



Godard View



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LaunchFest is Coming

By John Putman



This Saturday, September 13, 2008, from 10:00 a.m. to 4:30 p.m., NASA Goddard Space Flight Center will be opening its doors to the public for LaunchFest, an open house highlighting Goddard and its major missions.

This event will give the public an inside look at the facilities and culture of the Center, and a glimpse into many current and future NASA missions. The day will include a variety of activities, demonstrations, Center tours, live entertainment, delicious food, and much more.

LaunchFest is sponsored in part by Ball Aerospace, Honeywell International, Lockheed Martin, Comcast, and other sponsors, and is made possible by a partnership with the National Capital Section of the American Institute of Aeronautics and Astronautics.

Look for more details and information on LaunchFest at:
<http://www.nasa.gov/centers/goddard/events/launchfest.html>. ■



Photo Credit: Debora McCallum



Photo Credit: Debora McCallum

Caption: Tents go up in front of Building 8 in preparation for LaunchFest.

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Cover caption: Willis Jenkins, Jr. stands by an *Interstellar Boundary Explorer* (IBEX) display.

Image credit: NASA.

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 john.m.putman@nasa.gov. Ideas for new stories are welcome but will be published as space allows. All submissions are subject to editing.

Fermi Gamma-ray Space Telescope Gets Introduced to the Goddard Community

By Rob Gutro

The *Gamma-ray Large Area Space Telescope* (GLAST) was renamed on August 26. It was renamed the *Fermi Gamma-ray Space Telescope*, after Italian astrophysics pioneer Enrico Fermi.

To celebrate, on September 3, the Goddard community was introduced to an old friend. The "All-Hands on GLAST" was standing room only. Deputy Director Laurie Leshin hosted this "Fantastic celebration of the entire Center coming together." Leshin introduced Project Scientist Steve Ritz, who reiterated Goddard's collaborative effort on GLAST.

"This is a Goddard mission. Goddard is a great place to do these missions," Ritz said. He also thanked everyone involved with the project, including administrative staff, support staff, and the Public Affairs Office.

Deputy Project Scientist Dave Thompson gave the *Fermi* First Light presentation, which included a brief biography of Enrico Fermi and his work studying high energy physics. Thompson then went on to explain that *Fermi* has already seen 31 gamma-ray bursts and how more are being seen every week. "We have only scratched the surface of what the *Fermi Gamma-ray Space Telescope* can do," said Thompson. The presentation was followed by a lengthy question and answer session.



Photo Credit: Bill Hrybyk

Caption: Center Director Rob Strain, Deputy Director Laurie Leshin, and others listen to the Fermi First Light presentation.



Photo Credit: Bill Hrybyk

Caption: Some of the standing room only crowd at the Fermi All Hands.

After employees learned about *Fermi*'s name and findings, they were treated to a reception with refreshments outside the Building 8 Auditorium. Many lingered in the hallway talking about *Fermi* and the exciting things to come.

For more information about the *Fermi Gamma-ray Space Telescope*, please visit: <http://www.nasa.gov/fermi>. ■



Photo Credit: Bill Hrybyk

Caption: Deputy Project Scientist Dave Thompson speaks on Fermi.

Goddard Shows Off Contributions to *Constellation's* LSS Project

By James Law

As a key contributor to the Agency's efforts to return humans to the Moon and maintain a sustained presence once there, the Goddard community was all ears on August 20 as Chris Culbert, the *Constellation* Program's Lunar Surface Systems (LSS) Project Manager, visited Greenbelt.

During an all-hands meeting hosted by Goddard's Exploration Systems Projects (ESP), Culbert offered a glimpse into the LSS project's current activities, plans, and future opportunities. More than 150 Goddard employees crowded into the Building 3 Auditorium with more attending via video teleconferencing from the Wallops Flight Facility and the Independent Verification and Validation facility.

Established in August 2007, the LSS project will develop a sustained human presence on the Moon to promote exploration, science, commerce, and to further our Nation's preeminence in space exploration. It directly supports NASA's strategic goals established in 2006 by the NASA Administrator and will serve as a stepping stone to future exploration of Mars.

Under the management of ESP, the Center is already leading two critical LSS domains: communications infrastructure and lunar navigation. Goddard's Communications, Standards, and Technology Laboratory (CSTL) is currently supporting modeling and simulation efforts to demonstrate command, control, communications, and information interoperability and standards-based Internet Protocol communications. Goddard's Dave Israel manages the CSTL and serves as the LSS Domain Lead for Communications and Tracking.

The Center has been assigned to identify and analyze the unique technical challenges of navigating on the Moon's surface. Richard Lynch, Code 599, serves as the LSS Domain Lead for Navigation and is actively working to address these challenges through projects like the Lunar Navigation Determination System, Weak Global Positioning System Receiver, Hazard Avoidance and Position Control, Adaptive Sensor Fleet, and Celestial Navigation.

Culbert highlighted several post-Lunar Capability Concept Review results: a consistent, compatible definition of the transportation system, performance and cost estimates for the system, a risk assessment associated with delivering the system, and at least one viable example of how the system could be used to establish a full outpost capability.

"We've taken a good look through this last round of architecture activity and feel reasonably comfortable that it's a viable program," said Culbert. "Given that we're a decade away from flying these systems, it looks pretty good."

Next steps for the LSS project include joining with potential international and commercial partners to continue developing concepts and approaches for establishing a full outpost capability and, consistent with budget projections, clarifying NASA's contributions. "Our goal is to go to a Mission Concept Review in roughly the 2010 timeframe, and maybe as far as a System Requirement Review in the 2012 timeframe," added Culbert.

During the question and answer session, it was clear that the Goddard community is eager to be more involved in LSS. "I think you can see from the attendance here that there is a whole lot of interest in what you're doing," said Goddard Deputy Director of Engineering Dennis Andrucyk.

Culbert's visit included a tour of more than a dozen Goddard technology capabilities, including communications and navigation, avionics, software design, cryogenic fluid management, composite structures, test and verification, the Integrated Lunar Information Architecture for Decision Support (ILIADS), robotic surface operations, serviceability, and cargo handling. The tour also highlighted the Center's broad scientific capabilities, which can be applied to exploration needs from development of flight instruments to analysis and application of scientific data for decision support.



Caption: Quang Nguyen (center), Product Development Lead, and Alan Leung (right), Bus Interface Card Designer and Test Lead for the James Webb Space Telescope/Integrated Science Instrument Module Instrument Command and Data Handling System, discuss lunar avionics with Chris Culbert.

Other demonstrations showed the cooperation between scientists and engineers working in various domains from heliophysics to astrophysics to planetary science, collaborating on space weather forecasting, understanding regolith composition and the complex lunar plasma/dust environment, and mitigating the effects of dust and radiation. Culbert also viewed critical flight projects, including the *Lunar Reconnaissance Orbiter* and the Sample Analysis at Mars instrument.

According to Bob Menrad, Goddard ESP Manager, the relationship between the Center and LSS will continue to develop in the future. "LSS is where the tires meet the road in regards to the NASA strategic goal of a lunar human presence," he said. "The GSFC community has the ability to go from cradle to grave and from concept to execution, and will advance the development of technologies for new concepts in the future," he added. "Goddard personnel bring a rich blend of competencies to the missions they work on, and we look forward to a rich relationship that will only grow over time as the LSS needs grow."

For more information about ESP and Goddard's contribution to exploration, visit: <http://explorationatgoddard.gsfc.nasa.gov>. ■

NASA Explorer Realizes Possibility of Believing, Achieving

By Dewayne Washington

Willis Jenkins, Jr., is the Program Executive for NASA's Explorers Program, Science Mission Directorate/Heliophysics Division at NASA Headquarters. He is also the Program Executive for the *Interstellar Boundary Explorer* (IBEX), a mission to achieve the first observations of the region beyond the termination shock at the edge of our solar system.

"The NASA Apollo missions really sparked my interest and I vividly remember when we landed on the Moon," Jenkins recalls. "I was not really into looking up at the stars but I did dream of things that I could do up there."

In the mid-60s, as NASA mission managers and technicians were exploring the intricacies of space travel and communication, this Washington, D.C. native was also exploring transportation and communication. At age 6, Willie was working under the family car with his dad, a year later he had already built an in-house intercom, and by age 9 he was able to electronically jam local area radio frequencies.

"I told him he was going to be the first man on the Moon, but I often wondered if he was going to blow the house up," says his mother, Dorothy Jenkins. "I was actually glad he got that scholarship to go away to school."

Jenkins was recognized as a gifted student in junior high school by the Charles E. Merrill Foundation program known as "A Better Chance" (ABC). He began tenth grade attending North Andover High in North Andover, Mass., but later transferred to Amherst Regional High School in Amherst, Mass. At an age when most boys are struggling with sports, homework, and girls, 15-year-old Jenkins was also adjusting to a life away from home.

"I remember when he went off to school he was very lonely," his mom said. "I always told him he could be whatever he wanted to be." Jenkins admits the experience taught him to be responsible.

With long distance family support, Jenkins was able to finish high school early. He would spend his last high school semester adjusting to college life while attending the University of Massachusetts studying premed. "I was interested in biomedical, but I was also interested in electrical." The solution for Jenkins was to study both. "I decided I could invent the machinery that I could use in the operating room."

He continued studying and returned to Northeastern University in Massachusetts several years later to obtain his electrical engineering degree. Jenkins was then able to take on more responsibilities to include several major Government contractors. It wasn't long before he was working on NASA launch vehicles, satellite communications, and electrical engineering work for the *International Space Station* robotic arm.

Jenkins eventually became a civil servant at NASA Goddard Space Flight Center (GSFC), working on science missions such as *Swift*, *Time History of Events and Macroscale Interactions during Substorms* (THEMIS), and

LandSat-7. After a temporary assignment to the Explorer Program at NASA Headquarters, he returned to Goddard before accepting a permanent position with the program in 2003. As Program Executive, Jenkins manages NASA's oldest program dedicated to exploration.

Since 1958, the Explorers Program has been involved in more than 85 U.S. and cooperative international missions launched to explore our universe. "I really enjoy my work at NASA," Jenkins says. "I have been able to utilize what I know to help others make a major impact on the space exploration work we do for the Nation."



Caption: Willis Jenkins at NASA Headquarters in Washington, D.C.

A desire to explore convinced him to take on the additional responsibilities of Project Executive for IBEX. "I decided this would be another great opportunity for me to explore how things work."

Jenkins believes career opportunities have provided experiences necessary for him to become a member of an elite organization created to explore. "I take seriously the oath of office I took to work on behalf of the tax payers of the United States. I really take that to heart," Jenkins says.

When asked about his wife, Jenkins radiates a huge smile, "She's beautiful, isn't she?" Tina Jenkins is a Project Engineer at Goddard. With their two daughters, the family gives back to the community. "It is a family affair that we try to help others along the way."

Over the years, Jenkins has received numerous awards and recognition for the superior performance of his duties. In 2008, he received a NASA Equal Employment Opportunity Medal and a NASA Medal for his contributions to the THEMIS mission.

Jenkins believes his greatest work has been his participation in the education and public outreach efforts for the Agency. "I love to go out and talk with kids and tell them they can dream and be whatever they want to be," familiar words that have already propelled an exploring youth to discover the possibilities of believing and achieving. ■

Improving *Hubble's* Space Armor

By Kelsey Paquin

When astronauts return to *Hubble* for Servicing Mission 4 this fall, they will be revamping and reenergizing the telescope for the final leg of its journey. One of their tasks will be the installation of new outer blanket layers, or NOBLs.

Since its deployment, *Hubble's* thermal blankets have taken the brunt of the harsh space environment. Extreme temperature swings, solar radiation, and micro-meteoroids have been slowly degrading the telescope's protective covering. By examining blankets returned from prior servicing missions, NASA engineers determined much of the deterioration is actually cosmetic.

The NOBLs to be installed during Servicing Mission 4 are different from the original multilayer blanketing, but they will perform the same job. Instead of removing and replacing old thermal blankets, astronauts will simply install the NOBLs over them, creating a new and improved outer layer of blanketing.

When NASA sent astronauts to *Hubble* for its first servicing mission in 1993, the thermal blankets were in pristine condition after three and a half years in space. The crew did not note any extensive damage during their spacewalks, and small cracks were only visible in post-flight observations and photographs.



Caption: One of several tears in the outer layer of Hubble's multi-layer insulation blanket along the direct Sun-exposed side of the telescope.

The primary purpose of *Hubble's* thermal blankets is to protect *Hubble's* sensitive components from the harsh environmental effects of space. The blankets do this by reflecting the Sun's energy during the daylight portion of *Hubble's* orbit around Earth, retaining just enough heat to keep the components from getting too cold during its nighttime orbit, and protecting the telescope from radiation and orbital debris.

It is the meticulously designed construction of the thermal blanketing that enables it to withstand the dangers of space. Sixteen thin layers of dimpled aluminized Kapton material are covered by an outer aluminized Teflon shell, all together measuring less than one-tenth of an inch thick. Many of *Hubble's* components are extremely temperature sensitive, so this insulation has been essential in allowing the telescope to operate as efficiently as possible.

The big surprise came in 1997 when astronauts returned for the second servicing mission. Though it had only been a little over three years since *Hubble* was last serviced, the crew noted significant damage to the multilayered blankets, with nearly 100 cracks measuring five inches or longer. The cracks had certainly not affected the operations of *Hubble*. Ground telemetry had not indicated that thermal blanket deterioration was causing any significant problems in temperature regulation.

Without knowing how long it would be before they would return to the telescope, the astronauts took action to safeguard against further damage. Using classic NASA ingenuity, they fashioned four patches out of single-layer sheets of aluminized Teflon and two out of 17-layer blankets. Those patches are still in place today.

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Improving *Hubble's* Space Armor

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Photo Credit: NASA

Caption: Goddard engineers Richard Strafella (left) and Larry Dell hold a new outer blanket layer, or NOBL, which features a new external radiator panel.

During Servicing Mission 3A in 1999, astronauts removed and replaced several of the more damaged portions of the blankets. Now, only three sections of original blanketing remain. Those are the areas where astronauts hope to install NOBLs during Servicing Mission 4.

Until now, *Hubble* had never gone more than four years without servicing, so NASA engineers are busy analyzing data that is helping them predict the current condition of the blankets.

According to Mike Weiss, Deputy Program Manager/Technical for the *Hubble Space Telescope* program at NASA's Goddard Space Flight Center, "We fully expect the thermal blankets to look worse than they did when we last departed *Hubble* in March of 2002 at the completion of Servicing Mission 3B.

"With knowledge gained from testing returned blanket material and from astronaut debriefs, NASA has worked hard to design NOBLs that will protect the most damaged and sensitive areas of the telescope," Weiss said. "Goddard engineers have also trained the flight crew regarding how to deal with both expected and unanticipated blanket conditions."

A positive result of the blanket's degradation is that it enables NASA engineers to learn much about material degradation during long-term space exposure. They have examined blankets returned from all previous

servicing missions and analyzed them to understand the mechanisms that cause blanket degradation. The engineers then used this information to improve thermal protection for *Hubble* as well as other spacecraft such as the *James Webb Space Telescope*. Improved thermal blanketing will not only extend *Hubble's* mission life, but will also help prolong the mission span of other telescopes currently in development.

There are a slew of tasks slated for Servicing Mission 4, so there is no guarantee there will be enough time to install all three NOBLs. Other tasks more vital to the mission are ranked higher on NASA's list of priorities, such as installing new instruments, batteries, and gyroscopes. Spacewalking time is at a premium and distinctions like this must be made.

As extensive as the damage may seem to the untrained eye, blanket cracks are mostly cosmetic. With so many layers, cracks in the outer surface of thermal blankets have very little effect on internal temperatures. It would be a very long time before the damage could be severe enough to stop *Hubble* from producing its characteristically amazing science.

If astronauts are able to install the NOBLs, *Hubble* will have the best protection possible for its precious cargo of scientific instruments. Even if this task cannot be performed, expect to see *Hubble* trekking steadily along, setting a pace for discovery that has yet to be matched. ■

Meet Some of the Goddard *Hubble* Team

By Susan Hendrix



Photo Credit: NASA

Caption: Jackie Townsend.

Jackie Townsend is the *Hubble* Wide Field Camera 3 Instrument Manager at NASA's Goddard Space Flight Center.

Her team is responsible for ensuring this new science instrument, to be installed on the telescope during Servicing Mission 4, meets its technical requirements, is assembled on time, and within cost.

Jackie manages numerous engineers, technicians, and scientists at approximately 10 major organizations around the country to ensure they deliver the best possible instrument to *Hubble*.

She has a B.S. in physics from the University of Maryland, College Park. ■



Photo Credit: NASA

Caption: Keith Waylus.

Keith Waylus is the Servicing Mission Operations Manager in the Space Telescope Operations Control Center at NASA's Goddard Space Flight Center.

He ensures his team of about 90 engineers is fully prepared to carry out Servicing Mission 4 to *Hubble*. Keith ensures that the team is properly trained, procedures are built to command the telescope, and the control center is functioning properly.

During the mission, Keith will work as the Mission Operations Manager. He will be assigned to the 12-hour orbit shift, which includes the rendezvous with *Hubble*, the spacewalks, and deployment of *Hubble*. There is also a 12-hour planning shift, during which any more planning occurs to make sure the timelines are ready for the next day's spacewalks.

Keith has a B.S. in aerospace engineering from the University of Maryland and an M.S. in mechanical engineering from the University of Houston. ■