

January 26, 2001

# SPACE CENTER Roundup

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## Safety checks delay shuttle launch

Shuttle managers decided Jan. 15 to roll *Atlantis* back from the launch pad to allow additional inspection and testing of solid rocket booster cables. Pending the outcome of the inspections, *Atlantis* is planned for launch no earlier than Feb. 6.

"I guard against the phenomena of 'go fever' like it was the plague," NASA Space Shuttle Program Manager Ron Dittmore said. "When a challenge comes up, you have to be sensitive, to 'divorce' yourself from all the events and look carefully at the events and data of the particular challenge... I assure you that this program is extremely sensitive to the fact that we need clear evidence to overcome an anomaly that we don't totally understand."

The cable inspections on the entire shuttle fleet began as a result of an investigation of a primary explosive bolt that failed to fire during the launch of STS-97 on Nov. 30, 2000. The problem was traced to a flaw in the cable that was supposed to transmit the command for the bolt to fire. As a result, inspections of

other such cables on the shuttle fleet revealed some similar potential failures, and repairs were made to those cables. Inspections and tests were then ordered for all watertight cables used for functions other than commanding explosive bolts in the shuttle inventory that are

flown repeatedly on the solid rockets. Of the hundreds of spare cables tested, four conductors showed possible failures, which engineers are continuing to analyze. The inspection and tests of spare cables were not

completed until after *Atlantis* had been moved to the launch pad, and the results led to the Jan. 15 decision for further checks.

The cables to be checked on *Atlantis*' solid rockets are in a position where they cannot be reached at the launch pad. In the Vehicle Assembly Building, platforms are available to allow inspection, continuity checks and X-ray analysis on

*"It doesn't matter if they launch this week, this month or this year, we [humankind] are in space to stay."*

—William Shepherd  
ISS Commander



A KSC worker inspects the reusable cable and connectors located inside the external tank attachment ring on *Atlantis*' left-hand solid rocket booster in December.

the 18 solid rocket booster cables located inside each booster's system tunnel, a housing that extends along most of the length of the rocket.

If all goes well, *Atlantis* should return to the launch pad Friday, Jan. 26, for the 102nd shuttle flight. Launch of STS-98 (ISS Assembly Flight 5A) is now scheduled for no earlier than Feb. 6, with liftoff

tentatively set for 5:37 p.m. CST.

Once the shuttle arrives at the station, three EVAs are scheduled to install the \$1.4-billion U.S. Destiny Lab. The first EVA is the first of the new millennium and the first of Mission Specialist Bob Curbeam's career. On this EVA, Mission

Please see **SHUTTLE DELAY**, Page 6

## JSC names 10 new flight directors

The Mission Operations Directorate at Johnson Space Center has named 10 new flight directors. It is the largest class ever selected, and brings the number of current U.S. flight directors to 28.

"Such a large class was needed to support around-the-clock operation of the International Space Station," said Jeffrey W. Bantle, chief of the Flight Director Office. "The first flight director, Chris Kraft, was selected during the Mercury era. Since that time, only 48 men and women have served as flight directors throughout the history of human space flight."

The selection process began in June. "There were many outstanding people to choose from, which made the selection process most difficult," Bantle

said. "But it did remind me of the great talent, among both civil servants and contractors, in the Missions Operations Directorate, the Johnson Space Center and NASA."

A flight director manages the flight controllers who work in the Mission Control Center, and has overall responsibility for the successful management and execution of space flights. A flight

director also leads and orchestrates planning and integration activities with flight controllers, payload customers, International Space Station partners and others.

All of the 10 new flight directors have previously served as flight controllers. One works for a Canadian Space Agency contractor and another, the first flight director from the ranks of space station flight controllers, is employed by a NASA contractor.

The flight director class of 1983 with eight members had been the largest before selection of the class of 2000. ■

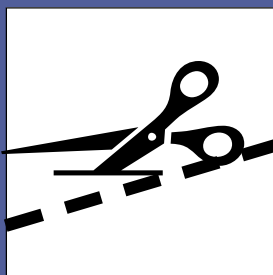


JSC's new flight directors class, front, left to right: Cathy Koerner, Joel Montalbano, Tony Ceccacci, Annette Hasbrook; back, Bryan Lunney, Steve Stich, John McCullough, Matt Abbott, Norm Knight, Derek Hassmann.



JSC readies for rodeo, trail riders.

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Clip-n-Save science activities.

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JSC staff recognized with Snoopy Awards.

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## Children's Art Calendar Awards Party has robot, aliens, safety, health and fun

By Mary Peterson

**S**afety and health was the theme, but things spacey were very much in the minds of the young participants at the 4th annual Children's Art Calendar Awards Party as they darted eagerly about the decorated Gilruth Center, not wanting to miss anything.

And a full hour it was. Bolstered by cookies, candies, and punch served from a table bedecked with beads and shiny confetti balloons, children took turns searching for their names artfully iced into a rocket-design cake, with little green and blue alien figures gracing the tops and sides. The cake, the special handiwork of JSC's Vicki Cantrell, was a real crowd pleaser, and anxious young hands could hardly leave it intact until after the ceremony.

"This is the greatest," said Perry Bennett, serving his second year as master of ceremonies, and acknowledging the event's organizer, Rindy Carmichael of Muñiz Engineering, Inc. He told the audience, "Not only has the calendar contest become an important activity to us at JSC, the team of Russians with whom we work has been highly impressed with the idea. They especially praised the way we encourage safety and good health practices at such an early age, and they are looking into starting a similar project in their part of the world."

Bennett then called the children individually to the podium, where each received a T-shirt embellished with his or her own artwork and a personal calendar. Personal photos were taken with astronaut Col. John Casper as a

special memento of the occasion, and he autographed pictures as well.

Following a group photo with all winners wearing their special shirts, the children were then free to ask questions of and dance with the robot furnished by the Houston Police Dept. and "assisted" by Officers Richard Rodriguez and

Marcella Guidry. Even the smallest tots couldn't resist dancing the "Macarena" with the agile, nuts-and-bolts guy.

As the party came to a reluctant end, the line was still long to have faces painted by Indyne Inc.'s very talented Sean Collins. He embellished faces with an assortment of glittery butterflies and birds, assorted

aliens, dinosaurs, and even a Tigger. Collins didn't mind the overflow. "I like doing this," he said.

This year's winners and sponsors were: Sarah Grunsfeld, 4 (Carol Grunsfeld); Jalynn Stewart, 4 (Rusty Stewart); Kelly Thomas, 4 (Gretchen Thomas); Jacob Valle, 4 (Gerard Valle); James Lassmann, 6 (Michelle Moore); Jessica Maggio, 5 (James Maggio); Sidney Farrow, 7 (Ruth Farrow); Patrick Zimmerman, 5 (Susan Zimmerman); Rachel Graubard, 5 (Robert Graubard); Jordan Vassberg, 6 (Nathan Vassberg); Melissa Cerimele, 7 (Mary Cerimele); Amber Canales, 7 (Tim Dawn); Christine Pham, 6 (Nulan Pham); Victoria Armstrong, 7 (Charles Armstrong); Victoria Denny, 6 (Kevin Denny); Anthony Ciancone, 6 (Michael Ciancone); Alexandra Vickery, 7 (Pandora Vickery); Alyssa Ross, 7 (Nicholas O'Dosey); Alexandra Valle, 7 (Gerard Valle); Laura Thomas, 6 (Gretchen Thomas); Jessica Muñiz, 8 (Robert Muñiz); Jennifer Reister, 9 (Leah Reister); Drew Deckerlegand, 9 (Diane Deckerlegand); Grace Green, 10 (John Casper); Jeremy Osborn, 9 (Laveeda Mullis); Katy Collins, 9 (Sean Collins); Hallie Bruce, 8 (Janet Bruce); Blake Kimball, 10 (Wanda Steiger); Mindy Karydas, 10 (Don Hanselman); Courtney Axline, 8 (Michael Axline); Kelly Langston, 9 (Barbara Langston); Melanie Mount, 10 (Frances Mount); Katya Ilin, 13 (Andrew Ilin); Lauren Whitted, 12 (Barb Whitted); Humsini Viswanath, 11 (Meena Viswanath); and Karen Baker, 12 (Ellen Baker). ■



NASA JSC 2001e00781

Houston Police Department robot entertains attendees during the Children's Art Calendar Awards Party at the Gilruth Center.

## Get ready to rodeo

**I**t's time for JSC employees to dust off their 10-gallon hats and shine their spurs for the upcoming rodeo season.

JSC will sponsor a variety of activities throughout the rodeo season. Working in concert with the NASA/Clear Creek/Friendswood Go Texan subcommittee, JSC hopes to support the commitment to youth and education.

To kick off the rodeo season, the Go Texan Style Show will be held at 11 a.m. on Jan. 26 at the Gilruth Center. The NASA/Clear Creek/Friendswood Go Texan subcommittee will host the event.

On consecutive Wednesdays, Jan. 24 and 31, performers from the Houston Livestock Show and Rodeo Speakers Committee will entertain employees during lunchtime in the Bldg. 3 cafeteria. Performances will include country and western singers, western bands, live animals, ropers (give it a try), rodeo clowns, and line dancers. Come on down and enjoy the free entertainment while you munch on the western-themed lunch specials at the cafeteria. The HLS&R Speakers Committee performers will also drop by the JSC Child Care Center to educate and entertain the children.

The month-long festivities will continue with the arrival of the Texas Independence Trail Riders at 3 p.m. Feb. 6. The trail riders will enter JSC through the Space Center Houston tram underpass by the Longhorn Project pasture. About 150 horses and riders and 10 to 15 wagons will ride through the center, passing by the JSC Child Care Center and stopping at the Gilruth Center. The Texas Independence Trail Riders will set up camp for the night in the wooded area near the pavilion.

The NASA/Clear Creek/Friendswood Go Texan subcommittee will host a dinner

dance from 7 p.m. to 11 p.m. Feb. 6 at Space Center Houston. This event will serve as the official welcome to the trail riders. Enjoy dining and dancing with Kelly McGuire & Hurricane. The theme for this year's dance is "Spaceship Rodeo." Tickets cost \$20 and include dinner, two drinks, live music, plus the exhibits for viewing at Space Center Houston, and more.

Tickets are available at the Exchange Stores. Proceeds go to the scholarship program of the HLS&R to help provide seven \$10,000 scholarships to NASA-area high school seniors for their college education.

The trail riders will depart JSC the next morning at 9 a.m. through Gate 4, near the 300/400 area, and travel through Clear Lake City on their way to their next overnight stop.

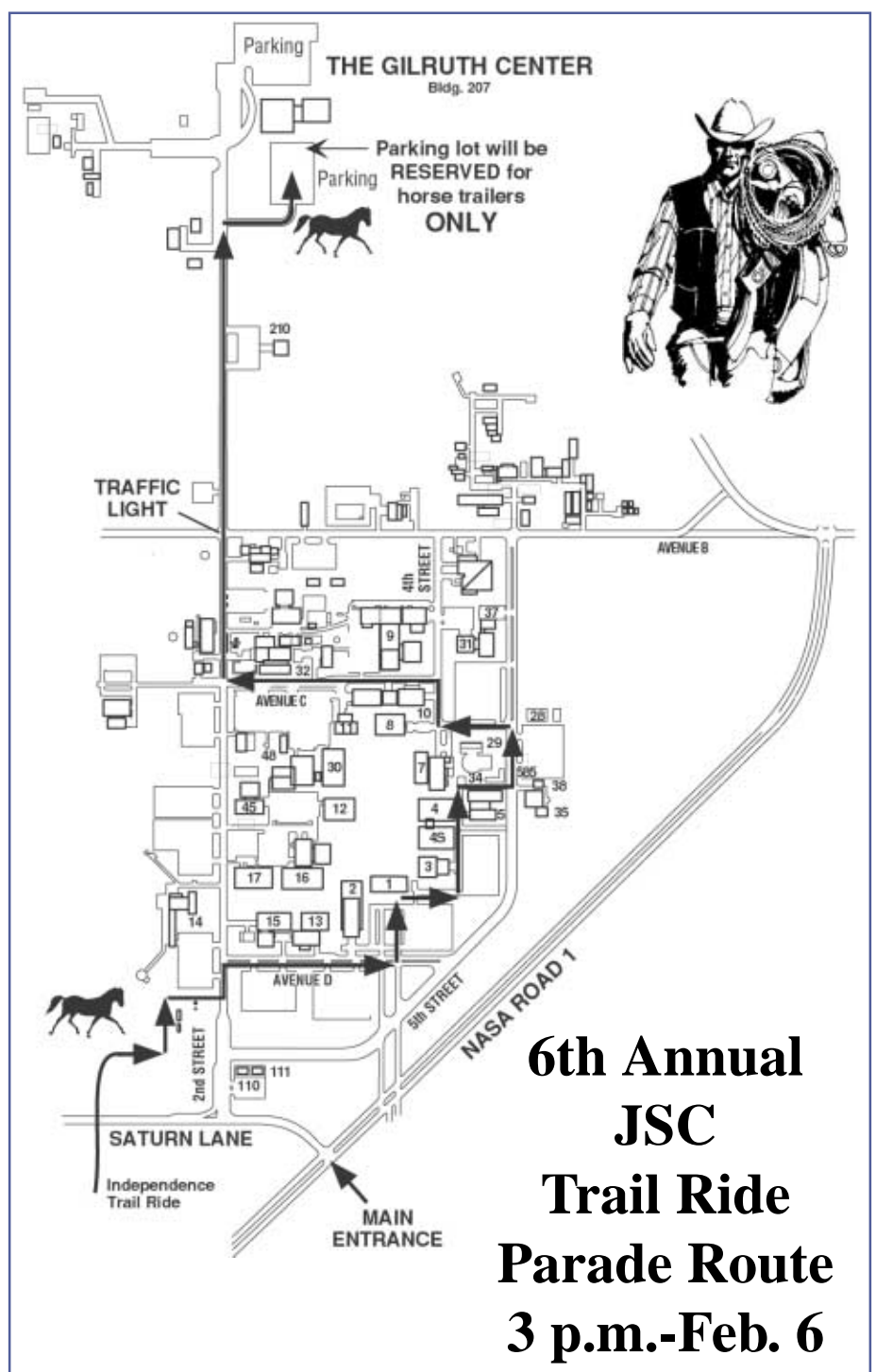
On Feb. 10, the Employees Activities Association will sponsor a bus trip to downtown to view the Rodeo Parade. This will include bus transportation, light breakfast, reserved bleacher seating and more. The bus will leave Rocket Park at about 8 a.m. More information will be available soon.

### NASA at the Rodeo

The HLS&R runs from Feb. 14 to Mar. 4. Once again NASA will be represented at the HLS&R. This year's exhibit will focus on the International Space Station, benefits derived from the ISS and other space programs, and NASA educational outreach programs available to students. Employees who would like to volunteer to staff the exhibit should send an e-mail to Robin Hart.

The EAA in the Bldg. 11 Exchange Store will sell tickets to the rodeo performances. Call x35352 for details.

For more information contact Ginger Gibson at x30596. ■



**6th Annual  
JSC  
Trail Ride  
Parade Route  
3 p.m.-Feb. 6**



## Data indicates shortage of engineers is imminent

**E**ngineers create everything we see or use in our everyday lives, from the alarm clock that woke you up today and your child's lunch box to your car and the roads you drive on. However, these everyday conveniences, and necessities, could be in jeopardy if the current decrease in engineering graduates continues.

According to Dr. Bonnie Dunbar, NASA astronaut and Assistant Director for University Research and Affairs, the National Science Foundation has reported that during the past 13 years, the number of U.S. aerospace and electrical engineering graduates has decreased approximately 50 percent. Compounded by the fact that the surge in high-tech industries has increased demand for engineers, the U.S. is facing a critical shortage of skilled engineering professionals that is currently being met by increasing the number of foreign engineers and scientists brought into the U.S. through the H1B visa process.

The engineering shortage, even in its early stages, is already evidenced in the space program. Although JSC remains an employer of choice among many engineering graduates, according to Dunbar, the national shortage has already impacted such programs as ISS software development.

"The aerospace industry is particularly hard-pressed because it is competing with other high-tech sectors which can pay higher starting salaries," said Dunbar. "It is difficult for a federal agency to compete in that arena."

Despite the growing demand for engineers and graduates with technical degrees, the National Academy of Engineers reports a downward trend in students pursuing engineering degrees.

Dr. Dunbar says preparation for an engineering course of study begins at the middle school and high school levels. Without the appropriate math and science classes in high school, some students can find themselves behind before they've even started their freshman year of college.

"We are not preparing our youth with the skills they need to be able to study engineering," said Dunbar. "By the time they are out of high school they need to have taken physics, biology, chemistry, and the math curriculum through calculus. Engineering deans have reported to me that increasingly more students entering engineering colleges must attend remedial classes just to begin their freshman year."

Former Center Director Aaron Cohen, now professor emeritus at Texas A&M University's College of Engineering, says that Texas A&M University is an exception and has not experienced a decline in high school applicants, but he has noticed a decrease in students pursuing graduate degrees.

"A&M is the largest engineering school in the country and our enrollment has not indicated a change," said Cohen. "But we have fewer graduates pursuing graduate degrees. It seems more are leaving academia after receiving their bachelor's degrees for lucrative jobs in

the marketplace." Current national indicators show that graduate engineering student enrollment is declining, with nearly one-half of those in master's and doctoral programs from countries other than the U.S.

Cohen says more research dollars are needed to help stimulate college engineering programs and entice students to further their education.

"At this time, aerospace colleges do not get a lot of support from industry," said Cohen.

"Putting more research dollars into the colleges, specifically into aerospace majors, is needed. That is the track to take to induce more students to study engineering."

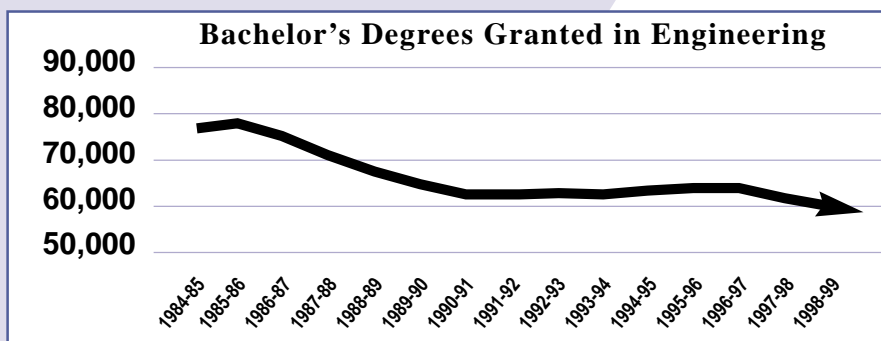
The shortage will take the efforts of many to reverse.

"Whether or not you are an engineer, you should be aware of this problem," says Dunbar.

"It currently has the attention of Washington D.C., the NASA Administrator, Mr. Abbey, and the Texas Legislature. The Johnson

*The future of human exploration and our nation's leadership of that exploration will depend upon ensuring that the engineering pipeline is full.*

—Bonnie J. Dunbar, Ph.D.



Source: Data collected by the Engineering Workforce Commission under a grant from the National Action Council for Minorities in Engineering, Inc.

## What can you do?

Bonnie J. Dunbar, Ph.D., NASA astronaut and member of the National Engineering Week Advisory Committee/NSF Engineering Advisory Panel, offers the following suggestions to help bolster student interest in engineering:

- 1) Remind friends, acquaintances and student audiences that without engineers, there is no NASA, no cell phones, no medical equipment, no airplanes, no Playstation®, etc.
- 2) Educate students, their parents, teachers, and counselors on the algebra, biology, chemistry, or physics courses required to pursue engineering degrees.
- 3) Share information about NASA's numerous educational programs, workshops and student programs. The JSC Home Page describes most: <http://www.jsc.nasa.gov/pao/educators/>.
- 4) Ensure that your alma maters and other universities have information about new research funds, such as the new University Initiative starting in FY02 that will help expand graduate programs, faculty and research. Information is available at <http://www.hq.nasa.gov/office/codea/codeac/WUWU/>.



Photo courtesy of Texas A&M University  
Texas A&M University is one of the few not experiencing a decrease in engineering enrollments. Shown here, A&M aerospace students prepare an airplane model for wind tunnel testing.

Space Center and its contractors hire more engineers than any other technical job classification."

Cohen feels all engineers need to actively communicate the excitement of the profession with students.

"Engineering is the basis for economic development of our country—be it automotive, architectural, etc.," said Cohen. "And the work is fantastic."

According to Mike Kincaid, branch chief, Education and Student Programs Branch, as NASA represents one of the more glamorous realms of engineering, it is fortunate to be able to attract great employees for its job openings. However, to increase the number of engineers, our employees are obliged to share our stories, projects and excitement with students, peers and teachers.

"It's appropriate for us to use space and the excitement of space exploration to encourage students to study math and science," said Center Director George Abbey. "By sharing the experiences of the human space programs with them, we can show them the rewards of becoming engineers."

During the past decade, JSC has created several programs to expose more of our area youth to the exciting and challenging work engineers do and to generate interest in pursuing engineering careers of their own.

"We're not doing these just so that students can have a good time," said Kincaid. "We do it to attract them to careers in engineering and science."

Despite the fact that JSC employs more than 15,000 individuals either as civil servants or contractors, we always need more volunteers for our outreach opportunities.

"All of these programs require engineers in the JSC workforce to dedicate a few hours to make the program successful," said Kincaid. "Without their help, the programs will ultimately fail, and the profession will suffer."

There are many ways that JSC employees and contractors can give back to the community and help perpetuate the interest in engineering, math and science needed to sustain our space program and economy at large.

Right now, organizers are still seeking volunteers to help accommodate the stream of requests from schools, teachers and student organizations for National Engineers Week.

Now in its 50th year, E-Week is a nationwide program committed to

## How JSC is tackling decline in engineering

increasing awareness and generating interest in engineering among our country's youth. February 18-24, engineering professionals from a wide range of industries will visit their local schools and community centers to provide guest presentations, hands-on activities and answer questions from students.

JSC employees still have a chance to participate in E-Week activities. Although E-Week officially runs for only seven days, in practice, JSC sponsors special engineering outreach projects for the entire month of February. As part of E-Week, JSC volunteers will visit area



NASA JSC S95-03745

Bill Shepherd, Expedition 1 commander, discusses math theories used in everyday life with Galena Park High School students during Engineering Week presentations.

schools to make science, engineering and space-related presentations. New this year, JSC will also provide six Web cast events and participate in Space Center Houston's Home School Day.

For more information on how you can participate in E-Week, visit JSC's internal E-Week Web site at <http://www4.jsc.nasa.gov/scripts/eweek/index.cfm>.

E-Week is just one of several student outreach programs JSC participates in. JSC also sponsors the Texas Aerospace Scholars, a yearlong, interactive, online learning process highlighted by a weeklong internship at JSC; the Summer High School Apprentice Research Program, in which students work at JSC for eight weeks during the summer with a NASA mentor in a lab or office environment; and the Mars Settlement Design Competition, a



Continued from Page 4 • • • •

## Decline

futuristic simulation game where high school students team with NASA mentors to design a Mars base proposal.

JSC also has expanded the successful KC-135 Student Flight Opportunities program to community college students in an effort to raise the visibility of engineering careers. There's also the Science Advisor Program (SciAd), Distance Learning... the list goes on and on.

Through these programs, JSC has established its commitment to sharing the excitement of space science with the engineers of the future. Now, it is up to individual engineers to ensure a positive legacy is left.

To be placed on the distribution list for outreach and volunteer opportunities, please call or e-mail Debbie Herrin at x38694. ■

### GET INVOLVED!

Have you promoted engineering lately?

It's up to all of us to share our unique experience in the space program with students as they begin to mold their education and make career choices. Here are just some of the programs at JSC where you can help our youth discover engineering.

#### TEXAS AEROSPACE SCHOLARS PROGRAM (TASP)

This is a yearlong, interactive, online learning process highlighted by a weeklong internship at JSC. Selected students are encouraged to study math, science, engineering and computer science by interacting with JSC engineers.

Contact: Mike Kincaid  
281.483.4112

#### SUMMER HIGH SCHOOL APPRENTICE RESEARCH PROGRAM (SHARP)

In this program, students work at JSC for eight weeks during the summer with a NASA mentor in a lab or office environment.

Contact: Nancy Garrick  
281.483.3076

#### MARS SETTLEMENT DESIGN COMPETITION

This is an exciting industry simulation game for high school students, set in the middle of the 21st century. A weekend overnight residence program at JSC emulates the experience of working as a member of an aerospace company team developing a design and operating proposal for a new Mars base. This year's competition is scheduled for February 2-4 and 16-18 at WSTF.

Contact: Norm Chaffee  
281.483.3777

### NEED MORE INFORMATION?

Explore these Web sites for more information and creative ideas!

Engineers Week  
For information on JSC's E-Week celebration, visit  
<http://www4.jsc.nasa.gov/scripts/eweek/index.cfm>.

For information on National Engineers Week, engineering statistics and creative ways you can participate in E-Week on your own, visit  
<http://www.eweek.org> or  
<http://www.discoverengineering.org/eweek>

Women in Engineering  
For special information on engineering opportunities for women visit <http://www.nae.edu/cwe>

## Here are simple but exciting demonstrations you can use for Engineers Week or other outreach project!

### 3-2-1 POP!

This activity demonstrates Newton's Laws of Motion. The rocket lifts off because it is acted on by an unbalanced force (First Law). This is the force produced when the lid blows off by the gas formed in the canister. The rocket travels upward with a force that is equal and opposite to the downward force propelling the water, gas and liquid (Third Law). The amount of force is directly proportional to the mass of water and gas expelled from the canister and how fast it accelerates (Second Law).

#### Materials and Tools

Heavy Paper (i.e. construction paper or stock paper)  
Plastic 35 mm. Film canister\* (with internal sealing lid)  
Cellophane tape  
Scissors  
Effervescent antacid tablet  
Paper towels  
Water

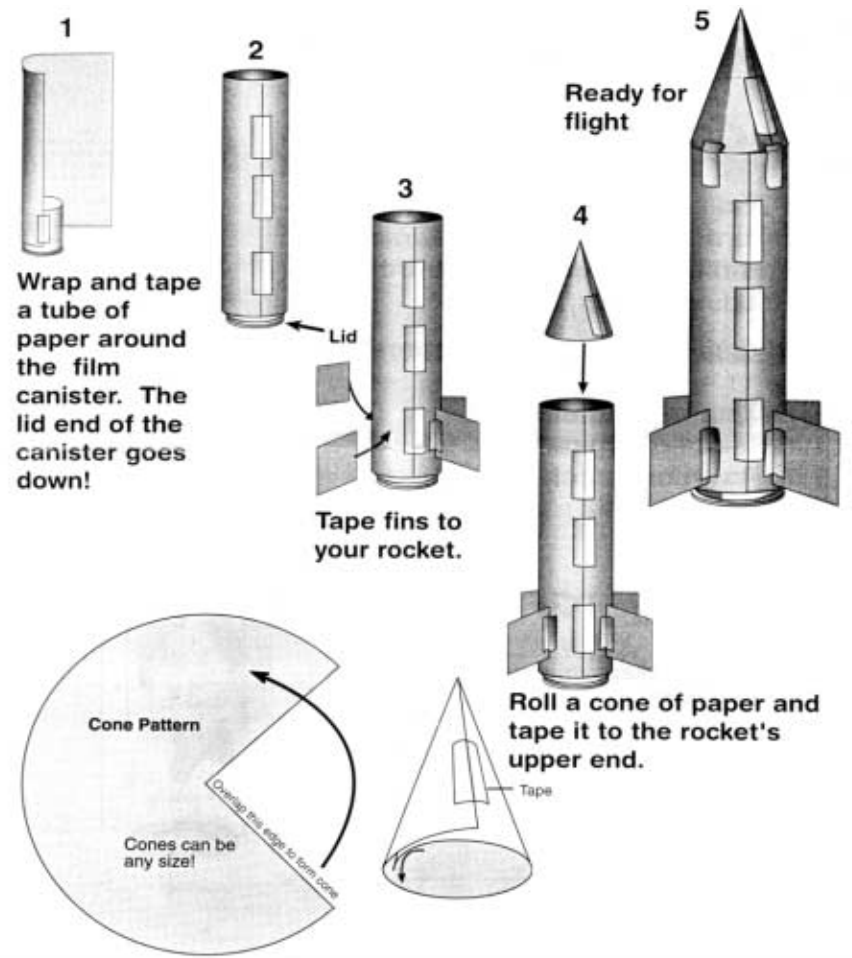
#### COUNTDOWN:

1. Put on your eye protection.
2. Turn the rocket upside-down and fill the canister 1/3 full of water.

#### Work quickly on the next steps!

3. Drop in 1/2 tablet.
4. Snap lid on tight.
5. Stand rocket on launch platform.
6. Stand back.

### LIFTOFF!



#### Discussion

How does the amount of water placed in the cylinder affect how high the rocket will fly?  
How does the temperature of the water affect how high the rocket will fly?  
How does the amount of the tablet used affect how high the rocket will fly?  
How does the length of empty weight of the rocket affect how high the rocket will fly?  
How would it be possible to create a two-stage rocket?

#### Extensions

Hold an altitude contest to see which rockets fly the highest. Launch the rockets near a wall in a room with a high ceiling. Tape a tape measure to the wall. Stand back and observe how high the rockets travel upward along the wall. Let all students take turns measuring rocket altitudes. What geometric shapes are present in a rocket? Use the discussion questions to design experiments with the rockets.

### Potato Astronaut

The effects of high-speed micro-meteoroid impacts are simulated with a potato and a straw. Students hold the potato in one hand and stab it with the other using a plastic milkshake straw. The penetration depth into the potato relates to the speed of the stabbing action. A straw slowly pushed into the potato collapses. The plastic isn't strong enough to support the force exerted at the opposite ends of the straw. However, when the straw is thrust rapidly into the potato, the straw easily penetrates and passes through. The straw enters the potato before it has a chance to collapse. As it enters, the surrounding potato helps support the straw by shoring up its sides.

#### Materials and Tools Checklist

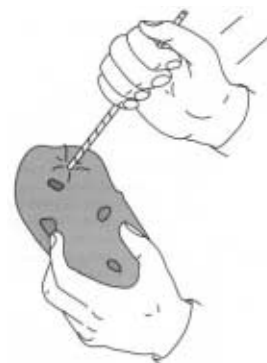
Potato  
Plastic (milkshake-size) straw

#### Objective

To investigate the relationship between velocity and penetration depth when a potato is struck with a plastic straw.

#### Procedure

- Step 1. Hold a raw potato in one hand. (See illustration.) While grasping the straw with the other hand, stab the potato with a slow motion. Observe how deeply the straw penetrates the potato.
- Step 2. Repeat the experiment but this time stab the potato with a fast motion. Observe how deeply the straw penetrates the potato. Compare your observations with the results of step 1.



The kinetic energy output of an impact, given in joules, is calculated with the following equation:

$$KE = 1/2mv^2$$

m = mass of impacting object  
v = velocity of impacting object

Note: The mass in this activity is actually the combined mass of the straw and the hand and forearm driving it.



#### Safety Precautions

Be careful to hold the potato as illustrated so that the straw does not hit your hand. Work gloves will provide additional protection.

#### Challenge

Students design a way to protect the potato from damage caused by impacts using flexible and light weight materials.

#### Materials and Tools Checklist

Plastic (milkshake-size) straw  
Potato  
Tissue paper, notebook paper, handkerchiefs, rubber bands, napkins, aluminum foil, wax paper, plastic wrap, etc.

#### Procedure

- Step 1. Students design a method for protecting potato astronauts from damage caused by the plastic straw when the straw is quickly stabbed into the potato.
- Step 2. After students have tested a method for protecting a potato, conduct a discussion to evaluate technologies developed. Refine the constraints for a protection system (e.g., the materials used must together be no thicker than - mm).
- Step 3. Have students redesign their system based on the refined constraints. Conduct additional impact tests with the straw.
- Step 4. Test protection systems. Evaluate the effectiveness of the protection systems developed.

#### Extensions

Compare technologies for protecting astronauts from micrometeoroid and space debris impacts to other protective technologies such as bullet-proof vests, suits of armor, shields on power tools, and windshields on vehicles. How does the function determine the form? Experiment with different fabrics and fabric combinations for protective garments.



# Ripped from the ROUNDUP

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

**1 9 6 6**

**T**he "world's smallest manned spacecraft," the Air Force - developed astronaut maneuvering unit (AMU), last week underwent extensive testing in Chamber B of the Space Environment Simulation Laboratory in Building 32. Gemini IX Pilot Charles A. Bassett will use the AMU for extensive extravehicular maneuvering during the mission. In the chamber tests, Maj. Edward Givens, USAF AMU project officer, was taken to a simulated altitude of more than 200,000 feet above sea level. The AMU performed successfully under high-vacuum conditions while integrated with the chest pack life support system, the tether line and the Gemini pressure suit. The AMU-propelled extravehicular activities in Gemini IX and XII are part of a series of DOD experiments being conducted during the Gemini program.

**1 9 7 1**

**M**any people have known the pride of accomplishment in constructing a model airplane, auto, or boat. The engineers of the Habitability Technology Section within the Spacecraft Design Office know regularly the fulfillment of assembling a model. However, this work not only involves building the model, or mockup, but designing concepts for it, too. And their finished products are full size!

The space station module, which took approximately seven weeks to design and construct, is compartmentalized lengthwise into three areas. The mockup, located in Building 13, houses the wardroom, kitchen facilities and a personal hygiene unit. The 12 by 15 foot wardroom will serve as a dining room, conference room, movie theater, recreation area and chapel (that's right, a chapel), among other uses. There are two windows which will allow crewmembers to stargaze at leisure.

**1 9 8 6**

**A**"dress rehearsal" of the first space shuttle mission takes place in February to clear the way for launch of the shuttle's first orbital flight.

This 11-day test series will involve operations at KSC, JSC, Dryden Flight Research Center, and the White Sands Missile Range. The Wet Countdown Demonstration Test/Flight Readiness Firing, all part of the Mission Verification Test, will exercise all elements of the nation's new Space Transportation System, including personnel, facilities, space vehicle, and computer programs in a demanding, real-time environment to demonstrate the proper integration of all elements prior to the STS-1 mission, now scheduled for mid-March.



## NASA space station chief receives Leadership Award

**I**n recognition of his demonstrated leadership excellence and his contributions to human space flight and the future of space exploration, David Thelen, NASA division chief, Space Station Division, Safety, Reliability, and Quality Assurance Office (SR&QA), recently received the Space Flight Awareness Leadership Award.

"It's an honor to receive this award, but I also want to acknowledge the joint leadership team (Safety & Mission Assurance Program Office and SR&QA), because they understood the challenge and held the keys to success," said Thelen.

Thelen was noted for initiating and supporting a series of "win-win" discussions with the International Space Station Program Safety and Mission Assurance Office, defining roles and responsibilities between that office and the SR&QA Office. He established the joint Commit to Flight Readiness Review in preparation for the ISSP flight readiness review process. In addition, he has led efforts to improve communication among the four SR&QA divisions in order to integrate all views into one consistent safety and mission assurance position for discussions concerning real-time flight issues and other concerns.

His leadership has led to more technical oversight and better support to the ISSP through new initiatives, including

the development of a new "Integration Lead" which has added real-time support on the Mission Management Team during ISS missions, and the implementation of a new software pilot program with the ISSP Safety and Mission Assurance Office to improve the quality assurance of ISS flight software.

Thelen leads 24 civil servants and 87 contractor personnel. He appreciates that the diversity of his staff leads to greater opportunities for all.

Thelen served as a flight controller and operations engineer after receiving a bachelor of science degree in mechanical engineering from the University of Houston in 1983. He began his NASA career as a safety engineer in 1987. In May 1989 he was assigned to the Orbit Project Office as a Mission Evaluation Room manager. In 1991 he was selected as a section head within SR&QA and has held a number of management positions within the directorate. ■



John Casper, right, director, Safety, Reliability, and Quality Assurance, presents the Space Flight Awareness Leadership Award to David Thelen, SR&QA division chief, as Rob Kelso, deputy director, SR&QA, looks on.

Continued from Page 1

## Shuttle Delay

Specialist Marsha Ivins, now on her 5th flight, will be inside the shuttle performing robotic operations to remove the lab from the payload bay and dock it to the station, with the help of Curbeam and Mission Specialist Tom Jones.

The second EVA will install the future connection point for the station's robotic arm to Destiny's exterior, preparing for the launch of that arm on shuttle mission STS-100 later this year.

The third EVA will be the 100th in U.S. space walk history and the 60th based out of the shuttle. It will conclude

with a trial of incapacitated crewmember tests, in which Curbeam and Jones will take turns playing the incapacitated crewmember and the active crewmember will use different methods to evacuate him back to the shuttle.

With three weeks of added time until the arrival of *Atlantis*, the residents of the International Space Station, Expedition One, will be using the time to review documents and procedures on installation and activation of the Destiny Lab. They will continue conducting an inventory of items on board, packing and

stowing equipment and supplies and taking part in conferences with numerous technical specialists. Their stay on orbit will likely be elongated three weeks because their ride home, STS-102, will be postponed due to the rescheduling of this mission.

Upon hearing news of the delay, ISS Commander William Shepherd responded, "It doesn't matter if they launch this week, this month or this year, we [humankind] are in space to stay." ■

## AIAA seeks Sperry Award candidates

The AIAA Houston Section is seeking nominees for the Lawrence Sperry Award, a national award for outstanding contributions to the field of aeronautics or astronautics by an AIAA member under 35 years of age.

As a majority of the nominations are submitted from academia and the

military, the National Young Professional Committee would like to see an increase in nominations from industry as well.

The award is named after Lawrence B. Sperry, a pioneer aviator and inventor. Past recipients of the Sperry Award include many prominent members of the aerospace community such as Eugene

Kranz, Sally Ride, and Daniel Tellep.

The nominee must be under the age of 35 on December 31 of the year preceding the presentation to be eligible for consideration. The deadline for nominations is July 1.

For details on nominations, contact Nicole Smith Mullins, (281) 244-7145.

# TICKET WINDOW

### The following discount tickets are available at the Exchange Stores

AMC Theaters	\$5.00
Moody Gardens (2 events) (does not include Aquarium Pyramid)	\$10.75
Moody Gardens (Aquarium only)	\$9.25
Space Center Houston	adult .. \$11.00 . . . child (age 4-11) . . . \$7.25 (JSC civil service employees free.)
Space Center Houston annual pass	\$18.75
Postage Stamps (book of 20)	\$6.60
Entertainment Books	\$20.00
Franklin Planner refills (Classic Style)	\$25.50
Franklin Planner refills (Seasons and Montecello)	\$30.25

### 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.
- Sweetwater Pecans . . . . . \$6.25 per lb.
- Chocolate-covered Pecans . . . . \$8.00 per lb.

**For additional information, please call x35350.**

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

Check out our new Web site on the JSC People page at: <http://hro.jsc.nasa.gov/giftshop/>



# Employees receive Silver Snoopy awards



Several employees have recently received the coveted Silver Snoopy Award in recognition of their contributions to this nation's human space flight programs. Recipients will be featured in this edition and in forthcoming issues of the *Roundup*.



Elizabeth Bauer

**Elizabeth Bauer**, project engineer/manager, was cited for her support in developing the Human Research Facility, the Ku-Band Receiver System and Power Supply, and the Single Stowage Locker for the International Space Station. Her work has contributed to life science studies of the crew with the goal of a safe, technically advanced ISS.



Ginger Gibson

**Virginia (Ginger) Gibson**, support services specialist, was recognized for the support she has provided to NASA's space programs and the astronaut corps in her role as JSC's special events coordinator. Her promotion of JSC and NASA through numerous public relations and promotional events has given people in the local community, Texas

and across the country a keener awareness of the benefits of the nation's space program.



Shakeel Razvi

**Shakeel Razvi**, deputy manager, Canadian Space Agency Elements and Robotics Integration, International Space Station Program, has made significant contributions to the integration and test of the Space Station Remote Manipulator System to be deployed on ISS Flight 6A. A risk mitigation test, which integrated the station arm with other station elements into an

early test of flight software, was completed ahead of schedule and on budget because of his leadership.



Shelia Cowan

**Shelia Cowan**, chief, Electrical Branch, was cited for her efforts and success in assuring that through the use of reliability-centered maintenance predictive testing and inspection techniques, the electrical systems in the mission critical buildings and the astronaut training facilities are properly maintained.



Jerry Goodman

**Jerry Goodman**, acoustics lead for the space station, works requirements for modules, payloads, and government-furnished equipment including working with international partners on these issues. He was cited for placing increased awareness on the importance of acoustics as a technical discipline.

**Roger Schwarz**, EVA

tools engineer, has provided excellent leadership in the development of tools for use by space walkers. He served as project engineer for Development Flight Test (DTO) hardware that flew on the STS-49, STS-72, and STS-76 missions. The DTO missions tested EVA hardware that is currently in use for ISS assembly. His efforts have also been instrumental in the successful certification and acceptance of the Service and Performance Checkout Equipment that will be part of the ISS Airlock. He recently traveled to Lockheed Sunnyvale during STS-97 as a member of a JSC team that developed procedures for successful EVA repair of an ISS solar array mechanism.



Roger Schwarz



Lindy Fortenberry and Frank Culbertson

**Lindy Fortenberry**, management analyst in the International Space Station Program Office, was recognized for her support to the Phase 1 Shuttle-Mir Program in establishing communications processes, flown artifacts management, and educational outreach. Her work in the establishment of ISS Program metrics and application of Phase 1 lessons learned has resulted in improved products that provide accurate indicators of the ISS Program's health.

**Ralph Marak**, aerospace test engineer, was instrumental in the development, certification, and delivery of Extravehicular Activity (EVA) equipment to support the highly successful Hubble Space Telescope servicing missions. Many of the HST servicing tasks involved EVA replacement of hardware that was not originally designed for on-orbit maintenance, so many special and unique tools were required, as well as handling aids and transfer equipment. This knowledge was utilized in the development of EVA tools and toolboxes for the ISS. His efforts to deliver EVA toolboxes on a tight schedule helped maintain the ISS assembly schedule. Two of the toolboxes are currently installed on the ISS, and two more are in flight processing at KSC for launch on the 7A mission.



Ralph Marak

**Carolyn Fritz** was cited for her work as the project manager for the Neutral Buoyancy Laboratory Space Station Remote Manipulator System. The NBL SSRMS provides a critical training capability for joint EVA/SSRMS operations. This capability will ensure that the upcoming space station assembly missions can be accomplished safely and successfully.



Carolyn Fritz

**The Silver Snoopy Award, administered by the Space Flight Awareness Program, is the astronauts' personal award to individuals who have performed an outstanding effort contributing to the success of human space flight missions. Since the Snoopy represents the astronauts' own recognition of excellence and less than one percent of the NASA and contractor workforce is given the award, receiving it is a special honor. The awards are personally presented by a member of the astronaut corps. More Silver Snoopy presentations are planned this year. An indication of a surprise presentation is the special blue Snoopy "Symbol of Excellence" poster on display in work areas. Any individual whose job performance has contributed significantly to flight safety and mission success is eligible for this very special award.**

*For more information on SFA programs and awards, contact Barbara Zelon, deputy director, SFA, at x38782.*



**DATES & DATA****January 29**

American Institute of Aeronautics and Astronautics, Houston Section presents "Apollo 13: Lessons in Safety, Quality, & Management." An out-of-this-world story with real-world implications. This unique look into the Apollo 13 mission is told from the perspective of Owen C. Brown, Ph.D., a nuclear submariner who became a spacecraft engineer. The program begins at 6 p.m. with a presentation and refreshments at 7 p.m. The presentation will take place at the University of Houston-Clear Lake's Bayou Building Atrium/Theater (2700 Bay Area Blvd. in Clear Lake.) Parking is available behind the Bayou building in the visitor's lot at no cost. Open to the public at no charge and no RSVP required. <http://www.jsc.nasa.gov/aiaa>.

**January 30**

JSC NMA meets: The JSC National Management Association chapter meets at the Gilruth Recreation Center at 11:15. R. Ken Trammell, executive director, Marine Corps Materiel Command, Albany, Georgia, will be the guest speaker. More information is available at [www.jsc.nasa.gov/nma/](http://www.jsc.nasa.gov/nma/)

**January 31**

Astronomy seminar: The JSC Astronomy Seminar Club will meet at noon January 31, February 7 and 14 in Bldg. 31, Rm. 248A. For more information contact Al Jackson at x35037.

Spaceteam Toastmasters meet: The Spaceteam Toastmasters meet at 11:30 a.m. at United Space Alliance, 600 Gemini. For more information contact Patricia Blackwell at (281) 280-6863.

**February 1**

Communicators meet: The Clear Lake Communicators, a Toastmasters International club, meet February 1, 8 and 15 at 11:30 at Wyle Laboratories, 1100 Hercules, Suite 305. For

more information contact Allen Prescott at (281) 282-3281 or Richard Lehman at (281) 280-6557.

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

**February 1**

NSS meets: The Clear Lake area chapter of the National Space Society meets at 6:30 p.m. at the Parker Williams Branch of the Harris Co. Library at 10851 Scarsdale Blvd. For more information contact Murray Clark at (281) 367-2227.

**February 6**

Quality Society meets: The Bay Area Section of the American Society for Quality meets at 6 p.m. at the Franco's Real Italian Restaurant on NASA Road 1. The speaker will be Bob Vickery discussing "ISO 9000 and Capability Maturity Models." No reservations are required. For more information contact Ann Dorris at x38620.

**February 7**

Astronomers meet: The JSC Astronomical Society meets at 7:30 p.m. at the Center for Advanced Space Studies, 3600 Bay Area Blvd. For more information contact Chuck Shaw at x35416.

**February 8**

Airplane club meets: The Radio Control Airplane Club meets at 7 p.m. at the Clear Lake Park building. For more information contact Bill Langdoc at x35970.

**February 9**

Astronomers meet: The JSC Astronomical Society meets at 7:30 p.m. at the Center for Advanced Space Studies, 3600 Bay Area Blvd. For more information contact Chuck Shaw at x35416.

"Mission Systems 2001: A Space Lab Odyssey," the first NASA/JSC conference devoted to enabling a dialogue between JSC labs that support the Human Exploration of Space, takes place January 30 - February 1 at the Nassau Bay Hilton.

Interested parties from the center's technology labs on site and off site that support HEDS are invited to attend the conference. All JSC civil servants will be admitted free of

charge and only need to sign the attendance roster at the conference to attend.

For more information, please contact Tom Nicodemus, conference administrative director, 281-286-1555, [nicodemus@systems.org](mailto:nicodemus@systems.org) or Steven Gonzalez, conference director, 281-483-6314, [steven.a.gonzalez@jsc.nasa.gov](mailto:steven.a.gonzalez@jsc.nasa.gov). Or visit [www.mission.systems.org](http://www.mission.systems.org) for more information.

**NASA BRIEFS****NASA SELECTS INNOVATIVE SMALL BUSINESS PROJECTS**

Developing a new class of deep-sea vehicles for sample collection is just one of the 280 research proposals NASA has selected for Phase I contract awards as part of its Small Business Innovation Research Program. The combined total of the awards is expected to be more than \$19 million.

The goals of the Small Business Innovation Research Program are to stimulate technological innovation, increase the use of small business, including women-owned and disadvantaged firms in meeting federal research and development needs, and increase private sector commercialization of federally funded research results.

NASA received 1,847 proposals, submitted by small, high technology businesses from across the country. The proposals were reviewed for technical merit and feasibility and relevance to NASA research and technology requirements. The selected firms will be awarded fixed-price contracts valued up to \$70,000 each to perform a six-month Phase I feasibility study.

Companies which successfully complete the Phase I activities are eligible to compete for Phase II selection the following year. The Phase II award allows for a two-year, fixed-price contract in the amount up to \$600,000.

The NASA SBIR Program Management Office is located at the Goddard Space Flight Center with executive oversight by NASA's Office of Aerospace Technology, NASA Headquarters. Individual SBIR projects are managed by NASA's ten field centers.

**NASA, NOAA GAIN UNPRECEDENTED VIEW OF ANGRY SOLAR CYCLE**

As the Sun's stormy season approaches its zenith, solar scientists have the best seat in the house, using the largest coordinated fleet of spacecraft and ground observatories ever assembled to observe these angry outbursts of solar radiation and predict the impact of turbulent space weather.

According to scientists from NASA and NOAA, the Sun is near the peak of its 11-year cycle of activity. Solar maximum is the two-to-three year period around that peak when the Sun's activity is most tempestuous and the Earth is buffeted with powerful solar gusts.

The coordinated use of NASA and NOAA technology was key in tracking and predicting the development of an intense solar storm nicknamed the "Bastille Day Event." With data from ground-based observatories, the Solar and Heliospheric Observatory - a joint project of the European Space Agency and NASA - and NOAA's Geostationary Operational Environmental Satellites, scientists were able to anticipate a bright solar flare and ensuing energetic proton shower July 13.

NOAA forecasters, using data from the Advanced Composition Explorer (ACE), typically can provide about one hour notice of prospective magnitude before the start of a geomagnetic storm. But the July solar shower blinded key ACE detectors. Without reliable data, scientists and forecasters had to wait until Earth's magnetic field became distorted before they knew that the disturbance had arrived.

A G5 geomagnetic storm - the most intense classification - raged for nearly nine hours after the solar shower's impact.

The effects of the July storm were widespread. Cameras and star-tracking navigation devices on several satellites were flooded with solar particles. For additional information on the Internet, visit:

<http://www.gsfc.nasa.gov/GSFC/SpaceSci/sun-earth/solarmax.htm>

<http://www.sec.noaa.gov/sec.html>

**GILRUTH CENTER NEWS****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 their 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.

**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>**

**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.

**SPACE CENTER Roundup**

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