



January 8, 1999

SPACE CENTER Roundup

VOL. 38, NO. 1 LYNDON B. JOHNSON SPACE CENTER, HOUSTON, TEXAS

Crew connects Zarya and Unity modules

Endeavour's six-member American and Russian crew ended their 12-day International Space Station assembly mission late Dec. 15, landing at the Kennedy Space Center.

The shuttle crew touched down at 9:53 p.m. CST, safely skirting threats of cloudy skies and rain showers that could have forced postponement.

It was only the 10th time in the 17-year history of the shuttle program of 93 missions that a crew has landed in darkness. With Commander Bob Cabana and Pilot Rick Sturckow at the controls, crewmembers made their approach from the southwest and over the Gulf of Mexico with electronic navigational aids but no lights.

Astronauts Nancy Currie, Jerry Ross and Jim Newman, Russian Cosmonaut Sergei Krikalev, Cabana and Sturckow

launched December 4 with Unity, the second large component of the new International Space Station.

The crew rendezvoused with Zarya, the Russian-built and launched power and propulsion module that had been launched November 20.

The crew returned to Ellington Field December 17. In congratulating the astronauts, JSC Center Director George W.S. Abbey said that they had done a fantastic job as the first shuttle and station crew.

To the hundreds of people in attendance, Cabana said, "I'd like to thank all of you for your dedication and hard work. That made it all possible."

Cabana said that when he joined NASA in 1985, he "dreamed of building a space station – a place where all nations could work together, a stepping-stone to the

Please see **STAR**, page 2



NASA Photo STS088-703-032

Using the shuttle's robot arm and three space walks by Jerry Ross and Jim Newman, the crew linked the two modules, creating a single uninhabited 35-ton, 75-foot-long structure that circles the Earth at more than 240 miles high.

Station truss acoustic testing begins at JSC

By James Hartsfield

A four-story-tall, 12-ton – relatively tiny – piece of the International Space Station is at JSC to undergo the noise and vibration of a simulated space shuttle launch, and more than a thousand neck-craning employees turned out recently for a glimpse of it.

An exact replica of the centerpiece of the station's 356-foot long girder-like truss structure, a 43-foot long segment called the S-zero truss, has been in the Bldg. 49 Spacecraft Acoustic Lab undergoing a complex series of vibro-acoustic tests. The S-zero Truss Structural Test Article will not actually be launched. The piece that will fly is currently under construction at Boeing's Huntington Beach, Ca., factory. The flight truss is scheduled to be shipped to Florida in mid-1999 to begin acceptance testing.

Also built at Huntington Beach, the test article arrived at JSC via NASA's Super Guppy aircraft in late October, said Don McCormack, NASA's station launch package manager for the truss segment. The S-zero is the first of nine segments that will be connected in orbit to build the football field-long final truss.

"Although this piece is huge, it's

incredible when you realize that it represents only about 12 percent of the length of the entire station truss," McCormack said. "We build test articles like this to allow us to verify the design through testing without putting the flight hardware at risk of damage. Simulating the acoustic and vibration environment of the shuttle's payload bay during launch in this test helps assure us that our predictions are accurate about what the various components on the segment will face at launch."

More than a thousand employees from all areas of JSC turned out for an opportunity to see the truss segment in Bldg. 49 during a break in the test activities. Among them was John Weghorst, who works at Boeing's Space Park facility.

"I wanted to see the hardware firsthand," Weghorst explained. "I'm amazed at the size. The station itself is bigger than people think it is. You can hear the dimensions on the news, but until you are right here on top of it, you don't realize just how big it really is."

More than 320 sensors – 240 accelerometers to measure vibrations, 20 microphones and 60 strain gauges – were placed on the truss test article after its arrival here, said Dennis Halpin, the

Please see **TRUSS**, page 2



JSC Photo S98-20383 by Benny Benavides

More than a thousand employees from all areas of JSC turned out for an opportunity to see the truss segment in Bldg. 49 during a break in the test activities



Employees take X-38 for test drive.

Page 2



Shine your boots: it's rodeo time again.

Page 3



Drug delivery system being developed.

Page 7

Astronaut Ascent/Entry Trainer adds to crew training tools

By Nicole Cloutier

Easier access, quicker simulation turnaround time, and improved crew training are just some of the benefits evolving from a desktop shuttle simulator developed by JSC's Rapid Prototyping and Interface Development (RaPID) Lab.

Known as the Astronaut Ascent/Entry Trainer, the simulator designed to provide astronauts with an easily accessible tool to maintain proficiency in ascent and entry flight procedures is getting rave reviews from astronauts and trainers alike.

"It's a great training tool," said JSC Associate Director (Technical) John Young, a frequent user of the AET. "I just ran the latest trajectories for STS-99 on it and it truly is an advance in terms of what we can do with our computer technology and the skilled team we have here working on the software."

Prior to the AET, training for ascent and entry flight procedures was primarily based on the Shuttle Mission Simulator. Although it provides very valuable training, the SMS is in high demand for its limited operating hours and requires advance scheduling and significant personnel support.

"We needed something to augment the training for the dynamic procedures," said Col. Charlie Precourt, chief, Astronaut Office, who initiated development of the trainer from the Astronaut Office and later contacted the RaPID Lab to tie in their expertise. "We wanted a trainer that would include all the Guidance Navigation and Control procedures such as RTLS aborts, TAL aborts and high and low energy entry procedures."

With that in mind the RaPID Lab designers went to work and delivered a product that can simulate space shuttle ascents and entries on a desktop computer. Astronauts can practice nominal ascents and intact aborts, contingency aborts, entries, and TAEM flight procedures.

"The AET is truly a team production," said Jeff Bertsch, chief of MOD's Technology

Applications Office, home of the RaPID Lab. "Although the initial software development was a small RaPID Lab project, the AET is actually a collaboration of ideas and technologies from many organizations. The Astronaut Office, Engineering Directorate and MOD worked together to make the AET a reality. A major goal in the develop-

ment of the AET was to capitalize on existing tools and commercially available technology as much as possible."

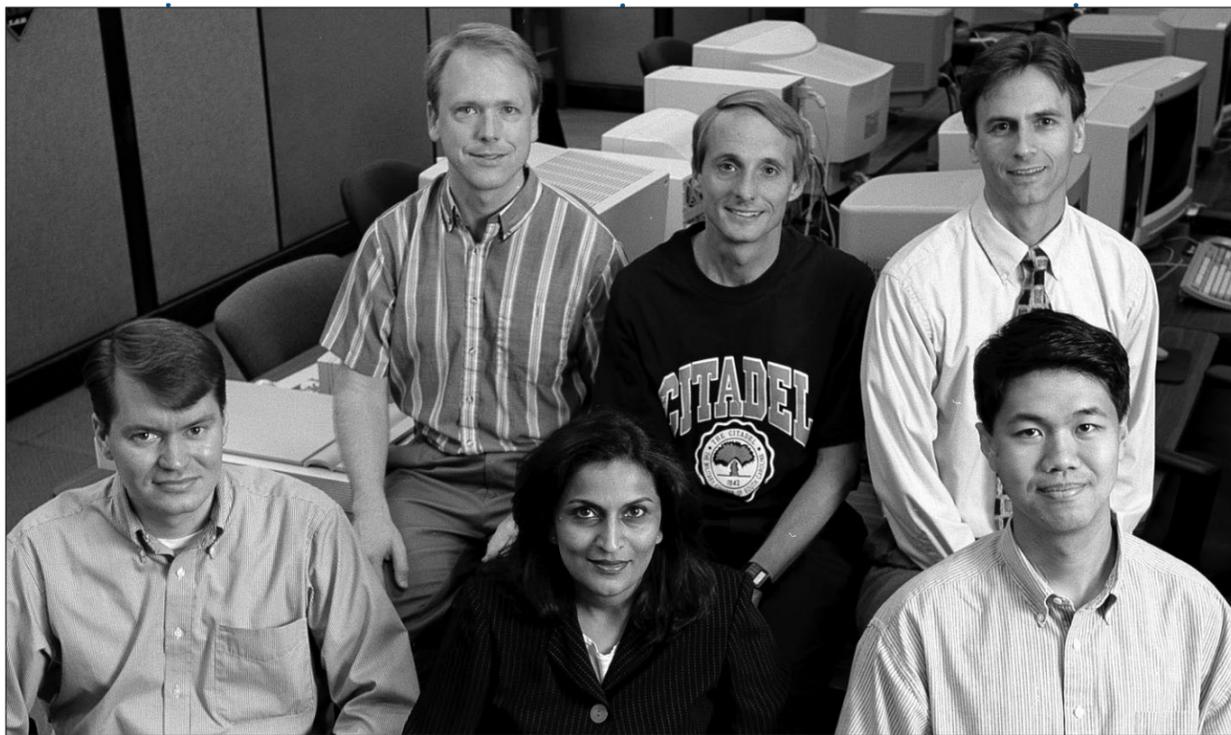
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The AET development team, from left, front: Mason Menninger, USA, Shashi Srinivasa, Jaymark Engineering, Francis Choi, USA, and back: Tom Smith, Barrios, Daniel Deger, NASA and Jeff Bertsch, NASA.

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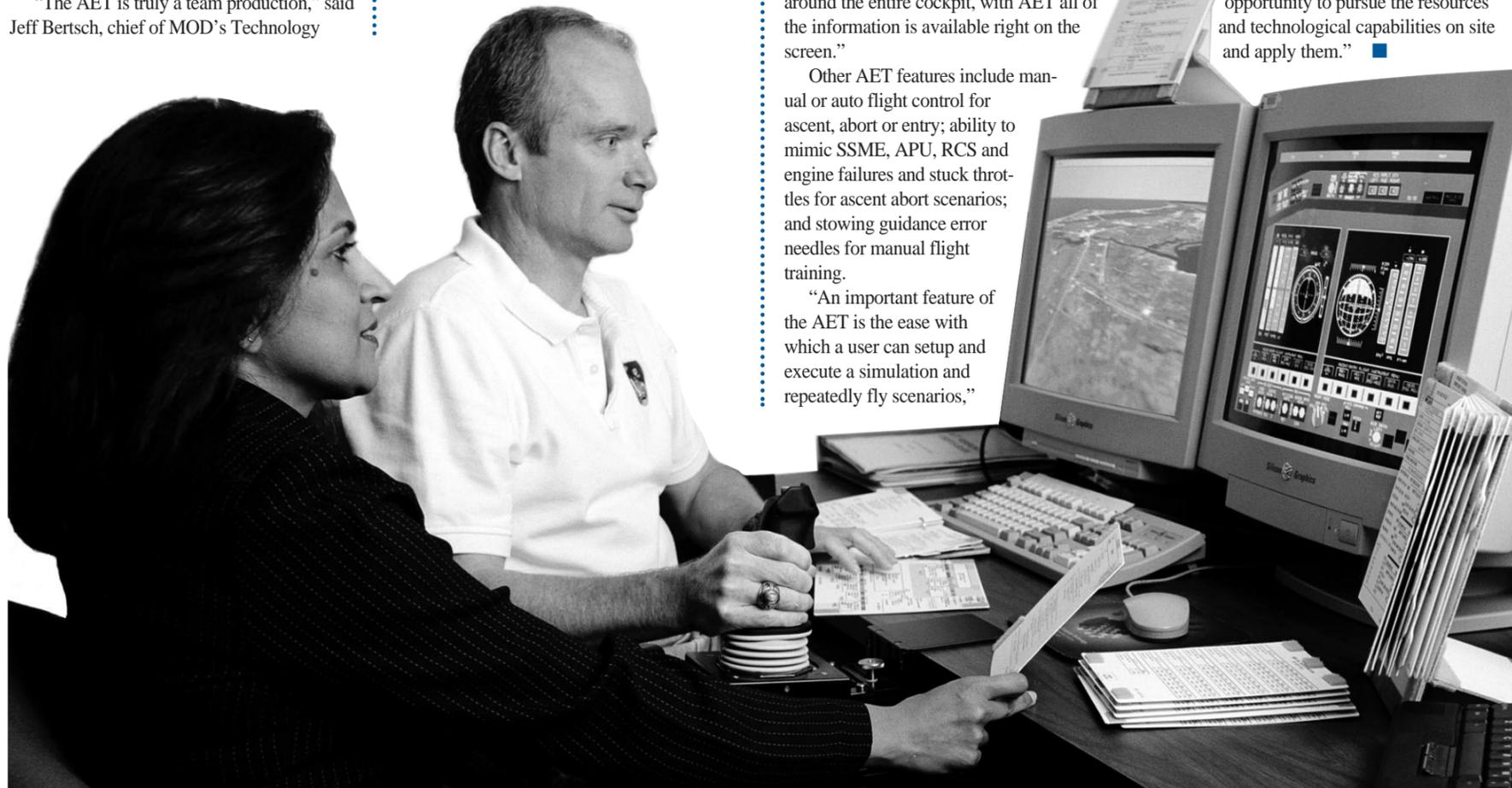
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Shashi Srinivasa, the Ascent/Entry Trainer project lead, and Astronaut Charlie Precourt try out new features to the AET in Bldg. 4S.

NASA JSC Photo S99-07341 by James Blair

Get ready to rodeo

It's time for JSC employees to dust off their 10-gallon hats and shine their spurs for the upcoming rodeo season. The center's "Go Western" Planning Committee will sponsor a variety of activities throughout the rodeo season. Working in concert with the NASA/Clear Creek/Friendswood Go Texan committee, JSC will support the commitment to youth and education.

The season kicks off Wednesday, January 27, with performers from the Houston Livestock Show and Rodeo speakers committee entertaining employees during lunchtime in the Bldg. 3 cafeteria. Performances will include country and western singers, western bands, live animals, ropers (give it a try), rodeo clowns, and line dancers. Come on down and enjoy the free entertainment while you munch on the western-themed lunch specials at the cafeteria.

January 29 is Go Texan Day in the Clear Lake area, so wear your finest western outfit to work that day. Also that day the Go Texan Rodeo Style Show will be held beginning at 11:00 a.m. at the Gilruth Center. Contact Pat Hirshfeld (281) 488-2290 for ticket information. On February 3 another contingent of the Houston Livestock Show and Rodeo performers from the speakers committee will entertain in the Bldg. 3 cafeteria.

The month-long festivities will continue with the arrival of the Texas Independence Trail Riders at 3 p.m. February 9. The trail riders will enter JSC through the Space Center Houston tram underpass by the Longhorn Project pasture. The JSC Circle Riders and Precinct 8 mounted patrol will meet them as they enter JSC.

About 150 horses and riders and 10 to 15 wagons will ride through the center, passing by the JSC Child Care Center and stopping at the Gilruth Center. The Texas Independence Trail Riders will set up camp for the night in the wooded area near the pavilion.

The NASA/Clear Creek/Friendswood Go Texan committee will host a dinner dance that evening from 7 p.m. to midnight, February 9, at Space Center Houston. This event will serve as the official welcome to the trail riders as well as highlight the substantial monetary



S98-01738

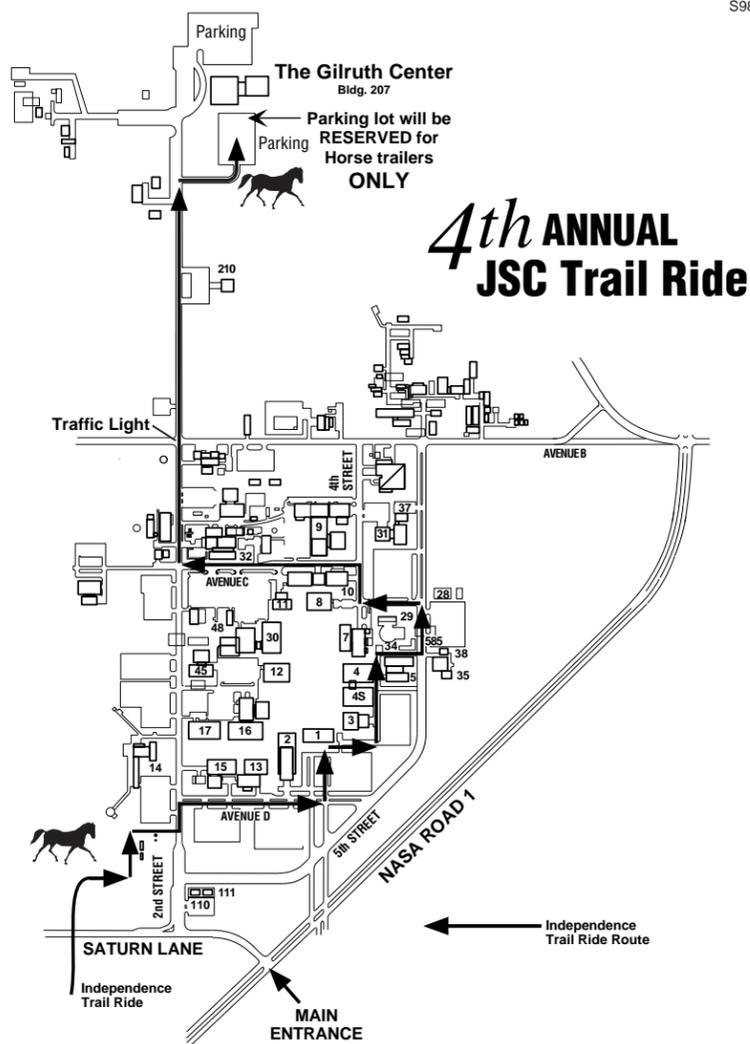
As she did last year, Rose Gardner of the JSC Travel Office will ride with the Independence Trail Riders when they enter JSC at Rocket Park.

contribution that the Houston Livestock Show and Rodeo is providing to the Longhorn Project.

Tickets are \$20 and include a barbecue dinner, two drink coupons, refreshments, live band and entertainment, plus the exhibits for viewing at Space Center Houston. Tickets are available at the Exchange stores. Proceeds go to the scholarship program of the Houston Livestock Show and Rodeo to help provide seven \$10,000 scholarships to NASA-area high school seniors for their college education.

The trail riders will depart JSC the next morning at 9 through the gate near the 300/400 area and travel through Clear Lake City on their way to their next overnight stop in Deer Park.

The Houston Livestock Show and Rodeo runs from February 19 to March 7. Once again NASA will have a booth at the Astro Arena. Contact Sandy Griffin at x31056 if you would like to help staff the booth. ■



GILRUTH CENTER NEWS

Hours: The Gilruth Center is open from 6:30 a.m.-10 p.m. Monday-Thursday, 6:30 a.m.-9 p.m. Friday, and 9 a.m.-2 p.m. Saturday. Contact the Gilruth Center at x33345.

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

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

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

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

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

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

Step/bench aerobics: Low-impact cardiovascular workout. Classes meet from 5:15-6:15 p.m. Tuesdays and Thursdays. Cost is \$32 for eight weeks. Call Kristen Taragzewski, instructor, at x36891.

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

Ballroom dancing: Classes meet from 7-8:15 p.m. Thursdays for beginner advanced classes and from 8:15-9:30 p.m. for beginner-intermediate and intermediate students. Cost is \$60 per couple.

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

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

Gilruth Home Page: Check out all activities at the Gilruth online at: <http://www4.jsc.nasa.gov/ah/exceaa/Gilruth/Gilruth.htm>.

TICKET WINDOW

Bldg. 3 Exchange Store hours are 7 a.m.-4 p.m. Monday-Friday.

Bldg. 11 Exchange Store hours are 9 a.m.-3 p.m. Monday-Friday.

For more information, please call x35350.

The following discount tickets are available at the Exchange Stores:

General Cinema Theaters	\$5.50
Sony Loew's Theaters	\$5.00
AMC Theaters	\$4.75
Moody Gardens (2 of 6 events)	\$9.75
Space Center Houston	...adult \$10.25 ...child (4-11)	\$6.50
(JSC civil service employees free.)		

All tickets are non-refundable.

Metro tokens and value cards are available.

Sweetwater pecans are on sale for \$6.00 while supplies last.

1999 Franklin Planner refills are now available at the Building 11 Exchange Store.

New Year's Photo Special

Photo processing: 3-inch single or double prints, \$2.99; or 4-inch single or double prints, \$3.99. (Not valid for black and white, panoramic, APS or reprints.)



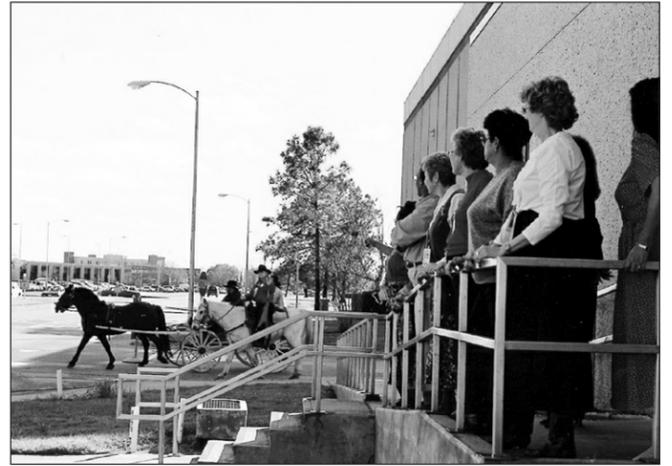
S98-00356

January

NASA Administrator Daniel S. Goldin visited the X-38 at JSC during a congressional visit by Sen. Robert Kerrey, D-Neb.

February

Employees in Bldg. T-585 welcomed the Texas Independence Trail Riders as they paraded through JSC last February on their way to the Houston Livestock Show and Rodeo.



S98-01740

THE Year 1998 IN Review

March

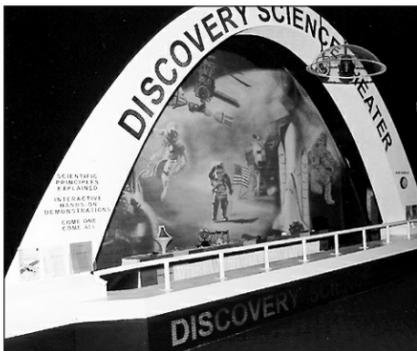
JSC Director George Abbey joined Clear Creek Independent School District trustees in breaking ground for the new intermediate school on the grounds of JSC. From left are Dr. John Wilson, superintendent of Clear Creek ISD; Abbey; Sophia LeCour, board of trustees president; and trustees Ralph Parr and Richard Labrecque.



S98-05024

April

A large crowd of JSC employees listened to President Bill Clinton during an April 14 visit to the center.



S98-05514

May

A team of JSC advisers worked with the Discovery Museum at Moody Gardens on Galveston Island to complete a major renovation. JSC volunteers played a major role in design and execution of the initial human space flight display and helped train Moody Gardens staff members.



S98-02887

June

Astronaut Andy Thomas, second from left, received a warm greeting from STS-91 Commander Charlie Precourt at Ellington Field after completing four and a half months on Mir.



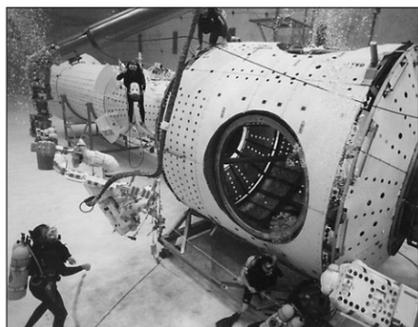
S98-08356



98-14252

September

JSC employees stood down from their daily tasks and suited up for a fun run as the annual Safety and Total Health Day ended with a strong finish.



S98-11949

July

JSC's Sonny Carter Training Facility Neutral Buoyancy Laboratory won the American Society of Civil Engineers' Texas Outstanding Civil Engineering Award.



S98-15766

October

More than 2,700 visitors from 41 states viewed JSC's facilities and technologies during Inspection 98.

August

Alan B. Shepard Jr. was remembered as one of NASA's greatest pioneers during memorial services at JSC.



98e08708

November

John Glenn, right, received a standing ovation during a ceremony for the space shuttle *Discovery* crew at Ellington Field. Crewmembers accompanying the 77-year-old senator were, from left, Curt Brown, Steven Lindsey, Steve Robinson, Scott Parazynski, Pedro Duque and Chiaki Mukai.



S98-17369

December

The structural test article of a section of the International Space Station truss arrived at Bldg. 49 to undergo vibro-acoustic testing. The truss is the backbone of the space station, linking the pressurized modules with the solar power arrays.

JSC employees receive high honors

One hundred civil servants received JSC's highest honor, the Certificate of Commendation, during an awards ceremony held in early December in the Teague Auditorium. The award is presented to employees whose contributions are so significant they deserve exceptional acknowledgment by the center. Recipients were:

Office of the Director

Douglas K. Ward

Human Resources Office

Vanessa C. Bowen
Bobbie G. Wood

Office of the Chief Information Officer

Wanda S. Hobley

Public Affairs Office

Patsy P. Malpass

Business Management Directorate

Marianne F. Bachstein
Martha J. Bishop
Sharon A. Delp
Izella M. Dornell
Judith E. Durand
Lawrence A. Kenyon
Marie D. Kliment
Alfred E. Morrey III
Patsy H. Ritterhouse

Flight Crew Operations Directorate

Olan J. Bertrand
Susan A. Brown
Lenora F. Guin
Arda J. Roy Jr.
Jamie K. Vaughn

Mission Operations Directorate

Cheryl R. Andrews
Paul J. Bertsch
Maureen E. Bowen
Barbara J. Corbin
Scott A. Curtis
Robert T. Gaffney
Terry J. Gobert
Jean C. Haensly
J. Mark Jernigan
Cindy L. Kochan
Ray B. Lachney
Flora B. Lowes
William E. Powers
Theodore U. Ro
John T. Sims III

Engineering Directorate

Gregory C. Blackburn
Hubert J. Brasseaux Jr.
Susan H. Burns
John F. Connolly
Donald M. Curry, Ph.D.
J. Phillip Dempsey
Eric C. Dimpault-Darcy
James L. Duron
Cliff L. Farmer

Donna L. Fender
Patrick W. Fink
Ronald H. Gerlach
Susan F. Gomez
Charles J. Gott
David A. Hamilton
Wayne A. Jermstad
Guy L. King
Carolyn M. Krumrey
David D. Lee
Herbert K. Mitchell
James E. Ratliff
William W. Renegar
Gerald B. Sanders
Teming Tse
Hester J. Yim

Information Systems Directorate

Robert T. Anderson
Pamela R. Baker
Richard T. Slater

Center Operations Directorate

Stephen P. Campbell
William C. Gieck Jr.
Sandra T. Ogden

Office of the Chief Financial Officer

Gerald W. Chapman Jr.
Nilda Reyes

Space Shuttle Program Office

Gail E. Clark
Vanessa S. Ellerbe
Richard D. Jackson Jr.
Frank Moreno
David E. O'Brien III
George W. Sandars

Safety, Reliability, & Quality Assurance Directorate

Timothy C. Adams
Alice T. Lee
Arthur L. Schmitt

International Space Station Program Office

Anthony J. Butina
Roberto S. Galvez
Susan H. Graham
Jerry B. Holsomback
Stephen D. Hunter
Charles M. Lundquist III
Brian K. Mitchell
Bettye J. Solcher
Dawn A. Thomas

White Sands Test Facility

David B. Harris
Karen D. Lucht

Space and Life Sciences Directorate

Michael R. Barratt, M.D.
David J. Fitts
Jerry L. Homick, Ph.D.
Marilyn M. Lindstrom, Ph.D.
Suzanne S. McCollum
John A. Rummel, Ph.D.
John J. Uri

Space Operations Management Office

Shayla E. Taylor

EVA Project Office

Nancy J. Patrick
Natalie B. Stubbings

Phase 1 Program Office

William C. Brown
Isaac W. Moore

Center workers receive prestigious Silver Snoopy Awards

Thirty-five JSC employees have, in recent months, become proud recipients of the coveted Silver Snoopy Award.

Civil service employees honored with Silver Snoopy awards are Betty Burg, Nancy Robb and Lisa Rea Phillips, all of the Business Management Directorate; Jack Woods, Flight Crew Operations Directorate; Cathy Boyd, Barbara Conte, Rick Davis, Kenneth Hill and Ginger

Kerrick, all of the Mission Operations Directorate; Floyd Booker, Michael Brieden, Linda Bromley, Karen Edelstein and Angel Plaza, all of the Engineering Directorate; Angela Pollard, Information Systems Directorate; Patricia Kolkmeier, Center Operations Directorate; Randall Adams and Albert Ong, both from the Space Shuttle Program Office; Glenn Watkins, Safety, Reliability, and Quality

Assurance Office; Jeanne Crews and Michael Golightly, both from the Space and Life Sciences Directorate; and Jessie Gilmore, Phase 1 Program Office.

Contractor recipients of the award are Nasser Ayub, Mark Cloutier and Daniel Harfe, Lockheed Martin Space Mission Systems and Services; Patrick Barrow, Frank Eades, Ronald Presswood and John Van Aken, Johnson Engineering

Corporation; Frank Hernandez, ILC, Inc.; Patricia Lombardo, Spar Aerospace Limited; Timothy Reynolds, Northrop Grumman Corp.; Robert Smith, The Aerospace Corporation; and Dowis Atkins and Harold Tausend, MD, Kelsey-Seybold Clinic.

The first quarter of FY99 will see more Silver Snoopy awards being presented. ■

JSC Safety Action Team: employees empowered for safety

The JSC Safety Action Team (JSAT) has been established to give employees a voice in the center's safety, health, environmental protection, and emergency preparedness programs. Membership in the JSAT is voluntary and includes technical and non-technical working level civil service, contractor and union representatives from on-site directorates, program and project offices, and center staff offices.

Two volunteers represent each organization, a prime and an alternate. The goal is to provide a forum for employees to resolve safety and health concerns and to inspire, mentor and facilitate widespread active participation in JSC's safety and health programs.

Last year at JSC, 70 incidents resulted in lost work days. To kick off their efforts, team members looked at the types of close calls and incidents that have occurred on site and focused their attention on those areas that seemed to be the biggest problem. Slips, trips, and falls are among the biggest contributors to on-site incidents, so the team established a sub-committee to review these incidents and propose recommendations to reduce them.

Every year a substantial number of close call reports involve crosswalks — a continuing problem on site. The team is trying to take an innovative approach to help reduce the problem through a combination of education and improved enforcement. The team is scheduled to complete this review by the end of January. Be on the look out for some fun things which will be done to increase awareness in this area.

In addition, the JSAT has signed up to be Centerwide Champions for the JSC VPP effort. You may have seen members of the JSAT at the annual security refresher briefing during which they provided a short orientation on VPP and what it will mean to JSC employees. The JSAT is available to all organizations to assist with preparation for the OSHA on-site review. For example, the team can

provide information, conduct briefings and carry out mock interviews. In addition, team members are working on evaluating a recent increase in electrical incidents on site, a proposal for having CPR-certified responders on site, and the availability of first aid kits on site.

If you would like to know more about the JSAT, contact the chairman, Julie Kramer, an engineer in the Structures and

Mechanics Division, or the deputy, Donna Shafer, an attorney in the Legal Office. A listing of the entire JSAT membership is on the Safety & Total Health home page under "Forums."

The JSAT conducts biweekly open meetings. If you have a safety or health concern you would like your peers to take a look at, contact one of the team members. ■



JSC Photo S98-20468

JSC Safety Action Team members are, from left, front: Jack Leavell, Julie Huerta, Vickie Kloeris, Vanessa Bowen, Jo Ann Reilly, Polly Aucoin, Ethel Reed, Delores Marshall, Donna Shafer, Leon Blum, Marie Havican; middle: Henry Wyndon, Cindy Coker, Kathryn Packard, Jessie Hendrick, Mary Alice Pruessner, Pat Dickson, Rachel Windham, Tanya Bryant, Bob Hall; back: Tim Delong, Abel Garza, Jerry Wagstaff, Jennifer Jones, Capt. John Hoge, Bob Gaffney, Chuck Barbour, Jovan-Justine Love, Eric McMichael, Mary McLain, Missy Bryant, Richard Aucoin.

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 7 4

The Space Shuttle Program is committed to the development and successful repeated flights of a complex combination of systems. These systems require the use of similarly complicated avionics systems, subsystems and components. To provide proper test and evaluation of these systems, the Shuttle Avionics Integration Laboratory is currently being established at JSC.

The SAIL will provide a central facility where avionics and related hardware (or simulation of this hardware), flight software, flight procedures and associated ground equipment can be fully integrated.

1 9 8 9

Preparations are in high gear at Kennedy Space Center to roll *Discovery* over to the Vehicle Assembly Building for mating with the rest of the STS-29 shuttle components, a move that may occur Jan. 19.

Discovery is scheduled for launch no earlier than Feb. 23, according to internal working targets. The exact date won't be released until after the Flight Readiness Review scheduled for Feb. 8-9.

1 9 9 4

Four years and five space walks after it was first put into orbit, the Hubble Space Telescope is now fully operational and capable of producing images "as perfect as engineering can achieve and as the laws of physics will allow."

NASA Administrator Daniel S. Goldin, backed by Dr. John H. Gibbons, assistant to the President for science and technology, and Sen. Barbara A. Mikulski, D-Md., chair of the VA, HUD and Independent Agencies appropriations subcommittee, last week declared the STS-60 mission to service the Hubble Space Telescope successful in correcting the vision of the telescope's optical components.

The announcement, accompanied by the first new images from HST, followed the initial five weeks of engineering check-out, optical alignment and instrument calibration.

What would you say if...?

By Mary Peterson

Forget that mother told you never to talk to strangers. You could be approached by one soon, and we all hope you will have the right answers. With just a little effort, you will.

What would you say if you were asked, "Do you receive regular safety and health training?" "If so, how often?" "What are the center's safety rules?" "What happens if an employee disobeys a safety rule?" "What are you supposed to do in an emergency?" "Can you tell me what the safety and health policy is at this worksite?"

These are just some examples of the types of questions that could come your way when OSHA visits JSC as part of the approval process for attaining the OSHA Voluntary Protection Program Star status. And, in keeping with our space industry tradition of being the best, Star status is VPP's best. That's what we're shooting for.

"We're proud of our safety and health efforts," says Rich Dinkel, deputy director of the Safety Reliability and Quality Assurance Office and VPP coordinator, "but these are 'living' programs and, as such, are always subject to change and improvement. For VPP, we are essentially in the mode of fine-tuning the level of excellence we have already established." This means, in large part, being sure the workforce is educated to the expectations of the VPP Program.

Most JSC workers are well aware of VPP, and some directorates have already made great strides in drawing their employees into "thinking VPP." Suddenly, such things as glitter VPP stickers, VPP magnets, VPP 19-elements cards, and video pens with safety slogans and emergency numbers are popping up on desks like mushrooms after rain, as unified thinking and team spirit begin to merge toward the goal of Star status.

A good example is the Life Sciences Directorate. Rachel Windham and Mary Petrovics are a formidable team when it comes to putting things into action, and much of the credit goes to them for the strong program they have been developing.

"We bring up VPP at just about every meeting of any kind," said Petrovics, "and

the 'tutorials' can range from five minutes to a twenty-minute presentation. We've put out a brochure on our emergency action plan and have also given everyone a copy of the VPP information booklet." And, she said, "we try to make learning fun and rewarding." This includes a "passport" activity where an employee must accomplish 35 tasks, which can range from giving a brief safety presentation to organizing a VPP meeting, and any number of things in between. The supervisor signs off on tasks done, and a substantial award is made when the passport is completely filled.

"We've also instituted a 'good housekeeping' program," continued Petrovics. "We do a housekeeping survey regularly, and if the office passes muster, it is identified with a 'VPP & JSC Good Housekeeping' award." "In fact," she laughed, "it has almost become a status symbol. Several people have asked when and how they can get one." No one, it seems, wants to fall short.

Life Sciences is just one of several directorates that have taken up VPP training with flair and creativity, and the results are evident in the high response they get when random questions are asked. When the OSHA on-site review is done, it is hoped everyone will be as well prepared.

A lot of imagination has gone into the planning of upcoming VPP events, even to the point of designing them around a mission theme. The employee planning team has decided that the dry run (a pre-OSHA visit self-evaluation) will be equated to a flight readiness review; the opening ceremony will be the launch; the OSHA on-site review will be the mission; and the closing conference provided by OSHA will be the landing.

When does it all happen? According to Dinkel, "We have submitted the applica-

tion for Star status to OSHA, and the rules of the game are that OSHA can follow up and visit at any time. So, we don't know exactly when they will show up. Right now, we are waiting for an OSHA response." Although the date isn't known, best guesses are that it will be soon, so no time should be wasted in

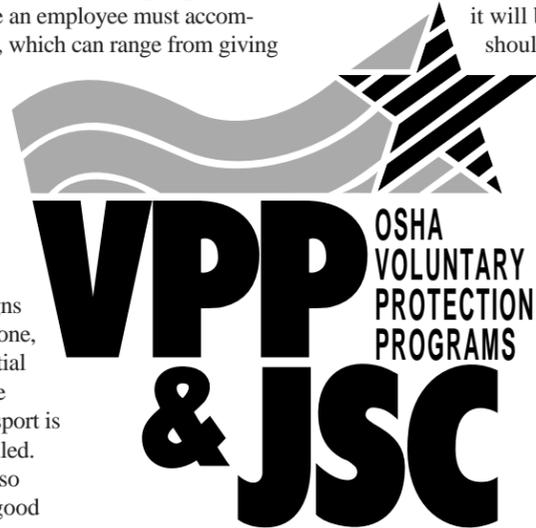
preparation and making sure that all employees are familiar with the VPP goals, objectives, the 19 elements, and their own safety and health programs.

"The point can't be emphasized enough," said Dinkel, "that the VPP incentive is truly the product of employee ownership. Everyone can

have a say, and we encourage this. It is not management's program. It's the employees' program. And that's why it works so well. If everyone does a little, as their way of routinely doing business, nobody has to do a lot."

In keeping with Dinkel's words, Center Director George Abbey, one of safety and health's most outspoken advocates, said, "Our most important resource at JSC is you. We have worked hard to keep our astronauts safe, and we've come a long way in ensuring their safety. But, it is equally important that we keep our employees, who are here on the ground, safe and healthy as well. For this reason, I strongly desire that JSC participate in the OSHA Voluntary Protection Program, and I think we can set the proper example by doing that. Considering the depth and breadth of our operations, it is a tremendous task, but nonetheless, very achievable. Winning Star status will go a long way toward proving JSC's merits as a safe, healthful, and caring environment in which to work."

Think VPP. Just keep in mind what you would say if... ■



World of discovery awaits future engineers

Next month, JSC will celebrate eight years of observing National Engineers Week when some 185 civil service and contractor employees visit elementary and middle school classrooms to encourage students to pursue careers in engineering, science, math and technology as part of a national outreach program called Discover "E" ("E" for engineering). For the first time astronauts will visit local area high schools to discuss engineering careers. JSC will celebrate National Engineers Week the entire month of February.

The volunteers will share their unique space-related expertise and experience with students and teachers as part of JSC's commitment to the local educational community. They will provide close to 350 classroom presentations.

"The goal in my presentations is to stimulate the students to imagine themselves as engineers," said JSC employee Wallace Tuthill. "That's the real challenge since too many students I have met have low or no expectations for their future. They seem to have trouble imagining that they will be reaping the bounty of their efforts today in the near future. I try to let them see my career history as a real life

success story that has been fun, interesting and rewarding in many ways, a life that they could live also."

Tuthill and the other volunteers are expected to interact with about 15,000 students at more than 100 schools in 20 school districts in the local educational community.

"I always make sure that I am enthusiastic about what I am discussing and I do my best to use terminology that the students understand," said Steve Rickman, deputy chief, Thermal Branch. "I hope that I can convey the excitement of the space program. I show them I am proud of what I do."

Retired JSC employee Norman Chaffee offers some additional tips to the volunteers. "I always take some promotional items from the Public Affairs Office library. The bookmarks that list the Internet sites are great, as are the small space shuttle triangular decals. A crew picture from the last flight or for the upcoming flight also works well."

Many volunteers use props as points of departure for their presentations. "A great prop I use frequently is the poster of an astronaut in a space-walking suit with the backpack," added Chaffee. "The poster

may be used as a point of departure to talk about several topics including the space environment and why we need a space suit, the features and systems of the suit and the backpack, and the astronaut's ability to do things in the suit."

JSC employee Rodney Rocha offers some pedagogical advice to the volunteers. "Make an agreement with the teacher in advance as to how your presentation will be conducted, especially handling questions and student-volunteers. Sometimes the teachers want to be in charge, screening all the questions as to their appropriateness or controlling classroom etiquette. But I prefer to build an easy-going atmosphere with the kids. I allow almost any question to be asked, even those unrelated to my talk. In addition, it's very helpful to repeat the question aloud."

National Engineers Week is an annual event to increase public awareness and appreciation of engineers and their work. For more details, visit the National Engineers Week Web site at <http://www4.jsc.nasa.gov/projects/eweek/moreinfo.htm> or contact Mae Mangieri at x32929. ■



JSC, Institute for Research develop new drug delivery system

In the future, microcapsules injected directly into human tissue may be the drug delivery system of choice to treat cancer and other diseases.

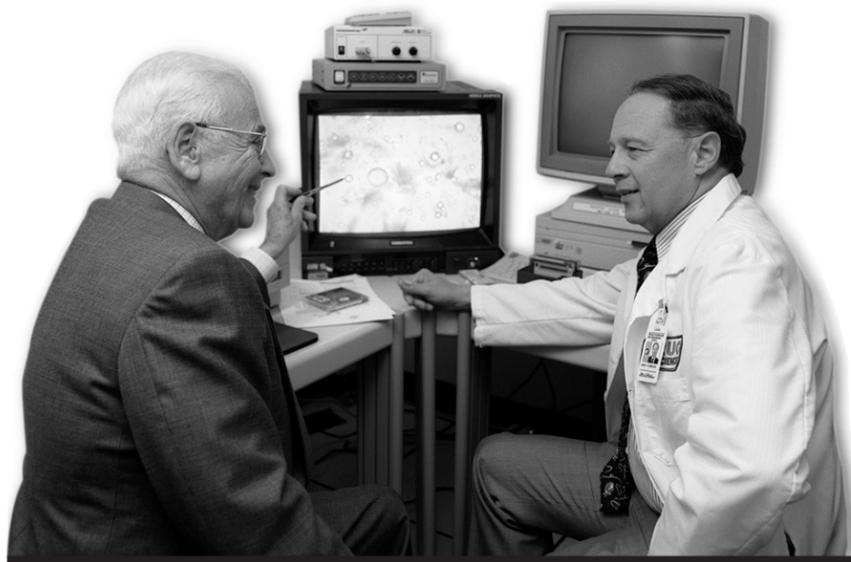
NASA and the Institute for Research, Inc., based in Houston, have jointly developed and co-patented a new drug delivery system that enables various drugs to be encapsulated for injection directly into tissue. This new technology, recently on display during Inspection 98, presents many opportunities for collaboration with pharmaceutical companies to develop new drug delivery systems for selected medical therapies, including chemotherapy.

The focus of the research by Dr. Dennis Morrison, principal researcher for JSC, and Dr. Benjamin Mosier, president of the Institute for Research, Inc., has been on making tiny microcapsules, slightly larger than white blood cells and similar to miniature water balloons, that can be injected into an artery leading into a large, solid tumor. Because they are too large to pass through the arterial bed, the microcapsules lodge there, creating an artificial clot or emboli that constricts the blood supply to the tumor. Diffusion causes the drug to leak through the outer skin of the capsule, creating a sustained release of anti-cancer drug directly inside the tumor. A tumor about one inch in diameter or larger may be treated effectively using this technique.

With this technology, cancer patients do not have to endure the debilitating side effects of having the anti-cancer drug circulating throughout their entire body. Moreover, because the tumor is treated directly, between one one-hundredth and one five-hundredth the normal systemic dose of medication is required. The surgeon does not have to insert a catheter into the artery to carry out the procedure, but now very small catheters may be very carefully maneuvered into arteries to enter specific portions of major organs.

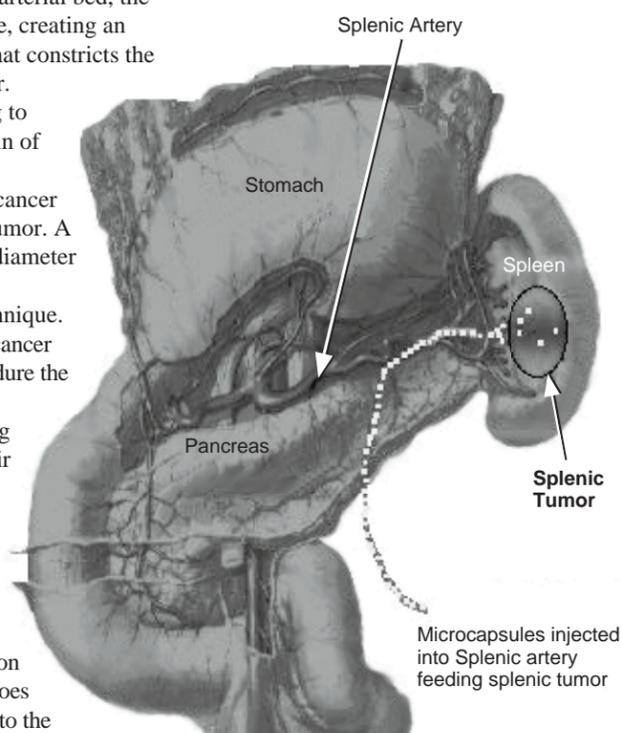
The microcapsules are made from liquids that differ significantly in density. As a result, the fluids tend to form two or three layers when blended together on Earth, with the densest material accumulating on the bottom and the least dense rising to the top.

For this reason, researchers have used the weightless environment of space to make these capsules. Microencapsulation experiments have been flown on nine shuttle flights including STS-95. Not only anti-cancer drugs but also a clot-dissolving enzyme, an antibiotic and an anti-nausea



JSC photo S98-20313 by Benny Benavides

Dr. Benjamin Mosier, president of the Institute for Research, Inc., left, and Dr. Dennis Morrison, principal researcher for the Johnson Space Center, examine an image of microcapsules produced during the STS-95 mission.



drug have been encapsulated in space.

In space, surface tension becomes the predominant physical force, which makes liquids try to become spherical. The formulas for the liquids have been optimized so that they make spherical capsules. Then a polymer skin forms on the outside of each sphere as a thin membrane, thus making the miniature water balloon.

An additional step in the process allows the capsules to be detected in the body after injection. Adding as little as five to 10 percent of a radio-contrast oil inside the capsules allows physicians to locate them with a CT radio scan to confirm that they are in the tumor and not in healthy tissue.

If CT scans show that the microcapsules have somehow found their way into healthy tissue instead of into the tumor, another technique co-invented by Morrison and Mosier allows physicians to remove the microcapsules lodged in the arteries. In the presence of a magnetic field that does not harm the body, such as a magnetic resonance imaging scan, little ceramic-magnetic particles embedded inside of the capsules are designed to heat up to a temperature just slightly warmer than that of the outer skin around the capsules. The particles melt a tiny hole in the microcapsule, causing it to deflate and dump its contents. The contents and the empty microcapsules pass through the capillaries, and the anti-cancer drug is diluted as it enters the bloodstream.

This technique involving a "burst release" of encapsulated drugs using a magnetic field may have many applications, according to Morrison and Mosier.

"This technology opens up the possibility that for other kinds of drug delivery systems, we can have a burst release of drugs after the microcapsules have been injected, and we can control that procedure by magnetic fields normally used for diagnostic imaging," said Morrison.

As happens on the ground, the little magnetic particles, when mixed, tend to settle away from the interface between

the liquids where the microcapsules are being formed. So research in microgravity is being used for many purposes: to show what kinds of microcapsules can be made, to improve the encapsulation process so that they can be made with not only one drug but with multiple drugs and with a radio contrast oil, and to determine how much of each element (the drug and the radio contrast oil) needs to be included to optimize effectiveness and to allow physicians to find out if the capsules are properly distributed throughout the target tissue. Lastly, microgravity is helping researchers study how to make more uniform capsules and how to make them in larger quantities on Earth.

"In space, control of the fluid processing is a lot easier," said Morrison. "Research done in space helps us determine the fluid flows and the chemical composition of the different liquids to help us develop the best microcapsules. It provides a tool to help us develop and scale up the technology to make the optimum microcapsules here on Earth."

The planned use of the new microcapsules is similar to another therapeutic method called Transcatheter Embolization (TCE), which also delivers the same drug and radio contrast oil

directly into the tumor. In TCE, the mixture of drug and oil is injected into the artery leading to the tumor, followed by an injection of Gelfoam particles. These particles then swell to block the blood vessels in and around the tumor so that the treatment does not prematurely "wash out" of the tumor.

Using this technique has improved the one-year survival rate of patients with inoperable liver tumors from 18 percent to between 55 and 69 percent.

"The advantage of the TCE technique is that it provides a way to keep the drug in the tumor longer," said

Mosier. "The disadvantage is that it is difficult to control how much drug is washed through before the Gelfoam particles actually plug the arterial flow. We believe that we have a better way of doing the embolization with our microcapsules because they form the artificial emboli and they carry the drug inside."

NASA has patented this technology. The patent was issued on Oct. 27, the same day that the Microencapsulation Electrostatic Processing System, a new apparatus used to process encapsulated drugs, was loaded into the SPACEHAB for its first flight test. Payload Specialists John Glenn and Chiaki Mukai and Mission Specialist Pedro Duque operated the microencapsulation experiments during STS-95.

Mosier has exclusively licensed the technology back and is now attempting to forge alliances with drug companies to begin product development to take it to market. Three to five years will be needed to obtain approval from the Food and Drug Administration, depending upon requirements for clinical use of this new drug delivery system. ■



PEOPLE *on the* MOVE

Human Resources reports the following personnel changes as of December 11, 1998:

Key Management Assignments

Elric McHenry was named manager, Space Shuttle Program Upgrades, Space Shuttle Program Office.

Pete Beauregard was named assistant to the chief, Space Flight Training Division, Mission Operations Directorate.

Bill Arceneaux was selected as manager, Integrated Test and Verification Office, Vehicle Office, International Space Station Program.

Dennis Beckman was selected as chief, Avionics Training Branch, Mission Operations Directorate.

Promotions

Karla Smith was selected as a transportation specialist in the Center Operations Directorate.

Aggie Williams was selected as a transportation specialist in the Center Operations Directorate.

Kim Brennan was selected as a financial management specialist in the Office of the Chief Financial Officer.

Reassignments Between Organizations

John Arnold moves from the Information Systems Directorate to the Office of the Chief Information Officer.

Phil West moves from the Engineering Directorate to the Public Affairs Office.

Katherine Autry moves from the International Space Station Program to the Business Management Directorate.

Jan Cox moves from the Space and Life Sciences Directorate to the Engineering Directorate.

Michelle Rucker moves from the White Sands Test Facility to the Engineering Directorate.

Wanda Hoblely moves from the Office of the Chief Information Officer to the Information Systems Directorate.

Pat Watson moves from the International Space Station Program Office to the Space Shuttle Program Office.

Tim Johnson moves from the Business Management Directorate to the International Space Station Program Office.

Rich Ellenberger moves from the Engineering Directorate to the Space and Life Sciences Directorate.

Jim Nise moves from the International Space Station Program Office to the Space Operations Management Office.

Tim Brady moves from the Engineering Directorate to the EVA Project Office.

Reassignments Between Centers

Joseph Madden of the Mission Operations Directorate moves to Kennedy Space Center.

Retirements

Larry Bourgeois of the Space Operations Management Office.

Resignations

Christi Garcia of the Mission Operations Directorate.

Loretta McDonald of the Mission Operations Directorate.

Karen Schmidt of the Center Operations Directorate.

NASA BRIEFS

NASA, CENTRAL AMERICAN NATIONS SIGN PACT

NASA and the Central American Commission on the Environment and Development will use existing satellite data to develop land-use maps of Central America. NASA Administrator Daniel S. Goldin and the President of the Central American Commission on the Environment and Development, and Minister of Environment and Natural Resources of El Salvador, Miguel Eduardo Araujo Padilla, signed a Memorandum of Understanding at NASA Headquarters December 10, establishing cooperation between the commission and NASA in support of the Mesoamerican Biological Corridor.

NASA SELECTS FUTURE-X FLIGHT DEMONSTRATOR

NASA has selected The Boeing Company, Downey, Calif., for negotiations leading to possible award of a four-year cooperative agreement to develop the first in a continuous series of advanced technology flight demonstrators called "Future-X."

Total value of the cooperative agreement, including NASA and Boeing contributions, is estimated at \$150 million, with an approximate 50/50 sharing arrangement. Work under the cooperative agreement will begin immediately depending on successful negotiations.

SOLAR WIND SQUEEZES SOME OF EARTH'S ATMOSPHERE

Researchers using NASA's Polar spacecraft have found the first direct evidence that bursts of energy from the Sun can cause oxygen and other gases to gush from Earth's upper atmosphere into space. Scientists first saw this effect September 24-25, 1998, when a storm from the Sun smacked into the Earth. Using particle detectors on Polar, they found that the flow of "polar wind" out of Earth's upper atmosphere increased substantially when the storm hit. In effect, pressure from the solar ejection squeezed gas out of the ionosphere.

Scientists have known since the early 1980s that Earth's upper atmosphere leaks oxygen, helium, and hydrogen ions (atoms that have gained or lost an electron) into space from regions near the poles. But it was not until the Polar spacecraft flew through this fountain of ionized gas in September 1998 that scientists confirmed that the flow of ions was caused by solar activity.

DATES & DATA

January 8

Astronomers meet: The JSC Astronomical Society will meet at 7:30 p.m. Jan. 8 at the Center for Advanced Space Studies, 3600 Bay Area Blvd. For details, call Chuck Shaw at x35416.

January 12

Aero club meets: The Bay Area Aero Club will meet at 7 p.m. Jan. 12 at the Houston Gulf Airport clubhouse at 2750 FM 1266 in League City. For details, call Larry Hendrickson at x32050.

NPMA meets: The National Property Management Association will meet at 5 p.m. Jan. 12 at Robinette and Doyle Caterers, 216 Kirby in Seabrook. Dinner costs \$14. For more information, call Sina Hawsey at x36582.

January 13

Spaceland Toastmasters meet: The Spaceland Toastmasters will meet at 7 a.m. Jan. 13, 20 and 27 at the House of Prayer Lutheran Church. For details, call George Salazar at x30162.

Communicators meet: The Clear Lake Communicators, a Toastmasters club, will meet at 11:30 a.m. Jan. 13, 20 and 27 at Lockheed Martin, 555 Forge River Rd. For more information, call Allen Prescott at 282-3281 or Mark Caronna at 282-4306.

Spaceteam Toastmasters meet: The Spaceteam Toastmasters will meet at 11:30 a.m. Jan. 13, 20 and 27 at United Space Alliance, 600 Gemini. For details, call Patricia Blackwell at (281) 282-4302 or Brian Collins at x35190.

IAAP meets: The Clear Lake/NASA Chapter of the International Association of Administrative Professionals (previously Professional Secretaries International) will meet at 5:30 p.m. Jan. 13 at Bay Oaks Country Club. Cost is \$16. For details, call Elaine Kemp at x30556.

January 14

SSQ meets: The Society for Software Quality will meet at 5:30 p.m. Jan. 14 at the Holiday Inn. For more information, call Earl Lee at 282-4331 or Herb Babineaux at x34263.

MAES meets: The Society of Mexican-American Engineers and Scientists will meet at 11:30 a.m. Jan. 14 in Bldg. 16, Rm. 111. For details, call George Salazar at x30162.

Airplane club meets: The MSC Radio Control Airplane Club will meet at 7:30 p.m. Jan. 14 at the Clear Lake Park pavilion. For more information, call Bill Langdoc at x35970.

January 19

NCMA meets: The National Contract Management Association will hold its annual conference Jan. 19-20. For details, contact Christine Mack at x31244 or Mara Savely at 286-5751.

January 20

Scuba club meets: The Lunarfans will meet at 7:30 p.m. Jan. 20 at Pot Pie Pizzeria at Watergate Marina. For details, call Mike Manering at x32618.

January 21

Directors meet: The Space Family Education board of directors will meet at 11:30 a.m. Jan. 21 in Bldg. 45, Rm. 712D. For details on this open meeting, call Gretchen Thomas at x37664.

January 25

Alzheimer's support group meets: The Clear Lake Alzheimer's Caregiver Support Group will meet 7:30 p.m. to 9 p.m. Jan. 25 in the first floor conference room in St. John Hospital, West building, in Nassau Bay. For more information, call Nancy Malley (480-8917) or John Gouveia (280-8517).

January 28

Radio Club meets: The JSC Amateur Radio Club will meet at 6:30 p.m. Jan. 28 at the Piccadilly, 2465 Bay Area Blvd. For details, call Larry Dietrich at x39198.



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