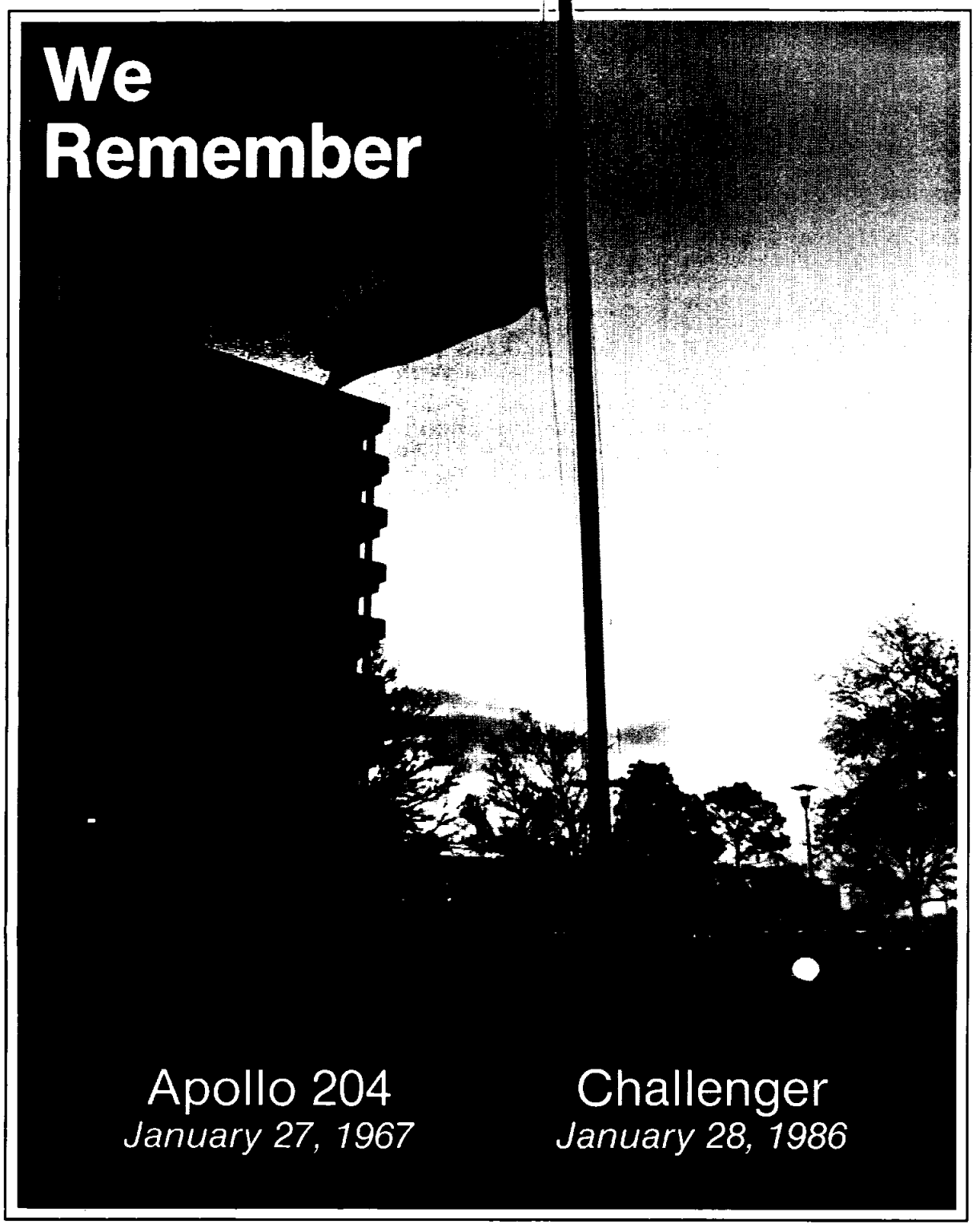
NASA
Lyndon B. Johnson Space Center

Space News Roundup

Vol. 26 No. 2 January 23, 1987 National Aeronautics and Space Administration



STS-26 crew ready for return to space

"My perspective is that we're on the move as a stronger, wiser agency," said Frederick Hauck, the newly chosen Commander of STS-26.

"I view the changes that have been implemented since the accident — the people, the organization, the redesign efforts — and am very encouraged at the prospect of this nation regaining its position of leadership in manned space flight."

Hauck made those comments at JSC on Jan. 15 as he, Pilot Richard Covey and Mission Specialists John Lounge, George "Pinky" Nelson and David Hilmers met the press for the first time since their selection to fly in *Discovery* next year.

"We're all extremely pleased to be named to this crew," said Hauck, currently the Acting Associate Administrator for External Relations at Headquarters. "It's what we joined NASA to do and we're looking forward to getting back to the business of flyingin space. I have a very strong crew here. We can best be described as representing the NASA team. And that team is in good shape and headed in the right direction."

Discovery is scheduled for launch from KSC Pad 39B into a 28.45-degree inclination orbit 160 nautical miles above the Earth's surface. The launch window stretches from 8:42 to 11:42 a.m. CST. Feb. 18, 1988. Landing is sheduled for 9:42 a.m. CST February 22 at Edwards Air Force Base.

STS-26's primary objective is to deploy NASA's second Tracking Data Relay Satellite (TDRS), and to carry OASIS-1, the Orbiter Experiments Autonomous Supporting

(Continued on page 3)

Recovery progresses

NASA officials in charge of the Space Shuttle recovery program briefed reporters Jan. 20 on the progress of those efforts, saying that the projected launch date for STS-26 can be attained if testing and systems modifications are completed as scheduled.

Richard Truly, Associate Administrator for Space Flight, Arnold Aldrich, Director of the National Space Transportation System, and J. R. Thompson, Director of Marshall Space Flight Center, outlined the recommended changes to systems and organization from Headquarters.

"I think the program has made a lot of progress," said Truly. "I think morale is up among the Centers in the work that we are doing. We are moving out and we are going to continue to do so."

Truly said the Solid Rocket Motor (SRM) redesign and one of the heaviest engine testing programs in the history of the Space Shuttle program are both going well, and that some changes in the Orbiter and ground systems also have been approved.

The Office of Space Flight Management Counsel recently approved Aldrich's recommendation to make proposed hatch jettison modifications to the Orbiter, Truly said. Included in that decision is a commitment to provide crew equipment such as individual parachutes and survival equipment.

"We did this because, after a long study, it's clear that this hatch

(Continued on page 2)

JSC sets five goals for future endeavors

JSC Director Aaron Cohen has announced five major goals for future endeavors as part of a Centerwide strategic planning effort.

The goals are seen by JSC management as the primary focus for the Center's long term efforts to support the Space Shuttle and Space Station Programs, and to maintain JSC's position as a world leader in manned spaceflight."

The accomplishment of these goals will ensure that JSC continues as the nation's preeminent Center for manned spaceflight development and operations, as a leader in building and operating manned space vehicles, and in conducting manned exploration of the Solar System," Cohen said.

The goals include enhancing and operating a safe and reliable Shuttle system, developing the Space Station and achieving a permanent manned presence in space, ensuring a continuing and premier role in manned spaceflight, providing an environment that promotes creativity and facilitates personnel development, and enhancing the good relationships with the U.S. aerospace community."

"The Space Shuttle is JSC's first and foremost goal," Cohen said. "This includes not only returning the Shuttle to safe flight status and building a replacement Orbiter, but also improving the overall capabilities of the Space Transportation System." Cohen said JSC must build the industrial and institutional base that must support the program over the long term.

The second goal, helping to build the Station and a permanent U.S. manned presence in space, carries many of the same requirements as does the Shuttle program, Cohen said. "Just as with the Shuttle program, we have to work as a Center to ensure the development of an industrial and institutional base that can support the Station over the course of many years."

Cohen said JSC also must concentrate its resources toward the development of Space Station elements for which it is responsible, help accomplish orbital assembly of the facility and develop and verify mission operation procedures.

The third goal, Cohen said, is an extension of the first two, and seeks to place JSC in a position to continue its excellence in manned spaceflight operations. "We have to ensure a continuing and premier role in the conception, design, development and operation of manned space vehicles and systems. We must maintain our basic technical pre-eminence in all aspects of manned spaceflight, and that means enhancing our engineering, operational, scientific and administrative talents," he said.

A key to that goal, he said, is to make sure that JSC has the highest quality personnel and support systems. "This fourth goal means we have to provide a work environment that promotes creativity, that encourages the development and retention of a high quality workforce," Cohen said. One aspect of this goal is the establishment of a JSC Team Excellence Program which encourages quality work from employees.

The fifth goal looks to the Center's outside relationships. "We must redouble our efforts to enhance the U.S. Space Team's cooperation and teamwork," Cohen said. The triad of government, industry and academia has been a critical factor inthe success of U.S. manned spaceflight, he said, and in the future the need for good teamwork will be even more important. "The number of participants is increasing, the involvement is more complex, and limited resources require that the unique talents of each organization be used to the fullest," he said.

Strategic planning seeks to develop JSC 'game plan'

The strategic planning effort now underway at JSC mirrors a NASA-wide effort to forecast future national requirements and be ready to meet them.

"The purpose of this intensive planning effort is to develop a 'game plan' that will allow JSC to make maximum use of its resources," JSC Director Aaron Cohen said. "We must not only carry out our Shuttle and Station responsibilities, but also strengthen our basic scientific and technical capabilities to meet the challenge of manned spaceflight in the 1990s and beyond."

The stratgeic planning effort, which began Dec. 15, includes two phases. Phase One is an effort to define internal and external factors which can affect JSC's future. Phase Two, scheduled to begin in February, is the development of a center strategy to deal with those factors.

The assessment phase began with the organization of seven teams, consisting of 95 JSC employees, who were chartered to organize and analyze data. The seven teams and their team leaders are: Data Systems, Elric McHenry; Engineering, William Huffstetler; Institu-

(Continued on page 3)

Raines retires, Harlan named SR&QA Director

Martin L. Raines, Director of the Safety, Reliability, and Quality Assurance Office (SR&QA) will retire from NASA at the end of February after 45 years of government service.

Charles S. Harlan will succeed Raines.

JSC Director Aaron Cohen said Raines has made significant contributions to the manned spaceflight programs since he joined the center in October 1964, as Manager of the White Sands Test Facility, N.M. He has led JSC's safety, reliability, and quality assurance activities since June 1969.

Harlan will begin his new assignment immediately. He joined the center in 1964 and has served in a number of key management positions, including Chief, Payload Operations Division and Deputy Director, SR&QA.

His most recent assignment has been in Space Station as Manager, Technical and Management Information System (TMIS) Office. Harlan graduated from the University of Kentucky with a B.S. degree in mechanical engineering.

Bulletin Board

JSC FCU to elect officers; nominations due

Three directors will be elected to serve three-year terms during the annual meeting of members of the JSC Federal Credit Union March 5. Any member who wishes to serve as a director should submit a brief resume to the Nominating Committee before Feb. 3. Nominations for director may also be made by petion with the signatures of one percent of the current membership, or approximately 160 members. The deadline for nomination by petition is Feb. 18. Directors are volunteers who serve without pay and determine the policies which guide the day-to-day operations of the Credit Union. Members may vote for the directors in the lobby of the Credit Union during regular business hours March 5, or attend the annual meeting that evening at 7 p.m. Nominations should be sent to : Nominating Committee, JSC Federal Credit Union, P.O. Box 58346, Houston, TX 77258. For more information, call Molly Springer at 488-7070.

Employee Assistance Office now in Bldg. 32

The Employee Assistance Office has new quarters and a larger staff. The EAO moved during the holidays from its old location in Bldg. 8 to a new suite of offices in Bldg. 32. Now joining Coordinator Connie Alexander are Counselor Nellie Wegmann and Administrative Assistant Lynn Moreland. The new telephone number for the office is x37895, although Alexander says she expects to have the old EAO number, x36130, back in a few weeks. Alexander and the work of the EAO were featured recently in an article describing JSC one year after the *Challenger* accident in the January edition of Houston City Magazine.

AIAA seeks science fair judges

The Houston Section of the American Institute of Aeronautics and Astronautics (AIAA) needs members to serve as judges for the Houston Science and Engineering Fair, to be held in April at the Astrohall. The AIAA will be giving awards for outstanding aerospace and aviation projects at the fair, which is being sponsored by local corporations, universities and the AIAA. Judging will be held Friday, April 3. Interested persons should call Student Affairs Committee Chairman Dick Bennett at 280-1500, x3112, or Jonette Stecklein at x36624.

Umpire Clinic to be held at Gilruth

The NASA Bay Area Softball Umpires Association will hold its annual rules and certification clinic Feb. 7 at the Gilruth Recreation Center. The clinic is open to all present and prospective softball umpires, players and coaches who would like to enhance their knowledge ASA softball. Registration is from 8 to 9 a.m., followed by a rules session from 9 a.m. to noon and on-field mechanics from 1 to 4 p.m. For more information, call Morris Williams at 332-3085 or Ron Buckley at 334-6843.

CFC reaches 95% of JSC goal

JSC's recently completed Combined Federal Campaign netted $238,166.55, or 95% of the Center's goal for 1986. The once-per-year fund raising drive benefits agencies of the United Way. Overall, the Equal Opportunity Programs Office contributed the highest percentage of its goal—196%. The second highest percentage was in the Personnel Office, whose employees contributed 155% of that office's goal. The Space Operations Directorate contributed the most in dollars—$72,628.94.

BAPCO to meet Feb. 17

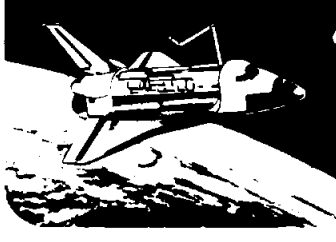
The next meeting of the Bay Area PC Organization (BAPCO), the local IBM PC users' group, will be held at 7:30 p.m. Feb. 17 at the Holiday Inn on NASA Road One. The group is open to all persons with an interest in microcomputers. BAPCO meets regularly on the third Tuesday of each month, and has recently organized a special interest group for beginners that will cover DOS, wordprocessing, spreadsheets and databases. For more information, call Earl Rubenstein, x33124 or Jack Calvin, 326-2983.

New in the Library

The JSC Technical Library is located in Bldg. 45, Room 100, and is open from 8:00 a.m. to 4:30 p.m. Monday through Friday. The general information number is x34240. New books received in the Library as of Jan. 7, 1987 include:

AIAA 7th Conference on Sounding Rockets, Balloons and Related Space Systems, 1986, Collection of Papers, by AIAA.
AIAA 9th Aerodynamic Deceleration and Balloon Technology Conference, 1986, Collection of Papers, by AIAA.
Ad Astra Hipparcos: the European Space Agency's Astronomy Mission, an Introduction, by ESA.
Advanced Database Techniques, by D. Martin.
CAD/CAM Techniques, by M. F. Hordeski.
ESA 7th Symposium on European Rocket & Balloon Programmes and Related Research, by ESA.
5th European Symposium, Materials Sciences under Microgravity: Results of Spacelab-1, by ESA.
Expert Systems in Government Symposium, by IEEE.
Fabrication of Composite Materials: Source Book, by M. M. Schwartz.
Future Mission in Solar, Heliospheric & Space Plasma Physics: Proceedings, by ESA.
IEEE Computer Society Conference on Computer Vision and Pattern Recognition: Proceedings/CVPR '85, by IEEE.
IEEE International Conference on Robotics and Automation, by IEEE.
Office Automation: a Social and Organizational Perspective, by R. A. Hirschheim.
Out of the Cradle: Exploring the Frontiers Beyond Earth, by W. K. Hartman.

NASA
Lyndon B. Johnson Space Center
Space News Roundup



The **Roundup** is an official publication of the National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, Texas, and is published every other Friday by the Public Affairs Office for all space center employees. **Roundup** deadline is the first Wednesday after publication.

Editor . . . . . Brian Welch
Assistant Editor . . . . . Kelly Humphries

Lectures win AIAA award

Coordinators of the Houston Section's award-winning lecture series are, from left, Dick Gillen, Jim Visentine, Bob Lewis, Mallik Putcha, Tom Barry, Joe Gamble, Clay Shadeck, Dudley Nelson and Stephanie Vickery. Not picutred: Dr. Alan Gates and Karen Godek.

The American Institute of Aeronautics and Astronautics has selected the Houston Section as the first place recipient of the 1986 AIAA Special Event Award for the invited lecture series on Fundamentals of Spacecraft Design held last year at the JSC.

The award, which will be accepted by Dr. Robert Lewis of JSC, chairman of the Houston Section at the time, will be presented by Dr. Allen Fuhs, AIAA President, during the AIAA annual meeting in Arlington, Virginia on April 30.

The honor comes at a time when the Houston Section is encouraging interested professionals to join the organization. The AIAA is divided into six regions nationally, with 66 chapters or sections across the country. The Houston Section, with 1,000 members, competed with such chapters as the Los Angeles and Orange County sections, with a combined membership of over 4,000, to win the outstanding event award. The Houston Section also won second place in the Outstanding Section Award and placed third in the Membership Chairman Award for AIAA sections with 500 members and over.

The stated purpose of the AIAA is to advance the arts, sciences and technology of aeronautics and astronautics, and to nurture and promote the professionalism of those engaged in these pursuits.

Membership benefits in the Houston Section include informational programs designed to provide the latest information in subject areas, technical tutorial programs which allow members to stay current in their professional interests, access to motivational and tutorial tapes and lectures, and annual symposiums which allow research results to be presented to colleagues at JSC.

The Yearly membership fee for the AIAA is $56.00. For more informantion or interested persons requiring membership applications, call Jim Visentine, x38923, Bob Lewis, X38232, or Karen Godek, present Section chairman, x38297.

Shuttle recovery progresses

(Continued from page 1)

jettison modification to the Orbiter will be a true enhancement to safety not only with the very far-out potential of providing a bail-out capability from stable gliding flight," he said, "but also it will have advantages in incidents that might occur on the runway or in other contingencies."

Truly said study and development of a "tractor rocket" extraction system will continue but that all of the pros and cons of such a system haven't yet been weighed sufficiently.

The Failure Mode and Effects Analysis/Critical Items List (FMEA/CIL) review is progressing and waivers will be acted upon at Headquarters, Aldrich said.

Aldrich said Systems Design Reviews, coupled with the FMEA/CIL review has led to a series of changes that are mandatory for first flight. Many have been baselined and are in the NSTS funding plan.

Aldrich said Operations Maintenance Requirements Document (OMRSD) test requirements, Orbiter landing systems, launch commit criteria, mission rules, Shuttle flight procedures, range safety systems, monitoring systems, trans-Atlantic landing sites, and all considerations that need to go into an updated Orbiter and shuttle vehicle maintenance assurance program have been the subject of thorough reviews.

"I think at this point we have done the right reviews," he said. "We understand the things we want to change. We've analyzed them. Many of them have been approved and baselined, and they are in our plan for implementation."

Thompson said propulsion systems changes are all mandatory before first flight, and focus on the SRMs and Space Shuttle Main Engines (SSME).

The primary emphasis on the SSME is in establishing margins of safety through a rigorous analysis of designs and an aggressive ground test program.

"Just over the last six weeks," Thompson said, "we have conducted the equivalent of six missions worth of engine firings. There have been no safety-related issues. The data looks good."

The first set of flight engines are on schedule for delivery in October, he said.

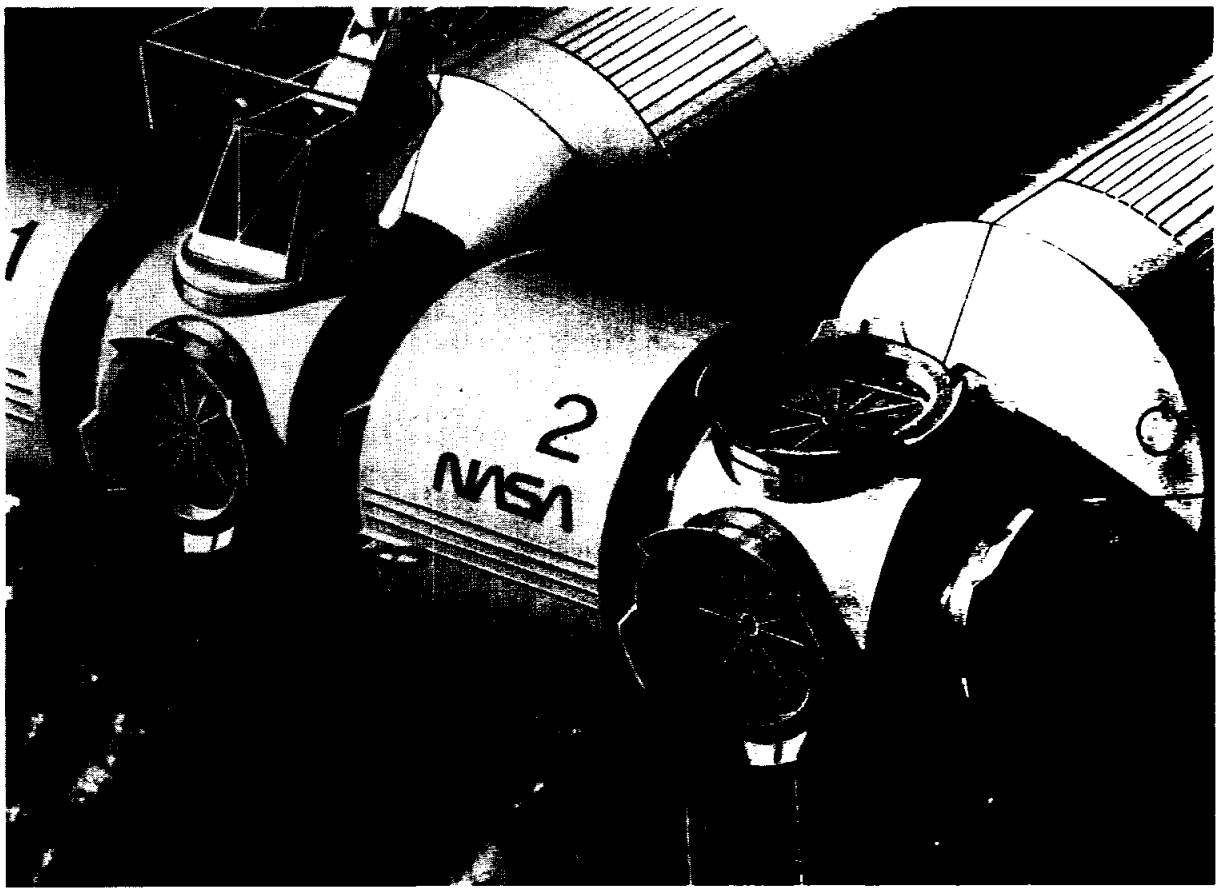
Internal SRM insulation tooling work is pacing the testing of the first all-up flight motor, called DM-8. The rest of the testing schedule depends on meeting timetables for firing DM-8, he added.

The first full-scale mission-duration firing of DM-8 is planned for the end of July, he said. DM-8 will be followed by DM-9, QM-6, QM-7 and QM-8 at two-month intervals.

All but QM-8 are viewed as required prior to first flight, Thompson said. QM-7 will test for cold conditions, he said, but QM-8 will test for hot conditions not expected in February.

Thompson said two additional ground test motors will be requested each year, he said, so that the SRM's may be "pushed to the limit."

Truly said NSTS organization changes are working well, so far, and that they will be proven in the long run.



This rendering of the Space Station expanded resource nodes will be part of an exhibition of space art and illustrations by John Frassanito and Raymond Loewy at the Circle Gallery in Houston's Gallieria. The show will open Feb. 15 with a special reception from 3 to 5 p.m. for all employees in the JSC civil service and contractor community. For more information, call 521-3323.

Hilmers: 'Our destiny is to go to the stars'

(Continued from page 1)

Instrumentation System designed to record environmental data in the orbiter payload bay during flight.

"I would define a major success as launching, returning and putting TDRS into orbit," Hauck said.

"The importance of this first flight, as much as anything, is in the act itself, of just getting us back into the business of flying space shuttles and doing it safely," said Covey, an Air Force colonel who was pilot on 51-I. "And a safe flight is the important thing for the first one, as it is for all of them."

Covey said the crew believes in the importance of the Manned Flight Awareness program, and will participate through contacts at JSC and visits to Marshall, KSC, contractors and subcontractors.

"One, it's important for us to get out and see the folks that are hands-on doing the job," Covey said. "Number two, to give them an opportunity to express their concerns, if they have any that they don't think are getting up through their management, and number three, it gives them a chance to look eye-to-eye with people who depend on their work."

As the first five astronauts scheduled to launch after the *Challenger* accident, the crew of STS-26 is expected to receive intense public attention. Many of the questions at the press conference dealt with their feelings about the safety of the mission.

"I have no apprehension whatsoever," said Hilmers, a lieutenant colonel in the Marine Corps who flew as mission specialist on 51-J. "I think there's going to be risk involved whether we are the first flight after the accident or the 101st flight. There's always going to be that risk. Our destiny is to go to the stars, and this just continues that path."

When asked if he is nervous about flying in light of the *Challenger* accident, Nelson responded: "No. I mean, that's my job. That's what I do."

The astronauts reported varying reactions from their families and friends, but said everyone has been supportive, which makes the job easier.

"My mother-in-law's reaction was, 'Well, I'm happy if you're happy.' And I assured her that I was," said Lounge, who flew as a mission specialist on 51-I. He said the atmosphere has changed since his previous flight.

"My last flight it was really kind of a festive, picnic atmosphere. A good percentage of my hometown came down to that launch; all my high school classmates who could make it. And it was a big social event," he said.

"I think the next time it won't be quite so festive until we are safely into orbit, and even on board, maybe we'll be a little more attentive. Not because it's less safe. It'll be more safe this time than it was the last time, I'm sure of that. Because we will have fixed problems that needed fixing. The 51-L accident has reminded us in a very harsh way that this is risky business and we have to pay attention. But we will pay attention on this flight and that's the primary thing that will make it safe. We will have the whole agency paying the utmost attention." All of the astronauts said they are confident that there will be no undue pressure to meet the projected Feb. 18 launch date. They voiced confidence in the NASA and contract workers who will support the mission.

Members of the STS-26 crew are, left to right, Mission Specialists David C. Hilmers, George D. "Pinky" Nelson and John M. Lounge, Pilot Richard O. Covey, and Commander Frederick H. Hauck.

"There will be a lot of questions asked, and again that's the job of the managers to ask the questions to make sure they're doing the right thing," said Hauck. "It is very important for this country to get back in space as soon as practicable. So you've got to balance that with wanting to make sure that you don't risk these very valuable assets that the country has.

Many questions also dealt with the possibility of a crew escape system being installed in the orbiter prior to the STS-26 mission. Hauck said the process of evaluating the trade-offs associated with the various escape proposals is continuing.

"Using the old adage that prevention is better than cure," Hilmers said, "if you look at putting a lot of resources in to preventing the same type of thing from happening again — and weare devoting lots and lots of money to trying to make the SRB as reliable as possible, and the main engines, all the components — that is a lot better way to go than to have to rely on the cure, some kind of system that gets you out of trouble when you're there."

Crew members said they will discuss whether to have any special remembrance of the 51-L crew during the flight.

"I know that the spirit of the crew of *Challenger* is with us," Hauck said. "We are looking forward to carrying on where they left off."

Game plan

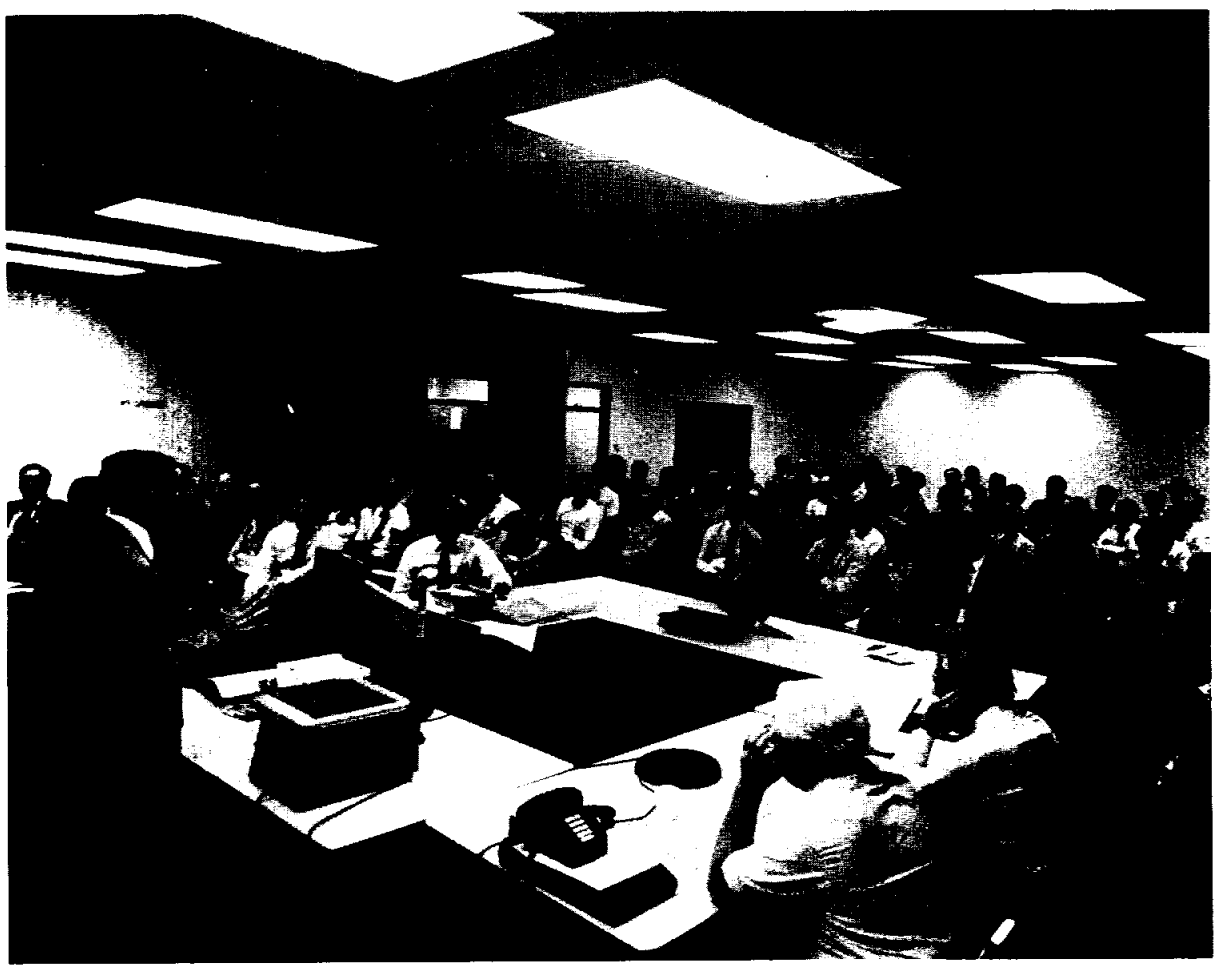
(Continued from page 1)

tional, Gene Easley; Operations, Jay Greene; Programmatic, Dave DeAtkins; Science, Dick Williams; and White Sands, Ray Melton.

Cohen said the teams were asked to consider a variety of issues facing the Center. What are the current strengths and weaknesses of JSC? What is the current state of our technology? What is the likely direction in which the space program will move in the next two decades? What changes should be expected in various space-related technologies? What are the key areas of opportunity open to JSC, that should be prepared for now? What specific strengths should JSC enhance?

At Roundup press time, the teams were scheduled to provide the Senior Staff with early answers to these and other questions during an all-day session Jan. 23. The assessment is due Feb. 13.

Phase Two, development of a center strategy or "game plan,"is scheduled to begin then and conclude by the end of March. Cohen said he anticipates that three teams will participate in the strategy development, formulating alternatives and forecasts. The Senior Staff will then formulate the final JSC strategy for the future.



JSC Director Aaron Cohen addresses members of the seven strategic planning assessment teams during an organizational meeting in December. Some 95 employees, representing all major JSC organizations, are involved in the first phase of the effort.

'Riblets' may help win America's Cup

Research by NASA and private industry to improve aircraft performance may be helping a U.S. yacht win races.

The racing yacht Stars & Stripes, a U.S. challenger in the America's Cup races, has its underside covered with "riblets", tiny V-shaped grooves developed more than 3 years ago at NASA's Langley Research Center, Hampton, Va., to reduce air turbulence and increase fuel efficiency of airplanes.

The Stars & Stripes has had its underside coated with rectangular sheets of a 3M Co. tape developed as an easier method of applying the riblets to surfaces. Yacht skipper Dennis Conner has been quoted as saying that the riblet sheets will boost his boat's speed.

The grooves are mounted on an aircraft fuselage aligned in the direction of the flow of air. The size of the grooves varies with the particular application, but it might be no more than 2 one-thousandth of an inch deep. That is deep enough, according to NASA researchers, to favorably alter the turbulent air flow that forms over the surface of a moving airplane.

NASA plans around-the-world balloon flights

Officials at NASA's Goddard Space Flight Center have announced plans to launch two large, unmanned balloons on around-the-world flights. The flights are expected to be launched during January and February from a site in Alice Springs, Australia.

The balloons will carry instruments to examine newly discovered high energy x-ray microflares and flare plasmas being emitted by the sun. Microflares have been found to occur more frequently than classic solar flares. Because of this, energy produced by these microflares is now believed to be significant and may explain some phenomena like the heating of the sun's corona.

The heating of the sun's corona is not well understood. Results of these studies may be very useful to an understanding of the microscale structure of the sun and other similar stars.

The balloons are expected to circle the globe in about 15 days and return to the Australian launch site which was selected because of its location in the southern hemisphere and the stability of its summertime winds.

The first balloon had not been launched at press time, but was expected to be launched when weather conditions allowed. The second balloon was to be released no less than 3-4 days later to minimize any potential operational interference between the two flights.

The helium-filled, 28 million-cubic-feet volume balloons are taller than the Washington Monument and will carry payloads, weighing 3,000 pounds, to an altitude of 130,000 feet. These are the first balloons manufactured from a newly developed material, called "Astrofilm," to be used in a global application.

According to Harvey Needleman, chief, Balloon Projects Branch, Goddard-Wallops Flight Facility, Wallops Island, Va., "The southern hemisphere is about the only place that we can conduct long duration flights of this type."

"To circumnavigate the globe, the balloons require strong, persistent winds to maintain proper latitude with minimum deviation. We expect that the flights will experience winds between 50 and 75 knots enabling the balloons to circle the Earth in 12 to 18 days," he continued.

The flights are being conducted by NASA for the University of California, Berkeley and San Diego branches, and carry a joint experiment by Louisiana State University (LSU) and the University of Washington.

Dr. Robert Lin is principal investigator for the University of California experiment studying microflares and solar flares. The principal investigator for the experiment flying on the second balloon is Dr. John Wefel of LSU. His experiment will utilize an emulsion chamber that will be exposed to the primary cosmic rays to study nuclear interactions and cosmic ray composition.

In addition to the scientific experiments, each balloon will carry electronic instrumentation developed to meet the special requirements of long duration flight. The electronic system will be powered by batteries with daily recharging provided by arrays of solar cells.

Satellites play important roles in the success of both flights. Two U.S. polar-orbiting satellites, carrying French ARGOS instruments, will track the balloon flights.

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: Countryside Oaks, 2-2.5-2, second floor deck, FPL, no pets, $585. Laura, x38100 or 326-3278.

Lease: Barringer Knoll apartment, 2 BR, FPL, W/D connections, $350/mo. 486-0315.

Sale: 2 acres near San Angelo on major highway, city utilities, ex. commercial potential, $25,000. David, 282-2855 or 485-3214.

Lease: Pipers Meadow, 3-2-2A, new paint, clean, fan, A/C, drapes, fenced, cathedral ceiling, $525/mo. 486-0315.

Sale/lease: University Trace 2-2 condo, W/D, FPL, $45,000 or 450/mo. Stan, 282-4728 or Frank, x31790.

Sale: Camino South 3-2-2, DR, den w/FPL and cathedral ceiling, rec. room w/bay window, kitchen w/custom cabinets, ceramic tile, walk-in pantry, wet bar, plush carpet, walk-in closets, fans, drapes, inside utility room, gas utilities, attic insulation, front and back patios, fenced, $76,320 OBO. x38162 or 280-0689.

Sale: Shoreacres 3-2-2, .5-acre, fenced, knotty pine kitchen and DR, beam ceiling, master BR, walk to Galveston Bay, boatramp, pier, HVC, $84,100. Jon S., 470-9267.

Sale/lease: Forest Bend 3-2.5-2 townhouse, LR, den, corner, storage, pool, park, $475/mo. or 41,500. 333-2322.

Lease: CLC 2 BR duplex, one-car garage, fenced, W/D connections, $450/mo. 486-4466.

Rent: Guest house, furnished, 650 sq. ft., quiet Galveston Bay community, large yard, access to pier, beach, no deposit, no lease required, $200/mo. plus utilities, prefer single. 474-2906.

Sale: Seabrook 75 × 150-foot wooded lakeview lot, all utilities avail. 474-3181.

Lease: Baywind II condo, 1 BR, 1 bath, FPL, all appliances, pool, game room, tennis. Jim Wiltz, x39009 or 944-0451.

Sale/lease: Seabrook Seascape 3-2-2 house, large den/dining, LR, FPL, fenced, trees. Ed, 358-6612.

Lease: Condo on Clear Lake, 24-hour security, pool, tennis, 2BR, 1 bath, $365 plus utilities. 480-5583 or 482-7156.

Sale: El Dorado Trace, 1-1.5 two-story condo, FPL, all appliances, fan, private courtyard, $29,900 OBO. 488-2587.

Sale: Baywind II 1-1 condo, FPL, mirrored walls, mini-blinds, ceiling fans, W/D connections, assumable loan. 471-6814.

Lease: Egret Bay condo, 2-2-CP, all appliances, FPL, $400/mo. plus $200 deposit and references. 486-8551.

Rent: Ski condo in Heavenly Valley, Lake Tahoe, 2 BR, 1 bath, sleeps 6, FPL, hot tum, 3 mins. to lifts, 10 mins. to gambling, entertainment, available March 14-21, seven nights $900 plus $300 deposit. Quin Shepperd, 486-7770.

Cars & Trucks

'78 Jeep J-10 truck, auto., 4x4, new tires and battery, $2,700, over-the-cab camper, $400. 474-2906.

'80 Toyota Corona luxury edition, A/C, AM/FM/cassette, 5-speed, one owner, ex. cond. Dale, 481-0046 or x39039.

'85 Chevy El Camino, auto., all power, sport wheels, AM/FM/cassette, velour interior, sport package, adult non-smoker owner, $6,500. 482-8488.

'78 Toyota Celica GT, 5-speed, AM/FM/cassette, Purelli tires, 85K mi., dealer kept, maint. records, adult non-smoker owner, $2,300. 996-8541.

'72 Mercedes Benz, white, model 220, gasoline, ex. cond., good tires, AM/FM/cassette, $2,999 OBO. Victor, 641-4894.

'80 Volkswagen pickup, rebuilt engine, new tires, tool box, $1,195. Wayne, x37533 or 471-2392.

'81 Honda Accord sedan, 5-speed, shop manual, $4,000. John, x38942 or 996-0689.

'78 Plymouth Arrow GT, 2-door hatchback, 5-speed, A/C, stereo, student or commuter car, $1,000. Everett, x36224 or 488-6024.

'76 red Corvette, 45K mi., loaded, T-top, AM/FM stereo, ex. cond., $4,500 OBO. David, 333-5887.

'78 Chevrolet pickup, Big 10, regular gas, shell top, A/C, PS, radio, $2,350. x38470 or 946-4458.

'82 280ZX turbo, 2+2, T-top, 5-speed, leater interior, A/C, PS, PB, alloy wheels, AM/FM/cassette, good cond., $7,995 OBO. Jan, x37019.

'79 Chevrolet Impala, PS, PB, A/C, AT, AM/FM/cassette/equalizer, orig. owner, $1,500 OBO. Dave, x34336 or 996-1239.

'78 T-Bird, beige, A/C, cruise control, $1,200. Jeff, x34337 or 943-7754.

'67 Mustang, 289 V8, 3-speed, new paint inside and out, new plugs and wires, rebuilt carb., new brakes, new air shocks, AM/FM/cassette, equalizer/booster, CB radio, mag wheels, new seat covers and mats, clean, $3,500 OBO. Mike, x38169 or 482-8496.

'86 Camero, T-top, loaded, still under warranty, $13,500. Sandy, x35338 or 925-5881.

'86 Silverado, loaded, still under warranty. Sandy, x35338 or 925-5881.

'80 Pontiac Grand Prix LJ, PS, PB, A/C, velour interior, 72K mi., gray over gray, $1,500 OBO. 486-7500.

'83 Chevrolet pickup, Stottsdale Fleetside, V8, A/C, PS, PB, tilt, cruise, tint, 40K mi. Jeff, x31795 or 470-1556.

'79 Mercury Cougar XR-7, 2-door, 110K mi., new tires, A/C, transmission overhaul, $1,250. Linda, x32531.

'78 Mercury Grand Marquis, loaded, 4-door, BO. 474-4228.

'80 Pontiac Phoenix, 4-door hatchback, 4-cylinder, auto., PS, PB, A/C, 60K mi., $1,100 OBO. 487-7364.

'76 Chevrolet window van, dual A/C, PS, PB, auto., .75-ton, cruise control, $1,900. Dick Sauer, x37121 or 554-6290.

'69 Toyota Crown, $39K mi., auto., air, clean, $2,000. 474-3751.

'82 Oldsmobile Toronado, diesel, loaded, new motor, clean, $4,500. 474-3751.

'76 Datsun 280Z, auto., A/C, 89K mi., mags, $2,200 OBO. Wayne Sandlin, 335-1366 or 483-7389.

'73 Porsche 914, 2-liter, 5-speed, A/C, new engine, tires, shocks, springs, paint, $3,950. 482-6763.

'80 Phoenix, needs front end drive work, $650 OBO. 280-9693.

Audiovisual and Computers

TRS 80 Model 3 computer, printer, 2 drives, $350. Wayne, x34266.

Canon Speedlite flash model 188A, $45; Canon FD 50/1.8 lens, $35; Canon case for AE1-P, $15, all ex. cond. James, x32632.

Microcomputer, CP/M 86 w/8086 chip, dual 8-inch floppies, 256K RAM, full-page CRT, needs power supply, $400. Jim, x35566.

Jackets, tribute to *Challenger* crew, JSC Space Shuttle team, Space Station and STSOC, 480-1746.

FT208R 2-meter amateur radio handi-talkie tranceiver, base station and auto. charger, supplies, speakermike, mint cond., $200. 487-3799.

Zenith 22-inch console color TV, good picture, $100. Shirley, 488-3238.

Realistic-Radio Shack 10-band stereo equalizer, ex. cond., $55. Musgrove, x38318 or 488-3966.

Hayes 1200B (internal) model incl. Smartcom II software for IBM PC and compatibles, used infrequently, ex. cond., $225. 335-8527 or 480-4548.

Boats & Planes

12-foot Sears canoe, birch bark exterior, good cond., $150. LaVon, 486-5351 or x30351.

Windsurfer, good learning board, $350. x30383 or 333-2769.

14.5-foot Flastron ski boat, rebuilt Mercury motor, 80hp, new direct drive steering, new trailer, $1,500. Alan, x31423 or 334-7814.

Open-bow 17-foot boat, motor, trailer, $1,000. Jerry, x39287 or 554-6093.

Cycles

'83 Kawasaki KZ1100, 3K mi., windshield, saddle bags, custom tank, ex. cond. 481-8180.

'80 Honda 750F, , 680 mi., plexifaring, cruise control, oil cooler, was $2,900, now $1,500. 481-1158.

Girl's bicycles, pink Huff Sweet Thunder, 16-inch w/training wheels; yellow Huffy Cactus Flower, 20-inch, both ex. mechanical cond., $30. 482-6763.

'83 Honda Nighthawk CB550, ex. cond., less than 2K mi., crash bar, one owner, $1,500 OBO. x31456 or 554-5933.

'79 Honda XR250, low hours, garage kept, $375. Jeff, x31795 or 470-1556.

Mongoose custom 20-inch BMX racer/freestyle, ex. cond., $145. David, 488-3966.

Sears men's 10-speed, $50. x30838 or 333-2769.

Household

Old applainces, furniture, beds, other odds and ends. Ed, 358-6612.

Antique small china cabinet, barley legs, dated 1870, can be used for TV, video recorder, $275; antique buffet, barley legs, dated 1870, matches cabinet, $275. 488-5564.

L-Shaped couch, beige Herculon, 1 year old, hide-a-bed, ex. cond., $450 OBO. 554-5968.

Sofa, loveseat and chair, flower prints, good cond., $165 OBO. 996-9628.

Magic Chef 19 cu. ft. frost-free refrigerator, ice maker, 1.5 years old, white, under warranty; Magic Chef gas dryer, 20-pound, heavy duty, $200. Pat, 280-1873 or 488-6050.

Matching Colonial sofa and chair, beige background w/earthtones, $175. 280-0595.

Magic Chef 4-burner gas stove, less than 1 year old, $275 OBO; Toyota pickup LWB bedliner, $100 OBO. Shirley, x34270 or 337-2682.

Combination wooden fold-down desk/dresser w/shelves, chair, $50 OBO. Debbie, x32811 or 280-1000.

Coffee table, needs refinishing; two end tables, $75 OBO. Debbie, x32811 or 280-1000.

Solid oak bedroom suite, $225; Lane cedar chest, walnut finish, $95; Oak buffet, $125; night stands, $20 ea.; mahogany chest of drawers, $80. 485-4995.

Help us help you.

Please use your new 5-digit office extension when submitting ads or news to the Roundup.

Piano, Kawai walnut console, was $2,500, now $1,500. 337-6840.

Dining room set, walnut table, 3 chairs, captain's chair, table, opens to 72 inches, $500. 337-6840.

Three-drawer student desk, $50; 40 × 70 glass tabletop, $100; '78 Suzuki GS750, $500. Davis, 282-2855 or 485-3214.

Musical Instruments

Black Ibanez Roadstar II guitar, 2 years old, $300; JMF Spectra amp., 300W, many features, $250. Jeff, x34337 or 943-7754.

Bundy clarinet w/case, stand, used 6 months, $45. Pat, 280-1873 or 488-6050.

Baldwin walnut piano, $950; Kimball Swinger 400 organ, $950; Holton Coronet, $125; bugle, $35; Conn trombone, $50. 485-4995.

King coronet, reconditioned, looks great, $75. Plauche, 474-2660 or x39034.

Wanted

Want musicians for Alvin Community Band, doesn't matter if you haven't played in a few months or 10 years, loaner instruments available. Alan, x31423.

Want printer w/serial interface. Amanda, 332-5623 or 333-5556.

Want single mother to share country home w/same, prefer non-smoker w/small child, $200 plus electricity. Barbara, x37704.

Want engineers for speech recognition experiments, send name and phone number to Mark, EE-2.

Want snow ski bindings, prefer step-in w/brakes. Ray, x33954 or 474-4885.

Want good used child's high chair, reasonable. 482-1505.

Want roommate to share 5-BR house in Friendswood, includes utilities, hot tub, W/D, cable TV, microwave, $225/mo. Rowena, x31670 or 996-9249.

Want art deco living room furniture, upholstered pieces, display cases, tables, lamps. Linda, 282-5118.

Pets

Quarter horse, 6-year-old, red, pleasure or trail ride, $600, saddle extra. Wayne, x37533 or 471-2392.

Lost & Found

Lost: Sterling silver bracelet. x30700.

Miscellaneous

Akai tape deck, Model GX285D, reel-to-reel, auto reverse, Dolby, $100 OBO; boy's 20-inch BMX bicycle, $50 OBO; girl's 16-inch bicycle, $25. Joan, 532-2674.

Three AT&T telephones, 2 wall, 1 princess, ex. working cond., $45 ea. Jim, x35566.

Leather and suede pants, $85 or $65; leather skirt, $65; rabbit fur reversible vests, $35. 480-1746.

Men's ski boots, size 9.5, Saloman SX-90s, like new, state-of-art boots for $85, were $285, now $85. Bob Allgeier, 488-0397.

Free bone density measurement offered by Bone and Muscle Laboratory of Medical Sciences Division, healthy women ages 25-45. Jan Cook, x33883.

Weight and barbell set, 110-pounds, sit-up bench, leg weightbench, weight bench, all $75. 488-4521.

Free women's karate classes, Hwy. 146 and Third St., Seabrook. Ed White Center, 474-2853.

Brunswick pool table, 8 x 4-foot, heavy slate, accessories, $350 OBO. Bill, x33311 or 481-1441.

IBM electric typewriter, key type, $130; small table, 2 chairs, $40; office chair, chrome legs, upholstered, $30. 488-5564.

Two 10-gallon aquariums plus stand, heaters, filters, ready for fish, 15 year's experience to help get you started, $150. LaVon, 486-5351 or x30351.

Troy Bilt rototiller, horse model 6hp, rear tines, Tecumseh engine, 4-speed, good cond., hardly used, $575 OBO. Mike, x38169 or 482-8496.

'80 Coleman lite pop-up camper, sleeps 6, propane stove, icebox, ex. cond., $1,500. Joan, 532-2674.

Treadmill, $60; 19-inch RCA color TV, $85; '76 Chevrolet Monza, needs work, $100 OBO; desk, $35; infant car seat, $15. Lorraine, 480-3377, x64.

Weight bench and free weights, was $100, now $50. Linda, 282-5118.

Chain saw, Sears, 18-inch bar, auto. sharpening, case, tools, owner's manual, $150. Don, x39237 or 331-4059.

Rubber waders, size 10, $15. Don, x39237 or 331-4059.

Camper top for short wheelbase pickup, $300. 486-9760.

New tire, only 2,546 mi., Goodyear C78-14, was $36, now $20. Bob, 532-3179.

Gilruth Center News

Call x30304 for more information

Physical fitness — The next 12-week course of the JSC Physical Fitness Program will be offered April 6-June 26 from 11 a.m.-noon or 4-5 p.m. All NASA and contractor employees and dependents are eligible upon completion of an acceptable physical exam and a maximal treadmill stress test.

Defensive driving — Learn to drive safely and qualify for a 10-percent reduction in auto insurance for the next three years. This all-day Saturday class, taught by a representative of the Safety Council of Greater Houston, meets 8 a.m.-5 p.m. Feb. 21 or March 21. Space is limited.

Beginning weight safety — This is a required course for JSC employees interested in using the Rec Center weight room. The class will be offered Feb. 11 and Feb. 25 from 8-9:30 p.m. Cost is $4.

Sign-up policy — All classes and athletic activities are first-come, first-served. To enroll in any class or activity, you must sign up in person at the Gilruth. Everyone will be required to show their work badge or EAA membership card. Payment must be made in full at the time of registration. No sign-ups are taken by phone. Classes tend to fill up 4 weeks in advance. We encourage you to sign up early.

Cookin' in the Cafeteria

Week of January 26 — 30, 1987

Monday — Cream of Celery Soup; Braised Beef Ribs, Chicken a la King, Enchiladas w/Chili, Italian Cutlet (Special); Navy Beans, Brussels Sprouts, Whipped Potatoes. Standard Daily Items: Roast Beef, Baked Ham, Fried Chicken, Fried Fish, Chopped Sirloin. Selection of Salads, Sandwiches and Pies.

Tuesday — Beef & Barley Soup; Turkey & Dressing, Country Style Steak, Stuffed Cabbage (Special); Corn Cobbette, Okra & Tomatoes, French Beans.

Wednesday — Seafood Gumbo; Catfish w/Hush Puppies, Roast Pork w/Dressing, Pepper Steak (Special); Broccoli, Macaroni & Cheese, Stewed Tomatoes.

Thursday — Cream of Tomato Soup; Beef Tacos, BBQ Ham Slice, Hungarian Goulash, Chicken Fried Steak (Special); Spinach, Pinto Beans, Beets.

Friday — Seafood Gumbo; Liver & Onions, Deviled Crabs, Roast Beef w/Dressing, Tuna & Noodle Casserole (Special); Whipped Potatoes, Peas, Cauliflower.

Week of February 2 — 6, 1987

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, Wieners & 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 February 9 — 13, 1987

Monday — Beef & Barley Soup; Beef Chop Suey, Breaded Veal Cutlet w/Cream Gravy, Grilled Ham Steak, Wieners 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, 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.

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.