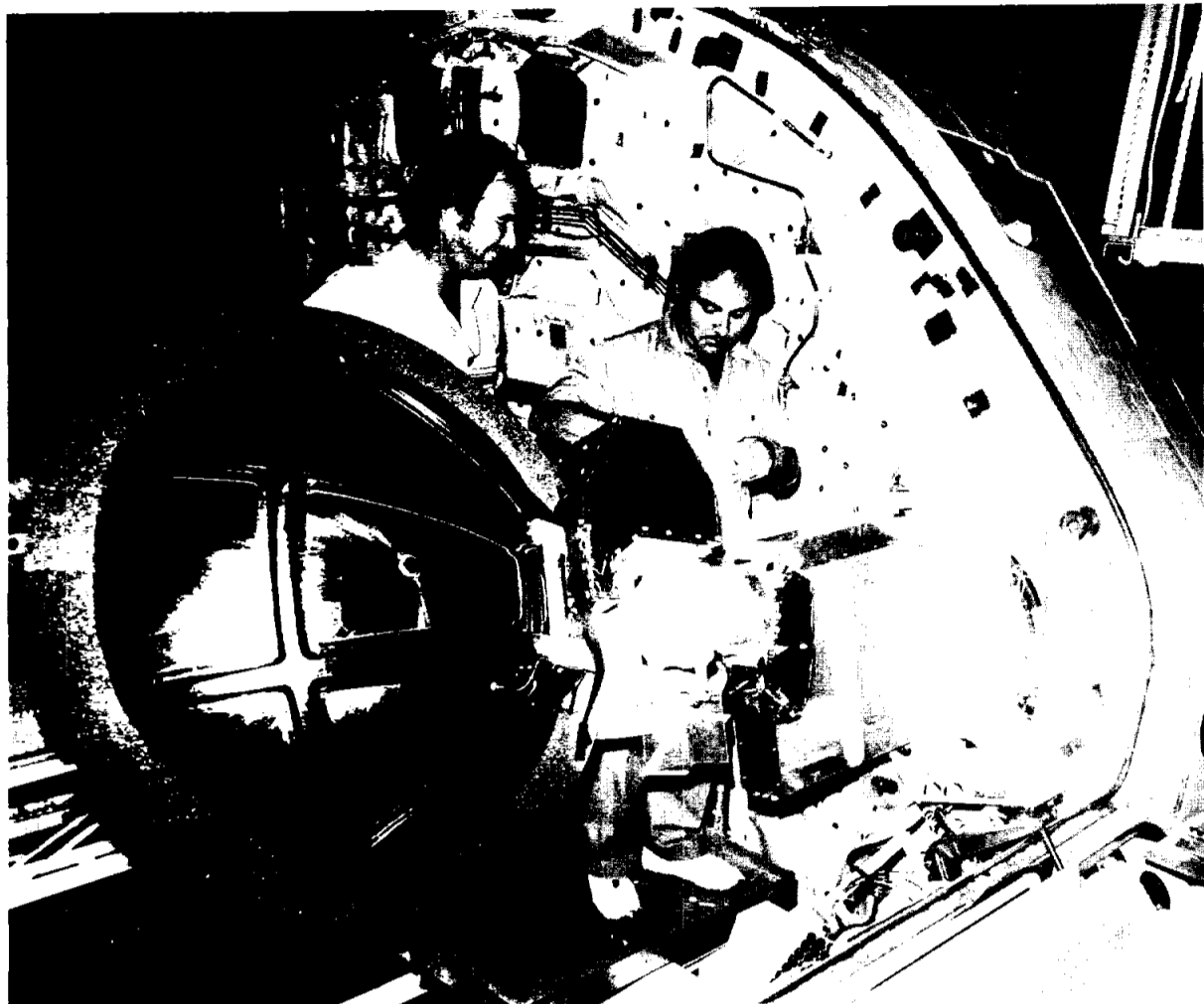


Space News Roundup

Vol. 21 No. 20

October 15, 1982

National Aeronautics and Space Administration



The Orbiter Challenger, now in the processing facility at the Kennedy Space Center, is shown here being fitted recently with a 36-inch Ku-band antenna for use with the new Tracking and Data Relay Satellite system, of which the first will go into orbit in Challenger's cargo bay. Challenger will be the first Orbiter capable of communicating with TDRS. The antenna is stowed in the forward part of the payload bay and is deployed after the spacecraft is in orbit. Challenger's first flight is scheduled for STS-6 in January of next year.

ISEE 3 diversion to comet approved

Plans to divert the International Sun Earth Explorer (ISEE 3) spacecraft to rendezvous with the comet Giacobini-Zinner have been given the go-ahead by NASA.

The comet intercept, the first ever done, will take place on Sept. 11, 1985 if a complex series of orbital maneuvers is successful over the next three years.

ISEE 3, launched in August 1978 under a cooperative program with the European Space Agency, has been studying the region between the Earth and the Sun in a delicately balanced orbit at a libration point between the two heavenly bodies.

Ground controllers at the Goddard Space Flight Center recently fired ISEE's thrusters in a maneuver which has sent it back toward the Earth. "The orbit was so delicately balanced, an astronaut could have flipped it this way with his finger," an Office of Space Sciences and Applications spokesman said.

That is but the beginning of an amazing series of orbital maneuvers in which ISEE 3 will ultimately use a lunar gravity assist to send it toward a ren-

devous with the comet 44 million miles from Earth.

Although not equipped with imaging instruments, the probe will be able to send back data on plasma, temperatures and the characteristics of particles in the cometary tail. It will, if targeting is successful, pass through the tail about 1,900 miles or more from the nucleus.

NASA officials hope the probe will then be in a position to aid European, Japanese and Soviet researchers who are sending a probe to intercept Halley's Comet in the Spring of 1986.

Comets are among the most visible and mysterious elements of our solar system. They are thought to be large bundles of ice, rock and gases which circle the sun in far flung orbits, some of which may take thousands of years to complete. Although not as famous as Halley's Comet, Giacobini-Zinner, which approaches the sun about every 13 years (Halley's returns every 76 years), is believed to be among the earliest remnants of the primordial solar system, and thus could provide clues to modern science on the origins of our cosmic neighborhood.

NASA announces crew for STS-10

Four of the five crew members who will man the Space Shuttle on its first dedicated Department of Defense mission, STS-10, have been selected.

They are NASA astronauts Thomas K. Mattingly, Commander; Loren J. Shriver, Pilot; Ellison S. Onizuka and James F. Buchli, Mission Specialists.

The fifth crew member, an Air Force manned spaceflight engineer, will be named at a later date.

STS-10 is currently scheduled for launch from the Kennedy Space Center in the last quarter of 1983.

Mattingly, whose last spaceflight was as commander of STS-4 in July, is a U.S. Navy captain who has been an astronaut since 1966. He served as a member of the astronaut support crews for the Apollo 8 and 11 missions and served as command module pilot of Apollo 16 in April, 1972. With the completion of two space

flights, he has logged 435 hours and two minutes in space, one hour and 13 minutes of which were spent in extravehicular activity during Apollo 16.

Shriver, a U.S. Air Force major, was selected as an astronaut candidate by NASA in 1978. In 1979, he completed his training period and became eligible for assign-

ment to Space Shuttle flights. He graduated from the USAF Academy in 1967, attended graduate school at Purdue University and saw duty in Thailand from 1973 to 1974. He attended the USAF Pilot School and Edwards Air Force Base and in 1976 began serving as a test pilot for the F-15 Joint Test Force there. He has flown 30 different types of fixed

wing and rotary wing aircraft, and has logged over 3,000 hours in jet aircraft.

Onizuka, a USAF captain, was selected as an astronaut candidate by NASA in 1978. In 1979 he was made eligible for assignment to Shuttle flights as a mission specialist. He entered active duty with the USAF in 1970 after

receiving his commission at the University of Colorado through the four-year ROTC program there. He attended the USAF Test Pilot School for a year beginning in August 1974, and in July 1975 was assigned to the Air Force Flight Test Center at Edwards, initially as squadron flight test engineer and later as chief of the engineering support section in the training resources branch. He has logged over 900 hours flying time.

Buchli, a U.S. Marine Corps major, is the recipient of an Air Medal, a Navy Commendation Medal, a Purple Heart, a Combat Action Ribbon, a Presidential Unit Citation, a Navy Unit Citation, a Meritorious Unit Citation and a Vietnamese Cross of Gallantry with the Silver Star. He was selected as an astronaut candidate by NASA in 1978 and became eligible for space flight as a mission specialist in 1979. He has logged more than 1,900 hours flying time, mostly in jet aircraft.



Thomas K. Mattingly



Loren J. Shriver



Ellison S. Onizuka



James F. Buchli

Flashlight in the heavens

Fleet of reflectors could augment national power needs, study says

It is summer in Philadelphia. The time is the near future. Dusk has come to the city as the terminator makes its slow passage from east to west across the continental United States. Millions of people have returned home from work, and as air conditioners are turned down, dinners are started and lights and televisions go on in the homes, the peak power demands on the metropolitan utility grid would normally be rising sharply.

But outside the area is cloaked in a diffuse light, even though the Sun has set, even though the Moon

has yet to rise. It is a light equivalent, in fact, to 56 full moons shining at once, or about the same level as average street lighting at night.

The light comes from 16 large solar reflectors 22,300 miles above the Earth in geosynchronous orbit. Collectively, they train their reflected light on various American cities, progressing from one to the next as the terminator moves across the continent. By augmenting street lighting needs of large power companies in various cities, the system would be capable of saving about \$285

million per year, and would pay for itself in less than five years.

Those are among the conclusions of a report recently released by the Langley Research Center in NASA Technical Paper 2065, "Illumination from Space With Orbiting Reflector Spacecraft," by researchers John E. Canady Jr. and John L. Allen Jr.

The concept of orbiting solar reflectors is not new, and indeed goes back to Hermann Oberth, who suggested a similar idea in 1929. But rather than functioning as a power producer such as the solar power satellite concept,

these reflectors would do no more than beam light to Earth. They would not store and send energy to Earth, nor would they increase temperatures in any area being illuminated within the 390 by 220-mile ellipse of light.

"There would be absolutely no change to the environment," Allen said. "We're talking about shining a flashlight on somebody. The system would be used only to augment and reduce peak power needs and could be used as a kind of national asset system in times of emergency and disaster, such as in land and sea rescue."

The idea is an outgrowth of earlier NASA studies, such as the Solares program at the Ames Research Center, for making use of large space structures to help ease energy problems on Earth.

Canady and Allen, using the 1976 energy usage data base for Philadelphia and extrapolating to other cities, suggest that about two hours of illumination at dusk and dawn in Philadelphia, Chicago, Denver, Los Angeles and Honolulu could save about \$285 million per year, paying for the system in a little less than five years. Since the

(Continued on page 3)

Space News Briefs

Quasar discovered 12 billion light years away

The size of our known universe effectively increased by an incredible 15 percent recently with the discovery of the most distant object known to humankind. A team of astronomers from the United States, Great Britain and Australia has identified a stellar object, known as PKS 2000-330, as a quasar which is 12 billion light years away, more than 1 billion light years farther away than any other object known. Light from PKS 2000-330 which is observed on Earth left that object before the Solar System was formed some 4.6 billion years ago, and probably before the Milky Way Galaxy was formed some 10 billion years ago. PKS 2000-330 was identified with radio telescopes of NASA's Deep Space Network in Australia, and measurements of its spectrum identified emission lines of hydrogen, oxygen, nitrogen and carbon with a red shift of 3.78, greater than that of any other object ever observed. The red shift is a measurement of how much an object shifts its light to the red end of the electromagnetic spectrum, and is thought to identify its velocity away from Earth. The mystery which surrounds quasars such as PKS 2000-330 is that they show up as light sources exceedingly bright for their distance, and must be tapping vast amounts of energy we do not understand. This brightness either means the red shift yardstick is incorrect, or the quasars are using energy sources which work in ways we do not even begin to fathom. Some have suggested that quasars are protogalaxies, but most scientists consider the available facts to be too inconclusive to support any one theory.

Findings indicate methane surfaces on Pluto, Triton

Scientists have found that both Pluto and Neptune's largest moon, Triton, have surfaces of frozen methane, and believe they may be crisscrossed with cracks and intricate webbings much like the Jovian moon Europa. This was the report of a team of astronomers from the Jet Propulsion Laboratory, the Harvard-Smithsonian Center for Astrophysics and Cambridge University in England. The team used the new Multiple Mirror Telescope operated by the University of Arizona and the Smithsonian to confirm their findings, and have also concluded that Pluto does indeed have a tenuous atmosphere as well. Methane is highly volatile and can change from a solid to a gas with only slight temperature rises. Both Triton and Pluto are close enough to the Sun for their methane surfaces to be on the verge of changing from ice to gas. Scientists believe Pluto's atmosphere is caused by the vaporizing of the methane ice. When the temperature drops to around 50° Kelvin at Pluto's farthest point from the Sun in its greatly varied orbit, the atmosphere is thought to thin and eventually disappear. At its closest approach to the sun in its 248-year orbit, the temperature reaches about 65° Kelvin, so scientists think the atmosphere may be present for only a few years out of every 248 years. They will observe Pluto as it nears its closest approach in 1989 and hope to see over the next 20 years the birth and death cycle of the atmosphere. Voyager 2 will pass by Neptune and Triton in 1989.

Orbiter 101 used in vibration tests

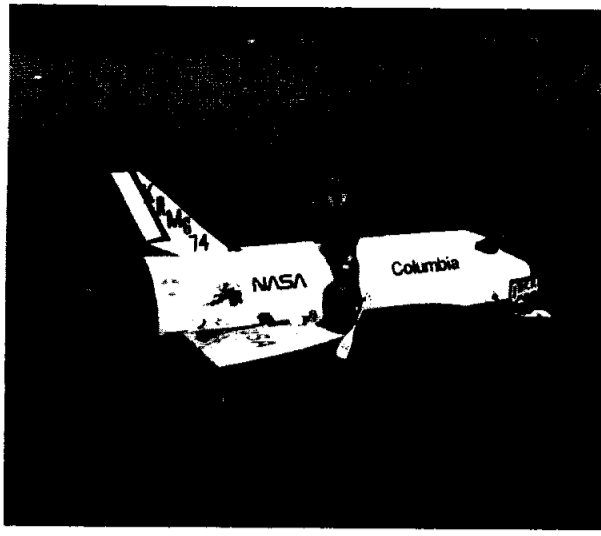
Orbiter Vehicle 101, the *Enterprise*, is back in service at the Dryden Flight Research Facility in a month-long series of structural failure tests. In order to identify potential structural trouble spots on the steadily emerging fleet of Shuttle Orbiters, technicians at Dryden are subjecting *Enterprise* to electromagnetic shaking to study its reaction to rapidly varying forces. Some 250 accelerometers attached to the Orbiter's surface are feeding readings from those vibrations into a computer, which in turn defines the mathematical relationships between force inputs and response accelerations. The process is known as modal analysis, and is designed to show where structural degradation may occur over the lifetime of an Orbiter without damaging *Enterprise* or any other vehicle on which it is used. *Enterprise* is being used to validate the usefulness of modal analysis for future use on other Orbiters. Tests are scheduled to continue through the end of this month.

'Leasecraft' memorandum signed

A mini space platform which could be in orbit and commercially available to customers by 1986 was the subject of a Memorandum of Understanding signed recently by NASA Headquarters and the Fairchild Space and Electronics Co. Called Leasecraft, the platform would be carried into orbit by the Space Shuttle, serviced periodically, and would be designed for a long lifetime in space. The platform would provide various commercial payloads with power, stabilization, communications and the ability to change orbit. Fairchild would be responsible for leasing room on the platform commercially, as well as for providing technical and administrative support. Under the memorandum, NASA and Fairchild will study the potential for a Joint Endeavor Agreement on the platform. More detailed plans for Leasecraft are expected in the next several months.

Lunar Rover is in the Army now

A prototype Lunar Roving Vehicle developed by the Grumman Aerospace Corporation for the Apollo program is in the Army now, at Fort Benjamin Harrison undergoing tests to see if similar unmanned vehicles can improve the effectiveness of soldiers. The Army will use the Lunar Rover, leased from Grumman, in a year-long study into robotics on the front line. Vehicles using Lunar Rover technology and more recent advances in communications, detection and robotics might be able to identify minefields, resupply troops, gather intelligence or even perform sentry duties, the Army believes. The Soldier Support Center at Fort Benjamin Harrison is studying such vehicles as "force multipliers" in any future military encounters.



SPACERAFTS, PART 2: Readers may recall a photo two issues ago (SNR, Sept. 17) of a boat decked out as an Orbiter in an English boat competition. Well here's an American version built by Rockwell International's Tulsa Division, which manufactures the payload bay doors for the real thing. The spacecraft competed in the Great Raft Race on Labor Day in Tulsa and won first place as Best Decorated. Jeanie Dodd of Rockwell-Tulsa reports the payload bay doors worked perfectly.

"I guess we've arrived," said Public Services Branch Chief **Charles A. Biggs** when word came from the American Automobile Association that JSC is now listed as a diamond attraction in the AAA tour books. "Starting with the 1983 editions, such outstanding attractions as your Lyndon B. Johnson Space Center will be shown with a diamond, a symbol that we believe better reflects the excellence of those attractions so designated by AAA field representative," wrote **Robert G. Williard**, AAA's Manager of Editorial Operations.

The substance they suggested as a principal constituent for repairing Shuttle thermal protection tiles in orbit may be a real mouthful (it's called tetraethylorthosilicate), but for **Glenn M. Ecord** and **Calvin Schomburg**, it proved to be an enormously valuable contribution to the Orbital Flight Test program. At a time when the extremely complex on-orbit tile repair techniques were found to be unreliable, Ecord and Schomburg came up with a solution which helped OFT take place, and also proved that repaired tiles could be used during the complete flight cycle. Initial cost savings prior to STS-1 alone were calculated at upwards of \$2 million thanks to their invention. In recognition of that, Center Director **Gerald Griffin** recently presented them with Invention Awards and a check for \$5,000 each.



Glenn M. Ecord Calvin Schomburg

Dr. Frank B. McDonald, formerly the Chief of the Laboratory for High Energy Astrophysics at the Goddard Space Flight Center, has assumed new duties as NASA's Chief Scientist. In that position, he will serve as the principal advisor to the Administrator and other senior officials on scientific aspects of NASA activities. McDonald joined Goddard in 1959. During his career with NASA, he has been project scientist on nine different satellite programs and the principal investigator for many space experiments. In the past year, he has been detailed to the White House Office of Science and Technology Policy as a senior policy analyst.

Some 55 representatives of the JSC government/industry team have been selected by the Manned Flight Awareness Office for an expense-paid trip to the Cape to view the STS-5 launch. Selection for the trip is one of the highest forms of recognition given to NASA/industry personnel who have performed in an outstanding manner. In addition to seeing the launch, the honorees will be recognized at a special reception where they will be greeted by NASA Administrator **James Beggs** and other senior NASA officials and astronauts.

Stanley H. Goldstein, Chief of the Employee Development Branch, was awarded a plaque recently by the U.S. Office of Personnel Management for significant contributions to employee development and training. "The basis for the award is the exemplary employee development and training program Mr. Goldstein has directed at JSC over the past fifteen years, in helping the Center meet the challenges of manned space flight and in making major contributions to the Center's programs and missions," said **Edward Vela**, OPM's Regional Director.

People

Graduation certificates were presented by Deputy Director **Clifford E. Charlesworth** recently to participants in the ninth Worker-Trainee Opportunities (WTO) Program. Graduates successfully completed one year of classroom and on-the-job training as prescribed by government guidelines. The graduates were: **Michelle Breedlove**, **Vanessa Ashworth**, **Virginia Greeley**, **Kelly Nisbet**, **Sharon Szpak**, **Judith Stovall** and **Daphne Webster**. This year, the Employee Development Branch also initiated a WTO of the Year Award, which went to **Daphne Webster**. The award was accompanied by a superior performance award and a monetary award. Letters of commendation also went to **Sharon Szpak** and **Vanessa Ashworth** for being nominated for the award.



Participants in the ninth WTO class pictured here are, left to right: **Freda M. Lowe**, WTO coordinator and instructor, **Virginia Greeley**, **Daphne Webster**, **Vanessa Ashworth**, **Sharon Szpak**, **Judith Stovall**, **Kelly Nisbet**, and **Michelle Breedlove**.



The latest in a series of somewhat informal JSC Regattas was held recently and resulted in the awarding of the Turtle Trophy (which is, inexplicably, an armadillo) to the crew of *Panache*. Skipped by Special Assistant to the Director **Neil Hutchinson** and crewed by JSC Director **Gerald Griffin**, Assistant to the Director **Larry Griffin** and Flight Operations Integration Office Chief **Pete Frank**, *Panache* finished the race dead last and thus qualified for the trophy. The winning boat was *Valvandi*, skippered by **Matt Matthews** of the Flight Manifest Office. Above right, crew members **Frank**, **Griffin** and **Hutchinson** pose gamely with the trophy, while at left, all four crew members huddle to reconsider nautical strategies. The race, formerly known as the LaCaWaFa Cup and before that the SPIDPO Cup, is organized under a handicap system, with starts for various vessels occurring at anywhere from T minus 0 to T plus 30 minutes. The Race Committee maintains that the handicaps are designed by "a group of internationally acclaimed yacht persons. These men and women possess unimpeachable integrity, have diligently studied yacht design and are considered intellectual giants in the field of yacht handicapping."

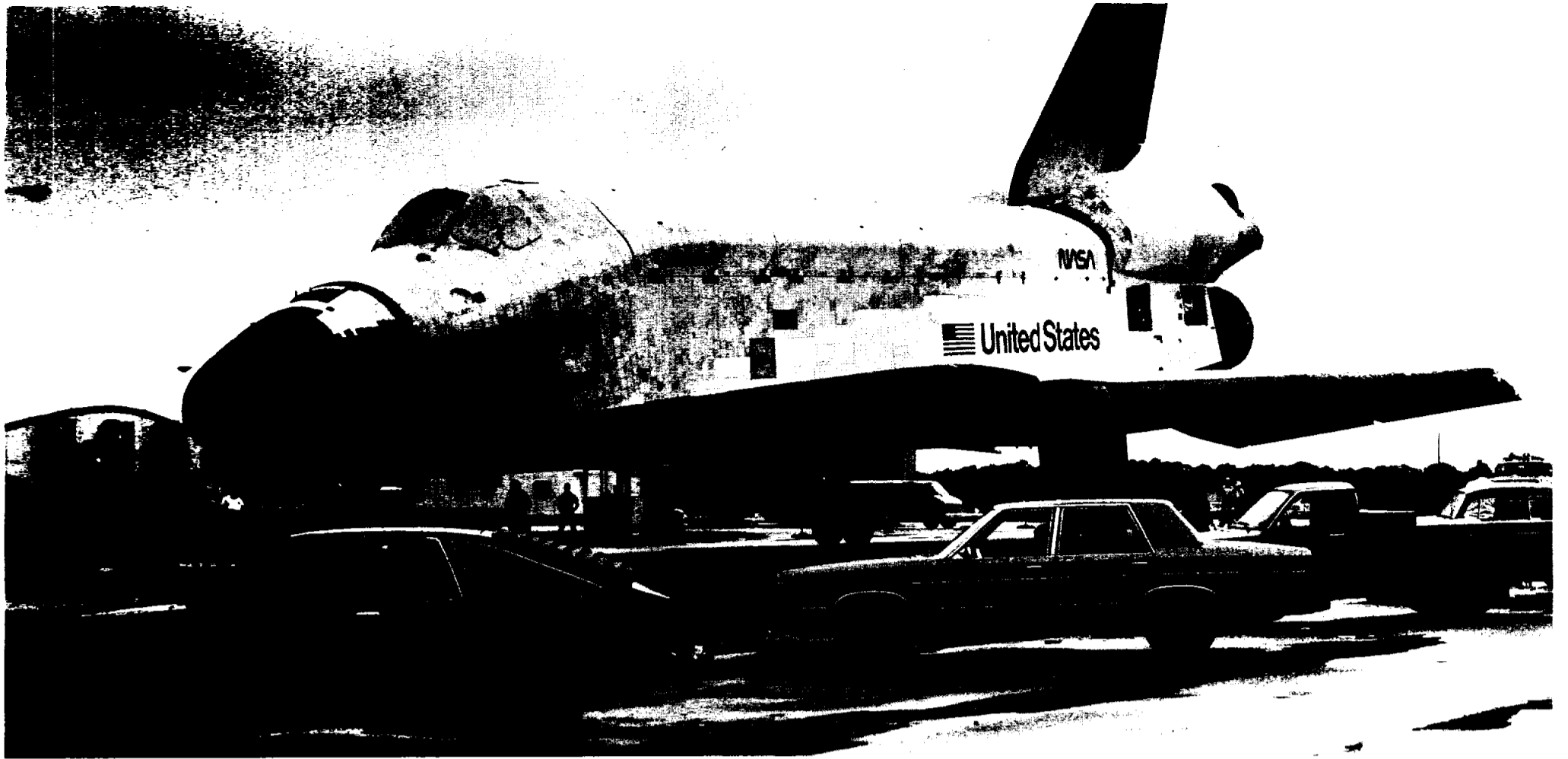
NASA
Lyndon B. Johnson Space Center

Space News Roundup



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Editor: Brian Weir



It may look as if the Spaceship Columbia is on the used car parking lot, but although she has over 10 million miles on the frame, her days on the road have just begun. Actually, this is a scene from the rollover last month at the Cape to the Vehicle Assembly Bldg.

Flashlight

(Continued from page 1)

design lifetime of the reflector system is 15 years, that would amount to about 10.5 years of operation at a profit of nearly \$3 billion.

The reflectors, each measuring a kilometer (6/10 of a mile) in diameter, would be carried aloft by the Space Shuttle. The compressed structures would be deployed from the Shuttle in low Earth orbit, and once erected in their flat circular shapes, would

use solar sailing techniques — employing low thrust provided by photons from the solar wind — to slowly move to geosynchronous orbit, Allen said. One reflector could be launched by a single Shuttle mission.

Once on station, the reflectors could be commanded to change attitude by controllers on the ground, or they could do it automatically. The reflectors would also be capable of changing their

positions in orbit, and could move 180° to the other side of the planet in about 10 days, by means of solar sailing, Allen said.

While cautioning that the paper does not represent a decision by NASA or any other agency to actually build and launch the system, Allen said he has been "inundated" with calls since the idea was picked up by Science Trends Newsletter and United Press International. "I hope the enthusiasm permeates," he said.

NASA, West Germany sign Spacelab agreement

West Germany has become the first country to purchase a dedicated Spacelab mission from NASA, at a cost of approximately \$65 million.

A Launch Services Agreement for the D-1 Spacelab mission, scheduled for launch on the Space Shuttle in June 1985, was entered into by Lt. Gen. James Abrahamson, NASA Associate Administrator for Space Transportation Systems; Professor Dr. Hermann Jordan, Chairman of the Board of the German Aerospace Research Establishment (DFVLR); and Dr.

Wolfgang Hasenclever, Vice Chairman of DFVLR.

The D-1 mission will consist of low gravity experiments in the field of materials processing in space and life sciences. The experiments are primarily sponsored by West German industry, universities and other research institutions. Scientists from other European countries and the United States are also participating in experiments to be flown on the D-1 mission. The West German Ministry for Research and Technology has overall program responsibility from the D-1 mission. The DFVLR

has management responsibility for the mission.

This Launch Services Agreement continues a long history of United States-West German space cooperation. The Federal Republic of Germany has been a strong supporter to Space Transportation System utilization and contributed 64 percent of the funding for the billion-dollar European development of Spacelab. Spacelab is a major element of Space Transportation Systems with facilities and equipment similar to laboratories on Earth but adapted to zero gravity.



Shown at the launch pad recently during the Countdown Demonstration Test are STS-5 crew members William Lenoir, Vance Brand, Robert Overmyer and Joe Allen. Allen is wired with biomedical sensors as part of pre-flight testing. The crew this week participated in a full-up 56-hour simulation of their upcoming mission with the control facilities at JSC.

Bulletin Board

Theme contest for EAA picnic begins

The Employee Activities Association picnic committee is sponsoring a theme contest for the 1983 picnic, to be held on-site next May at the Gilruth Center. The winning suggestion will be worth a \$50 savings bond to the suggestor. The deadline for entries is close of business Oct. 29. Each entry must be submitted in a sealed envelope to Joan Baker, Code CA12. All entries will be date stamped; in the event of a tie, the earliest submittal wins. The suggested theme must be explained sufficiently so it can be implemented, and the entry must be typed or clearly printed and must include the person's name, office phone, organization and mail code.

Space books hit the market this season

At least three new books which may be of particular interest to JSC employees are now or will soon be appearing on the bookshelves this fall. "Space," (Random House), another epic novel by James A. Michener, was officially released Oct. 1 and follows a variety of fictional and non-fictional characters from 1944 to the birth of NASA in 1958 and through the STS-2 mission last November. From Wallops Island to Saturn, Michener presents a novelized account of NASA's genesis and the agency's operations over the last quarter century. Two other new offerings are by JSC's own James Oberg. "Mission to Mars," (Stackpole), chronicles the assumption, guidelines and constraints for any future manned missions to the Red Planet. "UFOs and Outer Space Mysteries," (Donning), is an updated collection of several Oberg pieces on UFO stories and modern space myths. All three books are available locally.

AAS conference set for Houston, Oct. 25-27

The three-day annual conference of the American Astronautical Society (AAS) will begin at 1 p.m. Oct. 25 at Houston's Astroville Hotel, with space leaders from government and industry meeting to discuss the future course of space utilization. The conference, celebrating the 29th anniversary of the AAS, is being co-sponsored by the American Institute of Aeronautics and Astronautics. Registration opens at 4 p.m. Oct. 24 and 8 a.m. Oct. 25. Attendees may register by mail by writing to the AAS in care of Lockheed-EMSCO, D-01, 1830 NASA Road One, Houston, TX 77058. AAS Headquarters in Alexandria, VA may also be called for more information, at (703) 751-7323.

'Journey To The Stars' concert set

The Clear Lake Symphony at the University of Houston/Clear Lake City will appear in concert at 8 p.m. Oct. 23 at the Clear Lake High School Auditorium with "Journey To The Stars," a children's concert. Conducted by Dr. Charles Johnson, the symphony program includes Haydn's overture to "The Creation," and the themes from "Star Trek," "Star Wars," "Close Encounters" and "2001: A Space Odyssey." Tickets are \$3 general admission and \$1 for senior citizens and students. For more information, call 488-9390 or 488-9288.

Safety films to be shown

Safety awareness is the goal of a special film showing from 9 a.m. to 4 p.m. Oct. 22 in the Bldg. 30 Auditorium. The continuous showing of several films is designed to allow JSC employees to view them as their schedules allow. Included in the films is a study of the fire at the MGM Grand Hotel in Las Vegas, the award-winning "Learn Not to Burn" film with Dick Van Dyke and "Where's Tommy?" a study of safety hazards children can confront at home. The films are being presented by the JSC Safety Awareness Office in observance of Fire Prevention Month. Announcements will be circulated with complete film showing schedules.

Organizational meeting to be held

An organizational meeting for people in the training field will be held Oct. 26 at the Gilruth Center to explore the potential for setting up a local chapter of the National Society for Performance and Instruction. The meeting will be held from 5:30 to 7:30 p.m. The NSPI is a professional organization for training personnel. For more information, call Hattie Thurlow at x2388.

NARFE plans Galveston trip

Chapter 1321 of the National Association of Retired Federal Employees will meet at the Clear Lake Park Building on NASA Road One at 11:30 a.m. Nov. 3. Following a short business meeting, the group will go by bus to Galveston for lunch, sightseeing and a tour of the recently renovated sailing ship *Elissa*. For more information and reservations, call Margaret Goodwin at 334-2494.

Gilruth Center News

Call x3594 for more information

Macrame — Learn simple knots of macrame to make plant and towel hangers and many other gift items. Materials for projects may be purchased at the class for a reasonable fee. The class cost is \$30 for an eight-week course. Limited space, so register now.

Halloween Fun Run — The 2nd Annual Halloween Fun Run will be held at the Rec Center starting at 7 p.m. Oct. 29. Medals will go to the top finisher in each age group, with trophies to the best costume. The cost is \$5 per person and T-shirts will be given to the first 300 entrants. Refreshments will be served after this 5 km race.

Garage sale — Don't miss the Rec Center's garage sale Oct. 16 from 9 a.m. to 3 p.m. All types of homemade items will be on sale, and food and refreshments will be available.

Intercenter race — Once again, JSC employees will have the opportunity to represent themselves in this competition against other centers. The race series is being held from Oct. 11 to 22, with a race starting here at 9 a.m. Oct. 16. For more information, call the Rec Center at x3594.

Instructors needed — If you are proficient in teaching a leisure class which may be of interest to JSC employees, call Helen Munk at x3594 to discuss details.

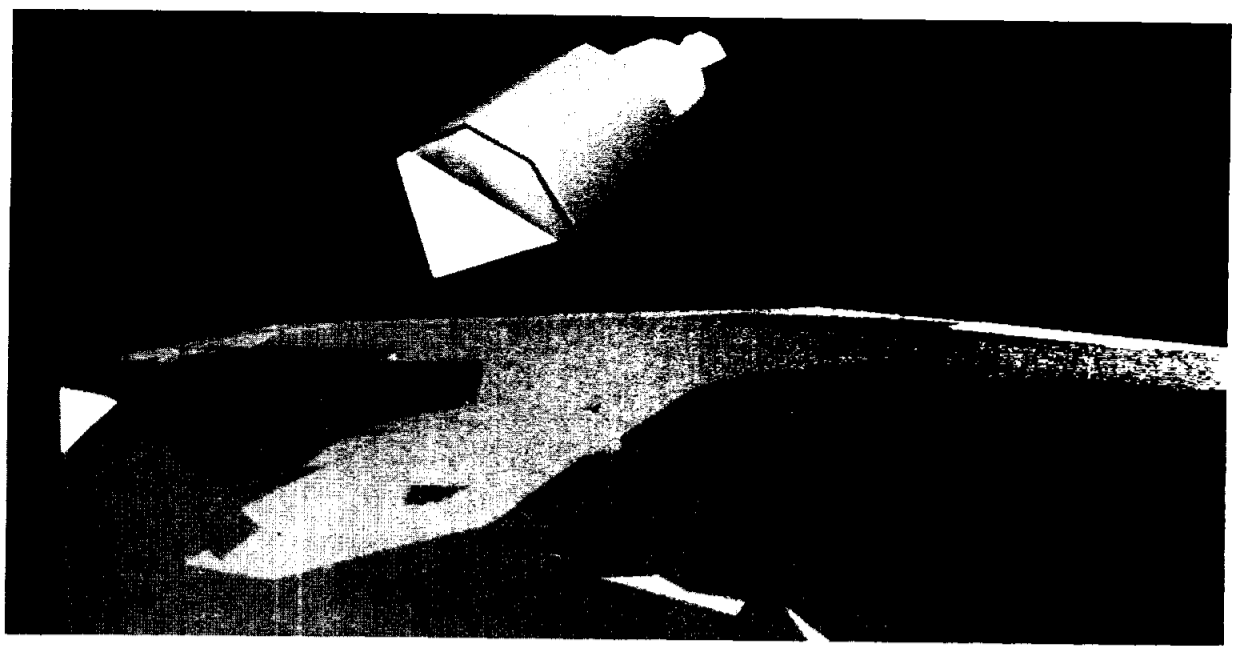
JSC vs. UH/CLC — Due to the success of our year-long one-on-one competition with the University of Houston at Clear Lake City, the Rec Center is expanding the program this year to include Ellington AFB. Sports under consideration include tennis, flag football, golf and racquetball. If you are interested in representing JSC, call Helen Munk at x3594.

Dancercise — This course meets from 5:30 to 6:30 p.m. Tuesdays and Thursdays for six weeks. The cost is \$20 per person. Call the Rec Center for details.

Children's Halloween party — Keep the kids safe on Oct. 31. Have them attend the Gilruth Halloween Party from 6 to 10 p.m. Halloween night. Featured events are a 3-D movie, popcorn, coke, treats and a costume contest with prizes in various age groups. The cost is \$1 per person and tickets are available in Bldg. 11

Country western dance — This popular class is again available beginning Nov. 1. Advanced dance is held from 7:15 to 8:45 p.m. and beginner's class from 8:45 to 10:15 p.m. Cost for the course is \$20 per couple with a limit of 15 couples. For more information, call the Rec Center at x3594.

Ballroom dance — Learn the fine art of ballroom dance. Class begins Oct. 28 for 8 weeks. Two classes will be offered on Thursday nights. The cost is \$50 per couple. Intermediates' class is from 7 to 8:15 p.m. and beginners' class is from 8:15 to 9:30 p.m.



This scene is a simulated view of one of the two communications satellites which will be launched from the Shuttle during STS-5. Florida and the upper Gulf Coast and the East Coast form the background for the simulated scene, created by computers supporting the mission simulation and training facility here.

Cookin' in the Cafeteria

Week of October 18 - 22, 1982

Monday: French Onion Soup; Beef Chop Suey, Polish Sausage w/German Potato Salad, Breaded Veal Cutlet (Special); Okra & Tomatoes, Green Peas. Standard Daily Items: Roast Beef, Baked Ham, Fried Chicken, Fried Fish, Chopped Sirloin. Selection of Salads, Sandwiches and Pies.

Tuesday: Split Pea Soup; Salisbury Steak, Shrimp Creole, Fried Chicken (Special); Mixed Vegetables, Beets, Whipped Potatoes.

Wednesday: Seafood Gumbo; Fried Catfish w/Hush Puppies, Braised Beef Rib, BBQ Plate, Weiners & Beans, Shrimp Salad, Stuffed Bell Pepper (Special); Corn O'Brian, Rice, Italian Green Beans.

Thursday: Chicken Noodle Soup;

Beef Stroganoff, Turkey & Dressing, BBQ Smoked Link (Special); Lima Beans, Buttered Squash, Spanish Rice.

Friday: Seafood Gumbo; Broiled Turbot, Liver & Onions, Fried Shrimp, Meat Sauce & Spaghetti (Special) Green Beans, Buttered Broccoli, Whipped Potatoes.

Week of October 25 - 29, 1982

Monday: Beef & Barley Soup; Beef Chop Suey, Breaded Veal Cutlet w/Cream Gravy, Grilled Ham Steak, Weiners w/Baked Beans (Special); Buttered Rice, Brussels Sprouts, Whipped Potatoes. Standard Daily Items: Roast Beef, Baked Ham, Fried Chicken, Fried Fish, Chopped Sirloin. Selection of Salads, Sandwiches and Pies.

Tuesday: Celery Soup; Fried Shrimp, Pork Chop w/Applesauce, Turkey a la King, Chinese Pepper Steak (Special); Au Gratin Potatoes, Breaded Squash, Buttered Spinach.

Wednesday: Seafood Gumbo; Fried Catfish w/Hush Puppies, Braised Beef Ribs, Mexican Dinner (Special); Spanish Rice, Ranch Beans, Buttered Peas.

Thursday: Green Split Pea Soup; Corned Beef w/Cabbage, & New Potatoes, Chicken & Dumplings, Tamales w/Chili, Hamburger Steak w/Onion Gravy (Special); Navy Beans, Buttered Cabbage, Green Beans.

Friday: Seafood Gumbo; Deviled Crabs, Broiled Halibut, Liver & Onions, BBQ Link (Special); Buttered Corn, Green Beans, New Potatoes.

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 rent: Galveston By-The-Sea condo, two BR, furnished apartment available by days (2 min.) week or month. Call Clements, 474-2622.

For sale: 1.39 acre lot in Friendswood, Cowards Creek, by owner, assume 10%, \$41.5K total. Call Chambliss, x4451 or 486-1907.

For sale or rent: League City, Pecan Forest, 3-2-2, fireplace, freshly redecorated, \$695/mo. or finance below market in 70s. Call 554-6200.

For rent: League City, 3-1 1/2-2, newly redecorated, nice neighborhood, no pets, \$525/mo. plus deposit. Call 554-6200.

For sale: 2-1-1 condo on Clear Lake, pools, saunas, lighted tennis courts. Call Joan, 488-6441.

For lease: Clear Lake townhouse, 2-2 1/2-2, fireplace, custom drapes, refrig., W/D, \$510/mo. Call Actkinson, x4761 or 482-7061.

For sale or trade: 5 lots in East Texas subdivision, heavily wooded, total \$4,500 or trade for equal value. Call Gary, x4341 or 332-5252 after 4:30 p.m.

For lease: Camino South 3-2-2, new carpet, very clean, fenced, near schools and churches. Call Price, x2851 or 488-3685 after 5:30 p.m.

Cars & Trucks

1972 Chevy Nova 2 dr., good second car, body in excellent condition. Call Lorna, 482-5305.

1981 Datsuns, two, good work cars, take your choice, either for approximate balance due. Call Jim, x2651 or 332-0116 anytime.

1969 VW Beetle, good running condition, \$1,100. Call Bernhard, 333-2968.

1976 Buick Skylark, V6, AM/FM, runs well, good tires, \$2,500. Call Mary, x2451 or 280-0311.

1979 Mercury Capri 2.3 liter Turbo RX coupe, loaded, 33K miles, excellent condition, \$5,600 or best offer. Call Jimmy, 333-6361 or 488-4321.

1966 Volkswagon Camper van, excellent condition, factory rebuilt engine, \$1,275. Call 488-7137.

1980 Triumph Spitfire, dark green, beige interior, 1,100 miles, excellent condition, \$5,500. Call 649-0503.

1978 Chevette, AC, auto, AM/FM stereo, new tires, low miles, \$2,450. Call 474-4885 after 5 p.m.

1979 Capri RS, 2.3 liter, turbocharged, PS, PB, AC, AM/FM/cassette, beautiful, carefully maintained, \$4,500 with car cover. Call Dr. Lambert, x5171 or 554-7079 evenings.

1978 Cadillac executive 2 door, loaded, \$5,500 firm. Call 483-6130.

1967 Mercedes 250SL, white, auto, blue leather interior, both tops, 50K miles, excellent condition. Call 661-3182 after 6 p.m.

1977 Olds Delta 88 Royale, 4 dr, PS, PB, AC, AM/FM/8 track, loaded, 31,800 miles, excellent condition, \$4,450, negotiable. Call 333-3213.

1978 Ford Fiesta, 4 spd., AC, AM/FMstereo, 58K miles, excellent condition, \$2,700. Call Tom, 480-0137 days, x5971 after 4 p.m.

1981 Datsun 200 SX, loaded, SL-package, cruise, best offer over \$8,000; also, 1977 Mercury Marquis, \$3,000. Call Randall, x5157.

1974 Opel 1900 wagon, running condition, good work car, \$600. Call Guess, x5341 or 649-5092 after 5 p.m.

1972 Mustang Mach 1, excellent condition, mags, stereo, motor and auto trans. rebuilt like new, \$2,750. Call Doris Wood, x4464 or 333-2373.

1981 Trans Am, special edition, loaded, best offer. Call 484-5907 or come see at 950 FM 1959, Windjammer Apts. no. 702.

1980 Winnebago, 26-foot, loaded, excellent condition, \$18K. Call 534-6171.

1979 Ford 1/2 ton pickup, F150, LWB, 6 cyl., std. shift, 51K miles, light blue with stripes, \$3,295 firm. Call Jim, x5017 or 481-3648.

1982 Ford Bronco, sacrifice, no equity, auto, air, cruise, tilt, AM/FM/cassette, metallic blue/white. Call 482-8465.

1976 Chevy Nova, red, 2 dr., excellent condition, second car, \$1,800 or best offer. Call Don, 332-9641, x309 days or 482-5305 after 5 p.m.

1977 MGB convertible, AC, PB, AM/FM/cassette, good condition, new top, 39K miles, \$3,950. Call 480-3678 after 6 p.m.

Cycles

1980 Suzuki GS450E, mint condition, extras, purchased new this year, 4,600 gentle miles, \$1,350. Call Al, x2108 or 554-7617.

1982 Harley Davidson FXE 80 Superglide, black, fat Bob tanks. Call 649-2465.

1978 Honda Hawk, 400cc, 5 spd., windshield, backrest and rack. Call 481-2669.

Boats & Planes

Center console tri-hull 18 ft. outboard, easy loader, fish or ski, first offer over \$2,000. Call Brooke, x2451 or 996-0027.

1979 22 foot Seary in-board/outboard, tandem trailer, perfect condition, \$9,500. Call 479-8141.

Audio & Video

Atari home video game with dust cover and cartridge, \$95, additional cartridges, \$10 each. Call Ken, 473-2602 after 5:30 p.m.

Bearcat scanner crystals, Pasadena PD and HPD, \$2 each. Call Samouce, x4727.

8-track component recorder/ player, excellent condition, \$50. Call Sharon, x4763 or 482-3078.

Concord receiver with cassette, 20 watts per channel, \$60; BSR McDonald 4800 turntable, \$25. Call Betty, x3328.

Household

Two traditional tufted back chairs, one gold, one green, good condition, \$30 each or both for \$50. Call 474-4885 after 5 p.m.

Living room sofa, \$100; occasional chair, \$50; king size mattress, box spring and frame, \$150; dual mattress, box spring and frame, \$30; 19" black and white TV with stand, \$25; 17" color TV with stand, \$75. Call Diane, x3725 or 538-2001.

Ethan Allen single bed, solid wood headboard and footboard, \$50; pup tent, \$10. Call 482-7546.

Hot Point 14.4 cu. ft. upright freezer, 2 years old, excellent condition, \$275. Call 482-8457 after 5 p.m.

JC Penney 20 cu. ft. 2 door refrigerator, frostless, top freeze, auto icemaker, excellent condition, almond, \$250. Call 481-9335, x332.

Antique 7-piece bedroom suite, china cabinet, desk & chair, washer & dryer. Call 538-3112 after 3 p.m.

Wanted

Need riders from Hobby Airport area to Bay Area Blvd. or in between. Call Boris Mahai, 488-9005.

Need carpool partners from SW Houston to NASA area. Call Chau Tu, 488-9005, x64 or 665-7628 evenings. Want non-smoker to share 3 BR dome home in Pearland. Call 486-2172 or 489-1059.

Want electric piano or synthesizer, also fenders and bag rack for 10-speed. Call Larry, x5435 or 480-7917.

Ride needed from Piper's Meadow to Bldg. 1, 8 a.m. or 8:30 a.m. shift. Call Tom, x4258 or 480-2776.

Wanted: JSC-EAA Picnic Committee members to plan events and work on the 1983 picnic. Call Nancy, x4039 or Charlotte, x4151.

Want someone to share nice 2 BR

townhouse in Forest Bend area, \$225/mo. plus 1/2 utilities. Call 996-9416 after 5 p.m.

Computers

Wanted: Sinclair ZX81 personal computer. Call Phil, 332-3013 after 1 p.m.

TI-59 programmable calculator and PC-100C printer, \$220. Call 481-4837 after 5 p.m.

Osborned computer users group forming in area — interested? Call 486-5091

Pets

Cocker Spaniel pups and adult dogs, AKC show quality, \$50 each; also Boston terrier for \$100. Call 332-1309 after 6 p.m.

Eight-month old Jendaya Conure, yellow, red, green and blue, hand-fed, tame and talking. Call Jay Marshall, 488-5510, x274 or 538-1570.

Free to loving family, female Peek-a-poo, 10 lbs., spade, all shots, very lovable. Call Jean, 480-6925 after 5 p.m.

English Pointer pups, whelped 9/18, weaned, white and black female, white and lemon male, champion lineage (Gunsmoke, War Hoop Jake, etc.), shots, wormed, dew claws removed, \$150. Call 337-1840.

California doe rabbit, registered, will swap for white buck. Call Plauche, x2783 or 474-2660.

Black and white Dutch Belt rabbit with cage, bottle and litter box, \$10. Call Marty, 488-4251.

Male wirehair Fox Terrier, 4 mo. old, AKC champion sire, all shots, healthy, spirited, fun. Call 337-3961.

English pointer pups, registered, whelped 8/18, champion lineage, \$150/\$200. Call 337-1840 after 5 p.m.

Musical Instruments

Silver Bundy comet in very good condition, best offer. Call Pat, x5015 or 554-6368 after 5:30 p.m.

Found

Set of car keys found in parking lot across Second St. north of Bldg. 17. Call x2426 to identify.

Pair reading glasses, Dior frames, black case. Call Paul, x3173 or 333-1054.

Photography

GAF Model ST/602 movie camera with case, Super 8, zoom lens slow motion; Bell & Howell multi-motion movie projector; camera and projector in excellent condition, both \$110. Call Weldon, x4971 or 482-1461.

Mamiya Super Press 23 camera, 100 mm 3.5 lens, 2-120 roll film

holders, focusing screen holder and rubber eye piece, \$325.; Vivitar electronic flash model 273 w/hood converter, \$50 with above camera. Call Frank, x3836 or 3837.

Hasselblad 500C w/80 mm Planar and A-12 back, \$650; Nikon bulkfilm back for Nikon F-2 w/seven 250-frame magazine and loader, all for \$375. Call Charles, x4231.

Miscellaneous

For sale: set of 40 glasses engraved with "H" includes five assorted sizes, make offer. Call Gary, x2181.

Left-handed golf clubs, 8 irons, 4 woods, putter, bag, covers, cart, good beginning set. Call 481-4837 after 5 p.m.

Empty freon tanks, 50 lb. size, \$2; 30 lb. size, \$1. Call McBride, x6226 or 337-4643.

Five horsepower Craftsman tiller w/reverse, heavy duty, used one season, \$325. Call 482-8457 after 5 p.m.

1978 World Engines 5 channel RCU, 5 servos and cadmium battery, model plane needs 35cc engine, excellent condition, \$150. Call 471-8556.

Deer season special: 30/06 Springfield "03" sporterized, bolt-action 5-shot with 4X scope, leather sling. Call Alter, x5111 or 474-4447 after 6 p.m.

Flying to NACA reunion Nov. 12 by Piper Comanche, room for 2 or 3 passengers. Call Lew Fisher, 332-7881 or 331-3954 evenings.

Wooden snake cage with glass front and screen top, \$10; 22" lawn mower, Briggs & Stratton engine, make offer; Sears weed whacker string trimmer, runs slow, make offer. Call Tony Smith, x4468.

Remington 12g pump, model 870, soft carrying case, 123 rounds of assorted shells, gunbelt, \$200. Call Bob, x2337 or 333-2487.

Manual slide projector, \$15; 3-speed record changer, \$25; 45 rpm changer, \$12; 10 lb. anchor, \$8. Call 488-3746.

Shrimp nets, boards, 8' x 4' culling box, misc. items, make offer. Call Schnell, 337-2402 or 488-9005.

Pool table, 8' regulation size, slate top, balls, cues, racks, table cover, \$250; golf club and bag, no putter, \$150. Call John, x5554 or 332-5958.

Collection of 101 24k gold on silver medallions, 2.25" diam., 210 troy oz. silver, 3 oz. 24k gold, complete with six drawer case, best offer over \$2,300. Call Ken, x2907 or 665-2515.