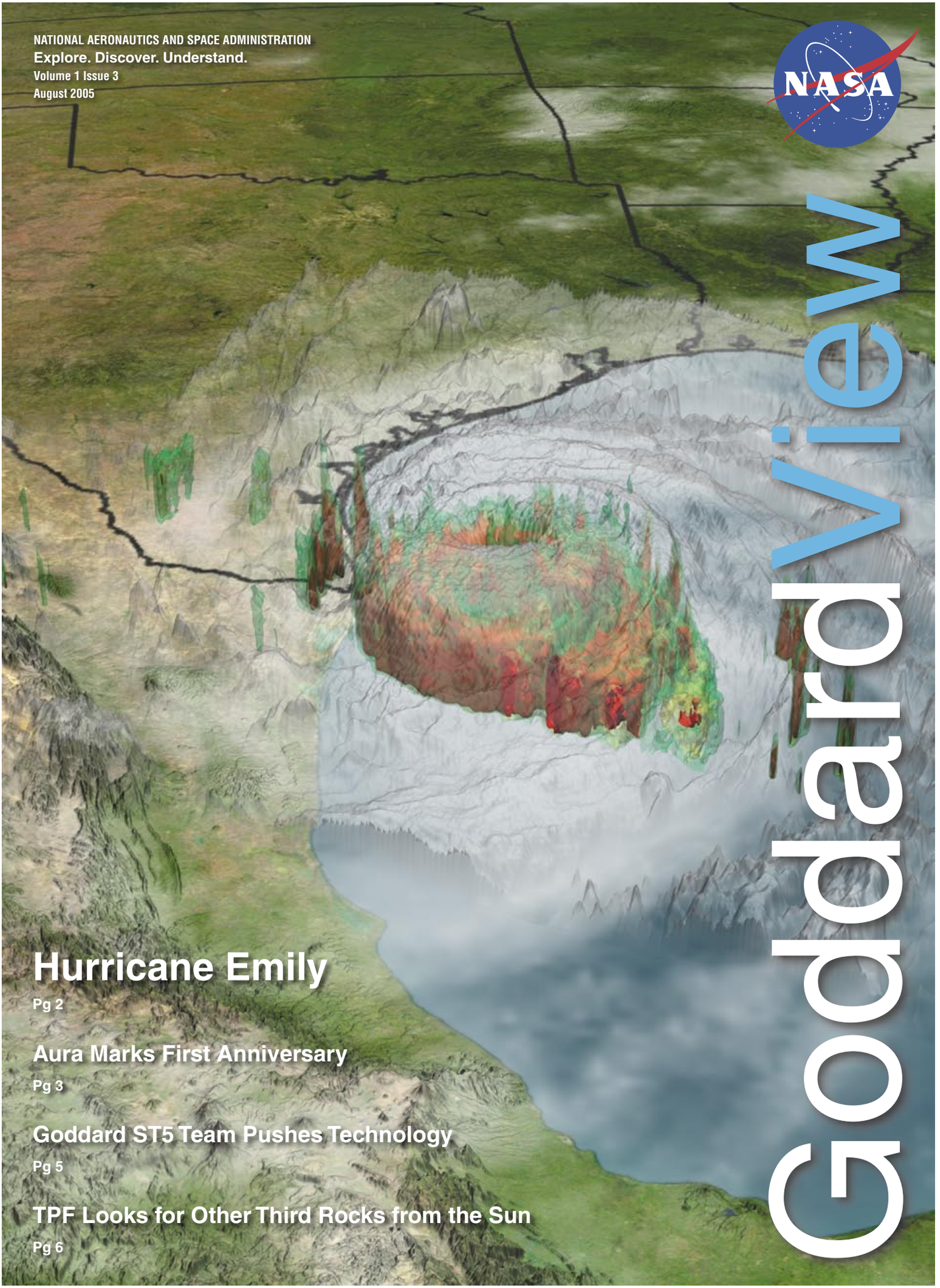
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
Explore. Discover. Understand.
Volume 1 Issue 3
August 2005

Goddard View

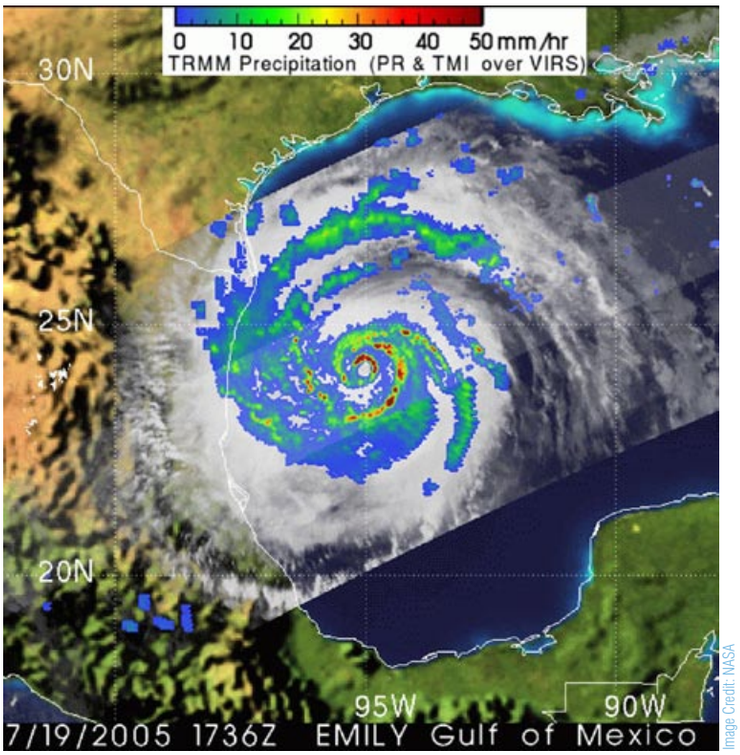


Emily Makes Landfall in Mexico

By Steve Lang

With the arrival of Hurricane Emily, in the month of July, the 2005 hurricane season is off to an unbelievably fast start. Already the record fifth named storm of the season, Emily made landfall in Mexico as a major hurricane two separate times: first in the Yucatan Peninsula as a Category 4 storm and now again in Tamaulipas along the northeast coast south of the Texas border as a Category 3 storm.

Emily became a tropical depression in the early morning hours of July 11 in the central Atlantic well east of the Lesser Antilles and west of the Cape Verde Islands. Storms that form in this region are known as Cape Verde storms and typically do not form here until later in the season. However, water temperatures are warmer in the Atlantic this year. Emily continued to move westward towards the windwards islands and became a tropical storm 24 hours later on the morning of July 12.



TRMM captured this image of Emily (above) at 17:36 UTC (12:36 pm CDT) on July 19 in the western Gulf of Mexico as Emily was in the process of re-strengthening.

The Tropical Rainfall Measuring Mission (TRMM) satellite has been following the progress of Emily. TRMM was launched in November 1997 to measure rainfall over the global tropics and has proven to be a valuable platform for observing tropical cyclones. TRMM is a joint mission between NASA and the Japanese space agency JAXA.

For more information, visit:
http://www.nasa.gov/vision/earth/lookingatearth/emily_trmm_july.html ■

Table of Contents

Cover: Image of Hurricane Emily taken on 7/20/2005 from TRMM/VIRS,TRMM/PR, and GOES data.
Image Credit: NASA

GoddardView Info

Goddard View is an official publication of the Goddard Space Flight Center. It is published bi-weekly by the Office of Public Affairs in the interest of Goddard employees, contractors, and retirees. Its circulation is approximately 11,500.

Managing Editor Trusilla Steele
Editor Alana Little

Deadlines: News items and brief announcements for publication in the Goddard View must be received by noon of the 1st and 3rd Wednesday of the month. You may submit contributions to the editor via e-mail at alittle@pop100.gsfc.nasa.gov. Ideas for new stories are welcome but will be published as space allows. All submissions are subject to editing.

TOMS at the Smithsonian

By Cynthia O'Carroll

Scientists in Goddard's Atmospheric Chemistry and Dynamics Branch are readying the engineering model of the Total Ozone Mapping Spectrometer (TOMS) for display at the Smithsonian's National Museum of Natural History in Washington, DC. The TOMS model will be part of a larger exhibit featuring atmospheric chemistry and the Aura mission, with an anticipated opening of late October 2005.

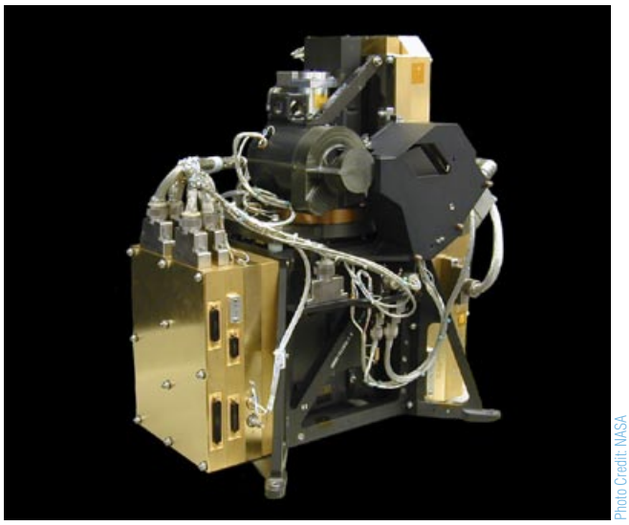


Photo Credit: NASA

TOMS model

The permanent exhibit, "Change is in the Air," will explore the interactions between atmospheric chemistry and climate, emphasizing ozone trends in the stratosphere and the effects of degrading air quality on the environment and the controlling physical processes. The exhibit will also demonstrate the differences between our neighboring planets and why Earth is capable of supporting life. Results from TOMS and Aura will be featured illustrating how the Earth's environment can be studied from space. The TOMS Engineering Model and a 1/8-scale model of the Aura spacecraft will be included in the permanent display.

"Exhibiting the TOMS instrument at the Smithsonian will be a great opportunity to demonstrate NASA's capabilities for observing the atmosphere and tracking environmental change," stated Dr. Ernest Hilsenrath, the Aura deputy project manager at NASA's Goddard Space Flight Center.
"I grew up in Washington, DC, and I spent many hours at the Smithsonian visiting the exhibits," remarked Hilsenrath. "My career in science was inspired by these visits and I am very proud to bring NASA science to a new generation of explorers."

The TOMS model is a test version of the instruments that have flown in space on NASA, Russian, and Japanese satellites to map global ozone. The TOMS instrument consists of a spectrometer that measures the amount of ozone in the atmosphere. The spectrometer observes sunlight reflected from the Earth's surface and atmosphere at an ultraviolet wavelength that is strongly absorbed by ozone. This information is then compared to measurements at another wavelength where absorption by ozone is weak.

Continued on Pg 6

Aura Marks First Anniversary

By Lynn Chandler

Aura, the latest Earth-observing satellite successfully completed its first year on orbit. NASA launched Aura on July 15, 2004 from Vandenberg Air Force Base, Calif. on a mission to study the Earth's ozone, air quality and climate.

Since its launch, Aura has provided scientists with global observations of the Earth's atmosphere including measurements of unusual ozone-depleting conditions over the Arctic and measurements of sulfur dioxide following volcanic eruptions in New Guinea. Aura's instruments work synergistically to provide a complete picture of the composition of the Earth's atmosphere, from the troposphere, where mankind lives, through the stratosphere, where the ozone layer protects life on Earth. "I predict Aura's data will have a profound influence on how we view and protect the environment," said Ernest Hilsenrath, deputy project scientist for Aura.

Aura helps answer three key scientific questions: Is the Earth's protective ozone layer recovering? What are the processes controlling air quality? How is the Earth's climate changing? Scientists are using Aura's data to study how the composition of the atmosphere affects and responds to Earth's changing climate. Mission results help scientists better understand the processes that connect local and global air quality.

Four instruments make up Aura's Earth Observing platform. The instruments survey different aspects of Earth's atmosphere from the troposphere through the stratosphere. Aura's four instruments include: the High Resolution Dynamics Limb Sounder (HIRDLS); the Microwave Limb Sounder (MLS); the Ozone Monitoring Instrument (OMI); and the Tropospheric Emission Spectrometer (TES).

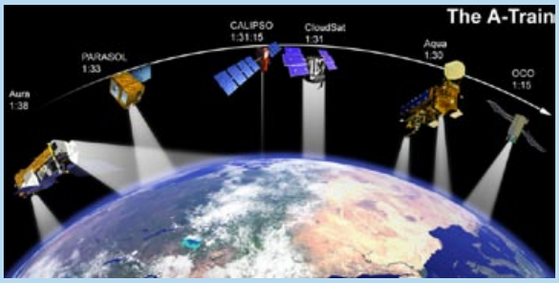


Image Credit: NASA

Aura orbits the Earth among a constellation of Earth Observing Satellites.

International partners make Aura a great example of teamwork. The United Kingdom and the United States built the HIRDLS. The Netherlands and Finland in collaboration with NASA built the OMI. The TES and MLS was constructed by JPL and Goddard managed the Aura project. Aura completes the first series of NASA's Earth-Observing System satellite. The other satellites are Terra, which monitors land, and Aqua, which observes Earth's water cycle.

Aura flies with the "A-Train," a constellation of Earth-observing satellites flying in formation. The constellation of six satellites will be complete by 2008. Each satellite has an independent science mission, however these complementary satellite observations will enable scientists to develop a more comprehensive picture of atmospheric processes than they could by using the observations of a single satellite instrument. ■

Goddard Technologists to Lead Three ST9 Concept Definition Studies

By Lori Keesey

Three Goddard technologists will lead year-long concept studies to define space experiments that demonstrate and validate advanced technology for future science missions.

The effort is a part of the New Millennium Program's Space Technology-9 (ST9) project, which is testing system-level technologies in five technical concept areas. By the end of August 2006, the teams will submit study reports describing a technology-validation experiment and its rationale, a development schedule, and cost plan. The Science Mission Directorate will then evaluate the proposals to select the concept area that will proceed into "formulation refinement" as the ST9 mission. A flight is scheduled for 2010.

The concept areas to be led by Goddard technologists include system technologies for solar sails (Tim Van Sant, Code 460), precision formation flying (Jesse Leitner, Code 591), and large space telescopes (Chris Schwartz, Code 502). Technologists from the Jet Propulsion Laboratory (JPL), meanwhile, will lead similar efforts for a terrain-guided automatic landing system for spacecraft and an aerocapture system technology for planetary exploration.
Joining all five team leads are 11 recently selected technology providers who will conduct studies and gather data needed to support the proposals. The technology providers represent both NASA Centers and private industry. A kick-off meeting is scheduled for late August. After that point, Van Sant, Leitner, and Schwartz said they are allowed to begin their studies.

Solar Sail Technology

In the area of solar sails, Van Sant will work with L'Garde, Inc. of Tustin, Calif., studying a flight experiment that would deploy and operate a steerable solar sail. Solar sails are made of very thin, reflective membranes (about 1/50th of the thickness of a human hair). They are deployed and supported by ultra-lightweight booms or masts. The reflective membrane exchanges momentum with reflected solar light, providing a small but continuous force that can accelerate a spacecraft through space—without the use of fuel. Solar photon pressure provides enough thrust to allow a spacecraft to hover at a fixed point in space or to change its orbital inclination—moves that would require prohibitive amounts of fuel for conventional propulsion systems.
In addition, Van Sant said the concept shows great promise in placing spacecraft in otherwise inaccessible orbits and has advanced well beyond mere concept and the limited ground tests of the past.

Solar Sail technology would be ideal for three possible missions: Heliostorm, which would alert scientists of solar storms that could wreak havoc on Earth-based communication systems; the Solar-Polar Imager, which could potentially be the first mission to image the Sun's polar regions; and the Interstellar Probe, which would travel well beyond the influence of the Sun into interstellar space.

Continued on Pg 12

STS-114 Update

Photo Credit: NASA

Not since 2002 have nine space travelers shared space simultaneously on the International Space Station. At least not until the morning of July 28, when astronaut Eileen M. Collins led her Discovery crew onboard the orbital outpost. Collins gives a wave from upper right. Clockwise from her position are astronaut Charles J. Camarda, Japanese Aerospace Agency astronaut Soichi Noguchi and Wendy Lawrence, all STS-114 mission specialists; cosmonaut Sergei Krikalev, Expedition 11 commander; astronaut James M. Kelly, Discovery pilot; astronaut Andrew S.W. Thomas, STS-114 mission specialist; and astronaut John L. Phillips, NASA Space Station Science Officer and flight engineer for Expedition 11. Astronaut Stephen K. Robinson, STS-114 mission specialist, took the photo with a digital still camera.

Photo Credit: NASA

Spacewalker Steve Robinson has successfully removed two gap fillers protruding from Discovery's heat shield during an unprecedented trip to the Shuttle's underside. During this test flight, Commander Eileen Collins and her STS-114 crewmates are re-supplying the International Space Station and trying out new techniques and equipment designed to make Shuttles safer.

Photo Credit: NASA

Less than 24 hours away from performing a spacewalk, when he will be exchanging this gag hardhat for the helmet portion of a spacesuit, astronaut Steve Robinson shares some light humor with his fellow crewmembers.

Goddard ST5 Team Pushes Technology

By Nancy Leon and Lynn Chandler

Have you ever noticed how some things just keep getting smaller and smaller? Take for example, our cell phones or personal computers. Just a few years ago it would have been impossible to conveniently tuck a cell phone away in a pocket or carry around a computer that weighs less than 5 lbs. Well, Goddard's Space Technology-5 (ST5) Project/Code 495 is building and testing that miniaturization concept with three small satellites.

Photo Credit: Candace Carlisle

Test deployment of one of the three ST5 spacecraft. The other two spacecrafts are still mounted to the Pegasus Support Structure.

These satellites, also known as micro-sats, will test and validate new technologies and aid scientists in understanding the harsh environment of the Earth's magnetosphere. Building and testing of all three micro-sats is underway in the Building 29 complex.

The first of the three micro-sats has successfully completed all environmental testing and is supporting operational training. Environmental testing of micro-sat two and three is under way with thermal vacuum testing scheduled to begin in August.

Miniaturized components and technologies are being integrated into each of the micro-sats. Each micro-sat weighs approximately 25 kilograms (55 pounds) when fully fueled and resemble a very large birthday cake at 53 centimeters (20.7 inches) across and 48 centimeters (18.7 inches) high. The three ST5 spacecraft will be launched using a Pegasus XL rocket and spun into a near-Earth polar elliptical orbit approximately 300 kilometers (190 miles) X 4,500 kilometers (2,800 miles). On schedule to launch from Vandenberg Air Force Base (VAFB) in late February 2006, ST5 has a mission duration of 90 days. "We are at a very exciting phase of the project with all three spacecraft assembled and under test. The entire ST5 team is looking forward to launch," said Doug McLennan, ST5 Project Manager.

Although small in size compared to their counterparts, each of these satellites is considered "full service," meaning they contain avionics with capabilities comparable to what is seen on spacecraft that are much larger. Each ST5 micro-sat will validate New Millennium Program (NMP) technologies such as the Cold Gas Mirco-Thruster (CGMT), X-Band Transponder Communication System, Variable Emittance Coatings for Thermal Control, and CMOS Ultra-Low Power Radiation Tolerant (CULPRiT) Logic.

Another feature resulting from the miniaturized size and reduced weight of the satellites is the ability to launch multiple micro-sats from a low-cost Pegasus XL rocket. The ST5 Project designed, fabricated, and tested a new innovative Pegasus launch rack that supports three micro-sats in a "stacked" configuration. By utilizing this type of multi-rack design, each micro-sat will be individually deployed in a spinning (Frisbee-like) motion.

After deployment, each of the micro-sats will be positioned in a "string of pearls" constellation that demonstrates the ability to spatially configure each micro-sat to perform simultaneous multi-point measurements of the magnetic field using a highly sensitive magnetometer. Using data collected from the ST5 constellation, scientists can begin to understand and map the intensity and direction of the magnetic field, its relation to space weather events, and the effects on our planet. With the help of pathfinder missions such as ST5, NASA hopes that in the future, scientists will be able to accurately forecast space weather and thereby minimize its harmful effects on space and ground based systems.

The ST5 Project is an instrumental part of NMP. NMP was created to identify, develop, build, and test innovative technologies and concepts for infusion into future missions. To determine the future capabilities needed, NMP is guided by NASA's Earth and Space Science "roadmaps." These roadmaps lay out the path of future scientific inquiry. They serve not only as a vital guide for NMP's selection of technologies, but are used to conceive and design the program's test missions as well.

Small, inexpensive, yet highly capable micro-sats are instrumental in the validation of new miniaturized components that will help pave the way for flying tens to hundreds of micro-sats in future missions.

For more information on ST5, visit: http://nmp.jpl.nasa.gov/st5/
For educational activities, visit: http://spaceplace.nasa.gov ■

TPF Looks for Other Third Rocks from the Sun

By Amy Pruett

If there is life outside of our solar system, the Terrestrial Planet Finder (TPF) equipped with instruments designed by Goddard scientists and engineers will find it. Since the unveiling of President Bush's Vision for Space Exploration in January 2004, NASA centers have been pursuing the goal of exploring the Earth, Moon, Mars, and Beyond with renewed spirit. One of Goddard's most recent contributions to the vision is the selection of Goddard Principal Investigator proposals from members of the Exoplanets and Stellar Astrophysics Lab (Code 667) for two six-month instrument concept studies for the Terrestrial Planet Finder-Coronograph (TPF-C).

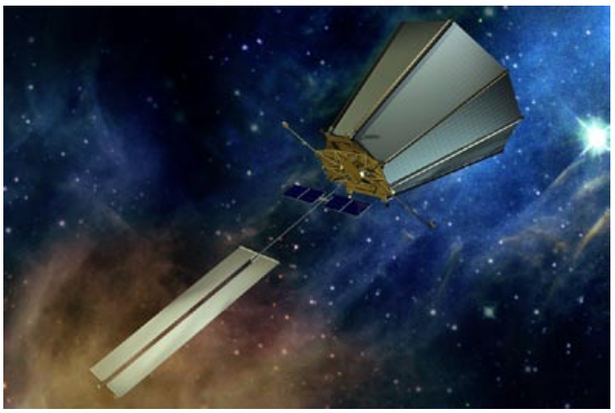


Image Credit: NASA

Terrestrial Planet Finder comprises two complementary observatories: a visible-light coronagraph (above), to launch around 2014, and a formation-flying infrared interferometer, to launch before 2020.

The TPF-C mission consists of an optical telescope with a coronagraph that blocks out light from the target star, enabling a search of the surrounding area without the star's rays getting in the way. TPF-C's mission, slated to start as early as 2015, will be to study planets orbiting stars up to 45 light-years away to find out if any are like the Earth, i.e. having a similar size, surface temperature, and composition.

The scientific instruments that Goddard scientists and engineers will design will look for specific elements that appear to be essential for life to exist. Each planet will be examined for the presence of liquid water and oxygen molecules on the surface of the planets or the atmosphere. Evidence for oxygen molecules. These elements will be a good indication that the planet is habitable.

Two Goddard proposals were recently selected for instrument concept studies for the TPF mission. Leading the two teams are Sally Heap, the Principal Investigator for the Coronagraphic Spectrograph and Mark Clampin, Principal Investigator for the Coronagraphic Camera. The coronagraphic spectrograph will obtain and record astronomical spectra and the coronagraphic camera will take pictures of exosolar systems, including terrestrial planets, gas giant planets, and dust.

"Goddard scientists and engineers have the opportunity with the TPF to put Goddard at the forefront of exciting technological challenges. It will give us an opportunity to obtain a leadership role in subsequent missions of exploration," says Clampin.

TPF is the only astrophysics mission presented in President Bush's Vision for Space Exploration. Managed by the Jet Propulsion Laboratory of the California Institute of Technology, and funded by NASA's Origins program, it was first proposed in May of 1999. An Announcement of Opportunity for TPF-C is not expected until 2006.

For more information, visit:
http://planetquest.jpl.nasa.gov/TPF/tpf_index.html ■

TOMS at the Smithsonian

Continued from pg 3

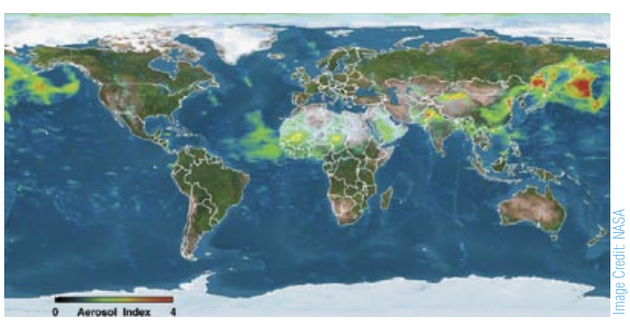


Image Credit: NASA

Aerosols affect climate both directly by reflecting and absorbing sunlight and indirectly by modifying clouds. The TOMS aerosol index is an indicator of smoke and dust absorption. The image shows aerosols crossing the Atlantic and Pacific oceans. Dust from the Sahara desert is carried westward toward the Americas. Asian dust and pollution travel to the Pacific Northwest.

The ozone layer protects life on earth from the damaging effects of ultraviolet radiation. Scientists believe that a group of industrial chemicals known as chlorofluorocarbons (CFCs), commonly used in air-conditioners, are responsible for the world-wide thinning of the ozone layer that has occurred in the last two decades, most prominently in the polar regions of the world. Maps of the Antarctica ozone hole produced by TOMS played a key role in the initiation of a successful global effort in the late 80's to ban the production of CFCs.

High quality global maps of ozone produced by TOMS, and other instruments that use similar measurement techniques, started in 1970 and continue today. Continuation of this data is made possible by an advanced instrument built by the Netherlands, called the Ozone Monitoring Instrument (OMI) that is flying on NASA's Aura satellite. The next generation of meteorological satellites currently being developed in the United States and Europe will have similar instruments that will continue monitoring the health of our ozone layer in the decades ahead.

For more about the TOMS instrument, visit: http://toms.gsfc.nasa/gov ■

Goddard Hosts 21st Annual Rocket Contest

By Alan Williams

The NASA Goddard Visitor Center held its 21st annual Apollo Model Rocket Contest on Sunday, July 17, 2005. The goal of the event was to honor the 36th anniversary of the Apollo 11 mission and to inspire a new generation of explorers, demonstrate the rocketry fundamentals we use at Goddard, and of course, to have some fun!

Visitor Center (VC) staffers and the NARHAMS rocket club turned the west lawn of the VC into a miniature Atlantic Missile Range. About 225 people gathered to watch as 35 rocketeers flew their rockets throughout the day. The contestants were challenged to recreate two important aspects of the Apollo 11 mission; the climb to the Moon, and the precision landing skill of the crew. All used the same low power (2.5 Newton seconds) solid rocket motors.

The altitude flights were tracked optically from a measured 400ft baseline to the east of the Delta rocket. Tracking accuracy was excellent, with less than a one percent average error. The winning rocket flew over 450ft in the air.

During lunch, VC staffers flew two scale models of the Saturn 5 Moon rocket, one only five inches tall. The crowd cheered as Goddard contractor Robert Edmunds flew a radio controlled boost glider kit produced by his own company.

The second event involved spot landing. Fliers tried to land their models closest to a stake in the center of a 100ft circle while the rockets drifted down on parachutes or streamers. The rockets flew from a launcher only 75ft from the circle's edge, but shifting winds made that stake an elusive target. One of our junior spacemen, complete with orange jumpsuit, beat everyone with a distance of just 6ft from the pin!

The rocket launch event was followed by a discussion in the VC auditorium. The discussion centered on the Apollo Mission, what it accomplished, and Goddard's role in the future of space exploration. Trophies were awarded for all flyers that did better than 4th place.

Photo Credit: Chris Gunn

Michael Hugh and his son's Jeeven and Daevin Hugh participate in the spot landing portion of the event.

BIG Reaches to Teach

By Trusilla Steele

Becoming "Engaged in Education" is of the mission adopted by the NASA/Goddard Space Flight Center chapter of Blacks In Government (BIG). This Region 11 chapter of BIG held their annual scholarship dinner in May at the Goddard Barney and Bea Recreational Center in support of NASA's goals of increasing participation of minority students in the fields of science, engineering, mathematics, and technology.

U.S. Representative Albert Wynn, D-Md said, "If a child doesn't perform well (in school), they will be in your communities unemployed." In his speech, Congressman Wynn explained how gaining an appreciation for education encourages the need to learn and to succeed. In fact, it was Wynn's grandfather's constant inquiries of his teachers and sustained interest in his education that gave him the incentive to do well in school.

Wynn realizes that every child is not college bond, but stresses the importance of parents and responsible adults guiding their children through their education so they can gain the expertise they need to be successful in life.

A total of $2,250 in scholarship awards were given to three local college students. To win the award students were required to write an essay. The top three essayists were chosen for the award. BIG Chapter President, Merle Robbins read each of the dynamic winning essays, one of which conveyed how a student was inspired to gain higher education after being falsely arrested. NASA/Goddard Space Flight Center, Deputy Director, Chris Scolese who was present for the event, stated that the essays were "very impressive."

Blacks In Government, was organized in 1975 and incorporated as a non-profit organization under the jurisdiction of the District of Columbia in 1976. BIG has been a national response to the need for African Americans in public service to organize around issues of mutual concern and use their collective strength to confront workplace and community issues. BIG's goals are to promote equity in all aspects of American life, excellence in public service, and opportunity for all Americans.

The BIG NASA/GSFC Chapter's theme is "each one reach one, each one teach one," which is exemplified as they continue to give numerous scholarship awards and support various local community activities.

For more information about the BIG NASA/GSFC Chapter, contact one of the BIG Officers by visiting the GEWA site at: http://gewa.gsfc.nasa.gov/ ■

Photo Credit: Chris Gunn

From left: Goddard Deputy Director, Chris Scolese; BIG NASA/GSFC Chapter President, Merle Robbins; Congressman Albert Wynn (holding appreciation plaque), and BIG NASA/GSFC Chapter Treasurer, Larry Phillips

SAA and Nanotech Facilities

By Nancy Pekar

Goddard recently signed a Space Act Agreement (SAA) that provides access to cutting-edge nanotechnology facilities at Lehigh University in Bethlehem, PA. Under the SAA, researchers can experiment with Lehigh's new aberration-corrected transmission electron microscope (TEM) without ever leaving Greenbelt.

With 0.1-nm resolution, Lehigh's JEOL TEM enables scientists to image and chemically analyze individual columns of atoms in crystalline materials, allowing the specimen's elemental composition to be fully understood.

Perhaps more importantly, Lehigh's JEOL TEM also can be operated remotely. Other than loading the specimen, everything—setting the apertures, controlling the alignment and acquiring data—can be done remotely.

Remote microscopy is more viable now than in the past, thanks to better software and Internet 2, (a nonprofit consortium developing and deploying advanced network applications and technologies, mostly for high-speed data transfer).

Goddard's lead nanotechnology researcher, Dan Powell plans to establish an operation interface to Lehigh's instrument. Once that interface is established, Goddard researchers have up to 100 hours of JEOL TEM time, which will allow them to begin to demonstrate the potential for space-based remote microscopy, which could be used in future missions.

"This kind of real-time remote access to cutting-edge equipment minimizes NASA's infrastructure costs while allowing us to establish an ongoing relationship with Lehigh," said Powell.

The SAA also involves a project, led by Michael Beamesderfer, to study the properties and mechanics of thin films that might be used in the James Webb Space Telescope's Near Infrared Spectrograph (NIRSpec), as well as a project to test miniaturized low-leakage valves for use in mass spectrometers and other science instruments, which is being led by Brian Jamieson.

For more information about accessing the JEOL TEM, contact Dan Powell x6-0428. For more information about this SAA, contact OTT's Ted Mecum x6-2198.

Proposal Opportunities

NASA Research Announcements (NRA)

Discovery (Pending Release)
LWSRBSP (Pending Release)
ESSP (Pending Release)

For more information please visit https://nspires.nasaprs.com

Research Opportunities in Space and Earth Science (ROSES)

NASA Energy and Water Cycle Study
NOI: 8/18/2005
Proposal Due Date: 10/5/2005

Land Cover/Land Use Change
Proposal Due Date: 8/1/2005 (Step 2)

Remote Sensing Science for Carbon and Climate
Proposal Due Date: 8/3/2005

Astrobiology: Exobiology and Evolutionary Biology
Proposal Due Date: 8/5/2005

Planetary Protection Research
Proposal Due Date: 8/5/2005

Mars Data Analysis
Proposal Due Date: 8/12/2005

New Investigator Program in Earth-Sun System Science
Proposal Due Date: 8/31/2005

2001 Mars Odyssey Participating Scientists
Proposal Due Date: 9/1/2005

Living with a Star/CEDAR Collaborative Studies with C/NOFS
Proposal Due Date: 9/9/2005

Terrestrial Ecology and Biodiversity
Proposal Due Date: 9/12/02005

FUSE Guest Instigator/Cycle 7
NOI: 9/16/2005
Proposal Due Date: 9/16/2005

Planetary Instrument Definition and Development
Proposal Due Date: 9/16/2005

For more information contact the New Opportunities Office
x6-5442

Discovery Launch Day Activities at the Goddard VC

Photo Credit: Debora McCallum

Goddard Technologists to Lead Three ST9 Concept Definition Studies

Continued from pg 3

Formation Flying

Leitner, a renowned expert in formation flying, will work with two JPL researchers and one from Arizona-based General Dynamics Decision Systems, to study technologies that will continuously and collaboratively control multiple spacecraft flying in formation. In particular, Leitner's team will examine advanced inter-satellite communication and sensor technologies.

Formation flying offers the scientific community many orders-of-magnitude improvement in angular resolution over the current state-of-the-art technology. With this technique, scientists would be able to image black holes and planets in other solar systems by flying many spacecraft in close collaboration and tight control to effectively create a distributed segmented telescope or interferometer.

According to Leitner, the technology is ideal for the Magnetospheric Multi-Scale Mission, the Terrestrial Planet Finder-Interferometer, the Stellar Imager, MAXIM, the Solar Imaging Radio Array, and the Submillimeter Probe of the Evolution of the Cosmic Structure.

Large Telescopes

Working with researchers from Northrop Grumman Space Technology, Lockheed Martin Space Systems, and systems engineers from Goddard and JPL, Schwartz will examine the technologies required to build large, deployable, actively cooled sunshields and cryogenically cooled telescopes—technologies that are critical for detecting and analyzing the composition of planets in orbit around nearby stars, and studying the formation of the first galaxies and the birth of stars and planetary systems.

From the study, Schwartz and his team will create a plan to develop a fully instrumented, cryogenically cooled, engineering model of a telescope that will be cooled to temperatures as low as –452 Fahrenheit (4 Kelvin). If the directorate chooses the proposal to proceed, Goddard and JPL systems engineers will develop predictive models, which the ST9 flight will validate.

Modeling is a very important aspect of the study, Schwartz added. It will pull together all the data and allow mission planners to develop future cryogenically cooled missions, like Single Aperture Far-Infrared Observatory (SAFIR) and the Cosmic Background Polarization (CMBPol) experiment. "We take data and feed it into our models to predict what telescopes will do under specific conditions, which is important in the development of any large telescope system," he said. ■

Employee Spotlight

Sally McCann has a degree in fashion design from the Maryland Institute College of Art. During her free time she teaches pattern making, fitting, and sewing at G-Street Fabrics in Rockville, Md. and also at Baltimore City Community College. So, what does someone with such talent at apparel making do at Goddard? Well, she sews thermal blankets for use on NASA space shuttles and satellites.

Sally McCann, a ManTech employee has worked at GSFC for the past seven years applying her trade to layers of Kapton, Germanium, and mesh netting in order to create thermal blankets, a type of multi-layered insulation that protects sensitive shuttle equipment from decay and contamination. Currently, Sally is working on a "crack repair bag," a toolkit that allows astronauts to repair tiny cracks in the exterior tile of the space shuttle should they appear. Space Shuttle

Photo Credit: Pat Izzo

Pictured is Sally McCann (left) teaching co-worker Rhea Glisan (right) how to assemble a thermal blanket for the THEMIS instrument in the blanket lab in building 7.

Discovery is carrying one such repair bag. With her work being vital to the support of shuttle missions and other NASA initiatives, Sally is constantly striving for perfection.

"You feel like you want to be satisfied with your product but you are never satisfied until your product is up in space and working," McCann said.

McCann's dedication to her work and professional expertise is such that she trains other thermal technicians in the craft of thermal blanket and toolkit making. ■