SPACE CENTER
Roundup

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NASA's Mars-bound mini-propellant plant

For 11 days last March, JSC was the site of the most Mars-like place on Earth.

To be exact, a 5-foot-diameter, 5-foot-long, cylindrical vacuum chamber inside Building 353 was configured to simulate Mars.

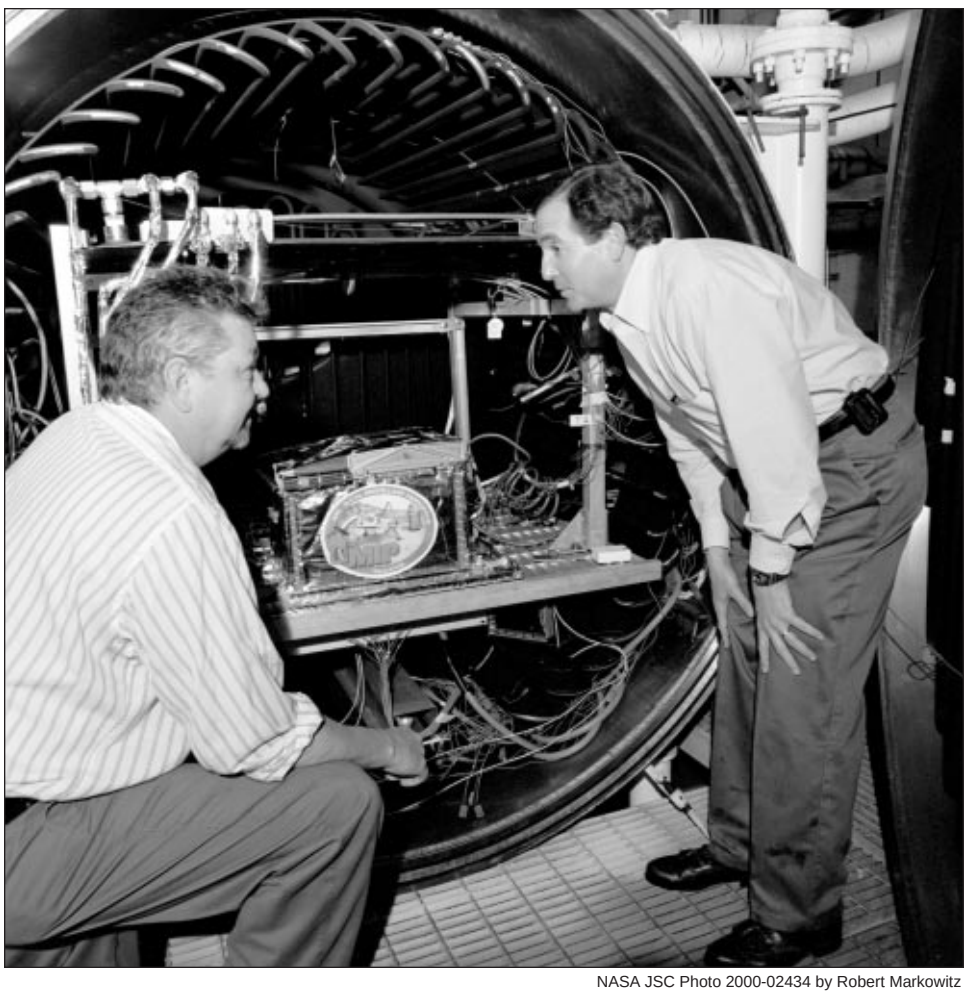
The atmosphere inside the chamber at the Engineering Directorate's Energy Systems Test Area was made up of 95 percent carbon dioxide, 3 percent nitrogen, 2 percent argon, and zero percent oxygen. The atmospheric pressure was approximately 1/100 of that of Earth, and the day-night temperature ranged between –88° Centigrade (–126° Fahrenheit) to –23° Centigrade (–10° Fahrenheit). Even the length of a day was adjusted to be 24 hours and 40 minutes to mimic the rotation of Mars.

Why duplicate Mars so accurately? Because a JSC payload is to fly on the next robotic lander to Mars and this payload needed to be thoroughly tested. JSC's Mars In-situ-propellant-production Precursor will test the feasibility of using the thin Mars atmosphere to produce oxygen for breathing air and rocket propellants. It will also contain a variety of other experiments to measure the effects of the dusty Mars atmosphere on solar cells and heat radiators.

This "living off the land" project, also known as "MIP," had been working against a schedule to deliver its flight hardware for integration onto the robotic Mars Surveyor Lander this summer, with a planned launch to Mars on a Delta II expendable launch vehicle in April of 2001. In light of that timetable, the JSC team building the experiment began rigorous Martian environmental testing in March.

"The loss of the Mars Polar Lander last December 3 has impacted our launch date," said MIP Project Manager Jim Ratliff of the Biomedical Hardware Development and Engineering Office. "The design of the 2001 Lander is very similar to the Mars Polar Lander. Consequently, NASA Headquarters has decided not to launch this lander during the 2001 opportunity."

"Despite the launch delay," Ratliff said, "the MIP Team has to press ahead on nearly the original schedule in order to stay within our budget constraints. Once qualification testing is complete, we can then focus on delivering the flight unit. This program has been 'test intensive,' but this is the first time hardware will produce a resource on another planet, and we want to make sure the design is robust enough to work remotely in the harsh Martian environment."



NASA JSC Photo 2000-02434 by Robert Markowitz

MIP Qualification Unit being installed inside Mars Simulation Chamber by Lockheed Martin Electrical Team Leader Jim Wines (kneeling) and MIP Principal Investigator David Kaplan.

> ***The concept is to use the resources on Mars to reduce the amount of materials that need to accompany a human mission …to 'live off the land.'***
>
> – David Kaplan

"The concept is to use the resources on Mars to reduce the amount of materials that need to accompany a human mission …to 'live off the land,'" said Principal Investigator David Kaplan of JSC's Exploration Office. "MIP will selectively absorb and compress carbon dioxide from the Martian atmosphere; produce propellant-grade, pure oxygen; test advanced photovoltaic solar cells for energy production; test techniques to combat the settling of airborne dust onto solar arrays; and test thermal radiators. In particular, producing oxygen using materials readily available on Mars would be an important step toward reducing the costs and risks of an eventual human exploration mission to Mars."

MIP will be the first hardware to use the indigenous resources of a planet or moon. Its successful operation will pave the way for future robotic and human missions to rely on propellants produced using Martian resources as feedstock.

The qualification unit began environmental testing on March 15 and finished March 29. Initial tests qualified the thermal performance using temperature extremes expected during the 11-month-long cruise to Mars. Thermal vacuum testing was followed by 10 continuous days of Mars surface environment simulations, including worst-case cold, worst-case hot, and normal temperature profiles. These tests exercised all operational modes of the hardware and software. Operations were conducted in a "hands off" manner by sending commands that scheduled activities for the next 48 hours, as will be done on the Mars surface. Verifying that MIP could operate remotely and return the proper experiment data was an important part of this test.

The experiment's Oxygen Generation Subsystem, which is led by Scott Baird of the Energy Systems Division, worked well in three test runs. For each run, oxygen was produced for 3 to 4 hours. The heart of the oxygen generation is a wafer-thin, solid-oxide ceramic disk made of zirconia about the size of a small cookie. It is sandwiched between two platinum electrodes and heated to 750° Centigrade (1380° Fahrenheit). When carbon dioxide is fed to this unit, the zirconia cell "cracks" the carbon dioxide into carbon monoxide and oxygen. Only the oxygen can penetrate through to the other side of the disk; the carbon dioxide and carbon monoxide gases are stopped in their tracks.

Testing also verified the capability of the JPL-provided Mars Atmosphere Acquisition and Collection experiment to absorb an abundant supply of carbon dioxide from the atmosphere and to supply this carbon dioxide as feedstock.

Two experiments provided by the Glenn Research Center – a solar cell experiment called the Mars Array Technology Experiment and a dust mitigation experiment called the Dust Accumulation and Repulsion Test – also worked well.

"We are currently tracking two issues as a result of the testing," said MIP Deputy Chief Engineer Howard Flynn of the Energy Systems Division.The causes for a pinhole leak in a bellows and an open circuit in a radiator heater have been found and are being corrected.

"Both experiments are scheduled to be returned to JSC in early June where they will be reintegrated and retested," Flynn said. "After successful re-testing, the MIP Qualification Unit will continue its qualification testing with a pyroshock test to take place at Lockheed Martin Astronautics."

When the flight hardware is completed later this summer, it will be placed in environmentally controlled storage until early 2002, which is when the Lander is scheduled to begin payload integration activities.

"We are convinced that the successful operation of MIP will significantly advance the critical exploration technology of producing important consumables on Mars from Martian resources," said Ratliff. ■

Space station trailers on tour this summer.

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Dealing with stress when the pressure is on.

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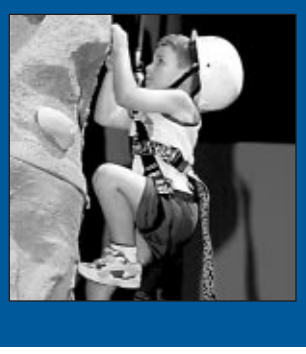

Extreme sports at Space Center Houston.

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Traveling trailers bring space station to Hometown, U.S.A.

Only three months out of the shop, the newly refurbished International Space Station trailers, simulating the interior of a habitation and lab module of ISS, are on the road and making appearances across the country.

The trailers, also known as Space Station Imagination, had a remarkable debut in Wilson, North Carolina. Located about 40 miles from Raleigh, the City of Wilson and area schools were invited to tour the trailers during a weeklong event sponsored by the *Wilson Daily Times*. The site was open to the general public every day from 3 - 7 p.m. The trailers made front-page news, were featured in a special *Times* insert, and had hits on all three local television station news broadcasts. More than 2,000 people toured the trailers during the week.

"The folks in Wilson did a tremendous job with publicity and coordinating the event," said Louis Parker, JSC exhibits manager. "In addition to the trailers, they blocked off their entire parking lot and arranged tents for other space-related activities that really made it a full-scale event."

Visitors also could try on a display spacesuit, and participate in model rocket launches and other hands-on activities.

The *Times* went so far as to provide small lab coats for the school-aged visitors to enhance their experience inside the trailers, where they could step into an astronaut's sleeping bag, peer into the closet-sized restroom,and even browse photographic images from space.

Top: Wilson area schoolchildren get a hands-on look at what a space lab module is like inside Space Station Imagination – NASA's traveling space station trailer. More than 2,000 people toured the trailers during the weeklong exhibit.

Left: Local museum volunteers show Wilson students examples of astronaut tools. Many organizations, including the local schools, set up tents around the trailers and organized hands-on student activities to further the student's space experience.

"I think the simplicity and humor of the videos guiding visitors through the trailers helped them enjoy and remember the messages we are trying to communicate," said Juan Galvez, JSC audio-visual manager. "We want visitors to have a basic understanding of what it takes to work and live in space and how that knowledge is being applied to the ISS."

Astronaut Dan Tani was on hand the first evening the trailers were opened to the general public to greet visitors and sign autographs. Tani had been to Wilson for a previous outreach event and was a familiar name to the community, which welcomed him like a "hometown hero."

"They were mesmerized," said Parker. "They couldn't believe some of it. They knew NASA launched space shuttles, but now they know there is a lot of science, medicine, and other work where technologies are being developed that will benefit the Earth. Some of them didn't even know that we were working with the Russians."

We may find it surprising that many people are unfamiliar with the scope of the ISS as well as the technology required to fly it, but increasing awareness of ISS's global reach is an important goal of the trailer tour. To achieve that goal the trailers will have a varied schedule, appearing in small to mid-size cities as part of a concentrated NASA awareness effort, at major events such as the Texas State Fair and air shows, and at science museums across the country.

This fall, the trailers will reach deep into JSC's eight-state region in the central U.S. It will also make stops at science museums in the region and be in Houston for major JSC-hosted events such as Open House and Inspection.

The trailer exhibit just completed a two-and-a-half-week stay at the NASA Independent Verification Facility at Fairmont, West Virginia, The education office at that facility hosted programs for schoolchildren across the state. They are back at JSC during June for maintenance and improvements before heading to California for the World Stamp Expo and the EAA Air Show at Oshkosh, Wisconsin. The exhibit will be on the road most of the year, returning periodically to JSC for maintenance and public tours. ■

Space Station Imagination – *coming to a city near you!*

May 28 - June 9
Johnson Space Center, Houston
Trailer Maintenance

June 30
Johnson Space Center, Houston
American Heritage Week Event

July 7 - 16
Los Angeles, Calif.
World Stamp Expo

July 26 - August 1
Oshkosh, Wisconsin
EAA Air Show

August 26
Johnson Space Center, Houston
JSC Open House

Late September/early October
Dallas
Texas State Fair

October and November
Small cities tour
Central U.S.

November 1- 3
Johnson Space Center, Houston
Inspection 2000

COMMUNITY NEWS

JSC reaches out to academe

NASA is stepping up its effort to collaborate with universities across the country on the research it does on space missions, biotechnology, and information technology. In the process, the agency's space-and-research centers are establishing stronger ties with campus scientists.

As part of this effort, JSC held the first-of-its-kind Experimental Program to Stimulate Competitive Research (EPSCoR) Expo May 8-9 at the Gilruth Center. EPSCoR representatives, about 40 university directors, faculty members, and researchers engaged in space-related topics, attended the conference.

The purpose was to acquaint attendees with JSC researchers and their current fields of study so that they might match NASA research interests with their own. If they see strong correlations, later this year they will be able to submit proposals to receive Headquarters funds to collaborate with NASA researchers on projects key to the agency's success.

"Over the years, JSC has found that including the academic community in our work can benefit everyone involved," said JSC University Affairs Officer Donn Sickorez. "We benefit from their insights and hard work; they benefit from our practical focus and depth of experience. The EPSCoR Program is an excellent example of how we can involve yet another segment of college and university faculty and students in the nation's space program."

> ***"The EPSCoR Program is an excellent example of how we can involve yet another segment of college and university faculty and students in the nation's space program."***
>
> – Donn Sickorez

The event began with an overview of JSC's research endeavors. Representatives from the center's Space and Life Sciences and Engineering directorates gave presentations on ongoing research at JSC that is critical to the center's success.

Dr. Charles Lloyd, manager, Biomedical Research and Countermeasures Program, gave an overview of current research in several areas including space medicine, occupational medicine, human factors, science payloads, and biotechnology. He also reviewed key activities of the National Space Biomedical Research Institute (NSBRI), the consortium led by Baylor College of Medicine. The NSBRI allows universities from across the country to take on the task of developing countermeasures or mitigating measures for potential risks involved in long-duration space flight.

Of particular note for the visiting EPSCoR representatives was Dr. Lloyd's review of 55 critical risks to long-duration human space flight for which the directorate needs to develop countermeasures or mitigating factors in order for human beings to be sent on extended space journeys, including potential missions to Mars. The study of each of these risks offers avenues for future collaborative research between NASA and academe.

Dr. Wendell Mendell, deputy chief of JSC's Earth Sciences and Solar System Exploration Division, offered additional avenues for collaborative research. He covered numerous topics including research endeavors in Earth sciences, orbital debris, planetary science, and the study and curation of astromaterials.

John Connolly of JSC's Exploration Office said that research in the Engineering Directorate is focused on projects planned beyond the International Space Station including returning to the Moon and going on to Mars. He described a roadmap of critical technologies ranging from propulsion systems and information technology to life support systems that the directorate is working on for keeping people alive and well for 100- to 300-day missions.

According to Connolly, academe will play a key role in developing these technologies. "When we think about the academic community, we think of you as coming in at the very forefront of what we need to develop."

Attendees appreciated the opportunity to find out more about the EPSCoR Program and to check out potential areas for collaborative research.

NASA JSC Photo 2000-03896 by James Blair

Lockheed Martin's Michael Alazraki and Karen Meyers discuss regenerative life support systems for long-duration space flights with Dr. Rebecca Lutte, professor of aviation at the University of Nebraska at Omaha Aviation Institute.

"I am attending on behalf of the University of Nebraska at Omaha," said Dr. Rebecca Lutte, professor of aviation at the University of Nebraska at Omaha Aviation Institute. "We are an EPSCoR research grant facility and coordinate the NASA research for the state of Nebraska. We are here to look at increasing collaboration through NASA. The university right now is mostly involved with the Small Aircraft Transportation System Program. So we are looking at some areas in general aviation and increasing air transportation to rural parts of our state."

Attendees were able to meet JSC scientists and researchers and visit laboratories across the center. Mini-tours of the X-38, TransHab, Mission Control Center, and BIO-Plex Facility were also on the agenda. Exhibits ranging from Inspection 2000 to the DeBakey ventricular assist device were also on display in the Gilruth Center.

The EPSCoR Program is designed to allow states of modest research infrastructure to develop a more competitive research and development base. In 1978, the National Science Foundation designated Alabama, Arkansas, Connecticut, Idaho, Kansas, Kentucky, Louisiana, Maine, Mississippi, Montana, Nebraska, Nevada, North Dakota, Oklahoma, South Carolina, South Dakota, Vermont, West Virginia, and Wyoming as EPSCoR states. Puerto Rico was also included. In 1992, Congress asked NASA to establish a NASA EPSCoR Program and granted $10 million to help EPSCoR states increase their research and development base. Under the terms of the 2001 EPSCoR competition, each state will be invited to propose up to three research projects totaling approximately $700,000 annually.

NASA codes and centers will publish collaborative research opportunities in a work titled *Research Compendium* due out in August. Any principal investigator who leads a research group at one of the EPSCoR states will be able to submit proposals through each state's EPSCoR system. Winning proposals will be announced in spring 2001. ■

A Glimpse of the Past ...Visions of the Future!

Johnson Space Center celebrates American Heritage Week 2000

Celebrate JSC's multicultural workforce during American Heritage Week June 26 through June 30. Special events in the Bldg. 3 cafeteria each weekday will highlight unique traditions and customs that distinguish the various backgrounds of JSC's more than 18,000 employees.

A parade led by the Forest Brook High School Marching Band will kick off the Grand Finale Friday, June 30, as exhibits and entertainers representing a cornucopia of cultures transcend the Gilruth Center into a global "village fair." The International Space Station trailers will also be open for tours at the site.

Admission is free for Johnson Space Center employees, contractors, and their families. To volunteer for the Grand Finale event or for more information regarding American Heritage Week, contact Patricia Burke at x30606 or visit the American Heritage Week Web site at http://www4.jsc.nasa.gov/EOPO/. ■

JSC observes Cinco de Mayo

JSC held its annual Cinco de Mayo Observance May 5 in the Bldg. 3 cafeteria. Guitarist Juan Manuel Traslavina headlined the festivities.

Traslavina has been playing the guitar for more than 20 years. He has performed throughout the United States, Europe, and the Caribbean. He recently released his second all-original jazz compact disc entitled "Liberation."

Traslavina works for SAIC supporting the SR&QA contract and has supported JSC for 12 years.

For more information about Traslavina, visit: www.ArtistUnlimited.com.

Dealing with stress

What you can do when the pressure's on

Feeling stressed out? You're not alone – technology, business, and the shrinking of our global village has changed the way people live their lives and the way work is done. Often, we are expected to do more with less – at home, in our personal lives, and at work.

Sometimes you have the ability to change elements of your environment to reduce the 'stressors' in your life – but other times the larger situation is out of your control and you can be left feeling overwhelmed and, well, stressed!

JSC is no different. It's no secret that the agency as a whole has faced downsizing right along with the rest of corporate America. However, as owners of the miracle of space flight, we are faced with a huge responsibility of ensuring the very best of technology, safety, and mission assurance, without compromise, despite the challenges.

It's those challenges that can wreak havoc on our workforce in the form of stress.

Positive stress is a good thing. Some people thrive on it. It motivates us, challenges us, and helps us grow.

On the other hand, negative stress, however legitimate, can cause people to lose perspective and have serious effects on not only job satisfaction and personal well-being, but, on a larger scale, can impact productivity, quality, and even safety.

For any of those reasons, acquiring methods to deal with your own stress should be a priority. Whether you think you have a lot or a little, it does affect you, your work, and, likely, people around you.

Jeanne Newman uses a few well-placed toys and soothing décor in her office to help to create a calming, anti-stress atmosphere. She also keeps a miniature Zen rock garden close by to help her "slow down" when things begin to snowball.

> ***Recognizing what you can and cannot control, and learning to let go of what you don't have control over is very important in managing stress.***
>
> – Jackie Reese

Many people around the center have faced stress, either here or elsewhere, and developed their own personal ways to cope.

"The key to my coping is taking a minute to breathe," says Jeanne Newman, IMPASS Public Affairs Services manager. "And I do mean taking several deep, long breaths. It helps me put the situation in perspective, assigns it a priority, and provides an opportunity to refocus my energy into identifying options. Too often we get spun up in a knee-jerk reaction and actually create our own stress because we haven't taken the time to step back and put things into perspective."

Sound simple? Yes, but even Newman says it takes a conscious effort if the situation is starting to snowball, so she uses several techniques to force herself to take that minute to breathe and step back. One technique is to take a walk around the JSC ponds.

"The physical activity helps burn up some adrenaline and the beauty of the landscape helps put things in perspective," says Newman. "I also keep things in my office to help give me that calmness such as a Zen rock garden (she insists raking designs in the sand does help), a few toys, and a serene beach painting. At home, I garden which provides physical activity, a sense of accomplishment, and 'alone time' to step back from the problem at hand.

"The bottom line for me is to give myself time to make a conscious choice on how I want to react, rather than reacting for the sake of reacting," adds Newman.

Other managers note that some people let things build up that they shouldn't and don't take any steps until it becomes problematic. Rather, they should learn how to better balance their life including not only work and family, but also hobbies, faith, and friends in and away from the workplace.

"I do a lot of listening and encourage folks to leave it behind them, to go home and come back to fight another day," said Milt Heflin, deputy chief, Flight Director Office. "I think each manager needs to stand back and recognize that the environment we work in is different than it was 20 years ago, and employees need to recognize that working with international partners will present new challenges. To lower our stress, we need to accept that and learn as individuals how to deal with it. Whatever adds to your stress that you can fix, fix it. What you can't fix, learn to deal with so it won't drive you nuts. Taking the time to know the difference, and getting help to decide, can be critical."

To help with that, many managers have arranged for seminars with stress experts for their employees. Heflin worked through JSC's Employee Assistance Program Office for a special presentation to his staff.

JSC's Elizabeth Hall and Jackie Reese help lead JSC's Stress Management Initiative.

"We're made up of Type AA people," said Heflin. "It's in their nature. They're selected by NASA to be the leaders in Mission Control. They're smart folks and they understand that stress is a serious issue. The Employee Assistance Program Office presentation to our staff gave us a good overview of what to look for, not only within ourselves but also what to be aware of in working with the teams in Mission Control.

I highly recommend more offices and organizations take advantage of the EAP outreach program."

"I realize my stress level is getting high when I have multiple tasks to do and cannot focus as well as I know I need to," said William Parsons, JSC deputy director. "That is when I know I must let go of things I have little or no control over. To manage it, I try to exercise regularly, either running, weight lifting, or golf, if time permits. I recognize there are certain things I can do to work the situation, and once I've done those things, I have to let the situation go."

So what do you do if you feel stress getting to you? There are several solutions, according to Jackie Reese, director of JSC's Employee Assistance Program, and Beth Hall, an industrial psychologist involved in JSC stress initiative. One of the simplest changes you can make is by simply adding some physical activity to your day.

"Outside research has shown that emotional health improves with aerobic activity," says Hall. "Furthermore, the added benefits you get from regular workouts such as power, agility, balance, speed, and neuromuscular coordination all increase morale and your job satisfaction, which are directly affected by stress."

"Center management has realized the toll stress can take on our employees and is actively seeking ways to reduce the risks associated with stress through our safety and health program," said Stacey Menard, assistant to the director for Occupational Safety. "In addition to the EAP's wonderful program and the Let's Stress, Less Stress campaign, we are focusing on behavior-based safety. This means finding ways to emphasize doing things safely at work, at home, and at play all the time. We've started with the STEP class, Safety Through Everyone's Participation, that gives students a few techniques to comfortably intervene when someone is about to commit an unsafe act. In the future, we hope to build a culture where we look out for each other's safety so we can mitigate the role stress has in causing injuries."

If you need a more personal coping strategy or would like more information on coping with stress as a group, you can contact the JSC EAP, which provides workshops on an individual or organizational basis.

Reese and the EAP team can be reached at x36310. Other information on managing stress can be found on the Total Health tab of the Safety and Total Health Web site at www4.jsc.nasa.gov/safety/. ■

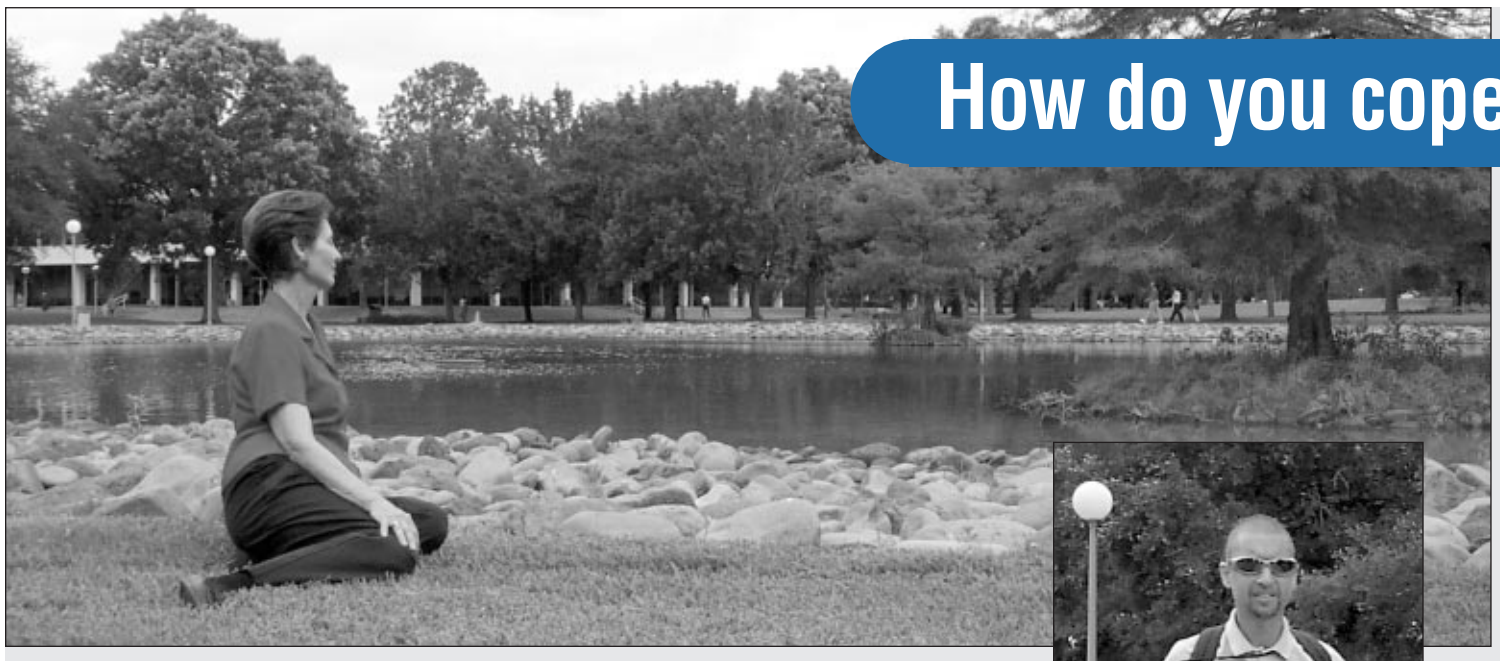
Symptoms of stress

- Irritability • Feeling easily overwhelmed • Persistent negative thinking • Chronic tension • Anxiety • Fatigue • Over-reacting
- Rashes • Aches, pains, nausea or other gastrointestinal symptoms • Headaches/migraines • Teeth grinding • Heart palpitations
- Restless agitation (*drumming fingers, etc.)* • Excessive perspiration • Feeling helpless or powerless • Feeling singled out or defensive

Bill Chill's 10 Best Stress Busters

- Take a deep breath • Change your scenery (*take a break*) • Plan ahead and set priorities (*clarify expectations and manage your time*)
- Ask for help • Balance work and home life • Get enough sleep • Exercise regularly and eat healthy foods • Put things in perspective
- Reward yourself and others • Seek encouragement from your friends • And relax – tomorrow is always a new day!

How do you cope with stress?



Employees on site are encouraged to take a moment and enjoy the landscape or take a relaxing stroll once in a while to help keep things in perspective when the pressure mounts up.

Beverly J. Spiller
Education Outreach Assistant
Media Services Corporation

"When answering the phones for a lot of people and I'm having a day when everybody in the world is calling, and I can't get my work done, I'll pick up the phone, shake it real good, take a deep breath, and calmly say, 'This is Beverly. May I help you?'"

Robin Hart
Speakers Bureau Coordinator
InDyne, Inc.

"Bubble wrap! Since there isn't any carpet in my office, I can tape down the corners of the bubble wrap to the floor and do a little dance on it! Sometimes I like to roll my chair around on it, but more often than not, I just jump up and down on it until it stops popping. Everybody can always tell when I'm having a very stressful day because it sounds like I've got a very loud popcorn popper in my office!"

Debbie Sharp
Lead Video Producer
Media Services Corporation

"I've gotten involved in kickboxing and yoga in part for stress relief and partly for the health benefits. I highly recommend both of these activities for people who are in high stress situations at work. I used to have a lot of problems with migraine headaches and shoulder pains from tensing up at work. You won't believe the difference that kickboxing and yoga make. I really feel great now… and I'm toning my body at the same time. You can't beat the multiple benefits."

Delene Sedillo
Contracting Officer
NASA/JSC

"If I know in advance that I'm going to be working or living in a stressful environment for several days or weeks, I immediately schedule a massage to occur after or in the middle of the 'stressful' period. This gives me something to look forward to. I think having a positive attitude, glass half full rather than half empty, contributes to successfully dealing with stressful situations whether at home or work."

Point and click to make a change

Do you think increased staffing would help relieve your workload? Done. What about having a lunch delivery service for those days you can't make it out for a quick bite? Done. And how about a calm, lush, landscaped walking trail for you to escape to when things get a little crazed? Sound good? Done.

And you can have more. For just a few minutes of your time and feedback, you can help initiate improvements to your workplace.

As part of the Stress Management Initiative, a brief, in-depth stress survey will be conducted online later this month. The results from the questionnaire, which will take less than 10 minutes to complete and is anonymous and confidential, will be used to make JSC a less stressful, safer, more unified place to work.

"This is a chance for everyone, centerwide, to participate," said Beth Hall, industrial psychologist responsible for leading the SMI for Life Sciences and Human Resources. "The changes made so far are because people were willing to voice their concerns and participate in the first study completed last year. We need that participation again."

In 1999, a small sample of JSC employees, less than 100 in fact, participated in a high-level survey about workplace stress and morale. The results were combined with data from the Human Resources Office, Space and Life Sciences, the Employee Assistance Program Office, and morale data from the International Space Station Program to paint a picture of the JSC workplace environment – and, essentially, to drive change.

Although small in scale, the results from that survey were used to negotiate increased staffing at the center.

"There is an increased sense among center managers that stress is directly impacting productivity and morale," said Hall. "Health and fitness are stepping up beside safety as key center principles. The level of commitment we are receiving is quite commendable."

Now is your chance to paint a more detailed picture and impact the future of your work environment.

"The feedback we receive from the survey is very valuable," explained Jackie Reese, MA, LPC, director of JSC's Employee Assistance Program. "We are really paying attention to the responses and implementing change because of what employees tell us."

As a result of the feedback from the last survey, the SMI team has implemented several actions and programs:

- ✔ Successful pitch to NASA Administrator Daniel Goldin for increased staff;
- ✔ "Bill Chill" awareness and education materials – "Top 10 List," *Roundup* article, posters, table tents, employee badges;
- ✔ Programmatic enhancements to employee service areas:
  - Extended Gilruth athletic and recreation programs,
  - Exchange Store sundries, and cafeteria services (extended hours, products, delivery);
- ✔ Focus groups of small JSC population discussing JSC stressors, suggestions, and exit interviews;
- ✔ EAP trends analysis looking at job stress-related cases – shows increase in job-stress issues throughout the site;
- ✔ EAP "roadshows" to center organizations focusing on stress and stress management;
- ✔ Stress assessment tools through the EAP;
- ✔ "Physiological/Psychological Impacts and Coping Skills" 4-hour stress course offered quarterly; and
  - ✔ Tips via Total Health Web site regarding stress awareness and prevention, health-related fitness activities; i.e., mall walking trail map.

Future actions on the SMI's "To Do" list include:

- ✔ Tracking stress-related clinic visits;
- ✔ Possibly extending child and elder care for JSC employees;
- ✔ Analyzing JSC processes for improved prioritization and definition of multiple requirements;
- ✔ Benchmarking against other high-achieving organizations and seeking improvements; and
- ✔ Possibly offering computer-based stress training via the Total Health Web site.

But again, strong, center-wide participation is needed to be the most effective at initiating these changes. Employees will be notified via E-mail when the survey is available. Results will be covered in a future *Roundup* issue. ■

For more information about the Stress Management Initiative or the upcoming survey, please call Hall at x37489.

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 5

From the Mission Control Center in Houston, Paul Haney described the beginning of what has been the United States' most spectacular and longest space flight to date with America's first space pilot going outside a spacecraft in space.

"Liftoff. We have liftoff at 16 minutes after the hour. Climbing very nicely. We have a roll program initiated. Roll program completed, McDivitt reported and the pitch program has been initiated."

Liftoff from Launch Complex 19 at Cape Kennedy was at 10:16 a.m., EST, June 3, and flight trajectory was very nearly as planned. The spacecraft with Astronauts James A. McDivitt as command pilot and Edward H. White II as pilot was placed in an orbit with a perigee of 100 miles and an apogee of 175 miles.

1 9 8 5

NASA scientists have adopted a laser originally designed to measure gases in the atmosphere to the task of cleaning out clogged arteries without harming the walls of the blood vessels. The technique, when perfected, could allow patients to avoid coronary bypass surgery.

Physicians at Los Angeles' Cedars-Sinai Medical Center and laser scientists at NASA's Jet Propulsion Laboratory recently teamed together to develop a laser system designed to non-surgically clean clogged arteries with unprecedented precision.

1 9 9 5

Though their tools will be updated, NASA flight controllers will carry many of the traditions and procedures from 30 years of experience to a new Mission Control Center as portions of STS-70 are controlled from a new building for the first time.

The new MCC's design offers an unprecedented flexibility in flight control operations, allowing the facility to be changed from controlling a space shuttle to controlling any other spacecraft with almost the speed of simply choosing a different function from a computer menu.


ROUNDUP
Frosch, Yardley cover new space technology in STS development

Damien, Green get Secretarial Excellence Awards


NASA JSC Photo JSC2000-04052 by Robert Markowitz

Yvette Damien


NASA JSC Photo JSC2000-03951 by Robert Markowitz

Linda Green

Yvette Damien of the Johnson Space Center's Public Affairs Office and Linda Green of the White Sands Test Facility each recently received the Marilyn J. Bockting Secretarial Excellence Award in recognition of their exceptional contributions, professional competence, and personal dedication.

Damien was recognized in April for her contributions as secretary to the director of the Public Affairs Office. She has added thoughtful organization to the everyday functioning of the director's office. Tracking actions to their completion, assuring timely responses to all inquiries, effectively handling callers on a wide variety of topics, taking the extra steps to ensure callers get what they need, prioritizing the incoming actions and requests for the director – these are all critical skills for an effective, responsive, and friendly interface to JSC through the front desk at the PAO.

In addition to her PAO responsibilities, she provides support to the associate director for university research and affairs and backs up and at times substitutes for the support staff to the associate director. Her organizational skills and professionalism have allowed for helpful process improvements and the orderly transition of cooperative projects between offices.

Green was recognized in May for her contributions as secretary to the manager, White Sands Test Facility, and his staff. She also serves as administrative assistant, responsible for coordination issues such as travel, training, personnel actions, awards, and co-op students. These responsibilities put her in constant contact with representatives from the general public, the media, academia, and industry, as well as with JSC and NASA Headquarters management.

Since the small size of the NASA contingent at WSTF precludes the depth of specialized support services available at larger installations, Green found it necessary to develop a high degree of independence and versatility to perform most of these diverse functions herself. Indeed, since the retirement two years ago of another secretary in the manager's office, she has worked exceptionally hard to perform those combined functions single-handedly. The non-stereotypical nature of test work creates a large number of unique, unforeseen demands, and as the primary focal point for many of these demands, she has demonstrated excellent innovation, adaptability, poise, and judgment in handling these unusual requests, in addition to the heavy load of daily routine functions.

Green maintains excellent official and personal records for quick retrieval of information often misfiled, overlooked, or forgotten by everyone else, and has become a valuable single-point focus for getting a job done through the WSTF manager's office. She has developed an excellent ability to foresee needs, plan responses, and prioritize the constant and diverse demands of the manager and his staff, rapidly producing high-quality work to support the schedule of each requester. Her speed and proficiency with the computer, combined with excellent knowledge of word usage rules, have made her an increasingly valuable asset. ■

PEOPLE on the MOVE

Human Resources reports the following personnel changes:

Key Management Assignments

Nate Wright Jr. was named acting director, Center Operations Directorate.

Leonard Nicholson was named chief engineer, Office of the Director.

Jim Jaax was named acting director, Engineering Directorate.

Frank Benz was named acting deputy director, Engineering Directorate.

Irene Verinder was named acting chief, Manufacturing, Materials, and Process Technology Division, Engineering Directorate.

Ladonna Miller was selected as manager, Space Shuttle Customer Integration Office, Space Shuttle Program Office.

Larry Shaw was selected as assistant chief, Technology Division, Safety, Reliability, and Quality Assurance Office.

M. Scott Johnson was selected as assistant chief, Space Shuttle Division, Safety, Reliability, and Quality Assurance Office.

Additions to the Workforce

Kristi Devos joins the Projects Procurement Office, Office of Procurement, as a contracting specialist.

Troy Whitney joins the Aircraft Maintenance and Engineering Branch, Aircraft Operations Division, Flight Crew Operations Directorate, as an electrical engineer.

Zeb Scoville joins the EVA and Crew Systems Operations Branch, EVA, Robotics, and Crew Systems Operations Division, Mission Operations Directorate, as an EVA instructor and flight controller.

Donna Dempsey joins the Avionics Training Branch, Space Flight Training Division, Mission Operations Directorate, as an ISS instructor.

Nicole Smith joins the Systems Training Branch, Space Flight Training Division, Mission Operations Directorate, as an ISS instructor.

Amy Pippert joins the Systems Development and Operations Division, Mission Operations Directorate, as a computer engineer.

David Saley joins the Guidance, Navigation, and Control Development and Test Branch, Aeroscience and Flight Mechanics Division, Engineering Directorate, as a navigational guidance and control systems engineer.

Promotions

Sherry Nelson-Murray was selected as an accounting technician in the Resource Control and Reimbursables Branch, Financial Management Division, Office of the Chief Financial Officer.

Reassignments Between Directorates

Bob Alexander moves from the Safety, Reliability, and Quality Assurance Office to the International Space Station Program Office.

Don Pallesen and *Ben Pawlik* move from the Mission Operations Directorate to the International Space Station Program Office.

John Shebalin moves from the International Space Station Program Office to the Space and Life Sciences Directorate.

Reassignments Between Centers

David Black moves to Marshall Space Flight Center.

James Reuter moves to Marshall Space Flight Center.

Retirements

William Drastata of the Office of Procurement.

Stanley Avent of the Mission Operations Directorate.

Palmer Chiu of the Engineering Directorate.

Bob Dotts of the Technology Transfer and Commercialization Office.

James Vincent of the International Space Station Program Office.

Resignations

Keith Reiley of the International Space Station Program Office.

Extreme Sports 2000: *the Ultimate Sports Zone*

Space Center Houston has a new adventure for everyone this summer, and it's the only extreme action in town. As of May 26, you can experience heart-pounding, adrenaline-pumping, in-your-face extreme action at "EXTREME 2000: THE ULTIMATE SPORTS ZONE"...and the whole family can take part.

Feel the rush while pushing yourself to the limits at today's most extreme sports – skydiving, snowboarding, rock climbing, bungee running, extreme basketball, and much more! It's the most-fun, no-limits summer attraction ever!

"EXTREME 2000 is truly going to be a fun, extraordinary experience for people of all ages," said Richard Allen, president and CEO. "We've combined the thrill of today's extreme sports with excitement and competition for a phenomenal summer attraction."

Each sport will put your mind and body to the ultimate test, whether competing against yourself or against others.

Rock Wall

You can't beat the view from up here! Using professional climbing equipment, participants "race" each other to the top of this 24-foot mountain. Contestants grab and step onto rocks protruding from the mountain as they climb upward to the summit.

Hang Time

You may have played basketball, but never before like this. We've taken this traditional sport and added an extreme twist – trampolines. It's a one-on-one vertical challenge like nothing you've seen before. Blocked shots and high-flying baskets have never been so spectacular. Everyone will be able to jump as high as Michael Jordan!

NASA JSC Photo 2000e15295

Bungee Madness

It's a race to find out who's the fastest! While strapped to a bungee cord that pulls you backward, you'll run to place your Velcro target as far out as you can while the cord's goal is to snap you back – your opponent will be doing the same!

Fearless Flyer

It's like surfing...in the air! You and the extreme trampoline make it happen. Get strapped into a bungee cord harness and the rest is up to you! Perform all kinds of aerial maneuvers jumping 20-24 feet in the air.

Rappel Tower

Two 30-foot rappel towers will really challenge your strength! After you're hoisted to the top of the tower, you descend quickly, bouncing off the vertical wall while trying to hit targets with your feet. The more targets you hit, the longer your ride.

Jump Zone

Strap yourself in and experience the thrill of jumping out of an airplane at 2,000 feet. You'll steer the parachute and soar to the ground to a landing sight you select – a forest, aircraft carrier, or amidst skyscrapers in a big city – as you feel and hear the wind roar past you. You'll get a score sheet of your ride to compare with others, and top performers record their names and scores!

The latest in virtual reality fun also is part of Space Center Houston's EXTREME 2000 action. Get beamed into a simulator in a weightless environment with "Grav-Ball." Use your entire body to bump the gravity ball and score points to win against an opponent or a robot. Or try your athletic ability at one of today's hottest extreme sports – snowboarding. You and your opponent plummet through a downhill race on "snowboards," using full-body motion to direct your board around trees, rocks, hazards, and other snowboarders. You can experience the latest video adventures at EXTREME 2000. Get right in the middle of the action on Street Luger, Alpine Skier, and Ultimate Skateboarder.

NASA JSC Photo 2000e15294

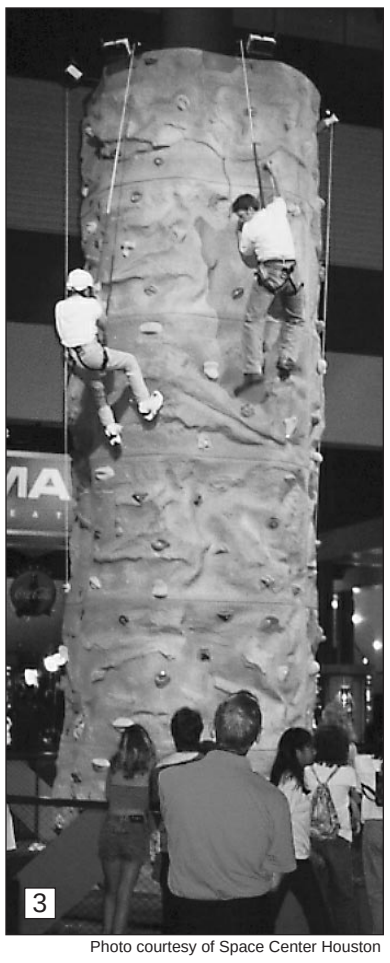


Photo courtesy of Space Center Houston

NASA JSC Photo 2000e15299

NASA JSC Photo 2000e15292

NASA JSC Photo 2000e15293

"We have been working for several months on putting all the pieces together to make this a unique, comprehensive, and fun experience for people of all ages," said Celina Ducceschi, exhibits manager. "Kids might wonder what the connection is with space, and that's what makes it so fun and educational. They may not realize that astronauts, too, are extreme athletes in their own right. Just as skydivers jump out of planes, astronauts venture outside the space shuttle for space walks. What could be more extreme than that?" Ducceschi added, "Parts of the exhibit will showcase the unique and daring responsibilities of extreme sports athletes as well as astronauts."

Space Center Houston also will be showing a new Imax® movie – *Extreme*. "It's absolutely a phenomenal film, and it's a perfect compliment to the exhibit," said Roger Bornstein, director of marketing. "After testing your own skills at rock climbing and snowboarding, you'll be able to see some of world's top daredevil, extreme athletes as they compete against nature's greatest dangers."

See first-hand the thrills and chills of extreme sports up close at Space Center Houston with live demonstrations throughout the summer. Enjoy the best-of-the-best in-line skaters, BMX bicyclists, skateboarders, and much more. Call 281-244-2100 for dates and times.

On display this summer also will be the hottest extreme sports equipment and gear, including surfboards, skateboards, motorcycles, jet skis, and much more!

Don't miss your chance to be an out-of-this-world extreme athlete and have an out-of-this-world extreme blast! There's nothing else like it! Don't forget Space Center Houston's EXTREME summer hours are 9 a.m. to 7 p.m. daily, until Labor Day. ■

For more information about EXTREME 2000, call 281-244-2100 or go to www.spacecenter.org. JSC employees show your civil servant badge for free admission. Contractors may obtain tickets at the admission windows.

Space Center Houston visitors find themselves pushing their limits as part of Extreme Sports 2000. 1) Sam Soden, 8, from Woodlands, takes on the rock climbing wall. 2) Lauren Hill, 9, from Bixby, Okla., bounces through the air on *Fearless Flyer*. 3) Visitors contemplate every move as they race to the top of the rock tower. 4) G. T. Elliot, 11, steers down the slopes on *Alpine Racer*. 5) Christy Acevedo, 7, from Rosenberg, makes her way down the rappelling wall. 6) Julio Galvan, 10, from Hoffman, takes a shot at the *Top Skater*.

NASA JSC photos by James Blair

DATES & DATA

June 13

Aero Club meets: The Bay Area Aero Club meets at 7 p.m. at the Houston Gulf Airport clubhouse at 2750 FM 1266 in League City. For more information contact Larry Hendrickson at x32050.

June 14

Astronomy seminar: The JSC Astronomy Seminar Club will meet at noon June 14, 21 and 28 in Bldg. 31, Rm. 248A. For more information contact Al Jackson at x35037.

IAAP meets: The Clear Lake/NASA Chapter of the International Association of Administrative Professionals meets at 5:30 p.m. at Bay Oaks Country Club. Cost is $16. For more information and reservations, call Tami Barbour at (281) 488-0055, x238.

Spaceteam Toastmasters meet: The Spaceteam Toastmasters meets at 11:30 a.m. June 14, 21, and 28 at United Space Alliance, 600 Gemini. For more information contact Patricia Blackwell at (281) 280-6863.

June 15

Communicators meet: The Clear Lake Communicators, a Toastmasters International club, meets June 15, 22, and 29 at 11:30 at Wyle Laboratories, 1100 Hercules, Suite 305. For more information contact Allen Prescott at (281) 282-3281or Richard Lehman at (281) 280-6557.

Directors meet: The Space Family Education board of directors meets at 11:30 a.m. in Bldg. 45, Rm. 712D. For more information contact Lynn Buquo at x34716.

June 20

NPMA meets: The National Property Management Association meets at 11:30 a.m. June 20 and July 18 at the Gilruth Center. For more information contact Ray Whitaker at (281) 212-6030.

June 21

Scuba club meets: The Lunarfins meets at 7:30 p.m. For more information contact Mike Manering at x32618.

June 29

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

July 3

National Space Society 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.

July 6

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

July 13

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.

MAES meets: The Society of Mexican-American Engineers and Scientists meets at 11:30 a.m. in Bldg. 16, Rm. 111. For more information contact George Salazar at x30162.

July 14

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

OUT&ABOUT★

JSC's Employee Assistance Program welcomes Channel 13 Weatherman Ed Brandon as he presents "Coping without Chemicals," a rare personal glimpse into his journey from chemical dependency and depression to sobriety and spirituality. The event is scheduled for June 21, 11:30 a.m. to 12:30 p.m. in the Bldg. 30 Auditorium. Barbara Reichlin, MA, LPC, LMFT, a recent guest of the EAP, presented "Getting the Love You Want." For more information on EAP activities call x36310.

TICKET WINDOW

The following discount tickets are available at the Exchange Stores

General Cinema Theaters	$5.50
Sony Loew's Theaters	$5.50
AMC Theaters	$5.00
Fiesta Texas .....adult . . .$20.50. . .child (under 48 inches) . .	$17.25
Astroworld Early Bird (use by June 18)	$17.25
Astroworld .....1 day . . .$21.00 . . . . . 2 day . . .	$31.00
WaterWorld	$12.00
Moody Gardens (2 events) (does not include Aquarium Pyramid)	$10.75
Moody Gardens (Aquarium only)	$9.25
Sea World .....adult . . .$29.00 . . . .child (3-11 years) . . .	$19.25
Schlitterbahn .....adult . . .$21.50 . . . .child (3-11 years) . . .	$18.00
Space Center Houston . . . . . adult . . $11.00 . . . .child (age 4-11) . . . . (JSC civil service employees free.)	$7.25
Space Center Houston annual pass	$18.75
Splash Town .....1 day . . .$13.00 . . . . . .Season Pass . . .	$37.50
Postage Stamps (book of 20)	$6.60

Exchange Store hours

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

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

For additional information, please call x35350.

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

NASA BRIEFS

NASA SPACECRAFT DATA IMPROVES TROPICAL FORECASTS

A microwave imager on board a NASA spacecraft can help improve forecasts of hurricanes and severe storms and can monitor long-term climate by seeing through clouds, new research shows.

The Tropical Rainfall Measuring Mission (TRMM) Microwave Imager (TMI) represents the first microwave spacecraft sensor capable of accurately measuring sea-surface temperatures through clouds. These findings were reported in the journal *Science* by Frank Wentz and colleagues at Remote Sensing Systems, Santa Rosa, California, who also are TRMM Science Team members.

Science team members have found that data from the TMI sensor on board the spacecraft has great potential to increase the accuracy of tropical storm and climate forecasts.

Microwave radiation penetrates clouds with little loss of signal, providing an uninterrupted view of the ocean surface, whereas much of the infrared radiation, typically used for measuring sea-surface temperatures from satellites, is blocked by cloud cover.

"The microwave imager can give consistent readings of sea-surface temperatures even through clouds," said Wentz, director of Remote Sensing Systems. "To date we've been limited by infrared sensors. Having the complete picture of ocean surface temperatures should greatly improve numerical models being run by the National Weather Service."
Sea-surface temperature plays a fundamental role in the exchange of energy, momentum, and moisture between the ocean and the atmosphere and is a central factor of air-sea interactions and climate variability. A better understanding of air-sea dynamics will translate into better weather forecasting.

GODDARD TO PROCURE LANDFILL GAS

NASA's Goddard Space Flight Center will burn landfill gas to heat its buildings under a new contract awarded recently.

"This project will prevent as much pollution as planting 68,000 acres of trees or removing 100,000 cars from Maryland highways by reducing harmful gases produced at the center and the landfill. As an added benefit, we expect significant savings over our current gas and fuel oil costs. Further savings will be realized in the future if the center expands the project to include alternate fuel for our vehicles," said Barry Green, Goddard energy manager.

The sole-source contract was awarded to Toro Energy of Maryland, LLC, Dallas, Texas, for utility service of landfill gas. The contract also will provide for modification of two Goddard boilers in the center's central heating plant, construction of a pipeline to transport landfill gas to Goddard, and construction of a gas-treatment facility at the Sandy Hill landfill in Bowie, Maryland.

Goddard's five boilers currently are capable of burning either of two fuels: natural gas or diesel fuel oil. The contract will modify two of these boilers so that they each can burn landfill gas, natural gas, or diesel fuel oil. The remaining boilers will remain unchanged.

SPACE CENTER Roundup

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Editor .....William Jeffs .....william.p.jeffs@jsc.nasa.gov
Assistant Editor .....Nicole Cloutier .....ncloutie@ems.jsc.nasa.gov