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3-D IMAX Featuring STEREO Opens at Air and Space Museum

By Rani Gran

The story of NASA's Solar Extraterrestrial Relations Observatory (STEREO) mission is now a major motion picture. The scientists involved with STEREO, and the vital information they gather and study, are being presented in a new digital 3-D film titled "3D Sun."

From launch, to interviews with scientists, to aurora and actual solar footage, it's all on screen in stunning 3-D. The movie opened at the National Air and Space Museum in Washington, D.C. on March 6, 2008.



Photo Credit: Pat Izzo

Caption: Visitors sport special glasses while watching "3D Sun."

NASA's STEREO satellites have given the world 3-D views of the Sun for the first time. The two observatories are about the size of a golf cart. They were launched on a Delta II rocket on October 25, 2006 from Cape Canaveral Air Force Station in Florida. During the two-year mission, the STEREO Program will explore the origin, evolution, and interplanetary consequences of coronal mass ejections (CMEs), which are among the most violent explosions in our solar system.

The 23-minute show has been programmed to run through at least Memorial Day. Show times are available at <http://www.si.edu/imax>. ■



Photo Credit: Pat Izzo

Caption: Kids of all ages enjoyed the movie.

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Cover caption: Dr. Laurie Leshin, Deputy Director of Science, signs the Space Act Agreement while wearing an astronaut glove.

Photo Credit: Debora McCallum

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Goddard Provides Environmental Testing for *Hubble* Components

By Rob Garner

Space is not a hospitable environment, and when scientists and engineers design and build new components for the *Hubble Space Telescope*, that fact is always clearly in mind.

Hubble must endure harsh temperature swings of 215° F, micrometeor impacts, and exposure to solar radiation. On top of that, before a spacecraft like *Hubble* can operate in orbit, it has to survive the trip to get there. That's where the environmental testing chambers at NASA's Goddard Space Flight Center in Greenbelt, Md., come in.

Astronauts traveling aboard the Space Shuttle *Atlantis* for *Hubble* Servicing Mission 4, scheduled for launch in August 2008, will take with them 22,000 pounds of cargo. This includes Wide Field Camera 3 and the Cosmic Origins Spectrograph, *Hubble's* new, high-powered scientific instruments.

Most of that cargo gets run through Goddard's centrifuge, acoustics, and thermal vacuum chambers to ensure it can endure the rigors of launch and the harshness of space travel. These chambers, only a sample of the dozens at Goddard, are housed in the Center's Environmental Test and Integration Facilities.

High-Capacity Centrifuge Facility



Photo Credit: Chris Gunn

Caption: Goddard's centrifuge can accelerate 2.5 tons up to speeds equivalent to forces 30 times greater than the pull of Earth's gravity.

The centrifuge simulates the feeling of gravity's pull during a launch. For astronauts, that's normally a few minutes at two or three times the force of Earth's gravity, measured in Gs. The equipment being carried in the Shuttle's cargo bay usually sees between 6 and 7 Gs because of vibration.

Goddard's 120-foot-diameter centrifuge can accelerate a 5,000 pound payload up to 30 Gs, well beyond the force experienced in a launch. The most intense roller coasters in the world top out at about 5 Gs. The new components going to *Hubble* on Servicing Mission 4 were not subjected to the centrifuge's full intensity, because they will never experience forces that great in their operational lifetimes.

Engineers run the tests beyond actual environment conditions. "We take the structural loading conditions that we expect to see during launch and then

jack them up 25 percent," says Mike Weiss, *Hubble's* Technical Deputy Program Manager at Goddard. Instruments should be able to handle actual conditions if they hold up to the increased, simulated experience. Two 1,250-horsepower motors help the centrifuge produce that experience.

Acoustic Test Chamber

Blastoff can make quite a racket, which is why the *Hubble* engineers use the Acoustic Test Chamber.

In this 42-foot-tall chamber, technicians expose payloads to the sounds of a launch. To do that, they rely on 6-foot-tall speakers. The speakers (more accurately called horns) use an altering flow of gaseous nitrogen to produce a sound level as high as 150 decibels for 2-minute tests. That's about the level of sound heard standing next to a jet engine during takeoff.

Thermal Vacuum Chamber

Weiss calls the thermal vacuum "the granddaddy of them all." More so than any of the other chambers, this chamber exposes the *Hubble* components (and other payloads) to conditions they will experience in space.

The chamber has massive mechanical vacuum pumps, which are essentially large versions of the vacuum cleaners people use at home. To augment those, the chamber uses cryopumps to ensure that the hard vacuum of space is simulated in the test chamber. These two types of pumps work together to eliminate all but the tiniest trace of air in the chamber, down to about a billionth of Earth's normal atmospheric pressure.

To simulate the hot and cold extremes possible in *Hubble's* neighborhood 350 miles up, the thermal vacuum chamber can reach temperatures in a 600° range from 302° F all the way down to -310° F. This chamber is the perfect place to test *Hubble's* thermal protection for that reason, although the chamber will not need to be pushed to its extremes for the trials.

Wide Field Camera 3, built at Goddard, has also spent considerable time in the chamber. This powerful new camera will replace Wide Field and Planetary Camera 2, installed on the telescope during the first servicing mission in 1993.

Engineers tested the new camera in the vacuum chamber by sending commands identical to those it will receive in orbit. Temperature, vacuum, and commands combine to make the camera behave exactly as it will once astronauts install it. The vacuum chamber tests have shown that the instrument will function properly.

Hubble may seem like a fragile telescope at first, and in many ways it is. Its solar arrays, antennas, and data-gathering instruments are delicate, but *Hubble* has a robust structure well suited for durability in low-Earth orbit and servicing by Shuttle astronauts. ■

Miniaturized 'SIDE CAR' Drives *Webb* Telescope's Signal

By Rob Gutro

As many technologies become more advanced they become miniaturized to take up less space and weigh less. That's what happened to some electronics being built for the *James Webb Space Telescope* (JWST), which will convert analog signals to digital signals and provide better images of objects in space when they're sent to scientists on Earth.

The electronic components on the *Webb* telescope are called "SIDE CAR ASIC." SIDE CAR ASIC is the acronym for "System for Image Digitization, Enhancement Control And Retrieval Application Specific Integrated Circuit." The SIDE CAR has been miniaturized from a volume of about 1 cubic meter (35.3 cubic feet) down to a small circuit that fits in your hand.

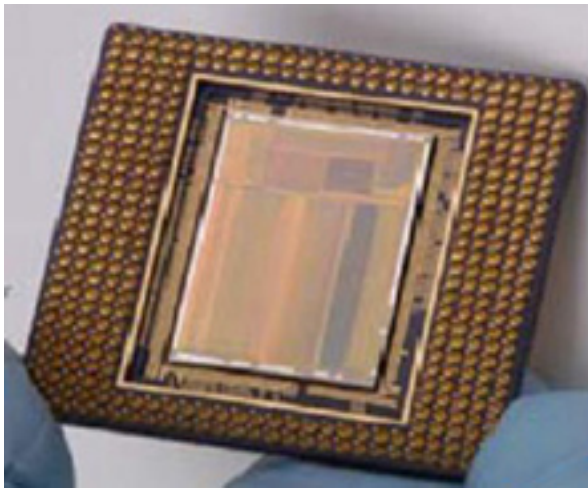


Photo Credit: Teledyne Imaging Systems

Caption: The SIDE CAR ASIC is a small, half-dollar-sized microprocessor developed for use on the JWST.

To understand what the SIDE CAR will do, it's similar to what is happening to broadcast television signals when they change from analog signals to digital signals in February 2009. Like televisions, the *Webb* telescope is getting several of those "converter boxes." One benefit digital signals have over analog signals is that digital signals can be more easily transmitted and stored.

SIDE CAR is a tiny, advanced, low-noise, low-power, microprocessor-based control chip designed by Teledyne Imaging Sensors in Thousand Oaks, Calif. It's about the size of a half-dollar and can do the same job as an electronics box weighing 20 pounds. Its smaller weight also makes it easier to launch.



Photo Credit: Teledyne Imaging Systems

Caption: The SIDE CAR ASIC in spaceflight package.

As the acronym implies, the SIDE CAR sits next to the detector like a sidecar on a motorcycle.

"A smaller SIDE CAR can be physically close to the detector it is controlling. This close proximity minimizes the distance the analog signal travels, thus reducing the noise of the system," said Dr. Matt Greenhouse, Integrated Science Instrument Module Scientist at NASA Goddard Space Flight Center in Greenbelt, Md.

The three instruments that will use the SIDE CAR on the *Webb* telescope are the Near Infrared Camera (NIRCam), Near-Infrared Spectrograph (NIRSpec), and the Fine Guidance Sensors (FGS). These instruments all use highly sensitive infrared detectors to study distant stars, planets, and galaxies.

Infrared light is a band of light on the electromagnetic spectrum with wavelengths longer than visible light, but shorter than radio waves, and cannot be seen by the naked eye.

"The significant technical advancement in the SIDE CAR is its very low noise (or interference with the data or images it's gathering)—the analog-to-digital conversion is nearly perfect, adding no significant noise—and its very low power; the SIDE CAR consumes only 11 milliwatts of power," said Markus Loose, lead designer of the SIDE CAR at Teledyne. Low consumption of power is important for keeping the telescope's science instruments cold (37 Kelvin, or -400° F) as they collect faint (heat) signals from objects near the edge of the universe.

It's important to make sure SIDE CAR is fully functional before it goes into the *Webb* telescope, so it's already being used to improve astronomy on the ground. Astronomers are "test-driving" four SIDE CARs that were installed in early 2007 in the University of Hawaii's 2.2-meter telescope on Mauna Kea. Since then, they have been collecting data and giving scientists experience in operating the SIDE CAR so that its performance is optimal by the time that the *Webb* telescope flies.

As a result of SIDE CAR's success in the review and in ground-based telescopes, other missions are planning to use it, and there's a plan to install it in the *Hubble Space Telescope* in 2008. ■

Safety Starts With Me—2008 Safety Awareness Campaign

By Trusilla Steele



NASA Goddard Space Flight Center will hold its annual Safety Awareness Campaign (SAC) from April 7–11, 2008. This year's theme, *Safety Starts with Me*, reflects the importance of everyone incorporating

safety in their daily activities. The agenda for the week includes safety activities and topics for all contractors and civil servants at Greenbelt. Join Center Director Dr. Weiler for the opening event on Monday, April 7 in the Building 8 Auditorium at 10 a.m. The SAC for Wallops employees will be held on Wednesday, April 23, 2008.

Safety is fundamental to the success of NASA's missions. Each employee has a role in becoming aware and preventing potential mishaps or accidents. The Safety Awareness Campaign is designed to elevate awareness of safety principles, practices, and lessons learned. The SAC also provides an opportunity for employees to learn strategies to incorporate sound safety practices into their daily activities. All employees are encouraged to attend at least two SAC activities.

Judith Bruner, Assistant Director for Safety and Security, and Melonie Scofield, SAC Coordinator, aimed to create a cohesive and inclusive environment for obtaining knowledge and awareness of NASA and Goddard safety policies and guidelines. Therefore, this year's SAC activities will be centralized with most of the activities occurring in the Building 3 and 8 auditoriums, Building 26, Building 33, and Building 21.

Want to learn more about the new public address system at Greenbelt? Plan to attend the Emergency Preparedness session on Tuesday, April 8 in the Building 8 Auditorium. The SAC will also include topics on cryogenic-, office-, and software safety. In addition, there will be specific topics for lab managers, travelers, and supervisors who conduct inspections. Training and certification on first aid and fire extinguishers will also be available during the week of activities.

Last year, we were honored to have former NASA Deputy Administrator Fred Gregory give a presentation on the importance of setting a good example. Just as parents strive to set an example for their children to follow, so should employees when it comes to safety. Indirect valuable lessons can be obtained from observing safe practices.



Photo Credit: Pat Izzo

Caption: Former NASA Deputy Administrator Frederick Gregory explains the importance of setting a good example at the '07 Safety Awareness Campaign.

This year, former Goddard Deputy Director Mike Ryschkewitsch will provide lessons learned regarding the root cause findings from the Mishap Investigation Board for the 2004 Genesis mishap. This presentation will be held in the Building 8 Auditorium on Thursday, April 10.

Employees will have two opportunities to learn safety principles and practices in a fun environment. Consider Safety Jeopardy on Wednesday, April 9 in the Building 8 Auditorium. This event consists of directorates answering questions regarding safety, and environmental and emergency preparedness as it relates to NASA and Goddard policies and regulations. Or check out the Forklift Rodeo on Monday, April 7 in the parking lot west of Building 8. Yes, there will be actual forklifts! Come root for your favorite team as they demonstrate the safe use of lifting devices and promote friendly competition among the directorates.

Visit <http://safety1st.gsfc.nasa.gov/safetyaware.cfm> for a complete listing of activities or check with your directorate SAC representative. ■

Goddard Day at Maryland Capitol—Public Gains Insight into NASA Goddard Missions

By Dewayne Washington

In an outreach effort to explain Goddard missions, Maryland elected officials, staff members, and visitors were treated to a day of interactive exhibits and thought-provoking presentations inside the Presidential Conference Center, West Miller Senate Building in Annapolis, Md. on February 21.

“The Goddard Community Relations team was looking for ways to increase Goddard’s profile in the state of Maryland,” said Debra Hollebeke, Government and Community Relations Manager for Goddard. “We thought this would be a great opportunity to explain Goddard’s impact in the State of Maryland, the Nation, and the global community.”

Throughout the day, legislators, members of various state departments, the Governor’s office, school groups, Girl Scout troops, and children as young as four experienced displays of various Goddard missions and talk to Goddard employees about what they do. There were several presentations, including a special appearance by Goddard’s own Nobel laureate and physicist, Dr. John Mather. Presenting before a special audience of U.S. Naval Academy midshipmen, Mather talked about his award-winning research and answered questions. He even autographed various items.

There were models of both the *Hubble Space Telescope* and the *James Webb Space Telescope* on display, as well as exhibits of the *Lunar Reconnaissance Orbiter*, a Technology Transfer exhibit. Materials describing Goddard’s extensive Earth Science programs to include climate research from the Chesapeake Bay to Antarctica were also available. Educational programs and technologies development were on display including a 3-D view of the Sun, an Apollo-era Moon rock, and much more.



Caption: Dr. Laurie Leshin and Joseph Ensor sign the Space Act Agreement.

The afternoon of events included an official signing of a Space Act Agreement between Goddard and Northrop Grumman Electronic Systems (NGES). Representing Goddard at the signing was Dr. Laurie Leshin, Deputy Director of Science, and Joseph Ensor of NGES. “This is a strategic partnership that blends the best of Goddard’s and Northrop Grumman’s advanced sensing capabilities,” said Leshin. “Combining forces will enable missions to measure what is currently immeasurable here on Earth and on other planets in our solar system,” said Dr. James Garvin, Goddard’s planetary science lead on the agreement. Garvin was available throughout the day to provide his always-entertaining view of exploring beyond Earth’s atmosphere.

Along with scientific information providing provocative food for thought, there were also various brunch and lunch food items available for all to partake. It was a great opportunity for Goddard community members to engage the public about how Goddard is directly contributing to the advancement of space exploration.

“This event was well worth the effort,” said Cynthia Trapp, an Education Outreach Coordinator for Goddard. “I thought the day was extremely well organized, very professional, with a look and feel that was very inviting to all.”

At the end of the day, many of the State’s most influential people were presented with insights into the Nation’s largest organization of combined scientists and engineers dedicated to learning and sharing the knowledge of the Earth, Sun, solar system, and universe. It is an organization that employs over 8,000 people and obligates over \$1 billion in the State of Maryland.

“The day was a huge success for us,” says Hollebeke. “From the planning to the logistics to the warm smiles of the Goddard participants, this event is a great example of how well the Goddard community can come together, no matter the mission. All who participated are to be congratulated for a job well done. The Goddard community should also know that Maryland has a greater understanding about who we are and what we are doing here.” ■

Goddard Day at Maryland Capitol



Photo Credit: Debora McCallum



Photo Credit: Debora McCallum



Photo Credit: Debora McCallum



Photo Credit: Debora McCallum



Photo Credit: Debora McCallum



Photo Credit: Debora McCallum

NASA MidSTAR-1 Proves Revolutionary Technologies

By Rob Gutro

Two new technologies launched onboard a U.S. Naval Academy (USNA) satellite called MidSTAR-1 have proven successful in their tests in space. One technology is a sensor that can check for harmful chemicals and the other is a special film that can control heat.

[These technologies were collaboratively developed between NASA's Goddard Space Flight Center, Greenbelt, Md.; NASA's Ames Research Center, Moffett Field, Calif.; and Eclipse Energy Systems, Inc.](#)

NanoChemsensor

The NanoChemsensor Unit (NCSU), can sense chemicals and contaminants that may be harmful to astronauts, as well as a wide range of scientifically interesting compounds. "The chemical nanosensor is like a smoke detector that would fit on the end of an eraser," said Dan Powell, lead nanotechnologist for Goddard. The NCSU was developed by Dr. Jing Li of Ames. Goddard was instrumental in identifying applications, as well as facilitating this first-ever demonstration of applied nanotechnology in space, onboard MidStar-1.

The NCSU's successful operation aboard MidSTAR-1 proved that it can sense target chemicals both accurately and repeatedly in space. The NCSU uses a network of tiny carbon nanotubes that are about 10,000 times thinner than a human hair, to sense various gases and their concentrations. These nanosensors are developed for NASA missions, such as cabin air monitoring for a crew exploration vehicle, in-flight fuel leak detection, planetary



Photo Credit: USNA

Caption: Dr. Billy R. Smith, Jr., Director of the USNA Small Satellite Program and MidSTAR-1 Program Manager, inspects MidSTAR-1 for damage after vibration testing at the Naval Research Laboratory.

exploration, and Earth science observation. This experiment proved that the nanosensors are robust and can undergo the vigorous launch process, and can work in the space environment, including microgravity, radiation, temperature variation, and vacuum.

The sensor currently in orbit aboard MidSTAR-1 was designed to detect trace amounts of nitrogen dioxide (NO₂), which is routinely given off as an air pollutant from many sources. This capability, when combined with the extremely small size, power consumption, and heat output, makes the NCSU useful to many industries and to the Government, including the U.S. Department of Homeland Security, who could use this unit to detect even trace amounts of explosives.

The NCSU can also be used to measure nitrogen dioxide levels in the upper atmosphere. "If you had a sensor like this, the size of a postage stamp, you could lick and stick it to monitor chemicals and environmental constituents anywhere," Powell said. "NASA wants to put this in the International Space Station (ISS) to monitor contaminants, and the Federal Aviation Administration may build handheld NCSU systems so aircraft crews could detect explosives and/or harmful gases in aircraft," Powell said.

A relatively cheap integrated NCSU system capable of being stuck to any surface would have a wireless radio transmitter, ad-hoc network, and a tiny solar cell or battery power supply about the size of a quarter. It could monitor environments and relay detection data for months or years before a replacement would be needed.

Since MidSTAR-1 was launched in March 2007, the sensor has been improved and can now detect and identify more than 15 different chemicals, including ammonia, hydrogen peroxide, hydrogen chloride, and formaldehyde.

Second-generation NCSUs, being developed for the ISS, are capable of selectively sensing several chemical compounds simultaneously and may be hardwired to a permanent power- and data-transmission system for continuous, long-term monitoring of a wide array of environments. Whether wireless or hard-wired, the systems could relay environmental status, contamination, or threat data from multiple sites to centralized monitoring stations located just about anywhere in the world, including to and from spacecraft and orbiting satellites.

Variable Emissivity Film

The second successful revolutionary experiment on MidSTAR-1 is a variable emissivity film. The flight onboard MidSTAR-1 demonstrated how a special film, no thicker than an empty plastic sandwich bag, can control the temperature on a spacecraft. The technology had not been demonstrated successfully in space until MidSTAR-1. Until now, it has been difficult to make a film that could survive the harsh conditions of space.

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NASA MidSTAR-1 Proves Revolutionary Technologies

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Electrochromics is the science behind the film, which could be applied to the outer surface of a spacecraft. By controlling voltage differential across the film, it is possible to change the film's ability to radiate waste heat into space or keep heat in a spacecraft. Very little power is needed, and the process is reversible.

Used on a spacecraft, the film can reduce launch weight, make future thermal design easier, reduce power consumption, and allow more accurate control of the spacecraft's inside temperature. The weight savings could be used to accommodate additional payloads, scientific instruments, and astronauts. The film also could be used on satellites, space antennas, space suits and visors, and robotic systems that will be placed on the Moon and other planets in the future.

There are many applications for this technology beyond space. It could be used to cover buildings and homes to reduce solar heat gain in the summer and decrease heat loss in the winter. One day, it could be possible to control the tint of a car window with the press of a button.

The variable emissivity film was manufactured by Eclipse Energy Systems Inc., of St. Petersburg, Fla., with joint financial sponsorship from Goddard and the U.S. Air Force.

Neither of the experiments would have reached space if not for the MidSTAR program. Billy Smith, Director of the Small Satellite Program and Manager of the MidSTAR program at the U.S. Naval Academy, Annapolis, Md., made it possible to launch these experiments on a limited budget.

"MidSTAR is the seventh piece of hardware that the Small Satellite Program has flown. It's by far the most sophisticated and most ambitious," Smith said. "It's proven to be the most productive, and all four experiments operating in space are producing excellent data." U.S. Naval Academy (USNA) students built the MidSTAR-1 satellite and placed the experiments onboard. The school currently controls the satellite and collects data, transferring it to Eclipse and other users.

USNA students are building another satellite, MidSTAR-2. Work will continue through 2008 under the auspices of the U.S. Defense Department. MidSTAR-2 will carry four Goddard experiments into space in 2011 to look at different parts of Earth's atmosphere, gamma rays, and solar winds. ■

The Wallops Landscape is Changing

By Elizabeth Flowers

Since July 2007, some Wallops employees have been relocated to the new Engineering Building, E-109. The new complex houses 95 civil service and contract employees.

The following NASA organizations are in the building: Applied Engineering and Technology Directorate, Code 500; Mechanical Systems Engineering Branch, Code 548; Wallops Electrical Engineering Branch, Code 569; Wallops Systems Software Engineering Branch, Code 589; Guidance, Navigation and Control, and Mission Systems Engineering Branch, Code 598; and Ground Network Project, Code 453. The following contractors also have personnel in the building: Computer Sciences Corporation, LJT, Hawk, ICNet, and ServiceSource.

Building E-109 has 5 fully equipped conference rooms and 16 modern, spacious labs. In addition, there are two high bay areas with loading docks that have roll up doors, as well as a mechanical lab and a fabrication area that each have loading docks.

The modern design and use of eco-friendly windows is a stark contrast to the line of barracks-style E-Buildings located north of the new building. In addition, an open center courtyard offers employees a place to relax and enjoy the upcoming warm weather.

While employees have been settling into their new carpeted offices, those on the north side of E-109 also have a window view of the demolition of Building E-108. ■

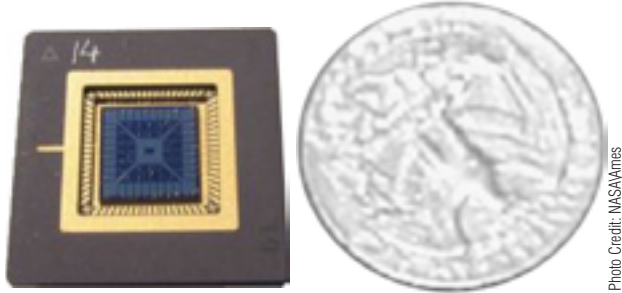


Caption: Demolition on Building E-108.

Two Goddard Employees Win Ames Award for Nanotechnology

By Rob Gutro

Fully integrated technology, smaller than a quarter, has been developed to detect hazardous gases or chemicals. This technology has been successfully demonstrated to be the first ever applied nanotechnology in space. Two Goddard employees are being recognized for their contributions to the U.S. Naval Academy/NASA Ames/NASA Goddard team that made it happen.



Caption: The NanoChemsensor Unit (NCSU) is smaller than a quarter.

Photo Credit: NASA/Ames

Dan Powell, Lead Nanotechnologist for Goddard and Andrew “Drew” Jones, a NASA Mechanical Engineer at Goddard, were recently awarded an Ames Honor Award for their part in developing this new class of space flight technology called the Nano Chemsensor Unit (NCSU). Powell worked as NASA Principal Investigator (PI) for the MidSTAR-1 Flight Project, which carried this first-ever nanostructured device to orbit.



Caption: Dan Powell and Andrew Jones.

Photo Credit: NASA

The team that developed the NCSU included Dr. Jing Li, PI for the development of the NCSU, and other scientists and engineers from NASA’s Ames Research Center, Moffett Field, Calif.; a technician from the U.S. Army; an engineer at the Arctic Slope Regional Corporation; and Dr. Billy Smith, PI for the MidSTAR-1 spacecraft, at the U.S. Naval Academy (USNA), Annapolis, Md.

The NCSU was launched aboard MidSTAR-1 on March 9, 2007, as one of several experiments aboard, successfully demonstrating that this class of applied nanotechnologies is practical for space-based applications in addition to Earth-based applications. “The nanosensor worked successfully in space,” said Li. “We demonstrated that nanosensors can survive in space conditions, and the extreme vibrations and gravity change during launch,” she added.

The opportunity for this space flight test for the NCSU was arranged by Powell, with whom Ames has had a long collaborative relationship. Powell, who has a passion for demonstrating the capabilities of nanotechnology, took advantage of Goddard’s relationship with the Naval Academy to offer Ames the opportunity for a technology demonstration flight. He has followed suit with an even greater collaboration with USNA to launch at least four prototype scientific instruments aboard MidSTAR-1’s proposed successor mission, MidSTAR-2.

Drew Jones’ main role was helping the USNA with the design, fabrication, and testing of the MidSTAR-1 spacecraft structure. Jones was also the primary liaison between the MidSTAR project and Goddard since January 2003, a role Dan Powell assumed for the MidSTAR-2 mission, currently being built at the USNA. Jones also suggested the idea of flying NASA experiments on MidSTAR, moving it from an educational outreach effort to a true partnership. Dr. Billy Smith, who leads the MidSTAR program at the USNA in Annapolis, Md. agreed and made it a reality.

Because the Ames team demonstrated a successful collaboration between Ames, Goddard, and the USNA in manifesting the NCSU on MidSTAR-1, and because the NCSU was a success, the team received the Ames Honor Award. The Ames team has followed up, in partnership with Powell, Jones, and others, to draft and submit a nomination for a NASA Honor Award. ■

In Memoriam: Dr. Robert Jastrow

By Jim Hansen



Photo Credit: NASA GISS

Caption: Dr. Robert Jastrow.

Dr. Robert Jastrow, the founding director of the Goddard Institute for Space Studies (GISS) and its head until 1981, passed away on Feb. 8.

Dr. Jastrow persuasively advocated the value to NASA of what became known as the “GISS formula” for a research organization. The key ingredients are a small permanent research staff, an academic environment, post-docs and students, ability of staff to teach courses for student recruitment and work with university faculty and researchers, and public outreach to make results of NASA research understandable and available to the public.

Robert Jastrow, with both a B.A. and an M.A. from Columbia College in 1945 and a Ph.D. in 1948 in nuclear physics, was a postdoctoral fellow at Leiden University, Netherlands from 1948–49, and a member of the Institute for Advanced Study at Princeton from 1949–50 and 1953. His work at Princeton led to the discovery of the “Jastrow Potential” for interactions between protons and neutrons.

Dr. Jastrow had stints as a research associate at the University of California and as an assistant professor of physics at Yale, after which he was a consultant at the Naval Research Laboratory in Washington, D.C. It was there he became fascinated with the budding American space program.

At the inception of NASA in 1958, Dr. Jastrow was invited to head the Theoretical Division of Goddard Space Flight Center. Dr. Jastrow was Chairman of NASA’s Lunar Exploration Working Group from 1959–61, an exciting period in NASA history described in his book, “Journey to the Stars.” The first location of his theoretical division was over a furniture store in Silver Spring, Md., as Goddard was just being built. In 1961, he convinced NASA management of the merits of locating his division in New York City, in the vicinity of Columbia University, where he founded the Goddard Institute for Space Studies.

Dr. Jastrow was a frequent commentator on science news, having appeared on more than 100 CBS-TV network programs on space science, as well as having many appearances on NBC’s *Today* and *Tonight* shows. His articles have appeared in the *New York Times*, *Reader’s Digest*, *Foreign Affairs*, *Commentary*, *Cosmopolitan*, *Atlantic Monthly*, *Natural History*, *Scientific American*, and *Psychology Today*.

Of Dr. Jastrow’s several best-selling books, perhaps the favorite is one mentioned by Michael Allison of GISS: “I first heard of the Goddard Institute as a college sophomore in, of all places, a course on science and religion, where I read ‘Red Giants and White Dwarfs.’ What an epiphany it was to learn that we and our world are made of the nucleosynthetic remnants of exploded stars!” Dr. Jastrow, with Malcolm Thompson, also wrote a pioneering textbook, “Astronomy: Fundamentals and Frontiers.” He had just completed, with Michael Rampino, an astrobiology text, “Stars, Planets and Life: The Evolution of the Universe.”

Dr. Jastrow taught at Dartmouth and was at the Marshall Institute in Washington, D.C., after leaving GISS. He was Director and Chairman of the Board of Trustees of Mount Wilson Observatory from 1992–2003, where he oversaw the refitting of the 100-inch telescope with state-of-the-art adaptive optics that allowed unprecedented observing from a ground-based telescope. ■

Employee Spotlight:

Teresita Smith

By Leslee Cork



Photo credit: Bill Hrybyk

Caption: Teresita Smith.

At age 23, Stay-in-School student Teresita Smith is part of the fastest growing segment of the workforce, Generation Y. During a recent interview with Reuters.com, Jenny Floren, CEO of Experience, Inc., stated that the workforce, "...need(s) the talent and creativity this generation brings, especially when you take into consideration the looming employment gap occurring from the outflux of retiring Boomers." Indeed, Teresita believes she and her Generation Y contemporaries are the future of NASA. Motivated, ambitious, and eager to learn, Teresita has much to offer this institution that seeks to inspire the next generation of explorers, and attract and retain a talented workforce.

With a bachelor's degree in Business Administration from the University of Maryland Eastern Shore already under her belt, Teresita is working to add a master's degree in Management and a certificate in Human Resources from Bowie State University to her list of accolades. She hopes to maintain her 4.0 grade point average all the way to the May 2009 finish line. Valuing education, Teresita feels young people should equip themselves with the skills and knowledge they need to succeed in today's competitive job market.

"When I first started working here, I was given a standard new employee guide. However, I wasn't given a guide on how to succeed in my office," Teresita explains as she recalls the start of her career in the Office of Public Affairs a year ago. "Imagine a fast moving train. It's not going to stop to let you onboard. You have to run, jump, and pray you don't fall off."

Teresita credits a lot of her professional growth to her informal mentors, Alana Little, Leslee Cork, and Michelle Jones. They helped her get acclimated to the office and provided her with much needed career guidance. Teresita feels this type of inner office support is very beneficial to all Generation Y employees who are new to the Agency. Unfulfilled with administrative tasks, Teresita's mentors encouraged her to seek more challenging work with greater meaning. To date, she has supported numerous Center events like the visit to Goddard by Queen Elizabeth II, STEREO's 2007 Open House, the Ground Breaking Ceremony for the Exploration Sciences Building, and the 3-D IMAX STEREO Sun movie premiere. Her roles ranged from tracking and maintaining RSVPs and arranging catering and setup, to acting as a tour guide and providing logistical support. Presently, Teresita is working on her next big project, assisting with marketing and promotions for the upcoming Yuri's Night Celebration, taking place at the Goddard Visitor Center on April 12.

Outside of work, Teresita performs community service for a variety of organizations. Teresita's parents, who were both in the military, witnessed so much despair during their tours of duty, that they instilled in their children the importance of helping those who are less fortunate. Some of the organizations she's supported are the National Multiple Sclerosis Society, St. Mary's Missionary Baptist Church Little Soup Kitchen, and the Guam Society of America. The latter being her favorite organization with which to volunteer. The society allows Teresita, who is African-American and Guamanian, to share her culture with those interested in learning more about her diverse background. One way in which she does this is through cultural stick dancing. "As graceful as a holy dance with elements of a step routine, stick dancing uses bamboo sticks and synchronized movements to interpret Guamanian stories," described Teresita. Additionally, the society sponsors educational, cultural, and social programs that foster its mission to provide humanitarian aide to victims of natural disasters, the poor, the distressed, and the underprivileged.

When contemplating where to work, NASA Goddard Space Flight Center floated to the top of Teresita's list of potential employers. She didn't know much about the space agency other than Dr. Mae Jamieson was the first African-American woman astronaut. Teresita did know, however, that she wanted to make a positive impact while at the Center, in the lives of her colleagues and in the quality of work she performs. Always willing to help out and constantly taking on new assignments, Teresita is on her way to doing just that. "Generation Y is a group of driven individuals who are just as passionate about their work as the next person. We are innovative and we have good ideas that are often overlooked. I think it's time for NASA to start listening if we are to be their successors," lasting words from Teresita Smith. ■