SPACE CENTER
Roundup

March 24, 2000

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Stellar employees receive Rotary awards

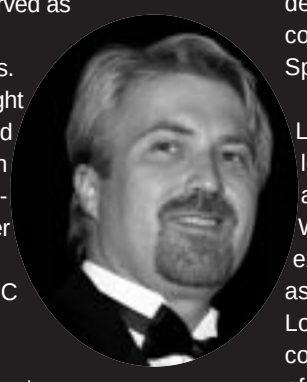
Young accepts National Space Trophy

JSC Associate Director (Technical) John Young, veteran of Gemini, Apollo and space shuttle missions, received the National Space Trophy at a March 10 black-tie celebration at Space Center Houston.

Several JSC employees received Stellar Awards from the non-profit Rotary National Award for Space Achievement Foundation, established in 1985 by the Space Center Rotary Club to recognize individuals who have made outstanding achievements in space, creating a greater public awareness of the benefits of space exploration.

Bob Castle Jr.

Young was selected for the NASA astronaut corps in September 1962 after serving 10 years in the U.S. Navy. He made a total of six space flights, Gemini 3, Gemini 10, Apollo 10, Apollo 16 and STS-1, the first space shuttle flight aboard *Columbia* in April 1981, and STS-9. From 1973 to 1987, he served as chief of NASA's Astronaut Office and helped plan 25 space shuttle missions. He later moved into space shuttle flight safety, as well as new space shuttle and space station development arenas. In his current position he oversees engineering and safety control for all center programs and activities.



Kriss Kennedy

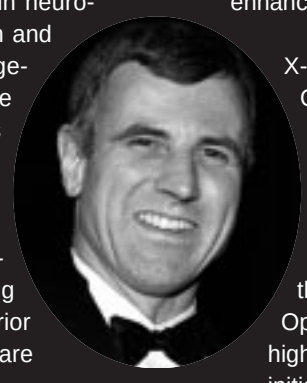
Other award winners included JSC Flight Director Bob Castle Jr. who received a Stellar Award for his outstanding leadership in the development of the flight control team operations concept and Russian interfaces to support the International Space Station.

JSC's Kriss Kennedy was honored for his significant contributions to the TransHab project, the design of the ISS alternative crew quarters, and the Mars Combo-Lander project.

JSC's Dr. Helen Lane earned a Stellar Award for her outstanding scientific accomplishments in nutrition and food science that have advanced the understanding and application of nutritional concepts for life in space and on Earth.

Helen Lane

Dr. Dave Williams received a Stellar Award for his achievements and leadership in neuroscience research and excellent management of the Space and Life Sciences Directorate at JSC.



Dave Williams

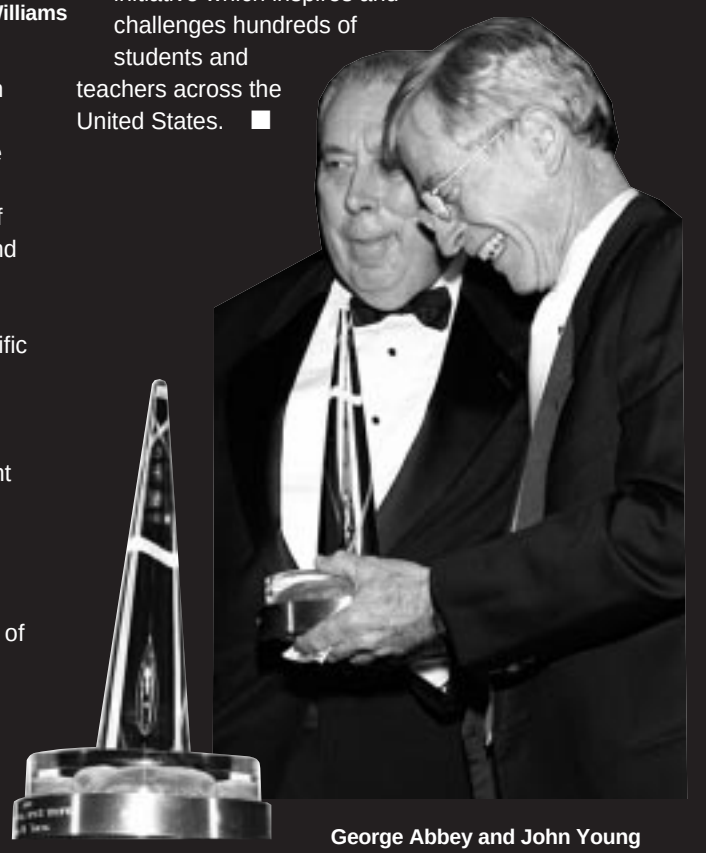
Also receiving a Stellar Award was JSC's Mark Bowman of Wyle Laboratories for his commitment to a working U.S.-Russian partnership and his superior performance in integrating U.S. hardware into Russian space vehicles.

And JSC's Dana Weigel, of Barrios Technology, earned a Stellar Award for her dedication, professionalism, and technical excellence in developing the Extra-Vehicular Activity procedures and conducting crew training for the successful third Hubble Space Telescope servicing mission.

Also receiving Stellar Awards were Del Freeman Jr. of Langley Research Center, for outstanding technical and leadership contributions to the development of advanced space transportation systems; Dr. Martin Weisskopf, of Marshall Space Flight Center, for scientific expertise, technical insight, leadership, and dedication as project scientist for the Chandra X-ray Observatory; Lorin Blewett, of Boeing, for his expertise in staged combustion rocket engines and successful management of the Space Shuttle Main Engine Development and Flight Operations Program; Larry Clark, of Lockheed Martin, for pioneering efforts in developing in-situ resource utilization technologies for use in reducing the mass and cost of planetary exploration; Dave Cochran, of Kistler Aerospace, for exceptional level of professional responsibility and technical leadership as structures manager for the K-1 Fully Reusable Launch Vehicle Program; Jeff Kincaid, of Boeing, for engineering leadership of the X-33 Linear Aerospike Rocket Engine Development Program teams; Charlie Murphy, of United Space Alliance, for establishing the NASA Shuttle Logistics Depot in Florida and for his leadership in transitioning it to United Space Alliance; and Dr. Kitt Reinhardt, of the Air Force Research Laboratory, for significant contributions to reducing the cost and enhancing the capability of future space power systems.

Four teams received Stellar Awards: JSC's X-38 Project Team, NASA's Chandra X-Ray Observatory Team, the Variable Specific Impulse Magnetoplasma Rocket Team, and the Student Tracked Atmospheric Research Satellite for Heuristic International Networking Experiment Team.

Finally, a special award was given to honor the NASA KC-135 Reduced Gravity Student Flight Opportunities Program for creating a unique and highly innovative engineering and science education initiative which inspires and challenges hundreds of students and teachers across the United States. ■



George Abbey and John Young

JSC domain users need to establish new personal identification number

Tighter security procedures, implemented by NASA/ISD and OAO/ODIN, will soon be in place for users requesting a JSC NT domain password reset. This is necessary to comply with center security directives.

As a result, starting April 3, 2000, all JSC NT domain users will be required to supply a personal identification number (PIN) when they call the JSC ODIN Help Desk to reset their JSC NT domain password.

All JSC NT domain users must go to the JSC NT domain PIN assignment Web page at https://pin.jsc.nasa.gov/ and enter a unique PIN, 4-50 characters.

This PIN will not expire and is locked after the initial creation. If a user forgets their PIN, they can contact an ID representative at URL

http://www4.jsc.nasa.gov/infosys/cisco/id_coor/

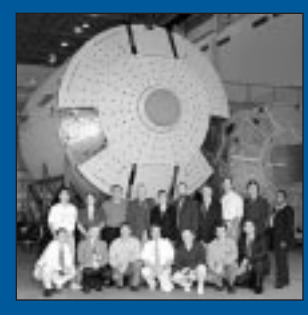
who will call the JSC ODIN Help Desk.

For more information on this new JSC security requirement, see

http://www4.jsc.nasa.gov/infosys/ntpass/pin-intro.htm.

Carter heads up Information Office. **Page 2**

The sky's the limit for JSC's Aircraft Ops. **Page 4**



Columbus lab begins testing at NBL. **Page 7**

Carter heads up Information Office

Jean E. (Jeanie) Carter is JSC's new Chief Information Officer. She replaces Jack Garman who retired in January after a distinguished career at NASA of 33 years.

Carter has been a member of the CIO office since its inception in 1994 and has served in a variety of increasingly responsible division and directorate staff positions while at JSC. Over the last several years, she has led JSC's involvement in a number of agency-wide Information Technology standards and security efforts, including leading the JSC penetration test team and chairing the Human Exploration and Development of Space (HEDS) I/T Security Team (HITS).

Jean Carter

> ***"With the challenges facing the advancement in Information Technology, we will continue to find ways to improve interoperability within the center as well as across the agency in conjunction with assessing the security risks and needs of the center.***
>
> –Jean Carter

Carter most recently served as JSC's Deputy Information Technology Security Manager, and in 1999, was named Deputy Chief Information Officer.

"I look forward to improving JSC's business processes and increasing effectiveness through the use of information technology, and improving our overall security posture," said Carter.

Carter joined JSC as a cooperative education student in 1984. She earned a B.A. in mathematics in 1987, and an M.B.A. in 1993 from the University of Houston, Clear Lake. ■

1999 NASA Honor Awards Ceremony

The NASA Honor Awards Ceremony was held on March 6 in the Teague Auditorium. More than 180 individuals and groups were nominated by center management and selected by the Incentive Awards Board at NASA Headquarters to receive NASA's highest honorary awards. Congressman Tom DeLay's opening remarks welcomed the awardees in the filled-to-capacity auditorium.

Each recipient of a NASA medal was presented with a framed certificate signed by NASA Administrator Daniel S. Goldin. Individuals selected to receive Group Achievement Awards on their teams' behalf received framed certificates. Certificates for individual participants of teams will be forwarded to the nominating organizations at a later date.

Following the ceremony, a reception was held in the lobby of the auditorium for award recipients and their guests. ■

The following is a list of the honorees, some of whom may have received their awards at earlier ceremonies:

NASA Distinguished Service Medal

Jeffrey W. Bantle
Randolph H. Brinkley
Curtis L. Brown Jr.
Robert D. Cabana
Franklin R. Chang-Díaz, Ph.D.
Bonnie J. Dunbar, Ph.D.
Jay H. Greene
Charles J. Precourt
Jerry L. Ross

NASA Distinguished Public Service Medal

Douglas C. Stone,
The Boeing Company

NASA Outstanding Leadership Medal

William G. Bastedo Jr.
Aldo J. Bordano Jr.
Robert E. Castle Jr.
Edward T. Chimenti
James D. Drewry Jr.
N. Wayne Hale Jr.
George E. Hyde
Richard M. Linnehan, DVM
Stephen K. Robinson, Ph.D.
Richard A. Searfoss
Terrence W. Wilcutt

NASA Exceptional Service Medal

Brantley J. Adams
Randall W. Adams
S. Jean Alexander
Lorraine Ossorio Anderson
William H. Arceneaux
Jeffrey J. Arend
William V. Bates Jr.
William P. Bays
Vincent L. Berend
June A. Boeckel
Gail L. Boyes
John M. Brennan Jr.
Anthony J. Butina
Jim D. Carr
Jean E. Carter
Yuan-Chyau Chang, Ph.D.
John B. Charles, Ph.D.
Jerry J. Clubb
Mable L. Cobbs
Michael G. Conley
Susan L. Creasy
Thomas E. Cremins
Nancy J. Currie, Ph.D.
John M. Curry
Denis L. Dahms
Bernestine D. Dickey
Richard Dinkel
Chirold D. Epp, Ph.D.
Richard W. Fox
Cynthia L. Garren
Stephen G. Gaylor
William H. Gerstenmaier
Mark S. Geyer
Edward P. Gonzalez
Claude A. Graves Jr.
David E. Greenthaner
Michael C. Gremillion
Gary P. Gutkowski
Lauri N. Hansen
Sam N. Hardee Jr.
Shelley A. Hilden
Daniel V. Jacobs
James D. Johnston Jr.
Thomas D. Jones, Ph.D.
Michael W. Kearney III
Maurice G. Kennedy
Mike Kinnan
Sergei K. Krikalev
Dennis A. Kross
Gerald K. Langford
Joseph K. LaRochelle
Kathleen C. Laurini
Wendy B. Lawrence
James C. LeBlanc
David M. Lengyel
Michelle P. Lewis
Steven W. Lindsey
Charles M. Lundquist III
Donna J. Mays
Larry B. McWhorter
Brian K. Mitchell
Stacey T. Nakamura
James H. Newman, Ph.D.
Victoria A. Nisbet
James R. Nise
John D. Norris
William C. Panter
Scott E. Parazynski, M.D.
Patrick S. Pilola
Stephen V. Porter
David M. Pruett
Sylvia G. Ramirez
Jene A. Richart
Theodore U. Ro
Judith L. Robinson, Ph.D.
Henry A. Rotter Jr.
Melanie W. Saunders, Ph.D.
Brenda K. Schmalz
Jack W. Seyl
Ernest E. Smith Jr.
Jeannette M. Spehar
Jon S. Symes
Dipak C. Talapatra, Ph.D.
Andrew S. W. Thomas, Ph.D.
Dawn A. Thomas
Valin B. Thorn
Kenneth O. Todd
Connie Van Praet-Cremins
Brenda L. Ward, Ph.D.
Gary D. Wessels Sr.
Jeffrey N. Williams
David A. Wolf, M.D.
Scott L. Wolf
Lucy V. Yates

NASA Exceptional Achievement Medal

Francisco Alanis
Timothy M. Ames
Brian L. Anderson
Charles D. Ardoin
Gregg J. Baumer
Barry E. Boswell
Susan H. Burns
Phillip S. Callen
Chi-Min Chang
Rickey D. Cissom
Gary L. Cox
James D. Dagen
James D. Dunn
Jefferson A. Dutton, Ph.D.
Donna L. Fender
Mark V. Glorioso
Richard L. Hill
Beth A. Humphries
Candace S. Hunt
Ricardo A. Machin
John P. McManamen
Charles R. Miller
Larry J. Moon
John F. Muratore
Lisa P. Price
Leslie J. Quiocho
Robert R. Rice
Joyce M. Rozewski
Michael J. See
Mark T. Severance
Michael A. Tigges
John K. Trainor
Lui Wang
John J. Zipay

NASA Public Service Medal

Oleg I. Babkov, Ph.D., Rocket Space Cooperation-Energia
Kim T. Dismukes, Information Dynamics, Inc.
Karen M. Engelauf, United Space Alliance
Burke O. Fort, Texas Space Grant Consortium
Leonid A. Gorshkov, Ph.D., Rocket Space Cooperation-Energia
Royce E. Mitchell, The Boeing Company
William R. Muehlberger, Ph.D., University of Texas at Austin
Jack G. Roach, Science Applications International Corporation
Jerry E. Siemers, The Boeing Company
Jared P. Squire, Ph.D., Yang Technologies, Inc.
John B. Vollmer, The Boeing Company
Louis S. Wheatcraft, Barrios Technology, Inc.
John E. Wilson, Ph.D., Clear Creek Independent School District
Michael G. Wood, The Boeing Company

NASA Group Achievement Award

Automated Transfer Vehicle Relocation Study Team
Canadian Space Agency Elements Integration Team
Composites Design, Testing, and Manufacturing Team
Configuration Management Team
Extended Nose Landing Gear Team
Ground Systems Requirements Team
International Space Station Imagery Team
ISS Procedures Development and Management Team
Logistics and Maintenance Team
Manifest Team
Neurolab Experiment Team
Russian-to-American Converter Unit Integration Team
Shuttle Training Aircraft Multi-Function Electronic Display Sub-System Integration Team
Space Station International Partners Office
Station Program Implementation Plan Volume 1 Development Team
TransHab Development Team
Unity Hardware Stowage, Processing and Certification Team
Vehicle Integrated Performance and Resource Management Team

COMMUNITY NEWS

Sweet success for Advanced Life Support researchers

Scientists are one step closer in their pursuit of food systems for the next generation of space exploration. In late January, agriculturists in JSC's Advanced Life Support Development Facility harvested the first-ever crop of chamber grown sweet potatoes, one of the Advanced Life Support Program's candidate crops.

The sweet potatoes are indistinguishable from your common grocer's pick but to the team that has been charged with investigating sustainable food solutions for long-term space voyages of the future, the harvest represents sweet success.

"This represents a significant test, both for Tuskegee University and for NASA," explained Dr. Dan Barta, NASA Horticulturist/Plant Physiologist. "This recent test represents a large scale, closed atmosphere where we actually were able to do some things we were not able to do previously. In addition to yield, the rate of photosynthesis of the crop was characterized. Plants can contribute to the purification of air by producing oxygen and removing carbon dioxide. Based on this test, we now have data to predict how much planted area would be required to meet a person's oxygen requirement.

Tuskegee University, a NASA University Research Center, has been tantamount to the progress of the food systems development through its Center for Food and Environmental Systems for Human Exploration of Space. URCs focus on a specific area of NASA interest and are sponsored by NASA's Minority University Research and Education Program, the Equal Opportunity Programs, Aerospace Technology, Life and Microgravity Sciences and Applications, Earth and Space Science, and Space Flight.

"JSC provides the hands-on technical collaborations and management of the Tuskegee URC," said Lupita Armendariz, manager of the MUREP at JSC.

Dr. Desmond Mortley, associate professor of Plant Science at Tuskegee University, teamed with Barta and Dr. Keith Henderson, NASA plant scientist, to design and conduct the test. Dr. Walter Hill, dean of the College of Agricultural, Environmental and Natural Sciences and director of the George Washington Carver Agricultural Experiment Station, recently visited JSC plant growth facilities to inspect the crop and return with experimental material for evaluation at Tuskegee. Hill was accompanied by Dr. Audrey Trotman, an environmental microbiologist who will explore how sweet potatoes can be used in waste recovery systems.

"We at Tuskegee University are absolutely delighted about the yield of sweet potatoes that was produced here at JSC," said Hill. "It's historical, it's phenomenal and it's going to make a difference in the program in the long term."

The work with crop plants also includes the development of highly fertile artificial soils, defining the amount of water recycling that can be achieved by plant transpiration, as well as utilization of resources recovered from solid wastes.

"Advanced life support systems are the next step in long term space exploration – be it to Mars, back to the moon or even to an asteroid," said Barta. "If a space habitat on another planets' surface is ever going to be self sufficient, then it needs to be able to produce food from recycled products – that's were plants come in."

A secondary goal of these growth experiments is using the knowledge gained to help food production challenges here on Earth.

"This research is of critical importance to many developing countries," explained Hill. "Many children and families rely on the sweet potato as a staple crop because of its nutritional value. We can apply the data learned carrying out objectives for planetary exploration, to studies we are concurrently running in parallel to help improve situations on Earth."

The sweet potato crop, planted September 22, 1999, was hydroponically grown, that is, grown without soil using a water-based nutrition system. The crop was grown in a gas-tight controlled environment chamber for 17 weeks and was closely monitored.

However, instead of heading to the produce counter like most potatoes, this crop is headed to the lab for analysis. A small selection was dedicated to the food lab for 'sensory evaluation' – yep, you got it, a taste test. Researchers there sliced, diced and cooked the potatoes into various recipes, like sweet potato french fries, to gauge the taste value of the crop. The remainder of the crop will be sent to other labs for such things as nutritional analysis, where they'll measure its various vitamin, protein, starch and carotene levels, as well as a tissue analysis that will reveal the mineral components of the produce such as calcium, nitrogen and magnesium. Yet another sample will go back into another chamber for shelf life studies to help determine exactly how well the potatoes react to storage conditions.

"We need to examine how this experimental crop compares to common field grown potatoes," explained Barta, the technical monitor for the Tuskegee research work.

All early indications are promising and the researchers are very pleased with the success of this initial crop, which yielded 125 pounds. ■

Photos available at:
http://advlifesupport.jsc.nasa.gov/

NASA JSC Photo 2000-01213 by Benny Benavides

REAPING THE REWARDS – JSC with Tuskegee University recently harvested the first crop of chamber grown sweet potatoes, a process that may be needed for extended space missions. Shown here, left to right, Dr. Dan Barta, NASA; Dr. Don Henninger, NASA; Albert Behrend, NASA; Dr. Walter Hill, Tuskegee University; and Dr. Audrey Trotman; Tuskegee University, hold a tray of the chamber potatoes. A tray of "inedibles" (ground up leaves and roots) that will be investigated for resource recovery is in front.

NASA Houston Livestock Show and Rodeo exhibit draws large crowds

Enthusiastic rodeo goers who visited the sprawling NASA exhibit at the Houston Livestock Show and Rodeo were treated to an out-of-this-world experience that had them kicking up their heels.

The show, which attracted record crowds this year, ran at the Astrodome complex from February 18 through March 5.

Located at an entrance to the packed Astrohall, the NASA exhibit drew huge crowds daily, providing educational presentations and interactive displays for space fans and anyone interested in learning about the wonders of space exploration. The exhibit provided a fun way for people to learn about the nation's space program and about JSC's latest technologies and its community outreach programs.

"We wanted visitors to the rodeo to get a little taste of what goes on at the Johnson Space Center," said Louis Parker, JSC exhibits manager. "Hopefully, we have enticed kids and their parents to come down to JSC (for Open House) and check us out further. We do more than just fly space shuttles."

Highlights included in the exhibit were computer-simulated games, where visitors could try their piloting skills in docking a shuttle to a space station, as well as demonstrations on what can happen if an astronaut isn't wearing a spacesuit. The main attraction for children – and some adults – was a picture booth where participants could have their photo taken in a spacesuit.

JSC's Space and Life Sciences Directorate's exhibit at the Houston Livestock Show and Rodeo showcased how space food is packaged, the NASA bioreactor, vacuum chamber/life support activities, and the virtual astronaut Web site. Also, a team of technical experts was on hand to explain orbital debris and its impact to spacecraft.

Human Resources provided Web site access to various programs offered through the employee development branch at JSC as well as information for students wanting to obtain employment with NASA. ■

Aircraft Operations

The Wings of JSC's Space Flight Readiness Program

Envision going to work each day to an aircraft hangar, where your view is filled with sleek, glistening jets lined up for duty, and the sounds of the office aren't so much telecons and the clicking of keyboards, but rather, weather briefings, pilot reports and the roar of jet aircraft taking off in the background.

Sound exciting? It is! Those are the sights and sounds for the many employees who staff JSC's Aircraft Operations Division at Ellington Field. Combined, they ensure our astronaut corps maintain their flying proficiency and that shuttle pilots and commanders are beyond prepared when it comes to landing the orbiter.

There are 80 civil servants in AOD, ranging from simulation engineers and aircraft mechanics to quality inspectors and documentation specialists, plus more than 300 contractors from Dyncorp, Lockheed Martin and SAIC who ensure operations run smoothly.

"We execute more than 15,000 plane operations a year," said NASA Division Chief Bob Naughton who oversees the activities at Ellington. "I am very proud of our safety record. It takes the commitment and professionalism of everyone out here to maintain that level of safety."

Naughton has a right to be proud. AOD has enjoyed more than 20 years of injury-free flight operations. "The professionalism here is the highest you'll find anywhere," continued Naughton. "And I'd be willing to say it's the best flying operation in the world."

Obviously, a workplace sprinkled with the blue suits of astronauts and gleaming white jets seems a glamorous place to be but, according to Naughton and those who work with him, it takes a lot of work to make it all happen.

Keeping 43 aircraft in top condition and risk-free is a continuous cycle of training, inspection, upgrades, maintenance and documentation.

One example is NASA's 31 T-38N "Talons" used to keep pilot and commander astronauts proficient with aviation skills and to introduce new mission specialist astronauts, who may have no flight experience, to high performance aircraft.

At any given time, about 24 T-38s are actively scheduled for flights to destinations throughout the U.S. This flight activity requires AOD staff to support 200 T-38 flights a week or 13,000 flight hours per year.

Each jet gets a daily preflight inspection, plus a more comprehensive inspection every 450 flying hours. Every five years, the plane is disassembled and checked for wear, corrosion or component replacement.

That is just the T-38s. AOD is also responsible for the KC-135A, a Gulfstream I (also known as NASA II), the Super Guppy, two Boeing 747s modified as Shuttle Carrier Aircraft, two WB-57F high-altitude aircraft and five Gulfstream II [four used for Shuttle Training Aircraft (STA) and one serves as a spare STA asset].

NASA JSC Photo JSC2000-04101

Bud Meins and Johnny LeMaster inspect the landing gear of a KC-135 as part of the preflight aircraft check. An average preflight examination for this plane takes an hour and a half.

"We have to be much more resourceful now," said Ace Beall, Flight Operations branch chief, who has been with the operation since 1981. "The astronaut corps is four times as large as it was when I began and we have less financial resources. We have to be much more efficient."

Beall oversees the 22 instructor pilots for the above aircraft, ensures their proficiency is maintained and tracks their flight records, training and flight currency. Although his instructor team represents the "cream of the crop," all of which are former military pilots with 3,000 - 5,000 hours of flight time, the constant upgrades of the NASA fleet dictate that the crew receive ongoing training.

Safety is the driving force behind the division's success. "It's a key element in our operation," said Charlie Hayes, STA manager. "We recognize that anything that goes wrong will get lots of visibility, so our rules of operation have been developed to guarantee a safe and effective training environment."

Hayes, a 30-year veteran of the division, directs the STA activities. The STAs are modified to be high-fidelity shuttle simulators and allow pilot and commander astronauts to train for the unique approach and landing scenarios of the orbiter. Usually, an astronaut flies a minimum of 500 landings before ever flying the orbiter itself.

"Normally, two STAs fly twice each day, four days a week," said Hayes. "Since many shuttle landing opportunities occur at night, a significant portion of the training occurs after dark and on weekends to avoid conflicting with Edwards Air Force Base activities."

Nine STA instructor pilots and eight flight simulation engineers assure the safe operation of the aircraft, but Hayes says six simulation software engineers have the difficult task of incorporating shuttle modifications into the STA six months before launch so that the crew has an opportunity to train on their mission configuration.

"It is recognized that this training is a major contributor to the successful landings the shuttle program has enjoyed to date," added Hayes. "We are intensely aware of the importance of our jobs to the success of shuttle missions."

The STA is only one example of how NASA has customized commercial vehicles to help train astronauts for shuttle activities. Essentially all NASA aircraft are modified to some extent for their specific mission. For example, the STAs, the Super Guppy, KC-135 and WB-57s are unique aircraft, flown only by NASA. That requires an immense amount of specialized know-how and technical documentation to assure that work on the aircraft is done correctly and safely. The quality assurance branch, headed by Harry Drottz, takes care of that.

"We want each individual that flies in one of our aircraft to feel they are climbing into a piece of equipment that will get the job done and return them safely," said Drottz.

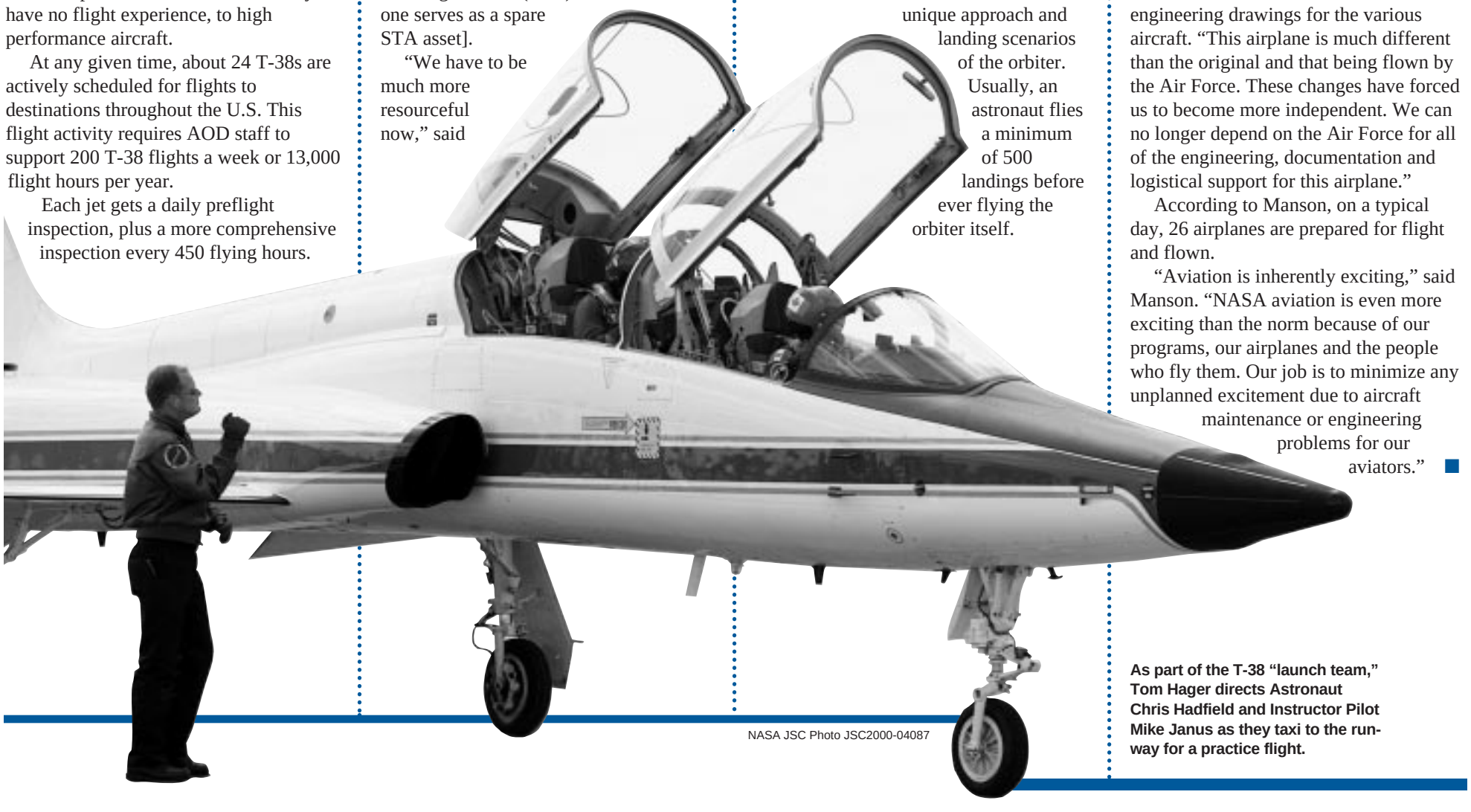
"For the STA alone, we have between 6,000 and 7,000 documents," said Martin Lewis, document management project manager.

The maintenance team, the keystone of AOD, relies heavily on this documentation. Under Al Manson's leadership, it's this team of 18 engineers and maintenance officers that keep the fleet in such remarkable condition.

"Modifications to our T-38s have altered the scope of our work significantly," said Manson, branch chief. Manson's branch maintains more 500,000 engineering drawings for the various aircraft. "This airplane is much different than the original and that being flown by the Air Force. These changes have forced us to become more independent. We can no longer depend on the Air Force for all of the engineering, documentation and logistical support for this airplane."

According to Manson, on a typical day, 26 airplanes are prepared for flight and flown.

"Aviation is inherently exciting," said Manson. "NASA aviation is even more exciting than the norm because of our programs, our airplanes and the people who fly them. Our job is to minimize any unplanned excitement due to aircraft maintenance or engineering problems for our aviators." ■



NASA JSC Photo JSC2000-04087

As part of the T-38 "launch team," Tom Hager directs Astronaut Chris Hadfield and Instructor Pilot Mike Janus as they taxi to the runway for a practice flight.

NASA JSC Photo JSC2000-04091

Nicole Stott, right, flight simulation engineer, uses the Advanced Validation Systems (AVaS) Simulator to test software and avionics upgrades for the Shuttle Training Aircraft as Jack Woods, flight simulation engineer looks on.

NASA JSC Photo JSC2000-04087

Fred Berger, Dyncorp engine technician, inspects a T-38 J-85 engine.

NASA JSC photos
by **James Blair**

A day in the life at Ellington Aircraft Ops

See what happens in just one month at AOD

- ▲ 500 aircraft parts are tested or repaired;
- ▲ 11 aircraft engines are overhauled or repaired;
- ▲ 40 aircraft tires are changed;
- ▲ 250 personal equipment articles (parachutes, life rafts, oxygen masks or pressure suits) are packed, tested or overhauled;
- ▲ 50 engineering tasks (projects, work orders and MRBs) are in work;
- ▲ 14,500 logistical transactions are conducted;
- ▲ 450 hours of training are completed, including safety, technical and administrative courses;
- ▲ Two or three T-38s undergo inspection including disassembly and removal of flight controls and engines, examination of electrical systems and inspection for evidence of corrosion.

NASA JSC Photo JSC2000-04091

David Mumme, NASA STA instructor pilot, runs through the cockpit preflight checklist for the Shuttle Training Aircraft.

NASA JSC Photo JSC2000-04104

Michelle “Shellye” Gore, SAIC, flight management specialist, assists Charlotte “Charlie” Ober (lower right) as she checks the daily flight schedule. Gore and Ober schedule 25 or more flights per weekday for all NASA aircrews.and maintenance teams.

“…it’s the best flying operation in the world.”

–NASA Division Chief Bob Naughton

NASA JSC Photo JSC2000e04105

The document management team, including (from left to right) Marty Lewis, NASA manager, Mirella Barron, NASA and Gabriele Mathews, Dyncorp, is responsible for maintaining the more than 7,000 documents required for NASA’s aircraft fleet.

NASA JSC Photo JSC2000e04106

Shown left to right, Rogelio “Roy” Torrez, NASA aerospace quality specialist, and Andre Davis, Dyncorp egress technician, inspect T-38 egress system.

Ripped from the ROUNDUP

Ripped straight from the pages of old Space News Roundups, here's what happened at JSC on this date:

1965

Col. John H. Glenn Jr., America's first astronaut to orbit the Earth, was sworn in as a consultant to NASA February 26 by NASA Administrator James E. Webb.

Glenn, who retired from the Marine Corps in January, will work with Administrator Webb in various aspects of NASA programs as his time and interest allow, including participation in conferences, appearances both in the United States and overseas, and following up on developments underway.

1975

The first major structural component of the space shuttle – the orbiter payload bay – recently completed by General Dynamics Convair Division, was scheduled to arrive at Rockwell-International Palmdale, California, facility.

The payload bay, which forms the mid-fuselage section of the orbiter spaceplane, is an aluminum structure 60 feet long, 15 feet wide, 13 feet high and weighs 13,500 pounds. The mid-fuselage was officially accepted by NASA last Friday.

The mid-fuselage was trucked from San Diego to the Palmdale plant and was scheduled to complete the 200 mile trip at 3 p.m. PDT Thursday.

1990

JSC is now the permanent home to a one-fourth structural scale model orbiter designed and built by Rockwell in 1974.

The highly detailed one-quarter size orbiter was the first structural dynamic test article of the shuttle ever built. It was used from 1974 through 1978 to investigate how well the dynamic loads of launch and landing could be predicted. Since 1978, the model had been in storage at Rockwell in Downey, Calif.

The model arrived at JSC via the final delivery by NASA's Super Guppy, the agency's 25-foot diameter cargo aircraft derived from a YC-97 tanker vehicle. The model's new home is now Bldg. 49 Vibration and Acoustic Test Facility where it will be used by personnel from the Structures and Mechanics Division to predict more accurately the forces payloads will experience during launch and landing.

Reaching out to the Moscow community

By Carlos Fontanot

Late last year, the Moscow Technical Liaison Office and the Public Affairs Office in Moscow started an educational program to reach out to the community with space and science presentations for schoolchildren of all ages.

MTLO and PAO representatives visited Moscow Public High School 1223 on February 23 as part of the Moscow Outreach Program. The group was welcomed by the school's principal, Galina Timofeyeva, and assistant principal, Olga Kryukova, and escorted to the physics classroom to set up computer and projection equipment for the presentation.

Shortly after 10 a.m., students started to file in to the physics classroom curious about the visitors, equipment and educational materials being prepared. Before the bell rang to indicate the beginning of the class, the room had already filled with about 50 tenth graders wondering what the visitors had in store for them.

Because the Russian public school curriculum includes a foreign language starting in first grade, these 15-year-old high school students were proficient enough in English to understand the presentation without the help of an interpreter.

Aided by high-fidelity, photo-realistic computer graphics projected onto a large screen, MTLO's Nathan Moore discussed what it would take for a round trip to Mars, including new technologies for the vehicle and logistics systems, the complexities associated with the long travel time, the amount of supplies and propellants to make the trip possible, the need to grow food, and generation of oxygen and water on the planet during the stay. Physical characteristics of Mars were taken into account when illustrating how future explorers would have to prepare for such a mission. The architecture of the base was discussed and illustrated with rotating computer models showing the interior and exterior of the modules to be used. Using an inflated balloon a student had brought to class, Moore explained atmospheric pressure and what it would take to contain it in the outpost.

Time went by quickly and the students seemed to enjoy their physics class, showing lots of interest and asking good questions ranging from the optimum number of explorers for a Mars expedition, or when this type of mission could take place, to what would happen if suddenly Mars creatures would appear.

Other topics like the International Space Station and the cooperation between the U.S. and Russia during the Phase One Program were also briefly discussed.

To facilitate further research on the presented topics, the students were given bookmarks listing NASA Web sites. The students also received ISS lithographs, NASA logo decals, and past mission emblems.

After the presentation, the school principal was very thankful and said that she anxiously awaited the next NASA visit to the school.

Two other schools in the Moscow area have also been visited by NASA personnel as part of the Outreach Program. Last November, Astronaut Candidates Leland Melvin and Suni Williams kicked off the program with a visit to St. Vladimir Academy where they jointly talked to approximately 35 high school students about astronaut training and what it takes to become an astronaut. Earlier this month, Moore modified his Mars presentation so that second grade students at the Anglo American School were able to understand what it would take to travel to Mars and build an outpost on the planet. The 7-year-olds had been studying space for the last month and were ready with very good questions at the end of the one-hour presentation.

Several other schools in the Moscow area have also expressed interest in a presentation and arrangements are being made to visit those schools. ■

Carlos Fontanot is on a one-year assignment in Moscow for JSC's Public Affairs Office.

GILRUTH CENTER NEWS

Open from 6:30 a.m.-10 p.m. Monday-Thursday, 6:30 a.m.-9 p.m. Friday, and 9 a.m.-2 p.m. Saturday. Contact the Gilruth Center at (281) 483-3345.
http://www4.jsc.nasa.gov/ah/exceaa/Gilruth/Gilruth.htm

Sign up policy:

All classes and athletic activities are on a first-come, first-served basis. Sign up in person at the Gilruth Center and show a yellow Gilruth or weight room badge. Classes tend to fill up two weeks in advance. Payment must be made in full, cash or by check, at the time of registration. No registration will be taken by telephone. For more information, call x33345

Gilruth badges:

Required for use of the Gilruth Center. Employees, spouses, eligible dependents, NASA retirees and spouses may apply for photo identification badges from 7:30 a.m.-9 p.m. Monday-Friday and 9 a.m.-2 p.m. Saturdays. Cost is $10. Dependents must be between 16 and 23 years old.

Nutrition intervention program: Six-week program includes lectures, a private consultation with the dietitian and blood analysis to chart your progress. Program is open to all employees, contractors and spouses. For details call Tammie Shaw at x32980.

Defensive driving: One-day course is offered once a month at the Gilruth Center. Pre-registration required. Cost is $25. Call for next available class.

Stamp club: Meets every second and fourth Monday at 7 p.m. in Rm. 216.

Weight safety: Required course for employees wishing to use the Gilruth weight room. Pre-registration is required. Cost is $5. Annual weight room use fee is $90. The cost for additional family members is $50.

Exercise: Low-impact class meets from 5:15-6:15 p.m. Mondays and Wednesdays. Cost is $24 for eight weeks.

Step/bench aerobics: Low-impact cardiovascular workout. Classes meet from 5:15-6:15 p.m. Tuesdays and Thursdays. Cost is $32 for eight weeks. Kristen Taraszewski, instructor.

Yoga: Stretching class of low-impact exercises designed for people of all ages and abilities in a Westernized format. Meets Thursdays 5-6 p.m. Cost is $32 for eight weeks. Call Darrell Matula, instructor, at x38520 for more information.

Ballroom dancing: Classes meet Thursdays from 6:30-7:30 p.m. for beginner, 8:30-9:30 p.m. for intermediate and 7:30-8:30 p.m. for advanced. Cost is $60 per couple.

Country and western dancing: Beginner class meets 7-8:30 p.m. Monday. Advanced class (must know basic steps to all dances) meets 8:30-10 p.m. Monday. Cost is $20 per couple.

Fitness program: Health-related fitness program includes a medical screening examination and a 12-week individually prescribed exercise program. For details call Larry Wier at x30301.

Aikido: Martial arts class for men and women meets 5-6 p.m. Tuesdays and Wednesdays. No special equipment or knowledge is needed to participate. Aikido teaches balance and control to defend against an opponent without using strength or force. Beginning and advanced classes start each month. Cost is $35 per month.

TICKET WINDOW

The following discount tickets are available at the Exchange Stores

General Cinema Theaters	$5.50
Sony Loew's Theaters	$5.50
AMC Theaters	$5.00
Fiesta Texas .....adult . . .$20.50. . .child (under 48 inches) . .	$17.25
Astroworld Early Bird (use by June 18)	$17.25
Astroworld .....1 day . . .$21.00 .....2 day . . .	$31.00
Water World	$12.00
Moody Gardens (2 events) (does not include Aquarium Pyramid)	$10.75
Moody Gardens (Aquarium only)	$9.25
Sea World .....adult . . .$29.00 . . . .child (3-11 years) . . .	$19.25
Space Center Houston . . . . . adult . . $11.00 . . . . . child (age 4-11) . . . (JSC civil service employees free.)	$7.25
Space Center Houston annual pass	$18.75
Splash Town .....1 day . . .$13.00 . . . . . .Season Pass . . .	$37.50
Postage Stamps (book of 20)	$6.60

Please bring your driver's license to pay by personal check.

Exchange Store hours

Monday-Friday
Bldg. 3 7 a.m.-4 p.m.
Bldg. 11 9 a.m.-3 p.m.

- All tickets are nonrefundable.
- Metro tokens and value cards are available.

For additional information, please call x35350.

Columbus Laboratory begins testing at Neutral Buoyancy Lab

A mockup of the European Space Agency's Columbus Laboratory, one of the agency's contributions to the International Space Station, recently made a splash at the Neutral Buoyancy Laboratory. Although not slated for launch until 2004, the ISS integration team conducted an Extravehicular Activity verification for the module in January 2000, well in advance of required tests.

The Columbus Laboratory is a pressurized, habitable module that will be attached to Node 2 of the station during assembly flight 1E. It is designed as a general-purpose laboratory which can support a variety of user disciplines, including materials and fluid sciences, life sciences, and technology development.

Alenia built hardware components for the mockup last summer for testing in its pool. To save money, the JSC integration team combined that hardware with a NASA-built Columbus trainer. Rothe Joint Venture had the tricky task of building the mockup and ensuring it could be integrated with Alenia's hardware in the short time before testing began. According to Raymond Aronoff, RJV Engineering, new technology aided them with the finished product.

"We were able to analyze the 'as built' mock up using our laser tracking system to compare that data against the CAD design at Alenia," said Aronoff. RJV is the only company at JSC using that technology. "This allows us to know exactly where there are any variances in the design. If the crew has any concerns or hindrances during the testing, with just a little research, we can determine if the actual flight hardware will present the same scenario, thus quickly sharing information and suggestions to the design group half way around the world."

"The mockup has a dual use," explained Heather Mitchell, technical manager for Columbus, EVA Project Office. "It was built for verification testing, but will be used as an NBL trainer as well. The module, and most of the outfitting hardware such as the outer debris shields and EVA aids are built once. We will use them again for flight crew training. We will have to return the Alenia- built mockup hardware to Italy. Therefore, we will need to build the training versions of these components once ESA has finalized the design of these components."

It is unusual to have this level of testing and crew procedures outlined this far in advance of a launch but having results early is very useful and will help ESA prepare for Columbus' Critical Design Review this fall.

"Originally, we did not intend to come (to the NBL) because Alenia has its own facility," said Bernard Clymans, senior configuration and AIV systems engineer, Module Projects Division, ESA. "However, when we examined the feasibility of a real EVA test, we saw that, because of its size, Alenia's facility was not quite sufficient."

Compared to Alenia's facility, the NBL provides a more realistic configuration of the ISS including a space station robotic manipulator system mockup and higher fidelity EVA hardware, such as EVA suits, foot restraints and tools. Due to limited space and support equipment at the Alenia facility, only a few unsuited divers can participate in testing. However, the spacious NBL can host several full-suited crewmembers with their support divers as well as the possibility for Alenia guest divers to participate in real-time viewing of crew testing.

"At the NBL, we can test the interfaces between the elements and use suited crewmembers," added Ulrich Thomas, ESA Columbus resident engineer and deputy launch package manager. "Neither of these benefits would have been possible at Alenia's test facility."

For both the ESA and NASA teams, the test itself was very valuable and a model of early program verification testing in the NBL on a multinational level.

"For us, it was very important from a task operations standpoint to verify with our baseline," said Peter Granseuer, COF Flight Operations, ESA. "Having the opportunity to run these tests here has been very beneficial and reassuring." ■

NASA JSC Photo JSC2000-00602 by Robert Markowitz

ESA representatives visited the NBL as part of the design verification testing for the Columbus Laboratory (in back). Shown, from left, front, are: Raymond Aronoff (RJV), Ulrich Thomas (ESA), Renzo Turino (Alenia), Robert Adams (USA), Riccardo Bosca (Alenia), Pedro Duque (ESA astronaut), Andrew Manning (Lockheed Martin); back: Scott Todd (RJV), June Huhn (NASA), Fernando Ramos (Boeing), Peter Granseuer (ESA), Simona Ferraris (Alenia), Gregor Woop (ESA), Bernard Clymans (ESA), Luca Agliati (Alenia), Hans Peter Leiseifer (ESA), Heather Mitchell (NASA). Not pictured: David Wade (RJV), Kevin Montgomery (Johnson Engineering), Christine Kovich (Lockheed Martin), and Frank Hartung (DASA).

Simple decisions, serious implications:

Backpacking and extended hike concerns

JSC SAFETY ACTION TEAM

By Keith Tischler

Articles on camping and hiking frequently address the importance of logistics preparation with regard to safety. Such examples typically include adequate and appropriate clothing for foul/extreme weather, water purity and availability, food selection and sanitation, and evaluation of weather conditions before departure. These hints are helpful for the beginning camper and those with moderate experience. However, as with many sports, backpackers/hikers with moderate experience are at an even higher risk of putting themselves in jeopardy than many beginners by continuing on as conditions deteriorate, primarily due to poor decision making.

Two such examples clearly demonstrate this subtle yet significant hazard. The first reflects the risk to a group losing less experienced hikers as conditions deteriorate. This results in people "slipping through the cracks." The second example illustrates a series of poor decisions leading to a bad situation, analogous to the chain of poor decisions resulting in aviation accidents.

In 1991, I joined a group of 30 University of Wisconsin students for a spring break backpacking trip down into the Grand Canyon. About two-thirds of the group were experienced wilderness backpackers. The descent to the Colorado River occurred in a single day, after which we set up camp. Several of the campers (primarily those less experienced) chose by exhaustion and preference to sleep under the stars and not pitch a tent.

That night it rained, soaking the exposed hikers and gear with water just above freezing. The descending snow line was visible in the canyon and stopped approximately 500 feet away from the campsite. Given the cold, wet gear and potential for hypothermia, the group opted to move up to a less remote site and hike out the following day. The author encountered two less experienced hikers lagging behind and decided to remain in back with them as the other hikers seemed unaware of them.

After about five hours, the group had pulled ahead with no sign of waiting for the two exhausted novices who were beginning to panic. We had plenty of gear, fuel, and food, so I calmed the two hikers and convinced them that, if exhaustion and nightfall necessitated, we could camp. Being fined for camping outside of a designated campsite should not be a concern given the circumstances.

Just after nightfall and 11 hours later, we hit the main trail and encountered one person walking back a quarter of a mile to see if we were near. The group had set up camp three hours earlier. No one had bothered to keep track of the two least experienced hikers. The risk of fatality was real. That day eight mules had been lost off the icy trail and two hikers had frozen to death below the rim.

The second example occurred on a hiking trip in Yosemite Park, California, via a ridge trail to El Capitan massif. Two other experienced hikers and I made a series of poor decisions driven by goal fixation. The trail to El Capitan was 12 miles one-way. We left late and discovered the road to the trailhead had been closed, adding four miles round-trip to the hike. We had brought a small amount of water with us because we planned to use a campsite well, but that turned out to be inaccessible.

After a leisurely lunch break, we continued and at mile six could see El Capitan, relatively close (by line of sight only). Intentions to turn back fell away as we could see our goal. We pressed on, running low on water but passing several streams we could drink out of if necessary. However, there was no way to treat the water to avoid getting sick.

At 6 p.m., we reached the halfway point. We found our way back in the dark with great difficulty, finally breaking down and drinking untreated stream water. We reached the parked car at 1 a.m.

We were very lucky and escaped the experience with no sickness and only sore feet. It could have been much worse – the lesson being establish limits beforehand and stick to them regardless of the temptation to modify your plans. ■

DATES & DATA

March 27

Alzheimer's support group meets: The Clear Lake Alzheimer's Caregiver Support Group will meet at 7:30 p.m. in the first floor conference room, St. John Hospital West building, Nassau Bay. For more information contact Nancy Malley at (281) 480-8917 or John Gouveia (281) 280-8517.

March 29

Spaceteam Toastmasters meet: Spaceteam Toastmasters will meet at 11:30 a.m. March 29 and April 5 and 12 at United Space Alliance, 600 Gemini. For more information contact Patricia Blackwell at (281) 280-6863.

March 30

Communicators meet: The Clear Lake Communicators, a Toastmasters International club, will meet March 30, April 6 and 13. Please note the new meeting location at Wyle Laboratories, 1100 Hercules, Suite 305. For more information contact Allen Prescott at (281) 282-3281 or Richard Lehman at (281) 280-6557.

Radio Club meets: The JSC Amateur Radio Club will meet at 6:30 p.m. at the Piccadilly, 2465 Bay Area Blvd. For more information contact Larry Dietrich at x39198.

April 3

NSBE meets: The National Society of Black Engineers will meet at 6:30 p.m. at Texas Southern University, School of Technology, Rm. 316. For more information contact Kimberly Topps at (281) 280-2917.

April 4

Quality Society meets: The Bay Area section of the American Society for Quality will meet at 6 p.m. at the Ramada King's Inn on NASA Road 1. For more information contact Ann Dorris at X38620.

Correction

The names of the secretaries who received the Bockting Award and their pictures were transposed in the February 25 *Roundup*. Katheleen Moser is shown on the left and Patricia LeBlanc is on the right. We regret the error.

OUT&ABOUT★

Composite of NASA JSC Photos by Bill Stafford

Danny Siner and **Jim Newsome** explain "glass cockpit" upgrades at an AIAA Lunch-n-Learn in February. Siner and Newsome, both NASA Multi-function Electronic Display Subsystem (MEDS) managers, presented an overview of the MEDS being incorporated into space shuttles. MEDS replaces older mechanical flight instruments and CRT displays with more ergonomic, easy-to-read display screens that can be customized for specific pilot preferences or phases of flight. MEDS has been installed in *Atlantis* and is ready to be flown in its inaugural space flight during STS-101 in April.

For more information on AIAA and its activities visit http://www.jsc.nasa.gov/aiaa.

April 6

Tech Symposium: AIAA's Annual Technical Symposium, titled "Pioneering A New Millennium of Technology and Discovery," will occur at the University of Houston April 6 and 7. For additional information visit www.jsc.nasa.gov/aiaa/.

Warning System Test: The site-wide Employee Warning System will perform its monthly audio test at noon. For more information contact Bob Gaffney at x34249.

April 8

Scholarship luncheon: The National Society for Black Engineers hosts a scholarship luncheon at Brady's Landing. For details regarding applications, volunteering or attending the luncheon, contact Stacey at dotsoni@hotmail.com.

April 9

Westside NSS meets: The "Westside" group of the Clear Lake area chapter of the National Space Society will meet at 2 p.m. at Silicon Graphics, 11490 Westheimer, Suite 100. For information contact Murray Clark at (281) 367-2227.

Ames to sponsor NASA-wide data management workshop in April

On April 18 and 19, 2000, Ames Research Center and Oracle will jointly sponsor a data management workshop. The purpose of the workshop is to inform and educate NASA and contractor project managers and researchers from across the entire agency about the present availability and applicability of a wide range of commercial, off-the-shelf (COTS) database systems.

Yuri Gawdiak of the Computational Sciences Division (Code IC) of Ames says that the goal of the workshop is to communicate and share various data management experiences, tools, and lessons learned across the agency. Use of an appropriate COTS product can be much more efficient and have a lower life-cycle cost than developing and updating needed software products from scratch on a case-by-case basis, according to Gawdiak.

Material covered at the workshop will include presentations and a series of specific case studies covering a diversity of projects – from large to small, in various discipline settings, and using different commercially available data management systems. While the workshop is a NASA-internal informational meeting, attendance is open to all NASA employees and support service contractors agencywide. Gawdiak sees this as the first in what may well be an ongoing series of Ames-sponsored workshops designed to bring the NASA data management community together to learn and share experiences.

The workshop will run from 7:30 a.m. to 5 p.m. each day and will be held at the Oracle Headquarters Corporate Visitor Center at 500 Oracle Parkway in Redwood Shores, California (about 12 miles north of Ames Research Center). To register online please go to

http://ace.arc.nasa.gov/postdoc/t/group/members.ehtml?group_id=-759

and join the workshop group. For the latest information on the workshop please go to

http://ace.arc.nasa.gov/postdoc/t/folder/main.ehtml?url_id=37952

NASA BRIEFS

NEW LAB READY TO TEST SUDDEN IMPACTS

The last time a government cannon boomed across the shores of Lake Erie was during the War of 1812, but a new laboratory at Glenn Research Center is now experimenting with ballistics of a different kind.

Building 49 houses Glenn's new ballistic impact facility. Its main features are a 40-foot-long gas gun that can eject projectiles at speeds up to 1,500 feet per second and a high-speed camera that can capture 2.5 million images per second.

One of the facility's main tasks is testing materials for aircraft engine housings. During rare in-flight events, if the engine is hit by hail or birds, the engine housing must contain any fragments and withstand the severe loads, or forces, that otherwise could cause the engine to separate from the wing of the airplane. Current engine housing materials, usually high-strength metal alloys and non-metal ballistic fabrics, do this job very well but are very heavy.

The materials to be tested include intermetallic alloys, fiber-reinforced composites and cloth-like polymers. New engine concepts require materials that can withstand higher temperatures and higher speed projectiles than current containment materials.

The data taken during these impact tests will also be used to verify and improve the accuracy of computer models that predict material response to impacts. Manufacturers can use these more accurate models to shorten the time and reduce the cost of bringing new designs to market.

GLAST INVESTIGATION SELECTED

NASA has announced the selection of an investigation to be flown on the Gamma Ray Large Area Space Telescope (GLAST) mission, planned for launch in 2005. In addition to the flight investigation, NASA selected four interdisciplinary scientist investigations to broaden the scientific expertise available to the project.

GLAST will explore the most energetic and violent events in a quest for the ultimate sources of energy in the universe. Objects explored will include distant galaxies fueled by super massive black holes at the center, neutron stars and individual black holes, remnants of stars that have ended their life with an explosion (supernova), and many others at the extremes of mass and energy.

The investigation selected by NASA is the "GLAST Large Area Telescope Flight Investigation: A Particle-Astrophysics Partnership to Explore the High-Energy Universe." The principal investigator is Professor Peter F. Michelson of Stanford University. The four interdisciplinary scientists selected and their investigations are: Stephen Thorsett of the University of California at Santa Cruz, "Observations of Rotation Powered Pulsars in Support of GLAST"; Professor Brenda Dingus of the University of Wisconsin, Madison, "GLAST: A GeV All-Sky Monitor of Transient Phenomena"; Dr. Charles D. Dermer of the U.S. Naval Research Laboratory, Washington, D.C., "Exploring the Non-thermal Universe: Analysis and Modeling to Maximize the Scientific Impact of GLAST"; and Dr. Martin Pohl , Ruhr University, Bochum, Germany, "Modeling the Diffuse Galactic Gamma Ray Emission."

SPACE CENTER Roundup

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Editor . . . . . .William Jeffs . . . . . .william.p.jeffs@jsc.nasa.gov

Assistant Editor . . . . . .Nicole Cloutier . . . . . .ncloutie@ems.jsc.nasa.gov

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