

Space News Roundup

Vol. 21 No. 14

July 14, 1982

National Aeronautics and Space Administration

Welcome to operations

July 4th spectacular marks end of orbital flight tests

It was, to say the least, an unusual confluence of events:

A used spaceship with over 7 million miles on the airframe lands on schedule for the first time on concrete, exactly on the center line, after being launched seven days earlier following a freak hailstorm at the pad only hours prior to liftoff. This completely "nominal" landing occurs on the 206th birthday of the United States and is attended by the nation's chief executive and first lady.

A second production spaceship has in the meantime been delivered under deadline and as advertised, with all of its 30,000 thermal protection tiles in place and densified, ready for spaceflight. It bears a new graphics scheme, carries new equipment, and is wholly a craft of the operational era which the day's events inaugurate.

After taking a cue from the President, the 747 which carries the new orbiter takes off from a runway in the high California desert, and with the timing of a maestro circles the field and flies by in review precisely as the huge crowd concludes a rendition of "God Bless America."

The confluence of people, hardware and events is such that photographers are able to capture an Orbiter returning from space and another one awaiting takeoff from

the ground in the same frame. It was the kind of scenario one would expect only in fiction, much less in real life.

But with flags whipping in the breeze at Edwards Air Force Base and waving from the hands of guests in the viewing room overlooking Mission Control in Houston, it was an unlikely series of events which actually occurred as NASA took the giant leap from testing to operations.

The day's events signified, in the words of Ronald Reagan, "the historical equivalent to the driving of the golden spike which completed the first transcontinental railroad. It marks our entrance into a new era. The test flights are over, the groundwork has been laid..."

Beyond that, the events of July 4, 1982 capped the end of what Entry Team Flight Director Harold Draughon called "one of the cleanest flights yet." Of some 63 vehicle tests scheduled for STS-4, 58 were accomplished by touchdown for a 92 percent success rate in that category alone. Other milestones and preliminary results of STS-4 included:

- A successful resurrection of the first Get Away Special payload just as some observers were writing it off altogether. The hot wire procedures which turned the experiment cannister on three days

into the flight brought all elements of the NASA troubleshooting team to bear, and elicited this thank you message to the STS-4 crew from the Utah State University students who designed and helped build the payload: "That's one small switch for NASA, one giant turn on for us."

- The first grappling of the desk-sized Induced Environment Contamination Monitor (IECM) and near complete success in all of its planned tests. Detailed results from the IECM operations are expected in about 30 days.

- A quantitative increase in data from the Night Optical Survey of Lightning, which first flew on STS-2. Experimenters won't know for several days how conclusive the data is or to what extent their expectations were fulfilled.

- First separation of two different proteins with the same electrical charge in orbit through the use of one of the seven different types of electrophoretic processes in the Continuous Flow Electrophoresis System. The separation of the two proteins, alumin, or substances derived from egg whites, proved the concept and paves the way for further operations of CFES, a joint endeavor of McDonnell Douglas and the Ortho Pharmaceuticals Corp.

- Completion of a number of vehicle tests, including different thermal attitudes, various reaction

control system firings and a first test of the robot arm during thruster firings. Flight Director Chuck Lewis said the arm responded to RCS firings with "considerable dynamics," rocking back and forth and then damping out its own motion.

- Apparent success in training procedures and hardware modifications in the waste compartment system. "You might make note that the crew did not complain about the toilet in this flight," Lewis said during a press briefing, "and they promised they would if they had any problems."

- A grassroots demonstration of widespread interest in the Shuttle program. Amateur radio groups, including W5RRR at JSC, transmitted air-to-ground and mission commentary live to thousands, and the American Telephone and Telegraph Co. logged more than 1 million calls to its special 900 number which featured the same programming. In the last nine minutes of *Columbia's* flight, some 8,000 calls were placed to the number. The phone company generated over \$1.2 million from the service.

For all the successful operations, however, there were some failures and disappointments. Chief among these was the still unexplained loss of the two solid

rocket boosters in the Atlantic Ocean. An investigative panel has been formed to study the failed recovery. Also disappointing to scientists was the apparent failure of the Monodisperse Latex Reactor which had worked so well on STS-3. NASA also had to wrestle with the quick fix of some 400 tiles in the few hours between a freak hailstorm at the pad June 26 and launch June 27. The attitude of *Columbia* was altered somewhat on orbit to allow the sun to bake cut any water which may have seeped into tiles on the bottom of the Orbiter. That attitude in turn is thought to have caused a noticeable warpage in the airframe, causing the payload bay doors to warp as well. Flight controllers responded by placing the Orbiter in a thermal control attitude, a slow wing-over rotation sometimes known as the barbeque mode. This straightened out the doors and the problem was characterized as being similar to one which was seen on STS-3, a known commodity in other words.

In summing up the mission, Lewis said, "We expanded our data base tremendously on STS-4. We are still learning how to use our vehicle and that'll never stop. After we land, we might change the oil, we'll change the crews and go again. It's a used vehicle, but before you ask, it's not for sale."

Ash from El Chichon analyzed here

Tiny particles of volcanic ash in the atmosphere which have contributed to some spectacular sunrises and sunsets over much of the United States in recent months have been collected by NASA aircraft and currently are being studied in laboratories at the Johnson Space Center.

The ash particles, about the same size as human red blood cells, resulted from the powerful volcanic eruptions of the El Chichon volcano in Mexico on March 28 and April 4 of this year.

Scientists are interested in studying material such as volcanic

ash which reaches altitudes sufficiently high to circulate worldwide and possibly affect the climate.

Samples from the El Chichon volcano were collected by NASA-Department of Energy high altitude aircraft using collectors specially designed to gather cosmic dust from the upper atmosphere. NASA scientists have conducted preliminary examinations on the material and the particles are now housed in the Planetary Materials Curatorial Facility at JSC.

The samples were examined with both optical and electron

microscopes. The ash particles are uniformly sized about two to four ten-thousandths of an inch, or about one-tenth the diameter of a human hair. They are mostly fragments of volcanic glass and crystals and should be of interest both to geologists studying the volcano and scientists studying the possible effects of volcanic clouds on the Earth's weather.

The El Chichon eruption provided NASA with the first opportunity to use its cosmic dust collecting equipment for other purposes. Since May 1981, JSC

scientists have conducted a program in which jet aircraft flying through the stratosphere deploy specially designed collectors to sample extraterrestrial dust as it settles from space toward the Earth's surface.

Because the Earth's troposphere, the weather zone below about 7 miles (12 kilometers), typically contains so many particles of man made origin, sampling cosmic dust is performed in the relatively clean stratosphere at altitudes of about 11 to 12 miles (18-20 kilometers).

Most volcanic eruptions eject material only into the troposphere, but especially powerful ones like the El Chichon event can send plumes of ash well into the stratosphere. NASA flight crews estimated that the material from El Chichon reached as far up as 13 miles (21 kilometers) and extended as far north as the U.S.-Canadian border.

Studies on the dust are being conducted by JSC scientists Dr. Uel Clanton and Jim Gooding, both associate curators of cosmic dust, and Dr. David McKay, geologist.

Spaceweek observance begins Friday

Spaceweek, an event which began in Houston in 1979, is now gearing up for the largest nationwide observance of the U.S. space program ever, and as might be expected, Houston will set the pace for activities among some 40 cities celebrating during July 16-24.

Many of the events in Houston will take place at or near JSC, according to Spaceweek officials, with at least one activity scheduled on-site each day of the week. The events include noon lectures, a model rocket launch, a banquet, a film night and a star party.

Both Texas Gov. William P. Clements Jr. and Houston Mayor Kathy Whitmire have signed proclamations officially endorsing Spaceweek and encouraging citizens of the state and city to attend events in their areas.

Elsewhere in the nation, astro-

nauts from JSC will speak in Detroit, Chicago, and St. Louis, Deputy Administrator Hans Mark will speak in Los Angeles, Florida and South Carolina will hold statewide events, and a Spaceweek exhibit will be featured in the U.S. Pavilion at the World's Fair in Knoxville. The governors of each state already have or are expected to issue proclamations in support of Spaceweek as well, according to National Spaceweek President Dennis Stone, who works for Ford Aerospace in Houston.

The events for Spaceweek-Houston kick off the night of July 15 at the Gilruth Center, and are listed below in a day-by-day breakdown:

Thursday, July 15: "Careers in Space," a multi-media guide to future prospects for extraterrestrial employment, presented by *Omni* Magazine and the Delta-Vee

pro-space organization, has its national premiere at JSC's Gilruth Center at 7 p.m. Stan Kent, founder of the privately-endowed Viking Fund, hosts the show on its tour around the country during Spaceweek. The presentation is free and open to the public.

Friday, July 16: Spaceweek officially begins with an Aerospace '82 Exposition at the JSC Bld. 2 Visitor Center, open from 9 a.m. to 4 p.m. each day of the week. Exhibits by the AIAA, Lockheed, Boeing, Rockwell, Hamilton/Standard, Singer-Link and others will be on view throughout the building. Free and open to the public.

• A children's space art display continues throughout July at the Houston Central Public Library at 500 McKinney across from City Hall. An awards presentation featuring former Astronaut Alan Bean was held July 8. This

"celebration of youthful creativity" is free and open to the public.

• A "Space Sciences Adventure," a workshop sponsored by the Texas A & M Gifted and Talented Institute will showcase the talents of gifted students from around the state as they engage in a model aircraft fly-off, with planes they have built under "contract" specifications for potential buyers, the judges. A debriefing conducted by Astronaut Dick Scobee will follow the fly-off. Events begin at 1:30 p.m. in the main auditorium at Texas A & M's Galveston campus on Pelican Island.

• Observatory tours and planetarium shows with a special slant towards Spaceweek begin today and run each day of the week during the afternoons and evenings at Burke Baker Planetarium, located at 1 Hermann

Circle Drive in Houston. Tours are held at 1 p.m., 2 p.m. and 3 p.m., free and open to the public. "To Worlds Unknown" a multi-media presentation, runs at 2 p.m. and 3 p.m., with special showings Friday, Saturday and Sunday at 8 p.m. Admission for the show only is \$1 for children and \$2 for adults.

Saturday, July 17: The Spaceweek '82 Aerospace Exposition continues at the JSC Visitor Center from 9 a.m. to 4 p.m. Tours and shows continue at the Burke Baker Planetarium at 1 p.m., 2 p.m., 3 p.m. and 8 p.m.

Sunday, July 18: The JSC Model Rocket Club will conduct a launch and craftsmanship contest from 1 p.m. to 4 p.m. in the rocket park at JSC. An area will be roped off west of the Saturn V display and rocket club members will safe and supervise rocket launchings. The public is invited to come with

(Continued on page 4)

Space News Briefs

Boeing studies flight deck simplifications

The Boeing Aerospace Co. is looking for ways to help astronauts master the more than 1,800 toggle switches, pushbuttons, rotary switches, circuit breakers and other controls needed to fly a Space Shuttle. With 100 times the controls and displays found in an average car and about three times the number of those on board the Apollo command modules, Space Shuttle Orbiter flight decks are the most complex ever developed for an aerodynamic vehicle. Under a \$150,000 contract with JSC, Boeing is studying ways to simplify this complex assortment. The method under study would replace individual switches with multifunction displays and controls where flight crews would need to push only one button to operate several different systems. A computer would automatically change the switch according to the function it is about to perform. The Boeing study is divided into five phases, and will culminate in the delivery of a breadboard mockup of the selected multifunction system.

NASA and Canada sign satellite pact

NASA Telesat Canada, the operator of the Canadian domestic telecommunications satellite system, signed an agreement in late June for the launching of five satellites in this decade. The five ANIK satellites will be the backbone of Canada's satellite communications system into the 1990s. The third and fourth generation ANIK C and D satellites will carry new pay TV and other broadcasting services, as well as point-to-point voice, video and data links, private business networks and a host of other specialized services. Four satellites will be launched from the Space Shuttle, and the fifth will be carried aloft by a Delta rocket. The first of the D series will be launched on a Delta from Kennedy Space Center in August. The first Shuttle launch of an ANIK C will come during STS-5 in November.

S.P.A.C.E. Foundation formed in Houston

The Foundation for Scientific Progress and Continual Exploration, S.P.A.C.E., was formed last month with the goal of helping finance a manned orbital space station. Houston businessman Doyle Brewington, the man who brought several Latin American students to see the STS-2 launch after learning that many thought the U.S. space program was "made in Hollywood," is chairman of the newly formed foundation. Brewington plans a 1983 media campaign to educate the public about space spinoffs and the need for a space station.

Six telescopes operated as single unit

Five radio telescopes in Australia and a sixth in South Africa were operated for the first time as a single radio telescope as wide as half the planet from April 20 through May 3. The project to operate the telescopes in unison to observe astronomical radio sources, called Very Long Baseline Interferometry, was directed by the Australian Commonwealth Scientific and Industrial Research Organization (CSIRO) and NASA's Jet Propulsion Laboratory. In all, about 30 quasars and galaxies were studied during the two-week project. Data collected on videotape at each site will be combined and computer-processed at JPL. While the technique is commonly used in the northern hemisphere for astronomy and geodesy, the Australian experiment is the first time it has been used for detailed mapping of radio sky sources and high accuracy geodesy in the southern hemisphere.

Bulletin Board

JSC to send employees to STS-5 launch

The Johnson Space Center will honor 12 select employees for their exemplary work with a trip to the launch of STS-5 in November, according to the Manned Flight Awareness Office. Honorees will be recommended by their directorate or program office and final selection will be made by a committee chaired by the Deputy Director. The program is patterned after the Apollo-Saturn Manned Flight Awareness Honoree Program. As with past programs, spouses will be allowed to participate. Selection will not be limited by position or job title. Rather, anyone who has performed an exemplary job will be considered. Final selection will be made late this month. Submissions should be sent to the Director, SR & QA, with proper justification. For more details, call Gene Keyes at x6208.

Some things to know in a big blow

The annual hurricane season for the Texas Gulf coast has already begun and extends through Nov. 30. The vulnerability of this area to the effects of severe weather has been amply demonstrated by Mother Nature in the past, and it could happen again. During such severe weather, hurricane and storm information will be available by recorded message at x3351 and through the on-site closed circuit television system. During non-duty hours, employees should call 483-3351 for the operational status of the Center. In the event of threatening weather, the Center Director has the authority to close the Center. If this happens, employees will be notified through normal supervisory channels, closed-circuit TV and the telephone recorder system. Precautions should include unplugging electrical items, securing sensitive documents, raising venetian blinds and closing office doors. Employees are expected at work the day following a closure unless advised otherwise through the news media or recorded messages.

Alley Theatre subscription drive underway

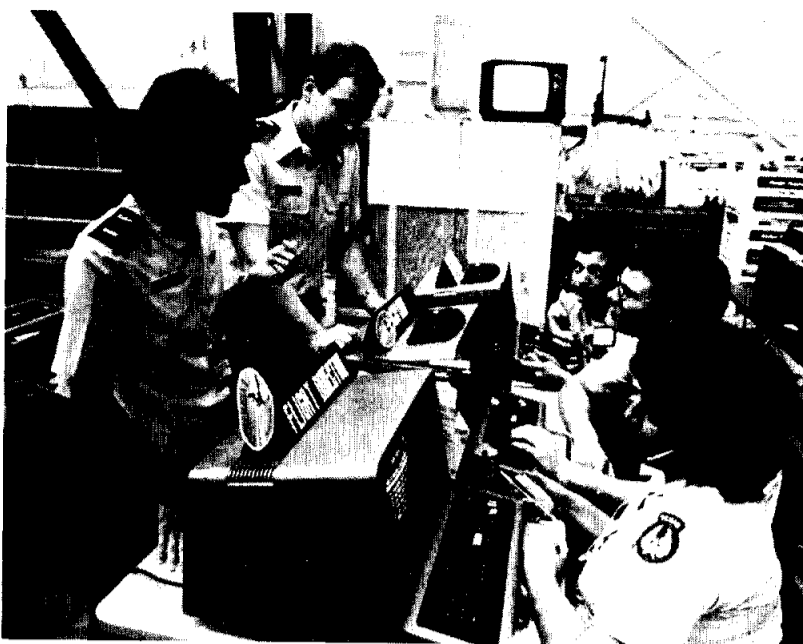
The Alley Theatre corporate subscription program is again being offered to all NASA employees and contractors. Season tickets are available for next year's series of six performances for \$36. Brochures and order forms are available at the Bldg. 11 Exchange Store or from your EAA representative. Subscription checks should be made payable to the Alley Theatre and sent to Doris Wood at Mail Code SN1. Subscription deadline is Sept. 22. Subscription coupons will be mailed just prior to the opening of the 1982-83 season in October.

Ellington Toastmistresses plan reunion

All members of the Ellington Toastmistress Club from 1960 to 1970 are invited to a reunion to be held at the home of former member Fran Noble. The reunion will be held at 2 p.m. Saturday, July 25. For more information and directions, contact Fran at 484-1175.

Astronomy brown bag seminars scheduled

JSC Astronomy brown bag seminars, which meet every Wednesday from noon to 1 p.m. in Bldg. 31, conference room 193, include an open discussion July 14 and a talk July 21 on "Optical Meteorology: Theory of the Rainbow," by Scott Davis, McDonnell Douglas. On July 28, Gary Greenleaf of JSC will discuss black holes. There will be no meetings in August. Seminars will resume in September.



Civil Air Patrol cadets from the local area had their own mini-MOCR and Shuttle simulator up and running in Bldg. 9A during STS-4. Supplied with a number of TRS-80 computers from a space-minded Radio Shack dealer, the cadets wrote their own programs and simulated the Crew Activity Plan throughout the mission. 2nd Lt. Leslie Lintern, far left, guided the cadets through the simulation, after having done others during the first three Shuttle flights.



Priess receiving the Meritorious Service Medal

Lt. Col. Jarrell J. Priess, head of the Aircraft Engineering Section at JSC, was recently honored by the 75th U. S. Army Maneuver Area Command with the Meritorious Service Medal in ceremonies June 26. A member of the 75th MAC since 1969, he is assigned as the command controller for Engineer Exercise Group C. Priess graduated from Stafford, Kansas, High School in 1954 and earned a B. S. in electrical engineering from the University of Kansas in 1963. He and his wife Janet and two daughters reside in Clear Lake City.

Dr. Walter C. Williams, Chief Engineer for NASA, retired this week from that post after 42 years in government service. Williams will be succeeded by Dr. Stanley I. Weiss, Associate Administrator for Space Transportation Operations. For the last month, Williams has served as chairman of a certification review of Space Shuttle main engines at ratings above the 100 percent power level. He has also been working with Weiss on the transfer of several offices to the Office of Chief Engineer, including the NASA Safety Office and the Reliability, Quality and Safety Assurance Office. After retirement, Williams will continue to consult on Space Shuttle systems. He began his career with the National Advisory Committee for Aeronautics in 1940.

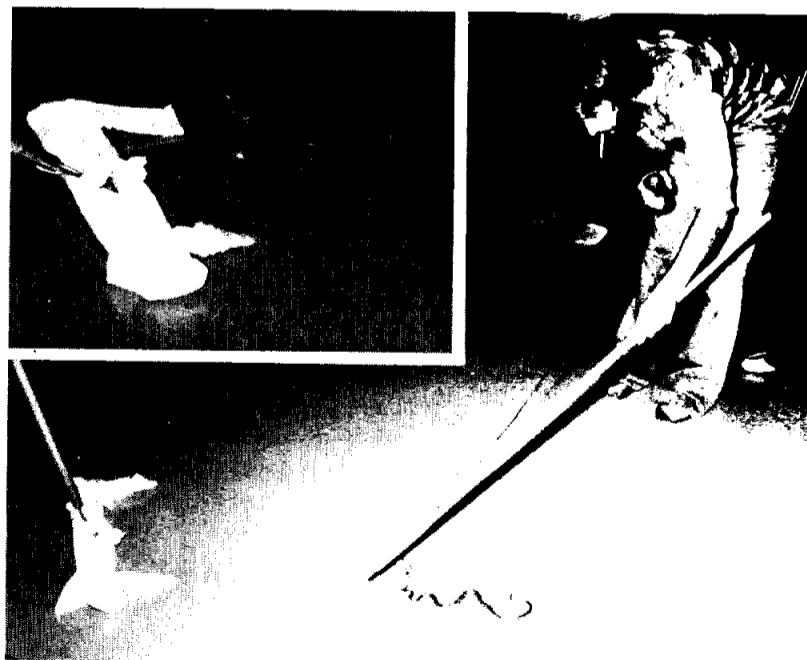
Chief Master Sergeant G. W. Womack, USAFR, who works in the Quality Assurance Division at JSC, was honored by the Military Affairs Committee of the Houston Chamber of Commerce June 18 as the outstanding enlisted Air Force reservist in the Houston area for 1982. Womack has been in the Air Force reserve since 1958 and employed at JSC since 1979. He presently fills the position of Senior Enlisted Advisor for the Headquarters, Tenth Air Force, located at Bergstrom Air Force Base.

Joe P. Olivares, Program Analyst for the Logistics Division, Center Operations Directorate, was the subject of a proclamation from Pasadena Mayor Johnny Isbell recently. Olivares, a resident of Pasadena since 1962 and a "guiding force" in the Boy Scouts of America in that community, had the 22nd of May named for him. "Joe P. Olivares Day" was proclaimed in Pasadena in recognition of his leadership in the Boy Scouts, and for receiving the District Award of Merit from the San Jacinto District, Silver Beaver Award from the Sam Houston Area Council and the Vigil Honor from the Colonneh Lodge of the Order of the Arrow. Olivares is the only Scoutmaster Troop 176 at Asbury United Methodist Church has had since 1962.

George F. Page, Director of Shuttle Operations at the Kennedy Space Center since 1979 and launch director for the first three Shuttle missions, has been named Deputy Director of KSC. The announcement was made by Gen. James A. Abrahamson, Associate Administrator for the Space Transportation System. Page assumed the position July 5. From 1964 to 1975, Page directed KSC operational planning and integrated systems testing of the Gemini and Apollo spacecraft. In 1975 he was named Director of Unmanned Launch Operations and directed some 54 major launches from KSC and the Western Test Range at Vandenberg Air Force Base, Calif.

People

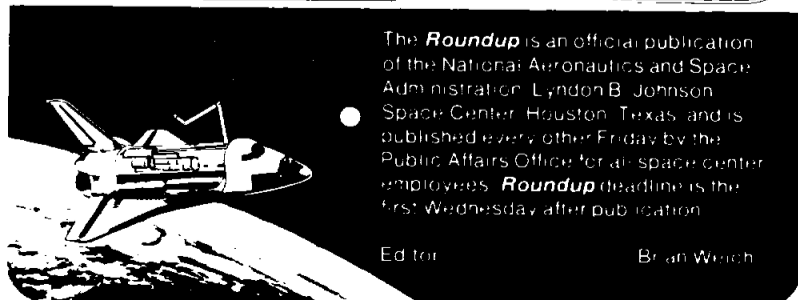
The 1982 Haley Space Flight Award will be going to Astronaut Office Chief John W. Young and STS-1 Pilot Robert L. Crippen during an American Institute of Aeronautics and Astronautics space systems conference in Washington, D.C. in October. The award is being presented for "their outstanding contribution to the advancement of astronautics," and for their piloting of the first Space Shuttle flight. Both Young and Crippen will be back in the saddle during the coming year, with each scheduled as commanders of Shuttle flights in 1983.



If the pace has been crawling in your area recently, be thankful it wasn't of the sort which slithered into Bldg. 9A last month. Employees in the high bay which houses the Shuttle mockups were somewhat nonplussed to find a small but potent copperhead in their midst. But with typical NASA real-time troubleshooting genius, dustmops and broom handles were reconfigured to reduce the reptile's slither envelope by several orders of magnitude.

NASA
Lyndon B. Johnson Space Center

Space News Roundup



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Editor

Brian Welch



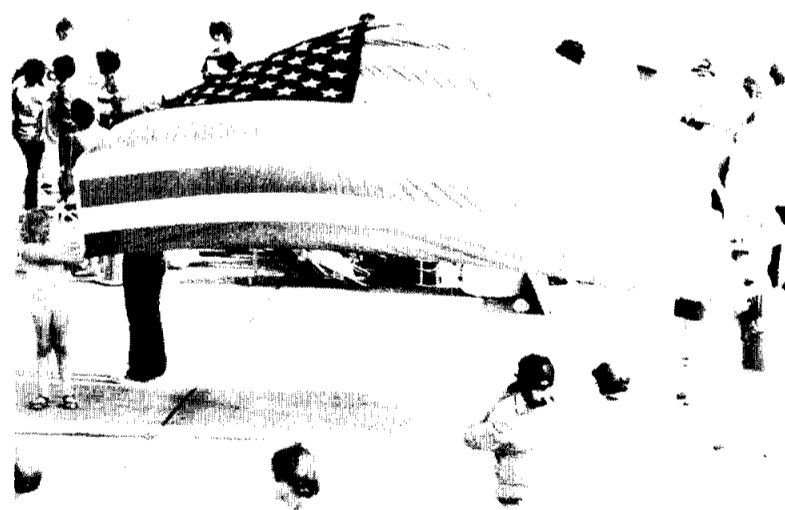
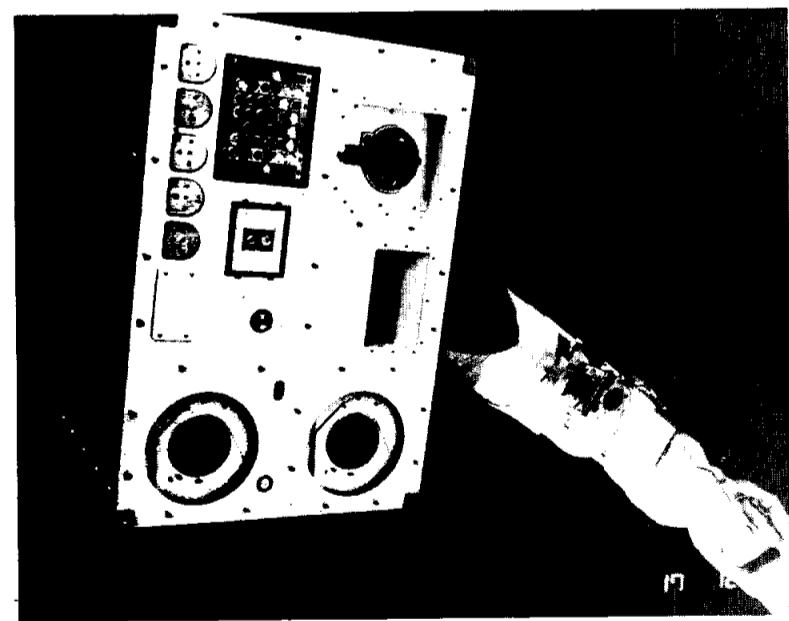
Dick Underwood

If you've ever seen one of his presentations, it's not hard to understand why Richard W. Underwood, Photographic Technology Division, was recently presented the Distinguished Speaker Award by JSC Director Christopher C. Kraft Jr. The award is presented to JSC employees who make 25 or more speeches during a five-year period as scheduled by the Public Affairs Office. Underwood uses NASA photography from a variety of missions as the centerpiece of his talks, and was the creator of the multimedia presentation featured last month at the American Institute of Aeronautics and Astronautics 50th Anniversary Banquet. On July 23, Underwood will again use photos and film footage as part of his presentation during "Space Voyage Night" at the JSC Bldg. 2 Visitor Center, one of several events scheduled on-site during Spaceweek.

Fourth to remember



The fourth and last test flight of Columbia, ending as it did on the Fourth of July and marking a milestone in NASA's fourth major manned spaceflight project, gave a whole new significance to the numeral four. It was definitely a fourth to remember. Above, Challenger arrives at Ellington moments after the STS-4 crew was welcomed back to JSC. Her sister ship, Columbia, was put through a variety of vehicle tests in orbit during preceding days, such as the RCS firings at upper left. Middle left, the largest grappled payload to date, the Induced Environment Contamination Monitor, is shown sniffing about in space. bottom left, Hank Hartfield's daughters, Judy, left, and Keely, smile as their space-borne father comes back to Earth. Meanwhile, bottom, the STS-4 Commander, Thomas K. Mattingly, is greeted by Aaron Cohen, Glynn Lunney and John Young, among others. At middle right, visitors to Ellington, caught up in the moment, unfurl an American flag as the 747/Challenger combination flies over. At right, the new Orbiter seems to be emerging from the large crowd on the tarmac as its 747 carrier taxis into the greeting area.



Gilruth Center News

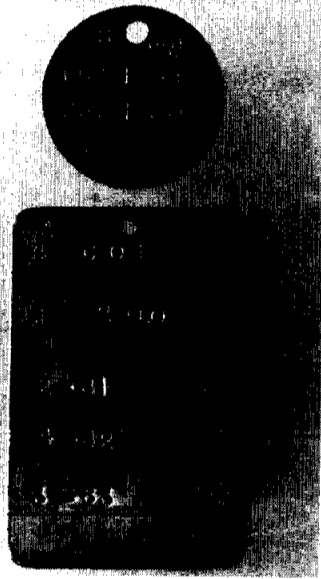
Call x3594 for more information

- Softball tourney** — It's not too late to sign up for the 14th annual Moon Walk Tourney, scheduled for July 16, 17 and 18. The cost is \$65 per team and is limited to 24 male and female teams each.
- Children's movie** — The next movie at the Rec Center will be "Amy," showing from 10 a.m. to noon July 24. The feature includes cartoons, and the cost of \$1 per person includes popcorn and soft drinks. Tickets are on sale at the Bldg. 11 Exchange Store.
- Aerobic dance** — Dance away those extra inches with Jacki Sorensen's dance class. The class meets Mondays and Wednesdays from 9 a.m. to 10 a.m. and Tuesdays and Thursdays from 4:15 p.m. to 5:15 p.m. Cost for this eight-week session is \$38.
- Defensive driving** — Learn to drive safely and qualify for a 10% reduction in your insurance for the next three years. Class is held from 8 a.m. to 5 p.m. Aug. 21 at a cost of \$18 per person.
- Dancercise** — Part dance, part exercise, all fun. This class will gradually get you into shape. The six-week course begins July 15 and meets Tuesdays and Thursdays from 5:30 p.m. to 6:30 p.m. at a cost of \$20 per person.
- Overnight trip** — This trip to Evangeline Downs includes bus, hotel, breakfast and two tickets to the club house. Trip dates are Aug. 14 and 15 and the cost is \$82 per person. For more details, call x3594. Space is limited.
- Table tennis** — Come and test your skills at the first annual JSC Table Tennis Tourney. This event will take place at 1 p.m. July 31. Entry fee will be \$1 per player. Events will be in men's and women's singles. First and second place trophies will be awarded. For more information, call x3594.
- Horseshoe tournament** — Entries are now being accepted for men's and women's singles. The tourney will be held July 17 starting at 1 p.m. This event will be held in the picnic area. Entry fee is \$1 per person.

Bulletin Board

Pressure systems may need scrutiny

Recent safety reviews have found several pressure systems on-site which lack current certification tags. These systems are not listed in the inventory of the Pressure Systems Management Program and are therefore not properly tagged. This can be important during any kind of malfunction, so as to allow repair workers an idea of what they are working with and the maximum allowable pressure. Tags like those shown at left list the pressure allowance and the date when recertification is needed. The round tag identifies components, while the rectangular tag identifies systems. Each system must have both tags. If any organization finds a system without a tag, contact the Pressure Systems Manager's Office.



Spaceweek

(Continued from page 1)

rockets and join the fun. Event also includes a Space Shuttle model craftsmanship and flight demonstration contest, open to all. The event is free and open to the public.

Monday, July 19: Noon lectures begin and run throughout the week in the JSC Bldg. 2 Visitor Center from noon to 1 p.m. The speaker Monday is John Kiker, a retired NASA engineer, who will discuss the ideas and history which lead to NASA's adoption of the Shuttle Carrier Aircraft concept, an idea most recently demonstrated in Houston with the refueling stop of the Space Shuttle Orbiter *Challenger* at Ellington Air Force Base. The lectures are free and open to the public.

• The Rice University Space Lecture series begins. Talks are held each night from 7:30 to 9:30 p.m. in Room 106 of the Geology Bldg. on the Rice campus. Friday's lecture only will be held in Room 301 of Sewell Hall at the same times. Monday's speaker is Dr. Carolyn Sumners, Director of Astronomy at Burke Baker, who will discuss "Enjoying Space From Your Backyard." Talks are free and open to the public.

Tuesday, July 20: The noon lecturer at the Bldg. 2 Visitor Center will be William Wright, Vice President of Lockheed Missiles & Space Co., who will discuss the Space Telescope, scheduled for launch from the Space Shuttle in 1985.

• The Spaceweek-Lunar Rendezvous Festival Banquet begins with a social hour at 6 p.m. in the Gilruth Center. A Chicken Kiev dinner will follow at 7 p.m., with a speech by Astronaut Brewster Shaw at 8 p.m. Tickets are \$15 per person and may be obtained from the Bldg. 11 Exchange Store, the Clear Lake Chamber of Commerce, Carl Gren Printing, Space Center Honda and the Bal Harbor Sales Office. For more information, call Sonne Hooper, banquet chairman, at 333-5556.

• The speaker at the Rice University lecture series at 7:30 p.m. in Room 106 of the Geology Bldg. will be Dr. Arthur M. Dula, a Houston attorney specializing in aerospace and technological law, who will discuss "Space Law: The Rules of the Journey."

Wednesday, July 21: The speaker at the noon lecture series in the Bldg. 2 Auditorium will be James Oberg, who will discuss Terraforming, the concept of transforming other planets to sustain

Earthly life. Noon to 1 p.m., free and open to the public.

• The speaker at the Rice University lecture series at 7:30 p.m. in Room 106 of the Geology Bldg. will be Dr. Loyd Swenson Jr., Professor of History at the University of Houston, who will discuss "Our Extraterrestrial Imperative: Mercury, Gemini, Apollo and Implications for the Future."

Thursday, July 22: Barry Moore, a physicist with the Lockheed Engineering Management and Services Co., will discuss the Landsat system and its applications with a wide-ranging visual display. Noon to 1 p.m., free and open to the public.

• Dr. Gary Ransford, a visiting scientist at the Lunar and Planetary Institute and former Project Voyager scientist, will discuss the Voyager encounters with Saturn. The talk begins at 7:30 p.m. in Room 106 of the Geology Bldg.

Friday, July 23: The noon lecturer at the Bldg. 2 Visitor Center will be

Joseph Loftus, Chief of the Technical Planning Office at JSC, who will discuss the evolution of the Space Shuttle and present an overview of the many possibilities for the future. Noon to 1 p.m., free and open to the public.

• "Space Voyage Night" culminates the week's activities with space films, photos and a star party at the Bldg. 2 Visitor Center beginning at 7:30 p.m. Dick Underwood of the Photographic Technology Division will take viewers on a guided tour of the Solar System and along with astronauts on some of the Mercury, Gemini, Apollo and Space Shuttle missions. After the films, visitors can step outside and view various planets and stars through telescopes provided by the JSC Astronomy Club. Free and open to the public.

• Astronaut Robert L. Stewart concludes the list of speakers for the Rice Lecture series. His talk begins at 7:30 p.m. in Room 301 of Sewell Hall on the Rice campus. Free and open to the public.

Cookin' in the Cafeteria

Week of July 12 - July 16, 1982

Week of July 19 - 23, 1982

Monday: French Onion Soup; BBQ Sliced Beef, Parmesan Steak, Spare Rib w/Kraut, Chili & Macaroni (Special); Ranch Style Beans, English Peas, Mustard Green. Standard Daily Items: Roast Beef, Baked Ham, Fried Chicken, Fried Fish, Chopped Sirloin. Selection of Salads, Sandwiches and Pies.

Tuesday: Split Pea Soup; Meatballs & Spaghetti, Liver & Onions, Baked Ham w/Sauce, Corned Beef Hash (Special); Buttered Cabbage, Cream Style Corn, Whipped Potatoes.

Wednesday: Seafood Gumbo; Cheese Enchiladas, Roast Pork w/Dressing, BBQ Link (Special); Pinto Beans, Spanish Rice, Turnip Greens.

Thursday: Beef & Barley Soup; Roast Beef w/Dressing, Fried Perch, Lasagne w/Meat, Chopped Sirloin, Chicken Fried Steak (Special); Whipped Potatoes, Peas & Carrots, Buttered Squash.

Friday: Seafood Gumbo; Fried Shrimp, Baked Fish, Beef Stroganoff, Fried Chicken (Special); Okra & Tomatoes, Buttered Broccoli, Carrots in Cream Sauce.

Monday: Cream of Potato Soup; Franks & Sauerkraut, Stuffed Pork Chop, Potato Baked Chicken, Meat Sauce & Spaghetti (Special); French Beans, Buttered Squash, Buttered Beans. Standard Daily Items: Roast Beef, Baked Ham, Fried Chicken, Fried Fish, Chopped Sirloin. Selection of Salads, Sandwiches and Pies.

Tuesday: Navy Bean Soup; Beef Stew, Liver & Onions, Shrimp Creole, Smothered Steak w/Dressing (Special); Corn, Rice, Cabbage, Peas.

Wednesday: Seafood Gumbo; Roast Beef, Baked Perch, Chicken Pan Pie, Salmon Croquette (Special); Mustard Greens, Italian Green Beans, Sliced Beets.

Thursday: Beef & Barley Soup; Beef Tacos, Diced Ham w/Lima Beans, Stuffed Cabbage (Special); Ranch Style Beans, Brussels Sprouts, Cream Style Corn.

Friday: Seafood Gumbo; Fried Shrimp; Deviled Crabs, Ham Steak, Salisbury Steak (Special); Buttered Carrots, Green Beans, June Peas.

Roundup Swap Shop

Ads must be under 20 words total per person, double spaced, and typed or printed. Deadline for submitting or cancelling ads is 5 p.m. the first Wednesday after publication. Send ads to AP3 Roundup, or deliver them to the Newsroom, Building 2 annex. No phone-in ads will be taken. Swap Shop is open to JSC federal and on-site contractor employees for non-commercial personal ads.

Property & Rentals

For sale: Water front lot, Lake Livingston Point Lookout Estates, Point Blank, Tx. Call 472-5667.

For lease: House in southeast Edgebrook, 3-2-2, air, built-ins, no pets, references, \$500/mo. plus deposit. Call 482-8827.

For sale: 7-year-old cabin on Lake Livingston Glen Haven Estates, 2-1, fireplace, electricity and approved wire, near Liberty, \$31,500. Call 469-0563.

For sale: Lot at Hilltop Lakes Resort City, three blocks from lake, nice facilities, \$1,500 equity, assume payments of \$75.34. Call Joe, x2175.

For sale: Bayou Chantilly 3-2-2, VA assumption-8 1/2%, owner 2nd-12%, cathedral ceiling, fireplace, fenced, indoor utility, Italian ceramic tile. Call 534-3240.

For sale: Home on golf course, 3-2-2, near NASA, assume 13% VA, \$83,900, \$20K equity. Call Nick, x5247 or 480-2500.

For sale: 3-2-2 contemporary house, freestanding fireplace, miniblinds throughout, ceiling fan in master BR, landscaped, \$69,500, \$750/mo., assume 11 7/8%. Call Linda, x4086 or 480-3771 evenings.

For lease: 3-2-2 Newport, League City, \$475/mo. plus deposit. Call 996-1542.

Cars & Trucks

1974 Honda Civic, in and out in excellent shape, needs engine, make offer. Call George, 333-9267 anytime after 1 p.m.

1977 Mercury Cougar Brougham, 4 dr., full power, AC, AM/FM, clean, excellent condition, original owner, see to appreciate. \$2,995. Call 482-1535.

1974 MG Midget convertible, gold w/black top, low mileage, \$2,500. Call x2181 or 474-3839.

1973 Plymouth Fury, 2 dr., 88K miles, good condition. Call Betty, x3328.

1950 Ford 2 dr. Custom sedan, flathead V8 engine, radio, heater, recent paint, new carpet, very clean, \$2,100. Call 554-6685 after 5 p.m.

1972 Chevy Pickup, 6 cyl., standard, excellent condition, \$1250. Call Harry St. John, x5835.

1975 Mercury Bobcat, AC, PS, PB, auto, \$1,500. Call Eberhard Grun, x5171 or 488-3312.

1979 Robinhood 23' fiberglass mini-motor home, 440 Dodge, one owner, excellent condition, see to appreciate, \$19,500. Call 472-6980.

1981 Camaro, blue metalflake, fully loaded, T-tops and spoiler, excellent condition, must sell, \$8,100. Call 488-2269 after 4 p.m.

1977 Honda MGB, super clean, AM/FM, AC, \$3,950. Call 486-4348, leave message for Tony.

1981 Camaro, like new, AC, auto, power, AM/FM stereo, \$6,200. Call 486-4348 and leave message for Tony.

1973 Mazda RX-3 wagon, auto, AC, very clean, one owner. Call John Kaitenbach, x3611 or 331-5751.

1977 Mercury Cougar, many extras, excellent condition, retail NADA — \$2,825, asking \$2,295. Call Charlie, x3655 or 333-4681.

For 1972 Chevy 8 pickup: 5 plugs, 2 oil filters, 1 air filter, \$20. For 1975 Datsun B210: 3 wheelcovers, \$15 each. Call 334-1983 after 5 p.m.

Boats & Planes

14 foot aluminum boat, \$100. Call Mike, 483-5913.

1975 Ebbtide fiberglass 17' boat, 165 hp Mercruiser I/O w/1975 Sportsman trailer, extras, one owner, see to appreciate, \$5,500. Call 472-6980.

KR2 homebuilt project, most woodwork complete, assorted extra materials and hardware, \$1,500 or best offer. Call Chuck, x3291 or 666-4251 evenings.

27' Irwin sailboat, inboard, VHF, DS, sumlog, 6 sails, \$14,000, possible owner finance. Call 534-3240.

24' Pennyan, flying bridge, sleeps 4, galley, head, 250 hp Chrysler, galvanized trailer, sell or assume. Call 554-6733.

Evindrude 1.5 hp outboard motor, excellent condition w/all papers, used about 10 hours. Call Eggleston, 482-4239.

18' white fiberglass canoe, good condition, \$450. Call 488-6032.

Cycles

1980 Honda CM400T, excellent condition, new tires, windshield, backrest w/rack, helmet, \$1,250. Call Curley, x3026 or 944-3522 after 5:30 p.m.

Boys 20" dirt bike, magstyle wheels, knobby tires, \$35; girl's 20" bike, banana seat, \$20. Call Dave, x3394 or 488-3276.

Moto-cross boots, leather, steel shins and toes, size 10 1/2 or 11, perfect condition, \$50. Call Rene Martinez, x2666.

Audio

Toshiba KT-S1 portable cassette player w/FM cartridge, micro-size headphones, carrying case, strap, \$80. Call 334-3370.

Photography

For sale: new, unused Nikon EM camera w/50mm 1.8 E lens, CF-11 case and silver oxide batteries, \$193. Call Gaudiano, x2851.

Mamiya C330f, twin lens reflex, 80 mm lens, 120 or 220 film, 2 focusing screens, mat box lens hood. Call Cree, x6411 or 481-1158 after 5 p.m.

Household

Couch and matching loveseat, good condition, \$100 for both. Call Kay, 333-5373 after 5 p.m.

Maple double bed w/mattress, \$50; Heathkit ignition analyzer, \$60; Rampart dirt bike, \$75; Winnie the Pooh recorder player, \$10; B & D cordless Vac, \$10; vaporizer, \$7; Norelco curling iron, \$4;

ironstone dishes for 8, \$15; nightstand, \$10; round table with tablecloth, \$10. Call Donna, x4571 or 474-4539.

Early American dining room group, includes 68" trestle table, two 12" extensions, two arm chairs and four side chairs, three years old, excellent condition, \$600. Call Durst, 483-3824.

Moving sale: dresser, slide-leaf table, chairs, full-size modern office desk, drafting table, bookcase, pillows, books, much more. Call for prices and details, one block from JSC Credit Union. Call Mike, x4326 or 480-1653.

Musical Instruments

Antique player piano w/approx. 50 old time rolls, \$2,000. Call Waite, x4241 or 333-2442.

Aria Pro-II acoustic 6-string guitar, case and strap included, new condition, \$250 firm. Call 534-4603 after 6 p.m.

Ludwig symphony snare drum, excellent condition, includes stand, sticks and tuning key. Call Tony, x5540 or 334-3346.

Animals

Champion-bred Arabian yearling, halter-quality filly, extreme typey head, smooth body, excellent action. Sire: Champion Morafic son. Blemished: \$2,000. Others available. Call Judy Guess, 370-4377.

Labrador pups, AKC, yellow whelped 3-9-82, parents on premises, both good hunters, hips guaranteed, call after 6 p.m. weekdays, anytime weekends at 534-2488.

Wanted

Need ride from Red Bluff Rd. to NASA on 7:30 a.m. to 4 p.m. shift, but will change schedule if need be. Call x2838.

Ride needed from 201 Vista in Pasadena off S. Shaver near Highway 3. Call Bonnie, x3041.

Would like to learn to play Appalachian dulcimer and/or auto harp,