August 11, 2000

SPACE CENTER
Roundup

VOL. 39, NO. 16 LYNDON B. JOHNSON SPACE CENTER, HOUSTON, TEXAS

JSC opens its gates for fifth annual Open House

In two weeks, August 26, the center again opens its gates to the community to see in person the places and people that make up the human space flight program. In addition to the many popular exhibits of years past, Open House 2000 will feature several new displays, many highlighting the international role of today's space program.

The International Space Station Program Office will debut a new exhibit in Bldg. 9 entitled "International Space Station – Passport to the Future." Visitors are provided with a 'passport' to be stamped as they visit "stamp stations" for each of the countries involved in the ISS. In the end they will have a nice souvenir and will have learned about the contributions from each international partner.

And for children, author Nancy Coffelt will be at Open House doing children's presentations and book signings in Bldg. 9. Her new book is the first in a series aimed at elementary school-level children and tells the story of the construction and purpose of the ISS. Star Station One, an outreach program implemented by The Boeing Company under a Space Act Agreement with NASA, is sponsoring the appearance of the Portland, Oregon, writer.

Another special exhibit will be the *Virtual Astronaut*, a new three-dimensional, interactive software program in Bldg. 37 from Space and Life Sciences.

"This year's event promises to be bigger and better than preceding years," said Kelly Humphries, Open House 2000 chairperson. "We'll have a lot of the traditional favorites, as well as some new things to share with our friends and neighbors visiting from all across Texas, and beyond."

Visitors can walk through the International Space Station and Benefits from Space mobile exhibit trailers positioned across from Tram Stop C. They also can see space-age robotics in Bldg. 9, check out the latest space medicine technology in Bldg. 37 or try out space tools and touch materials used to make spacesuits in Bldg. 7.

Nineteen buildings on site will open to the public, as well as Sonny Carter Training Facility where visitors can view the Neutral Buoyancy Lab's world-famous pool, and Ellington Field, home of NASA's T-38 fleet, the Shuttle Training Aircraft and the Super Guppy.

Free tram service will be provided for visitors and maps will be available to provide guests with information about the various sites available for tours, some of which are open to the public only on this day. A complete list of the buildings available for tours and their special exhibits can be found on page 5.

OPEN HOUSE 2000

Saturday, August 26, 2000
9 a.m. – 5 p.m.

Free to the public

Information Line
281-244-5312

Web site
http://openhouse.jsc.nasa.gov

See
Ballunar Liftoff Festival information page **4**
Map and exhibit list, page **5**

Organizers anticipate the largest crowd ever; however, they have ensured that safety remains the top priority during the event. Twelve water stations will be set up around JSC – at every outdoor information booth – and most activities are indoors for a cool atmosphere, but organizers stress we should all take an active role in ensuring Open House is a safe event.

"We want all volunteers to take care to have a safe and healthy Open House," said Humphries. "Help watch out for our guests who might not be accustomed to our summer climate. And watch out for each other and ourselves. Don't over extend yourself – take relief when needed."

Although organizers say they are well on their way to enlisting the 400 volunteers needed, there are still opportunities to contribute to this important event. Those interested in volunteering should contact CC de la Garza at x31033 or register online at http://www4.jsc.nasa.gov/openhouse/Databases/.

"I want to express my sincere thanks to all who have already signed up to make the day a success," added de la Garza.

The remaining training session will be held August 15 at 2 p.m. in Teague Auditorium. Organizers also wish to remind exhibitors that booths must be completed by the end of business Thursday, August 24, for a safety walk-through. ■

Engineers create Mars terrain on site.

Page 2

JSC hosts Texas' largest balloon festival.

Page 4

JSC's eldest employee going strong at 80.

Page 7

Composite of NASA JSC Photos by Mark Sowa

Photos clockwise from top, left: Robert Trevino and Joe Kosmo scope out the site of JSC's Remote Field Site Demonstration and Test Area; engineers use the simulated Mars field for an EVA power cable deployment task with assistance from the ATV Jr.; Dean Eppler and Joe Kosmo maneuver a boulder onto the site, and a 1965 photo depicts now retired NASA engineer Jack Slight maneuvering above the original JSC simulated lunar surface in a prototype Apollo spacesuit.

The dirt on Mars terrain

In the mid-'60s, NASA created a simulated lunar surface on the JSC site to help engineers conceptualize and design for missions to the moon. Now, more than 30 years later as NASA prepares to embark on new ground in the universe, engineers have created another simulated surface site – this one replicating Mars terrain.

NASA JSC Photo S65-22328

Tucked away in the far reaches of JSC's campus, a small 100-foot square area has been transformed from the grassy field so familiar in Southeast Texas, to what now appears as a quadrant of the Red Planet.

NASA engineers Joe Kosmo and Robert Trevino of the Crew and Thermal Systems Division, EVA and IVA Equipment Branch, spearheaded development of the Remote Field Site Demonstration and Test Area with Advanced Mobility Suit testing in mind. The design and capabilities of EVA suits will need to be vastly different for the purposes of extraterrestrial planetary surface exploration than they are for their current role in orbital operations.

Trevino uses our stroll through the site to illustrate his point.

"Normally we move in a straight line, but see what you are doing as you walk here?" asks Trevino. "You're having to look down to navigate around the rocks and obstacles. To accommodate for that, we have to design the spacesuit with that in mind. It will be very different from the current spacesuit. The purpose of this Mars field is to help us get into that environment so we can understand what the challenges and problems are."

"Planetary exploration is going to be a lot more challenging than orbital operations," adds Kosmo. "That is what we're trying to demonstrate here to the next generation of designers and engineers, the kind of conditions to contend with. It's going to be a challenge to develop equipment, procedures and the techniques to do the various operations for this new environment."

The project began in 1997 with a preliminary architectural study to determine the requirements for such a simulation. Kosmo and Trevino polled other organizations to gauge their interest or preferences and soon found the terrain could be of use to many teams, including designers for Mars rovers.

The result is now a terrain that can be used by many groups ranging from the Exploration Office to the Automation, Robotics and Simulation Division to other NASA centers and even private industry or universities.

The site was created by first scouting a suitable piece of land on the JSC campus. Developers sought a site that had characteristics that could easily be molded into the Mars landscape. The landscape was bulldozed, scraped of vegetation, and then covered with geo-fabric, a textile sheet that prohibits weed regrowth. The support of Center Operations engineers Steve Campbell and Melissa McKinley was invaluable to completing the project.

Moonlight lava, a basaltic volcanic rock from New Mexico, was positioned selectively upon the field of crushed decomposed granite to replicate the Red terrain. Kosmo and Trevino studied images from the Mars Pathfinder to determine the placement of the rocks.

"The rocks are distributed here to mimic the pattern from photos taken of Mars. We've simulated the natural environment," said Kosmo, "creating a microcosm of nature and representing it in a 100-foot by 100-foot area."

A casual observer might not notice at first glance, but all of the larger rocks are assembled close to one area. Gradually smaller rocks radiate from that area, and still smaller rocks are peppered through the remainder of the site. When asked about the placement, Kosmo and Trevino explained it is a pattern observed on Mars and also well recognized here on Earth. The theory is that as water flows, larger rocks are not moved much, but medium-sized rocks may get moved by the liquid some distance, and yet smaller rocks and sand can get carried away quite a distance.

NASA JSC Photo 2000-03852 by Mark Sowa

All in all, more than 20 tons of rock were used to create the terrain. A team of 13 volunteers held a "rock party" to break and position the rocks. They completed the task one Saturday morning – presenting JSC scientists and engineers with a Mars-like test bed.

Since the site's completion in May, engineering teams have already used the testbed. One team used the site to assess an inflatable-wheel rover vehicle.

"All they were able to use for testing before was climbing stairs," said Trevino. "This field gives them a real test environment to see if the vehicles can maneuver over rocks and obstacles."

Dr. Rob Burridge of S&K Electronics, project manager for the EVA Robotic Assistant, says the Mars terrain has already proven to be an asset for early design evaluations.

"The first time we took the rover out to the site, we found the robot could not maneuver around the terrain at all," said Burridge. His team redesigned the base of the robot to be better suited for the terrain. They've since used the site to test various sensors on the robot, including stereo vision, inertial measurement, and a laser rangefinder for tracking people.

"It was very valuable to be able to run over the uneven terrain, and see how the rocks showed up in the rangefinder. This will considerably speed development of our astronaut tracking algorithms," added Burridge, who expects to use the test site on a weekly basis.

According to Kosmo and Trevino the possibilities for the simulation site are endless.

"We have to start thinking about what we are going to need if we want to really start pursuing travel to Mars," said Kosmo. "This may include other test sites, and chambers to simulate the atmospheric environment. Our goals are ambitious and now is the time to start developing the various testing infrastructures needed to support future exploration efforts." ■

Volunteer goes extra mile to share the space program with students

When Norm Chaffee says he'll go the extra mile – he sure means it. Chaffee, an education outreach specialist in the Public Affairs Office, recently went more than 800 extra miles to help create "Space Night" at a school in Mexico City.

"Everyone I've met at NASA is always willing to go out of their way to help," said Brenda Farkas, a sixth grade teacher at the American School of Mexico City. "But to me, Norm is invaluable. He is 'living history' which is something I try to really focus on with my students. And I could not have done this event without his help and support."

This is the second time Chaffee has gone south of the border to help schoolchildren. It began when Farkas attended one of Chaffee's JSC teacher workshops for the Department of State International Schools educators in 1998.

She contacted Chaffee after the event and told him she wanted to organize a Space Week at the American School of Mexico City, where she teaches, and she asked if he would consider participating. Since his involvement would be on a voluntary basis, Chaffee, a part-time employee with Indyne, Inc., only asked that they reimburse his expenses and he would be glad to participate.

That was in 1999 and the event was a huge hit with students. Chaffee went back this year to contribute to Space Week again, and had a marvelous, if exhausting, time.

From May 10 to May 16, Chaffee visited with more than 500 students. The first day, he spoke to 150 high school science and math students during the day and then participated in Space Night with 300 sixth graders that evening. Space Night began with a dinner and presentations and followed with hands-on space activities until 1 a.m.

"The students were so enthused to participate in the varied activities we provided – from assembling a mock space station in the school's swimming pool to seeing a demonstration rocket launch! There's no doubt they were all space fans," said Chaffee.

Norm Chaffee's passion for volunteerism takes him to places near and far. Shown here, Chaffee provides students with a guided tour at JSC's Rocket Park. Other volunteer activities have taken the former NASA engineer as far as Mexico to share the stories of the early-space era.

Chaffee was joined by D'Ann Douglas, a Beaumont teacher, and Astronaut Danny Olivas for Space Night, who described the event as very positive and refreshing.

"The students were very excited just to be talking about space," said Olivas. "You could see the glint in their eye and could tell they were really jazzed up to be thinking about the future and all of the possibilities."

The event had special meaning for Olivas, who is a Mexican-American and recalls the impact space can have on students. "I remember growing up in El Paso, and we didn't have a lot of exposure to the space program the way the community does here around JSC. As a child, when the teacher spoke about space, we were at the edge of our seat. When you go to other parts of the world, they're still amazed by the space program – to them it still is 'rocket science.'"

Various other activities continued throughout the evening, ranging from demonstrations on gyroscopic forces to the principles of propulsion, but a highlight of the evening was the "Ask the Expert" area where students were able to ask Chaffee space-related questions.

Chaffee's unique ability to interact with the students, coupled with his expertise from 35 years as a JSC engineer, works magic, inciting the students and warming their interest in science and careers in space.

"They want to know everything from chemistry to Mars," said Chaffee. "It's a neat time. They are terribly excited and everyone's attention is captured."

It's a feeling that lasts throughout the week. The days are filled with visiting more classes, from kindergartners to advanced high school science, math and physics classes.

For Chaffee, the experience gives him a chance to "give this generation of students the sense of excitement and challenge that I have felt throughout [my] long NASA career." So while some might say Chaffee takes his title as outreach specialist a little too literally, Chaffee says he'll welcome the chance to go those extra miles, anytime. ■

Not on file: Engineer Highlight

Title:
Increment Engineer, Increment One.

Time at JSC: 14 years.

Education:
Texas A&M University, B.S., Aerospace Engineering (*Cum Laude*), University of Houston, M.I.E. Master's of Industrial Engineering and J.D., Doctorate of Jurisprudence (*Cum Laude*).

Favorite book and movie:
The Hobbit and *The Hunt for Red October*.

Favorite music:
Rock, dance, New Age.

When away from JSC:
Spending time with my family and golfing.

What you like about NASA… and your job at JSC:
The people and the fact that you are participating in making history.

Background: When deciding how to live your life, start with your obituary and work backward. This philosophy of living is certainly an accurate description of how one man was inspired to dedicate his career to space exploration.

"When you begin to think about your life, eventually you realize you want to leave a legacy," said Ted Ro. "On my deathbed, I want to look back and see that I made a difference in this world."

With that in mind, Ro has laid out a plan. He began work at JSC as a co-op, completed a couple (yes, a couple) post-graduate degrees and now commits himself to the pursuit of supporting a human mission to Mars.

NASA JSC Photo JSC-2000e18796 by Bill Stafford

Name: Theodore (Ted) Ro

"That is going to be a major milestone for humans, similar to landing on the moon, and I want to be a part of it," added Ro.

Ro has known he wanted to work in the space industry since he was a youngster. According to his mother, even as a kindergartner, he wanted to be an astronaut.

"I think movies are really what kicked off my interest as a teenager," said Ro. "*Star Wars* and *Close Encounters of the Third Kind* were major influences. That is when I knew I wanted to be an aerospace engineer."

Ro co-oped in MOD's Facilities Division and worked in project management. Deciding that he needed to hone his technical skills, Ro transitioned to the Flight Design and Dynamics Division where he worked on trajectory design and guidance algorithm development.

"That has been the most fulfilling job I have had yet at NASA," said Ro of his more than two years in that role. "It's very technical and uses every aspect of the engineering degree. It was really fulfilling because it embodied all that NASA represents – working there represented the cutting edge of technology."

While there, Ro wrote two technical papers: one on developing an aerocapture guidance algorithim and the other on optimizing aerocapture trajectories.

Ro recently transitioned to the ISS Program Office where he feels he can make further contributions to NASA's pursuit of long-duration human spaceflight.

"This is an extremely exciting time to be working on the International Space Station," said Ro. "It is out of planning and moving into assembly and operations."

Ro is also looking forward to the opportunities to visit other countries, such as Russia, with the Increment One team.

"I've always been aware of the multicultural reality of this world," said Ro, whose parents are Korean. "That is one of the benefits about joining the ISS program – having the opportunity to learn and understand the cultures and languages of other countries."

So although his long-term goal is to help humans go to Mars, for now Ro is content to concentrate on travel on our own planet before pursuing other worlds. ■

Hot air balloonists to convene at JSC

The Ballunar Liftoff Festival begins at 6 p.m. Friday with bluegrass music and a Grand Parade of balloon pilots. A balloon glow, last year's event seen above, will cap the evening starting at 7:30 p.m.

It's that time of year, when the Texas weather forecast becomes a bit repetitive. But the early morning hours present ideal conditions for ballooning. With that in mind, the skies will once again be speckled with bright Crayola colors and vibrant, quilt-like patterns as dozens of hot air balloons christen Ballunar Liftoff Festival and Open House weekend August 25 – 27. More than 100 balloons are expected to take part in what has grown to become Texas' largest balloon festival.

"Ballunar Liftoff continues to grow in attendance and awareness," said Claudette Alderman, executive director of the Festival. "Ballunar is one of the most popular balloon events with balloon pilots making it an invitation-only event for them. Adding the JSC Open House at the same time as the Festival has proven to be a win-win for both. Giving the public access to the nerve center of America's space program truly exemplifies the purpose of the festival."

The festivities begin 6 p.m. Friday with a bluegrass music concert and a Grand Parade of balloon pilots. The evening is capped by a balloon glow starting at 7:30 p.m.

Saturday the balloons will rise with the sun – this time geared up for some games of their own. A balloon "key grab" begins at 7 a.m. followed by skydiving, hang gliders, model rockets and sport kite demonstrations. Saturday evening, the air will resonate with the sounds of the legendary Max Q 'Astronaut' band.

Sunday begins with a balloon flight and skydiving competitions followed by more aerial feats and astronaut appearances. On the ground, an arts and crafts fair will intrigue visitors throughout the weekend while food booths satiate their palates. Rockit Scientist will entertain that afternoon.

"Rarely do we find people in the surrounding Houston/Galveston area that have not heard about Ballunar Liftoff Festival," said Alderman. "Again this year we are looking forward to demonstrating the earliest form of human flight to a record attendance."

Festival hours are 6 p.m. – 10 p.m. Friday; 6 a.m. to 10 p.m. Saturday and 6 a.m. to 7 p.m. Sunday. Cost is $3, children age 11 and under admitted at no charge. ■

For more information about the 7th Annual Ballunar Liftoff Festival call the Clear Lake Area Chamber of Commerce at (281) 488-7676 or visit their Web site at http://www.ballunarfestival.com/.

Safety tips for Open House

As we prepare for the upcoming Open House weekend – it's important to remember safety as a top priority. This year, we expect more than 100,000 visitors to JSC, many of whom will be children and elderly and will present unique safety considerations.

Open House volunteers will attend a training session, which includes safety, but it's important for all of us to keep these issues in mind for our upcoming visitors.

Mary Lee Meider of the Occupational Safety and Quality Assurance Branch offers these reminders:

Take extra care when driving and crossing streets on site during Open House. Visitors may not be aware of our regulations such as crossing streets at crosswalks or stopping cars for pedestrians at crosswalks.

A nurse-staffed first aid station will be available in the Bldg. 8 clinic lobby during Open House. The clinic's ambulance also will be available.

The emergency number is x33333. It will be on the back of volunteers' badges.

Drink plenty of fluids. Houston's climate and extended periods outdoors can make people prone to dehydration. JSC will have more free water stations located around site near information booths this year, as will Ballunar Liftoff.

Be prepared to help visitors evacuate during a fire alarm by directing them to stairs on upper floors and building exits.

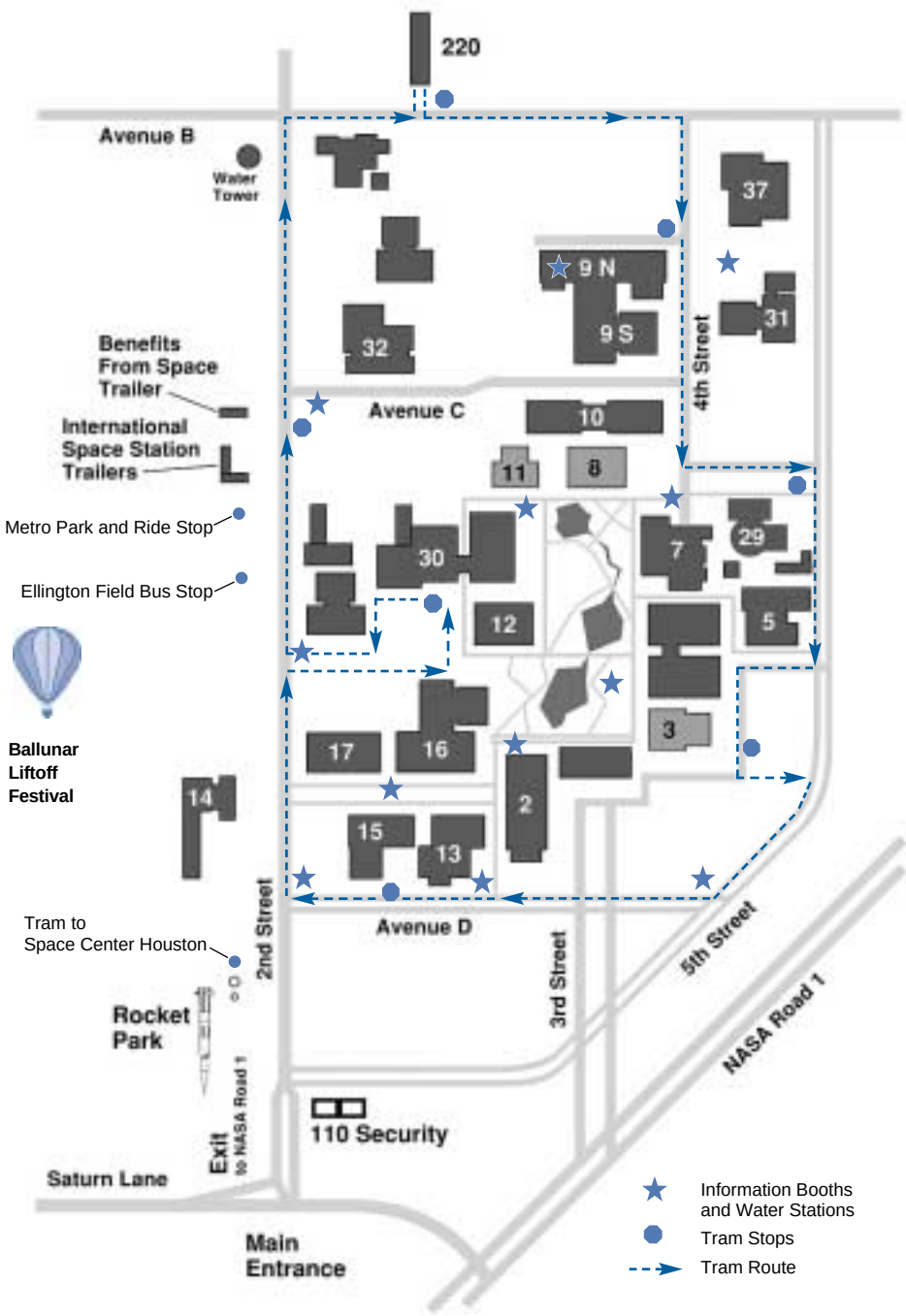
Check your tour area throughout the day for potential hazards – including tripping hazards or slipping hazards, sharp objects/edges along the tour route, and shock hazards (exposed wires).

As you check for hazards, keep in mind a lot of children will be among our guests.

Safety professionals will be walking around and available all day to help with any issues that may arise. ■

Here's where to go, what to see during
JSC Open House 2000

Here is a building-by-building rundown on most of what visitors to Open House 2000 will be able to see.



Building 2

In Bldg. 2S, watch a multimedia video presentation highlighting past and present human space exploration. Learn how the Educator Resource Center (at Space Center Houston) can provide FREE educational products and activity guides to enhance current teacher curriculum. Kids can color for a while or build a rocket and "launch it to the Moon."

The Lost Child Center and Lost and Found are located in Bldg. 2N.

Teague Auditorium

Learn from NASA astronauts, scientists, and engineers about the International Space Station and ideas for future missions to the Moon and Mars. Performances begin every hour from 10:30 a.m. to 3:30 p.m.

Building 3

Astronaut autographs will be available from 1:30 to 4:30 p.m. The cafeteria and gift shop will be open all day, and entertainment will be held outside from 9 a.m. to 5 p.m.

Building 5

Guests will see where astronauts train in sophisticated flight simulators for the shuttle and the space station. Tour both the Motion-Base and Fixed-Base shuttle trainers. View the simulator that provides a desktop platform for shuttle training.

Walk through the Space Station Training Facility and imagine the view from the cupola (the round observation window) in the real station.

Building 7

Advanced closed-loop life support chambers and a spacesuit lab are housed here. Visitors will see how engineers and scientists design, develop and test tools, life support systems, spacesuits, and heating and cooling systems. See a mockup of a galley concept to be used on the space station.

Building 9

Listen to the astronaut band "Max Q" perform from 2 to 4 p.m. Buy your official NASA souvenirs here.

Building 9NE will showcase space shuttle mockups and trainers. Check out space shuttle equipment, view the Full Fuselage Trainer and see robotic "hands" to be used for future space station activities. Cheer on the robot that competed in a recent national robot competition. Preview Inspection2000 and discover how industry, business, community, and education professionals can apply NASA technologies and processes in their own workplace.

Building 9NW will showcase the International Space Station mockups and trainers. Visit each country participating in the ISS Program, learn what each one is providing, and get your passport stamped by each one. Studying how human cells behave differently in space could lead to new treatments for cancer, diabetes, AIDS, or osteoporosis. Take a look at a bioreactor in action, growing 3-D human tissue outside the body in a rotating vessel that mimics zero-G.

Building 9S, with its Mockup Fabrication Facility, will show guests how tools, mockups, composite materials and other structures used for trainers or spacecraft development are made. Check out the nanotubes, which are 100 times stronger than steel at 1/16 of the weight. View displays of materials and tools used for developing new super-strong, lightweight composites for the X-38, a crew return vehicle for the space station developed by JSC.

Building 10

Check out the Fabrication and Assembly Facility. See a water knife cut through metal and other materials up to 5 inches thick. Check out a display of how actual soft goods are fabricated for spaceflight, including a fabric spaceflight vehicle.

Building 11

Astronaut autographs will be available from 1:30 to 4:30 p.m. The cafeteria and gift shop, where visitors can buy food and souvenirs, are open to visitors all day.

Building 13

Astronauts will sign autographs from 10 a.m. to 4 p.m. View a display explaining the work accomplished to earn the coveted Voluntary Protection Program Star site status, emblematic of JSC's commitment to safety. Visitors can discover what it takes to stop a shuttle landing faster than 200 mph by examining a shuttle tire, nose landing gear, and drag chute. See the Hyperbaric Chamber, a portable, lightweight chamber to be used on the space station for treating decompression sickness. See the prototype for a resistive exercise machine to be used by astronauts aboard the space station.

Building 14

Witness NASA-developed technology being used to find buried objects. See how astronauts conduct live video press conferences from space and how they use the latest computer-based color display technology in the space shuttle cockpit to enhance safety and vehicle capability for future missions.

Building 15

View shuttle upgrades including displays on future propulsion systems. Learn how NASA plans to use extraterrestrial resources to generate spacecraft fuel and crew breathing air and water. See displays on laser-initiated pyrotechnics, batteries, mini-fuel cells, rocket engines, and cable failure detection. In the Receiving Inspection and Test Facility, view computer chips under optical and electron microscopes and manipulate samples, some of which could actually fly in space.

Building 16

Visit the home of the main labs to test all shuttle systems – software and hardware – so problems can be detected and fixed before flights. Astronauts also train in rendezvous, docking and landing simulators located here. Watch as the shuttle docks with the International Space Station. Fly the shuttle from final approach to touchdown using a laptop landing simulator used by shuttle pilots. Find out about the magnitude and complexity of a Mars mission and see the Inner Solar System shown to scale.

Building 17

Building 17 houses the Space Flight Food Facility. Samples of current space food selections from the space shuttle, International Space Station, and Russian flight menus will be on display, plus food samples and packaging throughout space travel history.

Building 29

Here, see advanced life support chambers and examine plant growth in space. Attendees will see concepts of how plants can be used to provide food, contribute to air revitalization and water and waste recovery during long spaceflights. View displays of advanced spacesuit technology for use in future planetary exploration. Learn how NASA plans to explore the universe and see images and concepts of destinations such as the Moon, Mars, asteroids, and the Jovian moons Io and Europa. See a full-scale model of a Mars rover and 3-D landscape of Mars.

Building 30

Building 30 houses the Mission Control Center, where visitors can see the Apollo Mission Control Room, the White Flight Control Room where shuttle operations are conducted, and support rooms. In the Bldg. 30 auditorium, watch a video of the latest shuttle and station missions. Tour the Emergency Operations Center where experts coordinate emergency responses at JSC and support local communities during hurricane season, severe weather threats, and industrial accident alerts. Ask the meteorologists in the weather office why forecasting weather for space missions is not as easy as seen on the TV news.

Building 31

Building 31 is the home of the Planetary and Earth Sciences Laboratory, which houses lunar and other astromaterials and information about orbital debris. Get a close-up look at a lunar sample, a meteorite from Mars, and cosmic dust. Kids can sample "edible rocks" and explore simulated Mars sandboxes. Discover the new field of astrobiology – the search for the origin, evolution, and destiny of life in the universe. See how NASA protects the shuttles and space station from space debris.

Building 32

Get an astronaut autograph from 10 a.m. to 4 p.m. At the world's largest human-rated space simulation chamber, equipment is tested in conditions simulating the vacuum and temperatures of space. Watch engineers don real shuttle and Russian spacesuits. See a partial mockup of NASA's first inflatable habitation module proposed for use on the International Space Station.

Building 37

Astronaut autographs will be available from 10 a.m. to 4 p.m. The complete blood count is one of the most useful tests available to physicians. See how NASA is developing equipment to automatically perform these tests in microgravity. Learn how NASA studies the effects of spaceflight on central nervous system function.

Across the Street from Tram Stop C:

View JSC's new International Space Station mobile exhibit. Get a closer look at the benefits the public receives from the U.S. space program through a semitrailer exhibit focusing on technology transfer.

At the Sonny Carter Training Facility:

Visit the Neutral Buoyancy Laboratory, the largest indoor "swimming pool" in the world used by astronauts and engineers to perfect space-walking techniques.

At Ellington Field:

See the Shuttle Training Aircraft, the Gulfstream jet trainer modified to perform like the shuttle during landing. See the Boeing 747 that is used to transport the space shuttle fleet around the U.S. Bring your camera and get your picture taken in the cockpit simulator of a T-38 jet trainer used for astronaut training. Visit the Super Guppy aircraft (schedule permitting) used to transport space station hardware between manufacturer and launch sites. ■

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

The mighty Saturn I horsed an Apollo-clad Pegasus into a near-perfect circular orbit 330 miles high last week, leaving a bright trail for human space flights to follow.

When the smoke cleared at Cape Kennedy's Launch Complex 37, jubilant observers could still hear the rumbling of Saturn I's tenth straight successful launch – ten out of ten.

It was the final chapter of the Saturn I story, begun in October 1961. Future Saturns will be the improved Saturn IB, with the more powerful S-IVB second stage – the launch vehicle scheduled to begin flying unmanned Apollos in 1966, manned spacecraft the next year.

1 9 9 0

It will weigh more than a billion pounds, have walls of 12-foot thick concrete, an 8-foot-thick bottom, and it will make its inhabitants feel lighter than a feather.

Workers will begin digging a 400,000-cubic-foot hole on the grounds of JSC in December as they start construction of the new Neutral Buoyancy Laboratory, a facility that may be as crucial to the success of the Space Station Program as the launch pad.

Simulating weightlessness on Earth in enough quantity to practice assembling the space station, or even parts of the station, means thinking big. The pool will be 60 feet deep, 135 feet wide and 235 feet long. The building that will surround it could hold a football field sans one end-zone, and its ceiling will reach almost as high as nine-story Bldg.1 with a 1-ton crane that can traverse its length.

1 9 9 5

For 15 days, Dr. Nigel Packham, a Lockheed Martin life support scientist, lived on an atmosphere continually recycled by about 30,000 thriving wheat plants. The regenerative life support systems test was the first in a series of tests of advanced, recycling life support technologies planned over the next several years, said Dr. Don Henninger, chief scientist for regenerative life support systems.

Bomboy, Ball get Secretarial Excellence Awards

NASA JSC Photo 2000e18725 by Robert Markowitz

Patricia Bomboy

NASA JSC Photo 2000e18725 by Robert Markowitz

Jill Ball

Patricia Bomboy of the Flight Crew Operations Directorate and Jill Ball of the Space and Life Sciences Directorate each recently received the Marilyn J. Bockting Secretarial Excellence Award in recognition of their exceptional contributions, professional competence, and personal dedication.

Bomboy was recognized in June for her superior performance as the secretary to the chief of the Shuttle Training Branch, Aircraft Operations Division. Not only does she support the employees in her branch, she also is an aid to the Aircraft Maintenance and Engineering Branch's technical representatives.

During her 14 years at JSC, Bomboy has demonstrated outstanding skills in interpersonal relations and communications. Most noteworthy is her outstanding ability to "take charge" when the people she works with are not available. Bomboy functions as the key communications link to the branch during all operations. Her knowledge of technical terms used in the aviation and aerospace field is extremely beneficial in dealing on a day-to-day basis with a variety of individuals who work directly with the branch. Without Bomboy as this key communications link, the scheduling of resources and the communication of branch needs to its members would be significantly less effective.

Bomboy has worked extensively this year supporting the Zero-Gravity Student Campaign Program. In addition, she has provided technical support for the JSC Open House, Inspection Day, Safety and Total Health Day, and numerous other AOD extracurricular activities. Bomboy has worked directly with the members of her branch on two other projects, the Global Positioning System and the Multifunctional Electronics Display System. She is responsible for ensuring that all correspondence, filing, documentation, and recordkeeping are done in proper format and in a timely manner.

Bomboy also has the responsibility for tacking and documenting all shuttle astronaut pilot training on the Shuttle Training Aircraft. This is a detailed and time-intensive task of documenting the first four approaches of each STA training sortie for all shuttle pilots. Bomboy has developed a standard baseline for the training documentation, resulting in a very useful document for proficiency evaluation.

Ball was recognized in July for her contributions as secretary in the Medical Sciences Division. With her primary role as travel coordinator, she is a key member of the division's Secretarial Support Team. Over the past year, she has consolidated the division's travel planning functions, improved turnaround times, and established a valued, customer-focused approach. She handles all travel planning for the division, preparing travel orders and vouchers using the Space and Life Sciences Directorate's Travel Manager Program, making all necessary travel reservations, and coordinating a myriad of details for each traveler. Whether it is domestic, international, reimbursable-in-kind, or invitational travel, Ball provides each traveler with expert one-on-one assistance to ensure appropriate authorization has been obtained, keeps each traveler's official passport up-to-date, and helps with applications for government credit cards and telephone calling cards, as required. She also provides each traveler with a point of contact for personalized assistance if required while on official travel. ■

Additional security measures in effect across JSC

Tighter security is now in effect at JSC as the center prepares for 24-hour-a-day International Space Station operations. These measures will include additional badge checks in Bldgs. 1, 4 South, 30 North, 30 South and at Sonny Carter Training Facility.

There will be permanent guard stations in the parking lots north and south of Bldg. 30 manned 24 hours a day, seven days a week. All occupants of vehicles requesting access to the Bldg. 30 parking lots must be badged. This means that family members without badges who are dropping off or picking up employees at Bldg. 30 must make their drop offs or pick ups at the new guard houses.

In general, security officers will be more visible throughout the center and at Sonny Carter, conducting badge checks and enforcing security regulations. For more information, contact the Security Office at x34041. ■

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	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)	$7.25
(JSC civil service employees free.)				
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.

Super September Sale

- 10% off all merchandise, candy and cards Sept 1-15! Stop by the stores for details.

For additional information, please call x35350.

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

Clear Lake City Water Authority names facility after longtime NASA employee

For decades, he has contributed to his profession and to his community through service to NASA and the Clear Lake City Water Authority.

In recognition of his foresight and leadership in helping the Clear Lake City Water Authority meet the growing needs of its customers, the Authority recently named its water reclamation facility for its longtime director, Robert T. (Bob) Savely. The dedication ceremony took place at the Robert T. Savely Water Reclamation Facility located at the intersection of Space Center Boulevard and Middlebrook Drive.

Savely has served as director and board secretary or president of the Clear Lake City Water Authority since 1976.

"I like to keep busy and believe in supporting the community in addition to my professional activities," says Savely, NASA senior scientist in JSC's Automation, Robotics and Simulation Division. "Community service starts with the individual. If there's trash out in front of your house, you need to pick it up and not wait for someone to do it for you. When time in your personal life permits, there are always important public service and volunteer opportunities."

The first unit of the Clear Lake City Water Authority Water Reclamation Facility was built during 1967-1969 to process a flow of 2.25 million gallons per day to serve 25,000 people in the Clear Lake area. Through the years, the plant has been systematically expanded. It now serves approximately 16,000 acres with a population of 70,000 and is currently permitted for a flow of 9 million gallons per day. The upgraded plant provides a state-of-the-art tertiary treatment facility including ultraviolet disinfection.

> ***I believe that working for NASA is a rare opportunity to participate in making science fiction come true.***
> – Robert Savely

Full development of the project service area is expected to occur in 2002 when the plant capacity is increased to a flow of 10 million gallons per day to serve a projected population of 100,000.

Savely joined NASA in 1963, working on developing navigation systems for the Apollo spacecraft and later applying the same expertise to the space shuttle system. He began his career working on the onboard navigation software for the Apollo spacecraft. He soon became involved in a development role for the control center software for onboard navigation, a role that would continue in various forms throughout his career. He worked as a flight controller for all Apollo lunar missions. He noted that on Apollo 12, the navigation team was able to bring the Lunar Excursion Module to within a few hundred feet of the Lunar Surveyor lander that was used early in NASA's lunar exploration program, a tremendous feat given the tools available at that time.

NASA JSC Photo 2000e19536 by Bill Stafford

Robert T. (Bob) Savely, NASA senior scientist in JSC's Automation, Robotics and Simulation Division, checks the water at the reclamation facility recently named in his honor by the Clear Lake City Water Authority.

He transitioned his onboard navigation experience into the Space Shuttle Program and participated in the design, development, and operational support of the shuttle onboard navigation function. He also served as a flight controller for the first shuttle flights through 1983. According to Savely, in those days, it was common to rotate between operations support and development projects, keeping the engineers fresh for all of their different activities.

As the shuttle became operational, Savely saw an opportunity to move into the rapidly advancing field of artificial intelligence technology. With management backing, he formed the group that became the Software Technology Branch. He directed a staff of talented engineers in the development of expert systems software for failure detection, isolation, and reconfiguration. These expert systems and their successors are used today in the Mission Control Center as well as other areas inside and outside of NASA. A basic tool used for constructing expert systems, the C Language Integrated Production System or CLIPS, was developed by STB personnel and the team received a $40,000 NASA Space Act Award for its efforts.

Savely's team continued to leverage its activities into advanced tools for training applications, planning and scheduling systems, neural network technology, fuzzy logic applications, and parallel-distributed processing technology. The Intelligent Computer-Aided Training system provides a "smart instructor" to enable the teaching of basic, intermediate, and advanced classes on a variety of subjects. With time, the ICAT can tailor its instruction to the student's abilities, for more effective training. Other tools developed by the STB include the Electronic Documentation Project, used by the Mission Operations Directorate to provide on-line management of many of the flight documents used in mission support. Closer to home in AR&SD, the RMS Assistant project was implemented based on earlier STB expert systems technology used to support MCC flight controllers.

With his experience in advanced software technologies, regional university grants, and training technologies, Savely enjoys mentoring and advising the talented engineers and scientists of AR&SD in his role as division chief scientist.

He says that Apollo 11 is the highlight of his career. "There will never be a chance to do something like that again in all eternity." He also pointed out that Apollo 8 was a great achievement and inspiration.

And the first shuttle flight ranks second. "Getting the shuttle back to the runway the first time was another critical milestone. The onboard navigation system for the shuttle was relatively complex," he said.

He received the Presidential Medal of Freedom for Apollo 13 as a member of the mission operations team. He still calls the Apollo 13 mission experience "traumatic": "I've never seen the movie. I don't think I could stand the stress."

Savely finds his current work in the AR&SD fascinating and challenging, with many opportunities to contribute to several projects. His current work caps off what has been a varied and successful career. "I've had three separate careers – Apollo, shuttle and my current work in technology development," he said.

Key projects that the division is working on include the Simplified Aid for extravehicular activity (EVA) Rescue device, a mini-maneuvering unit that can provide contingency maneuvering capability for a spacesuited crewmember during EVA operations on the space shuttle and the space station, and Robonaut, a robotic system that may perform future space-walking tasks using an advanced mechanical hand.

Savely looks back on a career filled with exciting events and a life of service to his community.

"I am very grateful for the opportunities that I have had and continue to have at JSC," said Savely. ■

JSC's eldest employee turns 80

Members of JSC's Avionic Systems Division, where Frank Metcalf has worked for the last few years, and other guests recently gathered to help him celebrate his 80th birthday. Among the well-wishers were JSC Director George Abbey, JSC Associate Director (Management) Sue Garman, JSC Chief Engineer Leonard Nicholson, JSC Human Resources Director Greg Hayes, Engineering Directorate Director Frank Benz, Engineering Directorate Deputy Director Jim Jaax, and Avionic Systems Division Chief Ken Land.

Metcalf was born on Flag Day, June 14, in 1920 in Rockville, Connecticut. Before joining NASA, he worked for Bell Labs in Winston-Salem, North Carolina; Vickers, Inc. in St. Louis, Missouri; and McDonnell Aircraft, also in St. Louis. At McDonnell, he worked on the Mercury and Gemini trainers. He was transferred to Houston with the Gemini trainers where he has been ever since. He joined NASA shortly after coming to Houston.

Some of Metcalf's other career projects at NASA have been working the Human-Rated Vacuum Chambers in the Crew Systems Division; helping develop the RS-18 scanner for the RB-57 aircraft when he transferred to the Infrared Scanner Group; and working flight hardware experiments for the Space Shuttle Program after transferring to the ASD. He currently supports information technology resources management for the ASD.

At 80, Metcalf still jogs daily, five days a week, and is a living example of good health.

Metcalf says that his main hobby now is taking care of his wife, Evelyn. He enjoys his work and has no immediate plans for retirement. ■

NASA JSC Photo 2000-04746

JSC Director George Abbey presents a commemorative flag from a shuttle mission to Frank Metcalf in honor of his 80th birthday.

PEOPLE on the MOVE

Human Resources reports the following personnel changes:

Key Management Assignments

Dan Carpenter was named acting director, Public Affairs Office.

Lynn Buquo was selected as chief, Customer Support Office, Information Systems Directorate.

Carolyn Krumrey was selected as chief, Manufacturing Integration and Technology Branch, Manufacturing, Materials, and Process Technology Division, Engineering Directorate.

Dorothy Rasco was selected as manager, Flight Crew Equipment Management Office, Space Shuttle Vehicle Engineering Office, Space Shuttle Program Office.

Lynn Vernon was selected as chief, Command, Control/Planning Systems Development/Operations Branch, Advanced Operations/Development Division, Mission Operations Directorate.

Steven Gonzalez was selected as chief, Operations Research/Strategic Development Branch, Advanced Operations/Development Division, Mission Operations Directorate.

Barbara Corbin was selected as chief, Space Station Training Facility Project Office, Advanced Operations/ Development Division, Mission Operations Directorate.

Diane Costello was named manager, Institutional Resources Management Office, Office of the Chief Financial Officer.

Additions to the Workforce

Angela Bauer joins the Electrical Systems Branch, Systems Division, Mission Operations Directorate, as a flight controller.

Matthew Redmond joins the Communication and Data Systems Branch, Systems Division, Mission Operations Directorate, as a flight controller.

James Geffre and *Abhishek Tripathi* join the Advanced Development Office, Engineering Directorate, as aerospace flight systems engineers.

Jen Jones joins the Guidance, Navigation and Control Design and Analysis Branch, Aeroscience and Flight Mechanics Division, Engineering Directorate, as an X-38 design engineer.

Jennifer Rochlis joins the Robotic Systems Technology Branch, Automation, Robotics, and Simulation Division, Engineering Directorate, as a flight systems engineer.

Justin Dobbins joins the Avionics and Test Analysis Branch, Avionics Systems Division, Engineering Directorate, as an electronics engineer.

Geoffrey Yoder joins the Avionics and Test Analysis Branch, Avionics Systems Division, Engineering Directorate, as an EEE manager for GFE flight hardware.

Joe Gensler joins the EVA and IVA Equipment Branch, Crew and Thermal Systems Division, Engineering Directorate, as an environmental control systems engineer.

Richard Snyder joins the Propulsion and Fluids Systems Branch, Energy Systems Division, Engineering Directorate, as a liquid propulsion systems engineer.

Gilberto Varela joins the Power Systems Branch, Energy Systems Division, Engineering Directorate, as a battery/fuel cell design and test engineer.

Mark Landeck joins the Manufacturing Integration and Technology Branch, Manufacturing, Materials, and Process Technology Division, Engineering Directorate, as a lead design engineer, GSE.

Jay Leggett and *Alvaro Rodriguez* join the Thermal Branch, Structures and Mechanics Division, Engineering Directorate, as heat transfer engineers.

Nichole Mattson joins the Thermal Branch, Structures and Mechanics Division, Engineering Directorate, as a thermal protection and control design engineer.

Carrie McCaslin joins the Customer Support Office, Information Systems Directorate, as a computer engineer.

OUT&ABOUT★

Astronaut and JSC Associate Director (Technical) John W. Young receives the 2000 Goddard Astronautics Award. Robert L. Crippen, left, AIAA National president, presented Young with the award during an Honors and Awards Banquet in Washington, DC, May 12.

Chad Collins joins the Information and Flight Operations Team, Institutional Resources Management Office, Office of the chief financial officer, as a program analyst.

Debra Chowning joins the Quality Assurance, Reliability, and Safety Office; Occupational Safety and Institutional Assurance Division; Safety, Reliability, and Quality Assurance Office, as a quality assurance engineer.

Mike Miller joins the Hardware and Software Engineering Integration Office, Space Station Payloads Office, International Space Station Program Office, as a payload stage analysis lead.

Brian Rhone joins the Hardware and Software Engineering Integration Office, Space Station Payloads Office, International Space Station Program Office, as a payload test engineer.

Promotions

Marty Cassens was selected as a transportation specialist in the Transportation Branch, Logistics Division, Center Operations Directorate.

Kathy Green and *Delores Marshall* were selected as supply management specialists in the Supply and Support Services Branch, Logistics Division, Center Operations Directorate.

Reassignments to Other Centers

Dave Lamar moves to Glenn Research Center.

Carl Weber moves to NASA Headquarters.

Reassignments Between Directorates

Marvin Bennett moves from the Center Operations Directorate to the International Space Station Program Office.

Dennis Hoy and *Thomas Le* move from the Engineering Directorate to the International Space Station Program Office.

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

Blake Ratcliff moves from the Office of the Chief Financial Officer to the International Space Station Program Office.

Retirements

James Long of the Information Systems Directorate.

Resignations

Joseph Cook of the Engineering Directorate.

Todd McIntyre of the International Space Station Program Office.

Robert Shields of the International Space Station Program Office.

Michael Van Chau of the Space Operations Management Office.

NASA BRIEFS

NASA TECHNOLOGY MAY HELP EASE FLIGHT DELAYS

Sobering statistics show flight delays are at an all-time high, with air passenger frustrations running even higher. However, new technology developed by NASA's Langley Research Center may help ease some of those frustrations, allowing travelers to reach their destinations faster.

NASA researchers have designed a system to predict aircraft wake turbulence on final approach, so airliners can be spaced more safely and efficiently. The technology is called AVOSS or Aircraft Vortex Spacing System.

AVOSS determines how winds and other atmospheric conditions affect the wake vortex patterns of different types of aircraft. The system uses a type of laser radar, or lidar technology, to confirm the accuracy of those forecasts. All this information is processed by computers, which can then provide safe spacing criteria.

Weather plays a big part in the motion and decay rate of these trailing twisters. Until now, there has been no system to accurately predict wake vortex patterns and quantify the spacing needed for safety. This lack of this kind of data forces air traffic controllers to use rigidly fixed distances to separate different classes of aircraft during bad weather, causing unnecessary air traffic delays that disrupt flight schedules and increase costs.

NASA's AVOSS can provide the needed information. The system was installed at the Dallas-Fort Worth International Airport in Texas three years ago and has undergone continued development and testing. Initial test results show that AVOSS can increase individual runway capacity as much as 15 percent, depending on weather conditions and the number of "heavy" aircraft arriving.

SCIENTISTS DETECT THINNING OF GREENLAND'S COASTAL ICE

Scientists who want to monitor the state of our global climate may have to look no farther than the coastal ice that surrounds the Earth's largest island.

A NASA study of Greenland's ice sheet reveals that it is rapidly thinning. In an article published in the July 21 issue of *Science*, Bill Krabill, project scientist at the NASA Goddard Space Flight Center's Wallops Flight Facility, reports that the frozen area around Greenland is thinning, in some places, at a rate of more than three feet per year. Any change is important since a smaller ice sheet could result in higher sea levels.

Greenland covers 840,000 square miles and 85 percent of the island is covered by ice, some of which is up to two miles thick. With its southern tip protruding into temperate latitudes, monitoring this portion of the ice sheet may be one of the best ways to measure changes in our climate, at least in the Northern Hemisphere.

The ice mapping was completed by NASA, which has been surveying the Greenland ice sheet for nearly seven years. In 1993 and 1994, NASA researchers surveyed the ice sheet using an airborne laser altimeter and precision global positioning satellite receivers. Those same areas were surveyed again in 1998 and 1999.

Now, for the first time, portions of the entire ice sheet covering Greenland have been mapped with sufficient accuracy to detect significant changes in elevation.

Further information on the Greenland mapping project, including the technology behind the science, is available at:

http://aol.wff.nasa.gov/aoltm.html

Imagery supporting this story is available at

http://svs.gsfc.nasa.gov/imagewall/greenland.html

SPACE CENTER Roundup

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

Assistant Editor . . . . . .Nicole Cloutier . . . . . .nicole.cloutier1@jsc.nasa.gov

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