

# Space News Roundup

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National Aeronautics and Space Administration

## Safety panel to meet here

NASA's Space Flight Safety Panel will meet at JSC on Oct. 14 and 15 to discuss safety training for managers, orbital debris hazards and the results of a flight safety survey, according to Bryan O'Connor, chairman.

Government or contract employees who want to discuss flight safety issues with the panel should contact O'Connor at x31028 to schedule either an open or closed meeting, he said.

O'Connor said the panel has been encouraged by the response to previous calls for discussion. So far, he said, all of the concerns raised by employees have been legitimate flight safety issues.

Other panel members are Larry Bourgeois, JSC flight director; Norm Carlson, chief of the Vehicle Processing Division at Kennedy Space Center; and Harry Craft, deputy manager of the Payload Projects Office at Marshall Space Flight Center. Fred Gregory, chief of the Operational Safety Branch at Headquarters, is the panel's adviser.

The panel was established by NASA Administrator James C. Fletcher in September 1986 to promote flight safety awareness throughout the manned space programs, O'Connor said, and reports to George Rodney, associate administrator for the Office of Safety, Reliability and Quality Assurance at Headquarters.

## Microgravity cargo added

Five microgravity experiments for secondary payloads have been scheduled for STS-26. The tests will include life science, atmospheric science, infrared communications, and two student experiments.

The primary payload to be carried aboard Discovery is NASA's Tracking and Data Relay Satellite (TDRS). The additional cargo will be flown in the middeck area.

An automatic directional solidification furnace, a technology demonstration of directional solidification of magnetic materials, immiscibles and infrared detection

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Ethel Jarden and Bob McNeil get their backs—and their faces—into the tug-of-war at the third annual Mission Operations Directorate Olympics at the Gilruth Recreation Center.

## Olympians display competitive spirit

By Rich Owen  
Special to The Roundup

Players perspired, runners raced and directors were dunked as competition and good times combined in the third annual Mission Operations Directorate (MOD) Olympics on Sept. 26.

Almost 1,200 people converged on the Gilruth Recreation Center to watch and participate in the competition between 14 teams made up of seven NASA and seven STSOC divisions.

There were traditional events such as Frisbee toss, softball, basketball, tennis, volleyball and relay races. But there also were unusual events such as chugging contests—through a crazy straw, of course, a dizzy-bat race, and a management relay.

The management relay consisted of branch chiefs and above

shuffling papers, stamping out issues (balloons), chairing meetings (running a race while holding a chair where they sit), avoiding action items (obstacle course), and putting out fires (candles with water pistols).

Among those who volunteered to undergo the rigors of the dunking booth were MOD Director Gene Kranz.

The Training Division took overall first place and was awarded the Grand Winner's Trophy as well as the NASA First Place Trophy. STSOC's Software Engineering II took the STSOC First Place Trophy, and tied with the Systems Division for overall second place. Two last place trophies were presented to the MOD staff and STSOC's Software Engineering I.

## Needs are diverse

## Senators hear space business views at JSC

Space commercialization entrepreneurs who testified before the Senate Subcommittee on Science, Technology and Space at JSC agreed that the diversity of their needs makes it difficult to design policies that will help one sector of their fledgling industry without hurting another.

But they did agree with JSC Director Aaron Cohen that one important step is to provide a solid, consistent national space policy and civilian space program to help reduce the risks to investors.

"What we need to do to get on with (space commercialization) is to give a signal to the country and to our entrepreneurs in the country that we're serious about it," Cohen testified.

"We need to return the Shuttle to flight, we need to get the replacement Orbiter, we need to have the Space Station and we need to let people know there is no question we are going to have that," he added. "We have to move on in a very rigorous fashion and I think the commercialization and the entrepreneurs will take advantage of that."

"If you have to depend upon the government transportation system not only for deployment but for ongoing services, the reliability of those services is essential to your risk profile," said James Calaway, vice president of Space Industries,

Inc. (SI). "If that cannot be addressed adequately, then either the space-based services will not be financed or the government has to step in and help risk-share with the private sector."

Sen. Lloyd Bentsen, D-Texas, and South Dakota Sen. Larry Pressler, ranking Republican on the subcommittee, comprised the Senate panel at the Oct. 5 hearing and later toured JSC.

In addition to Cohen and Calaway, witnesses included Edward Frankle, NASA deputy general counsel; Walt Cunningham, former astronaut and chairman of the Houston Chamber of Commerce's Aerospace and Technology Committee; Dr. David J. Norton, director of the Space Technology Research Center; Wilton Scott, chairman of Space Industries, Inc. (SI); Bruce Ferguson, senior vice president of Orbital Sciences Corp.; and Deke Slayton, former astronaut and president of Space Services, Inc.

Bentsen said the testimony would help the subcommittee draft a Commerce in Space Act to help space entrepreneurs now that President Reagan has banned commercial payloads from the Space Shuttle unless they require a manned presence or the Shuttle's unique capabilities.

"We can't address all the economics, but we don't want govern-

(Continued on page 2)

## Earthquake rattles workers but most injuries are minor

JSC employees stationed at Rockwell International's Space Systems Group in Downey, Calif., are breathing a collective sigh of relief that the Oct. 1 earthquake was not worse, according to Dave Ewart, NASA's resident manager there.

"For most, it was the most dramatic earthquake they had experienced," he said.

Twelve people suffered minor injuries and one Rockwell employee suffered a non-fatal heart attack at the facility, which houses 30 NASA, 5,000 contract and 30 Department of Defense employees. Most of the injuries were cuts and bruises, he said, and there were no broken limbs. No JSC employees received

treatment.

None of the structural spares being readied for construction of the new Shuttle Orbiter were damaged, Ewart said, and the quake was not expected to have any effect on programmatic schedules. The crew module, forward reaction control system (RCS) and Orbiter/external tank umbilicals were in Bldg. 290, and the forward and aft fuselages and reinforced carbon-carbon (RCC) chin panel test articles were in Bldg. 1.

"It was a near thing with the RCS—overhead lights fell around it, not hitting it," he said.

The extent of damage is still being assessed, but the worst appears to

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## Chemicals, weather together cause ozone hole

Both human-made chemicals and weather phenomena appear to be responsible for a mysterious hole in the Earth's ozone layer, according to a NASA scientist participating in the Airborne Antarctic Ozone Experiment, but it is too early to judge whether there are any global ramifications.

Dr. Bob Watson, chief of NASA's upper atmospheric research program, and Dr. Dan Albritton, chief of the National Oceanic and Atmospheric Administration's aeronomy laboratory in Boulder, Colo., reported preliminary results Sept. 30 as the aircraft operations phase of

the experiment was completed. A full report is expected in the spring of 1988.

Scientists have been investigating several theories for the cause of the hole since its discovery in 1985. The hole has recurred each Antarctic spring since, and spread across the entire Antarctic continent. Watson said ozone levels in the hole reached an all-time low this year, dropping 15 percent below the previous record set in 1985.

Chief among the suspected culprits were chlorofluorocarbons, man-made chemicals that are used in aerosol sprays, fast-food con-

tainers, foam insulation, refrigerants and solvents. But researchers found them not solely responsible.

"The strong weight of evidence suggests that both chemical and meteorological processes were responsible for perturbing ozone this year," Watson said. "It's not meteorology alone. It's not chemistry alone. It's both."

The two processes appear to be interconnected, he added.

"Meteorology is critical," Watson said. "It is not just a chemical phenomenon. Without these meteorological phenomena, we would not have a dehydrated atmosphere and

we would not have a denitrified atmosphere. We believe those two processes are essential to provide the environment in which chlorine may play a significant role in the destruction of ozone."

Watson said the ozone hole phenomenon is significant because ozone stops harmful ultraviolet radiation from penetrating the Earth's atmosphere.

"More ultraviolet radiation could lead to increased levels of skin cancer, suppression of the immune response system and possibly have adverse effects on both aquatic life and terrestrial plant life," he said.

More than 150 people from 19 organizations representing four countries took part in the airborne experiments, based in Punta Arenas, Chile, beginning July 15. Two NASA aircraft based at Ames Research Center were used to collect data. An ER-2 high altitude aircraft that gathered data for 14 experiments through sample bottles and air-flow measuring systems flew a total of 36,192 miles, and a DC-8 flying laboratory that performed seven experiments utilizing remote sensing techniques to monitor the atmosphere flew more than 74,646 miles for a total 143 hours.

## Space News Briefs

### NASA, Air Force price Shuttle flights

The U.S. Air Force and NASA have signed an agreement establishing reimbursement policies for DOD flights on the Space Shuttle and NASA flights on DOD-procured expendable launch vehicles (ELV). Under the agreement, both DOD and NASA contribute to the operation of the national launch capability. The "quid pro quo" arrangement allows the two agencies to exchange similar launch services. Pricing provisions of this agreement apply to launches scheduled through fiscal year 1991 with subsequent pricing subject to renewal. The estimated DOD price for Shuttle hardware is \$115 million; NASA estimated prices for ELV hardware will be \$93 million for Titan IV, \$25.6 million for Delta II, and \$24.6 million for Titan II—all in fiscal year 1986 dollars.

### Computer Sciences Corp. wins contract

Computer Sciences Corp. (CSC), Houston, has been selected for negotiations leading to award of a contract for operations support to the Mission Support Directorate at JSC. The \$151 million cost-plus-award-fee contract is to provide maintenance, operations and sustaining engineering of all institutional data processing facilities, networks and workstations, as well as user support. CSC subcontractors include IBM, Ford Aerospace and Communications Co., and W de Y Corp., all of Houston.

### NASA, West Germany sign pact

NASA and the German federal minister for research and technology (BMFT) have signed a cooperative Earth observation memorandum of understanding. The agreement was signed by Dr. James C. Fletcher, NASA administrator, and BMFT Minister Heinz Riesenhuber. Under the agreement, BMFT, in cooperation with Italy's National Space Plan of the National Research Council (CNR/PSN), will provide an X-band synthetic aperture radar (X-SAR), which is planned to fly at least twice with the space-borne imaging radar-C (SIR-C) on the Space Shuttle. Later, an advanced X-SAR is expected to fly in combination with the NASA Earth Observation System on a NASA polar platform.

### U.S. participates on Soviet biosatellite

On Sept. 29, the Soviet Union successfully launched Cosmos 1887, a biosatellite mission carrying 2 monkeys, 10 rats and plant specimens. More than 50 NASA-sponsored scientists from Ames Research Center and universities throughout the nation are involved directly in 27 major joint experiments aboard Cosmos 1887. The cooperative effort is taking place as one of the 16 agreed projects under the US/USSR Space Agreement signed in Moscow in April. The experiments are investigating the effects of space flight on the major body systems, including skeletal bones and muscles, the nervous system, heart, liver, several glands and blood.

## Bulletin Board

### Fund-raiser to help Dave Herbek

Environmental Systems Section co-workers are planning an auction and party to raise funds to help Dave Herbek with more than \$40,000 in legal fees he owes after being cleared of bank robbery charges. The party is being planned for 5 p.m. Friday, Oct. 16 at the Gilruth Recreation Center. Refreshments will be provided and donations accepted at the party. The auction will feature space memorabilia such as the vest worn by Gene Kranz during the Apollo 11 mission. A previously planned raffle has been canceled, but tickets already purchased will be good for \$2 each at the auction. For more information, contact Brian Andersen, x32884; Quinn Carelock, x30765; Linda Perrine, x32885; Kathy Turner, x32881; or Dan Molina, x30770.

### Symposium to eye Space Station applications

The University of Houston-Clear Lake's Research Institute for Computing and Information Systems will host a national symposium on computer systems, software engineering and aerospace research with potential for Space Station applications Oct. 14-15. John Garman, director of Information Systems Services, Space Station Program Office, NASA Headquarters, will deliver the keynote address, "The Real Technologies in Space Station Information Systems" at 8:30 p.m. Oct. 14. The symposium begins at 12:30 p.m. Oct. 14. Advance registration is suggested; the fee is \$50, and includes the cost of the keynote dinner and second-day buffet luncheon. For more information, contact Dr. Glen Houston, 488-9392.

### Italian space leaders to visit JSC

Italy's two senior government space program officials will outline their program's current status and plans at the Clear Lake Rotary luncheon at 1:30 p.m. Oct. 26 at the Hilton Hotel. Carlo Bongiorno, director of space for the Ministry of Scientific Research, and Luciano Guerriero, director of the National Space Plan Organization, will be here for the "Italy in Houston" cultural program. Members of the Clear Lake Economic Development Foundation (486-5535), The Space Foundation (332-0779), the Clear Lake Chamber of Commerce (488-7676), the Southwest Aerospace Professional Representatives Association (486-8153) and the American Institute of Aeronautics and Astronautics (333-6492), as well as JSC and contractor personnel, may attend the luncheon for \$8.25 per person. Those who want to attend should make reservations through their organizations.

### Lecture to explore writing Ada packages

Ed Colbert, president of ABS(s/w) Absolute Software, will speak to Clear Lake SIGAda on "Writing Usable Ada Packages" at 7:30 p.m. Oct. 28 at Orient Trader's Restaurant, 17630 Highway 3. Admission is free. Dinner will be served at 6 p.m. at a cost of \$7.50 for members and \$8.50 for non-members. For more information, contact Kathy Rogers, 282-5415.

### Professional secretaries to meet Oct. 14

Kate Burdak of Rockwell will demonstrate the Macintosh computer at the Oct. 14 meeting of the Clear Lake/NASA Area Chapter of Professional Secretaries International. Dinner begins at 5:30 p.m., followed by the program and business meeting at 7 p.m. at the Holiday Inn on NASA Road 1. For more information, contact Beverly Anderson, x32042, or Jessie Gilmore, x32739. Dinner reservations should be made with Mary Todd, 282-3942.

### NARFE November meeting nears

The November meeting of the NASA Area Chapter of the National Association of Retired Federal Employees will be at 1 p.m. Monday, Nov. 2 at the Harris County Park Bldg. on NASA Road 1. For more information, call Phil Hinton at 334-2455 or Burney Goodwin at 326-2494.

### Correction

The name of the project manager for the new JSC visitors center was incorrectly reported in the Sept. 25 Roundup. Vance Ablott will be Walt Disney Imagineering's manager for the project.



JSC Photo by Benny Benavides  
Members of the Senate Subcommittee on Science, Technology and Space tour Bldg. 9A. In the foreground, from left to right, are Sens. Larry Pressler and Lloyd Bentsen, JSC Director Aaron Cohen, and NASA Deputy General Counsel Edward Frankle.

## Senate panel hears testimony at JSC

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ment standing in the way. And if we can find ways from a legislative standpoint where we can be of help, that's what we want to do," Bentsen said.

"It's not enough to satisfy the curiosity of scientists as to what's out there," Bentsen added. "We have to find ways where it improves the standard of living of our own people and that means the commercialization of (space)."

Pressler said space commercialization is on a "roller-coaster ride," and that stabilization of the government's policies are necessary if U.S. private industry is to compete with the subsidized commercialization programs of other countries.

"Make no mistake about it, space leadership cannot be bought on the cheap," Pressler said. "If we want to demonstrate rather than talk about space leadership it must

be established as a top national priority."

Scott said his company, which hopes to put the first private manned space station in orbit, needs some form of federal loan guarantee to get the capital it needs.

"In the early development stage we have had no problem attracting investors," he testified, "but we're talking about very small amounts in relation to what we eventually would have to have. To finish our program there is no question we will have to have major financial help."

Slayton said all he wants is a fair shot at government contracts for his company's small Conestoga launchers, but that government insurance requirements are excessive. He said the launch sector of the industry needs relief from requirements that range users insure against the actions of not

only their own employees and products, but those of government employees and contractors over whom they have no control.

"As usual, the solution is customers and when you've got the customers the money is there," Slayton said.

Frankle, NASA's deputy general counsel, said the nature of insurance for space ventures is changing and that the government may not have as much insight into the design and fabrication of commercial launch vehicles.

"I am not at all certain I see why NASA should be the entity providing such indemnification and insurance," he said. "We had some control over the risk in the past; we would not necessarily have some role in controlling the risk in the future... perhaps it should be some other agency that has some ability to control the risk."

## Downey quake damage still being assessed

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have been to Bldg. 6, which houses the engineering staff. The building received structural damage, and most of its workers were told not to report to work until Oct. 6, when they were housed elsewhere. It will be closed until Oct. 12, Ewart said.

Suspended ceiling tiles and hanging fluorescent lights fell in other buildings due to flexing that also

ruptured water lines and caused some flooding. Power was lost when the quake hit, but was completely restored within two days. Ewart said the biggest problem was falling fluorescent fixtures.

Rockwell clean-up crews, supported by other contractors, worked around the clock for four days to restore order and repair the water leaks, electrical shorts, gas leaks

and other damage, Ewert said.

Ewert said evacuation of the buildings during the quake was quick and effective in spite of the power loss because NASA and Rockwell employees had established evacuation routes and coordinators in case of fire.

Rockwell's companion facility at Palmdale, Calif., was not damaged by the earthquake.

## Student experiments to fly on STS-26

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materials will be sponsored by the Office of Space Science and Applications (OSSA).

Other cargo experiments scheduled for the next mission include the Physical Vapor Transport of Organic Solids, a materials research test of the 3M Corp. designed to grow crystalline films on selected substrates of organic solids.

The Infrared Communications Flight Experiment, designed to demonstrate feasibility of using diffuse infrared light as a carrier for Shuttle crew communications is sponsored by the Office of Space Flight (OSF).

Other OSSA sponsored experiments include the Protein Crystal Growth, which utilizes the weightless environment of space flight to grow protein crystals of a size and quality needed to determine the molecular structure of the proteins. Such information is essential for under-

standing protein functions and synthesis, and for drug design and is co-sponsored by the Office of Commercial Programs (OCP).

The Isoelectric Focusing Experiment is designed to gather data on the extent of electro-osmosis in space.

The study of the physics associated with the separation of two-phase polymer solutions also will be put to the test. This experiment, known as the microgravity or Phase Partitioning Experiment, could lead to a better understanding of a method used in separating biological cells.

Other tests will involve low gravity conditions. The severe Aggregation of Red Blood Cells, an experiment to study aggregation of red cells and blood viscosity under low-gravity conditions is also OSSA sponsored.

Another OSSA sponsored test will include television and photographic data and will be used to

survey the correlation between lightning phenomena and severe weather activity.

A test to obtain measurements of Earth-limb radiance for various positions of the Sun is another OSSA sponsored experiment and is named the Earth-limb Radiance Experiment.

Finally, two student experiments are sponsored under the Student Involvement Program, Office of Educational Affairs. One experiment designed by high school student Lloyd Bruce of St. Louis and sponsored by McDonnell Douglas, will heat titanium metal filaments and observe the effect of weightlessness on molecular structure.

Another, designed by Richard Cavoli of Marlboro NY and sponsored by Union College, will study the control of crystal growth through a semi-permeable membrane. Such crystals have application to development of image-intensifying screens to detect gamma and X-rays.



Six of the weekend skydivers who work at JSC link up in free fall at right. They are (front to back and left to right): Richard Jackson and Linda Hautzinger, Don Pallesen and Robert May, Bill Lee and John Hopkins. Not shown is photographer Dave Flanagan, who had to stay out of the formation to take the picture with his helmet-mounted camera.

Photos by  
Dave Flanagan

## Pillows of air cushion skydivers' every move

By Beverly Green

Skydiving may look like falling but it really seems a great deal more like flying, according to seven JSC workers who are regular jumpers at the Spaceland Para-Center in League City.

"You feel weightless and you can, by maneuvering your body, control the direction of your flight," explained veteran skydiver Bill Lee, an engineering technician for Bendix.

Although diverse schedules make on-site gatherings a rarity, skydiving has knitted a closeness that transcends the JSC group's week-days and lifestyles. In fact, the more than 5,000 jumps among them span some 15 years.

Lee has been actively enthralled with the sport for 15 years and works as a first-jump tandem master at the Center. Although it has been years since he and his cohorts made their maiden leaps, most agree that first jumps are momentous, he said.

One can make a first jump in one of three ways. The tandem jump has been around for four years and involves a parachute built for two. "A tandem master takes a student on a ride with a 60-second free fall," Lee said.

Another option is the accelerated free fall jump, made from 11,000 feet. "On the first jump, a student is accompanied by two jump masters that assist during a one-minute free fall," he added.

Scores of vignettes are treasured by the on-site enthusiasts. Linda Hautzinger, a propulsion flight controller in Mission Control, admits that her "free-spirited" nature prompted her to jump.

"Four years ago, I withdrew the last \$85 from my bank account to take my first jump," she said. "After a while, I stopped jumping but started again 8 months ago."

Another propulsion flight controller, Richard Jackson, has jumped 900 times and is noted for breaking world and state records. "My first jump was also my first time in an airplane. The flight up glided me through blue skies and puffy white cotton balls. Midair felt like pillows cushioning my every move," Jackson recalled.

Until recently, beginners were permitted to enjoy only a few seconds of free fall because first jumps were done by static line. The static line, the third first-jump method, is a nylon tether attached to the plane that opens the parachute automatically immediately after the student leaves the aircraft.

Other on-site jumpers share in regional and world competitions regulated by the United States Parachutists Association and the Federation Aeronautique Internationale. Two years ago, Jackson and Don Pallesen, who does sustaining engineering and software development in Mission Control, broke a world record. Their 23-canopy stack formation topped France's previous record by one. A stack formation is achieved when a number of jumpers descend together with their feet hooked in each other's lines and their parachutes stacked one on top of the other.

These free-falling achievers also organize regional and local competitions patterned after USPA guidelines. Robert May, an engineering technician in Altitude Test Chamber Operations, is an 8-year-veteran. Both May and Jackson were members of the first-place team last year in the Twenty-Way Sequential Competition, in which judges prescribe several free-fall formations the divers must make in sequence within a certain amount of time. Two and a half formations created by 20 skydivers won the title.

For more than a decade, John Hopkins, an engineering aide at Boeing, has enjoyed the sport. Both Hopkins and May share the local Twin Otter high-altitude jump record of 25,000 feet.

Other hobbies complement skydiving. Research scientist Dave Flanagan enjoys free-fall photography. Flanagan's work has been printed in "Parachutist," a national magazine. His photo of a 20-way sequential dive is on the cover of the July 1987 issue.

"Capturing aesthetically pleasing photographs of free-fall formations is challenging while surviving in an alien environment," he said. Flanagan has close to 500 jumps, 150 of which have been with a helmet-mounted camera.

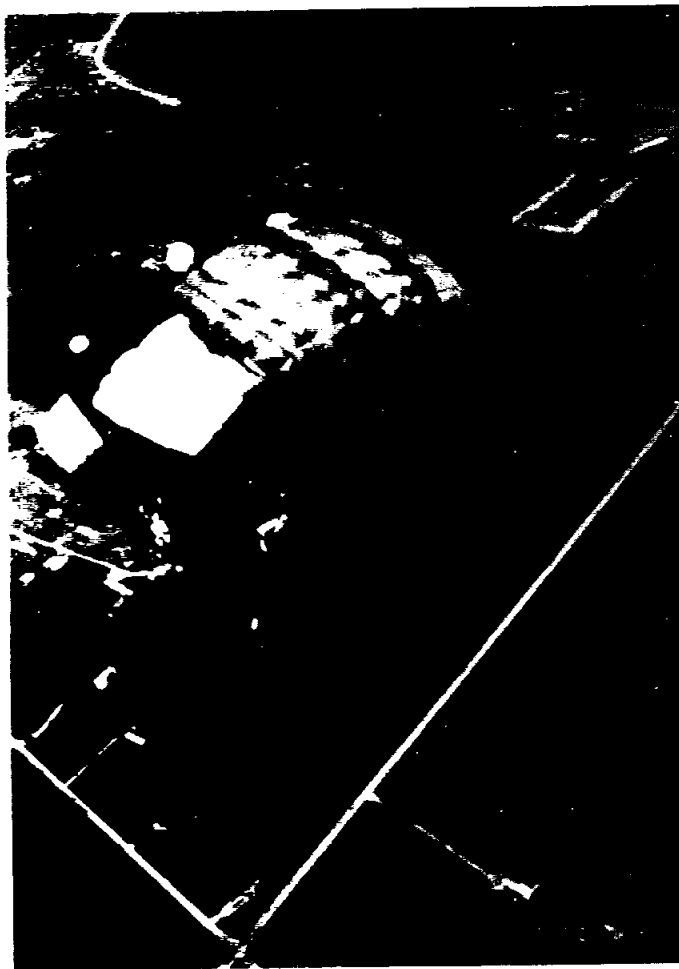
While these jumpers prove that appropriate training reinforced by safe environment and equipment can result in a rewarding sport, knees may be knocking at the thought of risk.

Although no skydiver is required to belong to the United States Association of Parachutists, USPA does require certification of instructors and those assisting others in jumps. Reserve parachute packers and those assisting others with packing are regulated by the Federal Aviation Administration.

Nevertheless, there were 30 skydiving fatalities in the United States during 1986. But they occurred at a rate of only one per 61,000 jumps.

The Spaceland ParaCenter is a SPA affiliate and is the largest commercial site in Texas, located on a square mile with a concrete runway. Adjacent to the runway is a large open field. Spacious training facilities, apparel and modern equipment and aircraft are featured.

Viewed in this context, Flanagan said skydivers urge enthusiasts to "fly clean, land soft, love hard and give beautiful memories."



The two photos above show a "triplane" formation with Jackson on top, May in the middle and Pallesen approaching. Triplanes can grow into "stack" formations involving 20 or more people. In the photo at right, four of the skydivers free fall over the familiar shoreline of Clear Lake; JSC can be seen in the lower left corner.



# Roundup Swap Shop

All Swap Shop ads must be submitted on a JSC Form 1452. The forms may be obtained from the Forms Office. Deadline for submitting ads is 5 p.m. the first Wednesday after the date of publication. Send ads to Roundup, AP3, or deliver them to the Newsroom, Bldg. 2 Annex, Room 147. No phone in ads will be taken.

## Property & Rentals

Lease: Baywind II condo, 1 BR, upstairs, drapes, new carpet, FPL, appliances, W/D, tennis, pool, \$295/mo. Chuck, x35402 or 488-5019 eve.

Sale: 13.5 acres, gently rolling wooded east TX land, front county blacktop, near Tyler and Henderson, assumable low cost Tx. Vet loan. McLeaish, 480-7445.

Lease: University Place, 3-2.5-1 townhouse, refrig., microwave, W/D, mini-blinds, fans, 4 miles to NASA. David, x32791 or 488-9768.

Lease: Baywind II 2-2.5 townhouse, large 2-story unit, 1,130 sq. ft., FPL, W/D, fans, pool, tennis, \$490/mo. Jeff, x30715 or 280-8608.

Lease/sale: Friendswood/Wedge-wood, 3-2-2, near schools, \$500/mo. plus deposit or \$3,000 down, assume \$46,000 FHA 9.5% loan, \$584/mo. Bob, 280-2636.

Sale: 8 acres, 325 feet frontage on State Hwy. 35 near Liverpool, 6 miles south of Alvin, \$5,800 per acre, flexible terms. Hardie, x31003 or 485-6074.

Sale: Friendswood, 3-2-2, new roof, on golf course, cul-de-sac, \$69,000. Warren, 482-2154.

Sale: 4-2-2, miniblinds, fans, microwave, 5 miles to JSC, low 60's, OBO. Roger, x36802 or 334-6866.

Sale: Furnished townhouse, 2,000 sq. ft., ex. cond., on golf course, Lake Travis, Austin. John, x57708 or 326-2461.

Sale: 2 Lots, Lake Livingston, private boat ramp and park, conveniences, \$1,500 down plus \$80/mo. James, x37929 or 280-9631.

Lease: Green Tee Pearland, 3-2.5, den, formal dining, \$850/mo. plus \$850 deposit. Ed Cawley, 280-5900 or 997-2034.

Lease: Friendswood, 4-2.5-2, beautifully landscaped, 2.5 lots, fenced, \$750/mo. Janine, 282-3035 or 480-9105.

Sale: League City/Bayridge, 3-2-2, drapes, fans, fenced, \$5,000 and assume payments of \$610/mo. on 10% VA loan. Keith, 334-6718.

Rent: Barringer Lane, Webster area, 2BR apartment, W/D conn., \$150 move-in. \$340/mo. Michael, 996-8113.

Sale: League City 3-2-2 on cul-de-sac, landscaped, fenced, new paint, extras, ex. cond., assume FHA fixed \$738/mo. plus low equity, will finance. David, x35464.

Sale: Seabrook 3-2-2, formal living room, appliances, close to schools, parks, shopping, 10 min. from NASA, \$50,500. Edward, x32163 or 470-8377.

Lease: Forest Bend 2-1.5 townhouse, 2 story, fans, \$395/mo. Betty Craig, x34158 or 420-2936.

Lease: Lake Livingston Waterfront 3-2 house, sleeps 8, furnished, pier, ex. fishing, skiing and swimming. James, x31407 or 482-1582.

Sale: 1.5-acre lot in Green Acres Webster, \$13,000 OBO, Boyd, x39415 or 332-4303.

Lease/Sale: League City/Countryside 3-2-2, good floor plan, big kitchen, \$500/mo. plus deposit or \$3,500 down, \$46,000 VA loan, \$613/mo. Scott, 482-3011.

Lease: Middlebrook, 3-2-2, fresh paint, drapes, FPL, fenced, near school. Walter, 332-1609.

Lease/sale: 5-2-2 Seabrook, 2160 sq. ft., FPL, custom bookcases, oak white kitchen, 10 minutes to NASA, CLISD, walking distance to Elementary and Junior High, \$650/mo. or \$72,000. Donna, x35250 or 479-1004.

Lease: 2-1 condo, large, 950 sq. ft. W/D, pool, playground, near day care, low deposit, \$330/mo. Manisha, 280-9822.

Lease: CLC area, large 2-1 condo, FPL, vaulted ceilings, W/D conn., appliances, storage, pools, hi eff. AC, \$350/mo. George, 486-0315.

Lease/sale: '80 mobile home, 14' x 56', set up Texas A&M, 2-1, AC, 7 min. to campus, ex. cond., \$235/mo. or equity plus assume \$122/mo. pymts. Scott, x37115 or 485-4364.

## Cars and Trucks

'74 Porsche 911S, red, new Pirelli P7, AC, 5 spd., ex. cond. w/records, 9K mi. on engine imported from Germany 6/86, \$12,750. Richard, x31144 or 474-9334.

'83 Olds Omega, 4 cyl., 4 dr., PS, PB, AC, good cond., \$3,500 OBO. Jim, x33428 or 488-0140.

'79 Chevy Malibu Classic, PS, PB, AC, 4 dr., 115K mi., reliable, \$1,100 OBO. Rick, x35480 or 996-8961.

'80 Volvo 4 dr. DL, AC, good cond., \$3,900 OBO. Lally, x39147 or 474-4941.

'86 Jeep CJ7, PS, PB, AC, 6 cyl., hardtop, 28K mi., \$9,450. David, x31470 or 554-7463.

'87 Volvo 240 DL, gold metallic, loaded, low miles, \$14,600. David, x31470 or 554-7463.

'59 Mercedes Benz 220S, \$2,700 OBO. David, x35464.

'82 Mercury Capri, 6 cylinder, auto., AC, AM/FM/tape, 44K mi., ex. cond.,

\$3,650. Bob, x39079 or 488-5881.

'78 Toyota Corolla, brown, 2-dr. deluxe sedan, ex. cond., one owner, \$1,500. Sue, x34008 or 482-9408.

'84 Monte Carlo, 41K mi., AC, PS, PB, bucket seats, tinted windows. Dee, x39024 or 482-6004.

'75 Volvo, 244 DL, 4-dr., AC, auto., AM/FM/tape, good cond., \$1,800. Buck Sharpton, 486-2111.

'64 Cadillac, 4 dr., engine needs head gasket, body in good shape, good paint, blue, \$600 OBO. Allen, x38999 or 486-6681.

'73 Dodge Roadliner motorhome, rebuild project, \$1,400 OBO; '81 Firebird Honeycomb Mags (4), \$100. Boyd, x39415 or 332-4303.

'70 Cutlass "S" 350/4 BBL, new tires, paint & chrome on SS II wheels, body stripped and primed, paint and parts available for restoration, \$1,500 OBO; '68 Cutlass "S" convertible, rebuilt 350/4 BBL, auto and rear-end, new top, tires, exhaust alternator and master cylinder, \$4,800 OBO. Kevin, 282-3819 or 482-5065.

'80 Audi 4000 Coupe 4 cyl., silver, new CV joints, clutch, AC, good cond., 1 owner, \$2,795. Leland, 335-8527 or 480-4548.

'84 Pontiac Fiero SE, red, 32K, sun-roof, AM/FM/tape, luggage rack, ex. cond., \$5,700. Mike, x34434 or 488-7912.

'79 Olds Cutlass Cruiser, new tires, brakes, belt, AM/FM, low miles. Manisha, x33340 or 280-9822.

'71 Corvette, auto, 350 engine, T-tops, 95K mi., good cond., original owner, \$4,900. Ann, 488-9280 or 333-3601.

'63 VW Bug, 15K mi. on rebuilt engine, AM/FM/tape, new parts, ex. cond., \$1,000 OBO. Ralph, x32513 or 532-2304.

'79 Toyota Pickup, 5 spd, AC, AM/FM, chrome wheels, radial tires, sun roof, ex. cond., \$2,250. John, x38178 or 482-5837.

'73 MG Midget, wire wheels, good cond., \$1,200. Lloyd, x31637 or 554-6871.

## Boats & Planes

16' Ski boat, 75HP Johnson, AM/FM, tow bar, new paint, 4 new seats, 5 new instruments, new carpet, skis, trailer, \$2,850. Reina, x31588 or 488-1326.

14' McKee Craft, 50 HP Mercury, canopy, instruments, vinyl cover, galvanized trailer, extra clean, \$3,200. Ted Sampsel, 326-1278.

'79 Bayliner 17' speed boat w/trailer, Volvo Penta AQ 120 I/O, new carpet, skis and hydraslide, \$4,500 OBO. Debbie, 534-3280.

16' Ski boat, 75-HP Johnson, tow bar, new paint, 4 new seats, instruments, carpet, skis, trailer, \$2,850. Ben, x31588 or 488-1326.

'79 Sunbird 16' sailboat w/trailer, 2 sails, cuddy cabin, \$1,400. Mary, 280-7303 or 480-1271.

## Cycles

Honda V65 Magna motorcycle, windshield, helmet, 4.2K mi., 4 cylinder, water cooled, \$3,500 OBO. Keith, x38952 or 486-5072.

Suzuki: #ALT 125 3 wheel all-terrain vehicle, 5 spd., \$850. Bauch, x31309 or 333-3382.

Boy's bicycle, 24", 10 spd., ex. cond., William, x33704 or 482-2369.

## Audiovisual & Computers

Radio Shack TRS model III computer, 48K, RS232, 2 floppy drives, software, \$150; acoustical modem, 300 baud, \$15. Dave, 332-3072.

Printer for PC, HP Thinkjet (inkjet), quiet, tiny, 150 cps, 190 dpi, centronics interface, w/IBM cable, great for portables, \$250. Mike, x37060 or 474-9132.

Seikosha GP 100CD printer, (Commodore compatible) \$85; Epson MX80 printer, \$90. Jerry, x31226 or 534-3710.

Complete video workshop: 2 camera w/char. gen., 2 portable VCRs, editor, enhancer, color monitor, mikes, lights, tripod, lens, filter and cases, \$5,000. Underhill, x32291 or 326-1303.

Hayes Internal Modem, 1200 Baud, smart comm. S/W, \$75. Mike, 482-1228.

Apple IIe, extended 80 column card, micromodem IIe, monochrome monitor, joystick, Grappler +, Gemini 10x, 120 cps printer, software. Alan, x38313 or 484-3317.

Marantz stereo, amp., AM/FM/tape, phono, cabinet, full remote, \$500; Color TV 25" console, needs adjustment, \$100. Color TV, Quasar "Fashion Accents" 10-in w/remote, \$195. Allen, x38999 or 486-6681.

Kenwood R-1000, short wave receiver 300kHz in original box, owner's manual, mint cond., 1 yr. old, \$275 OBO. Mike, 282-4100 or 996-9440.

## Household

Wicker and fabric couch, matching side table, \$400; queensized waterbed, \$150; dinette set, 5 pieces, smoked glass

top, gray vinyl chairs, \$200; stereo cabinet, \$25; bookshelves, \$25 (2), \$10 (2); 5-drawer bureau, \$75; stereo speakers \$20/pr. Janna, x34381 or 333-9690.

Child's desk, good cond., \$25. Alex, x33903 or 488-6521.

Sturdy Oakwood bunk beds, ex. cond., \$325; king-sized water bed mattress w/accessories; king-sized bed w/bookcase, good cond. Billie, x38334 or 482-4365.

Queen-sized, earth tone sleeper sofa, arms damaged by cats, \$500 OBO; O'Sullivan stereo cabinet, smoked glass doors, lift up top, \$100 OBO. Len, x35408 or 333-5576.

3-cushion couch, \$55; 2-cushion couch, \$50; solid console, AM/FM/tape w/record changer, \$75; Sears upright freezer, \$75; 2-drawer desk top, \$10. Suzette, x33606.

Magic Chef 30" chrome gas top, \$15; model 300 Kenmore garbage disposal, \$15; L-K celebrity stainless steel sink w/faucets, \$15; Whirlpool dishwasher, energy efficient, \$15. George, x34646 or 482-7156.

Beautiful pair of unusual carved large Spanish chairs, newly upholstered, \$500; French upholstered bench, \$250; Child's antique school desk and chair, \$35; child's table and chairs, \$27; two upholstered chairs, \$20; microwave custom stand w/storage, \$25; new 4-person life raft, \$25. Levine, 488-5564.

Sofa, loveseat and chair, floral design, \$100; 2 end tables, coffee table, \$75 OBO. Janet, x37355 or 554-4974.

Loveseat, upholstered rocking chair, golden brown color, good cond., \$50 and \$30. Carolyn, x31388 or 488-8678.

Living room suite, matching sofa, love seat and chair, earth tones, Herculon; coffee table, end table, oak finish w/glass inlays, ex. cond., \$950. Pierre, x32773 or 532-3515.

King-sized bedroom group, Basset, couch, chair, tables, breakfast table plus 4 chairs, 2-pc. open bookcase wall unit, ex. cond. Robert, 282-4464 or 488-3588.

King-sized bed w/box springs and frame, firm mattress, ex. cond., \$100. Laura, x35749 or 554-4577.

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## Gilruth Center News

Call x30304 for more information

**Mixed & men's flag football**—Registration times for the upcoming 10-week flag football seasons will be 7 a.m. for NASA-badged teams and 7 p.m. for non-NASA teams. Registration for the Tuesday mixed league that begins Nov. 17 will be Nov. 3. Registration for the Wednesday men's league that begins Nov. 18 will be Nov. 4. Registration for the Saturday men's league that begins Dec. 5 will be Thursday, Nov. 19.

**Turkey Trot 5K**—First 50 registered runners will receive a T-shirt for the 5K run that will begin Saturday, Nov. 21, at 8:15 a.m. Entry fee is \$6 before Nov. 17 and \$8 thereafter.

**Fall Intercenter Run**—The 10-kilometer and/or 2-mile races for the annual Fall Intercenter Run will be run throughout October. Runners may submit their times during the month, and the Rec Center will provide timers and refreshments at 5:30 p.m. Oct. 19 through 22, and at 8 a.m. Oct. 24.

**Weight safety**—Class is required for anyone wishing to use the Weight Room. Date is Oct. 22. Cost is \$4.

**Intermediate country and western dance**—Class starts Nov. 9 and continues every Monday night from 7 to 8:30 for six weeks. Cost is \$20 per couple.

**Defensive driving**—Course is offered Nov. 19 from 8 a.m. to 5 p.m. and costs \$20.

## Cookin' in the Cafeteria

### Week of October 12 — 16, 1987

**Monday**—Cream of Chicken Soup; Beef Burgundy over Noodles, Fried Chicken, BBQ Sausage Link, Hamburger Steak (Special); Buttered Corn, Carrots, Green Beans. Standard Daily Items: Roast Beef, Baked Ham, Fried Chicken, Fried Fish, Chopped Sirloin. Selection of Salads, Sandwiches and Pies.

**Tuesday**—Beef Noodle Soup; Baked Meatloaf, Liver & Onions, BBQ Spare Ribs, Turkey & Dressing (Special); Spanish Rice, Broccoli, Buttered Squash.

**Wednesday**—Seafood Gumbo; Broiled Fish, Tamales w/Chili, Spanish Macaroni (Special); Ranch Beans, Beets, Parsley Potatoes.

**Thursday**—Navy Bean Soup; Beef Pot Roast, Shrimp Chop Suey, Pork Chops, Chicken Fried Steak (Special); Carrots, Cabbage, Green Beans.

**Friday**—Seafood Gumbo; Broiled Halibut, Fried Shrimp, Baked Ham, Tuna & Noodle Casserole (Special); Corn, Turnip Greens, Stewed Tomatoes.

### Week of October 19 — 23, 1987

**Monday**—Chicken Noodle Soup; Wieners & Beans, Round Steak w/Hash Browns, Meatballs & Spaghetti (Special); Okra & Tomatoes, Carrots, Whipped Potatoes. Standard Daily Items: Roast Beef, Baked Ham, Fried Chicken, Fried Fish, Chopped Sirloin. Selection of Salads, Sandwiches and Pies.

**Tuesday**—Beef and Barley Soup; Beef Stew, Shrimp Creole, Fried Chicken (Special); Stewed Tomatoes, Mixed Vegetables, Broccoli.

**Wednesday**—Seafood Gumbo; Fried Perch, New England Dinner, Swiss Steak (Special); Italian Green Beans, Cabbage, Carrots.

**Thursday**—Cream of Chicken Soup; Turkey & Dressing, Enchiladas w/Chili, Wieners & Macaroni, Stuffed Bell Pepper (Special); Zucchini Squash, English Peas, Rice.

**Friday**—Seafood Gumbo; Baked Cod, 1/4 Broiled Chicken w/Peach Half, Salisbury Steak (Special); Cauliflower au Gratin, Mixed Vegetables, Buttered Cabbage, Whipped Potatoes.

### AT BUILDING #3

On Wednesday we feature The Reuben: Corned Brisket, Swiss Cheese on a bed of Sauerkraut, Poupon Mustard on Rye and 1/4 Pickle. Delicious!

Monday and Thursday check out our French Dip Sandwich.

NASA  
Lyndon B. Johnson Space Center

## Space News Roundup

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