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SPACE CENTER Roundup

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NASA spacesuit accepted for use in Russian Hydrolab Facility *Successful outcome opens door for additional crew training in Russia*

History was made last May when a manned Extravehicular Mobility Unit spacesuit was tested for the first time in the Hydrolab Facility at the Gagarin Cosmonaut Training Center in Star City, Russia.

The objective of the test was to integrate two EMUs into the facility to support ISS procedural development and future crew training. The test proved that the Russian facility systems could interface with the EMU and that the Hydrolab could support human pressurized testing with two suits in the water. The successful outcome has opened the door for U.S. spacesuit ISS training capabilities in Star City.

As a result of the successful test, U.S. engineering test subjects, Russian test subjects, and U.S. flight crews are now able to operate in the EMU at the GCTC. The first of three sets of training for the crew of STS-101, ISS assembly flight 2A.2 scheduled for this December, began this month using the EMU in the Hydrolab Facility.

The Neutral Buoyancy Lab at JSC's Sonny Carter Training Facility currently does not have a mockup of the ISS Service Module, while the Hydrolab does. Since the scheduled space walks for the 2A.2 crew will be conducted in the EMU with the Service Module, a way had to be found to train the crew in the American suits in the Hydrolab.

The test concluded a two-year effort between

Russian and American specialists, with the former explaining their facility and its systems, what its interfaces are, how proper levels of environmental control and safety could be maintained, and what was the best method to integrate the EMU into the Hydrolab.

The integration team led by Hamilton Sundstrand (Hamilton Standard and the Sundstrand Corporation recently merged) included members from NASA, HSMS, Wyle, ILC, Hernandez Engineering, Johnson Engineering, TTI and GCTC. Vincent Witt, a senior project engineer with Hamilton Sundstrand, was the team lead for the test.

"The team conducted a variety of activities over the course of several months prior to the final test last May," said Witt. "These activities not only tested the suit and support equipment, but also tested the suit processing proficiencies of the GCTC people based on the training that our U.S. engineers had provided them on the EMU. We wanted to ensure

the Russians had been trained properly to deal with nominal and emergency operations of the EMU in the Hydrolab."

Processing the EMU is more involved than the Russian Orlan spacesuit because it is one piece, unlike the EMU, which has many pieces. The Russians do not process their suit. Instead, they simply resize their suit to fit the test subject prior to each suited event. U.S. suit engineers had to teach them how to process, size and check out the EMU. Hardware to perform this task had to be supplied, and the Russians had to build a place to store the equipment.

Another aspect of the readiness to support EMU training was that safety divers from the NBL had to ensure that the Russian divers were qualified to work with the EMU. U.S. dive trainers ensured that the Russian divers knew how to perform nominal and emergency operations with the suit.

Testing of the EMU in the Hydrolab began last March. Initially, an unmanned 1-G test was conducted. The EMU was

attached to support equipment to check the suit and ensure that everything worked properly. This was followed by multiple unmanned water tests using a weighted mannequin. Unmanned water tests with a mannequin are conducted on a regular basis at the NBL to check out the suit, NBL, and support equipment. Next, a single, one suit, 1-G manned operation, with the test subject standing by the pool, was performed. The suit was pressurized to different levels to test the Environmental Control System (ECS) and human interaction. Then a test was performed on the pool deck to test the ECS and loads placed upon it with two people, as would nominally be the situation for crew training.

In May, the unmanned and the manned 1-G tests were repeated. An earlier test, an unmanned water test with a weighted mannequin, was also repeated. A final readiness review cleared the way for the first manned EMU test in the water.

Marquis Gibbs, a diver at the NBL, was the first U.S. spacesuit subject. He was placed into the suit and lowered into the water. The reaction of the Russian ECS was tested to see how it would react with a person in the suit in the water performing regular activities.

"When the message came that I was selected to support EMU

Please see **NASA SPACESUIT**, Page 2



Cousteau explores new environment.

Page 2



Watch out for construction above.

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Book Review: Fly Me to the Moon.

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McMonigal receives Flight Safety Award

Fred Gregory, NASA associate administrator for Safety and Mission Assurance, presented NASA's prestigious Flight Safety Award to JSC employee Kathleen A. McMonigal, M.D., of the Space and Life Sciences Directorate. The presentation was made on May 27 at Kennedy Space Center during the Space Flight Awareness Program reception held in conjunction with the STS-96 launch.

Dr. McMonigal received the award for her outstanding contribution to crew health by identifying a potentially significant long-term health issue that could affect flight crewmembers and test subjects who were consuming iodine-treated potable water during space missions and long-duration tests. After noting abnormal thyroid function tests among members of a test group, she promptly conducted a review of published scientific literature, contacted noted authorities on the relationship between iodine ingestion and thyroid disease, and worked to monitor iodine levels in flight crews. Based on her findings, the iodine level of potable water consumed by flight crewmembers and test subjects was immediately reduced to acceptable levels, thereby protecting them from possible permanent thyroid gland injury.



JSC employee Dr. Kathleen McMonigal receives NASA's Flight Safety Award from NASA Associate Administrator for Safety and Mission Assurance Fred Gregory during the STS-96 Space Flight Awareness reception at Kennedy Space Center.

"I am extremely pleased to receive the Flight Safety Award," said McMonigal. She expressed her gratitude to management and to other members of the team who worked with her to solve the problem. Accompanying her to the launch

was her husband, Terrence Pattinson, M.D., who serves as research medical monitor at JSC.

Dr. McMonigal joined NASA two years ago as a diving medical officer for the Neutral Buoyancy Laboratory. She has served as crew surgeon for the 91-day Lunar Mars Life Support Test Project and is the lead physician for Bioplex.

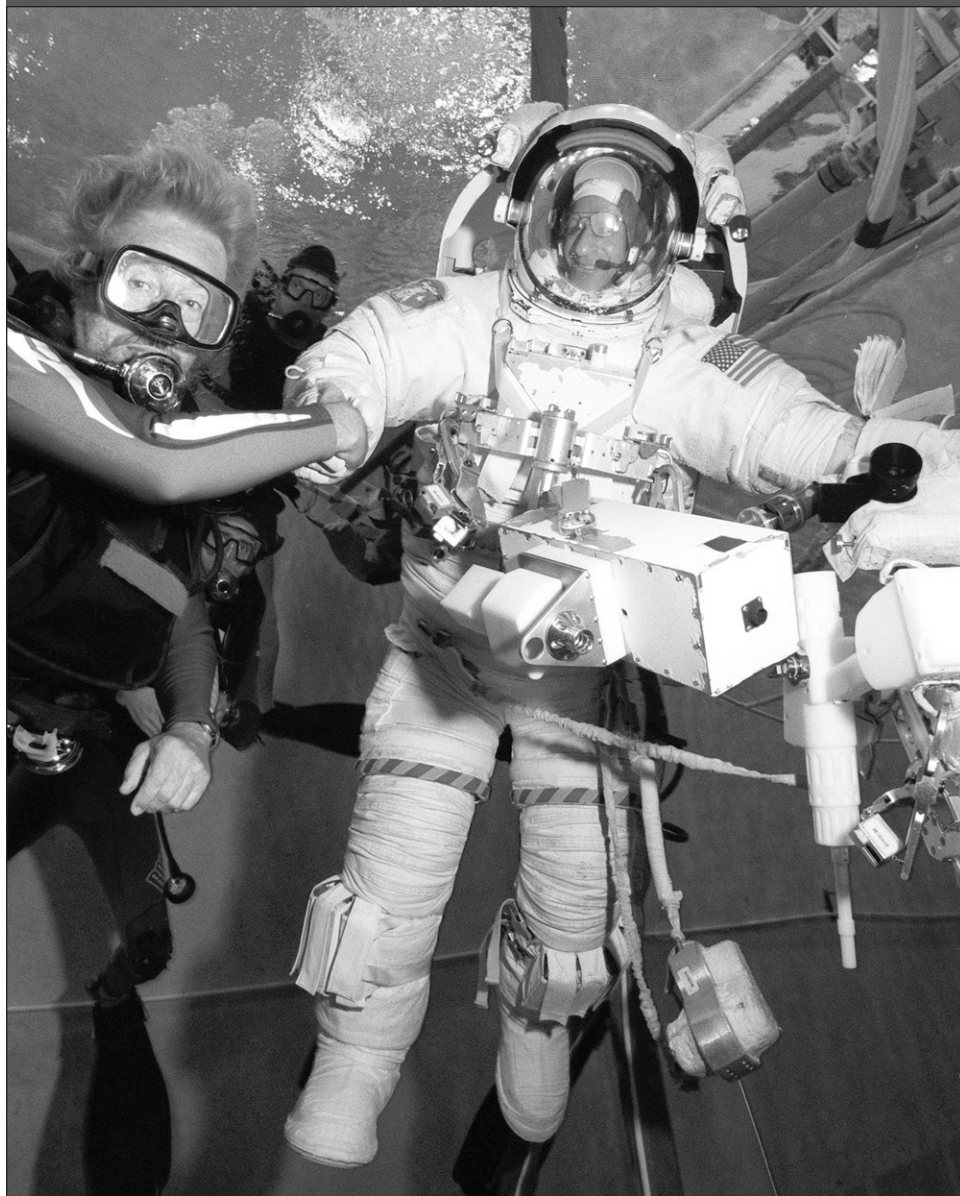
Dr. McMonigal earned her M.D. degree at the University of Minnesota where she also completed a residency in pathology and a fellowship in virology.

She practiced pathology for several years before coming to NASA.

The NASA Flight Safety Award, administered through NASA's Space Flight Awareness Program, recognizes extraordinary contributions to space flight safety that help avoid catastrophic mishaps which could threaten the spacecraft, crew

or mission. It emphasizes the importance of crew safety for all those involved with America's space flight program. ■

Cousteau: from deep sea to deep space



JSC Photo S99-05915

Jean-Michel Cousteau, son of famed underwater explorer Jacques Cousteau, ventured into a new underwater environment recently when he joined divers and astronauts at the Neutral Buoyancy Lab. Shown here with suited Astronaut Claude Nicollier, Cousteau, a legendary diver in his own right, observed Hubble Space Telescope training activities at the NBL.

Space Flight Awareness honorees attend STS-96 launch

Johnson Space Center was represented by 23 civil service and contractor Space Flight Awareness honorees at Kennedy Space Center's Banana Creek VIP Viewing Area to watch the beautiful early morning launch of STS-96. They were the proud recipients of NASA's very special SFA honoree award, given to a select few in recognition of their dedication

to quality work leading to flight safety and mission success.

JSC Space Flight Awareness honorees included Brian Mitchell, Flora Lowes, Tammy Long Gafka, Laura Bollweg, Stephanie Roy, Sylvia Buchta, Kathy Earl, Marla Duhon, Louis Nguyen, Lois Walker (SFA National Panel), Lester Sackett, John Norris, Tom Allen, Mike Donnelly, Bill

Morris, Larry Spector, Mark Eaton, Jonathan Zahn, Charles Gaevert, Sylvia Stottlemeyer (SFA National Panel), Robert Lewis, Brian Bihari, Jack Cervoni, Gil Carman, and John Clack.

The honorees also received a VIP tour of KSC and were guests of honor at a reception where NASA and contractor management, as well as numerous astronauts,

applauded their outstanding work and dedication to the space program. Astronaut Mark Kelly presented each honoree with a framed certificate and lapel pin at JSC's awards luncheon held during the event.

The next Space Flight Awareness honoree event will be held in conjunction with the launch of STS-99 currently scheduled for September 16. ■

Continued from Page 1

NASA spacesuit

integration into the Hydrolab I was ecstatic," said Gibbs.

"When I was told that I would be an alternate test subject I had mixed feelings of the extreme variety; I was honored and somewhat apprehensive. After the trip in March and being involved in training the Russian divers and seeing the level of professionalism and experience that they have with manned water testing, those feelings of apprehension seemed to drown.

"When it came time for manned testing, I had been upgraded to primary test subject. I had total confidence in the entire test team, and testing went off without a hitch. At the time I was only concerned with completing my responsibilities as a member of the team and it didn't really sink in that I would be the first person to ever be in an EMU in the Hydrolab. In retrospect, being a part of something as big as the ISS in that capacity gives me a feeling of accomplishment. If nothing else, my family is proud, and that is good enough for me."

Then another manned underwater test, this time with a Russian subject, Alexi

Altunin, was performed. Altunin is a member of the GCTC training test team, which qualifies him to perform procedural development activities. Again, the team tested how the systems functioned with the suit and tested everyone's proficiency. Then a dual suit run was conducted with Gibbs and Altunin serving as the subjects. Finally, a test using two Russians subjects, with the U.S. team acting as observers, was conducted. The test was a melding of how EMU operations are conducted in the NBL and how nominal EVA training is done in the Hydrolab. All of the tests were successful.

"At that point, we felt that we had successfully proven that the EMU will work safely with the Russian system," said Witt. "We are pleased that there are now no constraints to proceeding with training crews in the EMU in the Hydrolab."

The result of the task demonstrated common goals, a willingness and a desire to succeed, and a commitment to the assembly of the ISS. ■

Test participants

American spacesuit team

Vincent Witt	Integration Team Lead/HSMS
Scott Schoenherr	Hydrolab Operations Lead/NASA
Marc Ciupitu	GSE/Facility Engineer/HSMS
Stephen Anderson	EMU Suit Engineer/ILC
Jason Poffenberger	EMU Suit Engineer/ILC
Rolland Daley	EMU Suit Technician/ILC
Joseph Settles	EMU Suit Technician/ILC
Renny Hardwick	NBL/Environment Control Technician/JE
Ronnie Howard	NBL Safety Diver/JE
Brent Ferguson	NBL Safety Diver/JE
Marquis Gibbs	Test Subject/NBL Safety Diver/JE
Dominic Del Rosso	Test Subject/Hydrolab Operations Team/NASA
Todd Gauer	Test Safety Officer/HEI
Michael Duncan	Medical/Wyle
Matthew Mickle	Hydrolab Operations Team/Alternate Test Subject/HSMS

Russian spacesuit team

Nikolai Grekov	Hydrolab Manager
Victor Ren	EVA Training Manager
Oleg Pushkar	EVA Training Team Lead/Test Subject
Evgheny Irodov	Facility Manager
Alexi Altunin	EVA Training Team/Test Subject
Oleg Kishchenko	Orlan/EMU Suit Engineer
Oleg Ivanilov	GSE/Facility Lead
Oleg Brel	Orlan/EMU Suit Engineer
Gennady Tarasenkov	Medical

C o m m u n i t y N e w s

SHARP apprentices spending their summer at JSC are, from left, front: James Scott, Irene Chow, James Yelich; middle: Claudia Martinez, Guadalupe Rodriguez, Ezdehar Husein, Lam Nguyen; back: Rory Mallard, Grace Lee, Anjoli Avionn, William Cunningham, Stephen Jackson, Shelonda Hughes, Sarah Solis.

SHARP '99 students move toward a brighter future

By Cindy Manzano

The Summer High School Apprenticeship Research Program is well under way. Its 14 talented high school seniors are eager to ascertain all that NASA has to offer.

The program, now in its 19th year, is designed for students who have demonstrated an aptitude for and an interest in science and engineering careers. SHARP's main goal is to use NASA's inspiring mission, its unique facilities and its diverse and specialized workforce to provide enrichment experiences, and opportunities designed to expand students' career horizons and inspire excellence in formal education and lifelong learning. Carolyn Krumrey, a mentor for one of the SHARP apprentices, comments, "SHARP is a terrific way to allow students to gain work

experience in a technical area, while assisting NASA in performing our tasks for space flight. SHARP truly provides a step toward a brighter future for the students and NASA."

Each apprentice is assigned to a mentor in various branches throughout the center. Together the mentor and apprentice decide on a suitable project. The apprentice then spends the next eight weeks researching in a hands-on environment to prepare for his or her final technical presentation.

"We are actually working and contributing to the NASA space program," said apprentice Irene Chow, who is mentored by Eric Chan in the Crew and Thermal Systems Division. James Scott, who is working under Mark Hammerschmidt in the Guidance and Navigation, and Control Design and Analysis Branch, says,

"My mentor has done a great job at making me feel like I am actually making a difference and that my project truly matters." William Cunningham, who works in Crew and Thermal Systems Division and is mentored by Kevin Templin commented, "This program is so great because we have a chance to use what we learned in school."

Other SHARP apprentices include Anjoli Avionn in Crew and Thermal Systems Division; Shelonda Hughes, Grace Lee, Rory Mallard, Guadalupe Rodriguez and James Yelich in Manufacturing, Materials, and Process Technology Division; Ezdehar Husein in Energy Systems Division; Stephen Jackson in Automation, Robotics, and Simulation Division; Claudia Martinez in Biomedical Hardware Development and Engineering Office; Sarah Solis in the Systems Integration Office; and Lam Nguyen in the Aerospace and Flight Mechanics Division. ■

Volunteers to begin training sessions for Open House

Preparations continue as JSC runs toward the "Pathway to the Future" during its annual Open House from 9 a.m. to 5:30 p.m., Saturday, August 28.

To pull off this mammoth event, more than 250 volunteers will be needed. Training sessions have been scheduled for multiple times to ensure that everyone can attend. Training sessions will last approximately 1.5-2.0 hours. The following times have been established in the Bldg. 30 auditorium:

10 a.m. Friday, August 13
10 a.m. and 2 p.m. Monday, August 16
2 p.m. Tuesday, August 17
10 a.m. and 2 p.m. Wednesday, August 18
2 p.m. Thursday, August 19

Volunteers staff information booths, act as rovers, assist visitors with directions, staff the lost child center, or help keep the cafeterias clean during peak times. If you have not signed up, do it now. There is a special need for bilingual volunteers and individuals willing to work afternoon time slots.

The easiest way to sign up is by pointing your browser to <http://www4.jsc.nasa.gov/openhouse/Databases/> and selecting the time and position you would



like to work. For additional information contact one of the following volunteer coordinators: Jason Kruska at x36988, C.C. de la Garza at x31033 or Judith Stovall at x37735.

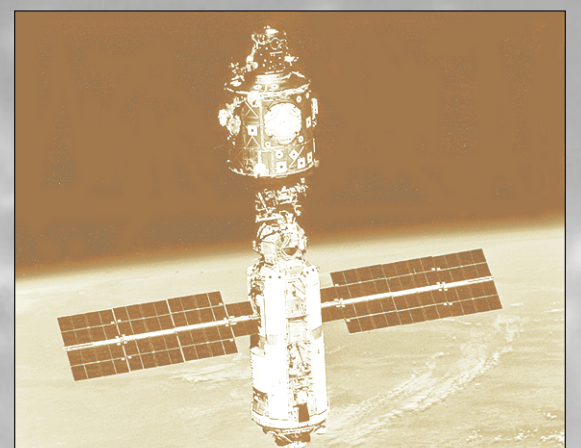
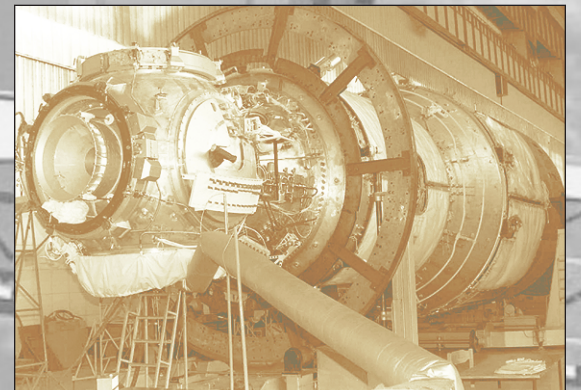
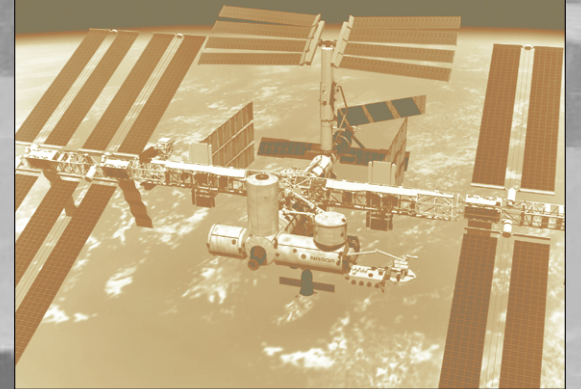
For additional information on this year's Open House event, visit the external Open House Web site at <http://openhouse.jsc.nasa.gov/> or call the information hotline at (281) 244-5312.

JSC Open House 1999 Photo Contest Rules

- Theme: Capture an image that best portrays the Johnson Space Center.
- The photo may be no larger than 8 in. by 10 in. and must be mounted on an 11 in. by 14 in. mount board. No framed images will be accepted. Images may be any shape, but must be mounted on the above-mentioned board.
- Photos may be black and white or color and may depict any subject best representing the Johnson Space Center. No electronically altered images accepted.
- Prizes will be awarded for First, Second, and Third Place and Best of Show. Prizes to be announced.
- Judges will be from the NASA Photo Lab, Graphics and management team.
- All photos received will be displayed at the Open House, August 28, in Bldg. 9. Winning photos will be featured in the *Roundup*.
- Photos must be received by noon August 13, at Bldg. 227, conference room.
- For more information contact Vicki Cantrell, Mail Code GP47, (281) 483-4047 or Mark Sowa, Mail Code GP45, (281) 483-2313. Judging will occur in August, prior to Open House.
- You may pick up your photo directly after the Open House festivities on August 31, Bldg. 227 by 2 p.m. Prizes may be picked up at that time with presentation of NASA-issued badge.
- Provide a permanently affixed label on the back of your photo mount with the following information: name, site, phone number, mail code. Do not bend or fold your photo. Provide a separate mount for each entry with a label attached to each.
- The contest is open to all JSC civil service and contractor employees including the Sonny Carter Training Facility and Ellington, and those employees located off-site who directly support operations at JSC. This contest is not open to family members of the referenced employees.
- The Open House Committee reserves the right to remove from competition any photo of a questionable nature as determined by the Open House Committee.

International Space Station Assembly Sequence:

Date	Flight	Launch Vehicle	Element
November 20, 1998	1A/R	Russian Proton	◆ Zarya Control Module
December 4, 1998	2A	<i>Endeavour</i> (STS-88)	◆ Unity Node ◆ Two Pressurized Mating Adapters attached to Unity
May 27, 1999	2A.1	<i>Discovery</i> (STS-96)	◆ Spacehab – Logistics Flight
November 1999	1R	Russian Proton	◆ Zvezda Service Module
December 1999	2A.2	<i>Atlantis</i> (STS-101)	◆ Spacehab – Logistics Flight
February 2000	3A	<i>Discovery</i> (STS-92)	◆ Integrated Truss Structure Z1 ◆ Pressurized Mating Adapter – 3 ◆ Ku-band Communications System ◆ Control Moment Gyros
March 2000	2R	Russian Soyuz	◆ Soyuz ◆ Expedition 1 Crew
March 2000	4A	<i>Endeavour</i> (STS-97)	◆ Integrated Truss Structure P6 ◆ Photovoltaic Module ◆ Radiators
April 2000	5A	<i>Atlantis</i> (STS-98)	◆ Destiny Laboratory Module
June 2000	5A.1	<i>Discovery</i> (STS-102)	◆ Leonardo Multi-Purpose Logistics Module carries equipment racks ◆ Logistics and resupply
July 2000	6A	<i>Endeavour</i> (STS-100)	◆ Raffaello Multi-Purpose Logistics Module ◆ Ultra High Frequency antenna ◆ Space Station Remote Manipulating System
August 2000	7A	<i>Atlantis</i> (STS-104)	◆ Joint Airlock ◆ High Pressure Gas Assembly
September 2000	4R	Russian Soyuz	◆ Docking Compartment 1 ◆ Strela Boom
November 2000	7A.1	<i>Endeavour</i> (STS-105)	◆ Donatello Multi-Purpose Logistics Module
January 2001	UF-1	<i>Atlantis</i> (STS-106)	◆ Multi-Purpose Logistics Module ◆ Photovoltaic Module batteries ◆ Spares Pallet (spares warehouse)
March 2001	8A	<i>Endeavour</i> (STS-108)	◆ Central Truss Segment ◆ Mobile Transporter
May 2001	UF-2	<i>Atlantis</i> (STS-109)	◆ Multi-Purpose Logistics Module with payload racks ◆ Mobile Base System
July 2001	9A	<i>Endeavour</i> (STS-111)	◆ First right-side truss segment with radiators ◆ Crew & Equipment Translation Aid Cart A
August 2001	11A	<i>Atlantis</i> (STS-112)	◆ First left-side truss segment ◆ Crew & Equipment Translation Aid Cart B
November 2001	9A.1	<i>Discovery</i> (STS-114)	◆ Russian-provided Science Power Platform with four solar arrays
January 2002	12A	<i>Atlantis</i> (STS-115)	◆ Second left-side truss segment ◆ Solar array and batteries
March 2002	12A.1	<i>Discovery</i> (STS-117)	◆ Third left-side truss segment ◆ Multi-Purpose Logistics Module
May 2002	13A	<i>Atlantis</i> (STS-118)	◆ Second right-side truss segment ◆ Solar array set and batteries (Photovoltaic Module)
June 2002	3R	Russian Proton	◆ Universal Docking Module
July 2002	5R	Russian Soyuz	◆ Docking Compartment 2
July 2002	10A	<i>Discovery</i> (STS-120)	◆ U.S. Node 2
August 2002	10A.1	<i>Atlantis</i> (STS-121)	◆ Propulsion Module

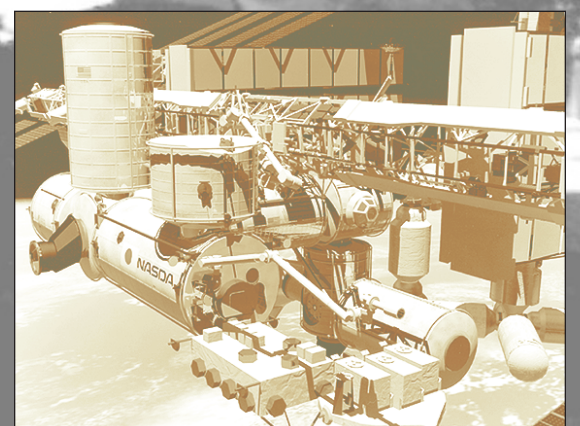
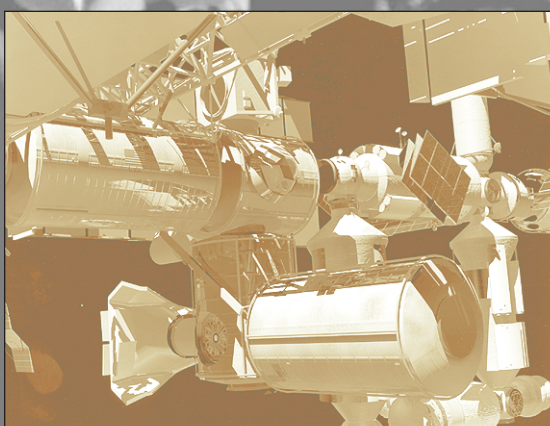


July 1999 Planning Reference

Date	Flight	Launch Vehicle	Element
October 2002	1J/A	<i>Endeavour</i> (STS-123)	<ul style="list-style-type: none"> ◆ Japanese Experiment Module Experiment Logistics Module ◆ Science Power Platform solar arrays with truss
January 2003	1J	<i>Discovery</i> (STS-124)	<ul style="list-style-type: none"> ◆ Kibo Japanese Experiment Module ◆ Japanese Remote Manipulator System
February 2003	UF-3	<i>Endeavour</i> (STS-125)	<ul style="list-style-type: none"> ◆ Multi-Purpose Logistics Module ◆ Express pallet
May 2003	UF-4	<i>Discovery</i> (STS-127)	<ul style="list-style-type: none"> ◆ Express Pallet ◆ Spacelab Pallet carrying “Canada Hand” (Special Purpose Dexterous Manipulator)
June 2003	2J/A	<i>Endeavour</i> (STS-128)	<ul style="list-style-type: none"> ◆ Japanese Experiment Module Exposed Facility ◆ Solar array batteries
July 2003	9R	Russian Proton	<ul style="list-style-type: none"> ◆ Docking and Stowage Module
August 2003	14A	<i>Discovery</i> (STS-130)	<ul style="list-style-type: none"> ◆ Cupola ◆ Science Power Platform solar arrays ◆ Zvezda Micrometeoroid and Orbital Debris shields
September 2003	UF-5	<i>Endeavour</i> (STS-131)	<ul style="list-style-type: none"> ◆ Multi-Purpose Logistics Module ◆ Express Pallet
January 2004	20A	<i>Atlantis</i> (STS-133)	<ul style="list-style-type: none"> ◆ U.S. Node 3
February 2004	1E	<i>Discovery</i> (STS-134)	<ul style="list-style-type: none"> ◆ European Laboratory – Columbus Attached Pressurized Module
March 2004	8R	Russian Soyuz	<ul style="list-style-type: none"> ◆ Research Module 1
March 2004	17A	<i>Endeavour</i> (STS-135)	<ul style="list-style-type: none"> ◆ Multi-Purpose Logistics Module ◆ Destiny racks
May 2004	18A	<i>Atlantis</i> (STS-136)	<ul style="list-style-type: none"> ◆ Crew Return Vehicle
June 2004	19A	<i>Discovery</i> (STS-137)	<ul style="list-style-type: none"> ◆ Multi-Purpose Logistics Module
July 2004	15A	<i>Endeavour</i> (STS-138)	<ul style="list-style-type: none"> ◆ Solar Arrays and Batteries (Photovoltaic Module S6)
August 2004	10R	Russian Soyuz	<ul style="list-style-type: none"> ◆ Research Module 2
August 2004	UF-7	<i>Atlantis</i> (STS-139)	<ul style="list-style-type: none"> ◆ Centrifuge Accommodation Module
September 2004	UF-6	<i>Discovery</i> (STS-140)	<ul style="list-style-type: none"> ◆ Multi-Purpose Logistics Module ◆ Batteries
November 2004	16A	<i>Endeavour</i> (STS-141)	<ul style="list-style-type: none"> ◆ Habitation Module

Notes: Additional Progress, Soyuz, H-II Transfer Vehicle and Automated Transfer Vehicle flights for cargo and crew transport, logistics and resupply are not listed.

Total assembly flights
37 space shuttle flights (2 completed)
9 Russian launches (1 completed)



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 9

We did it! "Tranquility Base here. The Eagle has landed," announced the flawless lunar landing of Apollo 11 at 3:18 p.m. on July 20, 1969.

And when Armstrong's heart rate rose to 156 at touchdown, there were similar reactions on Earth as pride, awe and humility struck the hearts of administrators, flight controllers, programmers, contractors and everyone who had played a part, however small, in the accomplishment.

Communications were good during the landing as Armstrong took over control of the Eagle during the final seconds and maneuvered it past a football field-sized crater filled with boulders to a smoother area at the Southern edge of landing site number two near the Sea of Tranquility.

1 9 7 4

Work on the new Integration and Mockup Laboratory, Building 9-A, is progressing and should be completed on schedule. Projected date is September 1974.

The walls are nearly all up on the building, which provides for an addition to the Technical Services Facility (Bldg. 9) of 30,500 square foot high bay mock-up area as well as a 8,300 square foot, two story connecting wing.

When completed, the facility will be used for systems integration and mockup studies of the various components of the space shuttle. Mockups of the orbiter cabin sections and payload bay will be housed in the building.

1 9 8 4

The signs on the Gulf Freeway say "Ellington Field" now, just as they once did on a less traveled road almost 70 years ago. Ellington Air Force Base is a thing of the past, and commercial and general aviation operations administered by the City of Houston are a thing of the future.

The City of Houston became the new owner on July 1, having recently acquired nearly 1,700 acres for general aviation operations. In addition, NASA is ready to start a thorough upgrading of JSC facilities there, first installed 22 years ago this summer.

Intergalactic space place for kids blasts off at Space Center Houston

StarTropolis... In a Galaxy Not So Far Away!

Are you ready for the new millennium? Do you have what it takes to play in the future? Space Center Houston's summer blockbuster attraction – StarTropolis: An Intergalactic Space Place for Kids...In a Galaxy Not So Far Away! – takes you on an incredible adventure into the next century.

Join "spaced out" guides Capt. Quark and Lt. Sharp as they take you on a spectacular, stimulating and fun journey through the world of StarTropolis. Wind your way through cool, rotating satellite dishes, tons of spacey neon, pulsating energy discs and far-out activities.

Drop your G's and gear up for space travel on several "rides," including the Multi-axis Gyro Tumbler that launches you in several different directions at once. Blast through the future in virtual reality like a rocket-propelled bumper car going 300 mph. Conduct your own futuristic experiments, or test your skills on the spinning satellite. There's so much to discover in the land of StarTropolis – it's a whole new galaxy of fun.

Cosmic Corridor and Deep Space Shaky Shack: Your journey into StarTropolis begins in the mysterious Cosmic Corridor, where you'll experience the confusion of zero gravity. Don't lose your balance as you explore the peculiar disorientation of space, with no sense of direction. What's up and what's down? Who knows inside the Deep Space Shaky Shack, where the bewilderment of zero gravity continues to mesmerize your mind and body.

Orbital Mayhem: Your training program continues, but only if you can accept the challenge. For crash courses in gravitational inertia, angular momentum and orbital mechanics, jump inside the Celestial Spinning Spot (don't have lunch first!), or take a ride on the Multi-axis Gyro Tumbler. How flexible are you? It's truly a test where you'll discover just how much you can handle in the extraordinary world of space.

There's more fun and thrills just ahead for kids of all ages, including the incredible Fling Thing, where you'll experience

velocity like never before. You and five other space comrades will quickly feel the G-forces pull you as you attempt to pitch a meteorite to your partner. Next, you can grab a seat and check out the Flyin' Flusher, StarTropolis' exclusive levitating lavatory of the future. Hold on and get an "up close" look at this space-age bathroom.

favorite food will be blasting off into the 21st century with us. Come see the world premiere of the millennium McDonald's® restaurant – Galactic Mac, only inside StarTropolis. You can also have your picture taken at the Galactic Mac with the "space age" Ronald McDonald.

After you finish your training, relax



JSC Photo S99-06461

Kids enjoy testing their flexibility on an attraction called the "Multi-axis Gyro Tumbler" at Space Center Houston's new summer exhibit, StarTropolis.

Then, try not to get "sucked in" at the Suction Section, where you can conduct your millennium experiment while discovering the engaging atmosphere of space.

Just when you think you're fully trained for the millennium, jump inside and strap yourself in for the ride of your life in the ultimate virtual reality marathon – Space Race – where you'll fly a futuristic hovercraft through the winding canals of a mysterious planet on this high-speed race against seven other pilots. Your mission: blast past your opponents through sliding doors, twisting tunnels and endless obstacles. It's the supreme test for the world's best space-craft pilots.

Your futuristic experience wouldn't be complete without taking the wildest trip of your life on the Millennium Mania ride. This awesome ride experience takes you beyond reality on an incredible trek via a full-motion simulator. Exhilarating graphics and precision movement make for an expedition that's sure to blast you off into another world.

Remember that everything will change in the next century, but America's

and enjoy live presentations at Startropo-DROPolis, the largest free-fall tower you'll ever see – where you'll become an expert on microgravity in the coming millennium. ■

To find out more about StarTropolis and Space Center Houston, call (281) 244-2100.

Space Center Houston extends its appreciation to Phil West in the Public Affairs Office for contributing his talents to the exhibit. West, who plays Lt. Sharp, is featured in the interactive videos throughout the exhibit. The NASA media services staff and Astronaut Bjarni Tryggvason also contributed their time and knowledge to the project.

TICKET WINDOW

Exchange Store hours

Monday-Friday

Bldg. 3 7 a.m.-4 p.m.

Bldg. 11 9 a.m.-3 p.m.

All tickets are nonrefundable.

Metro tokens and value cards are available.

For 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
Fiesta Texas	.....adult	\$18.25
	.....(child under 48")	\$15.50
Astroworld One-day Admission	.....	\$21.00
Astroworld Season Pass	.....	\$54.75
(valid at all Texas Six Flags Theme Parks and Water World)		
Water World	.....	\$10.75
Moody Gardens (2 of 6 events)	.....	\$10.75
Sea World	.....adult	\$27.25
	.....child (age 3-11)	\$18.25
Schlitterbahn Water Park	.....adult	\$20.75
	.....child (age 3-11)	\$17.50
Space Center Houston	.....adult	\$10.25
	.....child (age 4-11)	\$6.50
(JSC civil service employees free.)		
Space Center Houston Annual Pass	.....	\$18.75
Splash Town Water Park	.....adult	\$14.50 (child 48" and under)
	.....	\$11.50

Houston Comets tickets now available for August 6 and August 18. Limited quantities.

Houston Astros tickets now available for August 13 and September 12. Limited quantities.

Apollo 11 Family Picnic and Reunion, 4:30 p.m. - 7 p.m., July 22. Tickets on sale until July 19.

ROUNDUP

Frosch, Yardley cover
new space technology
in STS development



Looking back at Apollo 11: *reunion set for July 22*

'That's one small step for a man, one giant leap for mankind'

Those monumental words, first spoken by Neil Armstrong at 9:56 p.m. CDT July 20, 1969, are now legend and a keystone of America's space history. To commemorate the 30th anniversary of the first lunar landing, JSC and Boeing will host an Apollo 11 Family Picnic and Reunion from 4:30 - 8 p.m. July 22 at the Gilruth Center.

Tickets purchased in advance include a barbecue plate, beer, wine, soft drinks, and snacks. Free hot dogs will be

available for children age 12 and under. Food will be served from 4:30 - 6:30 p.m. In addition, special Apollo 30th anniversary buttons will be available at the picnic while supplies last.

Exhibits and artifacts from the Apollo Program will be on display throughout the buildings at the Gilruth complex during the event. Items that will be on display



include a one-third scale Lunar Module, the spacecraft that flew humans to the lunar surface; a lunar surface antenna; the Mobile Equipment Transporter, which allowed astronauts to carry tools around on the lunar surface; lunar surface maps; and assorted magazines and newspaper headlines announcing the landing. ■

Book Review

New book explores growing up with the Mercury generation

During Bryan Ethier's childhood, his favorite teachers weren't math, social studies, or science instructors; they were journalists Walter Cronkite and Jules Bergman. And his favorite heroes were the men whose lives they reported: the seven Mercury astronauts-Alan Shepard, Gus Grissom, John Glenn, Deke Slayton, Scott Carpenter, Wally Schirra, and Gordon Cooper.

Ethier's book, *Fly Me to the Moon: Lost in Space with the Mercury Generation* (McGregor), recounts the tales, thoughts, and dreams of his generation, merging quotes from the astronauts with autobiographical experience. What results for the reader is a journey back in time to the beginnings of this nation's human space flight program through the eyes and the imagination of a space buff whose life, like those of his fellow Mercury generation compatriots, was shaped by those early attempts to fly in space and the men who made them.

As he says, to fully experience Mercury, Ethier and those of his generation had to be Mercury. Ethier recounts the story when, as a youngster, he transformed a turkey baster into his own *Freedom 7* capsule and how he imaginatively transformed the back seat of his father's Ford Fairlane 500 into his own "individually-molded Mercury couch." During the Apollo era, he built his own Apollo command module facsimile "armed with a relatively useless ball pen hammer, a handful of splintered two-by-fours, and a bag chock-full of broken knobs, dials, and switches."

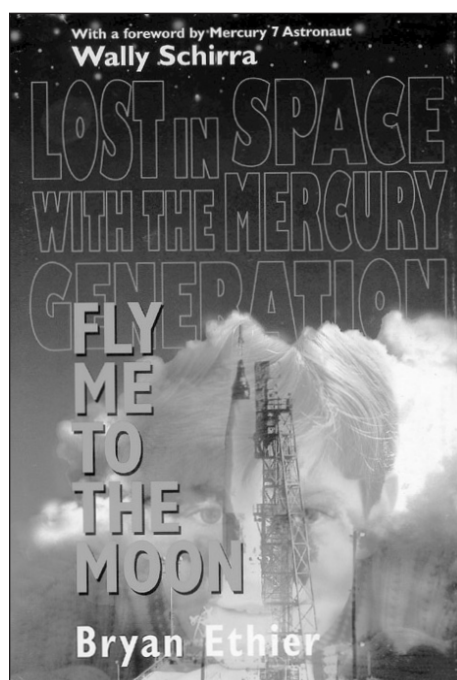
Beyond inspiring Ethier and his fellow members of the Mercury generation to build makeshift space modules and fly model rockets, the space program had a more pervasive impact on the development of their lives. Beginning with Mercury, the space program inspired them to dream, to be courageous, to understand that with "perseverance, effort, study and faith," they could achieve their goals. The space program taught them that they could be forever young and imaginative. As Ethier writes, "Those of us in the Mercury Generation know... that when we need to really connect with the Original Seven, all we have to do is look inside our hearts, and we will return to a time when we all were wide-eyed boys and girls wondering about worlds beyond our own."

The chapter titled "Heroes" recounts the launch of the world's first artificial satellite, *Sputnik 1*, on October 4, 1957, the establishment of the National Aeronautics and Space Administration in 1958, and the subsequent race between America and Russia to land a man on the moon. Ethier recounts the voyage of Russian cosmonaut Yuri Gagarin in April 1961, a flight that catapulted the Soviets ahead in their fight to dominant space exploration. Flights by Shepard, Grissom, and Gherman Titov followed.

Glenn followed these voyages with his own historic flight, a mission that Ethier retells, complete with the suspense of

whether or not the powerful Atlas rocket would function properly and whether *Friendship 7's* heat shield would hold. Sprinkled in throughout these stories of mankind's early voyages into space are the reflections on what they meant to those of Ethier's Mercury generation, including those of journalist Scott Pelley.

The chapter titled "Liftoff" relates Ethier's reflections on the first launch that he witnessed, that of *Columbia* on STS-1 in April 1981. What united that time with the earlier Mercury era was a need for heroes to make the nation feel good about itself. What that launch did for Ethier and his fellow University of Rhode Island classmates, it did for all of those in rapt attention at Cape Canaveral and across the nation: it united them together behind a common goal.



For Pelley, a shuttle launch is like the "birth of a child." Ethier relates how, on October 9, 1997, he had the chance to test this theory when his son, Adam, was born. Following the long, painful experience of his wife, Debbie, giving birth, Ethier notes that Pelley's hypothesis is correct. And just as a shuttle launch drives disparate people together and unites them behind a singular cause, so too does childbirth unite previously unrelated parents, doctors, and nurses for a common purpose.

Ethier structures each narrative about the effect of space flight on different people by beginning with an event from the recent past and then going further back in time to fill in the background. "Suite: Judy Blue Eyes" begins with singer/songwriter Jeannie Cunningham seeing Astronaut Judy Resnik on TV during the STS-41-D mission flown in 1984. The experience gave Cunningham a hero and, more importantly, the impetus to kick her cocaine habit.

The adopted daughter of a Marine officer and an abusive, alcoholic mother, Cunningham grew up with her brother Caleb, who had also been adopted. Ethier recounts her descent into the world of music and drugs and her eventual recovery. Today, astronauts

and music comprise her life, and she has her own recording studio-Resnik One.

Ethier also includes the stories of David Crosby of the band Crosby, Stills, Nash, and Young and former radio talk show host Dayna Justiz Steele-their associations with the worlds of music and space exploration. Through her association with Crosby and Astronaut Bonnie Dunbar, Steele was introduced to space exploration and to her husband, NASA research pilot Charlie Justiz. Justiz has been a research pilot for more than 15 years, instructing the astronauts on reentry and landing procedures.

These reflections lead again to the theme of how space flight unites people as Ethier recounts how, since the flight of Apollo VIII in December 1968, the residents of Timber Cove, Texas, not far from JSC, where Dayna and Charlie Justiz live, light luminarias-small votive candles-at 7 p.m. every Christmas Eve. Intended to enhance the festive appearance of the neighborhood, it was merely coincidental that the tradition began with the flight of Apollo VIII; nonetheless, most citizens of El Lago and Timber Cove still associate luminarias with spacebound neighbors.

Pelley, astronauts Mark Lee, Jay Apt and Steve Smith and Air Force Captain Rick Chiavetta, NASA Jet Propulsion Laboratory launch controller of the recent *Cassini* mission, all have common interests - space exploration and model rocketry. Ethier discusses these interests and how they have kept these and other men "forever little boys." Their "little boy spirit," born out of the Mercury era, has seen them through personal tragedies and has engendered them to incite that same spirit, that love of space flight, in the hearts and minds of their children and other youngsters.

Pelley, Associated Press journalist Howard Benedict, NBC reporter Jay Barbree, CBS journalist Walter Cronkite - they all wanted to be the first journalist to fly in space. None of them made it. In July 1986, NASA put an end to the Journalist in Space Program.

These were Ethier's teachers, the reporters who brought the space program into America's living rooms. As with his life, their lives became Project Mercury, Gemini, Apollo, Apollo-Soyuz, and Skylab. As passionate as he, it was difficult for them to report objectively on the space pioneers of the day, to "separate the objective reporter from the thrilled human being." Nonetheless they reported accurately, even sometimes critically, of the historic events they were all privileged to cover.

The book concludes with the author's reflections on the death of Shepard, an event that reminds Ethier of his mortality. This discussion leads to a final note, a chord that is struck throughout the book: the contrast between the immensity of space and the smallness of man and between the power and the immortality of God versus the humanness and the mortality of human beings. ■

Faces in the crowd

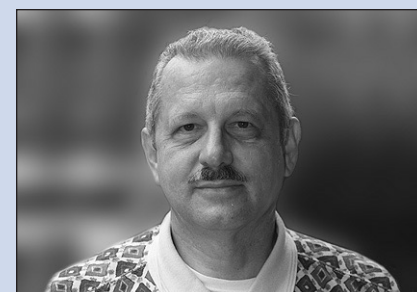
Where were you for the first lunar landing?



S99-05995

Richard Gavin
NASA, Branch Chief of Orbit Dynamics

I was 10 years old when it landed. I remember sitting in the living room taking pictures of the TV during the landing. Unfortunately none of the pictures came out, so I had a lot of pictures of a blank TV. But it was pretty cool watching it land.



S99-05993

Charles Nagay
GHG, Senior Engineer

I was in graduate school at the time of the first lunar landing and I watched it at home with my wife. I felt accomplishment and pride because we had finally accomplished our goal. That landing is what brought me to Houston in 1977 to work in the space program.



S99-05997

Benny Benavides
Dyncorp, Photographer

I was on the USS Hornet in the Pacific Ocean at the time. I was a staff photographer and flew aboard one of the four helicopters during the crew recovery. We didn't have TVs on board the ship, but we heard the landing by radio - so it was still an exciting moment.



S99-05996

Shirley Smith
NASA, Contract Specialist

I was in Florida working for the Department of Health & Human Services. I watched in astonishment as it was happening. I didn't think it could be done. When I relocated to this area, I sought out a job with NASA so that I could be a part of the space program.

JSC Photos by James Blair

DATES & DATA

July 17

Fun Run: The 21st Annual Lunar Rendezvous Run will take place at 8 a.m. July 17 at the Gilruth Center. Walkers and runners are welcome to participate in the 5k event. Interested parties should pick up registration forms at the Gilruth Center. For more information call Leonard Topolski at (281) 648-9042 or Willie Vanderbrink at (281) 470-6715, or email spacerun99@juno.com.

July 21

Astronomy seminar: The JSC Astronomy Seminar Club will meet at noon July 21 and 28 and August 4 and 11 in Bldg. 31, Rm. 248A. For details, call Al Jackson at x35037.

Communicators meet: The Clear Lake Communicators, a Toastmasters club, will meet at 11:30 a.m. July 21 and 28 and August 4 and 11 at Freeman Library, 16602 Diana Lane. For more information, call Allen Prescott at (281) 282-3281 or Mark Caronna at (281) 282-4306.

Scuba club meets: The Lunar fins will meet at 7:30 p.m. July 21 and August 18. For additional information, call Mike Manering at x32618.

Spaceland Toastmasters meet: The Spaceland Toastmasters will meet at 7 a.m. July 21 and 28 and August 4 and 11 at the House of Prayer Lutheran Church. For more information, call George Salazar at x30162.

Spaceteam Toastmasters meet: The Spaceteam Toastmasters will meet at 11:30 a.m. July 21 and 28 and August 4 and 11 at the United Space Alliance, 600 Gemini. For more information, call Patricia Blackwell at (281) 280-6863.

July 22

The Theatre of Seabrook will present an original adaptation of Maurice Sendak's Caldecott Award-winning "Where the Wild Things Are" as its third annual summer children's production. The play will be presented at 7 p.m. July 22, 23, 30 and 31 and at 2:30 p.m. Aug. 1. TOS presents its

productions in the Seabrook Community House located at First and Anders. Standard ticket prices are \$7 for adults and \$5 for children; however *Roundup* readers may present this notice and pay \$5 for adults and \$4 for children. For further information on this or any Theatre of Seabrook production, call Lynn Adams (281) 480-2549, Peter Kinser (281) 474-3185 or the theatre box office (281) 474-7552.

July 26

Alzheimer's support group meets: The Clear Lake Alzheimer's Caregiver Support Group will meet at 7:30 p.m. to 9 p.m. July 26 in the first floor conference room, St. John Hospital West building, Nassau Bay. For more information, contact Nancy Malley at (281) 480-8917 or John Gouveia (281) 280-8517.

July 29

Radio Club meets: The JSC Amateur Radio Club will meet at 6:30 p.m. July 29 and August 26 at the Piccadilly, 2465 Bay Area Blvd. For details, call Larry Dietrich at x39198.

August 5

Warning System Test: The site-wide Employee Warning System will perform its monthly audio test at noon August 5. For more information, call Bob Gaffney at x34249.

August 10

Aero Club Meets: The Bay Area Aero Club will meet at 7 p.m. August 10 at the Houston Gulf Airport clubhouse at 2750 FM 1266 in League City. For more information call Larry Hendrickson at x32050.

NPMA meets: The National Property Management Association will meet at 5 p.m. August 10 at Robinette and Doyle Caterers, 216 Kirby in Seabrook. Dinner costs \$14. For more information call Sina Hawsey at x36582.

NASA BRIEFS

NASA SELECTS KEY SPACE FLIGHT MANAGERS

NASA Associate Administrator for Space Flight Joseph Rothenberg recently announced several management changes in the Office of Space Flight at NASA Headquarters, Washington, DC.

William Readdy, former Director for Space Shuttle Requirements, has been appointed Deputy Associate Administrator for the Office of Space Flight. His primary duty will be to handle the day-to-day management of personnel and program activities.

Michael Hawes, formerly NASA's chief engineer for the space station, has been named Deputy Associate Administrator for Space Development (Space Station). Hawes' primary duties will include directing the space station budget, establishing and implementing station policy, coordinating external communications and serving as liaison to the Administration, Congress, industry and NASA's international partners.

Norm Starkey has been named Director for Space Shuttle Requirements. His primary duties will include directing the space Shuttle budget, establishing and implementing shuttle policy, coordinating external communications and serving as liaison to the Administration, Congress, industry and NASA's international partners. Starkey returns to the Office of Space Flight after serving as the Executive Director for the Aerospace Safety Advisory Panel since August 1996.

DESIGN ERRORS CAUSE WIRE SPACECRAFT FAILURE

NASA's Wide-Field Infrared Explorer (WIRE) failed because of an incorrectly designed electronics box that prematurely fired explosive devices, causing early ejection of the instrument's telescope cover, a NASA board has found.

The WIRE Mishap Investigation Board found that the design of the instrument's electronics box did not take into account subtle, but known, start-up characteristics of one component within the box.

The WIRE spacecraft is now in a stable orbit with its other systems and electronics in good working order. Ground controllers will proceed with tests on new flight-control technology aboard the spacecraft.

LUNAR PROSPECTOR TO MAKE A BIG SPLASH

The mission of NASA's Lunar Prospector will end on July 31, 1999, when ground controllers attempt to direct the spacecraft to impact the surface of the moon inside a permanently shadowed crater near the lunar south pole.

Scientists hope that the direct impact into a lunar crater will liberate up to 40 pounds of water vapor that may be detectable from ground- and space-based observatories. A positive detection of water vapor or its by-product, OH, would provide definitive proof of what some scientists have long suspected - the presence of water ice in the lunar polar regions.

Lunar Prospector was launched with a one-year primary and six-month extended mission to explore the lunar surface remotely. More information about Lunar Prospector can be obtained at the project Web site at <http://lunar.arc.nasa.gov>.

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 (281) 483-3345.

Sign up policy: All classes and athletic activities are on a first-come, first-served basis. Sign up in person at the Gilruth Center and show a yellow Gilruth or weight room badge. Classes tend to fill up two weeks in advance. Payment must be made in full, in exact change or by check, at the time of registration. No registration will be taken by telephone. For more information, call x33345.

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

Nutrition intervention program: Six-week program includes lectures, a private consultation with the dietitian and blood analysis to chart your progress. Program is open to all employees, contractors and spouses. For additional information call Tammie Shaw at x32980.

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

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

Weight safety: Required course for employees wishing to use the Gilruth weight room. Pre-registration is required.

Cost is \$5. Annual weight room use fee is \$90. The cost for additional family members is \$50.

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

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

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. For additional information call Darrell Matula, instructor, at x38520.

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 additional information call Larry Wier at x30301.

<http://www4.jsc.nasa.gov/ah/exceaa/Gilruth/Gilruth.htm>

SPACE CENTER **Roundup**

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