agency's (ESA) Mars Express spacecraft was delivered to the Baikonur launch center in Kazakhstan on March 19, after a harrowing 14 hour journey aboard a Russian Antonov cargo plane carrying the spacecraft, lander, and 10 team members from France to Baikonur. Project Manager Rudi Schmidt said, "It's probably easier to fly to Mars than to get 100 tons of equipment into two planes to Baikonur!"

The spacecraft is now being prepared for a planned June 2 launch aboard a Russian Soyuz rocket. The spacecraft should reach the Red Planet six months after launch. The Beagle-2 probe will then land and search for sub-surface water and spend 180 days hunting for evidence of past life by studying soil and rocks. Seven instruments onboard the orbiting Mars Express spacecraft will perform remote sensing measurements designed to answer questions about the Martian atmosphere,

Discovery Home Page

http://discovery.nasa.gov

Inside

structure and geology. The spacecraft will provide radio relay services between Earth and other devices to be delivered to the Martian surface between 2003 and 2007.

Artist's concept of the Beagle-2 lander on Mars.

The mission's scientific objectives include searching for extraterrestrial life and subsurface water, producing very high-resolution maps of the surface and the atmospheric composition, and learning about the interaction between the Martian subsurface, the atmosphere and the interplanetary medium. Mars Express is a key element in the global Mars exploration program.

ESA approved the mission concept for Mars Express in November 1998. All 14 member nations of ESA's Science Program Committee approved the plans. The cost for the project is estimated at 150 million Euros (US$ 175 million).

You can follow the progress of the mission on the web at the BBC News Online Mars Express diary, a monthly series of reports tracking the spacecraft as it prepares for launch.

The Role of ASPERA-3

ASPERA-3 is one of the scientific instruments that will fly aboard Mars Express. 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 instrument will use a technique known as Energetic Neutral Atom (ENA) imaging to visualize the charged and neutral gas environments around Mars. ASPERA-3 will make the first ever ENA measurements at another planet. These studies will address fundamental questions directly related to the many unknowns about water on Mars.

ASPERA stands for Analyzer of Space Plasmas and Energetic Atoms. The "3" denotes that this is the third ASPERA instrument to fly to Mars. ASPERA on board the Russian Phobos 2 mission in 1988 did an excellent job. ASPERA-C on the Russian Mars-96 mission has never been heard from since it lies at the bottom of the Pacific Ocean together with the ill-fated spacecraft, due to a malfunction during the third revolution around the Earth. Investigators are looking to ASPERA's third journey to Mars to add a new piece in the Martian water puzzle.

The ASPERA-3 instrument has four sensors to gather the data, along with the data processing unit and the scanning platform. Two of the sensors, the Electron Spectrometer (ELS) and the Ion Mass Analyzer (IMA) Imaging Detector, are being funded by NASA as a Discovery Mission of Opportunity. The IMA is a separate unit connected by a cable to the ASPERA-3 experiment.

- Ion Mass Analyzer (IMA) will measure ion fluxes from all directions in the energy range from a few electron volts up to 40,000 electron volts.

- Electron Spectrometer (ELS) will make measurements of the electron fluxes in the energy range from a few electron volts up to 20,000 electron volts. This may be the smallest electron spectrometer ever built.

- Neutral Particle Imager (NPI) combined with the

- Neutral Particle Detector (NPD) will measure energetic neutral atoms (ENA) in the energy range between 100 and 10,000 electron volts, providing a complete range of data about global distribution of plasma around Mars.

Dr. Rickard Lundin of the Swedish Institute of Space Physics led the development of ASPERA-3. The ELS and IMA were built by Southwest Research Institute of San Antonio, Texas, led by David Winningham, Principal Investigator and John Scherrer, Project Manager. The ASPERA instrument is being built by a large international team of 15 groups from 10 countries.

A Discovery Mission of Opportunity is not a complete Discovery Mission, but rather one piece of a larger mission. It gives the U.S. scientific community the chance to participate in missions of non-NASA agencies by providing funding for a science instrument, hardware components of a science instrument, or expertise in critical areas of a mission.

Meet David Winningham, ASPERA's PI

David Winningham, the Principal Investigator on Discovery's ASPERA-3 sensors, was born and raised in Texas and has lived there all his life. But he is very comfortable working in collaboration with scientists at the Swedish Institute of Space Physics who are leading the development of ASPERA-3 and with their other European partners. In fact, these international connections have made his 30 year career in space physics particularly enjoyable and culturally enriching. He's made the most of the opportunities presented to him and gotten paid to have fun.

David grew in the small town of Mexia, Texas, in the 1940's. He spent much of his childhood on his grandparents cotton farm while his parents went to work in the war industries. Sports held

no interest for him, but reading did. He loved mysteries and science fiction and would read several hundred books over the summer, encouraged by the library's contests to keep students engaged. In those pre-television days the only other entertainment was listening to Buck Rogers on the windmill-powered radio and watching Rocket Man at the movies on Saturday. "As an only child living with your grandparents and no other kids nearby, I had to be creative to keep myself amused," he remembers. He also spent a lot of time picking cotton. Reading introduced him to the world outside Texas.

The real David Winningham--still a farmer at heart.

David always excelled in math, science and physics but his parents knew they couldn't afford to send him away to college. Looking ahead, his father moved the family to Bryan/College Station, TX, where Texas A & M University is located, when David was 13. That year David started delivering newspapers and earned enough over the next 5 years that he saved $3,000, enough to pay for his undergraduate college tuition. "My parents purposely made it so I was able go to college," David says, "and not just any college but one of two places where engineering and science was big in Texas at that time."

David received his B.S. in physics in 1963, then got full internships and fellowships that covered his Masters and PhD tuition. He did his PhD thesis at the new Southwest Center for Advanced Studies in Dallas from 1966-70, working under a Canadian research professor on a Canadian/American international research satellite called ISIS. He stayed on as a research faculty member until 1980 when he joined Southwest Research Institute (SWRI) in San Antonio and has been there ever since. As an Institute Scientist, he's been a principal or co-investigator on a number of NASA and foreign missions. His career has been spent building instruments and then analyzing data that explore the Sun-Earth connections.

How did he get involved with the Swedish ASPERA instrument? "At the graduate school level I learned to enjoy international cooperation and meeting different people. We were involved with the Swedes on other projects, mainly sounding rocket projects. Through those interactions they invited us to participate in the ASPERA instrument on Mars Express. The first two ASPERAS were strictly Russian and Swedish. By the time this opportunity came around, the Russian connection had gone away with the collapse of the Soviet Union so the Swedes had to look for other partners with significant resources. We were invited to participate and subsequently proposed to the Discovery Program to gain support to do that."

SWRI built two of ASPERA's sensors with a team of 15 people at its peak. What was communication like with so many foreign partners working on the instrument? David says, "It only works well if you've had the relationship that we had that led to us to being chosen. The Europeans operate much differently than in the US in terms of how things are managed. They depend much more on collegial relationships which have been established over time where it's expected that each partner does exactly what they say they're going to do. The checks and balances are more on a handshake level than the level of an agency like NASA. It doesn't work well if you haven't established a long term relationship where you know how to talk with one another, know all the lingo, and know the minimum amount of things that need to be discussed."

David stresses that the ability to run a project like this successfully is almost directly proportional to having established a long term personal and professional relationship which reduces the necessity of a lot of formal checks and balances. European space management culture is very different than the American norm. Trust among the key players is essential.

For David, the most scientifically interesting part of Mars Express is the challenge of moving out to a sister planet and using those skills you've developed over the years at Mars. "It's a refreshing change," he says, "and a new challenge where old skills can be easily used and applied. The collegial, cultural enlightenment becomes probably the best part. The science is gravy on top of that."

David's advice for young scientists and engineers: "space is a very interesting thing to spend your life at because of the challenges it presents but never get so buried that you can't stop and smell the roses. There are so many things to life other than just strictly science. Enjoy those other things and appreciate them equally." David has made the most of his career opportunities, which have sent him to Canada, Russia, Peru, all the Scandinavian countries, Germany, France, England, Italy, and Switzerland. "That's what makes life interesting," he believes, "Just engineering can be as boring as digging ditches if it doesn't have any redeeming social value. The cultural aspects, particularly in these international projects, are what make it special."

Genesis Continues Collecting Pieces of the Sun

The Genesis spacecraft is in overall good health as it continues collecting solar wind material expelled from the Sun. As of April 14, the spacecraft was about 1.473 million kilometers (9 million miles) from Earth.

Aboard Genesis are three collector arrays that are exposed to, or hidden from, the solar wind depending upon which of the three solar wind regimes is encountered. Data received by sensitive ion and electron monitors located on the spacecraft's equipment deck determines which collector array is exposed. These monitors analyze the solar wind passing by the spacecraft and relay this information to the onboard computer, which in turn selects which collector arrays to deploy and retract.

Recent solar activity has called for the 'high-solar speed' collector array to be deployed 60% of the time. The low-speed array has been deployed 26% of the time while the 'E-Array' has been unshaded only 14% of the time. The 'E-Array' is deployed when sensors on the spacecraft detect a coronal mass ejection.

In February, Genesis hit halfway mark, logging 564 days in space with 563 days remaining until Earth return. Passing through this milestone, telemetry from the spacecraft indicates that it is spinning at a rate of 1.600 rotations per minute. The spacecraft's space age gas gauge indicates propellant usage totals are 16.41 kilograms (36.17 pounds), which averages out to 1.75 grams (0.0617284 ounces) of hydrazine per day.

In January, the Genesis team was saddened by news of the death of Vern Lunsford in an avalanche in British Columbia, Canada. He was an engineer at Lockheed Martin Astronautics who designed many mechanisms on the spacecraft's sample-return capsule.

Education and Public Outreach Highlights

Genesis at NSTA
Genesis outreach team members at McREL represented the mission at the National Science Teachers Association annual convention in Philadelphia, PA, March 27-30, 2003. The new Genesis "Delivering Data" poster was a hit with teachers, as was the standing-room-only workshop: "The Data Connection: Harnessing Science Content Data for Classroom Use." The workshop previewed the upcoming data module titled *Data Analysis and Generalizations*, illustrating how real data emerging from the Genesis mission is used. A Genesis workshop titled: "Investigating Standards-based Interdisciplinary Units" provided opportunities for teachers to share ideas of successes and learning strategies in the area of integrating multiple disciplines in the science classroom.

A Timely Education Module for Teachers
The Genesis mission is in its science collection mode. If you are a teacher (or a parent who wants to share mission education information with your child's teacher) "Dynamic Design: A Collection Process" is a timely middle school module. It involves students in a data collection process using the Genesis solar wind collectors as an example. Through an active, hands-on approach, students work in production design teams to explore how the Genesis spacecraft is collecting bulk solar wind with the collector arrays. Like all modules online, all materials are available for immediate download in print-optimized format for ease of duplication.

John Ristvey from McREL leads teacher workshop at NSTA.

What Exactly Is Solar Wind?
"What IS solar wind, and why do we study it? How does solar wind affect the planets in our solar system?" The Genesis mission web site features a new module titled "Solar Wind, Genesis, and the Planets" that is divided into pages that make up a unit, or module, of solar wind study. This is the fourth unit of study on science as related to the mission.

Genesis Reaches Out To Rural Educators
Rural educators, would you like to know about upcoming rural-centered conferences, workshops and grants, education research, and news about people, information, and resources? We have a Rural E-Newsletter that highlights information for those who are interested in rural education issues. Click here to subscribe to McREL's Rural E-News.

That Man On The Screen Sure Looks Like...
Several American Trans Air (ATA) passengers on a recent flight from Chicago to Los Angeles experienced a moment of recognition when they viewed the in-flight film and recognized a fellow passenger. Genesis Mission Principal Investigator Don Burnett was seated in the cabin while onscreen, explaining the significance of the Genesis mission. Click here to meet Don and hear him talk about his role in the mission.

Stardust Operating Well on the Way to Wild 2

In mid-April, the Stardust team completed the first Comet Wild 2 encounter sequence test in the Spacecraft Test Laboratory. This testing is in support of Stardust's historic encounter with Comet Wild 2 in January of next year. The team held a science workshop on April 3- 4 at Caltech. Issues covered ran the gamut from the expected dust environment around Comet Wild 2 to the media plan for encounter.

On March 22, Stardust successfully transmitted the remaining 27 of 32 images of the Pleiades star cluster stored in the spacecraft's memory. The Pleiades images were taken by Stardust's navigation camera and are being used to evaluate performance of the spacecraft camera's periscope. Stardust's Optical Navigation and Image Science Teams report image quality to be very good.

During one of the Deep Space Network (DSN) passes in February, the DSN took the opportunity to give their new Network Simplification Plan a deep space workout. The Network Simplification Plan is an upgrade of hardware and software currently being implemented at the various Deep Space Network ground stations. The demonstration was a success.

In early February the Cometary and Interplanetary Dust Analyzer (CIDA) returned to operations. The team ran a calibration test on the instrument and found it to be operating 'as advertised.' The CIDA is a mass spectrometer that will be used to study the chemical composition of individual particulates in the comet's coma during Stardust's encounter with Comet Wild 2 in January 2004.

Education and Public Outreach Highlights

At the end of March Stardust partnered with the Deep Space Network and the JPL Asian American Committee to participate in the 2nd Annual Pasadena Cherry Blossom Festival. Stardust's new mission banners were displayed, as well as a cube of aerogel. Handouts explaining the Stardust mission were available.

Also in March, the Stardust Education and Public Outreach team participated in the Mars K-12 Education Workshop in Tempe, Arizona, and demonstrated the importance of comet modeling. Approximately 125 educators were in attendance.

The Stardust Technology Transfer team recently provided samples of aerogel to a student at Pasadena's Art Center College of Design who used it to create a three-dimensional laser-etched image of the brain. The image can be seen on the cover of the April 2003 issue of Nature Neuroscience.

Graduate industrial design student April Tsui collaborated with JPL to experiment with marrying non-traditional materials with machining and rapid prototyping methods. At Art Center since 2001, she focuses on product and environmental design. This program encourages students to explore their creative process through traditional and scientific understanding of thought and creation. Lecturers from the California Institute of Technology and JPL enrich the program with classes on the scientific foundations of brain evolution, neuroscience, and aerospace research. Her latest project is an interactive aerogel exhibition at the California Science Center in Los Angeles. Click here to see more of April's work with aerogel.

New Launch Date for Deep Impact

In early April, a new launch window was announced for Deep Impact, the first mission to look deep inside a comet. Technical and management issues, including contamination in the propulsion system and late deliveries of key spacecraft components, resulted in delays in the pre-flight testing schedule. These concerns led Principal Investigator, Mike A'Hearn, to recommend to NASA a delay of launch which was approved by NASA management.

A launch integration and window beginning December 30, 2004, provides more thorough testing for the spacecraft systems before launch and still allows the spacecraft to arrive at Comet Tempel 1 as originally scheduled on July 4, 2005.

Deep Impact is a two-part spacecraft. The 370-kg Impactor will crash into Comet P/Tempel 1 to open the interior of the comet nucleus and produce a huge crater. The crater's size is dependent on comet porosity and strength. The Flyby spacecraft will observe the impact, crater development, ejecta and final crater with visible and IR multi-spectral instruments. On-board autonomous optical navigation will be used for precise targeting and control of impactor and fly-by spacecraft.

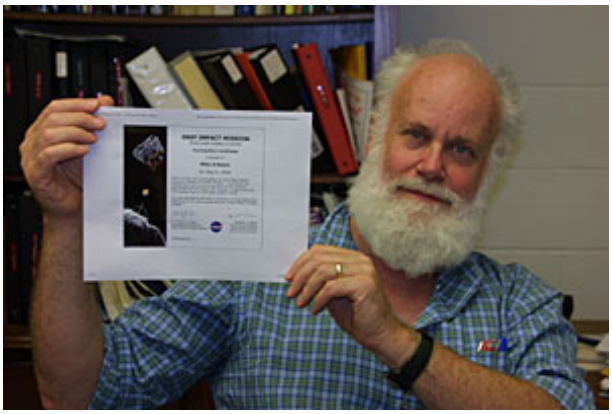
Recent accomplishments include completion of the instrument platform thermal vacuum test, the Impactor-to-Flyby spacecraft interface safe-to-mate test, and the Impactor mechanical assembly. The project delivered the re-worked Flyby prop system to integration and test and demonstrated closed loop command & telemetry between JPL and Ball Aerospace.

Education and Public Outreach Highlights

The Deep Impact engineers and scientists from all three partner institutions continue to visit classrooms across the country in their commitment to bringing exciting science and math to students. Sixty third graders and their teachers visited JPL to learn how the Deep Impact mission is being developed and built.

The outreach team is having an "impact" in the after school program system with repeated visits to L.A.'s BEST (Better Educated Students for Tomorrow), teaching students about comet science through creative stories and songs combined with the building of their own comet models.

The mission will initiate its *Send Your Name to a Comet!* campaign at the beginning of May. Names collected through the Deep Impact web site will be put on a CD and mounted to the side of the impactor so that, during encounter, those taking part will make a Deep Impact! Visit the mission's web site to sign up.



Deep Impact Principal Investigator Mike A'Hearn with "Send Your Name to a Comet" certificate #1.

A new Deep Impact activity designed by McREL was released at the National Science Teachers Association national convention for educator testing. Through the *High Power Activity: Decision Making*, students are introduced to the concept of controversy and collaborative decision-making using a real challenge from the Deep Impact mission. As a team, they must decide what considerations best meet mission objectives.

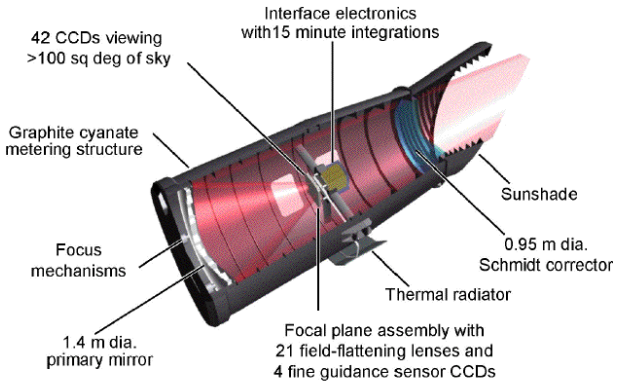
The Deep Impact mission also continues developing its relationship with Native Americans with World Hope Foundation, which is funded through a Kellogg grant. In a continuing collaboration with the GSUSA, outreach team members participated in Girl Scout Day Open House at NASA's Goddard Space Flight Center. On the west coast, eleven small Brownie Scouts of Troop 339 built comet models and will soon try their hand at making an ice cream comet. These small relational building blocks are developing a "community" that will participate in the mission's July 2005 event.

The team is developing additional collaborations with those who will be a part of the impact of Comet Tempel 1 through localized events across the country. Some Solar System Ambassadors and educators from the Solar System Educator Program (SSEP) are developing ideas for special events they would like to host during encounter. The mission's University of Maryland outreach team continues their very active participation with amateur astronomers through meetings and star events across the country preparing for Comet Tempel 1 to become observable again.

Kepler Development Underway

The Kepler mission will explore the structure and diversity of planetary systems in its quest to find planets in habitable zones. Planned for launch in 2007, Kepler's photometer will survey a large sample of stars to provide answers to a wide range of science questions about stars and planets.

Kepler is in the formulation phase, working on financial plans, schedules, and project documentation. Contracts have been executed with Ball for the photometer and flight system. Brashears was selected as the optics vendor and negotiations are now in process. The Mission Requirements Document Version 2.0 was released and the Preliminary Project Implementation Plan was completed.



Drawing of the photometer mounted on the spacecraft, which provides the power, pointing and telemetry for the photometer.

The second Ground Segment Working Group meeting was conducted at Ball. Ground Segment personnel were brought onboard to support software planning and schedule development. A ground-based photometric target study survey of the target region was initiated.

Education and Public Outreach Highlights

The Kepler E/PO program was presented as a poster in the "Exploring for Habitable Planets Beyond the Solar System" section at the NASA Astrobiology Institute General Meeting, Feb. 10-12, at Arizona State University, Tempe, AZ. Dr. Alan Dressler of the Carnegie Institution of Washington presented the first plenary lecture, "Life Beyond the Solar System: If, Where, When and How?" His talk included the value of Kepler as a predecessor to larger future planet-seeking missions.

The Kepler mission is collaborating with NASA's Sun-Earth Connections and Origins Education Forum leaders in planning for the Venus transit event of 2004. Plans include a web cast from Israel led by San Francisco's Exploratorium with participa-

tion from as many museums and science centers as possible and a widely disseminated classroom activity packet.

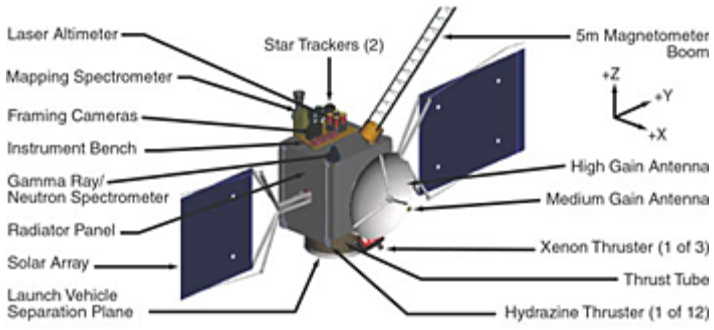
Kepler is planning for the Oct 8-11 Conference of the Alliance of Western Planetarium Associations (Pacific Planetarium Association, Rocky Mountain Planetarium Association, Southwest Association of Planetariums, and Great Plains Planetarium Association) at Clark Planetarium in Salt Lake City. Alan Gould will give a presentation about NASA's Kepler mission.

Kepler Project System Engineer Riley Duren gave a talk about the mission to about 70 very responsive fifth graders. According to Riley, "Ten of them even ditched recess to hang around afterwards and ask more questions."

Dawn Continues Development

The Dawn mission is a quest to understand the conditions and processes during the earliest history of our solar system by orbiting both Vesta and Ceres, two of the largest asteroids in the Solar System. The mission plan is to conduct 11 months of observation at each asteroid using six science instruments.

Recent accomplishments include completion of preliminary Memorandum of Agreement negotiations with instrument providers; submittal of a Planetary Protection categorization request letter to NASA's Office of Space Science; completion of the first round of "scenarios walkthroughs" for all mission phases; selection of Carleton as the Xe tank vendor; a decision to build the Digital Control Interface Unit (DCIU) and gimbal drive electronics in-house, after a make-or-buy trade study was completed, to take advantage of JPL's experience on Deep Space 1. The project delivered drafts of 7 required documents.



Dawn spacecraft diagram.

Near-term plans include conducting the Project Mission and System Review, forming a tiger team to work a power margin problem, receiving a formal proposal for long lead procurements from Orbital, completing the make/buy trade on ion propulsion system gimbals, and conducting a peer review of Dawn's mission assurance program.

Education and Public Outreach Highlights

Dawn's E/PO program began to staff up in the first quarter of this year. Team members include Lucy McFadden at the University of Maryland, Joe Wise at New Roads School in Santa Monica, CA, and Jacinta Behne and John Ristvey at Mid-Continent Research for Education and Learning (McREL) in Aurora, CO. Other participants are at NASA Ames Research Center (Bob Kanefsky, Clickworkers) and New Mexico (Horton Newsom and Find a Meteorite).

At McREL's booth at the National Science Teachers Association national convention in March in Philadelphia, Jacinta and John handed out Dawn fact sheets and began telling teachers about Dawn's mission to the asteroid frontier.

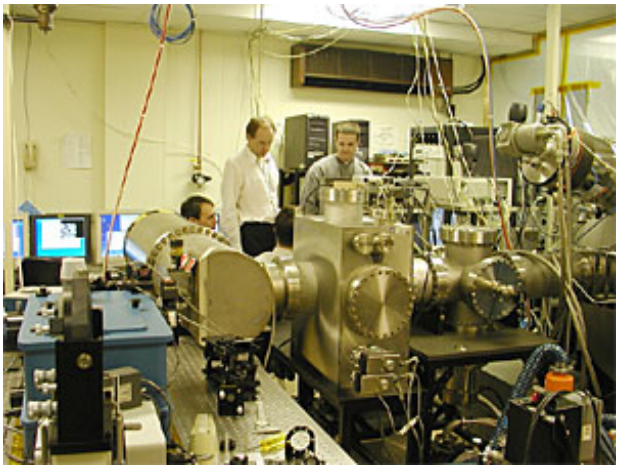
MESSENGER Facing Challenges One Year from Launch

Schedule is MESSENGER's primary concern. The project is on track for launch but the schedule is very tight. Also unplanned labor requirements in a number of areas have resulted in cost increases. Both of these concerns are bringing about intensified oversight at all levels.

During March, there were no changes to design or mission requirements. Formal initiation of Integration and Test (I&T) began on March 10. Hardware delivered in March included the star trackers, solar array drives and electronics, radio frequency switch assembly, low-gain antennas, and the sunshade frame. The subcontract for the heat pipes, the last major subcontract for the project, was finalized in March.

Science Team members continue to meet regularly with lead system and instrument engineers to clarify scientific issues regarding spacecraft design and fabrication. Weekly meetings of instrument leads continued to guide the development of MESSENGER payload instruments.

Science Team work in March focused on calibration of MESSENGER instruments, following the procedures documented in the individual calibration plans. Instruments in calibration during March included the Mercury Atmospheric and Surface Composition Spectrometer (MASCS), the Fast Imaging Plasma Spectrometer (FIPS) sensor of the Energetic Particle and Plasma Spectrometer (EPPS) instrument, and the X-Ray Spectrometer (XRS). Other instruments will undergo calibration in April after hardware fabrication has been completed.



The Mercury Dual Imaging System (MDIS) in the calibration facility.

Education and Public Outreach Highlights

Preparation of MESSENGER Education Modules (MEMs) continued in March. Betsy Miller and Harri Vanhala from the Challenger Center for Space Science Education (CCSSE) finished the first drafts of two lessons in the Staying Cool unit: "Sensing the Invisible – the Herschel Experiment" (middle school) and "Star Power! Discovering the Power of Sunlight" (high school). Work also continued on the remaining unfinished lessons of the unit.

Julie Edmonds from the Carnegie Academy for Science Education (CASE) and Rick Shope from JPL continued to work on the "Ice in the Solar System" curriculum for the MEMs. Final drafts for three of the eight instructional strands are being reviewed. The remaining sections should be completed by the end of April.

On March 27, Julie Edmonds presented a workshop at the National Science Teachers Association national convention in Philadelphia where the MESSENGER project was discussed and posters distributed. Participants were presented with a design challenge in a format similar to that to be used in MEM challenges.

In her role as MESSENGER Educator Fellowship Coordinator, Lizzie Taylor (CCSSE) worked during March on processing the incoming applications for the Fellowship Program, fielding questions and concerns from potential applicants, preparing the application packages for review, and conducting research for the upcoming workshop in June. There have been 139 Fellowship application requests, and a total of 27 application packages were received as of the end of March. The selection of Fellows and a planning meeting for the workshop will take place in April.

In March, the PI and several Science Team members prepared presentations to be made at the Joint Assembly of the European Geophysical Society, American Geophysical Union, and European Union of Geosciences in Nice, France, in April.

Discovery Dispatch

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