Space Center
Roundup

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Seeing things more clearly

Space Shuttle windshield problem solved by JSC team

By Eric Raub

The cockpit of the Space Shuttle provides a great view as the orbiter speeds away from the Earth, flies through space and glides back down. But what if the crew could barely see out of the window? Thanks to a JSC team, those worries are now over.

Since the earliest days of the Space Shuttle Program, a strange "haze" had always developed on the front windows of the orbiter. The haze got progressively worse after each flight. It was so bad after STS-8 that the problem prompted an investigation.

The investigation classified the haze as a deposit, probably created by flying through volcanic ash from a distant eruption. Yet the problem never went away–with or without distant erupting volcanoes–and exhibited strange characteristics. Those characteristics led some to question whether this haze was only a deposit.

Eventually the windows had to be replaced and they ended up at the Southwest Research Institute in San Antonio, Texas. After carefully analyzing the surface they found that the windows didn't get dirty, they got sandblasted.

"We were happy and complacent to think it was a deposit," said Lynda Estes, Space Shuttle and International Space Station window subsystem manager. "Southwest Research determined it was a frosting effect like grit-blasting." This grit-blasting resulted not only in an obscured view through the window, it also caused tiny microfractures in the glass surface.

Considering the affected Space Shuttle windows cost approximately $70,000 each, the news that something regularly spewed debris onto them quickly brought two questions to the forefront: What caused the microfractures, or haze, and how could this be stopped?

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Camp combines summer and sciences to create fun

By Eric Raub

During the summer months, when children of all ages needed a place to be during work hours, JSC offered something special with the Sizzling Summer Camp.

The summer camp, which came to a close on Aug. 17, was a special program offered only to the children of JSC employees, both contractor and civil servant. The children ranged in age from 7 to 15.

More than 70 children enrolled and took fieldtrips to places like Moody Gardens, Space Center Houston and Astroworld. They also did activities such as rock climbing, swimming, bowling and skating.

However, what set the camp apart from other summer care programs was the weekly science enrichment program. The program was developed and directed by Universities Space Research Association Scientist Dr. Ruwaida Haddad, who recently received an Exemplary Recognition Award for her volunteer efforts with the children.

The program provided hands-on experiments that volunteers made fun, but which also taught the children valuable lessons. For example, some of this year's experiments focused on germs, infection and cleanliness.

These children participated in JSC's Sizzling Summer Camp. The camp combined science, education and field trips to create a summer of fun.

"We want to give them some science in a play environment so they don't feel like they're in a classroom," Haddad said during the summer program. "No homework, no grading–just raise their curiosity and make them ask questions ... get them to push upward."

Other science activities included a demonstration of the Virtual Astronaut Web site by Futron employee Deborah Washington and David Kiss. Indyne employee Janine Bolton prepared handouts and led an information session on using the Internet to research science and homework.

Space Family Education employee and Executive Director of the JSC Childcare Center Kristy Hirning said the science enrichment program created a highly successful camp as far as the campers were concerned.

"They never want to leave and they never want it to end," Hirning said.

"We're really doing a great community service to our own employees," Haddad said. "These kids have no other choice but daycare, here they are experiencing a better environment. We are hoping to have more financial support and more transportation to make the program grow." ■

NEWS TO KNOW

Get ready:
Safety & Total Health Day is going to Make it Personal!

It's coming

October 17, 2001

NASA STARS Implementation Update

Human Resources is offering the following hands-on Resume Builder training sessions to civil servants who are interested in learning more about NASA's new automated resume system:

Thursdays
Sept. 6, 13, 20 and 27
9-10 a.m. and 1-2 p.m.
Building 12, Room 276

First-come, first-served by registering at http://nasastars.nasa.gov/jsc/sign_up/

From the Employee Assistance Program

What to Look for in a College and What Colleges Look For in a Student

Wednesday, Sept. 5
Noon - 1 p.m.
Building 30 Auditorium
Presented by Mike and Beth Dennard of Bright Futures Consulting

Understanding the Many Facets of Alzheimer's Disease

Wednesday, Sept. 19
Noon - 1 p.m.
Building 30 Auditorium
Presented by Brenda Carr of The Alzheimer's Association

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Seeing things more clearly

The likeliest culprit seemed to be the Solid Rocket Booster (SRB) Separation Motors. As the SRBs separated from the spacecraft, exhaust particles from the motors were being cast into the flight path of the Orbiter windows where the impacts caused tiny pits and cracks in the glass.

The motors appeared to be in the right place and the exhaust particles they spewed were the correct size. The fact the right hand side of the orbiter experienced up to 50 percent less haze than the left hand side could be explained by the shielding effect of the external fuel tank line. This runs along the right hand side of the tank through the line of sight from the SRB separation motor to the Orbiter.

The only problem was the fact the motors had the perfect alibi–an original aerodynamic analysis from the drawing-board days of the Space Shuttle in the 1970s.

"We thought this was a very viable source for many reasons," Estes said about her team. "We knew the size of the particles, we knew they weren't hypervelocity impacts. The problem was we had an old aerodynamic analysis hanging over our heads that said the motor plume wouldn't hit the orbiter."

The late astronaut David Walker finally brought the issue to a head after he demanded to have his window replaced. As commander, he did not want a window that was hazier than his pilot's, Estes said. Engineers replaced the window, and at the same time decided to make a final push to identify the exact nature of the problem, its source and, finally, to stop it.

They reached the logical conclusion that if air forced debris to blow into the windows, then air could be used to blow it away from the windows. They looked to the Space Shuttle Forward Reaction Control System (FRCS) thrusters to provide the puff needed to blow the debris away from the windows and harmlessly down the back of the orbiter.

This was a concern to some who heard the idea. What would the effect be of firing thrusters during a carefully planned launch? What if the firing of the thrusters caused the shuttle to tumble out of control?

"It's basically like spitting in a hurricane," Estes said. "And the two seconds worth of fuel is fuel they don't need and probably would dump anyway. This was a low-cost, win-win experiment."

So programmers reworked the launch software to force a plume to fire from the FRCS thrusters at the front of the shuttle one second before the SRB separation motors started, through their extremely quick operation and one second after they finished. This programmed FRCS firing has been conducted on all flights since STS-98. The results of the experiment have been better than anyone expected.

"We are getting a zero increase in new impacts and no new haze," Estes said. "Before we were getting three-digit increases in the scatterometer numbers (a device which objectively quantifies the light scatter, or haze, from a surface). We now get no increase in scatter.

"We were hoping to get maybe 80 percent of the problem resolved with this plan. It has been highly successful. We are getting a 100 percent success rate." ■

NEWS FROM WHITE SANDS

Prestigious NASA Team Award given to Hypervelocity Team

By David Hirsch

Teamwork has paid off for the NASA Hypervelocity Impact (HVI) Testing operations team. They have successfully consolidated testing operations at White Sands Test Facility (WSTF), a feat that would not have been possible without cooperation between the joint WSTF contractor, WSTF and JSC.

The HVI team is satisfying customers and meeting or exceeding their expectations. Currently, all four test ranges are operational and the average report turnaround time of one day is unprecedented. Customers are getting the results of their hypervelocity impact tests faster than ever.

There are a few programs the team has completed that they are especially proud of.

The HVI team designed and built a high-voltage, high-current test system capable of energizing one of the ISS primary power cables. The system needed to be capable of collecting high and low speed current and voltage data, as well as high-speed cinema and real-time video.

The test series required urgent systems modifications, same-day coordination of requirements with customers, completion of testing and reporting of results. The test series has enabled ISS designers to evaluate primary power loss risk.

The HVI team was also asked to evaluate toughened Shuttle Thermal Protection system tiles for HVI resistance. The purpose of the tests was to evaluate penetration effects of these new tiles when compared with current tiles. A total of 26 shots were fired and the results accurately reported on time even with tests occurring during the holidays.

Whether or not space structures could become a reality became a question the HVI team had a hand in answering when they developed and tested shielding concepts for the Transhab module. A one-fifth scale and full scale test of variations of the inflatable habitat's shielding has helped JSC get one step closer to making inflatable space structures a reality.

The WSTF Team members who contributed to the successes of Hypervelocity operations are: Tony Carden, Ed Denzler, Grant Dyer, Lenny Farnell, Don Henderson, Dave Hicks, Dave Huskey, Mike Kirsch, Paul Mirabal, Randy Page, Gary Peyton, Lou Rosales, Paul Schauer, Paul Spencer, Larry Starritt, Adrianne Telles, Anthony Trejo, Brooks Woole and Carl Wright.

The JSC Team members are: Freeman Bertrand, Eric Christiansen, Jim Hyde, Justin Kerr, Jay Laughman, Dana Lear, Frankel Lyons and Tom Prior.

WSTF develops toxic chemical detector

By Eric Raub

Potential hazards have always awaited astronauts brave enough to venture out of their spacecraft. Yet even when they come back through an airlock safe and sound, they may be bringing back with them some of the hazards of space in the form of toxic chemicals.

Astronauts who work outside of the Space Shuttle or the International Space Station (ISS) run the risk of coming into contact with monomethylhydrazine (MMH) and unsymmetrical dimethylhydrazine (UDMH).

Both of these chemicals are potential cancer-causing agents. Among other unpleasant side effects, the chemicals can cause nausea, vomiting and convulsions, and can potentially cause permanent damage by reducing the flow of oxygen to the brain.

These dangerous chemicals aren't coming from a galaxy far away, but from maneuvering and position-stabilizing thrusters on the Space Shuttle and ISS. If these toxic propellants would contaminate the Extravehicular Mobility Units, they may piggyback into the vehicle's airlock and would then contaminate the Shuttle Orbiter or ISS atmosphere if they remained undetected.

Even a small amount of these chemicals floating around in the airlock atmosphere is bad news for the astronauts, but how do the astronauts find out if they are present before the adverse reactions start?

The answer came from the White Sands Test Facility, which designed, developed, tested and flight-certified an effective MMH and UDMH detector using a pale yellow gold salt. All of the existing detectors had problems that kept them from being effectively used on the shuttle and ISS. So, Louis Dee, Ben Greene and Steve Hornung set out to build a better mousetrap.

"These commercial electrochemical reactors require an electrolyte. Water is primarily used," Dee said. "They would need to be placed in the vacuum of space; therefore, water is undesirable. ... They also respond to such interfering substances as hydrogen, ammonia and isopropyl alcohol."

Their gold salt detector effectively operates in the presence of the vacuum of space and can detect small concentrations of dangerous chemicals even with interfering substances in the sample. When the chemicals come into contact with the gold salt, a colorful reaction happens that tells the astronauts now whether or not they have a potential hazard on their hands.

"Hydrazines are very powerful reducing agents. Gold salt is an oxidizer," Dee said. "When the two come in contact with each other they spontaneously react. The pale yellow gold salt turns to a lavender or purple elemental gold."

Their detector first flew on STS-98 and is now standard equipment for the shuttle. However, a problem arose in using it in the new ISS airlock. The detector needs access to the vacuum of space to draw a sample of the atmosphere across the gold salt, but no ready access exists in the airlock.

"The airlock does not have the necessary connection to the vacuum of space needed for sampling," Dee said. "It does have a Manual Pressure Equalization Valve (MPEV) installed on the airlock hatch."

WSTF engineers Brian Anderson and John Anderson quickly solved the problem by designing an adapter that connects the detector to the vent valve. The WSTF Machine Shop fabricated the prototype over a weekend. The two hand delivered it to KSC that Tuesday and checked the fit of the prototype to the airlock MPEV outfitted in protective "bunny" suits.

Design of the Flight ISS Contamination Sampler proceeded in the following months. Russell Gardner and Norman Paquette of the WSTF Machine Shop worked overtime and on weekends to fabricate the parts, and Jessie Witcher joined them to inspect the parts.

The adapter proved to be just the piece of equipment needed to use the detector in the ISS airlock. It was launched on STS-104. Now, whether in the Space Shuttle or the ISS, the astronauts can breathe, eat and sleep a little easier knowing that the hazards of outer space are right where they should be. ■

Pictured here is the White Sands Test Facility team that developed a toxic chemical detector. Pictured, left to right, are Randy Page, Lou Rosales, Norm Paquette, Dave Huskey, Steve Hornung, Dave Baker, Jesse Witcher, John Anderson, Bob Duke, Russell Gardner, Lou Dee, Jayme Bass.

A 21st Century cockpit

A joint FCOD/MOD team brings the new cockpit to life

By Bruce Hilty, Brent Jett and Jeff Williams

While many at Johnson Space Center have been focused on the challenges of flying Space Shuttle missions and building the International Space Station, a small team of Shuttle trainers, flight controllers, engineers and astronauts have been putting the finishing touches on a new suite of displays for a revolutionary Space Shuttle upgrade.

They are focused on creating a 21st Century Space Shuttle cockpit. While the first flight of the new cockpit is projected to be in 2006, the project is already experiencing great success.

The team reached a major milestone on June 29 when it completed the detailed requirements for 10 flight displays and more than 100 systems displays, and delivered them to United Space Alliance (USA) for conversion into software requirements specifications for what the Program is referring to as Increment 1.

The Space Shuttle Cockpit Avionics Upgrade (CAU) is the Program's No. 1 safety upgrade, and Increment 1 is the term used for the first-flight capability of CAU. The approach used for developing the requirements has been somewhat unique.

Traditionally, the operations community would not be directly responsible for such an effort but, instead, would provide a consulting role only. For CAU, however, the roles were reversed. The operations community, in the form of the Space Shuttle Cockpit Council (SSCC), was directly responsible for the development requirements.

CAU will be developed over the next several years. The Project Manager is Mike Brieden of the Shuttle Vehicle Office. USA is the prime contractor for the program, Boeing Reusable Space Systems is providing Vehicle Integration services, and Lockheed Martin Systems Integration-Owego is developing the CDP's.

The 'skunkworks' approach

The SSCC was designed to partner the Mission Operations Directorate (MOD) and the Flight Crew Operations Directorate (FCOD) in the development and prototyping of requirements for the new Shuttle cockpit. The new approach to development was the brainchild of the original SSCC Co-chairs–astronaut Steve Lindsey and MOD's Bruce Hilty–nearly two years ago.

The SSCC development team was structured to include system trainers from the Shuttle Training Division, flight controllers from both the Systems Division and Flight Design and Dynamics Division, and several astronauts. The Engineering Directorate, USA and BRSS provided engineering support.

The SSCC concept put the responsibility for requirements development directly on the users of the cockpit, the flight and ground crew. The team began the development with a detailed definition of the current cockpit shortcomings and crew task analysis over an entire mission profile.

A series of "white papers" followed, which detailed the concepts of operations for the new cockpit and the avionics architecture, enabling requirements necessary to implement those concepts.

How can CAU be a 'safety' upgrade?

The CAU does not fit into the traditional category of safety upgrades. Shuttle safety and reliability metrics are normally defined in terms such as MTBF (Mean Time Between Failure) or PRA (Probability Risk Assessment), which focus on the likelihood that components will fail during operation.

The criticality of a component then determines its impact to safety of the crew and vehicle. The CAU does not address risks in those terms but in terms of crew workload and situational awareness (SA) in the midst of nominal and off-nominal crew procedures.

Studies of commercial and military aviation show that more than 60 percent of all accidents are attributed to crew error. Crew error increases as the workload increases, and increased workload results in a reduction of SA.

Although the Space Shuttle is still among the most technologically advanced aerospace vehicles ever built, its avionics architecture and crew displays were designed in the 1970s. When a system failure occurs onboard today's Space Shuttle, the crew has to collect the data from several complex displays and integrate other indirect information in the cockpit to diagnose the failure and determine the necessary corrective action.

The signatures presented with a given failure are often not intuitive and prone to misdiagnosis or procedural error. There is also a high dependence on the ground crew for diagnosing system problems and directing the appropriate response, which takes additional time and relies on continuous communications.

Another area of concern is the crew's ability to manage abort options during ascent and energy during entry. In today's cockpit, the crew relies on cue cards in the cockpit to determine the abort options in the event of an engine failure, which do not account for such things as a change in the launch time or engine performance degradation.

Given that the Shuttle will fly another 20 to 30 years, closing the flight crew SA gap has become the Space Shuttle Program's top safety issue.

The key to CAU's safety improvement is what the SSCC and the CAU Project specified as enabling requirements. CAU will build on the new "glass cockpit," referred to as MEDS (Multipurpose Electronic Display System), which was first flown on *Atlantis.*

The heart of the CAU comes in the form of a new Command and Display Processor, or CDP. Whereas most of today's data are available only to Mission Control, the CDP will integrate all on-board data for use on crew displays.

It will also allow for highly graphical and intuitive displays to be called on any of the Space Shuttle's 11 display units for both monitoring data and commanding to the vehicle systems, as well as an intuitive display navigation scheme.

The CDP will have the processing power necessary for software applications to monitor abort capability, provide for enhanced caution and warning, and failure diagnosis, as well as future growth. ■

NASA JSC 2001e02060 photo by David DeHoyos

Space Shuttle Cockpit Council

Key players on an important team

Display development for CAU

With the enabling requirements defined, the SSCC began in July 2000 to work toward June's milestone.

Astronaut Jeff Williams relieved Steve Lindsey as SSCC Co-chair while Lindsey trained for STS-104. Astronaut Brent Jett joined the SSCC leadership in January after completing STS-97.

Williams and Bruce Hilty organized the development team into three principle groups: display development, user interface standards development and prototyping and test and evaluation.

Greg Hite, of the Engineering Directorate, led the effort to define the processes used for the group's development effort. Astronauts Willie McCool and Rick Mastracchio led and integrated the display development effort.

Display leads included: Tori Palmer, Andy Hamilton, Mike Grabois, Bill Miller, Al Park, Wes Penny and Alan Fox of the Training Division; Dean Lenort and Ray Miessler of the Systems Division; Dennis Bentley and Larry Hendrickson of the Flight Dynamics Division and Billy Oefelin, Greg "Box" Johnson and George Zamka of the Astronaut Office.

Astronaut Nick Patrick led the user interface standards development with support from human factors engineers from Ames Research Center and Integradyne.

Astronauts Paul Lockhart and Lee Archambault led the test and evaluation effort and worked with Kevin Taylor and his team of software programmers in the display prototyping effort in MOD's Jupiter Facility, along with Bodan Scharunovych and his team in the data integration.

Abort management

Howard Hu of the Engineering Directorate led a team of engineers and flight controllers to develop the requirements for the Shuttle Abort Flight Management (SAFM) application, which will provide the crew insight into abort capability during ascent and energy management during entry. SAFM will provide one of the most significant improvements to the crew's SA for Increment 1 of CAU.

System integration

Additionally, among the biggest challenges facing the CAU team was the integration of the new architecture into the current Shuttle Data Processing System–particularly in the areas of CAU system operation and Orbiter vehicle ground processing.

Tori Palmer led a "tiger team" composed of SSCC team members, CAU hardware and software architects from USA, Shuttle flight software engineers and KSC Shuttle engineers to meet that challenge.

Astronaut Paul Lockhart and his team brief part of the STS-107 crew on the new cockpit as display author Ray Miessler and Jupiter Facility programmers look on.

Ripped from the ROUNDUP

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

1971

Neil Armstrong, America's first man to walk on the Moon, announced his resignation earlier this week. He has accepted an engineering professorship at the University of Cincinnati in Ohio and will leave NASA in October.

• Green cheese, no. Green rocks, yes! Among the samples returned by the Apollo 15 crew are seven or eight rocks that are pale green in color and which, in some cases, contain large green particles. The rocks are being analyzed in MSC's Lunar Receiving Laboratory.

Scientists and principal investigators have been busy here and at research centers studying lunar samples and films brought back by Dave Scott, Al Worden and Jim Irwin and analyzing returns from the experiments left on the moon's surface.

1976

Viking 2's Sept. 3 landing site on the Utopia Plains of Mars is five times more moist than elsewhere on the planet and therefore more likely to support life, scientists at the Jet Propulsion Laboratory report. The site was chosen last Saturday following a five-hour meeting between engineers and scientists working on the project.

• Television Office Chief James C. Stamps has received a $1,500 cash award for his part in developing a television noise-reduction device used during Skylab and ASTP missions. Stamps, or COD's Photographic Technology Division, and Bernard L. Gordon, formerly a Taft Broadcasting contract employee, split a $3,000 award given by NASA Headquarters in recognition of their joint work on the noise-filtering unit.

1991

Dress rehearsals complete, *Atlantis* is in the spotlight's glare as preparations escalate toward a possible Sept. 12 launch of STS-48, a mission to put the Upper Atmosphere Research Satellite aloft.

The STS-48 crew traveled to Kennedy Space Center on Sunday to participate in the terminal countdown demonstration test. The mock countdown, a warmup for all involved in the launch, came to a smooth conclusion Tuesday.


ROUNDUP
Frosch, Yardley cover new space technology in STS development

American Heritage Week

NASA JSC 2001e25431

Multicultural fun was in the air the week of Aug. 6 as JSC celebrated American Heritage Week. Sponsored by the Equal Opportunity Programs Office, American Heritage Week celebrates the uniqueness of all cultures at the same time. Pictured here are just some of the people who celebrated their heritage at the grand finale on Aug. 10 at the Gilruth Center.

Photos by

James Blair

New AED program at JSC to combat cardiac arrest

Every year, about 250,000 Americans die from sudden cardiac arrest, roughly the population of a medium-sized city. However, recent measures taken by the Occupational Health and Test Support Office should help keep JSC employees from becoming statistics.

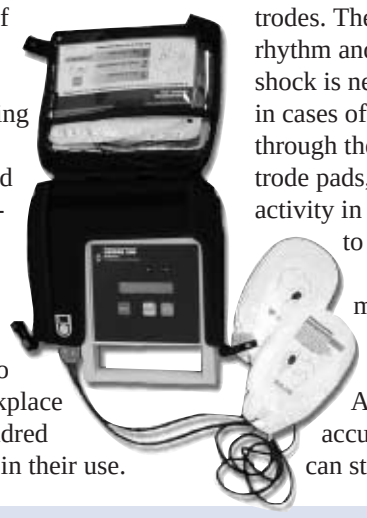
Most cases of cardiac arrest are caused by ventricular fibrillation (VF), a disorder in which the rhythmic beating of the heart's lower pumping chambers become chaotic and prevent the heart from pumping blood. Defibrillation is the only technique that is effective in returning a heart in VF to its normal rhythm.

Thanks to innovative technology, trained non-medical personnel using an Automated External Defibrillator (AED) can perform defibrillation. The sooner defibrillation is provided the better the victim's chance of survival. In cases of cardiac arrest, every minute of delay decreases the chance of survival by 10 percent. After as little as 10 minutes very few resuscitation attempts are successful.

To aid JSC employees in the event of a sudden cardiac arrest, the JSC Occupational Health and Test Support Office recently completed the final phase of the "Got the Squeeze, Call the 33333's" heart disease awareness campaign.

The campaign included the deployment of AEDs across the Johnson Space Center. The first two phases of the campaign increased the number of trained personnel who can recognize the symptoms of sudden cardiac arrest and who are aware of the steps that need to be taken.

The most recent phase of this program–deployment of AEDs across the Center–has just been completed. It included placing 46 AEDs throughout JSC, Ellington Field and the Sonny Carter Training Facility. The location of these AEDs is shown below.



JSC is among the first government sites to place AEDs in the workplace and to train several hundred non-medical personnel in their use. During standard business hours, JSC clinic ambulances respond with advanced cardiac life support anywhere on-site.

The placement of AEDs in workplaces with high numbers of people and risk shortens the response time in cardiac cases. It also increases the chance of survival, providing care until the trained medical personnel arrive.

How does an AED work? A microprocessor inside the defibrillator interprets the victim's heart rhythm through electrodes. The computer analyzes the heart rhythm and advises the operator when a shock is needed. AEDs advise shock only in cases of VF. The current is delivered through the victim's chest wall via electrode pads, stopping abnormal electric activity in the heart. This allows the heart to resume normal function.

The AED, designed for non-medical people, is user-friendly and provides voice prompts to guide the user in operation. Although greatly simplified for accuracy and ease of use, an AED can still post risks if used improperly. AEDs are prescription devices for operation only by individuals who have received proper training, and within a system that integrates all aspects of care, from first response to the hospital.

The AED is now recognized as one of the most important life-saving devices available. The ease of its use by properly trained individuals has given rise to Public Access Defibrillation (PAD) programs. As a result, AEDs are being placed in many federal government and public facilities, including airports such as Chicago O'Hare and San Francisco. All major airlines now carry AEDs in their aircraft.

To provide round-the-clock, daily coverage onsite, the JSC Fire Protection Specialists have been trained and carry AEDs in their vehicles to respond to all emergencies directed through the JSC "33333" emergency response network.

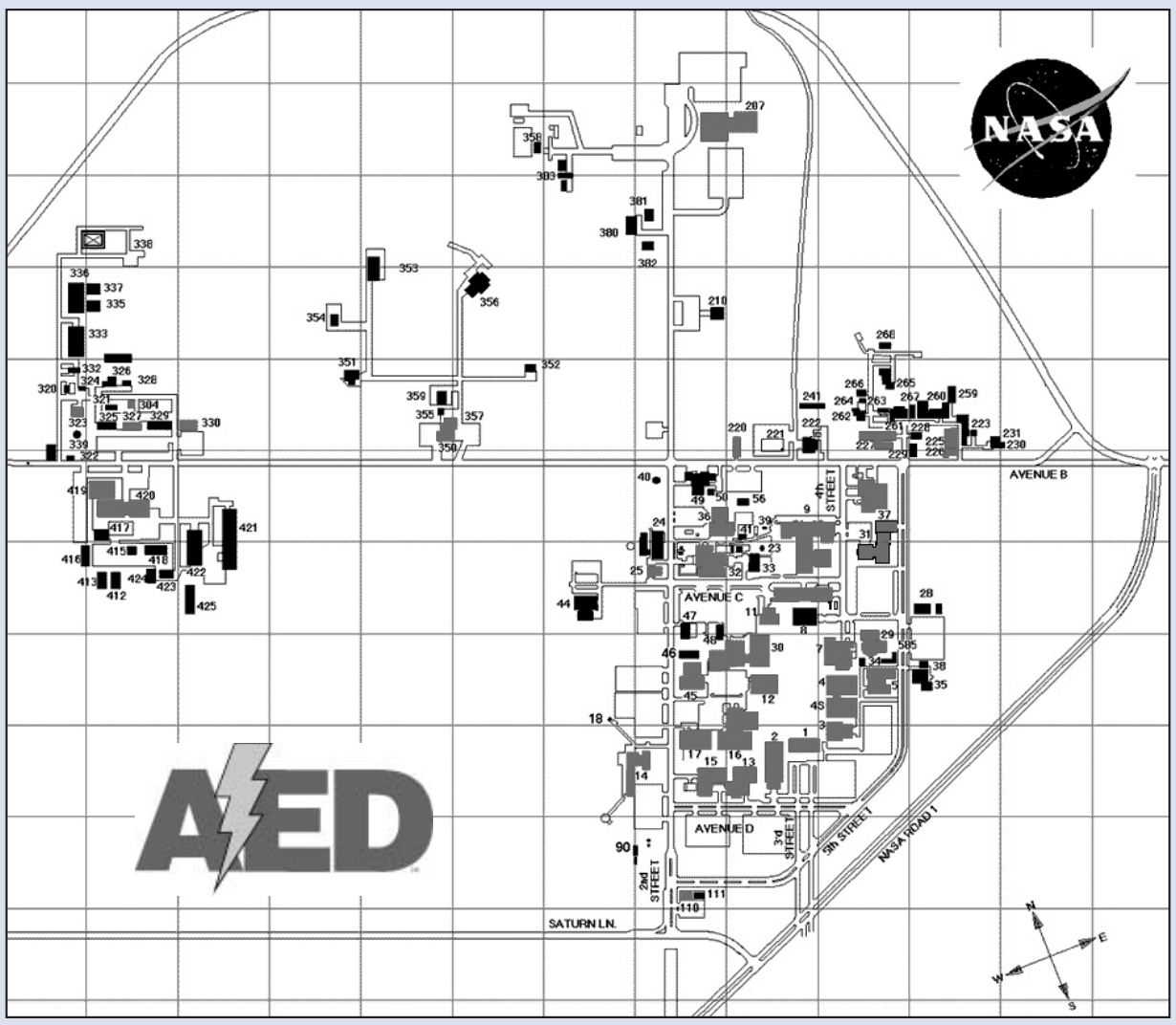
If you have any additional questions or would like more information on AEDs, please contact Angel L. Plaza at the Occupational Health and Human Test Support Office, x37305, or Kelsey-Seybold's Mike Fox at (281) 792-5724. ■

AED PLACEMENT AT JSC

Building	Location
Bldg 1	1st Floor next to RM 105 8th Floor next to RM 850
Bldg 2 North	Lobby next to RM 135
Bldg 3	Food entry way by bulletin board
Bldg 4 South	2nd Floor next to RM 2327 3rd Floor next to RM 3801
Bldg 4 North	2nd Floor next to south elevator
Bldg 5	CIM control
Bldg 7	Building 7A lobby
Bldg 9	O.C.C.
Bldg 10	Next to RM 100 High Bay
Bldg 11	North wall by exchange Service
Bldg 12	2nd Floor outside RM 298
Bldg 13	North lobby right wall
Bldg 14	Hallway next to RM 106
Bldg 15	Main lobby left wall by phone
Bldg 16	Outside RM 102
Bldg 17	Main lobby left wall
Bldg 25	Two fire response trucks
Bldg 30A	RM 2085 Hallway
Bldg 30 South	1st Floor RM 30M 2nd Floor RM2315 Canteen area
Bldg 31	Main lobby front wall
Bldg 32	Entry way chamber "A" high bay
Bldg 36	Lobby area by canteen machines
Bldg 37	Main lobby right side by phone
Bldg 44	Main lobby left side by phone
Bldg 45	1st Floor lobby left side by pay phone 5th Floor by elevators
Bldg 110	Lobby area behind desk
Bldg 207	Administration area, on wall behind counter
Bldg 220	Temporary wall in lobby
Bldg 226	Fire extinguisher cabinet in hallway
Bldg 227	Print shop hallway fire station
Bldg 323	Lobby next to RM 102
Bldg 330	Main door entrance left side
Bldg 350	Entrance door outside RM 140
Bldg 419	Hallway between Buildings 419 & 420

ELLINGTON FIELD AIR OPS
Maintenance Center, hanger 276 NBL 920N
Emergency Treatment Room RM 1337D

Note: Two AEDs at White Sands and El Paso



If you suspect that someone is having a heart attack, here is what you should do:

1. Call 33333 at JSC (44444 at Ellington), activate the emergency medical services and send someone to get the AED.
2. Locate an AED Operator. You will know by the logo on their door or by the list near the AED.
3. Trained CPR responder should initiate the steps of CPR as necessary.
4. AED operator should connect the AED to the patient if they are not breathing, not responsive and no pulse is detected.

PEOPLE on the MOVE

Human Resources reports the following personnel changes:

Key Personnel Assignments

David Schurr named the Deputy Manager, Business Management Office, International Space Station Program Office.
Richard Fox named the Assistant Business Manager, Assessments, International Space Station Program Office.
Gerald Sanders selected Chief, Propulsion and Fluids Systems Branch, Energy Systems Division, Engineering Directorate.

Additions to the Workforce

Jennifer Aranda joins the Legal Office, as an Attorney Advisor.
Kylie Moritz joins the Public Affairs Office, as a Public Affairs Specialist.
Michelle Diefenderfer joins the Institutional Procurement Office, Office of Procurement, as a Contract Specialist.
Jonathan Wood joins the Projects Procurement Office, Office of Procurement, as a Contract Specialist.
Julie Karr and *Angela Swafford* join the Space Shuttle Procurement Office, Office of Procurement, as Contract Specialists.
Diana Gomez and *Stacy Poole* join the Space Station Procurement Office, Office of Procurement, as Contract Specialists.
Jonathan Brogan joins the Orbit Dynamics Branch, Flight Design and Dynamics Division, Mission Operations Directorate, as a Flight Controller.
Ryan Proud joins the Ascent/Descent Dynamics Branch, Flight Design and Dynamics Division, Mission Operations Directorate, as a Flight Controller.
Larissa Smit joins the Cargo Integration and Operations Branch, Operations Division, Mission Operations Directorate, as a Flight Controller.
Rachel Hinterlang joins the Environmental Systems Branch, Systems Division, Mission Operations Directorate, as a Flight Controller.
Albert Sena joins the Simulation and Graphics Branch, Automation, Robotics, and Simulation Division, Engineering Directorate, as a Computer Engineer.
Deborah McDaniels joins the Thermal Design Branch, Structural Engineering Division, Engineering Directorate, as an Aerospace Engineer.
Oscar Benavides joins the Information Science Branch, Information and Imaging Sciences Division, Information Systems Directorate, as a Computer Engineer.
Paul Holtzclaw joins the Center Operations Directorate, as a *Security Specialist.*
Michael Darby joins the Office of the Chief Financial Officer, as a Program Analyst.
Steven Bockmiller joins the Space and Life Sciences Resources Management Office, Office of the Chief Financial Officer, as a Program Analyst.
John Gurecki joins the JSC Resident Office - KSC, Space Shuttle Vehicle Engineering Office, Space Shuttle Program, as Principle Engineer for Avionics Systems.
Dean Kunz joins the JSC Resident Office - KSC, Space Shuttle Vehicle Engineering Office, Space Shuttle Program, as Principle Engineer for Fluid Systems.
Sandra Day joins the Vehicle Branch, Space Station Division, Safety, Reliability, and Quality Assurance Office, as an Aerospace Engineer.
William Schaefer joins the Avionics and Software Office, International Space Station Program, as an Avionics Engineer.
Courtenay McMillan joins the Moscow Technical Liaison Office, International Space Station Program, as an Aerospace Engineer.
Bill Spetch joins the System Integration and Analysis Office, Program Integration Office, International Space Station Program, as a Vehicle Integrated Performance Engineer.
Dale Huls joins the Safety and Mission Assurance/Program Risk Office, International Space Station Program, as the Quality Assurance Lead.
Tony Sang joins the On-Orbit Engineering Office, Vehicle Office, International Space Station Program, as a Mission Evaluation Room Manager.
Frank Carpenter joins the Medical Informatics and Health Care Systems Office, Space Medicine and Health Care Systems Office, Space and Life Sciences Directorate, as a Medical Officer.
Richard McCluskey joins the Medical Informatics and Health Care Systems Office, Space Medicine and Health Care Systems Office, Space and Life Sciences Directorate, as a Medical Officer.

Promotions

Laura Wright was selected as a Senior Secretary in the Office of Procurement.
Rosalind Johnson was selected as a Lead Secretary in the Management Integration Office, International Space Station Program Office.

Reassignments to Other Directorates

Debbie Conder moves from the Office of the Chief Financial Officer to the Human Resources Office.
Angie Zavala moves from the Engineering Directorate to the Legal Office.
Robert Neil moves from the Information Systems Directorate to the Engineering Directorate.
Charles Salkowski moves from the Engineering Directorate to the Information Systems Directorate.
Tim Ames moves from the Flight Crew Operations Directorate to the International Space Station Program.
Tom Miglin moves from the Mission Operations Directorate to the International Space Station Program.
Angel Plaza moves from the Engineering Directorate to the Space and Life Sciences Directorate.
Nancy Robertson moves from the Human Resources Office to the Space and Life Sciences Directorate.
Jewel Hervey moves from the Office of the Chief Financial Officer to the Space Operations Management Office.

Retirements

Phil Cota of the Engineering Directorate.
Jimmy Gilbert of the Engineering Directorate.
Charles Price of the Engineering Directorate.
Jack Boykin of the Space Shuttle Program.
John Carpenter of the International Space Station Program.

Resignations

Wayne Hurlock of the Office of Procurement.
Jean-Loup Chretien of the Flight Crew Operations Directorate.
Terri Stowe of the Mission Operations Directorate.
Roger Billica of the Space and Life Sciences Directorate.

DATES & DATA

Get jazzed up! Come hear SAIC's Juan Manuel and others perform live jazz music at the University of Houston-Clear Lake Bayou Building Theatre Sept. 14, from 8-10 pm. There is a $10 cover, but only $8 if tickets are purchased in advance. For more information contact Rosalyn Manahan at (281) 992-2409. Check out Juan's music on the Web at www.mp3.com/juan23.

Want to bowl? Join the Thursday Night Bowling League, which begins Aug. 30. For more information contact John J. Thiel at (281) 269-2629 or j.j.thiel@att.net.

USA-Houston NMA
Wednesday, Sept. 19, 4:30 - 7 p.m. JSC Gilruth Center
Speaker: Mr. Tommy Holloway, NASA ISS Program Manager

NASA BRIEFS

BUSTED WHEEL MAY HOLD ANSWERS

Jet Propulsion Laboratory –A busted wheel on an experimental rover may change the face of future exploration on Mars.

While conducting tests of an inflatable rover in the Mojave Desert, one of the rover's shoulder-high spherical "tires" broke off the vehicle and blew away.

"It went a quarter of a mile in nothing flat," recalled technician Tim Connors, who quickly saddled up with the driver of a passing all-terrain recreational vehicle to chase down the runaway sphere. The moderate 20-mile per hour afternoon winds drove the ball fast and far.

The accident inspired the idea for a two-story high beach ball, dubbed "the tumbleweed rover," to roam the vast stretches of the Red Planet. The wind blowing across the face of the planet would be the only engine needed to propel the giant ball.

A payload carrying instruments such as cameras or water-seeking radar could be held in place by tension cords at the tumbleweed's center. When it's time to stop for a while, mission controllers would command the ball to partially deflate.

Jack Jones of JPL's Inflatable Rover Program warns the tumbleweed is only preliminary work, but he's enthusiastic about the promise this technology might hold for exploration of Mars and other worlds with thin atmospheres. Tests in the Mojave Desert confirmed a 6-meter diameter ball should be able to climb over or around one-meter rocks and travel up slopes 25 degrees and higher in the thin, breezy Martian air.

NASA COMPUTER TOOL SMOOTHES FLOW OF AIR TRAFFIC

Researchers recently monitored and tested a new NASA software tool that will give air traffic controllers the ability to predict aircraft position and avoid potential conflicts.

"The ability to accurately predict aircraft trajectories more than 20 minutes in advance is crucial to the success of air traffic management," said Rich Coppenbarger, the en-route data exchange tool (EDX) technical lead. "EDX allows automation used for air traffic control decisions to be more accurate, thereby increasing fuel efficiency and system capacity, and reducing controller workload."

With cooperation from United Airlines, 48 Boeing 777 aircraft received EDX software upgrades, which delivers flight data to automated air traffic management software in "real time." The next step is evaluation of the tool's capabilities for future application to real-time flight plan development and modification. This capability can be viewed as an important step toward attaining Free Flight, which is a FAA program that will give pilots the freedom to choose their own flight paths in real-time.

SPACE CENTER Roundup

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