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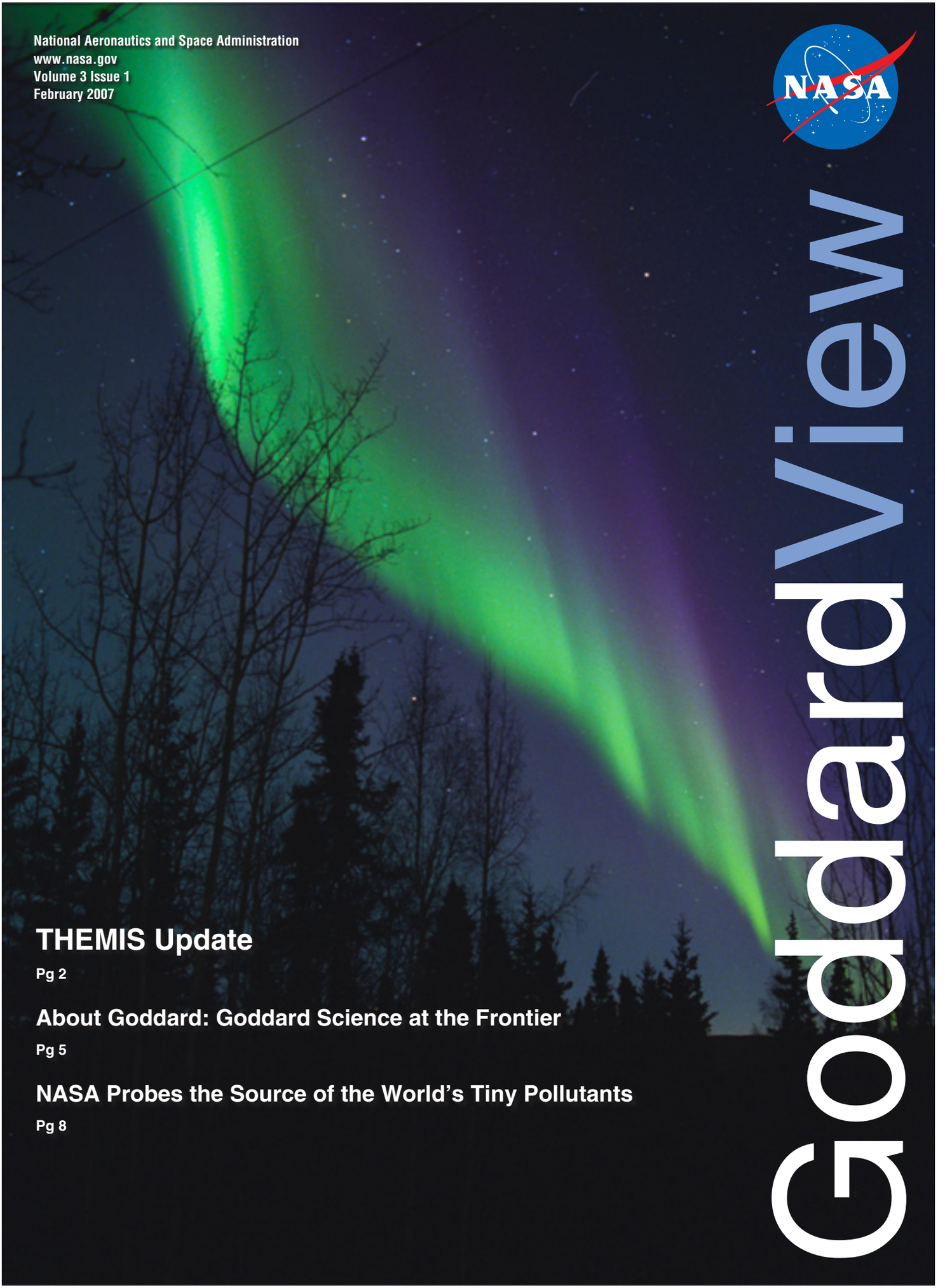
GoddardView



THEMIS Update

By Bill Steigerwald

Engineers and technicians have successfully installed the THEMIS spacecraft onto its upper stage rocket booster. The spacecraft will then be placed into its transportation canister on Feb. 1 and moved to Launch Complex 17 on Cape Canaveral Air Force Station on Feb. 2 for mating with the Delta II rocket.

The Mission

Time History of Events and Macroscale Interactions during Substorms (THEMIS) is a mission to investigate what causes auroras in the Earth's atmosphere to dramatically change from slowly shimmering waves of light to wildly shifting streaks of color. Discovering what causes auroras to change will provide scientists with important details on how the planet's magnetosphere works, and the important Sun–Earth connection.

On a clear night over the far northern areas of the world, you may witness a hauntingly beautiful light display in the sky that can disrupt your satellite TV and leave you in the dark.

The eerie glow of the northern lights seems exquisite and quite harmless. Most times, it is harmless. The display, resembling a slow-moving ribbon silently undulating in the sky, is called the aurora. It is also visible in far southern regions around the South Pole. Occasionally, however, the aurora becomes much more dynamic. The single auroral ribbon may split into several ribbons or even break into clusters that race north and south.

This dynamic light show in the polar skies is associated with what scientists call a magnetospheric substorm. Substorms are very closely related to full-blown space storms that can disable spacecraft, radio communication, Global Positioning System (GPS) navigation, and power systems while supplying killer electrons to the radiation belts surrounding Earth. The purpose of NASA's THEMIS mission is to understand the physical instability (trigger mechanism) for magnetospheric substorms.

A clash of forces we can't see with the human eye causes the beauty and destruction of space storms, though the aurora provides a dramatic symptom. Earth's molten iron core generates an invisible magnetic field that surrounds our planet. This magnetic field and the electrically charged matter under its control compose the Earth's magnetosphere.

The Sun constantly blows an invisible stream of electrically charged gas, called the solar wind, into space. The solar wind flows at very high speed past the Earth and its magnetosphere. In order to visualize what happens when the solar wind buffets the Earth's magnetosphere, imagine a windsock in a gale force wind. The Earth's magnetosphere captures and stores small fractions of the colliding solar wind energy and particles on magnetic field lines that stretch like rubber bands.

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Cover Caption: Photo of an Aurora taken November 1998 titled *Twilight Display*
Photo Credit: Jan Curtis

GoddardView Info

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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.

THEMIS Update

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During substorms, the solar wind overloads the magnetosphere with too much energy and the stretched magnetic field lines snap back like an enormous slingshot, energizing and flinging electrically charged particles towards Earth. Electrons, the particles that carry electric currents in everything from TVs to cell phones, stream down invisible lines of magnetic force into the upper atmosphere over the polar regions. This stream of electrons hits atoms and molecules in the upper atmosphere, energizing them and causing them to glow with the light we know as the aurora.

The same electrons sometimes charge spacecraft surfaces, resulting in unexpected and unwanted electrical discharges. And those electrons that enter the radiation belts can ultimately find their energies boosted to levels millions of times more energetic than the photons that comprise the light we can see. Electrons with these energies can damage sensitive electronics on spacecraft and rip through molecules in living cells, potentially causing cancer in unshielded astronauts. Rapidly varying magnetic fields associated with magnetospheric substorms also induce electric currents in power lines that can cause blackouts by overloading equipment or causing short circuits.

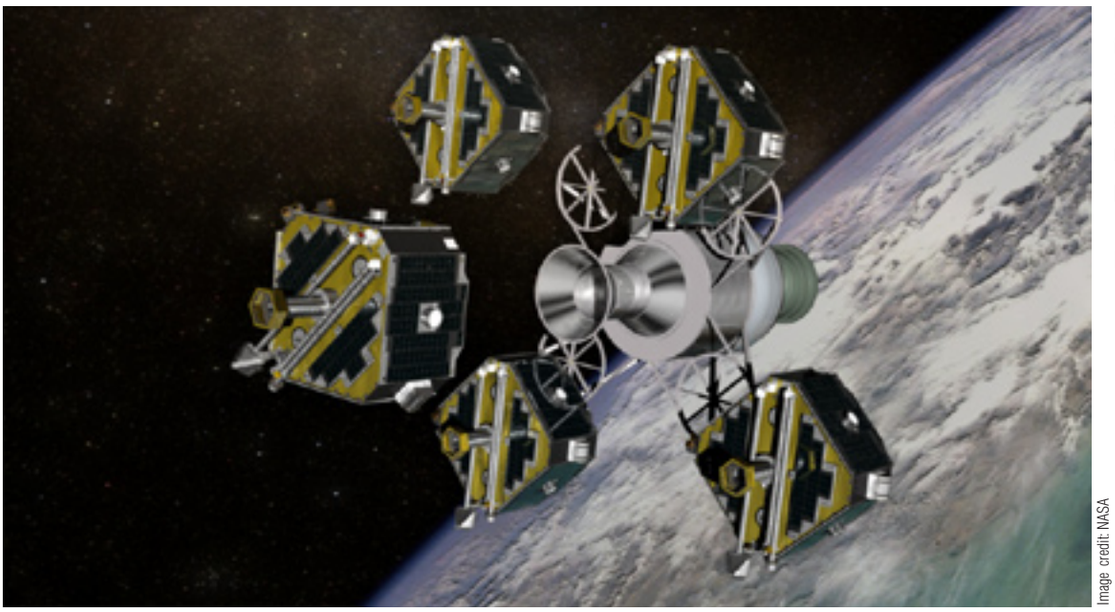

Image credit: NASA

Caption: Time History of Events and Macroscale Interactions during Substorms (THEMIS) is a two-year mission consisting of five identical probes and a network of ground observatories that will track and determine the cause of the violent eruptions of auroras that occur during substorms. When the five identical probes align over the observatories on the North American continent, scientists will collect coordinated measurements along the Sun–Earth line, allowing the first comprehensive look at the onset of substorms and how they trigger auroral eruptions.

Although the consequences of substorms are well-known, it is not clear exactly what finally snaps in the overloaded magnetosphere to trigger a substorm. Understanding what happens during substorms is important. "The worst space storms, the ones that knock out spacecraft and endanger astronauts, could be just a series of substorms, one after the other," said David Sibeck of NASA's Goddard Space Flight Center in Greenbelt, Md., project scientist for the THEMIS mission. "Substorms could be the building block of severe space storms."

Just like meteorologists who study tornadoes to understand the most severe thunderstorms, space physicists study substorms for insight into the most severe space storms. "Substorm processes are fundamental to our understanding of space weather and how it affects satellites and humans in the magnetosphere," said Vassilis Angelopoulos, THEMIS principal investigator at the University of California's Berkeley Space Sciences Laboratory, in Berkeley, Calif. Scientists propose two possible triggers for substorms, but until now, there has been no way to distinguish between the two models.

Discerning between the two proposed substorm trigger mechanisms is difficult because the magnetosphere is so large. Over Earth's night (solar wind down-stream) side, the solar wind stretches the magnetosphere far past the Moon's orbit, to form the geomagnetic tail. Substorms start from a small region in space inside the geomagnetic tail, but within minutes cover a vast region of the magnetosphere. However, the two proposed trigger mechanisms predict substorm onset in distinctly different locations within the geomagnetic tail, so the key to solving this mystery lies in identifying the substorm point of origin.

Previous single-spacecraft studies of the Earth's magnetosphere have been unable to pinpoint where and when substorms begin, leading to extensive scientific debate on the topic. However, NASA's THEMIS mission will solve this mystery with coordinated measurements from a fleet of five identical satellites, strategically placed in key positions in the magnetosphere, in order to isolate the point of substorm origin. The mission, named for Themis, the blindfolded Greek Goddess of Order and Justice, will resolve this debate like a fair, impartial judge.

THEMIS is scheduled for launch in February. When the five probes align over the North American continent, scientists will collect coordinated measurements down-stream of Earth, along the Sun–Earth line, allowing the first comprehensive look at the onset of substorms and how they trigger auroral eruptions. Over the mission's two-year lifetime, the probes should be able to observe some 30 substorms.

Down-stream alignments have been carefully planned to occur over North America once every four days. For about 15 hours surrounding the alignments, 20 ground stations in Canada and Alaska with automated all-sky cameras will document the aurora from Earth. The combined spacecraft and ground observations will give scientists the first comprehensive look at the phenomena from Earth's upper atmosphere to far into space, enabling researchers to pinpoint where and when substorm initiation begins. ■

Goddard's IPP Office: What's in a Name?

By Nancy Pekar

Shakespeare wrote, "That which we call a rose/By any other name would smell as sweet." And yet, in many cases, a name reflects an entity's essence.

Take what had been called Goddard's Office of Technology Transfer (OTT). Now called the Innovative Partnerships Program (IPP) Office, the office has been pursuing new avenues of technology transfer that are more accurately indicated with this new name.

Innovative

For many years, the office had been focused primarily on what is known as "spinoff"—that is, the out-licensing, commercialization, and other mechanisms for taking Goddard-developed intellectual property (IP) and finding new uses for it outside of NASA.

"We still do that, but it's really just one part of the story," says IPP Office Chief Nona Cheeks. "We're on the cutting edge in what we do now, bringing together multiple forms of technology development and transfer."

By using best practices in concepts such as open innovation, out-licensing, and small business-based research, NASA is taking an innovative approach to accelerating research and development and maximizing the return on those investments. This innovative approach includes:

- Technology Infusion: This mainly involves dual-use partnerships, whereby both NASA and the external partner(s) from industry, academia, or Government benefit from the R&D. For example, the medical industry may be seeking a new adhesive to use for *in vitro* devices requiring the same minimal outgassing and resistance to radiation that are needed by NASA for mounting space optics; a partnership would develop and test the new adhesive that would solve both needs.
- IP Management: Protecting NASA-developed technologies to ensure that they are not used without permission provides leverage for securing infusion partners, royalties through out-licensing that can fund additional R&D, and allow the American people—and indeed humankind—to receive benefits from the space program beyond the Agency's exploration and science goals.
- SBIR/STTR: The Small Business Innovative Research and Small Business Technology Transfer programs have been restructured and consolidated to be more cost-efficient and ensure that outside technologies with benefits for space program missions are infused into NASA. Goddard's SBIR/STTR personnel are now part of the IPP Office, providing guidance for the technical aspects of proposals related to Goddard-based research.

Partnerships

When Goddard and external organizations partner for technology development, they reap many benefits:

- Accelerated development of technology for missions/goals
- Efficient use of resources, including laboratories, equipment, and personnel
- Increased return on the investment in R&D
- Growth of commercial aerospace and other industries, providing economic benefits for the nation
- More science and engineering breakthroughs

"It's a cliché but I keep thinking of that old TEAM acrostic: Together Everyone Achieves More," said Ms. Cheeks. "By working together truly as partners, NASA and outside organizations both benefit. And that's a key part of our mission: Creating collaborations that leverage each party's resources and strengths while supporting NASA's missions, Goddard's strategic objectives, and the partner's goals."

More about Goddard's IPP Office is available by visiting http://ipp.gsfc.nasa.gov, e-mailing techtransfer@gsfc.nasa.gov, or calling 6-5810. "And we always welcome Goddard personnel at our offices," said Ms. Cheeks. The IPP Office is in Building 22, Room 290.

Our Vision

To be recognized as a leading source of value to NASA by creating innovative, mutually beneficial collaborations with industry, academia, and other Government agencies that yield positive impacts for the Agency, the U.S. economy, and mankind.

Our Mission

- To foster strong internal and external relationships by understanding and identifying where technology needs and solutions align.
- To develop innovative approaches to creating collaborations that leverage each party's resources and strengths while supporting NASA's missions, Goddard's strategic objectives, and the partner's goals.

Our Values

We will continually strive to be…

- Efficient and effective
- Creative and innovative
- Open and insightful
- Honest and ethical
- Professional and friendly

… in everything we do. ■

About Goddard: Goddard at the Science Frontier

By Natalie Simms

Photo credit: Bill Ingalls

Caption: Dr. Jim Garvin

Did you know our Center operates the Hubble Space Telescope, has built more planetary instruments than any other institution in the world, and is currently developing scientific instruments to explore Mars? This is but a glimpse of some of the amazing work being done right here at Goddard.

You will learn such fascinating facts and details performed by your own colleagues by attending the new "About Goddard" series, sponsored by the Office of Public Affairs and the Code 100 Directorate. This monthly series will provide you a snapshot into the diverse and intriguing work coming from our home Center.

On January 4, Kris Brown, Special Assistant for Strategy and Development in the Office of the Director, kicked off the series by revealing some noteworthy achievements. Center Director Dr. Ed Weiler followed with opening remarks and a discussion on the small satellite program Goddard has embarked upon with the recent Minotaur-TacSat launch from our Wallops Flight Facility.

Dr. Weiler introduced Dr. Jim Garvin, Chief Scientist for the Science and Exploration Directorate as he delivered the first presentation of the series, "Goddard at the Science Frontier." He discussed what we are doing at Goddard, our role, our ideas, and our legacy. He reminded us of the Hubble Space Telescope and how its repertoire of capabilities is more defined thanks to the contribution of Goddard employees. "Hubble has painted a picture of the universe and will continue to do so before the James Webb Space Telescope takes over in 2015," said Garvin.

The exploration of going back to the Moon is even more exciting. Garvin stated, "We are going back for good and as we go back, we need to find new solutions to understand the Moon and that is what Goddard does best." This is where the Lunar Reconnaissance Orbiter (LRO) and its several instruments, built and developed here at Goddard, come in.

The LRO mission is to obtain data that will facilitate returning humans safely to the Moon and enable extended stays. "This is going to be an absolute, scientific, and engineering treasure-trove," Garvin stated.

Another great opportunity to leverage all the things Goddard does well in science and new technology is with the Mars program plan. Garvin communicated the legacy of Mars exploration, which dates back to the mid-1980s.

"The dream was to map Mars topographically well enough to understand the crust, where the ice is, and the shape of the landscape, at human scales. It was the vision of the leadership at Goddard and then at Headquarters. This is the legacy of the first planetary orbiter laser altimeter that mapped the entire world and that legacy is felt today as Goddard has won the job to do that for the Moon, Mercury, and Mars," said Garvin. Goddard is at the forefront of landing the next generation of instruments on Mars, which will hopefully answer the question as to whether Mars could ever have been alive.

In concluding his presentation, Garvin mentioned some of Goddard's recent successes, the STEREO mission to understand the Sun in 3D and the astrophysical initiative of the James Webb Space Telescope. "I think the thing about Goddard that makes me most excited is the diversity of science; we do it all here, we are the Center of excellence for science," said Garvin.

The heart of many in the audience was touched by Dr. Garvin's captivating presentation, astonishing images, and animated footage of Goddard's science endeavors.

Rhona Post, Business Coach in the Office of Human Capital Management, attended the first session of this series. She commented, "I was amazed and energized by this first presentation of the "About Goddard" series. Garvin fostered an inclusive environment as he kept reminding us in the audience that all these great things happened here at Goddard. His genuine excitement and enthusiasm about work we do infused the audience with excitement. He helped us remember what we come to work for every day."

You are invited to attend the next presentations in the "About Goddard" series. The series is an opportunity to expand your understanding of Goddard's work and the role it plays within NASA. Your appreciation will deepen as you discover the many accomplishments that come from the Goddard Space Flight Center.

The "About Goddard" series is held in the Bldg 3 Goett Auditorium or the Bldg 8 Auditiorium on the first Thursday of each month.

Upcoming in the Series:

March 1 – Dr. Waleed Abdalati, Head of the Cryospheric Sciences Branch, Code 614.1 – "International Polar Year"

April 5 – Dr. John Campbell, Wallops Flight Facility Senior Manager, Code 800 – "Wallops Flight Facility"

May 3 - Jim Slavin, Chief, Heliophysics Science Division, Code 670 - "Heliophysics - What is it and What are the Effects?" ■

R&D 100, "Sammies" Award Applications Due March 1

By Nancy Pekar

The deadline is approaching for two prestigious awards that found a home at Goddard last year. Goddard's conformal gripper technology won an R&D 100 Award in 2006, while retired researcher Norden Huang won a Service to America Medal. These wins were announced on pages 4 and 5 in the October 2006 (Vol. 2, No. 18) *Goddard View*.

The Innovative Partnerships Program (IPP) Office, which is leading the effort to prepare and submit Goddard's applications for these awards, encourages Goddard personnel to consider these award opportunities.

R&D 100 Awards

Called the "Oscars of Innovation" by *The Chicago Tribune*, these awards from *R&D Magazine* recognize the top 100 most innovative and significant new technologies each year.

What constitutes significant? Obviously, major breakthroughs in technologies and processes that can change people's lives for the better, improve the standard of living for large numbers of people, save lives, promote good health, clean up the environment, and so on, qualify. The program further specifies "significant" as follows:

- Technologies that meet larger, more broad-based needs could be considered more significant than those that solve very specialized problems.
- Improvements must be attributed to significant breakthroughs in technology rather than incremental improvements.
- Innovations in mature technology areas (e.g., software) often have a more difficult time demonstrating the kinds of quantum leaps of improvement that the judges look for, though they still could win.
- The judges also look for the "Wow! Factor"—innovations that are so interesting, unusual, or clearly superior to existing technology that they prompt a "How did they do that?" response.
- The application must include a "competitive matrix" that shows how the innovation compares to existing technology with regards to crucial factors.

Finally, to be eligible for this year's award, a technology "must have been first available in 2006." Although Goddard-developed technologies do not always become available as products, they are eligible for this award and the IPP Office can structure the application appropriately.

To apply for the R&D 100 Awards, the first step is to file a New Technology Report (NTR), which can be done online at http://entre.nasa.gov. Once an NTR has been filed (or for assistance in filing it), contact:
Dale Hithon x6-2691; Dale.L.Hithon@nasa.gov.

Service to America Medals

This awards program pays tribute to America's dedicated Federal workforce, highlighting civil servants who have made significant contributions to the Nation. Honorees are chosen based on their commitment and innovation, as well as the impact of their work on addressing the needs of the Nation. Awardees are announced each fall at a dinner and awards ceremony in Washington, D.C.

The application form includes two essays:

- A 500-word required essay identifies the specific accomplishment(s) for which the person is being nominated, explaining who it benefits and how, as well as how it is important to the Nation.
- A 300-word optional essay can describe any additional attributes or activities that exemplify the nominee's commitment to public service, such as mentorship, community service, or other recognition/awards.

All career civilian employees of the Executive Branch are eligible, including former Federal employees who separated from Government service after September 27, 2006. Individuals, as well as teams, may be nominated in one of eight categories:

- Call to Service (for those hired after Jan. 1, 2002 and are 35 years old or younger)
- Career Achievement (for those hired before Jan. 1, 1987)
- Citizen Services
- Homeland Security
- International Affairs
- National Security
- Justice and Law Enforcement
- Science and Environment

If you know of a civil servant who should be nominated for the Service to America Medal, please contact
Dale Hithon 6-2691; Dale.L.Hithon@nasa.gov. ■

NASA Hurricane Education Reaches Philadelphia via "I2" Technology

By Rob Gutro and Andy Freeberg

Here at NASA Goddard, we've been using "Internet 2" (I2) technology to share our science with educators, most recently to teachers in Philadelphia.

In November, a team of education and media specialists from Goddard produced a live multimedia presentation with hurricane expert Jeff Halverson from the University of Maryland Baltimore County (UMBC), which was "broadcast" to educators in Pennsylvania.

What is Internet 2 and Who Uses It?

Internet 2 or "I2" is a technology used by universities to combine teaching and research, and collaborate with their colleagues at other universities or experts at organizations such as NASA. If the Internet is an information highway, Internet 2 is a superhighway operating at bandwidths as high as 10 Gigabytes per second. The applications for this technology include conferencing, accessing instruments in a remote location, and creating digital libraries. Think of it as a kind of video teleconferencing on the Internet, at a higher quality resolution.

Internet 2 is a consortium led by more than 200 U.S. universities, working with industry and Government. Internet 2 develops and deploys advanced network applications and technologies for research and higher education, accelerating the creation of tomorrow's Internet.

Photo credit: *UMBC*

Caption: From a studio in Baltimore, NASA hurricane expert Jeff Halverson uses Internet 2 and green screen technology to train science educators in Philadelphia.

Internet 2 deploys high-end networking technologies that offer 1 Gigabyte to 10 Gigabytes transmission, allowing for the use of real-time, multi-way, multi-channel High Definition video and data-streaming.

This event marked the first time that I2 was used to deliver science content to teachers. At Goddard, I2 has been used primarily in the research and development of network hardware and software applications. This was the first use of I2 by Goddard to deliver content outside this research and development program.

Behind the Scenes at Goddard

The live multimedia presentation was led by hurricane expert Jeff Halverson. Halverson also works at Goddard and is the former outreach manager for the Tropical Rainfall Measuring Mission (TRMM) satellite.

David Stroud, Multimedia/Education Technology Senior Producer, led a team made up of Andy Freeberg, Media Specialist; Shane Keating, Senior Systems Administrator/Distance Learning Network Coordinator; and John Leck, NASA Education Specialist. Network support testing at UMBC was coordinated by Paul Iwancio and at the Franklin Institute by the University of Pennsylvania's Gates Rhodes.

Using state-of-the-art technology, the education and media team successfully integrated I2, scientific data visualization, and a green screen. A green screen is used by television meteorologists as a way to make it appear that data is projected behind the meteorologist. Actually, the satellite data is mixed into the live television broadcast shot of the meteorologist standing in front of the green screen, so it looks like the weather is on the screen behind the meteorologist. The mixed data is also projected on television screens off to the side of the meteorologists, so when they point to a spot on the green screen, they can know if their hand is in the correct area.

Rather than meteorological maps, this project used hurricane visualizations by Goddard's Scientific Visualization Studio (SVS) produced with data collected by NASA satellites such as TRMM, and data from the Moderate Resolution Imaging Spectroradiometer (MODIS) instrument that flies on the Aqua and Terra satellites. The multimedia also included video segments produced by NASA-TV producers Michael Starobin and Andy Freeberg.

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NASA Probes the Sources of the World's Tiny Pollutants

By Mike Bettwy

Pinpointing pollutant sources is an important part of the ongoing battle to improve air quality and to understand its impact on climate. Scientists using NASA data recently tracked the path and distribution of aerosols—tiny particles suspended in the air—to link their region of origin and source type with their tendencies to warm or cool the atmosphere.

By altering the amount of solar energy that reaches the Earth's surface, aerosols influence both regional and global climate, but their impact is difficult to quantify because most only stay airborne for about a week, while greenhouse gases can persist in the atmosphere for decades.

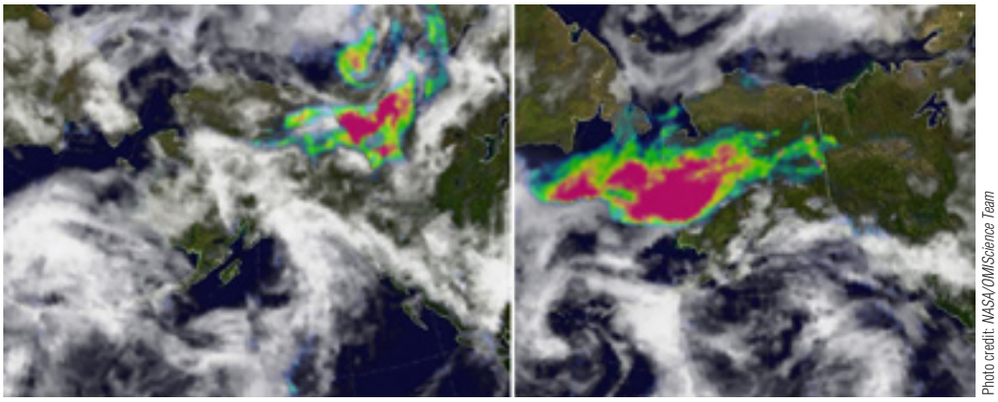

Photo credit: *NASA/OMI Science Team*

Caption: This pair of images from the Ozone Monitoring Instrument (OMI) on NASA's Aura satellite shows smoke measurements over Alaska and western Canada on August 15 and August 21, 2005. Increasing amounts of smoke are shown as an aerosol index with shades of blue (little or no smoke) to dull red (thick smoke).

In a study published Jan. 24 in the American Geophysical Union's *Journal of Geophysical Research-Atmospheres*, researchers investigated the sources of aerosols and how different types of aerosols influence climate. "This study offers details on the aerosol source regions and emission source types that policy makers could target to most effectively combat climate change," said Dorothy Koch, lead author and atmospheric scientist at Columbia University and NASA's Goddard Institute for Space Studies (GISS), in New York.

Using a GISS computer model that includes a variety of data gathered by NASA and other U.S. satellites, the researchers simulated realistic aerosol concentrations of important aerosol types in the atmosphere and studied the amount of light and heat they absorb and reflect over several regions around the globe.

Each area has a unique mix of natural and pollutant aerosol sources that produces different types of aerosols and causes complex climate effects. The industry and power sectors are particularly important in North America and Europe and produce large amounts of sulfur dioxide, while Asia has higher emissions from residential sources, which produce relatively more carbon-containing aerosols.

"Computer model simulations showed that black carbon in the Arctic, a potentially important driver in climate change, derives its largest portion from Southeast Asian residential sources," said Koch. Black carbon, commonly called soot, is generated from motor vehicles and industrial pollution, in addition to outdoor fires and household burning of coal and bio-fuels. Soot is produced by incomplete combustion, especially of diesel fuels, coal, and wood. Residential soot emissions are largest in areas where cooking and heating are done with wood, field residue, animal dung, and coal.

Black carbon absorbs sunlight, warming the atmosphere—just as dark pavement absorbs more sunlight and becomes hotter than light pavement. It has a large influence on global climate because winds transport approximately half of the black carbon aerosols produced in important aerosol source regions like Asia and South Africa to other parts of the world.

Most particles, especially sulfates produced from the sulfur dioxide emissions of factories and power plants, are light-colored and tend to cool the atmosphere by reflecting sunlight or making clouds more reflective. Computer model simulations suggest this effect is especially heightened over parts of the Northern Hemisphere, including the central United States. The study found, however, that sulfur dioxide emissions in Southeast Asia and Europe have a smaller impact on climate because atmospheric conditions in those areas are not as efficient at turning the emissions into sulfate particles.

The study also showed large amounts of aerosols containing organic carbon—which also tend to cool the atmosphere and partially offset the warming from greenhouse gas emissions—are produced by biomass (vegetation) burning. Most of the world's biomass burning emissions appear to come from Africa and secondarily, from South America. However, precipitation removes a greater proportion of biomass-burning aerosols from the atmosphere over Africa than over South America. As a result, more than one-half of the biomass-burning aerosols in the Southern Hemisphere can be traced back to South America.

"This research is only the first step in considering the impact of aerosols from different sectors on climate," said Koch. ■

Tech Transfer: Something for Everyone

By Nancy Pekar

Goddard's Innovative Partnerships Program (IPP) Office is offering a training program on Thursday, February 22, to help civil servant and contractor personnel understand the ins and outs of technology transfer.

"There have been many changes to the program in the past few years, particularly in our increased focus on what is known as 'technology infusion,'" explained IPP Office Chief Nona Cheeks. "Our new office name reflects that emphasis and the need for partnerships."

The technology infusion process involves partnering with outside organizations—companies, universities, other Government labs, even other NASA Centers—to complement Goddard's in-house capabilities.

"By providing Goddard researchers with access to new technologies, facilities, capabilities, and expertise, we accelerate their R&D efforts to achieve NASA missions more efficiently and cost effectively," said Ms. Cheeks.

"It's the classic 'make vs. buy' question," according to the IPP Office's Laura Schoppe, who will be leading the Feb. 22nd training program. "Too many times, R&D labs, even those in private companies, invest in research that is taking them down a path that has already been cleared." Ms. Schoppe said that NASA's combined program of technology infusion partnering and the "spinoff" approach to technology transfer is the best way to maximize the return on R&D investments.

"Our training program is designed to help the 'bench researcher,' as well as managers understand what technology transfer is, why it is important, and how they can and should participate in it," said Ms. Schoppe. "This class should be attended by anyone who deals with innovation and technology development."

Dispelling the Myths

Regardless of your level of experience with technology transfer, you should consider attending the Tech Transfer Overview Course on Feb. 22. Even individuals who have been at Goddard for many years still believe many of the myths regarding technology transfer. For example:

Myth #1:
My technology is so specific to the goals of the space program that no one else would be interested in it.

You'd be surprised to find that many space-based technologies have applications here on Earth. The IPP Office has the expertise to find the alternate applications, but first you must report the technology.

Myth #2: These "Invention Disclosures" are just more paperwork that is filed somewhere and no one ever looks at it.

The IPP Office reviews every New Technology Report (NTR) and determines which technologies have industry applications and which have strategic importance for Goddard. In both cases, specific strategies are developed to maximize the benefits to Goddard.

Myth #3: The R&D is still ongoing, so I should wait until it's finished to file the NTR.

As soon as you recognize that you have a new invention, you should file an NTR. Not only does the IPP Office need the NTR to establish Intellectual Property (IP) protection, but it can be used to develop a strategy to maximize value to you and Goddard.

Myth #4:
If I report my technology in an NTR, other NASA scientists and engineers will have access to my ideas, and possibly compete with me for funding.

Submitted NTRs are stored in a NASA database that can be accessed only by NASA IPP personnel, not by other scientists and engineers.

Myth #5:
Once I file the NTR, I can present my technology at a professional conference or in a paper.

If you present your technology at a conference or otherwise disclose it before Goddard has a chance to initiate patent efforts, the IP protection could be lost. This has negative financial impact for you and for Goddard. IPP will work with you to secure the best protection for your technology before you plan to disclose it.

Myth #6: I can give software or design information to any company or university under contract to NASA.

Unless you execute a separate agreement (which the IPP Office can help you with) to restrict the use and distribution of the information you share, you are likely to "give away" your technology, jeopardizing IP protection, and possibly revealing competition-sensitive information.

Don't continue to believe these myths. Attend the training on Thursday, February 22, from 9:00 a.m. to noon in Building 1, Room E100E and get the facts. Civil servants may register online https://saterninfo.nasa.gov, while contractors can register via e-mail Dale.L.Hithon@nasa.gov.

For more information, please contact
Dale Hithon 6-2691; Dale.L.Hithon@nasa.gov ■

NASA Hurricane Education Reaches Philadelphia via "I2" Technology

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Who Made it All Happen?

Goddard and the Franklin Institute collaborated as part of a National Science Foundation grant to test the usefulness of I2 for teacher professional development. The I2 experiment was the first of its kind, and by its success, is hoped to pave the way for a variety of future events.

Karen Elinich, Director of Educational Technology Programs for the Franklin Institute Museum, was the principal investigator on the grant. The research was designed to test how well the I2 network could deliver interactive professional development science content, with a focus on actual science data. Jennifer Oxenford, Associate Director, and Heather Weisse, Applications Coordinator of the University of Pennsylvania facilitated the partnering between Elinich and Goddard's David Stroud.

The result of this I2 Education event was a highly engaging, long distance, interactive workshop on all aspects of hurricane science by one of the world's top experts. From the Imaging Research Center's studio at UMBC, Halverson was able to both ask questions and respond to teachers in Philadelphia as if he were in the room with them. The workshop took place on Nov. 20 and was a pilot for future high-speed, streaming presentations via I2.

For more information, contact: David Stroud 6-1094 or David.B.Stroud.1@gsfc.nasa.gov

For more information on Internet 2, please visit on the Web: http://www.internet2.edu/ ■

NASA Solicitation and Proposal Integrated Review and Evaluation System (NSPIRES)

Supporting research in science and technology is an important part of NASA's overall mission. NASA solicits this research through the release of various research announcements in a wide range of science and technology disciplines. NASA uses a peer-review process to evaluate and select research proposals submitted in response to these research announcements. Researchers can help NASA achieve national research objectives by submitting research proposals and conducting awarded research. This site facilitates the search for NASA research opportunities.

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

Solicitations:

Aerospace Education Service Project (AESP)
Released: 2007-01-22
Proposal Due: 2007-03-30

Ground-Based Studies in Space Radiation
Released: 2007-01-05
Proposal Due: 2007-02-01

NASA Aeronautics Research Mission Directorate (ARMD) Research Opportunities in Aeronautics (ROA) NRA
Released: 2006-05-24
Proposal Due: See Announcement

NASA Earth and Space Science Fellowship/07
Released: 2006-11-01
Proposal Due: See Announcement

NASA Earth and Space Science Fellowship/07 Renewal
Released: 2006-11-07
Proposal Due: 2007-03-15

Research Opportunities in Space and Earth Sciences - ROSES 2006
Released: 2006-01-23
Proposal Due: See Announcement
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What to Do in Winter: Tips from the Montgomery County Fire and Rescue Service

From the Montgomery County Office of Emergency Management

Have your car(s) winterized before the winter storm season. Keeping your car(s) in good condition will decrease your chance of being stranded in cold weather. Have a mechanic check your battery, antifreeze, wipers, and windshield washer fluid, ignition system, thermostat, lights, flashing hazard lights, exhaust system, heater, brakes, defroster, and oil level. If necessary, replace existing oil with a winter grade oil. Install good winter tires. Make sure the tires have adequate tread. All-weather radials are usually adequate for most winter conditions. If you have a cell phone or two-way radio available for your use, keep the battery charged and keep it with you whenever traveling in winter weather. Keep a windshield scraper and small broom in your car for ice and snow removal. Put together a separate disaster supplies kit for the trunk of each car used by members of your household. If you should become stranded during a winter storm, these items will make you more comfortable until the storm passes.

The kit should include the following:

- Several blankets or sleeping bags.
- Rain gear and extra sets of dry clothing, mittens, socks, and a wool cap.
- Extra newspapers for insulation.
- Plastic bags for sanitation.
- Canned fruit, nuts, and high energy "munchies." Non-electric can opener if necessary.
- Several bottles of water. Eating snow will lower your body temperature. If necessary, melt it first.
- A small shovel, a pocket knife, and small tools, such as pliers, a wrench, and screwdriver.
- A small sack of sand for generating traction under wheels, a set of tire chains or traction mats.
- Jumper cables.
- A first aid kit and necessary medications.
- A flashlight with extra batteries.
- A candle in a metal can or other fireproof container. While candles are generally not recommended in disaster situations, having one in your car can be a source of heat and light if you are stranded.
- Matches.
- A brightly colored cloth to tie to the antenna.
- Keep your car's gas tank full for emergency use and to keep the fuel line from freezing.
- Let someone know your destination, your route, and when you expect to arrive. If your car gets stuck along the way, help can be sent along your predetermined route.
- Be aware of sleet, freezing rain, freezing drizzle, and dense fog, which can make driving very hazardous. Avoid driving during sleet, freezing rain, freezing drizzle, and dense fog—these serious conditions are often underestimated.

If you do get stuck:

- Stay with your vehicle. Do not leave the vehicle to search for assistance unless help is visible within 100 yards. Disorientation and confusion come very quickly in blowing snow.
- Display a trouble sign to indicate you need help. Hang a brightly colored cloth (preferably red) on the radio antenna and raise the hood (after snow stops falling).
- Occasionally run engine to keep warm. Carbon monoxide can build up inside a standing vehicle while the engine is running, even if the exhaust pipe is clear. Experience has shown that running the heater for 10 minutes every hour is enough to keep occupants warm and will reduce the risk of carbon monoxide poisoning, as well as to conserve fuel. Keep the exhaust pipe clear of snow and slightly open a downwind window for ventilation.
- If more than one person is in the car, take turns sleeping. One of the first signs of hypothermia is sleepiness. If you are not awakened periodically to increase body temperature and circulation, you can freeze to death.
- Huddle together for warmth.
- Use newspapers, maps, and even the removable car mats for added insulation. Layering items will help trap more body heat.
- Keep a window that is away from the blowing wind slightly open to let in air.
- Avoid overexertion. Cold weather puts an added strain on the heart. Unaccustomed exercise such as shoveling snow or pushing a car can bring on a heart attack or make other medical conditions worse.

Photo Caption: This picture shows a real snow crystal that fell to Earth. It was captured by Kenneth G. Libbrecht, Professor of Physics, and Physics Officer at the California Institute of Technology using a specially designed snowflake photomicroscope.

Employee Spotlight:

Eric Newman

By Alana Little

Photo credit: *Pat Izzo*

Caption: Eric Newman

Five years ago, Eric Newman was fresh out of East Carolina University and eager to land his first post-collegiate job when 911 happened. Entire markets had dried up almost overnight and the Government was the only watering hole in town. Eric took a chance on the Government and the Government took a chance on him and thus far, the benefits have been mutual.

As a Contracting Officer with Code 210M in the Mission Enabling Branch, Eric faces the daily challenge of trying to figure out how to meet his customers needs within the Government contract infrastructure. The Mission Enabling Branch provides procurement support for the Engineering Directorate, the Independent Verification and Validation (IV&V) Facility, the Integrated Financial Management Program (IFMP), the Scientific and Engineering Work Package (SEWP), the Tracking and Data Relay Satellite System (TDRS), the Outsourcing Desktop Initiative for NASA (ODIN), PAAC, and the Space Communications Program Office. His favorite part of the job is working on space flight projects.

When working on flight hardware there are frequently change orders (a formal document that has been signed off by the affected departments and authorizes changes to the Statement of Work or contract deliverables. It often ties to system planning, scheduling and cost functions by specifying an effectivity date for the items included). He says "I have the incentive to get those through quickly because they directly impact the project and sometimes the launch…doing my part well helps things run smoothly on a larger level."

Because Eric remembers how tough it was breaking into the working world after college, he wants to leave others with a little advice. He says " Figure out if you like your job and if you do, learn as much as you can, find informal mentors, and ask a lot of questions." ■

2007 Diversity Theme Contest

By Julia Kight

Once again, the Center Diversity Council is sponsoring a contest to select a Diversity Theme that will be used throughout 2007 on promotional and informational materials referencing Diversity related activities such as the Diversity Speaker Series, Diversity Movie Days, Diversity Dialogue Project, etc. This contest will be open to all civil servants and contractors. As in previous years, the theme should speak to our diversity vision and the benefits of inclusive behaviors, valuing and appreciating each person for what he or she brings to the workplace, and how those things translate into making Goddard a better place to work.

Winning themes from previous years are:

2004—"Many Faces, Many Places, Many Voices—One Goddard"

2005—"Diversity: Making Space for Everyone"

2006—"Goddard: As Diverse as the Universe We Explore"

Submissions will be voted on by the Center Diversity Council and the winner will be notified. Your entries should be submitted to Julia Knight at Julia.A.Knight@nasa.gov by February 16, 2007. We're hoping for a large number of entries from which to pick the 2007 winner! ■