NASA Glenn Research Center
AeroSpace Frontiers
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Symposium highlights Return to Flight efforts

Glenn's technological contributions will help get the shuttle safely back into orbit

BY S. JENISE VERIS

With the launch window for Return to Flight less than a year away, Glenn's Space Flight Awareness Program honored over 200 Center employees who contributed to an Agencywide effort to reinstate the shuttle program during a Return to Flight (RTF) Symposium held October 20.

Photo by S. Jenise Veris

Liquid Hydrogen and Liquid Oxygen Cable Tray Test Team led by Scott Williamson explains some of the Center's Return to Flight efforts to employees during the open tours.

Glenn contributions to this remarkable effort were captured in a video produced by the Imaging Technology Center that premiered as an kick off to the day's event.

"Our Center has responded admirably to the challenges of the Agency's Columbia Accident Investigation and Return to Flight activities," said Angel Otero, chief, Space Operations Division. "These activities have showcased our Center's technical

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Glenn technology helps predict cardiac arrhythmias

Glenn's award-winning Embedded Web Technology (EWT) team is partnering with Cleveland MetroHealth Medical Center to develop an early warning system that measures and tracks astronauts' heart activity remotely on the ground via the Internet.

Working through the John Glenn Biomedical Engineering Consortium, a NASA team lead by David York, chief engineer, Flight Software Engineering Branch, and a MetroHealth team led by Dr. David Rosenbaum, director of the Heart & Vascular Center, will determine a method for assessing the heart's electrical condition during zero and partial gravity conditions like those found on Moon and Mars.

EWT is the unique marriage of World Wide Web technology and Embedded Systems technology that enables requests from standard browsers running on remote clients and returns HTML files. With the help of EWT, flight surgeons on the ground will be able to retrieve an astronaut's electrocardiogram (EKG) data while exercising via a wireless server transmitted to a NASA server to determine real time susceptibility to cardiac distress.

"NASA is responsible for the health and safety of astronauts in space," said York. "EWT will enhance NASA's ability to monitor changes in astronaut's hearts over extended periods of time traveling in space."

MetroHealth is basing its research on an advanced, 14-lead EKG test that uses

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Inside

Teams selected to research critical issues in electric propulsion

NASA has selected four teams that will share $6 million committed over a 3-year period to conduct research in electric propulsion to pave the way for long lived, far-reaching solar system exploration missions supporting the Vision for Space Exploration.

Glenn manages the acquisition and technical oversight of all four efforts selected under this NASA Research Announcement for "Research into Critical Issues in Electric Propulsion" under Prometheus within NASA's Exploration Systems Mission Directorate.

Drawing on the Center's experience and invention involving ion thrusters and microwave cathodes dating back to the 50's and 60's, Glenn leads the effort to develop an electrode-less microwave electron-cyclotron resonance cathode for high power ion propulsion systems. The University of Michigan, Ann Arbor, will partner in this award valued at approximately $1.8 million. The Center is also a member of the University of Dayton Research Institute, OH, team awarded nearly $0.4 million to improve the long-term stability of high temperature magnets for high power electric propulsion systems, another contribution to enabling long-lived thrusters.

"Microwave cathodes and high temperature magnets are keys to providing electric propulsion thrusters that have the stamina for Vision missions," said Don Palac, implementation manager for Advanced Nuclear Propulsion and Power Projects. "These, and the other selected critical technology developments, allow us to build long-lasting thrusters capable of traveling beyond Jupiter's orbit. They also provide flexibility for Mars robotic and human missions to use the same set of thrusters for orbit maneuvering and adjustment far longer than the current state of the art."

NASA's Marshall Space Flight Center was awarded $1.7 to develop a high-power, two-stage pulsed plasma thruster system. The University of Alabama, Huntsville; University of Illinois at Urbana-Champaign; University of Michigan; and Aerojet, Redmond, WA; will be making contributions to this effort.

A group of three California-based aero companies make up the fourth team working to develop a long life pulsed-propellant injector for pulsed inductive thruster systems. Northrop Grumman Space Technology, Redondo Beach; RLD Associates, Encino; and VACCO Industries, South El Monte; will share the award for this work valued at approximately $1.9 million over nearly 2 years.

For more information about NASA's Prometheus Program on the Internet, visit http://exploration.nasa.gov/proprom.html. ◆

HQ Appointments

Dr. Garvin

Dr. James B. Garvin has been named NASA's new chief scientist. Garvin replaces veteran astronaut John Grunsfeld who returned to Johnson to begin training as an astronaut for a long duration mission, the specifics of which will be announced at a later date. Grunsfeld will also provide expert support and counsel to NASA's Astronaut Office.

As the Agency's chief scientist, he will work to ensure the scientific merit of NASA's programs, including those embracing exploration. Garvin's primary areas of scientific specialty include laser altimetry of terrestrial and planetary landscapes; geology of impact craters relevant to exploration of the moon and Mars; and sedimentology on Mars, Earth and Venus.

Rex Geveden has been named NASA's new chief engineer and director of independent technical authority. Geveden succeeds Theron Bradley, Jr., who retired on October 4.

Geveden served as deputy director of NASA Marshall since July 2003. As chief engineer, he reports directly to

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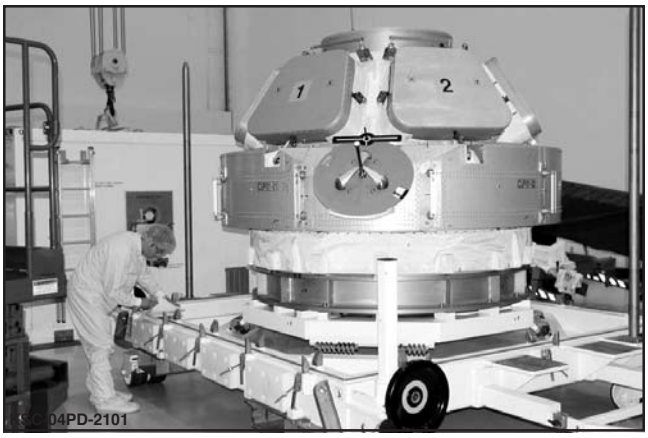
Room with an out-of-this-world view arrives at NASA



The world's ultimate observation deck, built in Italy for the United States segment of the International Space Station (ISS) has arrived at NASA Kennedy. The Cupola, a dome-shaped module with seven windows, is the final element to be installed on the ISS by early 2009. Cupola will give astronauts a panoramic view of operations outside the orbiting complex and enhance the robotic-arm operator's situational awareness, supplementing television camera views and graphics. It will provide external observation capabilities during spacewalks, docking operations, hardware surveys, and for Earth and celestial studies.

Photo Courtesy of NASA Kennedy

Return to Flight Symposium

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excellence, outstanding professionalism, and dedication. I have been very proud to be involved with the outstanding individuals who have made and continue to make great contributions to NASA's RTF efforts."

Right: Frank Ritzert discusses the Refractory Metal Wrap to Ohio News Network reporter Brian McIntyre. Below: John Doe displays shuttle acutator gears being tested.

Photos by S. Jenise Veris and Doreen Zudell

Frank Ritzert, Advanced Metallics Branch, team lead for the **Refractory Metal Wrap**, was the first of six panelists that gave a brief overview of RTF responsibilities and the current status of those efforts. He shared design issues that are being examined to improve this metallic sheet over-wrap concept for protection during reentry or on-orbit repair of the reinforced carbon-carbon (RCC) leading edges of the Space Shuttle Orbiter, identified as the area that caused the Columbia accident.

The Glenn-developed material known as **GRABER**, (Glenn Refractory Adhesive for Bonding and Exterior Repair) is a ceramic material also under consideration for in-space repair of large and small cracks in the shuttle wing leading edge. Dr. Mrityunjay "Jay" Singh, QSS/Ceramics Branch, leads the team that developed the GRABER material. He cited GRABER's RTF successes and other applications being explored in the RCC Repair Research and Development Program.

The RCC material applied on the wing leading edge and nose cap, where maximum temperatures are reached on reentry, was originally designed to safely operate for 100 missions. Glenn's **RCC Team,** led by Anthony Calomino, Life Prediction Branch, is conducting studies that will aid the RTF teams' understanding of how the material degrades with each mission cycle and the impact on safe mission limits. State-of-the-art facilities at Glenn, such as the Analytical Services and Metallography Laboratories, are key to the success of this effort.

A stray piece of foam material played a major role in the Columbia accident. Finding if and where any of the protuberance air load (PAL) ramps foam could be removed or reduced to prevent this reoccurrence was the task of the **Liquid Hydrogen** (LH2) and **Liquid Oxygen** (LOx) **Cable Tray Test Team** lead by Scott Williamson, Aero Power and Propulsion Test Engineering Division. Williams noted the different skills employed across the Center to design, fabricate, and install the necessary hardware to perform the PAL ramp tests inside the 8- by 6-Foot Supersonic Wind Tunnel.

Over the past year, Glenn's **Ballistic Impact Laboratory Team**, led by Matthew Melis, Structural Mechanics and Dynamics Branch, has been a primary participant in the RTF effort to develop an extensive spectrum of impact tests programs to assess the impact damage threat from debris sources—foam, ice, and other thermal protection material at different sizes, speeds, and angles—on orbiter windows, external tank structure, and orbiter leading edges.

Although there was no actuator failure associated with the Columbia accident, Glenn's **Shuttle Actuators Investigation Team** continues to play an important role in understanding and resolving the mechanical component and lubrication issues found in shuttle actuator gears. James Zakrajsek, Mechanical Components Branch, leads this team that is currently performing a variety of gear tests to determine the nature of wear and fretting damage related to gear tooth strength and damage tolerance over the life of an actuator.

Following a brief question and answer session, symposium participants were invited to visit demonstrations in Glenn facilities where work had a direct impact on RTF efforts. This event was the finale to an earlier awards banquet sponsored by Headquarters and Johnson's Space Flight Awareness Office. Each employee involved received a copy of the RTF video in a digitized-video disk. ◆

HQ Appointments

Continued from page 2

Geveden

Administrator O'Keefe for the overall review and technical readiness of all NASA programs. The Office of the Chief Engineer assures that the development efforts and missions operations are being planned and conducted on a sound engineering basis with proper controls and management of technical risks. ◆

Renaud visit

Joe Renaud, the new aerospace and defense advisor to Ohio Governor Robert Taft, took a 2–day tour of Glenn facilities at Lewis Field and Plum Brook, October 18 and 19, accompanied by Tom Carton, assistant director Ohio Department of Development (ODoD), and Pat Valente, deputy director, ODoD Technology Division. The tour followed briefings on Glenn's programmatic expertise and capabilities presented to Renaud, who leads the Ohio Aerospace and Defense Advisory Council efforts to aid and encourage collaboration between Federal aerospace and defense facilities to expand and develop new business opportunities in the State. Rick Manella, far right, chief, Structural Systems Dynamics Branch, gives an overview of the Microgravity Emissions Laboratory capabilities to, left to right, Carton, Renaud, and Valente.

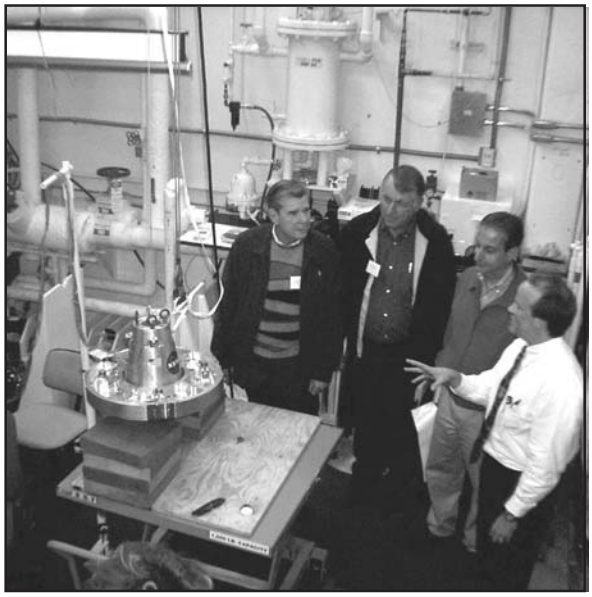


Photo by S. Jenise Veris

JIMO mission review

Photo by Kristin Jansen

On October 19, Glenn hosted the Monthly Management Review (MMR) for the Prometheus 1 spacecraft-Jupiter Icy Moons Orbiter (JIMO) mission, with the purpose of providing a summary of accomplishments, plans, and budget status to the Prometheus project management staff and team. The Prometheus project goal is to develop a nuclear-powered spacecraft, Prometheus 1, that could explore the three icy moons of Jupiter—Europa, Ganymede, and Callisto. This is the first monthly review to be hosted outside of the Jet Propulsion Laboratory, which oversees the mission. In addition to hosting the MMR and reviewing principal Glenn responsibilities in electric propulsion, power conversion, and heat rejection, Glenn provided in-depth reports on the power system materials development activities and spacecraft structural dynamic analyses being conducted at the Center.

Center for Space Medicine

On October 20, The Cleveland Clinic Foundation (CCF) launched a Center for Space Medicine. The center will work closely with NASA Glenn engineers and scientists to coordinate its efforts to research medical problems experienced by humans during long-term space flight. The establishment of this center will provide a means to strengthen linkages between the CCF and the emerging life science effort at Glenn. The CCF-Glenn art exhibition entitled "The Art of Science for Space" at the CCF Main Campus provided a colorful backdrop for the event. The exhibit includes NASA art, photographs, and artifacts and is on display through February 14, 2005. Pictured, above right, Dr. Peter Cavanagh, Lerner Research Institute; Dr. Joseph Hahn, CCF Innovations; Dr. Julian Earls, Glenn center director; and Dr. James Thomas, CCF; sign a Space Act Agreement establishing the Center for Space Medicine. Pictured, right below, is "The Art of Science for Space" display at CCF.

C-2004-1603 Photo by Marvin Smith

Photo courtesy of CCF

From the Director

A time of reflection and appreciation

Dr. Earls

At year's end, we traditionally celebrate, share generously within our communities, and count our blessings for family and friends. Also, this is the time of year that I personally thank all Glenn employees for your support and dedication to the work of the Center.

During this season of rest and renewal, let us reflect on our individual and collective strengths as we look forward to the hope and promise of the New Year. Next year will be an exciting one for Glenn as we implement a Strategic Management System that will continue to align our work with exploration and aeronautics. The system will enable our leadership to preserve the Center's legacy, protect the Center's resources, and engender sustained growth. We will expand our reach to bring in more work that is relevant to the Nation's Vision for Space Exploration.

We will continue to capitalize on our growing momentum to transform our culture to one that will support and sustain our best efforts. Now more than ever, each Glenn employee is critical to our vision for Glenn's prosperity.

May you find hope and joy in the ceremonies of the season. Have a safe and enjoyable holiday.

Happy Holidays,

John M. Earls

The "Ask the Director" highlight column will return in the January 2005 *AeroSpace Frontiers*.

Glenn supports Shoes and Clothes for Kids

Glenn employees continue a longstanding tradition of support to Shoes and Clothes for Kids (and its predessor Shoes For Kids), an organization that coordinates the purchase of shoes and warm clothing for needy children living in Northeast Ohio. This year's contributions exceed last year's donation by $600 and brings Glenn's total donation to $141,400 over the past 38 years. Pictured is Valerie McCormack, executive director, who came to Glenn to accept a $2500 check from Center Director Dr. Julian Earls and Glenn Shoe Fund Chairperson Ronald Alexander, External Programs Directorate.

Photo by S. Jenise Veris

"Special" Children's Fund underway

The Glenn "Special" Children's Fund continues its 46-tradition by collecting money for children of Glenn employees with special needs. Each employee will be receiving an informational flyer and envelope for donations in your mailbox. If you are an employee needing assistance for a family member, please contact Tim Hogan at 216–433–3111.

The Glenn "Special" Children's Fund was organized for the purpose of helping all Glenn employees who have children with special needs. We ask that you donate to this fund the money you normally would have spent on holiday cards and postage. One-hundred percent of donations are given to help the children.

Students experience space in the Arizona high desert

Glenn provides interactive educational experience

NASA's Desert Research and Technology Studies (RATS) team members talked with students and teachers at four NASA Explorer Schools (NES) in Glenn's region during a live one-hour satellite link videoconference on September 21.

This event is one in a series that is being coordinated and Web cast by the Digital Learning Network (DLN) teams at NASA Glenn and NASA Johnson to connect students from seven NES with Desert RATS scientists and engineers.

The Desert RATS team was in the field near Flagstaff, AZ, testing spacesuits and communication equipment designed to support future planetary exploration in conditions similar to those found on the Moon and Mars. For the seventh consecutive season, NASA's Desert RATS group continued the investigation and evaluation of a variety of prototype advanced extravehicular equipment being designed to support future planetary exploration. The group is composed of engineers and scientists from both NASA Glenn, Johnson, and Ames centers as well as supported by representatives from industry and academia.

Crossroads Elementary School, St. Paul, MN; Lorain Middle School, Lorain, OH; Scarlett Middle School, Ann Arbor, MI; and Southfield High School, Southfield, MI, engaged in several preprogram activities related to how spacesuits work and the tasks those astronauts perform while space walking. The students also participated in activities designed to introduce them to communications systems by learning how signals are broadcast over long distances and to the potential use of lunar resources in future exploration.

During the program students interacted with researchers in the Arizona high desert and discovered some of the methods NASA uses to prepare for future planetary exploration. They discussed the reasons for and benefits of field-testing, the challenges of communicating in space, and the design of prototype spacesuits. Students also discovered how experiments are designed and conducted in space.

"We were very excited to be able to connect students and educators to NASA scientists and engineers working in the field," said Glenn's DLN Program Manager Theresa Scott, CIO Business Office. "This experience gave students a firsthand look at the future of planetary exploration and how NASA is preparing for that event." ◆

Top photo: Desert RATS testing in Arizona. Bottom photo: Students at Lorain Middle School observing and participating via satellite link.

Administrator visits Explorer School

NASA Administrator Sean O'Keefe and astronaut Heidemarie M. Stefanyshyn-Piper visited with Cumberland High School, Cumberland, WI, students on October 27 to discuss future career opportunities they can pursue to fulfill the Vision for Space Exploration.

"It is vital that we partner with our schools to create learning environments that will prepare our young people for the journey ahead," O'Keefe said. "Our Nation's youth will inherit the challenge to explore Mars and beyond in the years to come. We must do what we can to engage them in the exciting possibilities the Vision for Space Exploration holds for them."

Cumberland Middle School is one of 100 schools selected nationwide to participate in the NASA Explorer Schools program. The program is a 3-year partnership between NASA and selected schools to provide opportunities and materials for teachers to spark student interest in science and math. To date, more than 100 teams of teachers and education administrators from diverse communities in 46 states have participated. ◆

Photo courtesy of Cumberland Middle School

Pictured is O'Keefe with Stefanyshyn-Piper at Cumberland Middle School in Wisconsin.

Glenn officially dedicates cryogenics facility

Cleveland Mayor Jane Campbell helps christen relocated research facility.

BY DOREEN B. ZUDELL

NASA Glenn and the City of Cleveland celebrated the reopening of the Small Multipurpose Research Facility (SMiRF) in a dedication ceremony on October 18. The recently completed facility was relocated by the City of Cleveland to clear the path for the new runway at Cleveland Hopkins International Airport.

Center Director Dr. Julian Earls, Deputy Director Richard Christiansen, Cleveland Mayor Jane Campbell, and Director of the Department of Port Control John Mok participated in the ceremony. Donald Campbell, who served as Glenn's center director during most of the planning and construction phases of the project, also attended.

Earls, Christiansen, Mayor Campbell, and Mok christened the facility by shattering carnations—frozen to cryogenic temperatures in liquid nitrogen—against the side of the SMiRF.

"Moving complex scientific facilities such as this one [the SmiRF] is complicated . . . the key to success was interagency cooperation," said Mayor Campbell.

SMiRF is part of Glenn's Creek Road Complex, which contains two cryogenic propellant research facilities and a supporting shop building. SMiRF specializes as a low-cost, small-scale screening facility for cryogenic fluid management concept, component, and subsystem testing, and long-term cryogenic storage using liquid hydrogen. It provides the ability to simulate space pressures and temperatures as well as launch pressure environments. The second research facility, known as the Cryogenic Components Lab–7, is designed to conduct low-cost, small-scale testing of cryogenic components.

"The Creek Road Complex is integral to our support for NASA's Vision for Space Exploration," said Mike Meyer, chief, Propellant Systems Branch. "We recently partnered on a successful NASA Marshall-led proposal to the Exploration Systems Mission Directorate at Head-quarters to develop key technologies for an in-space cryogenic propellant depot—effectively, a 'gas station in space' for vehicles heading to the Moon or Mars. Over the next 4 years we will be conducting a wide variety of tests at the Creek Road facilities to mature several technologies that are required to make an in-space cryogenic propellant depot possible."

After the ceremony at SMiRF, Earls, Christiansen, Mayor Campbell, and Mok briefly visited Lewis Little Folks (LLF), the Center's child development center. LLF students greeted the guests with a song and escorted them to the kindergarten classroom, where the children presented small gifts as a token of their appreciation for their new school. The school is one of three West Area buildings, along with the Fitness Center and Picnic Grounds, that were relocated by the City of Cleveland to make way for the airport expansion.

"The construction of these relocated facilities is an excellent example of the 'good-neighbor' relationship we have with the City of Cleveland," said Earls. "I am pleased that we worked together in this win-win solution."

The celebration culminated at the Picnic Grounds, where both Glenn and City of Cleveland relocation team workers were recognized for their hard work and dedication to the relocation project. Director Mok said that the work performed in the project will "benefit our community as we move forward into the 21st century." ◆

Photos by Marvin Smith

Top: left to right, Earls, Campbell, Mok and Christiansen (hidden) cryogenically christen the SMiRF. Middle: Meyer shares facility highlights with Campbell and Mok. Bottom: Earls and Campbell enjoy talking with LLF kindergartners.

Employees win with ACES

This mentoring program is designed to help employees achieve their potential.

BY DOREEN B. ZUDELL

Participants in the Advancing Careers and Employees Success (ACES) program testified to the importance of mentoring during the graduation celebration of ACES' inaugural class on November 4.

Facilitated by Kathy Wentworth-Drahosz of The Training Connection, Inc., the event provided opportunities for mentors and mentees alike to share their experiences and the discoveries they made during their yearlong involvement in the program. Twenty-six mentors and 26 mentees participated in the program, which was designed by a Center team specifically to help Glenn employees achieve their potential, to help the Center meet the challenges of the changing workforce, and to contribute to NASA's need for a strong learning organization.

"This program increased my awareness of management and allowed me to get out and learn more about different areas within the Center," said mentee Nazzetta W. Robinson, Office of Human Resource and Workforce Planning. "It also showed me the importance of making connections with others and passing along what I have learned."

Other participants affirmed this statement, adding program benefits such as exposure to Center processes, identifying goals and developing a career plan, and getting to know people that they would not normally meet.

Coordinated through the Organization Development and Training Office, ACES consists of formal training, facilitated matching of mentors and mentees, and a yearlong series of workshops and tune-up sessions. With the assistance of a training consultant, mentees develop a mentoring action plan that includes developmental assignments and networking opportunities.

"While one of the main objectives of the gathering was for mentors and mentees to thank one another and bring closure to the 'formal' mentoring relationship, we're confident that many of the relationships that have been established through this program will continue on an informal basis," said ACES Program Manager Judy Budd, Organization Development and Training Office.

For more information about the ACES program, contact Budd or visit the Web site at http://www.grc.nasa.gov/WWW/ODT/Mentoring/. ◆

C-2004-1604 Photo by Marvin Smith

During the ACES graduation activity, mentors and mentees participate in a team building exercise in which they must line up according to height without talking.

WWII code talker highlights activities

With the tone of an elder sharing Navajo folklore, Keith Little, the featured speaker for Glenn's 2004 Native American Month observance, spoke of the courage and contributions of Native Americans, particularly the legacy of Navajo Code Talkers. Little recalled how his curiosity as a young boy growing up on an Arizona reservation motivated him to see more of the world and to serve as a Navajo Code Talker in the U.S. Marine Corps.

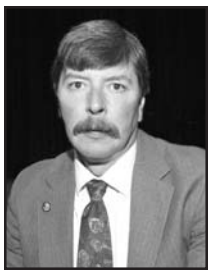
Navajo Code Talkers were responsible for developing and executing a secret code based on the Navajo language that helped the U.S. and its allies secure victory in World War II. Sophisticated enemy encryption experts were never able to crack the code. Little expressed delight at the opportunity to expand the circle of knowledge about their contributions, which are now prominently displayed in the new Smithsonian Institution National Museum of the American Indian to help educate all Americans about the lives and culture of this Nation's first inhabitants.

C-2004-1611 Photo by Marvin Smith

Glenn's Native American Month celebration also included storytelling by Mary Jane Buckshot and dance by the Lake Erie Native American Council. The same afternoon, Little was keynote speaker for the Veterans Awareness Program.

Following these special events, Little extended his reach to a broader audience through an interview on Cleveland's WCPN-Radio and NASA's Digital Learning Network via videoconferencing to students and teachers from Turtle Mountain Community College, ND, and two NASA Explorer Schools Circle of Nations, ND, and Cumberland Middle School, WI. Little is the 80-year old grandfather of Glenn's Avis Hudson, Office of Equal Opportunity Programs.

Center graduates nine in trades



Apprentice Graduate Stevens

The Center celebrated its skilled trades programs with graduation ceremonies for one trades apprentice and eight pre-apprentice graduates on October 29. Olga Gonzalez-Sanabria, director of Engineering and Technical Services, hosted the event while Stephen Mandes, executive director for the National Institute for Metalworking Skills, Inc. (NIMS), provided the keynote address.

Eric Stevens, Metals Technologies Branch, recently completed NASA's Trades Apprentice Program, which is administered by the Organization Development and Training Office.

Over the past 4 years, Stevens has completed extensive technical course-work coupled with on-the-job training within the Center. He received both state and national Certification as a Journeyperson from the U.S. Department of Labor. Previously, he earned a certificate of special merit from NIMS.

This year's Pre-Apprentice Machining Program graduates include Michele Balint, JoAnn Jejcic, Johnny Kaye, Kevin Mayes, Julio Rosa, Jack Tish, Andre Tufts, and Cynthia Williams. NASA Glenn, the Westside Industrial Retention & Expansion Network (WIRE-Net), and the City of Cleveland sponsor the program with the goal of providing skilled trades education to unemployed or underemployed adults.

C-2004-5140 Photos by Marvin Smith

Pictured above are Pre-Apprentice Graduates, left to right, standing, Rosa, Tufts, Tish, Balint, seated, Williams, Kaye, and Mayes. Not pictured, Jejcic.

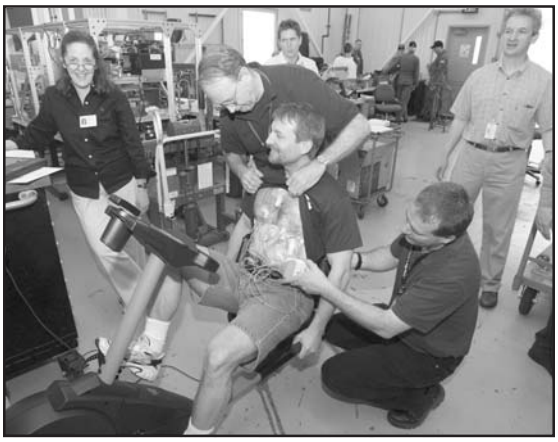
The intensive 32-week Pre-pprentice Machining Program involves 1/3 classroom training and 2/3 hands-on training to develop good manual machining skills in bench work, lathe and milling operations, surface grinding, and drill press operation. Students are required to earn NIMS Level I credentials during the program. Upon graduation the students are employed by local industry in entry-level positions such as machine operator, or as apprentices for precision machinist or tool and die maker. ◆

Glenn and MetroHealth team for astronauts

Continued from page 1

technology pioneered at Metro to screen for T-wave Alternans (TWA) or slight disturbances or changes in the heart's rhythm during a specialized stress test. These subtle, yet virtually invisible changes in the heart's electrical condition will appear on the TWA of someone at risk for cardiac arrhythmias that can lead to sudden cardiac death. This is the most common cause of death in the United States, annually claiming the lives of more than 400,000 Americans.

C-2004-722 Photo by Marvin Smith



Subjects are hooked up to a 14-lead EKG while pedaling a stationary bike for up to 15 minutes to gauge their heart rate before, during, and after exercise. Data is transmitted through a compact unit (embedded system) stored inside a holster that is worn on the ground and in flight.

"Since there is clearly evidence of astronauts and cosmonauts' experiencing arrhythmia during space flight, NASA wanted to use this technology to detect how microgravity and weightlessness enhance incidence of the heart's electrical instability," said Rosenbaum. "TWAs are a high marker for susceptibility to risk of cardiac arrhythmias, found in 70 to 80 percent of patients at risk."

Between May and October, NASA conducted noninvasive testing involving ground and in-flight measures taken on 15 test subjects using the same computer technology and exercise tests. NASA's KC–135 was used to simulate the weightlessness of space.

This research is part of a multi-phase initiative implemented by NASA and the National Space Biomedical Research Institute to design and test countermeasures and medical support technologies that maximize human performance in space, reduce biomedical hazards, and support medical care. ◆

People

Bencic

Bidwell

Dr. Hunter

Dr. Manning

Manzo

Roser

Promotion

Kathryn Roser was selected as the new executive support assistant for the Office of the Chief Financial Officer (CFO), effective November 14. Roser, who began her Glenn career 16 years ago, brings to her new position great CFO experience having served the entire period in the Center's Resources Analysis and Management Office. Earlier this year, Roser received a Glenn Outstanding Clerical Award.

Awards

Alderson Broaddus College presented an Alumni Achievement Award to **Michelle Manzo,** Electrochemistry Branch, during the Homecoming Alumni Banquet held October 9, on campus in Philippi, WV. Manzo, who was recognized for her career achievements in advancing aerospace battery technologies, began her NASA career in 1974 as a co-op student from Alderson Broaddus College.

Dr. Robert Manning, Antenna, Microwave and Optical System Branch, received a NASA Tech Brief award for the design and development of a method to evaluate signal-to-noise ratio (SNR) of an active communications link real time without any ancillary propagation beacon link. This work provides a correct and consistent mathematical basis for the proper statistical measure of the SNR, which is key to maintaining a reliable communications system in adverse propagation conditions. This technique reduces the cost and need for a separate link to assess prevailing propagation conditions on the communications link. It is also applicable for every situation involving the digital transmission of data over planetary and space communications links. The invention is described in NASA TM-2002-211703 "Real-Time In Situ Signal-To-Noise Ratio Estimation for the Assessment of Operational Communications Links."

The Society of Automotive Engineers (SAE) awarded the 2003 Wright Brothers Medal to **Colin Bidwell**, Icing Branch, and **Timothy Bencic,** Optical Instrumentation and NDE Branch. The award is presented to the author(s) of the best paper relating to the invention, development, design, construction, or operation of an aircraft and/or spacecraft. They accepted the award with co-authors Michael Papadakis, Arief Rachman, and See-Cheuk Wong from Wichita State University for the paper titled "An Experimental Investigation of SLD Impingement on Airfoils and Simulated Ice Shapes." The paper is the first public evaluation of supercooled large droplet impingement on both clean airfoils and airfoils with pre-cast ice shapes sponsored by NASA and the Federal Aviation Administration.

The Sensor's Division of Electrochemical Society recently elected **Dr. Gary Hunter,** Sensors and Electronics Branch, as division chair. During the 2-year term of his appointment, Hunter will be responsible for organizing symposia in topics such as chemical, biological, and physical sensors, as well as the processing technology of microelectromechanical systems (MEMS). He will also have charge of promoting educational activities for the division.

Retirements

Michael Baldizzi, Information Systems Division, retired on October 2, 2004, with 42 years of Federal service, including 38 with NASA.

Luequentian "Luke" Wilkins, Safety and Mission Assurance Directorate, retired on October 2, 2004, with 40 years of NASA service.

Joseph "Chris" Beins, Systems Engineering Division, retired on October 31, 2004, with 15 1/2 years of Federal Service, including 13 1/2 at NASA.

Beins

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Editor.....Doreen B. Zudell
InDyne, Inc.
Assistant Editor.....S. Jenise Veris
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Managing Editor.....Lori J. Rachul

DEADLINES: News items and brief announcements for publication in the January issue must be received by noon, December 17. The deadline for the February issue is noon, January 14. Submit contributions to the editor via e-mail, doreen.zudell@grc.nasa.gov, fax 216–433–8143, phone 216–433–5317 or 216–433–2888, or MS 3–11. Ideas for news stories are welcome but will be published as space allows. View us online at http://AeroSpaceFrontiers.grc.nasa.gov.

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News Notes

NEW YEAR FITNESS CLASSES: Sign up for the next session of Fitness Center classes is Wednesday, December 15, starting at 6 a.m. Mail your request to renee.c.barrett@grc.nasa.gov or call 216–433–6313 (voice mail is accepted). Go to http://fitness.grc.nasa.gov for the list of offerings.

SATURDAY VISITOR CENTER EVENT: The Glenn Visitor Center (VC) will present "Earth's Only Moon—Yesterday, Today and Tomorrow" on Wednesday, December 29 from 10 a.m. to 3 p.m. Learn more about the Moon's geology, the early efforts to explore its surface, and the Nation's plans to return to the Moon. Presentations as follows: 11 a.m.—"Lunar Revelations: An Overview of Lunar Science," and 1 p.m. —"Journey to the Moon: The Cleveland Connection." As always, free photos for everyone at the "Picture Yourself in Space" digital photo booth, kids "Make and Take" craft activities, and plenty of handouts. Reservations are suggested for the presentations. For more information or to make reservations, call 216–433–9653 or e-mail http://visit.grc.nasa.gov.

LESA MEETING: LESA/IFPTE, Local 28, will hold its next monthly membership meeting on Wednesday, January 12, at noon in the Employee Center, room 101.

AFGE MEETING: AFGE Local 2182 will hold its next monthly membership meeting on Wednesday, February 2, at 5 p.m., at Denny's Restaurant, 25912 Lorain Road, North Olmsted. All members are encouraged to attend.

Happy Holidays

In Appreciation

Thanks to all who donated their leave to me so that I could have additional time to take care of my husband, who was recently diagnosed with lung cancer. Your generosity has made all of the difference. May God continue to bless you.

—Linda Dukes-Campbell

Behind the Badge

a closer look at our colleagues

Terrian Nowden

Job Assignment: After completing my B.S. in mathematics, I obtained a position in the Computational Sciences Branch as a computer scientist. The 14 years prior to that, I worked as a technician in the Research Instrumentation Branch.
Time at NASA: I've worked at Glenn for 15 years.
Describe your family: Fortunately, my entire family is here in Ohio. Our family is somewhat large; my mother is the oldest of eight children. I am the oldest of the grandchildren and the proud aunt of one niece and three nephews.
Dream job: My dream job would be as a mountain tour guide at a ski resort in the western United States or Canada. This job would give me the opportunity to ski for free and earn a paycheck at the same time.
Hobbies/interests outside of NASA: I am a member of Mt. Zion Church of Oakwood. I am the financial secretary of the Inner City Ski Club. My father was one of the founders of this club, which is the oldest Black ski club in Ohio. In 1998, I represented my club in the Cleveland Metro Ski Council's Ski Queen Pageant. As much as I love to ski, I've been bowling longer. I belong to a family of women bowlers, which includes my mother, sister, aunt, and cousin. Currently, all of us bowl in the same league, but on three different teams. A member of the league once asked, "Do you all breed female bowlers?" In addition to bowling and skiing, I also enjoy bicycling, swimming, reading mysteries, listening to music, and eating!
Food temptations: I love food! I like to try new restaurants and dishes. But I'm always willing to go out for cheesecake and a meal at the Cheesecake Factory.
Philosophy to live by: Life is short, enjoy it!
Person you most admire: Jesus. We are fortunate not to have endured what He has.
Vacation fantasy: A 365-day sponsored tour around the world

In Memory

Evelyn Bazemore, XX, who retired in 19XX with XX years of NASA service, recently died. Bazemore was a graphic artist in the Engine Research Building. She was preceded in death by her huband, Martin, a NASA retiree .

Lawrence Brown Jr., 74, who retired in 1992 with 39 years of Federal service including 30 years with NASA, recently died. A Navy veteran, Brown began and ended his NASA career working in the Test Installation Division where he served as an electronic technician in the Electric Propulsion Lab, and later, as a supervisor in the Materials and Structures Laboratory. His son, Donald Brown, currently serves as an electrical engineer in the Central Process Systems Engineering Branch.

Edward Holmok, 89, who retired in 1978 with 35 years of Federal service, recently died. Holmok served as an instrument maker foreman at Glenn.

Glenn rewards Banks for counterintelligence awareness

The Security Management and Safeguards Office (SMSO) recently presented Bruce Banks, chief of Glenn's Electro-Physics Branch, with the first NASA Counterintelligence (CI) Program award. The award recognizes sustained commitment to protecting the security interests of NASA and the United States.

This award recognizes an individual the SMSO feels consistently supports the CI objectives and missions, reports potential foreign technology collection, and integrates counterintelligence principals into their daily work effort. A plaque, which accompanies the award, will be rotated throughout the Center every 6 months.

"It is through the involvement and efforts of employees like Bruce Banks that help ensure the protection of essential U.S. technologies," said Charles Scales, Director of Center Operations.

The NASA CI Program was officially ratified February 27, 2002, with the signing of NPD 1660.1, NASA Counterintelligence Policy. The program was designed for the propose of detecting, deterring, and neutralizing threats to NASA personnel, facilities, programs and projects by Foreign Intelligence Services, other foreign entities, and domestic or international terrorists.

The SMSO oversees the CI program at each NASA center with the objective of creating awareness and interacting with NASA programs and their representatives to recognize and report suspected foreign intelligence collection activities.

"CI integration strengthens the overall security program by promoting early identification and referral of cases involving possible espionage," explained David Malcom, SMSO special agent/ counterintelligence at Glenn. "CI involvement also enhances security applications in terms of targeting and methods of operation. The success of a center's CI Program heavily depends on the involvement and reporting by its employees."

Glenn has integrated counterintelligence principles and the use of classified foreign-collection threat information to improve the activities within programs to include risk management, threat awareness, illegal technology transfers, and preventing espionage. Based on Glenn employees reporting of suspicious activity, the SMSO is able to build upon previously observed trends of collection interest and activity by foreign companies and governments against the Agency.

In the last year the SMSO has made a concerted effort to facilitate employee reporting and involvement. Employees can now report suspicious activity by using the following e-mail address safeguards@grc.nasa.gov. ◆

C-2004-0000 Photo by Michelle Murphy

Center Director Julian Earls congratulates Banks on receiving the first CI Program award.

National Aeronautics and Space Administration

John H. Glenn Research Center
Lewis Field
21000 Brookpark Road
Cleveland, Ohio 44135

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