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GoddardView

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Science Boost and Life Extension for the Great Observatory: NASA Returns to Hubble

By Susan Hendrix

Photo credit: Bill Ingalls

Caption: Ed Weiler

Astronauts are gearing up for a house call to NASA's famed Hubble Space Telescope (HST) sometime in mid-to-late-2008. Called "Servicing Mission 4," or SM4, this last planned Shuttle servicing mission will extend and improve the observatory's capabilities through at least 2013.

NASA Administrator Michael Griffin announced the Agency's decision to service the observatory to an auditorium full of anxious employees at NASA Goddard Space Flight Center on October 31.

Griffin told the audience, "We have conducted a detailed analysis of the performance and procedures necessary to carry out a successful Hubble repair mission….What we have learned has convinced us that we are able to conduct a safe and effective servicing mission to Hubble. While there is an inherent risk in all spaceflight activities, the desire to preserve a truly international asset such as the Hubble Space Telescope makes doing this mission the right course of action."

Long time Hubble supporter Senator Barbara Mikulski, in attendance for Griffin's announcement, applauded it, saying "This is a great day for Maryland, for America, but most of all, for science. Hubble is a national asset and a national priority. Without question, Hubble has been the most successful NASA program since *Apollo*. And like *Apollo*, Hubble has helped America lead the way in discovery and exploration."

Together, their words evoked loud cheers and applause among the more than 250 employees in attendance for the Administrator's decision.

When Will We Return to Hubble?

NASA managers are working closely to determine where in the Shuttle manifest to include a Hubble servicing mission, and on what vehicle. The proposed 11-day mission will be different from the previous four servicing missions in that the Agency will be required to support a "launch-on-need" mission—another Shuttle on the pad ready to fly should the astronauts need a different vehicle to return safely to Earth.

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Cover caption: A snapshot of the Hubble Space Telescope taken in March 2002 by STS-109 crew members on board the Space Shuttle *Columbia.*
Photo Credit: NASA

GoddardView Info

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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.

Science Boost and Life Extension for the Great Observatory: NASA Returns to Hubble

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Photo credit: Bill Ingalls

Caption: NASA Administrator Michael Griffin announced plans for a fifth servicing mission to Hubble Tuesday, October 31, during a meeting with Agency employees at Goddard in the Building 8 auditorium. Goddard is the Agency Center responsible for managing Hubble. Also in attendance were U.S. Senator Barbara Mikulski; Dr. Edward J. Weiler, Goddard Space Flight Center Director; and Ms. Shana Dale, NASA Deputy Administrator.

The astronaut crew selected for Servicing Mission 4 include Commander Scott D. Altman, and Pilot and Navy Reservist Capt. Gregory C. Johnson. Mission specialists include veteran spacewalkers John M. Grunsfeld and Michael J. Massimino, as well as first-time space fliers Andrew J. Feustel, Michael T. Good, and K. Megan McArthur.

For more information about the newly selected SM4 astronaut crew, visit: http://www.nasa.gov/mission_pages/shuttle/shuttlemissions/hst_sm4/index.html

New Instruments Will Improve Hubble Science

As part of Hubble's makeover, the astronauts will install two new instruments—the Cosmic Origins Spectrograph (COS) and Wide Field Camera 3 (WFC3). COS will study the large-scale structure of the universe and how galaxies, stars, and planets formed and evolved, and it will help determine how elements needed for life, such as carbon and iron, first formed.

As a spectrograph, COS won't capture the kinds of images that have made Hubble famous. Rather it will perform spectroscopy, the science of breaking up light into its individual components.

Any object that absorbs or emits light can be studied with a spectrograph to determine its temperature, density, chemical composition, and velocity. A primary science objective for COS is to measure the structure and composition of the ordinary matter that is concentrated in what scientists call the "cosmic web"—long, narrow filaments of galaxies and intergalactic gas separated by huge voids.

WFC3 will study a diverse range of objects and phenomena, from young and extremely distant galaxies, to much more nearby stellar systems, to objects in our own solar system. Its key feature is its ability to span the electromagnetic spectrum from the ultraviolet (UV, the kind of radiation that causes sunburn), through visible/optical light (what our eyes can detect), and into the near infrared (NIR, the kind of radiation seen with night-vision goggles).

WFC3 extends Hubble's capability not only by seeing deeper into the universe, but also by providing wide-field imagery in all three regions of the spectrum (UV, Visible, and NIR). It is this wide-field "panchromatic" coverage of light that makes WFC3 unique. As an example, WFC3 will observe young, hot stars (glowing predominantly in UV) and older, cooler stars (glowing predominantly in the red and NIR) in the same galaxy. WFC3 will complement the Advanced Camera for Surveys (ACS), now flying on Hubble.

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NASA Returns to Hubble

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Extending the Scientific Life of Hubble

In addition to the new science instruments, astronauts will improve the "pointing control system" by replacing a degraded Fine Guidance Sensor (FGS) with a fresh, refurbished unit, bringing the number of healthy FGSs on board to two. Only two FGSs are needed for pointing Hubble accurately, and the third FGS will provide additional target pointing efficiency and redundancy.

Astronauts will replace the aging gyroscopes aboard Hubble with a fresh set of six new ones to meet the observatory's very precise pointing requirements. The six batteries onboard Hubble are all original equipment, intended for a design life of about five years. After 16 years of continuous service, the batteries are degrading and in need of replacement. Their replacement will result in ample power margins for the remainder of Hubble's mission life.

New outer blanket layers will be installed on Hubble's exterior to provide additional thermal protection to some of its equipment bays, replacing the existing multilayer insulation, which has degraded over time because of the extreme temperature fluctuations of space, as well as interactions with the residual Earth atmosphere.

Attempting an On-Orbit Repair

NASA engineers and astronauts are defining a set of activities designed to repair and restore Hubble's Space Telescope Imaging Spectrograph (STIS) to full operating status. Installed aboard Hubble in 1997, STIS proved to be the most versatile spectrograph ever flown in space—until it stopped working in 2004 because of a power supply failure. Astronauts will attempt an on-orbit replacement of one of the electronics boards. A repaired STIS would complement the COS instrument, bringing a full suite of spectroscopic tools for astrophysical research to Hubble.

Preparing for a Future Rendezvous

NASA engineers have known for years that Hubble will need to be safely de-orbited at the end of its mission life. In order to accommodate a "next generation space transportation vehicle," astronauts will install a Soft Capture Rendezvous System (SCRS) to Hubble's aft bulkhead. This ring-like device will permit Hubble to be docked to a future vehicle, as well as to accept a propulsion module for a controlled and safe eventual de-orbit of the observatory.

Although Hubble itself will "retire" someday, SM4 will extend the observatory's scientific life for many years, allowing us to enjoy even more spectacular images and amazing science discoveries yet to come.

For more information about NASA, the mission, and the Hubble, visit: www.nasa.gov/hubble www.hubble.nasa.gov ■

Presidential Rank Award Winners Honored

By Crystal Gayhart, Edited By Trusilla Steele

The 2006 Presidential Rank Award recipients were recognized on October 31, 2006 by NASA Headquarters for their accomplishments. Each year, the President of the United States honors a select group of career members from the Senior Executive Service (SES), Senior Level (SL), and Scientific and Technical (ST) corps who are selected for their outstanding leadership accomplishments and service over an extended period of time in some of the Nation's most critical positions in the Federal Government.

These senior executives and professionals are outstanding leaders, who consistently demonstrate strength, integrity, industry, and a relentless commitment to public service. Through their personal conduct and results-oriented leadership, they have earned and kept a high degree of public confidence and trust. They have demonstrated their success in balancing the needs and perspectives of customers, stakeholders, and employees with organizational results. Senior executives and senior professionals from across the Government are nominated by their agency heads, evaluated by citizen panels, and, finally, approved by the President.

There are two categories of rank awards, Meritorious and Distinguished, with Distinguished being the highest honor that can be bestowed by the President. Each year, not more than 5 percent of Governmentwide career SES and ST may receive the Meritorious rank award for their sustained accomplishments. Not more than 1 percent of Governmentwide career SES and ST may earn the Distinguished rank for their sustained extraordinary accomplishments. In 2006, Ms. Dorothy Perkins was the GSFC recipient bestowed the highest honor of Distinguished Senior Professional as a member of the SES core. The award recipients' 2006 accomplishments, as recognized, follow:

Dorothy Perkins (Distinguished SES Award Recipient)

Ms. Perkins has served as the Deputy Center Director—Technical; for the NASA Goddard Space Flight Center (GSFC) since September 2004. With the Center Director, she is responsible for the overall scientific, programmatic, and financial management of the Nation's largest organization of combined scientists and engineers focused on exploration of the Earth, solar system, and universe. She oversees a workforce of more than 10,000 civil servant and contractor employees, with a $2.5 billion budget.

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Public Affairs Hosts a Behind-the-Scenes Tour for Journalists

By Lynn Chandler

On Tuesday, October 31, more than 30 science writers descended on Goddard for a behind-the-scenes tour of the Center. The annual meeting of the Council for the Advancement of Science Writing and National Association of Science Writers was held in Baltimore this year. The close proximity to Greenbelt made it a perfect opportunity to invite them to learn more about our Center.

The tour allowed the Office of Public Affairs to reach new audiences from all over the country, especially those who wouldn't normally be in this area. Among the participants were writers from *Popular Science*, *Nature*, *Science*, and *MSNBC*.

Photo credit: Steve Cole

Caption: Paul Newman discussing the Antarctic ozone hole research with science writers.

The tour consisted of four main areas including the Building 7/10/29 complex, Buildings 11/30, the Building 28 atrium, and the Visitor Center. While in Buildings 7/10/29, the writers were treated to seeing hardware being built for the Solar Dynamics Observatory, which is due to launch in 2008. They learned about Goddard's involvement with the worldwide hunt for other worlds with a visit to the ExoPlanets and Stellar Astrophysics Laboratory. The writers also viewed the Clean Room as it was being prepared for the hardware for the upcoming Hubble servicing mission.

In Buildings 11/30, videos and presentations were shown about the James Webb Space Telescope (JWST), and its advanced technologies. They also toured the Detector Development Lab and got an up-close look at micro-shutter array technology.

Presentations were given about our two upcoming black hole missions, the Gamma-ray Large Area Space Telescope (GLAST) and Laser Interferometer Space Antenna (LISA).

In the Building 28 atrium, the visiting science writers learned about Goddard's role in studying the Earth, Sun, Moon, and Mars. Several Earth scientists shared their latest results on topics ranging from the ozone hole and how carbon dioxide effects climate change, to hurricanes and ice sheets.

NASA's first mission under the Vision for Space Exploration, the Lunar Reconnaissance Orbiter (LRO), was also showcased in Building 28. The Solar Terrestrial Relations Observatory (STEREO) team was on hand to share 3-D movies of the Sun.

As expected, the tetrahedral walker, or TET Walker Rover, was also a very popular exhibit. The Science Visualization Studio (SVS) and the Conceptual Imaging Lab showcased their award-winning imagery and visualizations.

The day culminated with a reception at the Visitor Center sponsored by the Team ADNET companies, with a special visit from Goddard's Nobel Prize winner, John Mather. The new movie, *Footprints*, was shown on Goddard's latest exhibit, Science on a Sphere (SOS), which is a six-foot globe suspended in the air. While enjoying themselves at the reception, the writers mingled with our scientists and engineers and learned more about our world-class science and technology facility. ■

NASA Leadership Development Program Graduates Honored

By Christine Williams

Photo credit: Pat Izzo

Caption: L-R: Margaret Caulfield and Dennis Vander Tuig, 2005–2006 Leadership Development Program (LDP) graduates. Charles Chase, speaker, is pictured in the middle.

On August 24, 2006, 24 members of the 2005–2006 NASA Leadership Development Program (LDP) celebrated the completion of their developmental year with a ceremony at NASA Headquarters. Nine Centers were represented in this year's graduating class.

In his address to the graduates, NASA Associate Administrator for Institutions and Management, Mr. Charles Scales, noted that for NASA to meet the vision for Space Exploration, "NASA leaders must first steer a new direction for the Agency here on Earth." Mr. Scales told the graduating class:

- "We must be better leaders of people as well as technical experts, even though it may mean giving up control of what we loved to do ourselves.
- We must learn to use the skills needed to tap into and nurture the creativity of every employee. We must support them in bringing new ideas and renewed energy into our programs and projects even though it would be easier to just tell them what to do.
- We must create an environment that allows for open dialogue, a place where dissenting opinions and disagreements can be aired and fully considered, even when it would be easier to avoid the conflict and faster not to ask others opinions.
- We must focus on the long-term viability and success of the Agency, even when the pressures and priorities of the day demand our attention."

Mr. Scales praised the class on the completion of their Agencywide Project, Management Tools, and Integration Assessment. This project assessed the efficiency and effectiveness of NASA's tools and processes used to support executive level program decision making.

As part of this project, the participants conducted 85 stakeholder interviews, identified 121 functional tool requirements, and evaluated 148 tools of interest. The full report on this project will soon be available on the LDP Web site: http://ldp.asas.gov.

Participants Steve Noneman (MSFC), Barb Kenny (GRC), William Lapenta (MSFC), and Doug Hudgins (ARC), were elected graduation speakers. Each shared their reflections of the year, their thoughts on leadership, and how the LDP helped them strengthen their ability to be more effective leaders.

The vision of the LDP is to create powerful leaders who align with NASA's vision, mission, and values and who create results that matter to the American people. Program elements include developmental assignments, a class project, individual coaching, training, and briefings by NASA and outside leaders. Participants must be grades 13–15 and are competitively selected at the Agency level. Key to the program is participating in developmental assignments designed to broaden participant understanding and strengthen their leadership skills.

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NASA Leadership Development Program Graduates Honored

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This year's graduates and the organizations where they engaged in their developmental assignments are listed below.

2005–2006
Leadership Development Program Graduates

Participant	Assignment Locations
Douglas M. Hudgins, ARC	NASA HQ, Office of Science Mission Directorate; USDA Forest Service, Research and Development
David L. Kao, ARC	Department of Homeland Security; Google Corporation
Surendra P. Sharma, ARC	NASA HQ, Office of Science Mission Directorate;
Mauricio A. Rivas, DFRC	NASA HQ, Office of Aeronautics Research Mission Directorate; NASA HQ, Office of Earth Science Mission Directorate
Barbara H. Kenny, GRC	NASA HQ, Office of Program Analysis and Evaluations; National Science Foundation
James D. Stegeman, GRC	NASA HQ, Office of Space Operations; NASA HQ, Office of the Administrator
William J. Taylor, GRC	NASA HQ, Office of Exploration Systems; NASA HQ, Office of the Administrator
Margaret I. Caulfield, GSFC	NASA HQ, Office of the Chief Engineer; NASA HQ, Office of Space Communications
Dennis C. Vander Tuig, GSFC	NASA HQ, Office of Exploration Systems; NOAA/NESDIS, Chief of Staff Office
Sharyl A. Butler, JSC	DuPont Corporation
Kathryn L. Lueders, JSC	NASA HQ, Office of Legislative Affairs; NASA HQ, Office of Earth Science Mission Directorate
Scott A. Wood, JSC	NASA HQ, Office of Human Capital Management; NASA HQ, Office of Program Analysis and Evaluation
David A. Kruhm, KSC	NASA HQ, Office of Chief Engineer; NASA HQ, Office of Program Analysis and Evaluations
Roland Schlierf, KSC	Patrick Air Force Base; Merritt Island Wildlife Refuge
Manjula Y. Ambur, LaRC	NASA HQ, Office of Chief Financial Officer, Cleveland Clinic
David H. Jones, LaRC	NASA HQ, Program Analysis & Evaluation Office; NASA HQ, Office of Aerospace Research Mission Directorate
John H. Koelling, LaRC	Joint Planning and Development Office; Uniformed Services University of the Health Sciences
Michael A. Marcolini, LaRC	Department of Energy; Hampton Roads Research Partnership
Teresa J. Danne, MSFC	NASA HQ, Office of Chief Financial Officer; NASA HQ, Office of Legislative Affairs
Chryssa Kouveliotou, MSFC	NASA HQ, Astrophysics Division; NASA HQ, Office of Program and Institutional Integration
William M. Lapenta, MSFC	NASA HQ, Office of Science Mission Directorate; NASA GSFC, Modeling and Assimilation Office
Steven R. Noneman, MSFC	NASA HQ Office Space Exploration Systems; RAND Corporation
Joe A. Sanford, MSFC	NASA HQ, Office of Chief Engineer; NASA HQ, Office of the Administrator
Theadore J. Mason Jr., SSC	NASA HQ, Office of Applied Science; NASA HQ, Office of the Chief Engineer ■

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Prior to this position, Ms. Perkins was the Director of Flight Programs and Projects at GSFC where she was responsible for managing 40 flight projects in development, including the Hubble Space Telescope (HST), James Webb Space Telescope (JWST), and the Global Precipitation Measurement (GPM) mission.

Ms. Perkins undertook transforming the GSFC internal investment process upon assuming her current role. Five different funds and processes existed for investing in technology development, proposal development for competitive opportunities, and technical infrastructure, for a total annual investment of more than $50 million. These processes were not internally aligned, and most were only loosely driven by GSFC's strategic goals.

Ms. Perkins identified leaders to develop business plans for each strategic area, including enabling technologies. As a part of the overall process, Ms. Perkins aligned all of the investment calls for proposals so that they were opened to the workforce simultaneously. As a consequence of these changes, the GSFC internal investment funds, a scarce resource, are closely focused on positioning GSFC to contribute most effectively to GSFC's and NASA's strategic needs.

Ms. Perkins is chair of the Standing Awards Committee at GSFC, which selects recipients of GSFC's prestigious Honor Awards, and nominates candidates for NASA Honor Awards. Ms. Perkins took steps to increase the diversity of the nomination pool, and consequently, the selections. She involved the committee in establishing outreach activities, which would increase awareness among the general population of the importance of nominating people for these awards. She raised the accountability and created an atmosphere of open and respectful communication, with the consequence that difficult conversations are held and diverse opinions are presented for committee consideration.

Krista Paquin (Meritorious SES Award Recipient)

Ms. Krista Paquin became the Associate Director of GSFC in September 2004. She reports to the Center Director and shares responsibility for executive leadership and management oversight of one of the largest engineering, science, and project management organizations in the country. With an annual budget of almost $3 billion annually, over 9,000 civil service and onsite contractor employees, 1,121 acres, 33 major buildings, 40 minor buildings, and technical facilities, GSFC delivers highly complex space-based end-to-end missions and scientific instruments. Ms. Paquin oversees all Center institutional resources, business planning processes, human capital, and Center operations.

She manages the Center overhead accounts, ensuring that costs are contained such that the Center remains cost competitive in an environment where it must compete for nearly a third of its work and where opportunities for new scientific missions are on the decrease.

Soon after Ms. Paquin took over as the Associate Director, the Center was faced with severe budget reductions to the direct-funded Research and Development projects. This resulted in a civil servant workforce without work assignments, skill imbalances, and the potential for higher overhead rates. For two successive budget cycles, she has successfully led a team of senior managers to deliver an executable institutional program budget that maintains constant General and Administrative (G&A) rates and fully utilizes the civil service workforce, despite tremendous change and unpredictability in the Agency funding situation.

Ms. Paquin has been the champion for establishing formal organizational business strategies, outlining near and long-term goals, with emphasis on shared leadership. Ms. Paquin aggressively utilizes the plan to ensure that activities and new initiatives are derived from the plan and focused on the highest priority needs of the Center rather than becoming distractions. As the key tool for implementing the Business Strategy, Ms. Paquin manages the Integrated Business Planning process, which links the center work plan and program objectives with integrated full-cost elements. She was one of the chief architects of this process several years ago. Working with key Goddard leaders, Ms. Paquin modified the process to ensure that technology investment decisions are evaluated concurrent with institutional funding decisions and a balanced program of achieving priorities. She leads the Center-level development of multiyear workforce and facility competency plans that ensure core competencies are sustained and enhanced.

Ms. Paquin provides leadership for Center Human Capital transformation activities. She founded and chairs the Human Capital Board of Directors, which reviews and approves internally and externally driven changes in Human Capital systems, processes, and policies to ensure that tactical solutions align with long-term strategies. As the senior Goddard official for implementation of the class action settlement terms, she utilized the Board to oversee the implementation of 60 actions intended to improve the fairness of promotion, recognition, employee development, and selection processes and met all court prescribed deadlines.

Nancy Abell (Meritorious SES Award Recipient)

Nancy A. Abell became the Chief Financial Officer (CFO) in July 1998. She reports directly to the Agency Chief Financial Officer and has a matrix reporting responsibility directly to the GSFC Center Director. She is responsible for planning, analysis, and control of Center resources, specifically the development, implementation, and administration of the Goddard system of resources management and financial control.

In this capacity, Ms. Abell serves as the principal advisor to the Center Director concerning financial, budget, and resources management at GSFC.

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She and her staff manage an annual Center budget of approximately $3 billion, which supports the Center programs and projects, the institution, and a workforce that comprises approximately 10,000 civil service and contractor employees. Ms. Abell provides technical direction and management of approximately 110 civil servants and 50 support contractor personnel.

Ms. Abell's organization contains the first and only Regional Financial Office (RFO) for the Agency and her responsibility includes the management of the accounting and finance operations for three installations—GSFC, NASA Headquarters (HQ), and the NASA Management Office (NMO) for the Jet Propulsion Laboratory (JPL). The three installations combined account for approximately 40 percent of the Agency's financial transactions. Additionally, she has functional responsibility for a large decentralized resources management community, of approximately 200 people.

Ms. Abell began her public service career with NASA/GSFC in the summer of 1968 as a summer intern. Her extensive experience in resources and financial management make her a valuable senior manager at NASA.

During her tenure as the CFO, Ms. Abell has been instrumental in leading the Center's successful transition to the Agency's freshly installed Integrated Enterprise Management Program (IEMP) financial software. The IEMP program is an Agency initiative that transitioned 12 years worth of data from 10 installation legacy systems into a single Agency repository that feeds the Agency's accounting and financial information to provide compliance, standardization, and improved efficiency. Additionally, she has significantly advanced the stabilization efforts throughout the Center's highly technical science and engineering community, as well as the administrative user community.

In particular, Ms. Abell provided functional leadership for the successful implementation of IEMP's Travel Manager and Core Finance software for GSFC, HQ, and NMO/JPL. In addition, she has also led the successful implementation of the Web Time and Attendance Distribution System, e-Payroll and Labor Distribution System modules. The transition has occurred over several years beginning in 2003, representing a long period of major change and conflicting priorities among staff members. Throughout the period of transition, all installation financial operations were maintained. Her exemplary leadership skills were instrumental in effecting the smooth transition of very complex systems.

Dr. Michael King (Meritorious ST Award Recipient)

Dr. King is the Senior Project Scientist of the Earth Observing System (EOS), and has served as its scientific leader since August 1992. This system of Earth Observing satellites currently consists of 10 spacecraft in orbit that obtain vital information about the Earth's global surface, atmospheric temperature, and precipitation.

In addition to the satellite component and its science teams that develop algorithms for quantitative Earth-system science, the EOS program also consists of a science component and data system element, which supports long-term global observations of the land surface, biosphere, solid Earth, atmosphere, and oceans. Dr. King provides primary day-to-day interface between the Earth science community and the NASA Science Mission Directorate, and establishes and supports an extensive ground-based and airborne field validation program for EOS observations. He guides and leads the efforts of 24 project scientists and their deputies associated with the various EOS payloads and the EOS Data and Information System (EOSDIS). He leads the development of virtually all of NASA's Earth science education and outreach products.

Dr. King serves as a member of the Goddard Senior Fellows, a group of appointed senior scientists who advise the Center Director on new business and scientific issues.

Dr. King is one of NASA's most highly recognized scientists—based on his leadership of the EOS project and the scientific results that it continues to produce. Among his many recognitions, he was elected in 2003 as a Member of the National Academy of Engineering. In 2001, he received both the NASA Outstanding Leadership Medal in recognition of his exceptional leadership of the EOS, and he received Goddard's highest scientific award in Earth Science, the William Nordberg Memorial Award. In 2000, he received the Verner E. Suomi Award of the American Meteorological Society (AMS), the third highest medal of the AMS, for significant and fundamental contributions to remote sensing and radiative transfer, and for leadership in spacecraft experiments.

Dr. King has lectured on global change on all seven continents, and has been invited to speak before the Cabinet of South Africa, at press conferences, and television interviews, and has been a frequent invited keynote speaker at international conferences in South Africa, Argentina, Korea, Croatia, and the US. Dr. King has authored over 75 papers published in refereed scientific journals, in addition to editing four scientific documents and encyclopedia articles. He has 3,200 citations to his credit. One paper, which has received about 240 citations since it was published in 1978, is a classic in the determination of aerosol size distribution by inversion of spectral aerosol optical thickness measurements. Among his many papers, 13 have received over 100 citations and another 9 over 50, with 2 having received over 200 citations. ■

Scientists Find Possible Origin of Mysterious Red and Blue Lights in the Milky Way Galaxy

By Amy Pruett and Nancy Neal-Jones

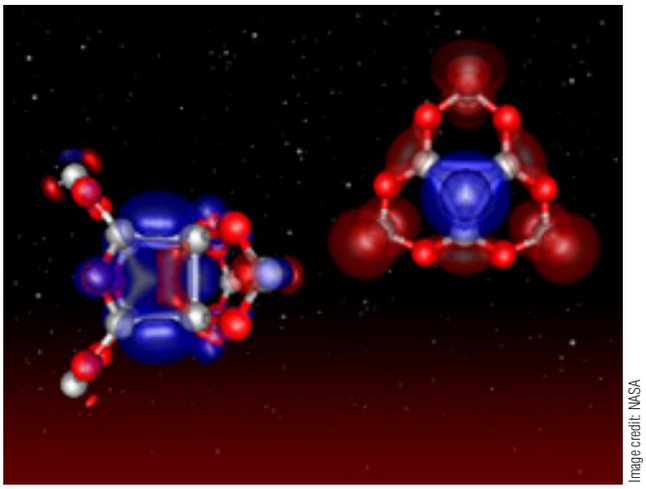

Image credit: NASA

Artist rendering of silicon oxide nanocluster silicates.

NASA's Goddard Space Flight Center, in collaboration with university scientists, have solved yet another mystery. For years, scientists have observed unstructured silicate particles in space, but could not pinpoint the origin of recent observations of a wide presence of crystalline silicates or their role in the Milky Way Galaxy.

The work of Ashraf Ali from Goddard; Shiv N. Khanna from Virginia Commonwealth University, Richmond; and A.W. Castleman, Jr., from The Pennsylvania State University, University Park, have successfully created nanoclusters of silicates. The team was also able to predict that these particles would have absorption features in the frequency range where red and blue lights are observed in the Galaxy, and could be the original building blocks of Earth and other planets in our solar system.

To further understand these silicon oxide nanoparticles (tiny particles made of silicon oxide molecules), Castleman and his colleagues undertook studies of cluster formations and their growth under expanding ionized gas and followed the changing composition of these clusters. The experiments were designed to enable scientists to get information about formation mechanisms operative in the space around stars where silicates are often found.

By exposing silicon monoxide to the plasma conditions, they were able to convert silicon oxide gas to clusters of silicon oxide nanoparticles. The formation of these particles have never been observed or proven before Ali, Castleman, Khanna, and their coworkers began their study. Employing theoretical methods to study the growth of silicon oxide nanoparticles, Khanna and his colleagues obtained direct insight into mechanisms and unraveled two puzzling mysteries. First, they demonstrated the detailed processes via which silicon oxide molecules assemble together to form silicates, thereby providing another step towards the understanding of the history of the formation of our solar system.

Secondly, the silicon oxide nanoparticles have electronic properties, which also allow the absorption of the blue and red light, and it might relate to the absorption of starlight and emission of red and blue light known as Extended Red Emission and Blue Luminescence, respectively. Astronomers have long observed the red lights in the Milky Way Galaxy, but have never been able to determine the exact nature of particles that were responsible for the emission.

"To understand the chemical evolution of the formation of planets, we have to understand the composition and degree of crystallinity of grains in interstellar space," said Ali.

By determining the role of the chemical processes involved in the formation of solids, scientists understand more of the mechanics that inspired the creation of Earth and its neighboring planets. The particles discovered likely played a major role in dust formation process in circumstellar environments of young and evolved stars.

Ali and his colleagues conducted their experimental research at The Pennsylvania State University Chemical Physics Laboratories in University Park, Penn., and the theoretical work in the Physics Department of The Virginia Commonwealth University. The investigations were made possible by funding from NASA, the U.S. Air Force, and the Department of Energy. The results were published in the June 19 issue of *American Chemical Society's Nanoletters.* ■

Goddard Researchers Win HQ Partnership Seed Funding

By Nancy Pekar

The Partnership Seed Fund has been established by the Innovative Partnerships Program (IPP) at Headquarters to enhance NASA's ability to meet mission technology goals. Designed to address barriers and initiate cost-shared, joint-development partnerships, the Seed Fund provides "bridge" funding to enable larger partnerships and development efforts to occur.

Four Goddard projects were selected for this inaugural round of funding.

Project: Development of a Continuous Adiabatic Demagnetization Refrigerator (CADR) and Integrated Control Electronics
NASA Personnel: Peter Shirron (Code 552)
Partners: Lake Shore Cryotronics and Lockheed Martin's Advanced Technology Center
Goal: To advance the technology readiness level (TRL) of the CADR through design changes in control electronics and cryogenic components that have the greatest impact on temperature stability, allowing the CADR to be used in upcoming astronomy missions.

Project: Infusing Environmental Knowledge into Decision Support and Planning Tools for Exploration Mission Operations
NASA Personnel: Julia Loftis (Code 580)
Partner: United Space Alliance (USA)
Goal: To integrate Goddard's Integrated Lunar Information Architecture for Decision Support (ILIADS) lunar geospatial information system (GIS) software tools with USA's Questus™, a crew-centric management and planning applications suite, thereby creating collaborative tools that will be used for near-term Lunar Precursor and Robotic Program (LPRP) exploration mission formulation studies, analyses, and operations, as well as to conduct real-time and safe crew-centric lunar sorties in the long term.

Project: Large Focal Plane Technology for Simultaneous Imaging and Guiding
NASA Personnel: John Mather (Codes 665 and 443) and Brent Mott (Code 553)
Partners: Lockheed Martin/Sunnyvale, Rockwell Scientific, Conceptual Analytics
Goal: To provide NASA with a new architecture for future large observatories in space through implementation of a focal-plane concept, which significantly reduces system complexity, cost, and risk while providing the extreme performance required for future missions.

Project: Lightweight, Cryostable, Low-Cost Mirrors for the Next Generation of Space Telescopes
NASA Personnel: David Content (Code 551), Douglas Rabin (Code 671), Ron Eng (MSFC), and Dominic Benford (Code 665)
Partner: ITT Space Systems
Goal: To advance the TRL of a "multi-core" borosilicate, or ultra-low-expansion (ULE), glass mirror architecture that can improve scientific return (by enabling a larger aperture at lower cost) of near-term mission concepts at the Discovery/MIDEX level, including exoplanet coronagraphs, solar spectroscopic imagers, or dark-energy telescopes.

Goddard's IPP office managed the submission process for this Center's proposals, reviewed the more than 50 preliminary proposals, and then selected projects for full proposal development. The office also assisted with the development of the final eight proposals submitted to HQ.

In addition to helping researchers prepare for next year's Partnership Seed Fund solicitation, Goddard's IPP office will be pursuing other partnership development efforts for the many projects submitted as part of this year's efforts. ■

Goddard's Unsung Heros:

Gail Allen

By Alana Little

After 30 years of working at Goddard, Gail Allen, who works in the Logistics and Transportation Management Branch (Code 274), has seen and heard it all! Managers, scientists, and engineers alike rely on her as Goddard's Passport Agent to ensure they have up-to-date passports and visas to enable them to travel across the globe to support NASA's programs. Gail also provides extensive administrative support to her Branch, which provides all types of transportation services including project logistics support, traffic management, export control, travel, pickup/delivery services, and storage.

Photo credit: Pat Izzo

Caption: Gail Allen

Gail often works with travelers who give short notice to complete their documentation for trips to other countries however, she continues to meet their deadlines on time, every time. Gail tells travelers that the typical timeframe for processing a new passport takes 6 weeks, and passport renewals require 4 weeks. However, when she does receive short notice, she usually completes the entire process before the customer's deadline. Moreover, Goddard's travelers have come to rely on her for these types of results. In fact, Gail does her job so well that she only recently received a back-up person to handle her Passport Agent duties when she is not available. Gail said she doesn't mind the responsibility and busy schedule because she loves her job and enjoys working with her customers.

Gail has experienced several emergencies involving travelers going on back-to-back travel and of travelers going to various countries for which visas are required.

A recent example of a back-to-back travel emergency occurred when a traveler returned from a trip to India and Gail had to work her magic and arrange to have his passport delivered to him for another immediate trip to China.

The tools Gail uses to do her job are almost as important as knowing with whom to talk to get a passport approved almost overnight. "Travel Manager is a big help," she said, "but I am looking forward to the change to E-Travel. With E-Travel, a traveler can book travel from start to finish including flights, hotels, and car rentals." This may not seem that important, but Gail still remembers frequently having to call three or more different companies to get everything booked if some did not have what she needed.

Travel has definitely come a long way from when Gail was just a Cooperative Office Experience (COE) student back in 1976.

Because Gail has been Goddard's Passport Agent for so many years, I asked her how often she traveled and what her most exotic trip was. She replied, "In 2001, I attended the Blacks in Government Conference in Los Angeles, California. This was my first time flying." I showed my surprise at her answer, and then she added that she had plans to visit Europe in the near future.

I finally asked Gail if there was anything she wanted the people of Goddard to know, and she replied, "There are two things. First, Goddard is a great place to work. I've been in Code 200 for 30 years, so that really says something. Second, if you are going on official travel, make sure you have an official passport. You need one passport for official travel and one for personal travel to avoid a conflict of interest while on travel." ■