NASA
Lyndon B. Johnson Space Center

Space News Roundup

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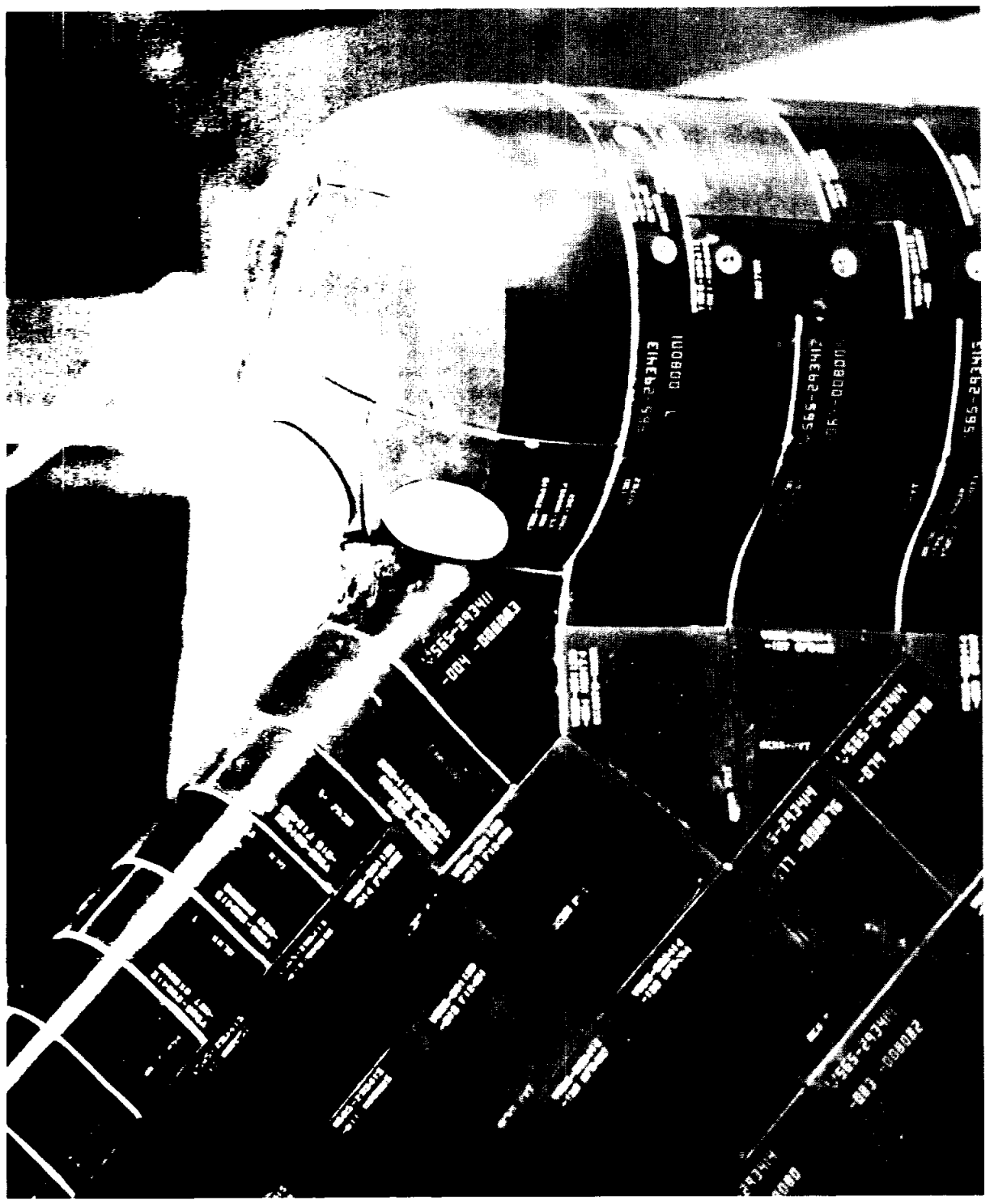

The new business end of the Orbiter *Columbia's* vertical stabilizer will be tried out for the first time during the landing of the STS 61-C mission. The pod houses the Shuttle Infrared Leeside Temperature Sensor, SILTS, a device which will help make the next generation of air and spacecaft possible.

Boeing Aerospace chosen for FEPC

NASA nas chosen Boeing Aerospace Operations (BAO) of Cocoa Beach, Fla., for award of the Flight Equipment Processing Contract (FEPC) at the Johnson Space Center.

BAO has the Wornick Co. of McAllen, Texas, as a subcontractor.

The three-year award, with a two-year priced option, will be for services beginning in January 1986 at an estimated total cost of approximately $76.5 million. The contract also includes provisions for two additional, unpriced five-year extensions.

JSC will manage the work under a cost-plus incentive/award-fee contract arrangement which includes an incentive fee for sound cost management and an award fee based on performance.

BAO will assume responsibility for receipt, launch preparation and post-launch activities relating to the overall processing of crew-related flight and flight-type equipment required to support the Space Transportation System program. The primary function of the flight equipment is to support the flight crew in its daily operation of the Orbiter vehicle. The contractor will process and resupply the individual equipment items in preparation for launch and operate and maintain support equipment required for the successful processing of the equipment. Included are: Extravehicular Mobility Units (space suits), food and medical systems, communications equipment and other miscellaneous items.

Hamilton Standard Division of United Technologies Corp., Windsor Locks, Conn.; ILC, Dover, Del.; and RCA Service Co., Cherry Hill, N.J., will remain as suppliers for spacesuit equipment and communications equipment.

This selection represents the consolidation, into one contract, of work being performed by 16 firms under 19 contracts.

In addition to BAO, final negotiations were conducted with Hamilton Standard Management Services, Inc. of Houston.

STS 61-N crew named

The National Aeronautics and Space Administration has announced the flight crew for a dedicated Department of Defense mission scheduled for September 1986.

Mission 61-N, set for launch no earlier than September 4, 1986, will be commanded by Lt. Col. Brewster H. Shaw, Jr. It will be Shaw's third Shuttle mission. He served as pilot on STS-9, the first Spacelab mission, and as commander of flight 61-B which launched November 26.

Pilot on 61-N will be Cdr. Michael J. McCulley. Mission specialists named are Cdr. David C. Leestma, Maj. James C. Adamson, and Maj. Mark N. Brown. A DOD payload specialist will be announced later.

Leestma will be making his third space flight. He was a mission specialist on 41-G in October, 1984, and is scheduled to fly on 61-E, the ASTRO-1 flight, in March, 1986.

It will be the first flight for McCulley, Adamson and Brown. All are members of the 1984 astronaut class.

All of the crew members are military officers. Shaw and Brown are in the Air Force. McCulley and Leestma are Navy officers and Adamson is an Army officer.

Space Telescope trades launch dates with EOM

NASA has switched the launch of the Hubble Space Telescope (HST) with the launch of the first Earth Observation Mission (EOM). Under the new schedule, the Space Telescope will be launched on Oct. 27 and EOM will lift off on Aug. 18, 1986.

Crews assigned to the missions will also switch to stay with the payloads for which they have been trained.

The change was made to provide additional contingency time for the delivery of the Space Telescope from the West Coast, through the Panama Canal to the Kennedy Space Center. While satisfactory progress is being made by the major contractor, Lockheed Missiles and Space Co., Sunnyvale, Calif., to support the earlier launch date, it was deemed desirable to provide the added contingency time to insure that no slips occur in the Space Shuttle launch schedule, according to NASA Headquarters.

A concurrent benefit obtained as a result of the change will be a significant improvement in the scientific return from the EOM. Dr. Marsha Torr, EOM mission scientist, Marshall Space Flight Center, said that the Earth Mapping Metric Camera Experiment will benefit significantly from a higher sun angle and an improved chance of better weather over the primary land masses of interest in the northern hemisphere. The astronomy and plasma physics experiments also will gain from additional observing time provided by longer periods of orbital night in the southern hemisphere, Torr said.

James B. Odom, HST project manager at Marshall, emphasized that the telescope is presently on its approved schedule for delivery to Kennedy. "We still intend to deliver the Hubble Space Telescope to Kennedy on June 21 as is currently planned," he said.

The Space Telescope, NASA's premier unmanned optical observation, will be deployed into orbit from the Space Shuttle *Atlantis* above the Earth's obscuring atmosphere. From its Earth orbit, it will see seven times farther and with 10 times more clarity than telescopes on Earth. It also will see objects 50 times fainter than now visible.

The Orbiter *Atlantis* will be used for both missions as previously planned. Performance characteristics of the newest orbiter will insure attainment of the altitude requirements of both missions.

The EOM and Telescope projects are managed by Marshall for NASA's Office of Space Science and Applications, Washington, D.C.

Preliminary 51-B/Spacelab 3 results released

After almost nine months of analyzing the massive amount of information returned from the STS 51-B/Spacelab 3 mission, scientists gathered at the Marshall Space Flight Center in December to present some significant preliminary findings.

"The mission has made some major contributions in the physical and life sciences," said Dr. George H. Fichtl, Spacelab 3 Lead Scientist. "We have gained a lot of insight for future Spacelab and Space Station research. And I think we can now say that space research is becoming routine."

"Initial results from the three Spacelab 3 crystal growth experiments are very promising," Fichtl said. The two triglycine sulfate crystals and the single mercuric iodide crystal grown aboard the space laboratory were at least as good as the best crystals grown on Earth to date. And they may actually be better, but additional testing will be required to confirm this, according to Fichtl. "This is of major significance, because normally, we must grow between one and two thousand crystals on Earth to get just one crystal that is equal to the quality of those grown on Spacelab 3. Mercuric iodide crystals have application in X-ray detectors, and triglycine sulfate crystals are used in infrared detectors."

Additionally, the methods used to grow the crystals on orbit were proven during the flight. Triglycine sulfate crystals were grown from a solution, as part of an experiment provided by Alabama A&M University in Huntsville. The mercuric iodide crystal was grown using a vapor transport process in an experiment provided by EG&G Energy Measurements Inc. of Goleta, Calif.

The third crystal growth experiment, which also used mercuric iodide and was provided by France, performed as expected and added to scientists' knowledge about the process of crystal nucleation. This is a difficult process to study on the ground because of gravity-induced convection, according to Fichtl.

The fluid physics experiments also provided new information. The Drop Dynamics Module that was repaired during the flight by principal investigator and payload specialist Dr. Taylor Wang enabled researchers to do some experiments not possible on Earth. Results of the experimentation confirmed some of the theories on how drops behave when rotated. This was the first opportunity to test some theories posed centuries ago by scholars, including Sir Isaac Newton.

The experiment also proved that the use of sound waves is a viable technique for manipulating liquids in a microgravity environment. This has direct application to containerless materials processing in space. This technique allows the processing of materials without incurring the contaminating effects introduced by the container. From the flight, it was learned that the "acoustic bottle" or "crucible of

(Continued on page 2)

Space News Briefs

Second source for SRMs proposed

NASA has proposed developing a second source for the Space Shuttle's solid rocket motor (SRM). Four firms have expressed an interest in becoming that second source. The firms are: Aerojet Strategic Propulsion Co., Sacramento, CA; Atlantic Research Corp., Alexandria, VA; Hercules, Inc., Wilmington, DE; and the Chemical Systems Div. of United Technologies Corp., San Jose, CA. NASA determined in October 1984 that SRMs were one component where second sourcing might benefit the government as envisioned by the Competition in Contracting Act of 1984. However, an assessment also showed that any potential second manufacturers would have to qualify as producers of the SRM, and the total cost of qualifying could be up to $100 million. Federal budget constraints will preclude NASA from funding that amount, but with continued interest by the four firms, the Agency is willing to issue a formal Request for Proposals. "Industry must, however, be willing to respond with the full knowledge that NASA will provide no firm guarantee of recovery of their qualification costs," a NASA statement said. "If industry is so willing, and where competition remains available... NASA intends to proceed with establishing a second source." Doing so is seen as a way to keep costs down on the SRMs, as well as to broaden the nation's industrial base for producing large solid rockets. The agency has outlined these specific conditions to the interested firms. A positive response, the statement said, would provide the basis for a formal RFP.

Kraft papers donated to Virginia Tech

Former JSC Director Dr. Christopher C. Kraft, Jr., a 1945 graduate of Virginia Polytechnic University, has donated a collection of his papers to the university's library. The extensive collection includes speeches, technical notes and correspondence. Drawn from 37 years of experience in the aerospace field, the collection fills a space of 30 cubic feet. It will be housed in the special collections department of the library.

New crystal furnace to be built

NASA and the International Space Corp. of Melbourne, FL, have agreed to develop a high temperature furnace for producing various types of infrared semiconductor crystals in space. Called the Normal Freezing Furnace, it will use a directional solidification crystal growth process similar to that which has been employed on past Shuttle missions. The agreement calls for six to eight flights aboard the Shuttle. New space manufacturing techniques are seen as one way to enhance the U.S. position in the highly competitive worldwide semiconductor market.

Bulletin Board

Faget to address AIAA

Dr. Maxime A. Faget will discuss operation of the Industrial Space Facility when he addresses a dinner meeting of the Houston Section of the American Institute of Aeronautics and Astronautics Jan. 23. Joining Faget for the presentation will be Caldwell C. Johnson, Chief Engineer for Space Industries, Inc. The program, to be held Jan. 23, begins with a social at 5:30 p.m., dinner at 6:30 and the program at 7:30 p.m. The cost is $8 for members and spouses, $10 for non-members and $7 for students. The reservation deadline is noon Jan. 20. To make reservations, call LaRue at 333-4150, x267, Debbie at 333-0701 or Carol at 280-1500, x3499.

NMA to meet Jan. 22

The next meeting of the JSC Chapter of the National Management Association will be held Wednesday, Jan. 22 at the Gilruth Recreation Center. The social hour will begin at 5 p.m., followed by a dinner at 6 p.m. For more information, call Lupita Armendariz at x3041.

Viking Project reunion planned

The year 1986, besides being one of the most active years in space science since the late 1970s, will also be the tenth anniversary of the Viking Project landings on Mars. Accordingly, a tenth anniversary reunion has been scheduled for July 19, 1986 at the Langley Research Center. For more information, contact Jesse Timmons, Mail Stop 433, NASA Langley Research Center, Hampton, VA 23665. Timmons can also be reached at (804) 865-4621.

BAPCO to meet Jan. 21

The Bay Area PC Organization, BAPCO, will hold its next monthly meeting at 7 p.m. Jan. 21 at the Holiday Inn on NASA Road 1. For more information, call Earl Rubenstein at x3501 or Jack Calvin at 326-2983.

Gilruth Center News

Call x3594 for more information

Defensive driving — Learn to drive safely and qualify for a 10 percent reduction in your auto insurance for the next three years. This class meets Jan. 18 from 8 a.m. to 5 p.m. at a cost of $20 per person. Space is limited.

Instructors needed — If you are proficient in teaching a leisure class which may be of interest to JSC employees, the Rec Center could use your services. Call Helen Munk at x3594 to discuss details.

Beginning shorthand — Learn a multi-purpose skill in this 6-week course which begins Feb. 20. The class meets from 5:30 to 8:30 p.m. at a cost of $85 per person.

Word processing — Work with Wordstar and a variety of word processing machines in this course which begins Feb. 20 and runs from 5:30 to 8:30 p.m. The cost is $190 per person.

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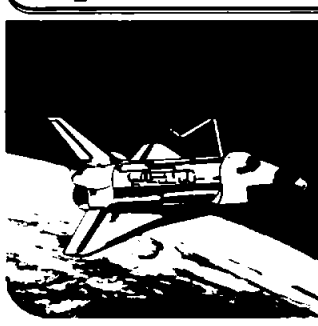
Editor Brian Welch



PROFS now includes JSC phone directory

The Data Processing Systems Division (DPSD) has implemented the newly designed NASA JSC on-line phone directory (OPD), available via Professional Office System (PROFS).

According to User Support Branch Chief Charles Mains, PROFS access will provide users with ready access to a JSC telephone directory containing up-to-date phone numbers and locations of JSC and on-site contractor personnel.

Access to the OPD can be obtained from the PROFS main menu via the PF10 function key, configured as "On-Line Phone Directory." It has been noted by PROFS Administrator Charlotte Owens that users who had personalized their PROFS menus prior to OPD implementation would not have received the PF10 configuration with the initial OPD release. Users can access the directory, however, by typing OPDLOOK on the command line of PROFS main menu or they can call the Help Desk to make arrangements for the new PF10 configuration.

Personnel are listed alphabetically in the directory along with their NASA organization code, building/room location, and telephone number. From the OPD menu, additional function keys are available to sort data by name and organization, search by name and organization, access "Help" screens, and request directory updates.

The OPD contains JSC and on-site contractor employee data as submitted by their respective companies. Information is the same as that which is obtained from NASA telephone operators. Directory information can be modified quickly and easily through function key access to the special OPD change request form. A simple procedure is used for completing this on-line form and sending it via PROFS to the FD34/Telecommunications Services Office for immediate processing. The OPD will maintain a current listing of the JSC telephone directory as long as FD34 is provided locator information through the OPD change form or by normal procedures (JSC Form 149).

A help screen for use of the on-line change form is available through the OPD menu along with an additional help screen for operation of the directory system itself. Employees are reminded, however, that the OPD is only as good as the information submitted by employees via the on-line system or form 149.

DPSD feels that the PROFS OPD should greatly improve the integrity and accuracy of personnel locator information. DPSD Division Chief Milo Keathley said DPSD will strive to improve the system for maximum benefit to users. He added that several enhancements already are being planned, one of which includes directory access from additional host computers.

The OPD is an easy-to-use menu-driven system designed with on-line assistance. The on-line instructions should be adequate for using OPD; but if you need additional information, you may call the Help Desk at 280-4800. So, go ahead — log onto PROFS and try the system.

'Observer' and 'Magellan'

Mars, Venus probes named

NASA has selected official names for two planetary missions scheduled for flight in 1988 and 1990.

A mission to map the planet Venus, previously known as Venus Radar Mapper, is now called Magellan. The Mars Geoscience/Climatology Orbiter is now named Mars Observer.

The Magellan mission will map the entire surface of planet Venus for the first time, using a synthetic-aperture radar instrument. The radar — which can image the surface despite the cloud cover that enshrouds Venus — will map the surface with subkilometer resolution adequate enough to identify geological processes and provide information that will lead to an improved understanding of the planet's evolution. The spacecraft will orbit the planet about once every 3 hours, coming as close as 250 kilometers from the surface.

The Magellan spacecraft, attached to a Centaur-G upper stage, is scheduled for launch from the Space Shuttle in April 1988 and arrival at Venus in July 1989.

The name selection resulted from a search conducted by the NASA headquarters Office of Space Science and Applications, aided by The Planetary Society.

The Mars Observer mission will map the planet Mars to determine the global elemental and mineralogical character of its surface and to investigate the Martian climate, both present and past.

The Observer spacecraft will be adapted from an existing, production-line type of Earth-orbital spacecraft to reduce costs. This mission will be the first in a series of low-cost planetary observer missions using this approach.

Use of the generic Observer name for a series of related space missions is in keeping with the practice established by NASA's Mariner, Pioneer and Explorer series of missions.

Mars Observer is scheduled for launch in August 1990 from the Space Shuttle. It is scheduled to arrive at Mars in August 1991.

The Magellan and Mars Observer projects are managed by the Jet Propulsion Laboratory, Pasadena, Calif., for NASA's Office of Space Science and Applications.

Spacelab 3 results

(Continued from page 1)

sound" in which the droplet is contained, had much better characteristics than had been theorized. "And this is good news for containerless processing," Fichtl said.

Drop dynamics experiments confirmed theories on how drops behave when rotated slowly. However, experiment data violated some basic theories relating to the behavior of drops being rotated at higher rates. It was found, for example, that drops tend to transition (change) to a new shape at rotation rates lower than had been predicted. "All this tends to indicate that some of our theories may need to be modified," said Fichtl. The Drop Dynamics Module experiment was developed by the Jet Propulsion Laboratory.

Researchers for the Geophysical Fluid Flow Cell Experiment reported that all 102 hours of their data looked good, and is expected to lead to a better understanding of the dynamics of stellar interiors and planetary atmosphere.

Many of the results confirmed existing theories of convection. It was noted by the research team, however, that at higher heating rates — such as those that may be found on the Sun — the data showed some interesting and significant departures from what had been anticipated. Since the mission, researchers have been able to successfully develop computer models of some of this new information.

"In the area of atmospheric research and astronomy, the Atmospheric Trace Molecules Spectroscopy (ATMOS) experiment, sponsored by the Jet Propulsion Laboratory, also produced some fantastic results," Fichtl said. For the first time, researchers were able to simultaneously measure the concentrations of chemical compounds associated with carbon, nitrogen, oxygen and other chemical cycles in the atmosphere. This will provide a better insight into the chemical processes that govern the distribution of minor and trace gases in the atmosphere between 10 and 100 kilometers.

Many of the results confirmed existing theories of convection. . . researchers have been able to successfully develop computer models of some of this new information.

The instrument worked so well that it was able to record concentrations of gases as low as parts per 100 billion. This is significant, because it is the first time such sensitive measurements have been made. And, for the first time, researchers were also able to detect and measure traces of nitrogen pentoxide. This compound had heretofore been undetected in the atmosphere, but was predicted to be present.

The aurora experiment recorded data on every planned pass, and accumulated 274 color photographs and five hours of video recordings. The spectacular pictures that are still being analyzed have already revealed some structures not previously observed.

The Studies of the Ionization of Solar and Galactic Cosmic Ray Heavy Nuclei (IONS) instrument reportedly worked well, and research teams in India, the sponsoring nation, are still processing their data.

The one-day science conference was the first review of the results of the mission since its launch in April. The Spacelab 3 mission was the first operational mission of Spacelab. The mission carried 15 experiments in five areas of research.

Notice to Retirees

Retired JSC employees who receive the *Space News Roundup* should contact the Personnel Office, not the *Roundup* office, for change of address notification. Send change of address information to Personnel Office, Mail Code AH76, NASA Johnson Space Center, Houston, TX 77058. Please allow 60 days for processing.

Uranus becomes a place

During the unlikely span of only half a day, the space probe Voyager 2 will, on January 24, learn more about the planet Uranus than has been gleaned in the past 205 years.

Now well into its investigations of the seventh known planet from the Sun, Voyager is almost two billion miles from Earth and eight years into its perpetual journey. The encounter, which began Nov. 4, 1985, will continue through Feb. 25. During that period, the spacecraft's 11 instruments will perform close-range studies of the planet, its five known satellites and nine rings. The probe also will search for a planetary magnetic field, new satellites and new rings.

Voyager's trajectory, which will eventually take it out of the Solar System, will send it flying past Uranus for a closest approach at noon CST Jan. 24, some 56,000 miles from the planet's blue-green cloudtops.

From that point, Voyager's trajectory will be bent again, just as it was at Jupiter and Saturn, for the long trip to Neptune. Arrival at that close cousin of Uranus is scheduled for Aug. 24, 1989.

Because Uranus is about twice as far from Earth as Saturn, the rate at which Voyager will be able to transmit data to Earth is slower. Normally, this would have seriously limited the number of photographic and other data that could be sent back, but engineers and scientists have programmed one of the Voyager 2 computers to compress and encode the imaging data in order to return 200 images each day.

In addition, several antennas at each of NASA's Deep Space Network (DSN) sites will be electronically linked to increase their receiving power, allowing more of Voyager's faint radio signal to be captured. This technique, called arraying, greatly enhances the overall strength and quality of the signal received. Antenna arraying will be used at the Australia, Spain and California DSN complexes.

Most of the key data obtained during the Uranus encounter and all of that during the closest approach will be received by the antenna complex in Canberra, Australia.

The Canberra complex, which also will be electronically linked with the Australian government's 210-foot Parkes Radio Astronomy Observatory, is critical to the encounter for several reasons. The spacecraft track will be almost directly above Canberra during the closest approach, allowing up to 12 hours of coverage of Voyager 2 daily. As a result of this geometric relationship, the quality of signal received from Voyager will be greater since it will pass through a thinner slice of the Earth's atmosphere than if received at either the Spain or California stations.

Uranus is one of the giants of the Solar System, but even at about 64 times the volume of Earth, the planet is so far away that it can't be seen without powerful binoculars or a telescope. The light that reaches Earth from Uranus is 1,600 times fainter than that received from Jupiter.

Uranus and Neptune are near twins: their compositions are similar, and they are almost the same size. Uranus is 31,800 miles in diameter and Neptune is 31,000 miles in diameter.

The most distinctive feature of Uranus is its unusual rotational position, tipped over on its axis. Scientists theorize that early in the planet's history, a collision with another planet-sized body might have tilted Uranus from a vertical or near vertical axis to the present orientation, with its 98-degree axial tilt.

Compared to Earth, with a 23.5-degree axial tilt, the seasons on Uranus must be quite extreme. One pole spends half a Uranian year (or 21 Earth years) in sunlight, while the other pole is in darkness.

The length of a Uranian day is uncertain. Direct measurements indicate it is either 16 or 24 hours, while theoretical models set the day closer to 16 hours.

Another question mark for Uranus is the nature of its weather. One key to understanding a planet is determining what drives the weather systems, and one major element of weather is the amount of heat a planet emits compared to the amount it receives from the Sun.

Jupiter, Saturn and Neptune each have significant internal heat sources. Each planet emits more energy than it absorbs from the Sun. Uranus, on the other hand, shares at least one characteristic with Earth in that both planets emit very little heat of their own making.

Every planet employs some mechanism to distribute the heat it absorbs and the energy it emits. On Earth, sunlight is absorbed mostly at the equator. From there, the oceans and atmosphere distribute the heat north and south to the poles to maintain a global temperature equilibrium.

On Uranus, the southern hemisphere is currently absorbing all of the sunlight coming to the planet, so there may be significant meridional flows—or, atmospheric motions that cross the latitudes like the seams of a baseball—carrying heat from one pole to another.

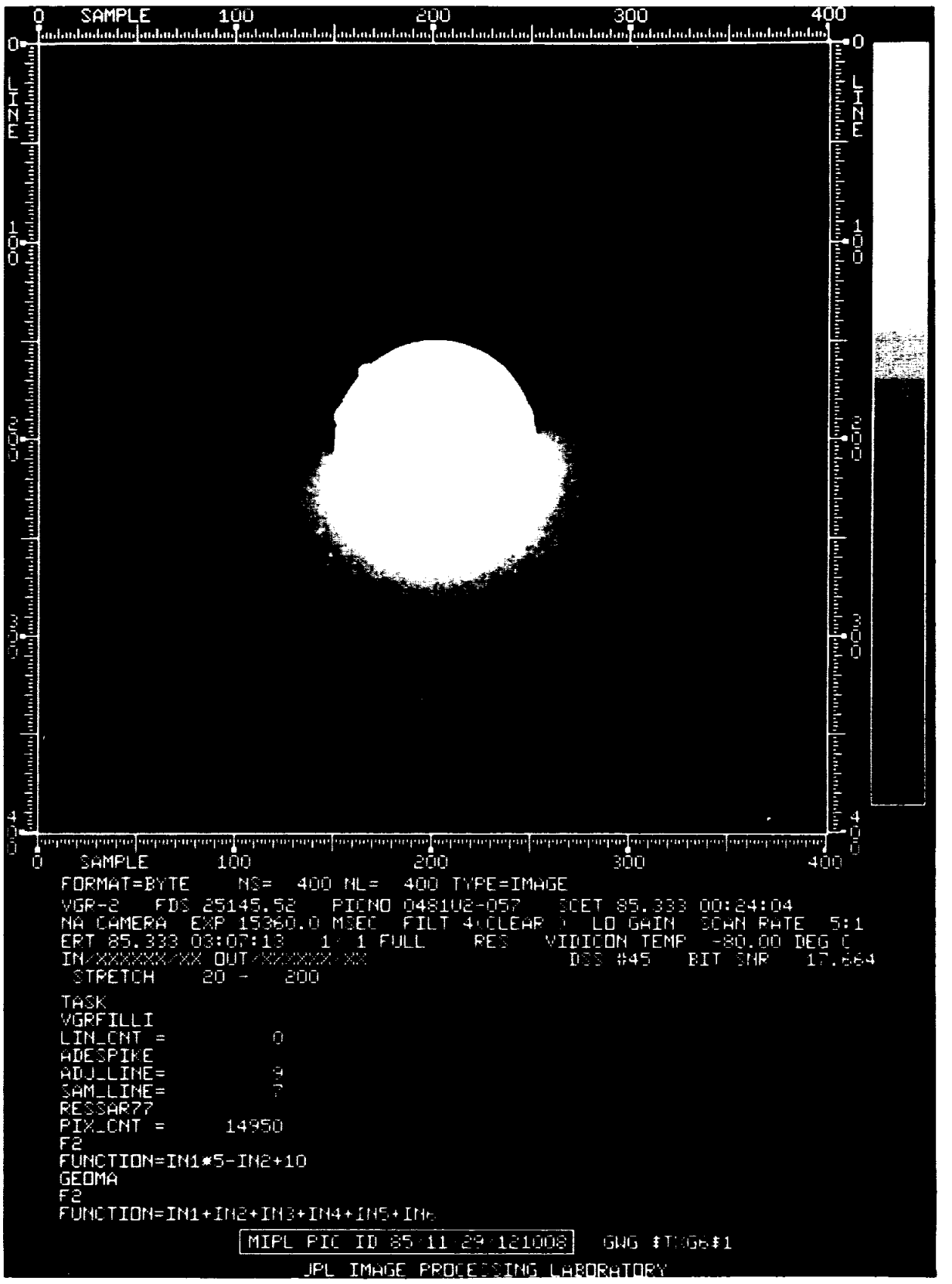
Another mysterious feature of Uranus is the thin ring system. At least nine rings, composed of some of the darkest material in the Solar System, circle the planet above the poles. So far, three of the gas giants have known ring systems. Scientists have identified an arc of material around Neptune, but so far have not been able to perceive a complete ring system.

No one knows if the rings formed with Uranus 4.5 billion years ago, or if they emanate from a more recent development, such as the breakup of a moon.

After observing the rings of Saturn, scientists now expect that small shepherding moons may play a role in the formation of the Uranian ring system. Little, however, is sure about the five known moons. Their sizes and masses are not well determined, nor is their composition well understood.

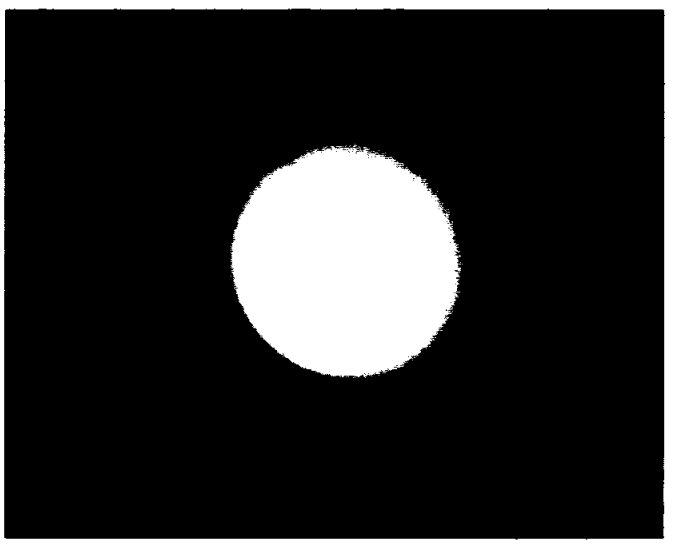
Although considerably smaller than the Galilean moons of Jupiter or Earth's Moon, the satellites of Uranus are among the largest in the Solar System. Closest to the planet and smallest is Miranda, about 300 miles in diameter. Next is Ariel, whose diameter is about 825 miles. Umbriel is the third satellite, with a diameter of about 690 miles. Titania is fourth from the planet and has a diameter of 995 miles. The outermost and largest of the satellites is Oberon, with a diameter of 1,010 miles.

The moons are thought to have icy surfaces, but their features can only be guessed at until late January. But after the Voyager flybys of Jupiter and Saturn, scientists are prepared for the unexpected.



Closing in

At press time, images coming to Earth from Voyager 2 still showed Uranus as a fuzzy blue ball, although more and more definition and features are expected to show up in the next few days. This image, taken Nov. 29, is heavily enhanced by computers and shows the first hint of the Uranian ring system. At present, scientists can confirm nine known rings, but more would not be unexpected. At the speed of light, this image took almost three hours to reach Earth.



NASA TV to cover Voyager & 51-L

Television from low Earth orbit and deep space will be available to JSC employees on the Center's closed circuit television system and on Storer Cable Channel 33.

NASA Select content from Jan. 23 to 29 will include downlinks from Space Shuttle Mission 51-L and daily programming from the Jet Propulsion Laboratory as Voyager 2 flys by Uranus.

Scheduled television during Mission 51-L will feature coverage from launch through landing. Downlinks from the Orbiter *Challenger* will take place mostly in the late afternoon and early evening hours (Houston time) of the mission.

Live television coverage of the Uranus encounter will run from approximately 10 a.m. to 9 p.m. daily. A special feature of the daily JPL programming will be a 1-hour science report summarizing each day's activities. The program will be transmitted at 7 p.m. CST Jan. 23 and 24, and on Jan. 26, 27 and 28. The Jan. 29 program will be 90 minutes long. Significant scientific findings will be reported, including selected segments of real time imagery from the Voyager 2 cameras. Interviews with scientists, computer-generated animation and press conferences will be included.

Scheduled 51-L television includes launch coverage and payload bay views on Orbit 4 during the first Flight Day; a taped replay of the TDRS-B deploy and a survey of the SPARTAN free flyer on Flight Day 2; SPARTAN deploy activities on Flight Day 3; television from inside *Challenger* on Flight Day 4; the SPARTAN rendezvous and capture on Flight Day 5. Two 20-minute lessons from teacher Christa McAuliffe will highlight the last full day in space on Flight Day 6. Coverage of the landing at Kennedy Space Center on Flight Day 7 also will be included.

NASA Select programming during Shuttle missions is often dynamic—unscheduled television can be transmitted at the discretion of the crew or the flight director, and real time events during the mission may also dictate changes in the schedule. To the extent possible, NASA Select programming during the week will be designed to fully cover both the STS 51-L mission and the Voyager encounter with Uranus.

In addition, air-to-ground audio from STS 51-L will be available through the JSC mission transmitter at 171.15 megahertz.

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: Camino South 3-2-2, split bedrooms, FPL, large fenced back yard. Lyn Amann, x4415 or 333-2359.

Rent: Galveston/Tiki Island, furn. new 3 BR home on canal, boat dock, fishing, etc., TV, master bath spa, weekend, weekly or monthly rates. 486-9335.

Rent: Heritage Park 3-2-2, new paint/carpet/stove, near pool, $500/mo. + dep. Sue, 486-9469.

Sale: Piper's Meadow 3-2-2, brick, FPL, garden bath, fans, mini blinds, fenced, large lot, 1,489 s.f., low equity, $79,500. K. Perkins, x3754 or 486-1015.

Lease: Kirkmond South 4-2-2, fenced, formal dining, new paint/carpet, inside util., $525/mo. 482-6609.

Sale: Lake Livingston house, large wooded lot, $18,000 cash or down payment, owner finance at 5%. (817) 281-7384.

Sale/lease: 3-2.5-1+1 townhome, near NASA, low equity, 11.5% FHA fixed, no approval/escalation, owner will consider small 2nd. 333-2636.

Lease: Fairmont Park area, brick 4-2-2, drapes, FPL, fenced, fans, 15 min. to NASA, $475/mo. 486-0462.

Lease: CLC Univ. Trace townhome, 2-2.5-2, all appliances, security system. FPL. Betty Rathbone, 333-4044 or 486-4800.

Lease: Barringer Area 2 BR, fan, miniblinds, W/D hookup, $330/mo. + $100 dep. 480-6742.

Sale: Nassau Bay 3-2-2, all new interior, formals, large fenced yard w/trees, new roof & AC/heat, $105,000. 335-1416.

Lease: Pebblebrook condo, El Lago, 1 BR, 2nd flr., W/D, mirrors, $300/mo. + dep. Lindemann, 488-3300 or 532-2218.

Sale: Bayview 3-1.5-2 brick, 2926 Leroy, $39,900. Gil, x3401 or 559-2603.

Lease: Seabrook 3-2.5-2, fenced, large lot, appliances, $600/mo. + dep. 474-2638.

Sale/lease: 1 BR condo, near NASA, miniblinds, refrig., W/D, FPL, patio, pool, sauna. 326-2282.

Sale/lease: Webster 1 BR condo, W/D, fan, appliances, 2nd flr., covered parking, $280/mo. or $30K. Richard, 280-1592 or 487-5685.

Sale: Memorial Point, Lake Livingston lakeview lot, near pool & tennis, restaurant & marina, paved streets, util. 946-3945.

Sale: Country home off FM 518, 3-2, huge, between Kemah & League City, $95K. 334-1883.

Sale: Alvin 3 BR home, den, study, FPL, large lot, quiet, 9% assume, $56K. Kaye, x5222 or 585-3570.

Sale: Heritage Park 3-2-2, nearly new, fans, drapes, ex. cond., finance avail., $62,900. 996-9628.

Sale: Baywind II 2-story condo, ex. value, 2-2.5, newly remodeled, extras, $46,000. Claudia, x3601 or 462-4065.

Sale: Forest Bend 3-2-2A, new paint, fenced, landscaped, trees, covered patio, cathedral ceilings, $57K, assume. Jeff, x6233 or 996-8721.

Sale/lease: Friendswood 3 BR home, ex. cond., incredibly low at $43,000 or $500/mo. Bill, 333-6678 or 367-4562.

Sale/lease: Gatsby 1-1 condo, near College of Mainland, 14 min. to NASA 1, all appliances, covered parking, pool. Valerie, x2208 or (409) 935-1149.

Lease: Friendswood 3-1.5, fenced, $475/mo. w/option to buy. Ron, 480-8101 or 326-3106.

Cars & Trucks

'78 Chevy 1/2 ton pickup, 1 owner, longbed, shell, 6 cyl. gas miser, 3 spd., 70K mi., $2,495/trade. 280-0454.

'83 Ford Escort, 2 dr. hatchback, PS, PB, AC, 5-spd., stereo, $3,800. 333-9678 or 481-3889.

'76 Ford LTD, 2 dr., AC, PS, PB, cruise, no rust, good cond., Michelin tires, $1,750. 585-8308.

'77 Chevy Luv pickup, camper top, $1,200. Mike, x3314 or 585-8055.

'80 Toyota Corolla station wagon, auto, AC, AM/FM, roof rack, below NADA at $2,750. 474-2981.

'75 Chevy Malibu station wagon, V-8, AC, PS, PB, runs good, valve job, new brakes, no rust, $975. Norris, x3851 or 488-2276.

'78 Thunderbird, velour seats, clean in & out, AC, $2,000. 486-1324.

'84 Audi 5000S, sunroof, auto, AM/FM/cassette, 23K miles, must sell, $13,250. Ron, 480-8101 or 326-3106.

'74 Volvo station wagon, 145 series, new paint, rebuilt auto trans., runs well, AC, $1,000. Sam, 538-4206.

'72 Mercury Capri. Charles, 280-2284 or 482-6539.

'71 Porsche 914, 1.7, new red paint, very clean, dependable, runs well, new Monza exhaust, many extras, $3,895. Steve, 333-6037 or 482-0208.

'70 Thunderbird, runs well, needs body work, best offer. Marge, x5505 or 482-2060.

'80 Olds Cutlass LS, V-6, 4-dr., PS, PB, AC, AM/FM/cassette, tilt, cruise, new tires, ex. cond., reliable, $2,800. Nelda, x5011, or 532-1403.

'83 Mitsubishi Starion Turbo, 5-spd., AM/FM/stereo, cruise, ex. cond., $7,995. 488-1042.

'82 Chevy Citation, 4-dr., PS, PB, AT, AM, good tires, $3,500 OBO. 534-2891.

'76 Ford LTD, good condition, $800. 487-0155.

'83 Pontiac Bonneville, 4-dr., V-8, many extras, ex. cond., $5,850. Mike, 280-8403.

'77 Buick Regal, 4 dr., AC, radio, clean & reliable, see to appreciate, $1,595. Margaret, x4231 or 526-7201.

'82 Olds 98 Regency, diesel, loaded, clean, runs well, 38K mi., below book at $5,450. 326-3370.

'75 Bricklin, collector's edition, 351 Ford engine, auto, 48K mi., $12,900 OBO. Don, 280-6307 or 554-6205.

'80 Turbo Trans Am, T-tops, AC, AT, PS, PB, pwr. windows/locks, tilt, cruise, alarm, 58K mi., $5,800. Mike, x4606 or 488-2185.

'83 Dodge custom van, PS, PB, AM/FM/cassette, tilt, 38K mi., will consider trade for equity or $9,500 OBO. Runnels, x4739 or 484-4598.

'78 motorhome, 19', no generator, 33K mi., $7,450; '70 VW Beetle, auto stick, new paint/brakes, $1,250. 482-8457.

'52 Studebaker, 1-ton dump truck, good working condition, $1,650. 486-0462 or 477-7637.

'81 Mazda 626, 2 dr. spt. cpe., 45K mi., ex. cond., AM/FM/cassette, $4,000. Weber, x5511 or 486-0265.

Boats & Planes

'80 Monark bass boat, 50 HP Evinrude, troll mtr., depth finder, galv. Dilly trailer, $3,700. Don, 280-6307 or 554-6205.

'85 Wetbike, 800cc. Bullock, 326-4949.

Sportcraft 23', 165 HP I/O, ex. cond., many extras, $5,500. Bill, 486-0581.

Cycles

'80 Honda 500cc cycle, shaft driven, water cooled, runs well, 10K mi., $500. Darrell, 486-4909.

Girl's 10-spd. all pro bike, 24", like new, $50. Lynda, x4476.

'71 Suzuki T125, good starter bike, shop manual, needs new accelerator cable, $100 firm. Mark, x5056 or 334-6681.

'71 Honda CB450, 2,400 mi., Wixom fairing, crash bars, carrier, mint, $1,100. 486-9335.

'75 Honda 750F Supersport, low miles, ex. cond. Bullock, 326-4949.

'80 Suzuki 850 GSL, fairing, luggage rack, ex. cond. Clint, 488-8919.

Audio/Video & Computers

Ink jet printer. Glenn, 488-9005 days.

Zenith (JVC) camcorder w/2 batteries & adapter, $650; portable RCA VCR (VGP170), 2 batteries & case, $450. 488-1042.

Magnavox 25" TV, stereo, 8-track tape, AM/FM radio, all in beautiful wood cabinet, $150. Shirley, x2486 or 488-6310.

Akai GX-635D open reel tape deck, auto reverse, 6-heads, like new, $650 OBO; 7 new 10" tapes & reel, $150 OBO. Blaine, x2411 or 488-4890.

Atari 800 computer, disk, printer, modem, color monitor, software and games, desk, more, $699. Bob, 474-4336.

IBM PC jr parallel printer attachment, $70. Dave, x2411 or 333-4852.

EPI 201 floorstanding loudspeakers, $225/pair. Musgrove, x3566 or 488-3966.

Atari video game, like new, storage case, 20 games, $200. Ed, 480-0273.

Two new printers, TRS-80 DWP-210 and TRS-80 DMP110, $600 for both. 538-1579.

Cobra 25GTL 40-ch. CB, antennas included, $75. Ed, x5489 or 480-0273.

Whistler radar detector, 1 yr. old, never used, ex. cond., $170 OBO. 522-7012.

TRS-80 32K color computer, cassette, books, $450 OBO. 532-1155.

Household

Antique dining room table and 4 hand carved leather covered chairs, $450; antique china cabinet, dated 1875, $375. 488-5564.

Dinette set w/4 chairs, $250 OBO; microwave stand, $25 OBO; buffet bar, $25 OBO. 486-5342.

Tappan refrigerator, 22 cu. ft., side-by-side, icemaker, runs well, $125. 474-4336.

Wicker loveseat & matching chair, ex. cond., $45; 941-5908.

Sofa bed, $150; 3 section sofa, $95; desk, $25; BBQ grill, $25. 482-6609.

Four dinette chairs, ex. cond., $5 ea. Marge, x5505 or 482-2060.

Full size mattress, box spring & frame, ex. cond., $125. 554-4133.

Maple 5-drawer chest, good cond., $50; student desk and chair, $35. 944-6457.

Electric dryer, runs, as is, $30. 559-2745.

Six woven wood window shades, std. size, ex. cond., $25 ea. Dee, 280-6956 or 488-0416.

Bissell shampoo machine w/scrub, polish & carpet brushes, $15; Samsonite ladies makeup case, $30; Lenox Montclair china, 6 dinner plates, $15 ea.; Zenith 19" B&W TV, $35. Suzette, x5018.

Foam backed draperies, 72" × 61", like new, $10. Ed, x5489 or 480-0273.

Beige couch, $75; 6-pc. living room set, gold, $250; 12" B&W TV, still in box, $45; used 12" B&W TV, $25; stereo tuner and speakers, $120. Mark, x6101 or 486-0909.

Refrigerator, $100; washer, $50; both in good cond. 558-3710.

Sears heavy duty dryer, 5 yrs. old, $100. 488-6822.

Two pc. sectional, $100; chair & ottoman, $15; double bed, complete, $50; queen bed, complete, $35; bentwood rocker, $10; antique oak ice box, ex. cond., $300. Donna, x2708 or 481-0679.

Drafting table, 3' × 4', wood w/aluminum T-square guides, plus drafting chair & T-square, $75. Liz, x4596 or 280-8831.

Musical Instruments

Reconditioned upright piano, $400. 487-0155.

Fender dual showman 100 watt guitar amp w/4 × 12 speaker cabinet, $350. Galen, x3576 or 332-8837.

Hondo Les Paul copy guitar & Peavey Decade amp, $200; dozens of albums for sale. Alan, x2651.

Wanted

Want roommate for 3 BR home, 12 mi. from NASA, full privileges, bills paid, $250/mo. Runnels, x4739 or 484-4598.

Want roommate for large townhouse near NASA, large BR w/private bath, cable TV, FPL, W/D, extras. Clint, 488-8919.

Want roommate for large League City house, W/D, TV, refrig., $200/mo. + 1/3 bills. Galen, x3576 or 332-8837.

Want sofa or day bed, in good cond. 554-4133.

Want roommate for 3-2-1.5 brick home in League City, furnished, no smokers please, $210/mo., bills paid. Keith, x3643 or 332-8251.

Want ride or carpool from Hwy. 6, Algoa/Santa Fe, to NASA. Rita, x6105.

Want to buy electric trains. Don Jeffers, x2449.

Want used deer rifle, bolt action preferred. Gardner, x4722.

Want roommate(s) to share 4 BR home in Camino South, $300 + 1/2 util. 480-8210.

Want roommate to share furnished 3 BR home in Meadowgreen, W/D, cable, VCR, fan, FPL, $225 + 1/3 util. 480-5752.

Want golf items for personal collection, memorabilia, clubs, books, etc. Trebes, x6313.

Pets & Livestock

Female miniature dachshund, 3 mo. old, loves children, adorable, great gift, $50. Shirley, x3210 or 338-2845.

7-mo. old black doberman, AKC, ears clipped, shots, moving, must sell, $100. Sharon, x5212 or 5287.

5, 10, 20, or 30 gal. aquariums and various supplies. Ray, x6327 or 554-5434.

Free puppies, part Labrador, born Nov. 29. Karen, x4866 or 947-2025.

Miscellaneous

Snow chains, 2 pr., 15" and 14", never used, $25 ea. or $45 for both. Don, x4739 or 482-7102.

Honey and pecans. Clarence Blume, x5159 or 554-2911.

Tabletop router, 1 HP 120 VAC motor, $100 OBO. Steil, x5056.

Jason Model 313D 60mm astronomical refractor w/all accessories, parts for 8" reflector also, $100. Williams, x2781.

Ride West Loop park and ride vanpool to JSC. Heetderks, x4651.

100 National Geographics, $20 for all; formica tabletop, 2 chairs, $55; metal drop leaf typing table, $25. 488-5564.

Garmont Omnilite ski boots, women's size 9, black, almost weightless, $40 OBO. Karen, x6156 or 520-8348.

Two Uniroyal WSW radials, R185-13, $15 ea., both for $25. 488-8105.

6" bench grinder, $25; two Ford van bench seats, $100 ea. or $180/both; fur alpaca rug, 4' × 6', $225. 482-8457.

Ski Park City w/Clear Lake Ski Club, March 8-15, $650/person. 333-2636.

Bethany camper, sleeps 5. Charles, 280-2284 or 482-6539.

1890 Lord & Taylor steamer trunk, $79/trade. 280-0454.

Men's snow skis, bindings, $100 OBO; Sanyo microcassette recorder + 5 tapes, $75 OBO. Blaine, x2411.

5 mag wheels for VW Beetle, $15 ea. or $60 for all. Mark, x5056 or 334-6681.

Wilson golf clubs, 10 irons, 3 woods, balls, shoes, bag, $95. Dave, x2411 or 333-4852.

3 Goodyear GT G70-15 raised white letter tires, good cond., $75 OBO. Henry, x7484 or 554-6803.

One bundle cedar shingles, some ridgerows, $10. Trebes, x6313.

Braun RL 915 flash, professional model, used little, $125. Dunn, x2276 or 472-7478.

Approx. 68 yards carpet w/pad, good shape, $50. Ray, x3954 or 474-4885.

16-ft. trailer, flatbed, elec. brakes, steel radials, ex. cond., Williams, x3338 or (409) 925-7163.

Sears heavy duty weight bench, weights, leg lift, curl bar, $100 OBO. Scott, x5803 or 538-3355.

Cookin' in the Cafeteria

Week of January 13 — 17, 1986

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.

Week of January 20 — 24, 1986

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

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

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

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

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

Week of January 27 — 31, 1986

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

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

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

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

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

Week of February 3 — 7, 1986

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 February 10 — 14, 1986

Monday — Chicken Noodle Soup; Weiners & 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, Weiners & 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.